Somerset County Council

Transport Asset Management Plan 2010

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Contents

Foreword from the Cabinet Member, Environment

I am delighted to be able to introduce Somerset County Council's second Transport Asset Management Plan (TAMP 2010). The County Council has a key commitment to improving Somerset's highways and transport infrastructure and the TAMP represents an important component of this goal by clearly outlining how the transport assets in the County are assessed and managed.

The original TAMP 2009 set a high standard for future versions to build on and it was recognised nationally as a leading example of a Transport Asset Management Plan.

The transport network is the most valuable publicly owned asset managed by the County Council. Through the TAMP elected members will be able to make more informed decisions on investment in the highway network, so that the interests and the needs of the community are best served, the highways and transport service is at the optimum level, and resources are used to maximise benefits in a timely manner both now and in the future.

Somerset's transport assets, which are used by nearly all residents, businesses and visitors to the county, provide a vital contribution to the economic health of the county and the quality of the environment, as well as providing a range of social and recreational benefits to our customers. Ensuring the ongoing safety of all users of the network is also a high priority for the County Council.

An increasing awareness of the importance of transport networks has raised the profile, both at a national and a local level, of how the transport services are managed and delivered. The Local Transport Plan guidance has therefore encouraged local authorities to develop Transport Asset Management Plans to guide the management of their transport assets.

It is intended that the Plan would be a 'live' document; building on existing systems and processes to provide a continuous improvement framework that complements and supplements existing practice. TAMP 2010 has achieved this and built on and improved the previous TAMP 2009 to provide a more structured approach to the management of all the key transport assets which the County Council is responsible for, including carriageways, footways, bridges, street lighting, highway drainage, traffic signals, signs and public rights of way.

The TAMP will enable each set of assets as a whole to be managed in the most cost effective manner. Publication of TAMP 2010 is to be welcomed as providing an invaluable working document for use by elected members and officers of the County Council, and as a source of information for others interested in the transport network.

Councillor Anthony Trollope-Bellew

Cabinet Member, Environment

1. Executive Summary

Asset management

1.1 Asset management is a tactical approach that identifies the optimal allocation of resources for the management, operation, preservation and enhancement of the highway infrastructure to meet the needs of current and future customers.

1.2 Asset management in Somerset has taken major strides over the last few years with support from senior management and members for the production of Somerset's Transport Asset Management Plan (TAMP).

1.3 Many of the elements of good asset management are in place and are described in detail. The TAMP incorporates overarching transportation strategies to maximise the benefits to the community leading to better value for money and efficiency savings in service delivery. The TAMP has been produced 'in house' by SCC officers following the County Surveyors Society (CSS) national guidance document 'Framework for Highway Asset Management'.

1.4 The TAMP development has been led by the Highway Asset Manager, a board comprising key users of the TAMP, and key suppliers of resources and information, including input from capital and revenue accountants. Consideration by the Council's Asset Strategy Group has enabled co-ordination with the council's broader asset management agenda. Advice has also been utilised from best practice in other authorities, relevant guidance, and government expectations. Consultation with wider stakeholders has facilitated a knowledge and understanding of Somerset's TAMP outside of this Authority.

1.5 The preparation of a TAMP is not a statutory requirement from the Government, but their preparation is encouraged as representing best practice. The TAMP now places Somerset at the forefront in this area of performance.

Annual Updates

1.6 The TAMP creates a clear plan of action, extending into the future, around which activity is organised. The plan is developed, updated and rolled forward annually, linking into the Council's service and financial planning systems, with review processes driven by performance monitoring. On an annual basis it presents an opportunity to identify and address new challenges, facilitate decision-making on priorities and clearly communicates those priorities.

1.7 TAMP 2010 is of a good standard, comprehensively exceeding the minimum requirements. It defines established levels of service, and captures performance, budgetary and valuation information. TAMP 2011 will strive to be of an excellent standard. It will be this version which reviews levels of service, identifies performance gaps, and reviews budgets against service standards.

1.8 The work plans set out in the TAMP for 2010/11 will reflect the budgetary decisions taken for the coming financial year through the Medium Term Financial Plan. For future years, the TAMP will enable Members to identify where services fall short of current best practice, and to align budgets based on better information on requirements, agreed service levels and acceptable risks.

1.9 Information will be more readily available to allow officers to make more informed decisions, especially regarding whole life costs and option appraisal.

1.10 The TAMP contains the following sections;

Goals, objectives and policies

1.11 Transport asset management is a way of running the 'business' of operating a highways and transportation network. The TAMP has been guided by the corporate objectives of the Council, as outlined in the Somerset Sustainable Community Strategy, the County Plan, and the Local Transport Plan (LTP2). The relationships between these higher order objectives and asset management activity are comprehensively set out in the TAMP. The comprehensive approach to asset management represented by the TAMP will help to ensure that the road safety implications of asset management are also thoroughly addressed.

TAMP sets out the role of asset management in contributing to the key LTP2 objectives:

- Improving safety
- Improving accessibility
- Reducing the growth of congestion
- Supporting economic growth
- Protecting the environment

Levels of service

1.12 Levels of service describe the quality of services provided by transport assets for the benefit of customers. They are indicators that reflect the Council's broader goals. Levels of service reflect in measurable terms how SCC, as the highway authority, engages with customers and responds to their needs. The levels of service provided also reflect the legal framework that applies to highways. Levels of service can be categorised as either:

- Condition assessment: preservation of the asset's physical integrity;
- Demand aspirations: the service delivered by the asset in terms of its use.

1.13 Demand aspirations describe the non-condition related performance requirements of each asset. These can relate to safety, availability, accessibility etc. Such measures recognise that assets provide a service to customers by enabling them to travel. The customer's views of the services provided need to play an important role in service plans.

Inventory and condition

1.14 SCC's transport network consists of over 6,600 km of Highway and more than 6000km of Public Rights of Way. Highway inventory and condition data has been developed and used for a number of years. This has enabled needs based budgets to be allocated and priorities selected using objective data. The need to produce detailed valuations and life cycle plans has provided the opportunity to re-evaluate current data. This analysis has enabled deficiencies and gaps to be identified. These are captured in the TAMP's Improvement Plan, and will continue to be addressed in the preparation of TAMP 2011.

Prioritisation

1.15 Like all Highway Authorities, SCC is facing continued demands on its budgets. A prioritisation methodology is required to ensure expenditure maximises benefits against Council objectives. Currently, budgets are allocated to each asset using inventory data and historic spend, which is refined each year to deliver condition targets, and meet public expectations. The TAMP will provide more developed processes which will enable the competing needs of each asset and maintenance activity to be ranked against each other, utilising the service levels defined and agreed by Members through the TAMP.

Risk management

1.16 Risk is inherent when dealing with the transport assets and needs to be managed accordingly. Risks generally fall into two types; tactical and operational. The tactical risks are those risks that affect SCC' ability to deliver its core objectives, they can typically be dependent on budgets, customer influences or changing weather patterns. Operational risks are those encountered day to day and tend to involve the service delivery on the ground. All risks are owned by those in a position to best manage them. The Tamp uses the SCC risk assessment matrix which involves identifying both the likelihood and the impact of an event.

Lifecycle plans

1.17 Maintenance lifecycle plans have been prepared for individual sets of assets, taking account of best practice in maintenance techniques and expected performance for various treatments. The lifecycle plans incorporate Whole Life Costing, enabling budget needs to be identified and compared against current funding allocations. The TAMP includes lifecycle plans for each of the following transport assets:

Carriageways ● Footways and Cycleways ● Highway structures ● Highway surface water drainage ● Verges and landscaped areas ● Highway lighting ● Road signs ● Road markings and studs ● Traffic control systems ● Public rights of way ● Safety fencing ● Cattle grids ● Arrester beds ● Winter service ● Depots

Work plans

1.18 Work plans are the forward looking programme of schemes to be carried out. They allow planning and advanced co-ordination of works. As levels of service are developed long term work plans and expenditure forecasts can determine future budgetary requirements. A full list of next year's proposed schemes is contained in Appendix 5.

Valuation of assets

1.19 Whole Life Government Accounting principles require that highway assets are valued, and are contained within the authority's accounts. The TAMP facilitates this process. Assets are valued according to their Gross Replacement Cost, which is how much it would cost to build equivalent assets to current standards now. SCC's transport asset valuation as at June 2009 is in the order of £8.9 billion, while the level of depreciation stands at £409m. The TAMP has enabled better models for deterioration to be developed, providing a more realistic value of the asset consumption. Asset valuation places the value of highway assets in context with other SCC assets. It also helps to make the case for appropriate levels of maintenance funding. The expansion of the highway asset base through highway improvement schemes, and through estate roads in new developments, represents a challenge. The TAMP provides the opportunity to identify the revenue budgets required to ensure that this increasing stock of assets can be effectively maintained.

Monitoring, review and improvement

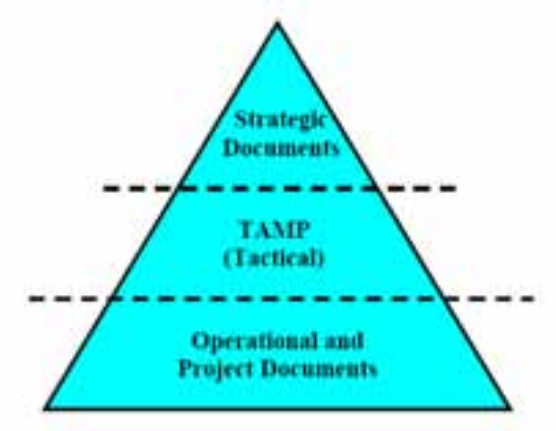
1.20 The ongoing annual cycle of preparation of Somerset'sTAMP has enabled a series of key improvements to be identified, which will advance SCC's asset management practice. The improvement plan details the specific actions to be taken, and outlines which level of service the actions are intended to benefit. Areas identified for improvements fall into two distinct categories; development areas for inclusion in future versions of the TAMP and recommendations arising from this TAMP. This will ensure that the focus is maintained on the outcome of the improvement, and the ultimate benefit it may provide to the customer.

2. Introduction

The purpose of the Transport Asset Management Plan (TAMP)

2.1 SCC has a transport network consisting of over 6,600 km of Highway and more than 6,000km of Public Rights of Way. This TAMP sets out the strategic goals and objectives for the transport network, with the levels of service currently achieved and the Asset Management processes currently in place.

2.2 The TAMP is a tactical document linking strategic documents such as the 'Local Transport Plan' (LTP2) to operational documents such as the 'Highway Network Management Plan' (HNMP).



Annual updates

2.3 This TAMP is the second edition of Somerset's 'Transport Asset Management Plan and includes improvements set out in the Improvement Plan in TAMP 2009. The TAMP creates a clear plan of action, extending into the future, around which activity can be organised. The plan is updated and rolled forward annually with review processes driven by performance monitoring. It presents an opportunity on an annual basis to identify and address new challenges, to establish a consensus and facilitate decision-making on priorities and to clearly communicate those priorities.

The benefits of asset management

2.4 Asset management can enable the optimal allocation of resources to be identified for the management, operation, preservation and enhancement of transport infrastructure.

2.5 The plan has been developed using the County Surveyors Society (CSS) national guidance document 'Framework for Highway Asset Management'

2.6 Specific benefits of an asset management approach to transport assets, identified by CSS, are as follows:

- Reduced life-cycle costs;
- Defined levels of service;
- Improved quality and transparency of decision making;
- Decreased financial, operational and legal risk;
- The ability to track performance;
- The ability to predict the consequences of funding decisions;

- The ability to discharge statutory valuation and financial reporting responsibilities.

The benefits of a Transport Asset Management Plan

2.7 The process of preparing, implementing, monitoring and updating the Plan helps SCC to understand its current service delivery, its ongoing resource needs and its risks and opportunities in managing its transport assets. The TAMP presents wider opportunities to consider how the Plan can assist SCC in its own performance management, including benchmarking with other authorities, and communication of key messages to stakeholders.

2.8 Other benefits include:

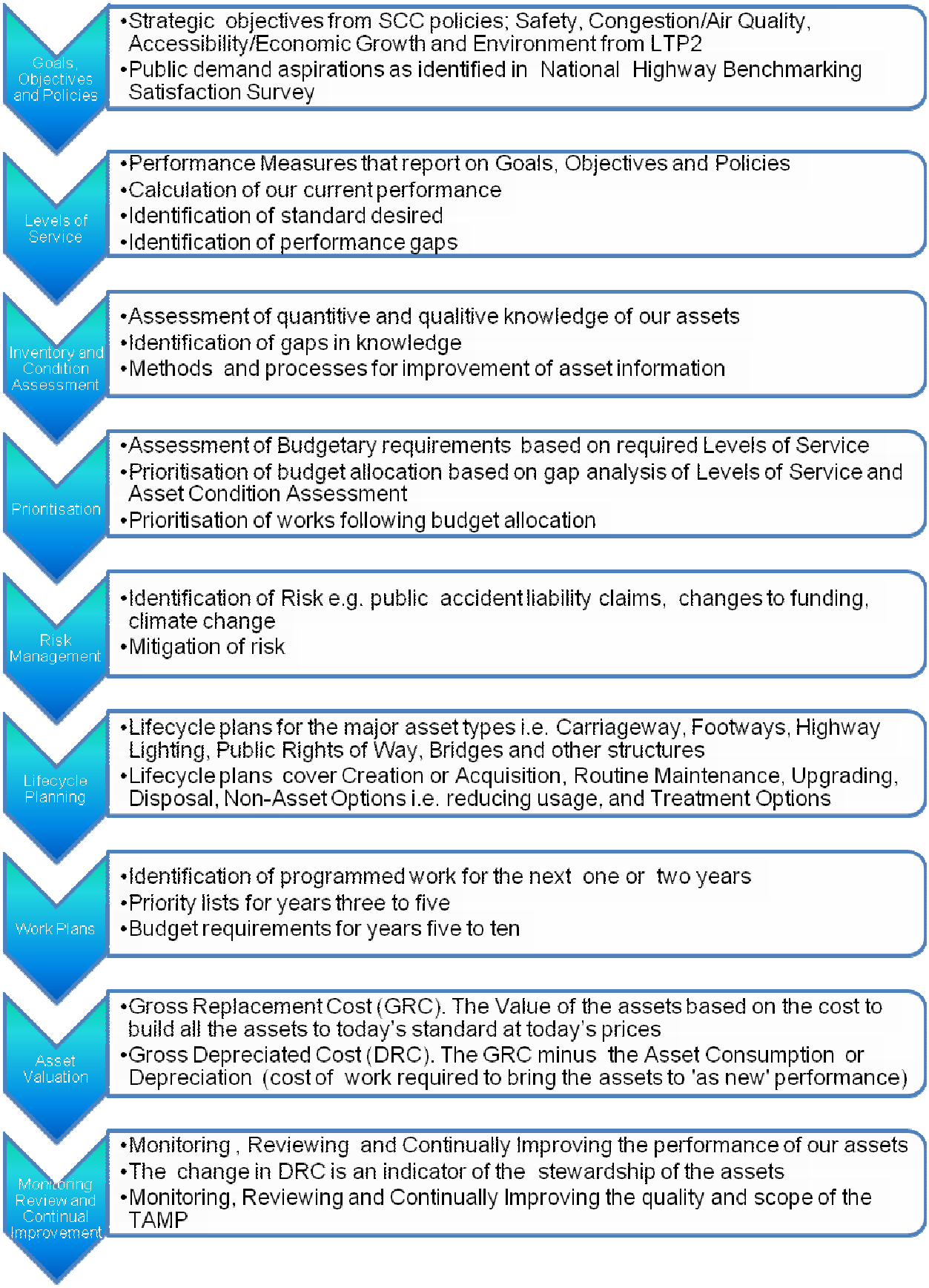
- Clarifying SCC's knowledge of asset quantities and condition;
- Producing future budget profiles and works programmes;
- Identifying gaps in budget requirements, service levels and knowledge, leading to an improvement plan;
- Identifying risks associated with those gaps;
- Considering the best options for maintenance of each asset in order to minimise costs over its whole life;
- Planning and managing performance. Improving service delivery, learning from best practice and embedding performance management;
- Managing physical and financial resources. Improving efficiency and effectiveness, maximising resources through medium to long term planning;
- Enabling access to services for SCC customers by providing, maintaining and managing physical networks and services;
- Embedding effective programme and project management.

Other drivers behind the TAMP

2.9 In addition to the benefits identified there are several other drivers behind the preparation of the TAMP. 'The Code of Practice for Highway Maintenance, Rethinking Construction' advocates an integrated approach to the planning and delivery of infrastructure works. "Whole of Government Accounting" requires commercial-style accounts to be drawn up, and the Prudential Code requires local authorities to have explicit regard to option appraisal in terms of being affordable, prudent and sustainable. The Gershon report also requires that local authorities make significant savings and supports the requirements of Best Value to obtain efficiency savings.

The TAMP as a plan of action

2.10 This TAMP maps a process that flows through the document.



Regional working groups

2.11 SCC works with several regional working groups to ensure that best practice is shared and to explore efficient methods of working together. These include the South West TAMP working group that involves Local Authorities and industry partners. SCC has a formal partnership with leading consultants in carriageway management, WDM, and with our Network Management service provider.

2.12 SCC also belongs to the South West Highway Maintenance Group promoting information sharing and best practice.

Southwest One

2.13 Southwest One is a joint venture between SCC and IBM. Category planning has been introduced as part of SCC's procurement transformation through Southwest One. The current highway maintenance contract, which commenced in 2010, underwent this process which ensured that the contract structure and length delivered best value and efficiencies.

Somerset Strategic Partnership

2.14 The Somerset Strategic Partnership (local councils, other public services such as health and education, the voluntary and community sector, and business representatives) has developed the Somerset Community Strategy; 'A Vision for Somerset', to deliver: "A dynamic successful modern economy that supports, respects and develops Somerset's distinctive communities and unique environments".

Transport objectives

2.15 To tackle these challenges, a series of transport objectives has been identified which reflect the national and regional priorities, and also reflect those economic and environmental issues which are so important in Somerset. These objectives below are developed in more detail in LTP2:

- To improve safety for all who travel;
- To reduce social exclusion, and to improve access to everyday facilities;
- To reduce the growth of congestion and pollution, and to improve health;
- To support sustainable economic growth in appropriate locations;
- To protect and enhance the built and natural environment.

2.16 LTP2 shows that national, regional and local stakeholder influences have been taken into account whilst developing SCC's policies, priorities and strategies. The TAMP links the following broad strategies into specific operational activities.

- Casualty Reduction
- Congestion
- Accessibility
- Environment
- Economy

The history of asset management in Somerset

2.17 Whilst the preparation of the TAMP itself brings benefits, the principles of Asset Management have been actively used in Somerset over a number of years.

2.18 Since January 2001 SCC has consistently improved the management of its highway assets. In particular it has introduced:

- The Highway Network Management Plan, that set out;

- To minimise reactive work, consistent with maintaining safety, in order to maximise the level of planned works;
- To adopt 'whole life' cost principles, to maximise the benefit of investment being made in the highway;
- To provide budgets based on a 'needs' basis;
- To provide a responsive and consistent interface with the public;
- To develop risk management techniques;
- To implement a performance management regime.

- A new highway safety inspection regime using trained and dedicated inspectors;
- The proactive use of information from inspections and claims, to direct works to particular locations;
- A capital spend increase on structural maintenance and surface dressing.

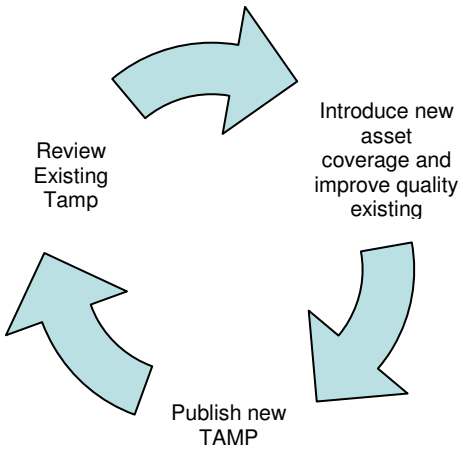
2.19 This has improved surface road condition on all roads, and significantly reduced highway claims against SCC.

2.20 Since April 2004, SCC has introduced service plans for specific assets. These include service inspections, lifecycle maintenance, and establishing needs based budgets. This transition from reactive work to planned work has generated efficiency and effectiveness gains, better co-ordinated work, and improved customer service levels.

2.21 These established elements of good asset management are explained in the Highway Network Management Plan, Highway Safety and Maintenance Manuals and contract requirements for scheme briefs. This TAMP will bring all these aspects under one umbrella.

An annual cycle of improvement

2.22 This Second TAMP is an improvement on TAMP 2009. A new Level of Service, Asset Condition, has been introduced which is supported by a suite of asset condition indicators. Service Provider contractual performance indicators that were not related to asset condition have been removed or replaced. TAMP 2010 includes an improvement plan for the next publication (TAMP 2011). This, as well as updating quantities and values as they change, will specify improvements in both the depth and coverage of the TAMP. The key improvement in TAMP 2011 is to fully develop and agree the desired Levels of Service. This will then allow detailed gap analysis of the current standards and those required. The performance gaps in the levels of service will then set the priorities that will determine future budgets needs.



2.23 The process will be repeated annually. This cyclical improvement will raise the standard of the TAMP from an initial basic document to a fully developed TAMP.

3. Goals, Objectives And Policies

Introduction

3.1 Highway asset management is a way of running the 'business' of operating a highway network. The overarching goals and objectives of SCC, as outlined in the Somerset Sustainable Community Strategy, SCC's County Plan, its Local Transport Plan (LTP2) and other SCC policies, must guide asset management processes and plans. It is, therefore, essential to define the relationship between asset management and other corporate goals and objectives.

Somerset Sustainable Community Strategy/County Plan

3.2 SCC's corporate goals are set out in the Somerset Sustainable Community Strategy 2009 – 2026, and the County Plan 2010/11. The following aims, challenges and priorities (set out in Table 3.1 on the following page) are relevant to the TAMP. SCC's Mission as set out in the County Plan 2008 is to, *"provide excellent services that are accessible, responsive and sustainable to ensure that Somerset is a healthy and vibrant place to live, work and visit."* In accordance with this, SCC services are delivered against four key values: -

- **Customer focus** Putting the customer at the heart of everything we do;
- **Can-do attitude** Getting the job done and doing it well;
- **Collaboration** Working with others to deliver our services;
- **Care and respect** Treating others as they would wish to be treated – with care, respect, dignity and understanding.

Local Transport Plan (LTP2) objectives

3.3 LTP2 objectives are based on the Government's shared priorities for transport which are improving safety, air quality, and accessibility, and tackling congestion. These have been supplemented by local objectives for economic growth and environmental protection.

3.4 The following LTP2 objectives and targets are relevant to the TAMP:

Table 3.2: Meeting LTP2 objectives

LTP2 objective	Role of the TAMP
Improved **safety**: Reducing road casualties.	Improving road surfaces helps to reduce road accidents by improving skidding resistance and reducing the occurrence of potholes. Regular highway inspection minimises the likelihood of tripping accidents due to poor footway condition, and of visibility problems due to overgrown trees and shrubs.
Improved **access** to services and support sustainable **economic growth**.	Maintaining and improving the condition of highway assets, and better management of street works, will improve accessibility to local services and facilities, enabling movement of goods and people, and facilitating business to operate effectively.
Reduce growth of **congestion** and pollution and improve health.	Improved management and maintenance of highway assets will reduce the growth in congestion, by ensuring assets are fit for purpose and by managing maintenance operations to minimise disruption during works. Better management of street works will help minimise congestion and delay, and as a result will improve air quality. Improved condition of footways and cycleways will encourage their use, and minimise short distance car trips, with benefits for air quality and physical activity. Use of quieter road surfacing will reduce the impact of transport noise.
Protect and enhance built and natural **environment**.	Improved management and maintenance will enable environmental protection to become a key part of all operations. A Highways Management Biodiversity Action Plan is already in place, and recent innovations are enabling clear identification of environmentally sensitive locations.

Table 3.1: Meeting County Plan and Community Strategy Aims

Community Strategy/ County Plan Aim	Relevant Community Strategy Challenge	Relevant County Plan Priority	Role of the TAMP
Aim 1: Making a Positive Contribution Standing up for Somerset	Challenge 1: Strengthen the leadership given by councils and partners through closer working together, and engage local people and communities in decision making.		The TAMP is one of the delivery plans that will be aligned to support strong and effective local leadership.
		1.1 Work collaboratively with our partners to develop, deliver and monitor the Sustainable Community Strategy and Local Area Agreement (LAA).	Highway condition is included in a basket of indicators used to measure improved accessibility within the LAA.
Aim 2: Living Sustainably Safeguarding Somerset for future generations	Challenge 3: Prepare for and respond to the impact on Somerset of Climate Change.	4.1 Reduce carbon emissions through energy management, improved energy efficiency, and installation of renewable energy technologies. Respond specifically to proposals in relation to nuclear energy, energy from waste and the Severn Tidal Power Project.	The TAMP will need to consider how transport assets will be managed to: ▪ Reduce carbon emissions; ▪ Provide resilience to the effects of Climate Change.
	Challenge 4: Increase people's quality of life through the use of Somerset's environment, nature and heritage.		Improved management and maintenance will enable protection of our environment, nature and heritage to become a key part of all operations.
	Challenge 5: Make Somerset a more affordable place for people to live.	3.1 Manage the predicted growth and change in Somerset in a sustainable and integrated way.	Effective management of transport assets will be vital to providing an efficient and effective transport system to support planned growth.
		3.2 Work with our partners to ensure that we increase the availability of and access to, affordable housing and accommodation.	Effective management of transport assets will be vital to maintaining good access to existing and planned housing.
		3.3 Increase accessibility to services, investing in traffic management, and delivering the major transport schemes in Taunton.	Effective management of transport assets will be vital to maintaining good access to services by all modes of transport.
	Challenge 6; Encourage communities to be more self-sufficient and united.		
Aim 3: Ensuring Economic Well Being Somerset is known for its diverse and successful economy	Challenge 7: Broaden and strengthen the local economy.	5.3. Maximise the economic and cultural potential of the planned growth in Somerset, and regenerate vulnerable market towns.	Effective management of transport assets will be vital to providing an efficient and effective transport system which supports economic growth.
	Challenge 8: Plan for new sustainable communities to be built in Somerset.		Effective management of transport assets will be vital to providing an efficient and effective transport system to support new sustainable communities.

Community Strategy/ County Plan Aim	Relevant Community Strategy Challenge	Relevant County Plan Priority	Role of the TAMP
Aim 4: Enjoying and Achieving Somerset people are able to feel fulfilled	Challenge 12: Promoting lifelong learning and cultural opportunities.		Effective management of the transport network, including rights of way, will facilitate access to learning, recreational and cultural activities.
	Challenge 13: Promote independent living.		Effective management of the transport network, including rights of way, will facilitate access to good affordable health, social and well-being support.
Aim 5: Staying Safe Somerset people feel safe in their homes and on the move	Challenge 16: Road Safety.	9.2. Deliver our road safety plans with key agencies through the Road Safety Partnership.	Effective management and maintenance of transport assets will ensure that the transport network remains safe to use, and helps to reduce road casualties. Good road condition and skidding resistance is particularly important.
Aim 6: Being Healthy All people can expect to live long and healthy lives in Somerset	Challenge 19: Tackling high-risk health issues.	11.1 Tackle obesity through encouraging healthy eating, and greater participation in regular exercise and activity.	Effective management of walking and cycling infrastructure, and the rights of way network, will help people to undertake regular physical activity.
Aim 7: Enhancing the Effectiveness of SCC Its work in partnership with others in delivering excellence		13.2 Improve customer access to and satisfaction with our services. Using customer insight to inform more joined up service delivery at local level, through the implementation of the Cabinet Office Customer Service Excellence Standard Framework, with our partner Southwest One.	The TAMP will seek to ensure excellent customer access to services e.g. processes for customers to report highway defects.

Emerging national transport goals

3.5 The above objectives and associated targets are currently used to define the transport investment programme for Somerset. However, recent reports such as the Eddington study on transport economics, and the Stern report on Climate Change have triggered the Government to re-evaluate its goals for transport policy. New local policy development now needs to consider how local priorities align with these emerging national goals, which will guide the objectives for the new Local Transport Plan (LTP3), to be published in 2011.

Towards a Sustainable Transport System

3.6 The Department for Transport published its new approach to transport policy 'Towards a Sustainable Transport System (TaSTS)', supporting economic growth in a low carbon world', in October 2007. The TaSTS report explains:

- How the Government will ensure that transport plays its role in delivering the reductions in carbon emissions proposed by the Stern review;
- Government policy and investment plans for 2013-2014; and
- A new approach to longer term transport policy following the model established by Eddington, including engagement with passengers, users, the transport industry and other stakeholders.

New national strategic goals

3.7 The TaSTS report is the beginning of a process to prepare a new long term transport plan by 2012. It sets out a number of new goals where transport has a key role to play as follows:

- Maximising the overall competitiveness and productivity of the economy, so as to achieve sustained economic growth;
- Reducing transport's emissions of CO2 and other greenhouse gases, to help avoid dangerous climate change;
- Contributing to better health and longer life-expectancy through reducing the risk of death, injury or illness arising from transport, and promoting travel modes that are beneficial to health;
- Improving quality of life for transport users and non-users, including through a healthy natural environment, with the outcome of improved well-being for all;
- Promoting greater equality of transport opportunity for everyone, with the outcome of a fairer society.

New policy directions

3.8 The key issues emerging from this new policy direction that the TAMP must consider are:

- The need to ensure that investment in asset management supports the competitiveness and productivity of the area, and that street works do not undermine business productivity; and
- The need to fully explore how asset management can support reductions in CO2 emissions.

3.9 SCC policy is currently in a process of change, the scope of which has not been reflected completely within this year's version of the TAMP but which will be included within the TAMP 2011. The main areas affected within the TAMP are:

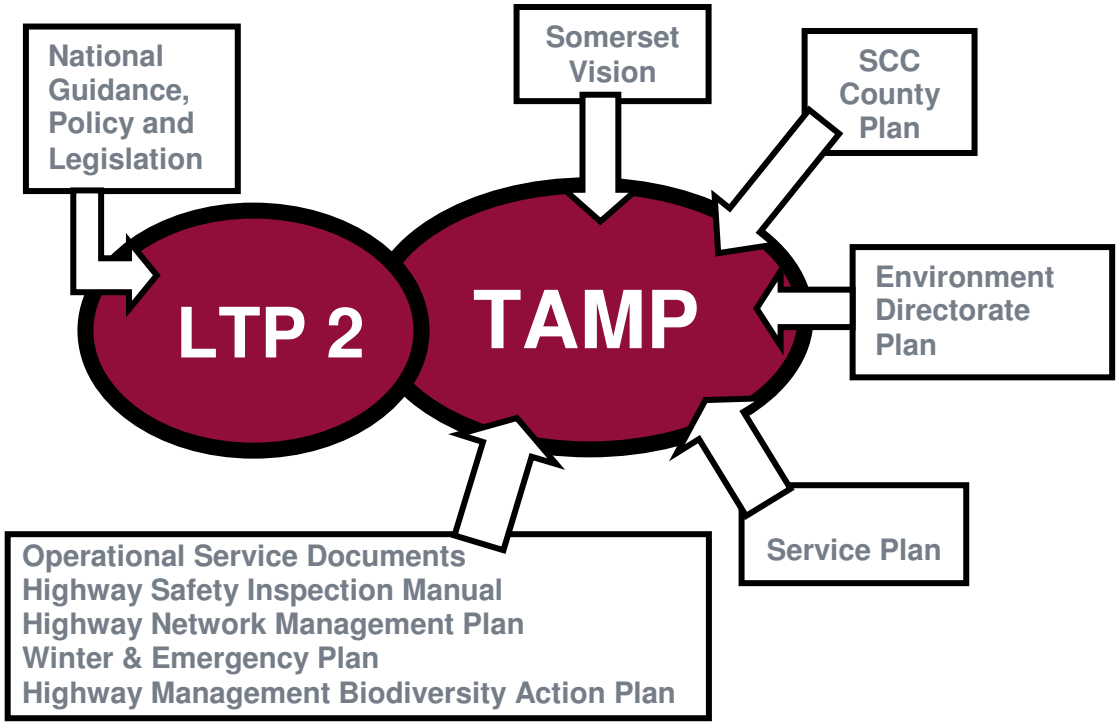
- The County Plan priorities have now changed.
- The Regional Spatial Strategy is due to be abolished in favour of a more locally derived assessment of housing needs.
- It is possible that capital budgets may change and this could impact on maintenance activity.

- There is currently some uncertainty regarding the future of the Forward Transport Plan.

The TAMP 2011 will aim to grasp more closely the aspirations and realities of the current administrations both in Somerset and nationally once they become defined.

Relationship between TAMP and National / Local policies and plans

Policies and documents



3.10 Key policy documents are set out below in Table 3.3.

Table 3.3 Key policy documents

Key ✓ General relevance ✓✓ Significant relevance ✓✓✓ Substantial relevance ✓✓✓✓ Major relevance

Policies and documents	Level of relevance to TAMP	Relevance
Regional policy		
South West Regional Spatial Strategy/Regional Transport Strategy	✓✓✓	Identifies growth areas and strategic transport routes which will influence asset management priorities.
Regional Economic Strategy	✓	Identifies priority themes and areas for investment to deliver economic growth in the Region. Little direct linkage with asset management priorities.
Policies and plans for Somerset		
Somerset Sustainable Community Strategy	✓✓✓	Discussed in detail in Table 3.1 above.
Somerset Local Area Agreement	✓✓	Agreed priority outcomes for Somerset over the next three years. The TAMP will support delivery of targets for improved accessibility and road safety, climate change and housing growth,

		health, economy and natural environment.
Somerset Economic Strategy	✓✓	Identifies priority themes and areas for investment to deliver economic growth in the County. Should influence asset management priorities.
Regeneration Delivery Plan	✓✓	Plan to coordinate regeneration activity across physical regeneration, economic regeneration and environmental regeneration. Largely coordinates existing plans and policies such as the LTP so only indirect influence on the TAMP.
Somerset Local Transport Plan (LTP2)	✓✓✓✓	Transport investment strategy and programme for Somerset and funding mechanism for integrated transport schemes and highway maintenance.
LTP strategy documents		
Taunton Area Transport Strategy Bridgwater Transport Strategy Yeovil Transport Strategy Accessibility Strategy and Emerging Action Plans Passenger Transport Strategy Parking Strategy Cycling strategy Rights of Way Improvement Plan Air Quality Action Plans (Taunton and Yeovil)	✓✓✓✓	Detailed area and theme based transport strategies.
SCC operational policies and plans		
County Plan	✓✓✓	Discussed in detail in Table 3.1 above.
Corporate Asset Management Plan	✓✓✓	Overall management plan for the full range of the Council's assets. TAMP will set out in more detail how transport assets will be managed within the context of wider corporate asset management.
Customer Access Strategy	✓✓	Strategy to improve our customers' access to services. TAMP will need to consider customer access issues such as reporting defects etc.
Highway Network Management Plan	✓✓✓✓	TAMP will compliment the Highway Network Management Plan by relating policies/standards/ procedures and performance to levels of service in line with the highways strategic objectives.
Highway Management Biodiversity Action Plan	✓✓✓✓	Delivery of the Biodiversity Action Plan which ensures compliance with the habitats regulations will be supported through TAMP and influence service delivery.
Highway Safety Inspection Manual April 2008	✓✓✓✓	TAMP will influence intervention levels and asset management priorities through the identification of service levels.
Winter and Emergency Plan 2009-2010	✓✓✓✓	Identifies priority themes, areas for investment and direct influence on lifecycle planning and asset management priorities.
National Park Management Plan – Multi Area Agreement	✓✓	Creation of delivery plans for: ▪ Environmental quality – particularly the quality of highway infrastructure and the roadside environment ▪ Recreation and access – particularly the condition of the public rights-of-way network, public transport services and recreation provision ▪ Developing the tourism economy of Exmoor National Park
New and emerging plans and policies		
Road Safety Partnership Delivery	✓✓✓✓	

Plan 2008-2011		Three year delivery plan for reducing road casualties. Effective asset management including road condition and skidding resistance will be a vital component of this.
District Local Development Frameworks (LDF)	✓✓✓	Set out long-term local spatial plans in each District including new development areas and transport improvements which will influence asset management priorities.
Taunton Town Centre Area Action Plan	✓✓	Local Development Document setting out spatial plans for the Taunton Town Centre area. Will influence asset management priorities in that local area.
Traffic Management Act Network Management Plan	✓✓✓✓	This Network Management Plan (NMP) responds to SCC obligations to the Network Management Duty (NMD) of the Traffic Management Act 2004. It provides a comprehensive guide and reference document for SCC and other "responsible organisations" in relation to The Act; as well as demonstrating that SCC is complying with the expectations of the Government with regard to The Act and the NMD. It also links into other duties of SCC including Bus Punctuality/Improvement Partnerships (BPIP), the Somerset Local Transport Plan 2006-2011 (LTP), and the emerging Local Transport Bill which will increase the duty of SCC to improve the bus operating environment.
Congestion Delivery Plan	✓✓✓✓	The Congestion delivery plan establishes processes to identify and, where reasonably practicable, deal with things that could cause congestion and disruption on the Local Traffic authority's network.
Regeneration programmes		
Project Taunton	✓✓	Vision and programme for town centre regeneration. Largely delivers plans and policies set out in LDFs, LTPs and other statutory documents so only indirect influence on the TAMP.
Yeovil Vision		
Bridgwater Challenge		

Codes and standards

- Well-maintained Highways, Code of Practice for Highway Maintenance Management (Roads Liaison Group, July 2005)
- Management of Highway Structures, A Code of Practice (Roads Liaison Group, September 2005)
- Well Lit Highways, Code of Practice for Highway Lighting Management (Roads Liaison Group, November 2004)
- Framework for Highway Asset Management (County Surveyors Society, 2004)

4. Levels of service

Introduction

4.1 Levels of service describe the quality of services provided by transport assets for the benefit of customers. They are composite indicators that reflect SCC's social, economic and environmental goals. Levels of service therefore, in terms that can be measured and evaluated, reflect how SCC, as the highway authority, engages with customers and responds to their needs. The levels of service provided reflect the legal framework that applies to highways.

4.2 To ensure that levels of service are easily understood by customers, a written description for each level of service has been developed, together with a documented process (a process map) to explain what needs to happen, by whom, when, and to what standard.

4.3 Customer Service Standards have been developed to inform customers:

- What you need to do to receive a service
- The standard of service we provide
- How to comment on the service you have received

4.4 They are available to view at: **www.somerset.gov.uk/somerset/ete/about.cfm**

4.5 Performance management is a key element of SCC service delivery. The levels of service link to established SCC performance indicators.

Levels of service

4.6 Levels of service can be categorised as either:

- Condition Assessment: preservation of the asset's physical integrity;
- Demand Aspirations: the service delivered by the asset in terms of its use.

Condition assessment

4.7 The physical condition of the asset in practice has two elements:

- Its perceived condition as 'measured' by the public and road user perception;
- Its condition as determined by measurement and analysis of road condition data, which is less obvious to the public and the road user.

4.8 This distinction is important. Whilst levels of service promote a focus on customer needs, there will be instances (particularly in relation to the structural condition of assets) when the customer can only develop an informed opinion based on technical information.

Demand aspirations

4.9 Demand aspirations describe the non-condition related performance requirements of each asset. These can relate to safety, availability, accessibility etc. Such measures recognise that assets provide a service to customers by enabling them to travel. The customer's views of the services provided need to play an important role in our service plans.

4.10 As a highway authority we have made a direct link from the levels of service to the LTP priorities, and also from the LTP priorities to the corporate aims and priorities, that will help us deliver the long term plan for Somerset which we are developing with our partners in the Somerset Strategic Partnership.

4.11 The levels of service deliver against SCC's mission, to provide excellent services that are accessible, responsive and sustainable, in order to ensure that Somerset is a healthy and vibrant place to work and visit.

4.12 Our levels of service include:

- **Safety** The safety of the transport asset and reduce the risk of accidents to all users.
- **Accessibility and economic growth** Maintain the transport asset so it is accessible to the customer and fit for purpose, enabling movement of goods and people and facilitating business to operate effectively.
- **Environment (including air quality and congestion)** Improved management and maintenance will enable environmental protection to become a key part of all operations. Take measures to reduce emissions and improve air quality, reduce congestion and improve journey times.
- **Demand aspirations** To inform decisions on the allocation of resources between competing demands.
- **Asset condition** To maintain the physical condition of transportation highway assets.

4.13 The Highways and Transport services are leading work to benchmark progress and performance between local and regional authorities, including the National Highways Best Value Benchmarking Clubs and the South West Highways Service Improvement Group, where it has established a national core list of public survey questions on satisfaction with transport provisions and services to ensure a rigorous and well-rounded testing of public satisfaction.

4.14 As the Highway authority, we acknowledge that the highway network is provided for the benefit of our customers, and therefore, the customer's views of the services that we provide play an important role in our service plans (Demand Aspirations).

4.15 Each Level of Service can be delivered to varying standards depending on the investment provided. We have adopted the terms, Excellent, Good, Fair and Poor to reflect these different standards. The following generic definitions are provided:

- **Poor** Service delivers below minimum requirements;
- **Fair** Service delivers at minimum requirements;
- **Good** Service constantly delivers above minimum requirements;
- **Excellent** Service delivers well above minimum requirements.

4.16 Table 4.1 sets out the key components of TAMP levels of service, and demonstrates how the above standards have been interpreted to define levels of service.

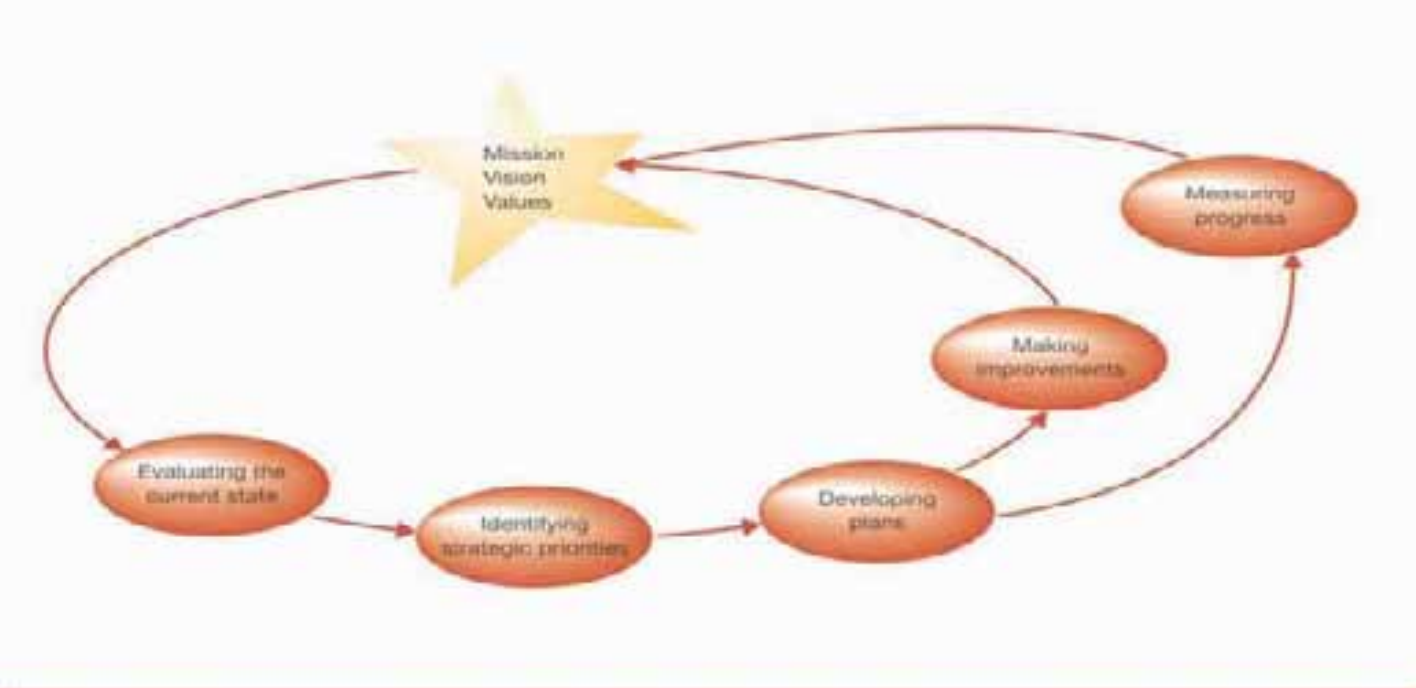
Performance measures

4.17 Carefully constructed performance measures are an essential asset management tool. Their value is in guiding the decisions about managing the network. A comprehensive performance management framework (Scorecard) has been developed and implemented to effectively link objectives, targets, priorities and community needs with service improvements and resources.

4.18 These performance measures are:

- **Current** Providing information about current performance;
- **Available** At the fingertips of those who need to know, when they need to know;
- **Robust** Providing reliable information.

4.19 Effective performance management is critical to ensure delivery of targets and objectives. The SCC performance management processes allow regular monitoring and review of progress towards targets, scheme delivery and expenditure. This will enable us to manage and redirect resources as required to deliver our targets. These processes operate within the context provided by the SCC 'Planning for Success' framework (below).



A performance framework through which success becomes the natural outcome

Table 4.1: Levels of service definitions

Level of service	Definition	POOR: Service delivers below minimum requirements	FAIR: Service delivers at minimum requirements	GOOD: Service constantly delivers above minimum requirements	EXCELLENT: Service delivers well above minimum requirements
Safety	Increase the safety of the transport asset, and reduce the risk of accidents to all users	Does not meet minimum safety requirements	Meets minimum safety requirements	Meets current good practice in safety	Exceeds good practice
Accessibility and economic growth	Maintain and improve the condition of highway assets and better management of street works, will improve accessibility to local services and facilities, enabling movement of goods and people, and facilitating business to operate effectively.	Does not meet minimum accessibility requirements	Meets minimum accessibility requirements	Conforms to requirements of good practice	Exceeds requirements of good practice
Environment	Improved management and maintenance will enable environmental protection to become a key part of all operations. A Highways Management Biodiversity Action Plan is already in place and recent innovations are enabling clear identification of environmentally sensitive locations. Take measures to reduce emissions and improve air quality, reduce congestion and improve journey time	Does not meet minimum biodiversity requirements. Does not meet minimum air quality requirements Does not meet minimum congestion targets, e.g. long vehicle delays and journey times	Meets minimum biodiversity requirements. Meets minimum air quality requirements Meets minimum congestion targets	Conforms to requirements of good practice. Surpasses air quality targets Meets recognised good practice for congestion	Exceeds requirements of good practice. Exceeds air quality targets by a significant margin Exceeds recognised good practice
Demand aspirations	The non-condition related performance requirements of assets. (The level of desire or need that exists for particular services by the public)	Does not meet minimum customer satisfaction for the performance of the assets	Meets minimum customer satisfaction for the performance of assets	Meets above average customers' expectations on delivery of services compared with other County Councils (median performance)	Exceeds customers' expectations on delivery of services compared with other County Councils (upper quartile performance)
Asset Condition	The physical condition of transportation highway assets.	Does not meet the minimum requirements to maintain the assets at an operational level	Meets the minimum requirements to maintain the assets at an operational level	Conforms to the requirements of good practice and maintains assets at current condition	Exceeds the requirements of good practice and maintains assets at optimal performance levels

The SCC performance management framework

4.20 All TAMP performance indicators have been drawn from those already in use. A scoring mechanism has been developed to allow performance to be measured and evaluated. Selected national and local indicators are listed in LTP2 and are shown in Table 4.2, which also depicts their linkage through to levels of service. All indicators are:

Specific **M**easurable **A**greed **R**ealistic **T**ime bound

4.21 In setting realistic targets for our measures, we have shown commitment to achieve a specific and better quality and/or level of service over a specified time frame. All of our targets are a tool to help improvement, in themselves they cannot guarantee change.

Table 4.2: Indicators and the linkage to levels of service

Performance indicators	Level of service				
	Accessibility and economic growth	Environment	Road safety	Demand aspirations	Asset condition
NI 168 – Principal road condition	✓	✓	✓	✓	✓
NI 169 – Condition of Non Principal Roads (Classified) (B)	✓	✓	✓	✓	✓
NI 169 – Condition of Non Principal Roads (Classified) (C)	✓	✓	✓	✓	✓
BVPI 224b – Condition of Non Principal Roads (Unclassified)	✓	✓	✓	✓	✓
NI 47 – Total killed and seriously injured casualties	✓		✓	✓	
NI 48 – Child killed and seriously injured casualties	✓		✓	✓	
BVPI 99c – Total slight casualties	✓		✓	✓	
SE2 – Salting before formation of ice (pre-salting network)	✓		✓	✓	
Number of routes salted within prescribed time	✓		✓	✓	
Verge – No. of defects on visibility splays A & B	✓		✓	✓	
Verge – No. of defects on visibility splays C & U	✓		✓	✓	
SW SL1 – % of streetlights not working	✓		✓	✓	
SW SL2 – Average number of failures per lamp per annum (Street lights)	✓		✓	✓	
SW SL3 - % of failures due to SCC equipment (Street Lights)	✓		✓	✓	
SW SL10 – Total average cost of maintaining a street light	✓				
SW SL16 – Estimated backlog as % of total stock (Street Lights)	✓				✓
SW SL31 – % street lighting supports over 25 years old	✓				
SW B1a – Bridge stock condition indicator BCI average	✓		✓		✓
SW B1b – Bridge stock condition indicator BCI critical	✓		✓		✓

Performance indicators	Level of service				
	Accessibility and economic growth	Environment	Road safety	Demand aspirations	Asset condition
SW B2 – % of bridges not meeting the required carrying capacity	✓	✓	✓	✓	✓
SW TS2 – % of premature lamp faults per year (Traffic Signals)	✓	✓	✓	✓	
SW TS4 – % of sites with more than 6 faults per annum (Traffic Signals)	✓	✓	✓	✓	
LPI3 – Ease of use of rights of way – Network Maintenance & Improvement (excludes Capital Bridge & Structures Work)	✓			✓	
LTP 8 – Air Quality – Taunton and Yeovil		✓			
Overall Satisfaction with highways & transport service (vs. local importance)				✓	
Overall Satisfaction with Highways and Transport Service (vs. national importance)				✓	
Footway	✓		✓	✓	✓
Drainage	✓	✓	✓	✓	✓
Verge	✓	✓	✓	✓	✓
Road Studs annual % length failure as identified in the night time survey			✓	✓	✓
Road markings no. defects identified on A+B roads			✓	✓	✓
Road markings no. defects identified on C+D roads			✓	✓	✓
Road markings no. yellow line defects identified	✓			✓	✓
Non illuminated sign maintenance no. defects identified on A+B roads	✓		✓	✓	✓
Non illuminated sign maintenance no. defects identified on C+D roads	✓		✓	✓	✓
Non illuminated sign maintenance no. finger arms refurbished	✓		✓	✓	✓
ROW Capital works – Vehicular Bridges carrying PROWs, Stone arch bridges span >2m, non vehicular bridges >6m	✓			✓	✓
A road SCRIM			✓	✓	✓
B road SCRIM			✓	✓	✓
Traffic Signals	✓	✓	✓	✓	✓
Retaining Wall Av	✓		✓		✓
Retaining Wall Crit	✓		✓		✓
% of Winter maintenance fleet over 10 years old	✓	✓	✓	✓	✓

Scoring

4.22 To enable each level of service to be measured and evaluated, a scoring mechanism has been developed. As described in the following paragraphs, the level of service rating is calculated using the supporting performance measures. Any single performance measure may contribute to more than one level of service.

4.23 Table 4.5 provides an overview of the scoring mechanism. Within that table, the general steps are:

- **Column 1** The importance, in descriptive terms, of the performance measure in contributing to the level of service. The contributions are described as major, moderate, minor or nil, and are outlined in Table 4.3 together with their numerical weightings.

Table 4.3: Performance measure contribution

Importance	Description	Weighting
Major	Making a major contribution to the objective, essential.	3
Moderate	Making a moderate contribution to the objective, desirable.	2
Minor	Making a minor contribution to the objective, useful.	1
Nil	Making no contribution to the objective.	0

- **Column 2** The performance measures.
- **Columns 3 to 6** For each performance measure, the numerical boundaries (tolerance levels) for poor, fair, good and excellent standard are defined, respectively.
- **Column 7** The current value for each performance measure.
- **Column 8** For each performance measure, the current value (Column 8) will equate to either a poor, fair, good or excellent standard (compared and benchmarked with other similar authorities where applicable)
- **Column 9** For each performance measure, the current standard is converted to a numerical value using the scores shown in Table 4.4.

Table 4.4: Numerical scoring for level of service standard

Standard	Score
Excellent	4
Good	3
Fair	2
Poor	1

- **Column 10** The numerical weighting for the performance measure contribution to the level of service, as shown in Table 4.3.
- **Column 11** The current level of service, calculated as the weighted average.

4.24 The total score for each level of service is the summation of the weighted scores for that particular level of service.

4.25 Linking the level of service rating directly to the underlying performance measures will in the future, enable the impact of different maintenance/funding strategies to be directly assessed.

4.26 Through the delivery of the TAMP, we aspire to deliver our services to align with the County's mission of providing "excellent services that are accessible, responsive and sustainable to ensure that Somerset is a healthy and vibrant place to work and visit".

Table 4.5.1: Accessibility and economic growth

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Major	NI 168 – Principal road condition	>7%	6–7%	4–5%	<4%	4	Good	3	3	**9**
Major	NI 169 – Condition of Non Principal Roads (Classified) (B)	>10%	8–10%	6–7%	<6%	10	Fair	2	3	**6**
Major	NI 169 – Condition of Non Principal Roads (Classified) (C)	>10%	8–10%	6–7%	<6%	10	Fair	2	3	**6**
Major	BVPI 224b – Condition of Non Principal Roads (Unclassified)	>18%	12.1–18%	8.6–12%	<8.6%	6	Excellent	4	3	**12**
Major	NI 47 – Total killed and seriously injured casualties	>509.8	382.1–509.8	285.4–382	<285.4	274	Excellent	4	3	**12**
Major	NI 48 – Child killed and seriously injured casualties	>38.5	26.6–38.5	20.1–26.5	<20.1	8	Excellent	4	3	**12**
Moderate	BVPI 99c – Total slight casualties	>3179	2484.1–3179.0	1946.6–2484.0	<1946.6	1954	Good	3	2	**6**
Major	SE2 – Salting before formation of ice (pre-salting network)	<96%	96–97%	98–99%	100%	100	Excellent	4	3	**12**
Major	Number of routes salted within prescribed time	<96%	96–97%	98–99%	100%	86	Poor	1	3	**3**
Moderate	Verge – No. of defects on visibility splays A & B	<98%	98%	99%	100%	100	Excellent	4	2	**8**
Moderate	Verge – No. of defects on visibility splays C & U	<98%	98%	99%	100%	100	Excellent	4	2	**8**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Moderate	SW SL1 – % of streetlights not working	>0.84%	0.84–0.67%	0.66–0.45%	<0.44%	0.58	Good	3	2	**6**
Minor	SW SL2 – Average number of failures per lamp per annum (Street lights)	>0.25%	0.25–0.16%	0.15–0.11%	<0.1%	0.27	Poor	1	1	**1**
Minor	SW SL3 - % of failures due to SCC equipment (Street Lights)	<90%	90–94%	95–98%	>98%	87.83	Poor	1	1	**1**
Minor	SW SL10 – Total average cost of maintaining a street light	>£63.79	£63.79–£51.41	£51.40–£37.70	<£37.69	40.28	Good	3	1	**3**
Minor	SW SL16 – Estimated backlog as % of total stock (Street Lights)	>40%	40–27%	26–14%	<13%	21	Good	3	1	**3**
Minor	SW SL31 – % street lighting supports over 25 years old	>40%	40–31%	30–25%	<25%	24.47	Excellent	4	1	**4**
Moderate	SW B1a – Bridge stock condition indicator BCI average	<80%	80–89%	90–94%	>95%	81.91	Fair	2	2	**4**
Moderate	SW B1b – Bridge stock condition indicator BCI critical	<80%	80–89%	90–94%	>95%	78.11	Poor	1	2	**2**
Major	SW B2 – % of bridges not meeting the required carrying capacity	>11%	7–11%	3–6%	<3%	12.9	Poor	1	3	**3**
Moderate	SW TS2 – % of premature lamp faults per year (Traffic Signals)	>9.00%	6.01–9.00%	6–3%	<3%	2.66	Excellent	4	2	**8**
Moderate	SW TS4 – % of sites with more than 6 faults per annum (Traffic Signals)	>30%	29.99–20%	19.99–10%	<9.99%	25.96	Fair	2	2	**4**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Major	LPI3 – Ease of use of rights of way – Network Maintenance & Improvement (excludes Capital Bridge & Structures Work)	<69.2%	69.3–78.5%	78.6–90%	>90.1%	75.6	Fair	2	3	**6**
Moderate	Footway	£3,012,061	£3,456,544	£3,769,472	£4,795,489	£3,456,544	Fair	2	2	**4**
Major	Drainage	£1,988,900	£3,479,494	£6,640,088	£10,635,682	£3,479,494	Fair	2	3	**6**
Minor	Verge	£518,599	£596,600	£1,193,200	£3,010,400	£1,193,200	Good	3	1	**3**
Minor	Road markings no. yellow line defects identified	> 60	41 - 60	20 - 40	< 20	61	Poor	1	1	**1**
Minor	Non illuminated sign maintenance no. defects identified on A+B roads	> 400	251 - 400	100 - 250	< 100	370	Fair	2	1	**2**
Minor	Non illuminated sign maintenance no. defects identified on C+D roads	> 450	301 - 450	150 - 300	< 150	336	Fair	2	1	**2**
Minor	Non illuminated sign maintenance no. finger arms refurbished	< 100 sites	100 - 200 sites	201 - 300 sites	>300 sites	85 sites	Poor	1	1	**1**
Moderate	ROW Capital works – Vehicular Bridges carrying PROWs, Stone arch bridges span >2m, non vehicular bridges >6m	<69.2%	69.3–78.5%	78.6–90%	>90.1%	0	Poor	1	2	**2**
Moderate	Traffic Signals	N/A	N/A	N/A	N/A	N/A	Fair	2	2	**4**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Moderate	Retaining Wall Av	<80%	80–89%	90–94%	>95%	77	Poor	1	2	**2**
Moderate	Retaining Wall Crit	<80%	80–89%	90–94%	>95%	55	Poor	1	2	**2**
Moderate	% of Winter maintenance fleet over 10 years old	>30%	30-15%	15-0%	100%	13	Good	3	2	**6**
Accessibility and Economic Growth Level of Service Score								**Good (61.27%)**		

Table 4.5.2: Environment

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Major	LTP 8 – Air Quality – Taunton and Yeovil	>106ug/m3	81 – 106ug/m3	40 – 80ug/m3	<40ug/m3	50.8	Good	3	3	9
Moderate	Drainage	1988900	3479494	6640088	10635682	0	Fair	2	2	4
Major	Verge	518599	596600	1193200	3010400	0	Good	3	3	9
Moderate	NI 168 – Principal road condition	>7%	6–7%	4–5%	<4%	4	Good	3	2	6
Moderate	NI 169 – Condition of Non Principal Roads (Classified) (B)	>10%	8–10%	6–7%	<6%	10	Fair	2	2	4
Moderate	NI 169 – Condition of Non Principal Roads (Classified) (C)	>10%	8–10%	6–7%	<6%	10	Fair	2	2	4
Moderate	BVPI 224b – Condition of Non Principal Roads (Unclassified)	>18%	12.1–18%	8.6–12%	<8.6%	6	Excellent	4	2	8
Minor	SW B2 – % of bridges not meeting the required carrying capacity	>11%	7–11%	3–6%	<3%	12.9	Poor	1	1	1
Moderate	SW TS2 – % of premature lamp faults per year (Traffic Signals)	>9.00%	6.01–9.00%	6–3%	<3%	2.66	Excellent	4	2	8
Moderate	SW TS4 – % of sites with more than 6 faults per annum (Traffic Signals)	>30%	29.99–20%	19.99–10%	<9.99%	25.96	Fair	2	2	4
Major	LTP 8 – Air Quality – Taunton and Yeovil	>106ug/m3	81 – 106ug/m3	40 – 80ug/m3	<40ug/m3	50.8	Good	3	3	9
Major	Traffic Signals	0	0	0	0	0	Fair	2	3	6

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Minor	% of Winter maintenance fleet over 10 years old	>30%	30-15%	15-0%	0%	13	Good	3	1	**3**
Environment (including Congestion and Air Quality) Level of Service Score								**Good (66.96%)**		

Table 4.5.3: Road safety

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Major	NI 168 – Principal road condition	>7%	6–7%	4–5%	<4%	4	Good	3	3	**9**
Major	NI 169 – Condition of Non Principal Roads (Classified) (B)	>10%	8–10%	6–7%	<6%	10	Fair	2	3	**6**
Major	NI 169 – Condition of Non Principal Roads (Classified) (C)	>10%	8–10%	6–7%	<6%	10	Fair	2	3	**6**
Major	BVPI 224b – Condition of Non Principal Roads (Unclassified)	>18%	12.1–18%	8.6–12%	<8.6%	6	Excellent	4	3	**12**
Major	NI 47 – Total killed and seriously injured casualties	>509.8	382.1–509.8	285.4–382	<285.4	274	Excellent	4	3	**12**
Major	NI 48 – Child killed and seriously injured casualties	>38.5	26.6–38.5	20.1–26.5	<20.1	8	Excellent	4	3	**12**
Major	BVPI 99c – Total slight casualties	>3179	2484.1–3179.0	1946.6–2484.0	<1946.6	1954	Good	3	3	**9**
Major	SE2 – Salting before formation of ice (pre-salting network)	<96%	96–97%	98–99%	100%	100	Excellent	4	3	**12**
Major	Number of routes salted within prescribed time	<96%	96–97%	98–99%	100%	86	Poor	1	3	**3**
Major	Verge – No. of defects on visibility splays A & B	<98%	98%	99%	100%	100	Excellent	4	3	**12**
Major	Verge – No. of defects on visibility	<98%	98%	99%	100%	100	Excellent	4	3	**12**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
	splays C & U									
Moderate	SW SL1 – % of streetlights not working	>0.84%	0.84–0.67%	0.66–0.45%	<0.44%	0.58	Good	3	2	**6**
Moderate	SW SL2 – Average number of failures per lamp per annum (Street lights)	>0.25%	0.25–0.16%	0.15–0.11%	<0.1%	0.27	Poor	1	2	**2**
Minor	SW B1a – Bridge stock condition indicator BCI average	<80%	80–89%	90–94%	>95%	81.91	Fair	2	1	**2**
Minor	SW B1b – Bridge stock condition indicator BCI critical	<80%	80–89%	90–94%	>95%	78.11	Poor	1	1	**1**
Moderate	SW B2 – % of bridges not meeting the required carrying capacity	>11%	7–11%	3–6%	<3%	12.9	Poor	1	2	**2**
Major	SW TS2 – % of premature lamp faults per year (Traffic Signals)	>9.00%	6.01–9.00%	6–3%	<3%	2.66	Excellent	4	3	**12**
Moderate	SW TS4 – % of sites with more than 6 faults per annum (Traffic Signals)	>30%	29.99–20%	19.99–10%	<9.99%	25.96	Fair	2	2	**4**
Major	Footway	£3012060.53	£3456543.643	£3769472.323	£4795488.796	£3456544	Fair	2	3	**6**
Moderate	Drainage	£1988900	£3479494	£6640088	£10635682	£3479494	Fair	2	2	**4**
Major	Verge	£518599	£596600	£1193200	£3010400	£1193200	Good	3	3	**9**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Minor	Road Studs annual % length failure as identified in the night time survey	> 25%	15.01 - 25%	5-15%	< 5%	10.60%	Good	3	1	**3**
Moderate	Road markings no. defects identified on A+B roads	> 50	31 - 50	10 - 30.	< 10	11	Good	3	2	**6**
Moderate	Road markings no. defects identified on C+D roads	> 90	61 - 90	30 - 60	< 30	54	Good	3	2	**6**
Moderate	Non illuminated sign maintenance no. defects identified on A+B roads	> 400	251 - 400	100 - 250	< 100	370	Fair	2	2	**4**
Moderate	Non illuminated sign maintenance no. defects identified on C+D roads	> 450	301 - 450	150 - 300	< 150	336	Fair	2	2	**4**
Moderate	Non illuminated sign maintenance no. finger arms refurbished	< 100 sites	100 - 200 sites	201 - 300 sites	>300 sites	85 sites	Poor	1	2	**2**
Major	A road SCRIM	N/A	N/A	N/A	N/A	N/A	Good	3	3	**9**
Major	B road SCRIM	N/A	N/A	N/A	N/A	N/A	Fair	2	3	**6**
Minor	Traffic Signals	N/A	N/A	N/A	N/A	N/A	Fair	2	1	**2**
Minor	Retaining Wall Av	<80%	80–89%	90–94%	>95%	77	Poor	1	1	**1**
Minor	Retaining Wall Crit	<80%	80–89%	90–94%	>95%	55	Poor	1	1	**1**
Major	% of Winter maintenance fleet over 10 years old	>30%	30-15%	15-0%	0%	13	Good	3	3	**9**
Road Safety Level of Service Score								**Good (66.88)**		

Table 4.5.4: Demand aspirations

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Major	NI 168 – Principal road condition	>7%	6–7%	4–5%	<4%	4	Good	3	3	**9**
Major	NI 169 – Condition of Non Principal Roads (Classified) (B)	>10%	8–10%	6–7%	<6%	10	Fair	2	3	**6**
Major	NI 169 – Condition of Non Principal Roads (Classified) (C)	>10%	8–10%	6–7%	<6%	10	Fair	2	3	**6**
Major	BVPI 224b – Condition of Non Principal Roads (Unclassified)	>18%	12.1–18%	8.6–12%	<8.6%	6	Excellent	4	3	**12**
Major	NI 47 – Total killed and seriously injured casualties	>509.8	382.1–509.8	285.4–382	<285.4	274	Excellent	4	3	**12**
Major	NI 48 – Child killed and seriously injured casualties	>38.5	26.6–38.5	20.1–26.5	<20.1	8	Excellent	4	3	**12**
Major	BVPI 99c – Total slight casualties	>3179	2484.1–3179.0	1946.6–2484.0	<1946.6	1954	Good	3	3	**9**
Major	SE2 – Salting before formation of ice (pre-salting network)	<96%	96–97%	98–99%	100%	100	Excellent	4	3	**12**
Major	Number of routes salted within prescribed time	<96%	96–97%	98–99%	100%	86	Poor	1	3	**3**
Major	Verge – No. of defects on visibility splays A & B	<98%	0.98	0.99	100%	100	Excellent	4	3	**12**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Major	Verge – No. of defects on visibility splays C & U	<98%	0.98	0.99	100%	100	Excellent	4	3	**12**
Moderate	SW SL1 – % of streetlights not working	>0.84%	0.84–0.67%	0.66–0.45%	<0.44%	0.58	Good	3	2	**6**
Minor	SW SL2 – Average number of failures per lamp per annum (Street lights)	>0.25%	0.25–0.16%	0.15–0.11%	<0.1%	0.27	Poor	1	1	**1**
Minor	SW SL3 - % of failures due to SCC equipment (Street Lights)	<90%	90–94%	95–98%	>98%	87.83	Poor	1	1	**1**
Moderate	SW B2 – % of bridges not meeting the required carrying capacity	>11%	7–11%	3–6%	<3%	12.9	Poor	1	2	**2**
Moderate	SW TS2 – % of premature lamp faults per year (Traffic Signals)	>9.00%	6.01–9.00%	6–3%	<3%	2.66	Excellent	4	2	**8**
Moderate	SW TS4 – % of sites with more than 6 faults per annum (Traffic Signals)	>30%	29.99–20%	19.99–10%	<9.99%	25.96	Fair	2	2	**4**
Moderate	LPI3 – Ease of use of rights of way – Network Maintenance & Improvement (excludes Capital Bridge & Structures Work)	<69.2%	69.3–78.5%	78.6–90%	>90.1%	75.6	Fair	2	2	**4**
Major	Overall Satisfaction with highways & transport service (vs. local importance)	<53.41	53.41 – 55.42	55.43 – 56.24	>56.24	55.77	Good	3	3	**9**
Major	Overall Satisfaction with Highways and Transport Service (vs. national	<53.45	53.45 – 55.49	55.50 – 56.18	>56.18	55.91	Good	3	3	**9**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
	importance)									

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result	Category	Score	Weighting	Current Weighted Score
Major	Footway	3012060.53	3456543.643	3769472.323	4795488.796	0	Fair	2	3	**6**
Major	Drainage	1988900	3479494	6640088	10635682	0	Fair	2	3	**6**
Minor	Verge	518599	596600	1193200	3010400	0	Good	3	1	**3**
Minor	Road Studs annual % length failure as identified in the night time survey	> 25%	15.01 - 25%	5-15%	< 5%	10.60%	Good	3	1	**3**
Minor	Road markings no. defects identified on A+B roads	> 50	31 - 50	10 - 30.	< 10	11	Good	3	1	**3**
Minor	Road markings no. defects identified on C+D roads	> 90	61 - 90	30 - 60	< 30	54	Good	3	1	**3**
Minor	Road markings no. yellow line defects identified	> 60	41 - 60	20 - 40	< 20	61	Poor	1	1	**1**
Minor	Non illuminated sign maintenance no. defects identified on A+B roads	> 400	251 - 400	100 - 250	< 100	370	Fair	2	1	**2**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result	Category	Score	Weighting	Current Weighted Score
Minor	Non illuminated sign maintenance no. defects identified on C+D roads	> 450	301 - 450	150 - 300	< 150	336	Fair	2	1	**2**
Minor	Non illuminated sign maintenance no. finger arms refurbished	< 100 sites	100 - 200 sites	201 - 300 sites	>300 sites	85 sites	Poor	1	1	**1**
Minor	ROW Capital works – Vehicular Bridges carrying PROWs, Stone arch bridges span >2m, non vehicular bridges >6m	<69.2%	69.3–78.5%	78.6–90%	>90.1%	0	Poor	1	1	**1**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result	Category	Score	Weighting	Current Weighted Score
Moderate	A road SCRIM	N/A	N/A	N/A	N/A	N/A	Good	3	2	**6**
Moderate	B road SCRIM	N/A	N/A	N/A	N/A	N/A	Fair	2	2	**4**
Minor	Traffic Signals	N/A	N/A	N/A	N/A	N/A	Fair	2	1	**2**
Major	% of Winter maintenance fleet over 10 years old	>30%	30-15%	15-0%	0%	13	Good	3	3	**9**
Demand Aspirations Level of Service Score								**Good (67.91)**		

Table 4.5.5: Asset Condition

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
Major	NI 168 – Principal road condition	>7%	6–7%	4–5%	<4%	4	Good	3	3	**9**
Major	NI 169 – Condition of Non Principal Roads (Classified) (B)	>10%	8–10%	6–7%	<6%	10	Fair	2	3	**6**
Major	NI 169 – Condition of Non Principal Roads (Classified) (C)	>10%	8–10%	6–7%	<6%	10	Fair	2	3	**6**
Major	BVPI 224b – Condition of Non Principal Roads (Unclassified)	>18%	12.1–18%	8.6–12%	<8.6%	6	Excellent	4	3	**12**
Minor	SW SL16 – Estimated backlog as % of total stock (Street Lights)	>40%	40–27%	26–14%	<13%	21	Good	3	1	**3**
Minor	SW B1a – Bridge stock condition indicator BCI average	<80%	80–89%	90–94%	>95%	81.91	Fair	2	1	**2**
Minor	SW B1b – Bridge stock condition indicator BCI critical	<80%	80–89%	90–94%	>95%	78.11	Poor	1	1	**1**
Minor	SW B2 – % of bridges not meeting the required carrying capacity	>11%	7–11%	3–6%	<3%	12.9	Poor	1	1	**1**
Minor	Footway	3012060.	3456543.643	3769472.323	4795488.796	0	Fair	2	1	**2**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
		53								
Minor	Drainage	1988900	3479494	6640088	10635682	0	Fair	2	1	**2**
Minor	Verge	518599	596600	1193200	3010400	0	Good	3	1	**3**
Minor	Road Studs annual % length failure as identified in the night time survey	> 25%	15.01 - 25%	5-15%	< 5%	10.60%	Good	3	1	**3**
Minor	Road markings no. defects identified on A+B roads	> 50	31 - 50	10 - 30.	< 10	11	Good	3	1	**3**
Minor	Road markings no. defects identified on C+D roads	> 90	61 - 90	30 - 60	< 30	54	Good	3	1	**3**
Minor	Road markings no. yellow line defects identified	> 60	41 - 60	20 - 40	< 20	61	Poor	1	1	**1**
Minor	Non illuminated sign maintenance no. defects identified on A+B roads	> 400	251 - 400	100 - 250	< 100	370	Fair	2	1	**2**
Minor	Non illuminated sign maintenance no. defects identified on C+D roads	> 450	301 - 450	150 - 300	< 150	336	Fair	2	1	**2**
Minor	Non illuminated sign maintenance no. finger arms refurbished	< 100 sites	100 - 200 sites	201 - 300 sites	>300 sites	85 sites	Poor	1	1	**1**
Minor	ROW Capital works – Vehicular Bridges carrying PROWs, Stone arch bridges span >2m,	<69.2%	69.3–78.5%	78.6–90%	>90.1%	0	Poor	1	1	**1**

Weight Description	Performance Measures	POOR	FAIR	GOOD	EXCELLENT	Latest Result 2008/9	Category	Score	Weighting	Current Weighted Score
	non vehicular bridges >6m									
Major	A road SCRIM	N/A	N/A	N/A	N/A	N/A	Good	3	3	**9**
Major	B road SCRIM	N/A	N/A	N/A	N/A	N/A	Fair	2	3	**6**
Minor	Traffic Signals	N/A	N/A	N/A	N/A	N/A	Fair	2	1	**2**
Minor	Retaining Wall Av	<80%	80–89%	90–94%	>95%	77	Poor	1	1	**1**
Minor	Retaining Wall Crit	<80%	80–89%	90–94%	>95%	55	Poor	1	1	**1**
Minor	% of Winter maintenance fleet over 10 years old	>30%	30-15%	15-0%	0	13	Good	3	1	**3**
Asset Condition Level of Service Score								**Good (57.43)**		

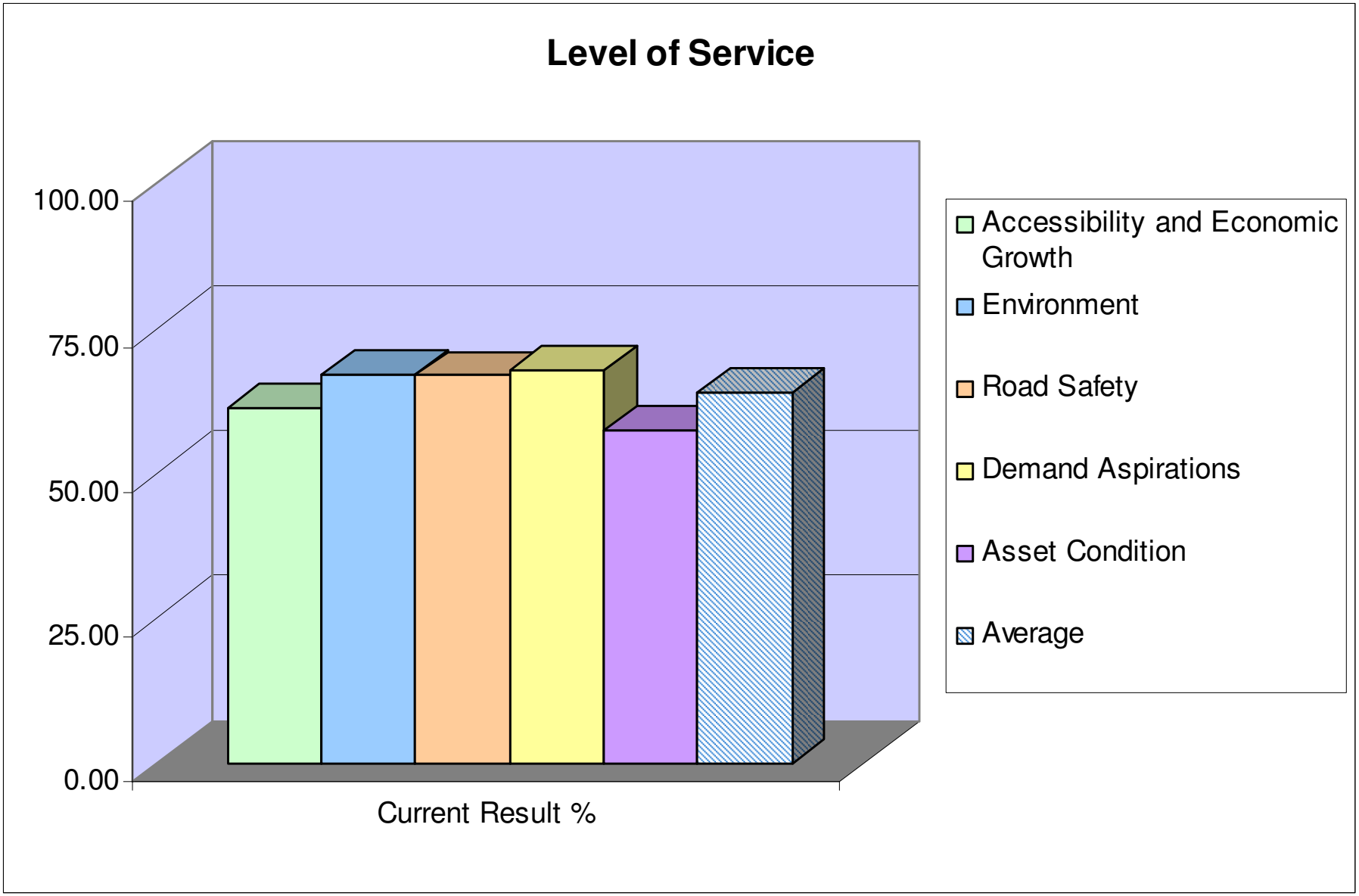

Level of Service
100.00
75.00
50.00
25.00
0.00
Current Result %
Accessibility and Economic Growth
Environment
Road Safety
Demand Aspirations
Asset Condition
Average

Table 4.6: Levels of Service achieved

	Maximum Possible Weighted Score – Sum	Weighted Score Achieved – Sum	Current Result %
Accessibility and Economic Growth	284	174	61.27
Environment	112	75	66.96
Road Safety	308	206	66.88
Demand Aspirations	296	201	67.91
Asset Condition	148	85	57.43
Average			64.09

Excellent	75.01 – 100%
Good	50.01 – 75%
Fair	25.01 – 50%
Poor	0 – 25%

5. Inventory and condition

Introduction: Why is Inventory and Condition important?

5.1 To deliver the Goals and Objectives in Chapter 3 and achieve the required Levels of Service in Chapter 4 it is necessary to appreciate the extent of the highway network, the range of assets involved and the condition of the components that sustain it. Equally it is important to understand that the highway is an engineering structure and that to manage and maintain it effectively and efficiently requires knowledge of the individual assets, how many there are, the condition they are in and the materials used. This is inventory and condition data and along with knowledge of the functional requirements provides the quantitative and qualitative measures of the highway assets.

Background

5.2 SCC recognised the importance of a systematic approach to highway maintenance at an early stage.

5.3 A network of links and sections was defined for SCC's Class A and B roads, and a comprehensive inventory collection was undertaken using handheld data capture devices. On completion of the main roads, the inventory collection was extended to include all urban areas within 40 mph limits. A reduced set of inventory items, including carriageways, footways, gullies, kerbs and verges was undertaken on the rural Class C and Unclassified roads.

5.4 This inventory collection process in the 1990s, captured more than a million items, and forms the foundation to the current highway inventory data. At the same time, SCC started to assemble detailed construction records on the Class A and B roads, and traffic data for use with the industry standard road condition surveys, Deflectograph, SCRIM, and MRM within the WDM Pavement Management System.

5.5 Highway inventory and condition data has been developed and used for many years, to enable needs based budgets to be allocated and priorities selected using objective data.

Asset management approach

5.6 The preparation of the TAMP has re-focused attention on network inventory and condition data. The need to produce detailed valuations and life cycle plans has provided the opportunity to evaluate the suitability and confidence levels of current data by considering its extent, its accuracy and suitability. This analysis is enabling deficiencies and gaps to be identified.

5.7 In 2002 Somerset County Council purchased and introduced the Confirm Asset Management system. Confirm is a Pitney Bowes MapInfo product.

5.8 The Confirm system provides a Highways Information System that:

- Meets the highway maintenance information handling business requirements of the County Council and provides a single point of contact for highway issues;
- Acts as an interface between officers and the public;
- Creates defect repair jobs on site during inspections using wireless Personal Digital Assistants (PDA's);
- Minimises the County Council's risk by ensuring that the Section 58 defence against highway liability claims could be proven through sound inspection and recording procedures;
- Produces electronic Works Orders to service provider and has an EtoN compliant Streetworks system to co-ordinate works;
- Cross-references data by location to build a maintenance history for every section of highway;

- Summarises information in a way that allows performance indicators to be produced in an effective and efficient way.

5.9 Confirm is now an integral part of highway management in Somerset.

5.10 The original RMMS style inventory datasets were extracted from the previous *'HERMIS'* database. A GIS Inventory Data Management Suite was developed and is now used to maintain the inventory and network data which is published on the County's intranet mapping system.

5.11 SCC has a number of other well established, specialist and functional management systems that use and manage inventory and condition data.

Table 5.1: Management systems

	Inventory data	Condition data	Customer enquiries	Works orders
Carriageways	GIS Inventory Data Management	WDM Pavement Management System	Confirm	Confirm
Footways				
Structures retaining walls and earthworks	The Structures Database	The Structures Database	Confirm	Confirm
Drainage	GIS Inventory Data Management	CCTV Video Surveys	Confirm	Confirm
Lighting	Facilities Management System	Facilities Management System	Facilities Management System	Facilities Management System
Signs, road markings and road studs	GIS Inventory Data Management ParkMap – Traffic Regulation Orders, under development	GIS Safety Defects Night time inspections Spreadsheets	Confirm	Confirm
Traffic control systems	TC Management System	TC Management System	Confirm	Serco Contract
Verges	GIS Inventory Data Management	GIS Safety Defects	Confirm	Confirm
Trees	GIS Inventory Data Management	GIS Inventory Data Management	Confirm	Confirm
Landscape areas	Area Offices	GIS Safety Defects	Confirm	Confirm
Rights of way	ProW Database	ProW Database	PROW Database	PROW Database
Depots and salt barns	Spreadsheets	Spreadsheets	Confirm	Confirm
Winter maintenance Treatment routes Self help locations	GIS Inventory Data Management	Service Provider Records GPS tracking records	Confirm	Confirm
Winter maintenance Gritting vehicles Other winter plant	Spreadsheets	Service Provider Records	Confirm	Confirm
Ancillary assets Cattle grids Arrester beds Safety fencing	GIS Inventory Data Management	Spreadsheets	Confirm	Confirm

5.12 The TAMP requires the inventory and condition data to be accessible, but not necessarily in a common system. The different systems in use are not an impediment to openness or data sharing. Originally, data sharing was promoted using paper plans, but desktop mapping is now used by the Highways Client, using PlanWeb, SCC's intranet mapping, and MapExplorer. There are now 219 datasets published within PlanWeb. This volume of data has required the development of meta data to establish data owners, managers and publishers, as each has a key role in maximising the value of their data.

5.13 Inventory collection is quite straightforward. The challenge comes in maintaining the data. A series of innovative ways of indirect inventory collection and data exploitation has been developed to intercept changes to the inventory and highway network, and to identify other valuable sources of information.

Carriageways

5.14 The carriageway is the largest single set of transport assets. The delivery of goods and services throughout Somerset depend upon it. This is brought into focus when a part of the network becomes temporarily unavailable.

5.15 SCC was one of the first authorities to have the WDM Pavement Management System (PMS) when it was developed and became available in the early 1990s. The generic word 'pavement' is perhaps unfortunate as it does not relate to footways, but is the word used throughout the industry to describe 'paved' surfaces which carry wheeled traffic, for example carriageways and aircraft runways.

5.16 The WDM Pavement Management System was designed to provide a complete solution to pavement maintenance from the input of raw survey data through to treatment selection, budgeting and maintenance history. The PMS incorporates all of the approved processing methods required to analyse the industry standard pavement survey methods, SCRIM, Deflectograph, SCANNER and CVI/DVI (through the UKPMS module) and so the PMS is able to manage data at the raw survey level and so supports re-processing, trending and the influence of some maintenance treatments.

5.17 All machine based and visual condition surveys are fitted to the digital highway network, which is held within the PMS. The PMS also stores and maintains all the construction and maintenance records as well as details of accidents and traffic flows.

5.18 The type and extent of highway condition surveys during the last 10 years has been influenced by the need to generate carriageway and footway Best Value Performance Indicators (BVPIs). New sets of Rules and Parameters have been produced each year and specify the types of survey and the minimum coverage required for each class of road.

5.19 Highways authorities are required to calculate the BVPI highway condition indicators for their network by processing their survey data to the appropriate set of Rules and Parameters within an accredited PMS.

5.20 During the last few years there have been changes to the type of condition surveys specified and to the methods used to process the data. Consequently there has not always been consistency from year to another year or the ability to identify trends.

5.21 SCC identified the need to extract more value from all the highway condition survey data and the PMS and established a Partnership with WDM, who are recognised as leaders in this area. The Partnership has developed Somerset's SCRIM Policy Document, produced survey strategies for SCRIM and Deflectograph and developed objective ways to identify and predict future structural maintenance and surfacing dressing priority lists, which are fundamental to the successful management of the highway network and undertake all the carriageway condition surveys.

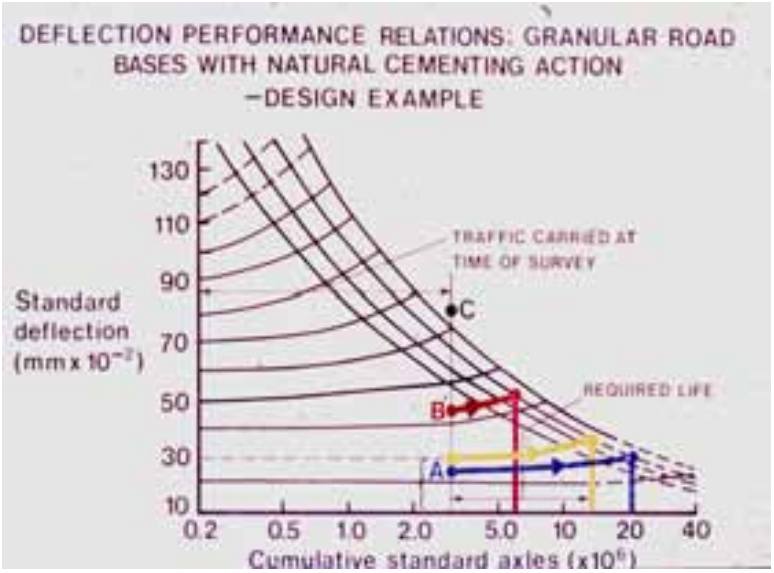
Condition surveys

Deflectograph

5.22 All roads, other than those constructed of concrete, are flexible and bend, or deflect by small amounts under the weight of vehicle wheel loads. The Deflectograph (see right) was designed to measure and record these very small deflections of the road surface under the action of a slow moving standard load.

5.23 Deflection measurements are taken in both wheel paths using two deflection beams which are mounted under the vehicle on a common reference frame that rests on the road surface. The deflection beams, and reference frame are stationary during the deflection measurement cycle and remain stationary until the maximum deflection has been recorded.

5.24 Although the measurements are taken on the surface the Deflectograph records the total deflection for the layers of the road and from the underlying soil foundations on which the road is built. Detailed calculations using the deflection measurements, the road construction layers and the amount of traffic (example see right) can predict how much life the carriageway has left before strengthening is required and provide a recommended overlay thickness.



5.25 Deflectograph surveys have been undertaken on the County's Strategic and Main Distributor roads since the 1980's and were used for many years to produce a Principal Road Condition Indicator.

SCRIM (Sideway-force Coefficient Routine Investigation Machine)

5.26 The skid resistance of the road surface is measured by a SCRIM machine (see right). This specialist vehicle records the friction, or side ways force, on a fifth wheel mounted within the chassis. The wheel is mounted at an angle of 20 degrees to the direction of travel and water is continuously applied to the road immediately in front of the fifth wheel as skidding is most critical under wet conditions.

5.27 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. These requirements are formalised as a set of site related Investigatory Levels in the Design Manual for Roads and Bridges, Volume 7, Section 3 referred as HD 28/04 and are being refined in Somerset's SCRIM Policy Document.

5.28 The skidding resistance measurements recorded by the SCRIM surveys are used to identify lengths of road that are at or below the investigatory levels for each site.

5.29 SCRIM survey vehicles travel at target speeds of 50km/hr or 80km/hr and skidding resistance data recorded at other speeds can be speed corrected to give equivalent values at 50 km/hr.

5.30 SCRIM surveys have been undertaken on the County's Strategic and Main Distributor roads since the 1970's and have been used for many years to produce a Local Principal Road Condition Indicator.

SCANNER (Surface Condition Assessment for the National Network of Roads)

5.31 WDM developed their Road Assessment Vehicles (RAVs, see right) for high speed data collection on the Highways Agency motorway and trunk roads, recording surface conditions and crack detection. These vehicles have become the primary provider of SCANNER survey data on highway authority roads throughout the United Kingdom.

5.32 SCANNER surveys were introduced in 2004/2005 and their use has been gradually extended so that they are now required to produce the National Indicators for Principal (Class A) and Non-Principal (B and C class) roads. Highly specialist survey vehicles have been developed, which use lasers and digital images to record vast quantities of detailed measurements about the road surface. The vehicles travel at normal traffic speeds up to 100km per hour and so do not interfere with traffic flow whilst they record their data, which includes gradients, cross falls, radius of curvature, profile variance, rut depths, cracking and digital video images.

5.33 Newer, much smaller vehicles have been developed which can produce the same quality of data so that surveys can now be undertaken on the narrower roads. Prior to the introduction of Scanner surveys there was a similar machine called the MultiFunction Road Monitor (MRM) that collected some of the same information but with less advanced technology. The MRM used a smaller number of lasers to estimate rut depths and did not have the ability to identify carriageway cracking. Data from MRM surveys was used to view road conditions within the County but was not used for any performance indicators.

5.34 SCANNER and the earlier MRM laser surveys measure carriageway conditions that are visible from the road surface. SCC has followed the County Surveyors Society recommendation and has continued to use Deflectograph surveys with their ability to assess the structural condition of the County's Strategic and Main Distributor roads.

Coarse visual inspections (CVI)

5.35 The ukPMS introduced a simplified standard form of visual survey that could be used for both carriageways and footways. Photographs were produced to illustrate the defects to be identified and all inspectors were required to pass an accreditation test. This was aimed at minimising the possible subjective nature of the survey.

5.36 CVI Surveys were specifically designed to collect coarse visual data without the need for walked surveys. The use of digital mapping and touch screen technology allowed visual defects to be identified and recorded at approximately 15km/h.

5.37 CVI surveys have been undertaken on SCC's un-classified road network since 2000 and the results were processed in the PMS to calculate some of the BVPI condition indicators on the non principal road network. The condition of the unclassified roads has been reported using CVI surveys until 2007/8. Although highway authorities are no longer required to produce a condition indicator for the unclassified road, SCC and many other authorities have continued with the CVI surveys as un-classified roads represent such a large proportion of the highway network. In SCC the unclassified roads form half of the total network and the CVI survey provides valuable data which can be used by the PMS to inform scheme selection and provide valuable comparative data.

5.38 Carriageway inventory, particularly road lengths and widths, was collected as part of the initial RMMS inventory. See Table 5.2

Table 5.2: Carriageway asset by district and road class (km)

District	A roads	B roads	C roads	Unclassified
West Somerset	83.6	115.2	296.1	455.9
Taunton Deane	83.7	56.2	378.3	581.3
Sedgemoor	120.1	60.1	332.5	564.4
Mendip	180.6	109.1	486.9	743.3
South Somerset	191.8	117	721.8	927
Total	659.8	457.6	2215.6	3271.9

5.39 Roads have also been categorised into maintenance hierarchy that reflects their individual importance and usage. See Table 5.3

Table 5.3: Carriageway asset by district and hierarchy

District	National primary routes	County main distributor	County secondary distributor	Local inter-connecting roads	Local collector road	Local road
West Somerset	0	139.1	75.1	55.8	207.8	473.1
Taunton Deane	11.4	122.1	6.4	121.1	197.6	640.9
Sedgemoor	30.1	133.7	27.9	110.7	173	601.6
Mendip	81.5	188	51.9	114.1	273.6	810.7
South Somerset	36.2	234.5	49.2	68.1	493.5	1076.1
Total	159.2	817.4	210.5	469.8	1345.5	3602.5

Footways

Detailed visual inspections (DVI)

5.40 The ukPMS introduced a simplified standard form of Detailed Visual Inspection survey that could be used for both carriageways and footways. DVI Surveys are undertaken solely on foot and record details of the defects identified and their position (see right).

5.41 DVI footway surveys were a requirement to produce the Footway Condition Indicator BVPI 187 and have been undertaken on the County's Hierarchy 1 and 2 Footways (Busy Urban Areas) since 2002. These footways represented approximately 3% of the total footway network. The WDM PMS manages details of the DVI surveys and was used to produce BVPI 187.

5.42 When the requirement to produce BVPI 187 was discontinued in 2008/09 SCC ceased to collect data in this way as the information was not considered suitable for planning maintenance works or representative of the overall footway network.

5.43 Footways adjacent to carriageways were one of the original RMMS inventory datasets.

5.44 In urban areas there are surfaced footpaths, linking paths and pedestrian areas that are detached from the carriageway network. A data network of these linking footways is currently being created to ensure that planned inspections can be easily carried out on foot. A total of 225 km of these have so far been identified. At present, they have no inventory data, but some condition data is being generated by routine inspections.

5.45 BVPI 187 was not a particularly useful indicator. The DVI Surveys were only required in the centre of the larger towns, accounting for 3% of the footway network. As an alternative, a new condition indicator is being developed.

5.46 It is anticipated that in 2010 the UK Roads Liaison Group will launch a new footway survey known as the 'Coarse Network Survey' which should provide a tool fro condition assessment and allow for comparison between authorities.

5.47 The length of the footway and cycleway networks are listed below in Table 5.4.

Table 5.4: Length of footway and cycleway by road class and district

District	Class A (Km)	Class B (Km)	Class C (Km)	Unclassified (Km)	Cycleway (Total Km)
West Somerset	16.4	7.1	18.1	87.5	6.5
Taunton Deane	49.7	18.8	61.9	334.1	51.2
Sedgemoor	79.1	28.5	51.5	327.4	27.2
Mendip	79.5	39	74.6	293.6	23.5
South Somerset	87.1	40.1	118.6	442.2	23.1
Total	311.8	133.5	324.7	1484.8	131.5

Structures, retaining walls, earthworks

5.48 SCC's structures are managed and recorded in the Structures Databases, a bespoke in-house system using Microsoft Access. The system contains a comprehensive set of inventory data and inspection results from general, enhanced general and principal inspections. In addition wherever it is possible all structures have been photographed.


Blue Anchor Sea Wall (from beach)

5.49 SCC's structures encompass a variety of different construction types, sizes and materials and range from new steel structures to masonry arches and ancient monuments. This diversity is perhaps best illustrated by considering some examples from the photographic records.

5.50

5.51 The inventory and condition data is continually being updated. All of the assets contain detailed OS Grid co-ordinates, and are published as a mapping layer within PlanWeb and MapExplorer, including hyperlinks to the digital 'elevation' and 'view' photographs.


Blue Anchor Sea Wall (from road)

5.52 The Structures Databases also generates the Bridge Condition Index for each structure, following guidance in *Bridge Condition Indicators* (BCI) – Volumes 1 to 3, and subsequent addendums issued in August 2004. These addendums give definitions (weighted averages for each related stock group) as follows:-

1) CIB – Condition Indicators for Bridges;

2) CIRW – Condition Indicators for Retaining Walls.

5.53 The *Bridge Condition Indicators* (BCI) guidelines also cover gantries for overhead signs and signals but there is currently none of these recorded in Somerset. The Condition Indicator for Structure Stock (CIST) is a weighted average of CIB and CIRW.

5.54 **A summary of the structures is given below in Table 5.5**

Type Of Structure	Number
Bridges	2262
Footbridges	139
Culverts	397
Tanks	1
Retaining walls	459

Drainage

5.55 In the 1990's, the initial eleven drainage inventory items recorded the visible surface items, such as gullies and manholes, but did not include details of the piped drainage, the specialist flow regulators or the location of outfalls. 'Drainage' is now one of over 245 datasets available to all users through PlanWeb. Before the findings of the Pitt report were published, drainage had been the key asset that had already been targeted. The following initiatives have been developed to address this gap.

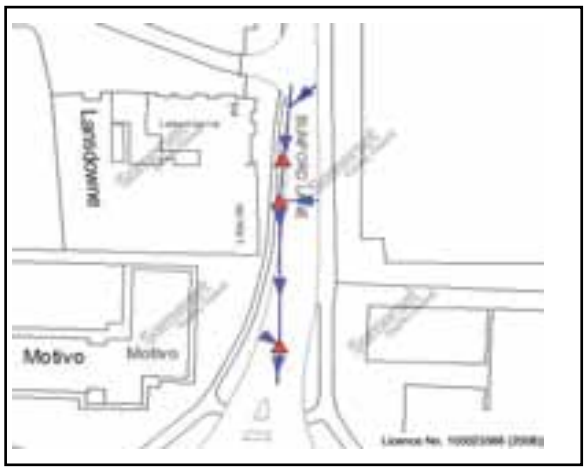
5.56 **Jetting plans** A policy decision required that highway drainage at all resurfacing sites should be fully checked and any problems rectified. Good drainage would not only improve the life of the carriageway but would reduce the risk of future road openings, with the associated costs and congestion. Detailed plans were produced for each site (by the Highway Information Management Team), and drainage details recorded by the Jetting Gang as they were identified on site.

The details collected are used to:

- Validate existing inventory
- Identify unrecorded changes
- Record the location of the outfalls
- Record details of the pipe runs, pipe size, material type and direction of flow

Step 1: Data recorded by operative (below left)

Step 2: Added to Drainage Layer by GIS Technician (below right)



5.57 **CCTV plans** CCTV surveys are undertaken if drainage problems or blockages are identified by Area Offices or from the jetting work.


CCTV SURVEY REPORT OF STORM DRAINAGE

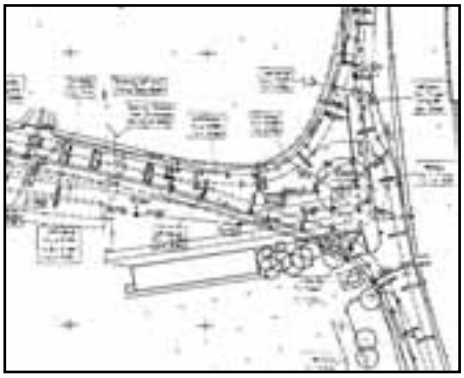
5.58 As part of their reporting mechanism, the CCTV team provide a map based site plan showing details of the drainage system (example, see right). This is sent in electronic format to the Information Management Team, who then incorporate the data into the mapping drainage layers.

5.59 To date 373 documents and plans have been received.

5.60 Work is in progress to create a mapping layer to show the locations where a CCTV survey has been undertaken. This will include a hyperlink to the original document and a reference back to the CCTV video library.

5.61 **As-built scheme drawings** As-built drawings for New Adoptions (Developers) and Minor Works (in-house) are provided as part of the completion and payment process. This provides high quality improvement and maintenance information about changes to the network and materials. As-built drawings are currently received in the form of a paper copy. The information is captured using GIS. Although the initial emphasis is on drainage details, the drawings are retained so that other key inventory items can be collected at a later date.

Major works as-built (see below left)



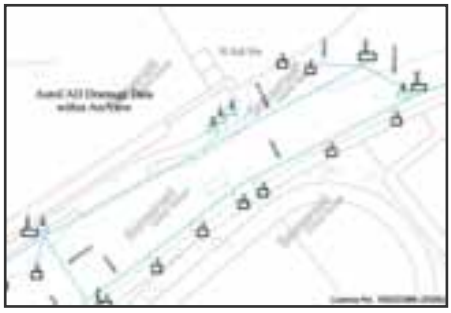
Added to drainage layer (see right)

5.62 Future plans include scanning all new drawings and adding them to the existing library of 1746 scanned drawings. These will then be hyperlinked to the drainage layer.

5.63 **Vulnerable flooding sites** Locations of flooding points and emergency actions required are identified from local knowledge and problems reported, then are published as a mapping layer.

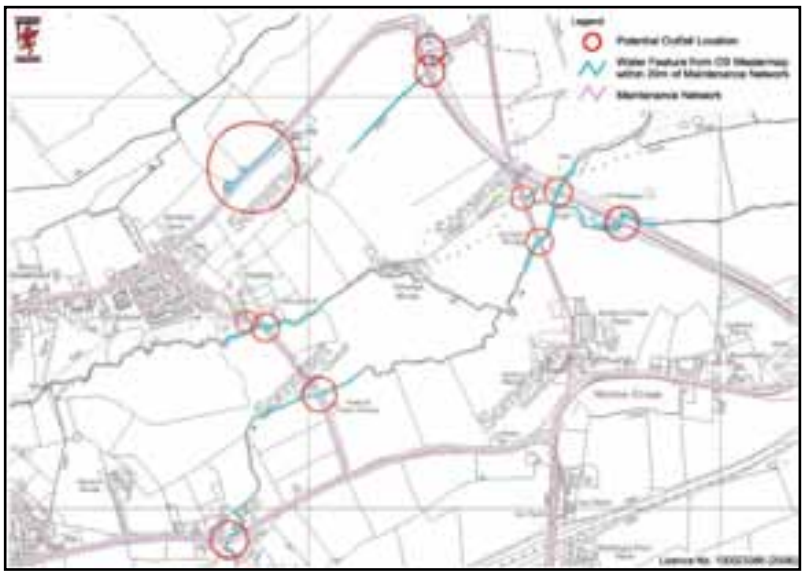
5.64 **Electronic drainage inventory** The practicality is currently being tested of extracting drainage details from drawings received in electronic format, and adding them directly into the GIS layer. Although there are problems to be resolved, initial success has been achieved in extracting drainage information from an in-house AutoCad drawing.

AutoCad drawing (see below, left)



Drainage data imported directly into GIS (see above, right)

5.65 **Outfalls – Map based identification** '**OS** text' and OS MasterMap can be used to identify potential locations of drainage outfalls (see right). The text layer has been searched to identify any of the following key words: "issues", "sinks", "drain", "pond", "collects", "stream" or "river" and the MasterMap topology layers searched for the legend field "0059 Inland water edge/limit"



5.66 A GIS layer to show the possible locations of the outfalls for highway drainage was produced by selecting any of the text or water features that were within a specified distance of the digital highway centre line.

5.67 **Local sketches** Sketches and notes kept by highway supervisors and inspectors can be a valuable source of local knowledge, especially about drainage. They can be particularly useful as they have concentrated their efforts on the more complex sites, or where problems have been encountered. This knowledge needs to be captured it in a logical and formalised way.

5.68 **Exit interviews** Debriefing interviews provide a vast amount of local knowledge. A formal programme has been introduced to identify the departures of key staff and schedule an exit interview. During the most recent interview, an old file containing 62 detailed drainage sketches was identified, and all of its details have been retained for incorporation into the drainage layers.

5.69 **Easements** The details of formal easements that have been agreed are retained within the legal records maintained by the County Terrier. This is another potential source of valuable information. Unfortunately, as it is not currently possible to separate out the highway related issues, this dataset has yet to be exploited.

5.70 **Drainage summary** All drainage data is tagged with an attribute to reflect the confidence based on the original data source. Details collected from sketches can then be updated if better information becomes available. Details of documents are also stored to enable future hyperlinks to be established.

Highway gullies and kerb offlets

5.71 Table 5.6 contains the current inventory information for highway gully assets. The datasets are primarily derived from inventory and converted to Ordnance Survey National Grid Coordinates (OSGRs) which can then be displayed using GIS software.

Table 5.6: Highway gullies and kerb offlets as at November 2008

Area	Highway gullies (No.)	Kerb offlets (No.)
Mendip	23372	338
Sedgemoor	25744	2962
Taunton Deane	25514	223
West Somerset	13605	178
South Somerset	41046	1054
Total	**132844**	**4755**

Ditches and grips

5.72 Ditches adjacent to the highway form an important and integral part of draining the highway through grips or pipes. The efficiency of these drainage methods depends upon these ditches being adequately maintained.

5.73 Some roadside ditches do not have a positive outfall and rely upon soakage. They are normally created for highway purposes and are the responsibility of SCC as Highway Authority. Those ditches that 'run' are presumed at law to be the responsibility of adjacent landowners, as are those land drainage features that accept highway water.

5.74 The owners of these ditches have a duty to clear their ditches and drains to prevent them from causing a nuisance to highway users. The Highway Authority does have a right of drainage into roadside ditches, which must not be impeded, and has powers to enforce its drainage rights should circumstances necessitate it.

5.75 It was held in Attorney-General v Waring (1899) J.P. 798 that the owner of land adjoining a highway has a common law duty to scour and cleanse the ditches that adjoin the highway to prevent them from causing a nuisance to the highway: that the highway authority can, notwithstanding their statutory remedies, bring an action against the owner for an injunction restraining the continuance of the nuisance.

5.76 Table 5.8 contains the current asset inventory information for all ditches adjacent to highways. The datasets are primarily derived from inventory and displayed using either ESRI or MapInfo GIS software.

Table 5.7: Ditches and grips

Area	Ditches (No.)	Ditches (Length)	Grips (No.)	Grips (Length)
Mendip	852	151 km	1111	1521 m
Sedgemoor	1534	262 km	2118	2771 m
Taunton Deane	748	103 km	1063	1408 m
West Somerset	355	67 km	715	1719 m
South Somerset	2384	420 km	3064	4468 m
Total	**5873**	**1003 km**	**8071**	**11887 m**

Highway surface water carrier drains (pipe work)

5.77 Drainage systems are currently illustrated where known on the highway inventory system. These include piped systems, kerb offlets, soakways, catchpits, and interceptor tanks.

5.78 SCC has a considerable amount of drainage inventory items with enough reliability to give a high or medium confidence. These have been selectively published to avoid confusion and clutter the mapping system. The intention is to rationalise these items and get them into just three datasets e.g. gullies, drain points and drain lines.

5.79 There are gaps in asset knowledge of underground surface water drainage systems, but it is important to appreciate that although many highway gullies in urban areas are connected to surface water sewers, these sewers are not the responsibility of the Highway Authority. In many cases the Highway Authority is only responsible for the gully and its short connection to the actual sewer. District Councils and Water Authorities, who are responsible for the public foul and surface water sewers, have kept detailed plans of their locations, which are available for public inspection. To date, 410km of the piped highway drainage has been recorded on the computer based GIS system. A series of mechanisms have been developed to capture details of highway drainage from a number of different sources and this has resulted in a significant increase in the quantity and quality of highway drainage data now available and will continue to grow. When a problem site is identified, local jetting or cctv surveys are undertaken so that any necessary repairs or replacements can be made and details of the asset information collected and added to the drainage mapping layers. There is no routine collection of condition data related to drainage systems, nor is one considered desirable or cost effective.

5.80 The large majority of above ground drainage assets have been recorded within the asset inventory and subsequently displayed on the GIS mapping system.

5.81 Drainage records of all new developments and estates built since the Development Control Supervision function was transferred to County Hall in 2000, are captured by the Highway Information Management team and displayed using GIS software. Copies of plans can be requested from Highway Development Control.

5.82 The Area Offices hold some ‘as built’ drawings from SCC schemes and investigation surveys. These tend to be ‘locally’ promoted schemes (arising through the structural maintenance programme) and pre-2000 schemes. Reactive CCTV videos are also stored at the Area Offices. These are currently being added to the GIS layer.

Outfalls

5.83 SCC currently has 1014 inventory records for outfalls.

Culverts

5.84 Culverts with a span of 900mm and above-are contained in the lifecycle plan for structures. The smaller culverts are included in the life cycle plan for Highway Surface Water Drainage

Verges, trees, landscape areas

5.85 **Verges in rural areas** Details of maintained and total verge widths in rural areas were collected as part of the full RMMS survey, but this excluded the large network of rural class C and unclassified roads. A map based inventory collection system has been developed to store details of the number of cuts required on each section of verge. The system generates

a database containing details of the adjacent highway, and accurate start and end measurements. This enables detailed plans to be produced for use by the Contractor, and quantities to be calculated. As all data is referenced to the highway network, data can be plotted by Class, Maintenance Hierarchy, Parish, etc.

5.86 **Table 5.8: Summary of verge lengths cut by SCC**

Area	A and B Roads (km)	C and Unclassified Roads (km)
Sedgemoor	178	774
Mendip	943	1643
Taunton Deane	88	476
West Somerset	124	296
South Somerset	557	2066
Total	**1890**	**5255**

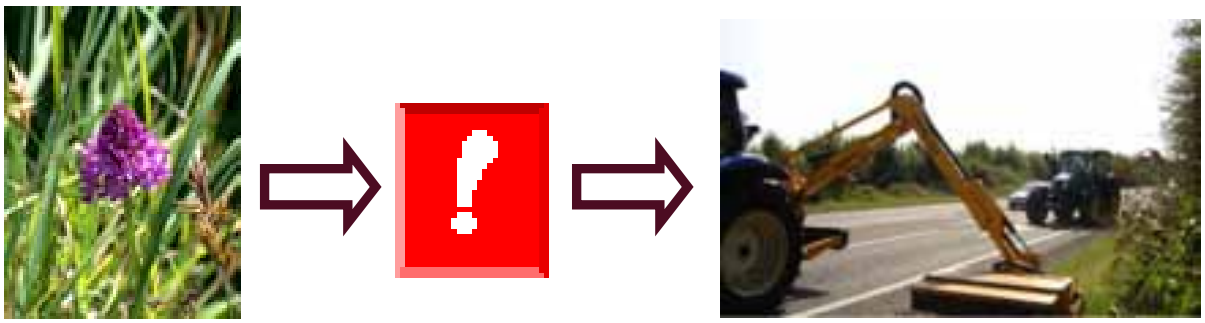
5.87 Somerset is proud of its biodiversity, and has started to record details of special flora and fauna which could be damaged by rural grass cutting, together with the locations of noxious weeds which could be spread if they were cut.

5.88 An inventory of sensitive sites has been created (see right), and the locations added to the contractors' verge cutting plans. These show the number of cuts widths required on each road, drawn from the verge cutting inventory.

5.89 A simple idea was developed into a working system when the locations of the sensitive sites were adapted and programmed for use within standard GPS tracking devices and mounted in the cab of each of the tractor mowers.

5.90 Replacing the GPS speed camera warning with our 'Sensitive Sites' layer provides strong visual and audible warnings to the operators as they approach any of the special sites.

5.91 This prevents damage, helps ensure that verge maintenance is carried out in accordance with the Biodiversity Action Plan and provided a 'good news story' when it won a national award for innovation and technology.



5.92 Locations of rural junction visibility splays are also stored and maintained. However, little data is currently available for high amenity cutting areas, which although cut by District Councils are part funded by SCC.

5.93 Data is managed using the GIS Inventory Management Suite.

Table 5.9: Biodiversity sites requiring 'special' attention

Area	Biodiversity sites (No.)
Sedgemoor	11
Mendip	3
Taunton Deane	9
West Somerset	14
South Somerset	12

5.94 **Trees** An in-house training course provided inspectors with sufficient knowledge to undertake a combined inventory and condition survey. All defects and queries are referred to the County Arboriculturist. Sites to be surveyed were prioritised using the following criteria: urban areas, freight routes, remaining Class A and Class B roads. These are now substantially complete and the survey work has been extended to cover the rural Class C and Unclassified roads. Trees to be considered are those on the highway or within falling distance of it. The inventory data is mapped and maintained using the GIS Inventory Management System.

5.95 **Landscaped areas** Records of newly created landscape areas are held in Area Offices, but have not been captured into a GIS mapping layer.

5.96 **High amenity grass cutting** Grass cutting of highway verges in urban areas is undertaken by District Councils. SCC makes a contribution towards the cost of high amenity grass cutting based on the total areas. There are paper records in Area Offices but none of this has been captured into GIS mapping layers.

Lighting

5.97 SCC's lighting assets are managed and recorded in the Facilities Management System, which has been developed with, and is managed by SEC Electrical Ltd. The system contains a comprehensive set of inventory data, collected in line with the "Institution of Lighting Engineers Technical Report 22, (2007) Managing a Vital Asset: Lighting Supports". All illuminated signs and bollards are managed by the Lighting Section, and form part of the lighting inventory. The system is self- contained, and records details of all the visual and electrical inspections, the defects and works history.

5.98 The inventory and condition data is continually being updated, as it is an integral part of the management system. Although not all of the assets have been plotted against map backgrounds, there are good text descriptions, and the absence of full mapping has not impinged on management of the asset.

Inventory and operations

5.99 Highway Lighting includes the provision and maintenance of the following:-

- **Lighting columns**
- **Wall mounted lighting points**
- **Associated luminaries**
- **Illuminated signs**
- **Illuminated bollards**
- **Cabling**
- **Bulk change and clean**
- **Electrical testing**
- **Structural testing**

- **Energy consumption calculation**

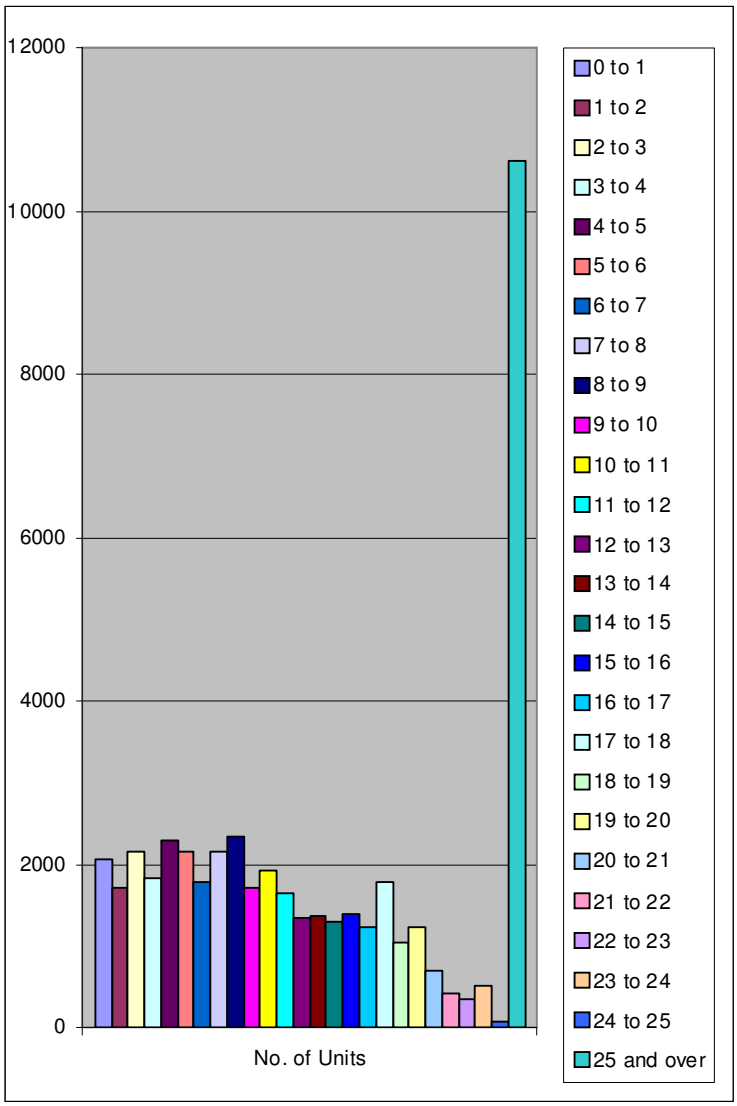
5.100 The accuracy of the data is considered to be greater than 80% correct. From 1999, the contractor has obtained information from site visits to units. Following each planned or reactive inspection, SCC staff check over 80% of the data provided by the contractor, and verify and amend the data-base accordingly.

5.101 The lighting stock increases between 1% and 2% p.a. and this will rise even further as Taunton, Yeovil and Bridgwater continue to grow. These installations will be to the latest specification by developers and others – resulting in approximately 4,500 additional columns in the first 5 years subsequent to release of this report.

Table 5.10: Type and numbers of lighting units

Type of Lighting Unit	Number
Street lights	47097
Subway lights	302
Belisha beacon	214
Belisha beacon floodlight	4
Belisha beacon post lights	52
Cattle crossing light	2
Keep left centre	93
Signs	4193
Traffic lamps	114
Bollards	1648

5.102 The data (below) is information direct from the Highway Lighting Network Management System (HLNMS) and indicates the age profiles of the current Highway Lighting assets. However a vast majority of dates applied to units previous to 1996 (currently anything over 12 years of age) are estimated, as electronic records were not kept before this date.



5.103 This is especially the case with the old accepted areas of Bridgwater, Taunton and Yeovil, as little data was provided by the agencies when their agreements were terminated. Currently these 3 areas contribute to over 50% of the ages of 12 to 25 years of age and more than 20% of those units above 25 years of age.

Condition assessment

5.104 40.8% of street lighting columns are over 15 years old.

Signs, markings and road studs

5.105 Data on signs, safety bollards, road studs, and road markings, was collected within the full RMMS inventory collection on the Class A, Class B and urban roads. Signs, road markings and road studs were not collected on the limited inventory survey of the rural Class C and unclassified roads.

5.106 Signs and road markings can be generated by a number of different mechanisms, including 'Safety Schemes', Minor Traffic Management, and routine maintenance. The frequency with which signs and road markings appear and disappear, and the absence of structured coordination, have constrained the maintenance of existing inventory datasets. Processes have been developed to receive as-built drawings and works orders, but these have yet to be fully implemented.

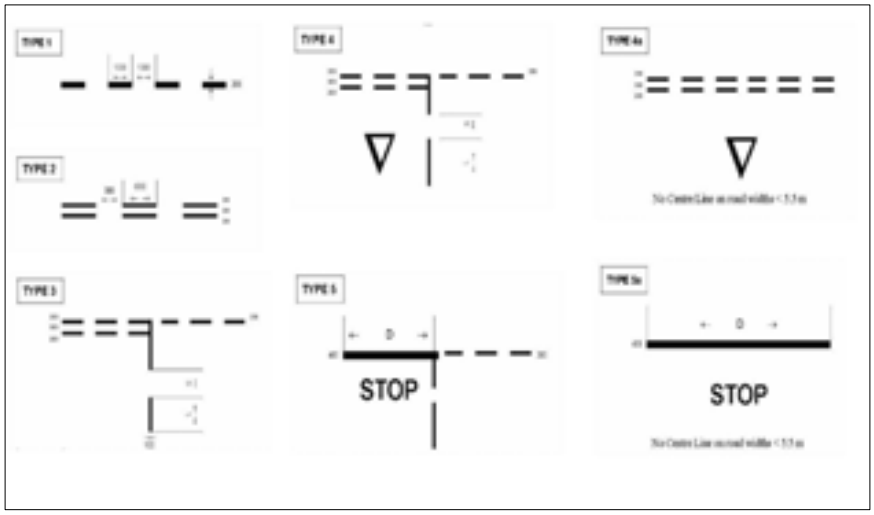
5.107 Historically, Traffic Regulation Orders (TROs) were prepared by District Councils. The process of decriminalising parking has highlighted the need for a comprehensive record of all parking restrictions. A survey of all parking restrictions and traffic regulations is currently being undertaken. Records are captured on site directly onto a laptop using Buchanan's ParkMap system, and downloaded onto a host PC. They are then checked and validated prior to the production of a new blanket TRO for each District.

5.108 It is anticipated that data will be extracted from the host Parkmap system and translated into mapping layers to be published within PlanWeb. This should provide high quality data, including photographs of individual signs, for all signs and yellow road markings associated with Traffic Regulation Orders. Other road markings being specifically recorded include zigzag lines at pedestrian crossings, school keep clear markings and box hatching at junctions. This should form the basis of an accurate inventory of signs and road markings.

5.109 Digital videos are now available for all Class A, B and the majority of C roads from the SCANNER surveys and could form the basis to update and validate other aspects of the existing sign inventory, such as advanced direction and warning signs.

5.110 RMMS sign inventory included attributes such as 'post mounted' or 'wall mounted', but did not record any information about sign posts. This is an omission that will need to be addressed, particularly as posts and foundations are frequently more costly than the sign plates they support. This is especially highlighted by the increasing use of passive posts.

5.111 **Junction markings** SCC collected its highway inventory in the 1980's using the standard RMMS inventory items, designed for motorways and trunk roads. The items required for a junction marking were a complex mix of longitudinal lines and transverse and special markings, which were difficult to interpret accurately, or to use to create Works Orders. Most junctions on County roads can be represented by one of the following standard patterns:



5.112 As the layouts use standard line styles, the quantities can be stored as simple attributes:

- Number of dots;
- Number of hazard lines;
- Hazard line type (6m Line + 3m Gap, 4m Line + 3m Gap);
- Length of stop line.

5.113 Junction details were already being collected as part of the surface dressing and resurfacing preparation work to ensure the correct markings were re-instated, so a logical progression was to

convert this information into a GIS layer. This will enable future site visits to be reduced and establish valuable asset information. In some instances it has also been possible to collect or validate details from aerial photography.

5.114 Of the estimated 13,900 junctions in Somerset, details of more than 6,000 junctions have so far been recorded in this way. These are published as a mapping layer on the County's mapping intranet site.

5.115 Signs and road markings are the least comprehensive or reliable inventory datasets.

Table 5.11: Signs, road markings and road studs

Sign / Marking Type	Quantity
RMMS signs (non-illuminated)	36224
RMMS road markings lines	1871 km
RMMS road marking items	24270
RMMS road marking hatching	67538 m^2
RMMS road Studs	101697
Junction markings	6331
Traffic regulation order – Signs	Not yet available
Traffic regulation order – Yellow lines	Not yet available
Traffic regulation order – Other lines	Not yet available
RMMS signs (non-illuminated)	36224

Traffic control systems

5.116 SCC's traffic control assets include signalised junctions and shuttle systems, signalled controlled crossing sites, bus gates, automatic number plate recognition systems, remote monitoring, vehicle activated signs and CCTV cameras. They are all recorded and managed in the TCS Management database, using MS Access. The database contains a comprehensive set of inventory attributes. The system is self contained, and records details of all the visual and electrical inspections, the defects and works history. All of the TCS assets contain detailed OS Grid co-ordinates and are published as a mapping layer within PlanWeb and MapExplorer.

5.117 The inventory and condition data is continually being updated as an integral part of the management system. Developments are proposed to incorporate links to Schedules of Rates, so that each installation can be specifically priced.

5.118 SCC has over 260 traffic control installations that are managed with the use of a UTC hub, a remote monitoring system and fault reporting system. While it is not a mandatory requirement to provide all this equipment on the highway, it is a legal requirement to ensure that once installed, all equipment is maintained and remains in a safe condition. Sites have been provided with electronic traffic control systems since the 1930's in Somerset when the earliest simple traffic light controlled junctions were introduced.

5.119 Significant expansion has occurred particularly since the early 1980's when the first SCOOT system for Somerset (East Reach, Taunton) was introduced. Equipment exceeding or even approaching 'design life' (particularly controllers, ducts, wiring, poles and gantries) is liable

to structural or operational failure. There are various factors causing this; the age of the stock, materials used in the construction, design and quality of the equipment, protective finish (if any), pollutants in the atmosphere, ground conditions, trafficking, salting, etc. State-of-the-art remote monitoring has been introduced at nearly all sites (100% of crossings and junctions), but approximately 40% of traffic control equipment is now life-expired. In addition new design requirements, and greater demand for pedestrians, cyclists and buses, point to the need for significant capital expenditure at many installations.

5.120 The details of all traffic control equipment and its condition is stored in a bespoke database. This database is comprehensive and has information on quantity of stock at every location and its condition, but the datasets for some important components and attributes are incomplete due to resource shortages or lack of historic records. For instance, the database does not hold all information on age or condition, and some assets such as below ground equipment i.e. ducts, cabling and inspection chambers, are of unknown age and in many instances in variable and unknown condition. The inventory database is to be updated with all available information including GIS data.

5.121 The table below lists current inventory from the database

Table 5.12: SCC signals inventory

Asset type	District					
	Sedgemoor	Mendip	West Somerset	Taunton Deane	South Somerset	Total
Junctions and shuttle systems	19	22	2	37	22	102
Stand alone Pelican/Puffin/ Toucan Crossing	22	24	7	31	34	118
CCTV Sites	3	1	0	4	1	9
Vehicle Activated Signs	2			3	14	19
Bus Gates				2		2
ANPR Sites				14		14
Total	**46**	**47**	**9**	**91**	**71**	**264**

Rights of way

5.122 SCC developed a detailed technical brief for producing the Public Rights of Way Database. All Rights of Way have recently been re-digitised using OS 1:2500 scale mapping. The previous version used 1:10,000 scale maps. A full inventory and condition survey of the network has also been undertaken to populate the new database with information. An interactive web site has been commissioned to enable the public to view the network and the register of definitive map modification applications, and to report faults.

5.123 The field survey work also identified a significant number of bridges and other structures. Rights of Way has sought technical assistance from the Bridges Team who are currently collecting geometric, photographic and condition information for the significant bridges on the PROW network so that these bridges can be assessed and, if appropriate, intervention activities undertaken.

5.124 The mapping layer from the PROW database is available as a layer in the desktop mapping systems, PlanWeb and MapExplorer.

5.125 Somerset has one of the longest rights of way networks in the country; with over 9000 paths the total length stands at 6129 km. The following table shows the lengths and percentages for the different categories of ProW in Somerset.

Table 5.13: Rights of way network by status

Category of ProW	Kilometres	% of total network
Footpath	4821	78.6
Bridleway	1001	16.3
Restricted Byway	299	4.9
BOAT	8	0.1
Total	6129	100

5.126 An asset capture and condition survey of the network was carried out during 2006/07. This included identifying locations at which an item of furniture was missing.

ProW network assets

5.127 An asset capture and condition survey of the network was carried out during 2006/07. This included identifying locations at which an item of access furniture was missing.

Table 5.14: ProW network assets

Surface	
Sealed surface	321km
Unsurfaced	3613km
Mixed/stone	1302km
Mixed/tarmac	802km
Gate	
Mobility KG Large	14
Gateway	834
2 in 1 FG	217
2 in 1 FG Step-over	290
Pedestrian KG	1663
Mobility KG	50
Bridle	948
Pedestrian	1351
Fieldgate	9247
Other	155
FG adjacent gap	190
	14959
Estimated no. of missing gates	*800*
Signpost	
Waymark	1534
Fingerpost	8483
Other	449
	10467
Estimated no. of missing signposts	*1000*
Stile	
Squeeze	219
One step	6153
Ladder	92
Two step	2896
Stone	578
Adjacent FG	1303
Rambler	130
Other	87
	11440
Bridges	
Culverts <6m	1367
Bridges <6m	2860
Bridges >6m	417
	4644
Estimated no. of missing bridges	*100*

5.128 It should be noted that there are many variations within the above categories; subsequent work programmes and reactive works will have addressed some of the missing items above.

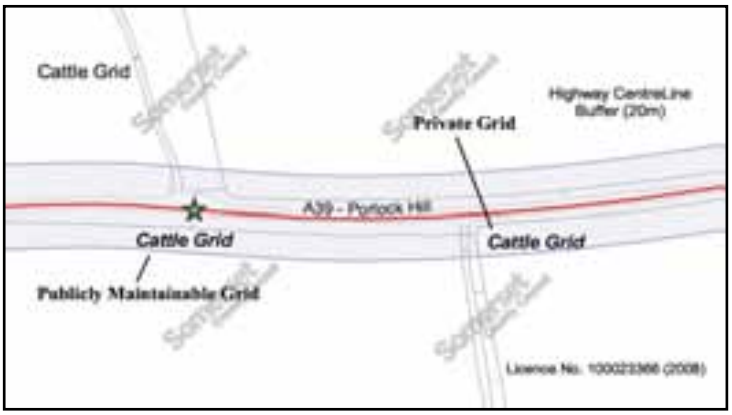
Ancillary assets

5.129 Early stages in preparing the TAMP identified a lack of information about cattle grids or arrester beds. This prompted urgent action, using innovative ideas to identify asset locations.

5.130 **Cattle grids** Inventory and asset data can often be derived from the OS map backgrounds. The text names can be used for much more than confirming locations and spellings, or (when translated into gazetteers) enabling search routines for mapping applications. Simple analysis of the OS text layers from MasterMap or its predecessor Landline, can be used to search and identify asset information over very wide areas.

5.131 A separate map layer of text names for the geographic area of Somerset was created, which can be searched to select records containing key words. This has been used quickly and successfully to identify all the publicly maintained Cattle Grids and Escape Roads within the County. Some Cattle Grids are on private roads or farm tracks.

5.132 GIS was used to identify those most likely to be publicly maintainable by selecting sites within a 20m buffer of the digital road centre-line and then comparing the resulting list with the County's Road Record polygons.



5.133 This produced a map layer (see example right) which enabled Inspectors to plan a route, visit and photograph each site, record specific site based asset data and undertake a condition inspection. Local knowledge and research into archive files produced valuable details of ownership and responsibility for the different components of each Cattle Grid.

5.134 Somerset's existing cattle grids are summarised in Table 5.16.

Table 5.15: Inventory of cattle grids owned by SCC

District	Number
Mendip	1
Sedgemoor	4
South Somerset	3
Taunton Deane	1
West Somerset	31

5.135 **Arrester beds** A similar exercise was undertaken to identify the locations of arrester beds, which are often referred to as escape roads. A set of archive drawings for each one of the installations provided details of all the related components.

5.136 The existing arrester beds are detailed below:

Table 5.16: Inventory of arrester beds

ID	Road number	Location
001	A39	Porlock Hill (West Somerset)
002	T3730	Crowcombe (West Somerset)
003	A39	Bristol Hill Wells (Mendip)

5.137 **Safety fences** The original full RMMS inventory included safety fences and some simple attributes of them. This information formed the initial basis for mapping the data, so that each site could be visited, checked for compliance with the appropriate British Standards, and given a full specialist inspection. Each section of fence has its own inventory, inspection and maintenance history.

5.138 The existing safety fencing within Somerset is detailed below. (SCC does not inspect or maintain safety fencing which is attached to structures owned by the Highways Agency.)

Table 5.17: Inventory of safety fencing

Type	Length (m)
Open Box Beam	18,974
Untensioned Corrugated Beam	1801
Tensioned Corrugated Beam	4949
FlexBeam	287
Total	26,011

Auxiliary data sets

5.139 Although the primary reference data sets are inventory and condition, there are many others that can provide valuable information. SCC has developed extensive skills in manipulating and mapping data, and in the use of desktop mapping. PlanWeb has been themed to suit the needs of individual groups, and provides access to more than 200 datasets.

5.140 The following gives an indication of the range of available data:

- The Highway Scheme Proposal Register (HSPR):
- Electronic road records;
- Accident data;
- Environmental data;
  - Biodiversity data;
  - Heritage and conservation areas;
  - Flood zones;
- Vehicle and pedestrian traffic data;
- Cycle routes;
- Network management related data:
  - Traffic sensitive routes;
  - Sites of special engineering difficulty;
  - Reinstatement categories;
  - Road closures and alternative routes;
- Pavement management;
- Digital videos.

Depots

5.141 SCC owns the following highway depots to facilitate the delivery of the highway maintenance service:

Table 5.18: Inventory of depots

Highways area	Depots
Mendip	Glastonbury Depot, Wells Road, Glastonbury.
	Frome Depot, Manor Furlong, Frome.
South Somerset	Yeovil Depot, Meads Avenue, Houndstone Business Park, Yeovil.
Sedgemoor	Dunball Depot, Dunball Industrial Estate, Dunball, Bridgwater.
West Somerset	Minehead Depot, Mart Road Industrial Estate, Minehead.
Taunton Deane	None – Atkins (the Network Service Provider) has its depot on Priorswood Industrial Estate, Taunton.

5.142 All of the SCC depots provide the following facilities.

- Materials storage, including salt barns;
- Vehicle parking and plant storage;
- Garages for SCC owned winter maintenance vehicles;
- Vehicles and plant maintenance workshops;
- Welfare facilities for operatives;
- Office accommodation for the highway services contractor.

Winter service

5.143 Winter service within a large rural county is vital to ensure that access to goods and services is maintained in winter periods. Precautionary treatment routes were well established but historically there were no specific parameters against which to assess changes or new requests. A rationalisation process identified and agreed the following set of parameters:

5.144 Strategic routes, using highway maintenance hierarchies; freight routes; emergency locations (fire, police, ambulance stations and dialysis centres); links with adjoining Counties and major settlements, identified from addressable properties; settlements above 500 ft (identified by mapping addressable properties and contour data) and access routes to the larger urban and rural schools.

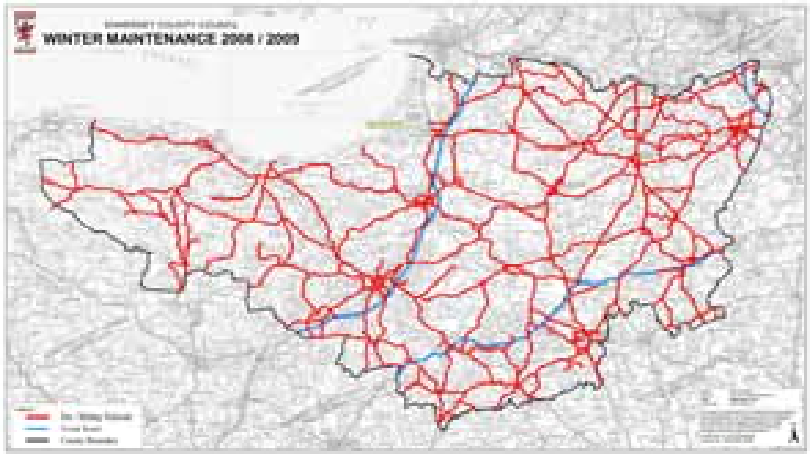
5.145 Starting with the Strategic routes, each of the roads associated with each layer are defined and stored as a separate GIS mapping layer. This makes it possible to quantify the route length of each individual layer and the cumulative impact on the overall treatment length by including each successive additional dataset.

Table 5.19: Winter service criteria

Road length statistics		
Pre-Salting routes layer	Impact distance km	Running total
Strategic and County Routes	969	
Freight Routes	22	991
Emergency Location Links	27	1018
Adjoining Counties Links	43	1061
Major Settlement Links	25	1086
Settlements above 500ft Links	46	1132
Urban/Rural School Links	12	1144
Area Manager Input	115	1259
Internal Route Continuity	171	1430
Total	**1430**	

5.146 In this way it is possible to appreciate the cost implications of each layer and the impact on the overall budget. It also provides a robust set of parameters that both explains and justifies which roads are to be treated and why.

5.147 The overall assessment is reviewed for route continuity and experienced Area Highway Managers provide sanity checks (see right).



5.148 Winter service routes are maintained using routines developed within GIS, and are published in PlanWeb, and as leaflets distributed in libraries and public offices. Winter service help is also provided in rural areas by maintaining grit bins, grit heaps and salt bags. Their locations are mapped and plotted as inventory datasets.

5.149 SCC owns a fleet of Winter Gritting vehicles which the Service Provider uses on the Pre-salting road network. SCC also own snow ploughs for these gritting vehicles and snow ploughs which are kept and used by farmers and farming contractors throughout the County. An inventory of this winter maintenance plant and their location is maintained in Appendix J of the “Winter and Emergency Service Directory” which is revised and published annually.

Asset inventory and condition data tables

5.150 The importance of inventory and condition data was first stated in the 1988 ‘Highway Maintenance – A Code of Good Practice’. It remains equally important today with the development of the TAMP. All available inventory and condition data has been analysed to assess the extent, availability and reliability of information. From these parameters, a matrix has been defined, so that an overall assessment can be made of the current knowledge level of the asset.

Table 5.20: Extent of data collected definition

Extent of data coverage	Definition (Estimated % of known data)
Initial	Less than 5%
Partial	5 – 50%
Substantial	50 – 95 %
Complete	More than 95%

Table 5.21 Reliability of data collected definition

Reliability of data collected	Definition (an assessment based on accuracy and position)
Poor	Data is unreliable
Moderate	Data is moderately reliable
Good	Data is highly reliable

Table 5.22: Knowledge level matrix

	Extent			
Reliability	Initial	Partial	Substantial	Complete
Poor	Low	Low	Low	Low
Moderate	Low	Low	Medium	Medium
Good	Low	Medium	Medium	High

Table 5.23: Combined summary of inventory knowledge and condition

Asset	Inventory %	Condition %	Combined score
Carriageways	82.82	100.00	91.41
Footways	86.59	50.00	68.29
Structures, Retaining walls and earthworks	100.00	100.00	100.00
Drainage	57.75	25.00	41.38
Lighting	100.00	100.00	100.00
Signs, Markings, and road studs	42.59	33.33	37.96
Traffic control systems	100.00	100.00	100.00
Verge, trees and landscaped areas	80.05	87.50	83.78
Rights of way	100.00	80.00	90.00
Depots	100.00	100.00	100.00
Winter service	100.00	100.00	100.00
Ancillary assets	100.00	100.00	100.00

Key:	
	Poor = 0 to 25
	Fair = 25.1 to 50
	Good = 50.1 to 75
	Excellent = 75.1 to 100

6. Prioritisation

Introduction

6.1 Like all Highway Authorities SCC is facing continued demands on its budgets, and prioritisation methodology is required to ensure expenditure maximises benefits against SCC's targets and Strategic Objectives.

6.2 The Goals and Objectives against which priorities need to be set are laid out in Section 3 There are five LTP2 objectives which need to be considered when making decisions on maintenance priorities:

- Improved Safety;
- Improving accessibility;
- Reducing the growth of congestion;
- Supporting economic growth;
- Protecting the environment.

6.3 Prioritisation of maintenance cannot achieve the above objectives alone, but they must be considered when ranking individual schemes, and programmes of routine works.

Finance

6.4 SCC sets its budgets on a 3 year rolling cycle according to the Medium Term Financial Plan. The capital budget is also set in line with SCC's Capital Strategy, the core principle of which is *"to maximise capital investment within affordable revenue consequences"*.

6.5 The majority of Highways investment is financed through borrowing. LTP borrowing is technically supported through DfT supported borrowing allocations but this is significantly diluted with the recent changes to revenue support grant. Additional investment for structural road maintenance, street lights and traffic signals is financed by discretionary prudential borrowing.

6.6 The SCC Mission is to *"Provide excellent services that are accessible, responsive and sustainable, to ensure Somerset is a healthy and vibrant to live, work and visit."* Further detailed priorities are set out with our partners in the Local Area Agreement, and in SCC's County Plan (see Section 3: 'Goals, objectives and policies').

6.7 The annual financial planning process starts in the summer, when officers work up capital and revenue bids to present to Members. Officers are required to set out their proposals, and the LAA and County Plan links to ensure that the funding requested meets overall priorities. The capital bids, which will arise from a series of pressures such as on-going maintenance need and demographic growth, are also required to provide information on sustainability, community safety, long term viability, risk analysis, performance improvement, value for money and deliverability.

6.8 Once revenue and capital proposals have been reviewed by Directorates, they are scored by the Corporate Finance Planning team. They are presented to the Executive Board for initial consideration, and then to Scrutiny Committees. Ultimately, proposals for capital funding and its revenue consequences are formally agreed at Executive Board in February, and then full Council.

6.9 Each year SCC invests approx £17million of capital expenditure on structural maintenance schemes on its highways and this is typically spent as below:-

- Restructuring or Resurfacing (ROR) Principal: £1.74m
- ROR Non-Principal: £4.175m
- Surface Dressing: £6.5m
- Patching: £1.4m
- Footways: £1.5m
- Other: £1.1m

Existing prioritisation process in Somerset

6.10 Currently, budgets are allocated to each asset using inventory data and historic spend, which is refined each year to achieve delivery of condition targets, and meet public expectations.

6.11 The prioritisation process uses the allocated budget for that asset, and ranks the schemes in order of priority using several different criteria. For each asset there is varying knowledge of its condition and future performance, and so an individual ranking system is used when carrying out scheme prioritisation. For assets such as carriageways, where surveys are regularly undertaken, there is a greater knowledge than for example drainage systems, and the process used for ranking these schemes is more developed.

6.12 For TAMP 2011 a process will be developed whereby the competing needs of each maintenance activity are ranked against each other, utilising the service levels agreed by Members.

6.13 It should be noted that several maintenance activities will interact, and one activity may aid in the performance of, and decisions about, another activity. Examples of this are:

- Gully emptying – removal of detritus from the gully pot.
- Ditch cleaning – removal of and grading of a ditch to ensure it functions correctly
- Drain jetting – cleaning of blocked piped systems (See table 8.5.3 for a full list of maintenance service standards for Highway service water).
- Verge cutting – stops blockages (See section 8.6.7 for details of the current verge cutting service standard).

6.14 These activities are designed to improve safety by removing water from the highway surface, or to improve visibility. They can, however, also aid the performance and life of the carriageway surface, as a well-drained highway is less susceptible to deterioration.

6.15 The most common cause of a pothole arises when water in a construction layer freezes. It causes the layers above to ‘heave’ as the water/ice expands. When thawing occurs the water dissipates but leaves the surface raised until traffic weight pushes it back down. While surface layers can be designed to be flexible, they become fatigued through repetition of the freeze/thaw cycle, and the bond between materials is lost, resulting in a pothole. This allows further water into the lower layers and hence the pothole grows.

6.16 The reduction in potholes avoids the need for excessive reactive maintenance, and allows budgets to be directed to where the greatest benefits can be achieved.

6.17 The current focus of this TAMP is on capital expenditure in structural maintenance. However, without comparable investment in revenue budgets, the effectiveness of any capital investment will be reduced. The existing service standard is shown in each of the lifecycle plans for that asset.

Examples of current individual asset maintenance prioritisation

Carriageway asset deterioration model

6.18 Using the data obtained from road condition surveys, SCC has been able to profile how its roads will deteriorate over time, and determine the current position on the life time line of the highway asset. This has allowed the carriageway asset to be valued in its present condition, and enables its worth to be forecast as predicted deterioration occurs. The Government have indicated that all roads should be at “steady state” by 2011, where an agreed backlog of maintenance is considered reasonable.

6.19 Different road construction and vehicle usage means that not all roads will deteriorate at the same rate. It is possible to forecast peaks and troughs of deterioration, which can be mapped against future investment needs.

Structural Carriageway Scheme Identification

6.20 The Carriageway Lifecycle plan describes the condition assessment regime which includes structural, safety and serviceability surveys undertaken by specialist survey machines, and using visual methods. These surveys provide a variety of data which is held in the WDM Pavement Management System and can be reported either as GIS overlays or in tabular form for every 10m length of road in the County. Table 6.1.1 describes the survey type and data collected that are used in the scheme identification and prioritisation process.

Table 6.1: Description of Survey type and condition data

Survey	Parameters collected	Description	Use
SCANNER (surface condition assessment for the national network of roads)	Rutting	Measure of the deformation of carriageway under wheel loading	Indication of structural weakness.
	Profile Variance 3m (short wavelength) 10m (medium wavelength)	Measure of the ride quality and deformation in the direction of traffic.	Short wavelength can indicate potholes/ covers etc. Medium wavelength areas of subsidence etc.
	Cracking	Measure of the extent of cracking present in surface	Indication of deterioration that if left untreated could result in safety defects
	Texture	Measure of the 'roughness' of the surface	Secondary contribution to skidding resistance and important in working with tyre to shed water
SCRIM (sideways force coefficient routine investigation machine	Skidding resistance	Measures skidding resistance against 'Investigatory levels'	Road safety and casualty reduction
Deflectograph	Structural perceptible assessment	Assesses strength of whole pavement	Identifies weak areas, and assesses residual life of carriageway
CVI (Coarse Visual Inspection)	Assessment of pavement condition	Visual survey that identifies defects present.	Groups defects to provide overall condition and areas with specific defect types

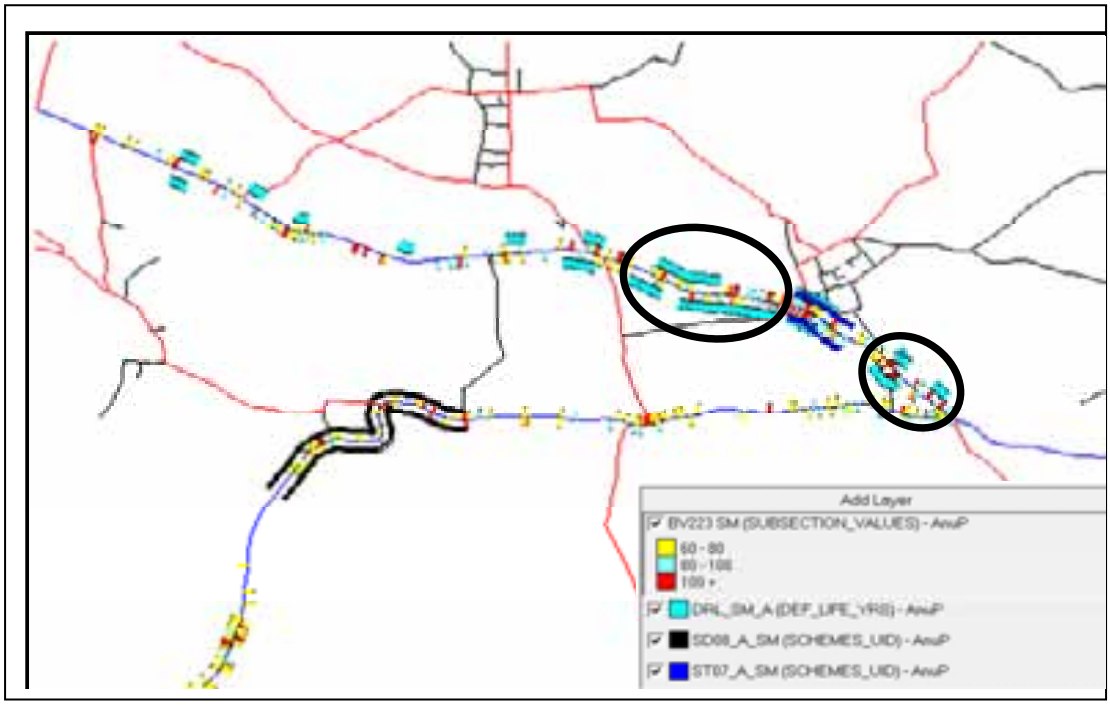
6.21 The process of scheme identification and prioritisation relies on the functionality within WDM Pavement Management System to rank the severity of defects and identify areas of defect clusters.

6.22 For classified roads the reporting for National Indicators 168 and 169 use SCANNER data, with thresholds and weightings applied to the individual defect types to assign Road condition Indices for every 10m section of road. The RCI can range from 0 to 315. The National Indicators are reported as % of the network over a higher threshold that should be considered for planned maintenance (known as RED: RCI > 100). Additionally the % of the network between a lower threshold and the upper threshold is also reported that should be investigated to determine the optimum time for maintenance (known as AMBER: RCI >40, but < 100).

6.23 The condition of the road network is such that the areas of red are distributed across the county, and a treatment programme for these sections alone would not represent an efficient use of resources. Therefore the survey results for classified are interrogated to list all 10m lengths that have an RCI of > 60 and filtered into bands of 60 to 80, 80 to <100 and 100+, and lengths with low strength identified from the Deflectograph, as well as programmed schemes. The data is then overlaid onto a background map for each area with the various condition parameters colour coded. Each map is visually assessed to identify clusters of 10m sections that have the highest Road Condition Index (RCI) values, and/or low residual life to form potential schemes. When assessment of potential schemes is made local knowledge, Traffic Management Act implications etc are considered to determine a workable scheme.

6.24 An example of the raw data plotted onto maps is shown in figure 6.1.1

Figure 6.1.1: Example Overlay Map showing Potential Schemes

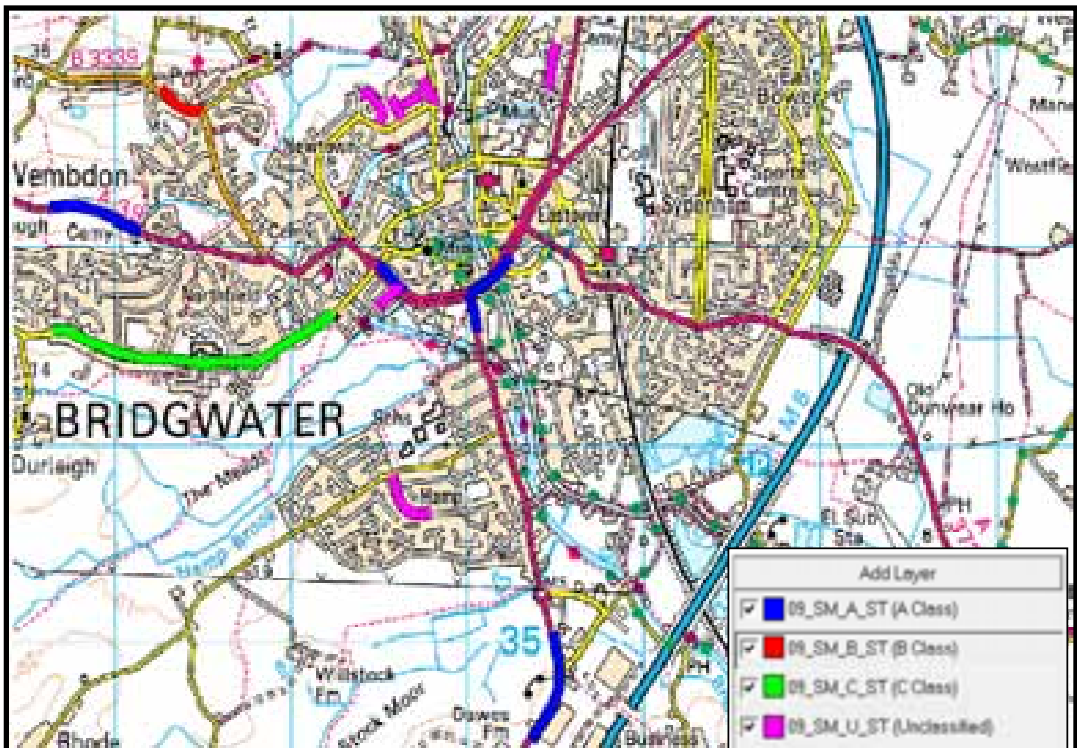


6.25 Each potential scheme is assigned a unique scheme name.

6.26 Unclassified roads are surveyed by Coarse Visual Inspection (CVI) and the condition parameters that produce BV224b are the Structural CI, the Wearing Course CI and the Edge CI. The threshold levels for these parameters are 85, 60 and 50 respectively, and if a section exceeds the threshold then this contributes towards the BVPI. Although the reporting of BV224b was discontinued in 2007/2008, these threshold values were used in identifying structural maintenance schemes.

6.27 Once the road code, section label and chainage has been listed for each scheme, each individual scheme is entered into the PMS scheme builder to enable the schemes to be overlaid as coloured strips onto maps. See figure 6.1.2 for example

Figure 6.1.2: Example Raster Map showing Potential Schemes



6.28 For the classified roads the 10m RCI data is obtained for each condition parameter for each potential scheme and saved as a report. The details for the latest Deflectograph survey are also obtained for each scheme, where it is available, and saved as a report.

Detailed data analysis

6.29 The analysis and treatment selection processes carried out in the scheme assessment process is based on the same principles adopted in the network level financial model that forecasts road maintenance requirements for the carriageway lifecycle plans. It is important that the principles applied at the network level are also replicated at the project level to ensure that long-term network level goals can be achieved. The detailed analysis processes are described below

6.30 For each potential scheme, the various condition survey datasets within its start and end chainages were collated into one table. For the classified roads this table contains SCANNER, Deflectograph and SCRIM data extracted from the PMS, at 10m subsection lengths. For the unclassified roads this table contains the Structural, Edge and surface condition indices at 20m level. This data amalgamation was undertaken using MS-Access and exported into MS-Excel for detailed analysis.

6.31 On the classified roads networks, SCANNER data was used for the initial treatment selection, then the Deflectograph data (where available) was examined to validate or modify the initial treatment. SCRIM deficiency was used for scheme prioritisation; for example if the identified structural scheme length has a high percentage of SCRIM deficient sections then it is given a higher priority over a similar scheme with little or no SCRIM deficiency.

Assigning Maintenance Treatments for Classified Roads

6.32 For each 10m SCANNER survey length, the RCI value for each of the five defects (i.e. Rut Depth, 3m Profile Variance, 10m Profile Variance, Whole Carriageway Cracking and Texture) was banded in 'Green', 'Amber' or 'Red' using the individual parameter thresholds in the National Indicator guidance published by the DfT.

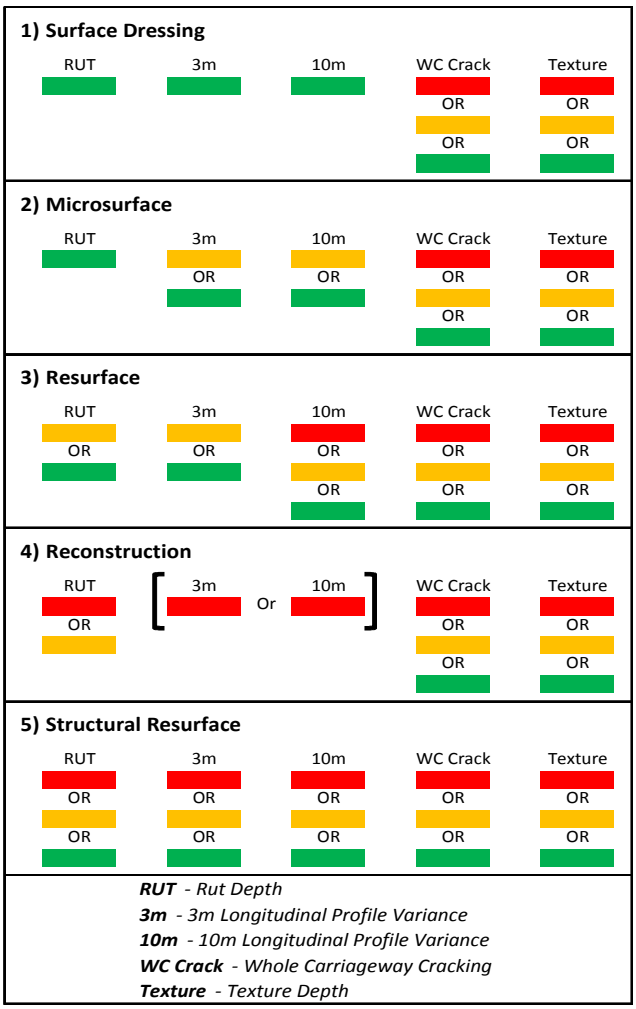
Green: below lower threshold

Amber: between lower and upper thresholds

Red: above upper threshold

Depending on the combination of colours for the 5 condition parameters treatment types are assigned to each 10m section of road as shown in figure 6.1.3

Figure 6.1.3: Scanner treatment selection



Deflectograph Data to Validate or Modify the SCANNER Treatment

6.33 Deflectograph data, where available, were considered in the analysis to validate or modify the initial treatment selected using the SCANNER for the 10m survey length. The Deflectograph data at 100m summary lengths was populated on to the 10m survey lengths.

6.34 If a major treatment such as reconstruction is identified based on the SCANNER defects, but the Deflectograph indicates there is still a significant amount of Residual Life (RL) left in the pavement, then a non-structural treatment will be selected. Non-structural treatments include Surface Dressing, Microsurface and Resurface.

6.35 Alternatively, if the treatment selected by the SCANNER data is non structural but the Deflectograph indicates a zero or negative RL, then an alternative structural treatment will replace the SCANNER treatment. Structural treatments include Structural Resurfacing and Reconstruction. Treatment validation/ modification based on the RL from Deflectograph data were made using the set of rules shown in **Error! Reference source not found.**

Table 6.2: Treatment Selection Using Scanner and Deflectograph

Treatment by SCANNER	Residual Life by Deflectograph	Final Treatment Selected
Any Treatment	<=-4	**Reconstruction**
Reconstruction	-3 to 1	**Reconstruction**
Any Treatment (except Reconstruction)	-3 to 1	**Structural Resurface**
Reconstruction	2 to 5	**Structural Resurface**
Structural Resurface	2 to 5	**Structural Resurface**
Resurface	2 to 5	**Resurface**
Microsurface	2 to 5	**Resurface**
Surface Dressing	2 to 5	**Resurface**
Reconstruction	6+	**Resurface**
Structural Resurface	6+	**Resurface**
Resurface	6+	**Resurface**
Microsurface	6+	**Microsurface**
Surface Dressing	**6+**	**Surface Dressing**

6.36 After the final treatment for each 10m length is assigned as per the above treatment selection process, they were summated over the length of the scheme to give treatment proportions within the scheme (i.e. composition of the various types of treatments within the scheme). This is used for costing and ranking purposes. Although it may not be practical to apply several different treatments over the scheme length (especially on shorter schemes), using the treatment composition results in better estimations of the overall cost of the scheme. This is comparable to either applying localised repairs prior to constructing the surfacing over the entire scheme length, or applying different treatments over practical lengths on suitably longer schemes.

6.37 If there are no deflectograph results the treatment option is decided from the RCI data alone.

Assigning Maintenance Treatments for Unclassified Roads

6.38 The unclassified road are surveyed by CVI and the parameters which produce the BVPI are the structural Ci, Wearing Course Ci and the Edge Ci and the threshold levels are 85, 60 and 50 respectively. If a section exceeds the threshold then this contributes towards the BVPI.

6.39 The data is in 20m sections and this data is collated and exported to excel spreadsheets for each scheme. The data that exceeds the threshold was collated into the following bands shown in the table below.

Table 6.3: Defect Bands

Defect Band	Comment
Structural + Edge	**Sections that exceed the threshold for both the structural Ci and the Edge Ci.**
Structural or structural +Wearing	**Sections that exceed the threshold for either structural or structural plus wearing.**
Wearing + Edge	**Sections that exceed the threshold for both the wearing Ci and the Edge Ci**
Wearing	**Sections that exceed the threshold only for wearing.**
Edge	**Sections that exceed the threshold only for edge.**

6.40 Each of the defect bands have different treatment costs since for the structural + Edge defect a structural treatment will not completely treat the edge so the full cost of an edge treatment is allocated but the width of the road will be reduced by 2m when calculating the structural treatment, to take into account the work being done on the edge. However, for the structural + wearing it would be expected that the structural treatment would also treat any wearing defects, therefore, only the cost of the structural treatment is required. For the wearing and edge the full cost of the edge and the full cost of the wearing treatments would be required.

Scheme Effectiveness, Ranking, Value for money and Impact on National Indicators

6.41 Once the treatments have been assigned the details are listed in a ranking spreadsheet. The cost for each scheme is calculated by the treatments and unit rates. The schemes can then be ranked by using a number of criteria.

Scheme effectiveness: a measure of how much of the scheme is treating defective lengths of road using defined parameters.

Impact on national indicator: a measure of the effect of the scheme on the reported national indicator

Value for money: a measure of the cost of the scheme, the predicted life of the treatment and the effectiveness in treating defective lengths of road

An example for the A roads is shown below, with the details for one scheme also illustrated. The spreadsheet can then be ranked by any of the parameters to produce a prioritised list.

Figure 6.4: Example of ranking spreadsheets for the Classified Roads

Scheme	ROAD_NAME	AREA_NAME	% Functional	% Structural	Scheme Effectiveness	Scheme lane.m	Scheme Cost	Psuedo BC	Effect on NI168
09WS_A_ST11	A38	SED	0%	100%	100%	299	£52,391	4417	0.0000%
09SS_A_ST08	A358	TD	0%	100%	100%	50	£4,081	4288	0.0000%
09SM_A_ST11	A39	SED	5%	95%	95%	192	£33,248	4202	0.0039%
09SM_A_ST12	A39	SED	0%	100%	100%	160	£13,911	4026	0.0000%
09SM_A_ST01	A3038	TD	0%	100%	100%	120	£10,433	4026	0.0000%
09WS_A_ST06	A3088	SS	4%	96%	93%	2,388	£225,876	3136	0.0008%
09WS_A_ST04	A38	SED	22%	78%	78%	401	£30,892	2365	0.0000%

Table 6.5: Example scheme for classified road

Scheme 09MD_A_ST14	
Length of Scheme	778 lane metres
% Functional	47%
% Structural	53%
Scheme Type	structural
Scheme Effectiveness	77%
Scheme Cost Estimate	£64,996
Pseudo BCR	1397
Effect on NI	0.0025%

Unclassified roads

6.42 A similar approach was used to prioritise the unclassified road but the CVI parameters were used, an example of the spreadsheet for the unclassified road is shown in the table below. The effectiveness in this case is the amount of the scheme that is above the threshold for any of the 3 condition parameters included in the BVPI.

Table 6.6: Example of the ranking spreadsheets for the Unclassified Roads

Scheme Name	Road Name	Area	Effectiveness	Scheme Length	Scheme Cost	Pseudo BC	Effect on BV224b
MD_U_ST05	U2301	MEN	93%	280	£9,867	1035	0.0080%
SS_U_ST09	U5799	SS	89%	248	£8,446	987	0.0067%
MD_U_ST03	U1672	MEN	83%	600	£21,341	914	0.0153%
MD_U_ST04	U1675	MEN	84%	859	£30,927	908	0.0220%
MD_U_ST07	U2391	MEN	77%	260	£7,103	866	0.0061%
SS_U_ST07	U5721	SS	93%	294	£15,236	862	0.0084%
MD_U_ST08	U2391	MEN	77%	440	£13,129	859	0.0104%
MD_U_ST06	U2301	MEN	94%	318	£18,280	845	0.0091%

Skid resistance

6.43 A document has been drafted to provide clear unambiguous procedures for managing the Skid Resistance and Risk of the road surface for public highways maintained by SCC. This is limited to A and busy B classified roads, together with the local quarry routes.

6.44 It was first considered prudent to verify whether the skid resistance requirements of the technical guidance HD 28/04, which is specifically for trunk roads and motorways, are appropriate for a predominantly rural county. First a background accident rate was established, using data from the Police and the Road Safety Partnership, for a single non event category. This was compared to the other event categories to see if the HD recommendations could be relaxed, or needed to be more onerous. The sections identified from SCRIM surveys where skid resistance was below the investigation level were then interrogated against an accident rate/time period. This establishes a ranked list of sites where investigation and possible treatment is required.

6.45 A procedure for inspection of these sites has been established. If any require work for safety reasons, these are programmed, or temporary works organised immediately, to maintain safety.

Footways and drainage

6.46 The following form is used to rank schemes from within one asset group and not against other assets.

Footway/Drainage prioritisation form

Location					**Road No.**			
Type of work		Surfacing	Footpath		Drainage		Other	
Hierarchy	**Category**	**Carriageway-**	Strategic Route			+7		
			Main Distributor			+6		
			Secondary Distributor			+5		
			Linking Road			+4		
			Local Collector Road			+3		
			Local Access Road/Urban			+2		
			Local Access Road/Rural			+1		
		Footway (See Manual)	Busy, town centre		+4			
			Well used urban		+3			
			Urban, busy village		+2			
			Little used		+1			
Insurance claims in last 5 years			0-2	+1	2-5	+3	>5	+3
No. of defects in last 2 years, from planned inspections			1-2	+1	2-5	+2	>5	+3
Deterioration if not done			None	+1	Some	+2	Serious	+5
Future Insurance Liability			None	+0	Likely	+1	Definite	+3
Other work to be done in conjunction			No	+0	Yes	+1		
Value for money			Poor	+0	Good	+1	Excellent	+2
Personal Recommendation					Yes	+1		
Comments								
Score =								
Assessed by ……..								
Date……..								

6.47 Once the scheme has been scored using the above form, it can be ranked against other potential schemes and interrogated against the available budget, to see if implementation will take place.

Traffic control systems

6.48 A prioritisation model has been developed based on the following:

- Controller age;
- Traffic flows;
- Consequence of traffic light failure – for safety and for traffic delays;
- Links to schools;

- Pedestrian use;
- Age of traffic head;
- Ongoing maintenance liabilities;
- Performance Indicators.

Highway structures

6.49 For structures, the prioritisation model is based on the following:

- Safety – bridge assessment value;
- Safety – need for bridge monitoring;
- Safety – public accidents;
- Road class;
- Level of equerries;
- Large span;
- Consequences of parapet failure;
- Bridge Condition – critical index.

Highways schemes proposal register (HSPR)

6.50 Once a scheme has been identified using the relevant ranking criteria for that asset, it is entered onto a GIS database, HSPR, and can be viewed with other data sets. These data sets may include schemes from other groups, proposed Statutory Undertakers works, events such as Glastonbury Music Festival etc. This allows the works to be programmed and the highway network to be managed, to ensure traffic disruption is minimised.

Added value consultation

6.51 Using asset management principles and the scheme selection processes detailed above, SCC has programmes of maintenance work in advance of the following financial year. This allows the following year's programme of work to be shared with other SCC groups such as the Road Safety Partnership, Transporting Somerset, Major Schemes, LTP Improvements, Traffic Engineering etc.

6.52 This early sharing of information allows proposals to be viewed and discussed, if amendments to proposals could in fact aid multiple objectives. This results in joint funding of some schemes and allows the benefit of expenditure at the location to be maximised. At these meetings, the condition survey information is available and often used to discuss the merits of extending the limits or changing the design of a scheme to maximise the benefits.

Proposed prioritisation using a value management process

6.53 It is intended that SCC's goals and objectives, having been interpreted into highway maintenance policies and procedures, will be prioritised using a Value Management (VM) Process. This process can prioritise the competing needs of highway maintenance activities against each other, i.e. a drainage scheme against a footway scheme etc. The process provides a formal, structured, transparent and consistent approach for comparing different schemes and maintenance activities against each other. The outcome of the VM process is a priority score for each unique maintenance activity and scheme. The score is based on how well the activity will satisfy the strategic goals and objectives.

7. Risk management

Introduction

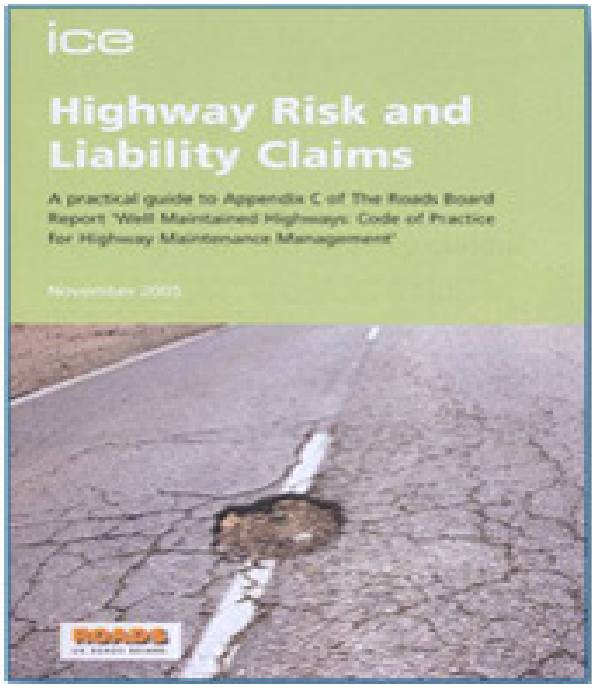
7.1 Managing risk is an integral part of managing transport assets. All activities from management, identification and prioritisation of works to the establishment of budgets have risks associated with them. These risks need managing. The assessment of comparative risk is, therefore, a key asset management tool. It can be used at a tactical level within the asset management process, to assist with option appraisal and selection, via assessment of the comparative risks of:

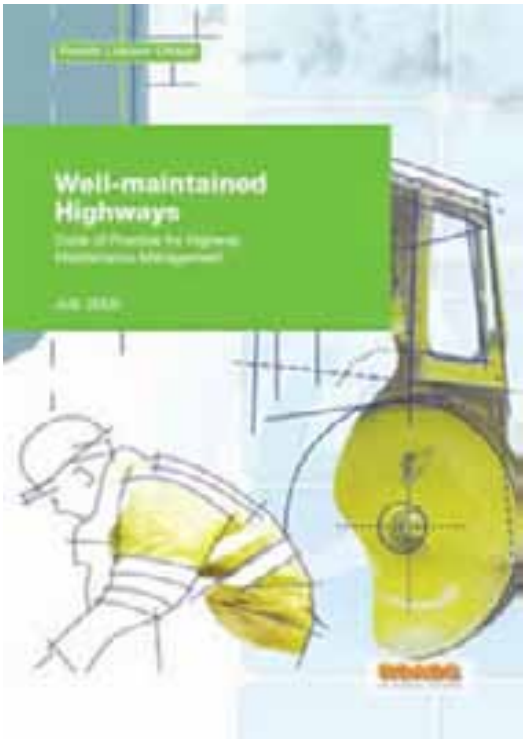
- Providing differing levels of service;
- Funding works on different assets or;
- Funding network improvements as opposed to maintenance works.

7.2 SCC takes a corporate approach to managing risk, set out in "SCC – Strategic Risk Management Policy", (version 4, 22 May 2008). This document focuses on managing higher level corporate and strategic risks. SCC has a Strategic Risk Management Group and has appointed a Risk Manager to administer corporate risk management within the Council. In terms of risk management, the purpose of the TAMP is to supplement the corporate policy for risk management by addressing the tactical and operational risks encountered in transport asset management.

7.3 The following documents are also relevant to considering TAMP risk management:

- Well-maintained Highways – A Code of Practice for Highway Management (July 2005, see below right);
- Highway Risk and Liability Claims – A Practical Guide to Appendix C of The Roads Board report 'Well Maintained Highways – Code of Practice for Highway Maintenance Management'(December 2005, see below left).





Risk management responsibility

7.4 The corporate policy outlines the risk responsibilities for SCC officers, Members, and Committees etc. Table 7.1, below, identifies some key responsibilities:

Table 7.1: Responsibilities for risk management

Who	Role
Elected Members	To oversee and ensure the effective management of risk by senior managers through scrutiny processes and, where appropriate, direct involvement.
Management Team	To ensure that the organisation manages risk effectively through a comprehensive corporate strategy. To identify and steer the management of strategic risks through the organisation. To consult on and prepare corporate risk maps and action plans.
Risk Manager	To promote the effective management of risk across the organisation, its departments and services.
Directorate Management Teams	To ensure that risks are identified and effectively managed in each service area.
Insurance Section	To effectively manage claims made by and against the Council, and ensure risk management issues arising from these are reported to the Management Team and relevant Project Managers.
Health and Safety Team	To provide support and guidance to service managers in managing health and safety risks
Service Managers	To manage risk effectively in their particular service areas, and to implement specific actions arising from the Directorate Action Plan.
All Employees	To effectively manage risk in their job.
All Asset Users	To take responsibility to use service with due care and diligence.

7.5 As detailed in paragraph 7.2, SCC has a Risk Manager who is responsible for council corporate risks.

Identifying risks

7.6 With reference to the SCC corporate policy for managing risk, the main risks that could affect each of the assets have been identified.

7.7 **Tactical risks** can affect SCC's ability to deliver annual programmes to specified budgets, for example – weather, changes in customer influences, local political pressures, the consequences of changes in levels of service. These risks are those most likely to be managed via the asset management planning process, with actions to address them including varying levels of service.

7.8 Tactical risks are those that could adversely impact on medium term plans (3-10 years) and/or goals and objectives. These risks will be identified and managed by the Asset Management Team as part of the annual TAMP planning process.

7.9 **Operational risks** are those encountered on a day-to-day basis as SCC manages and operates the network, e.g. service delivery, repair failure etc. These risks will be identified and managed by the appropriate service delivery teams, as part of the day to day management of the network.

Assessing risks

7.10 A risk is defined as "the chance of exposure to the adverse consequences of future events". Once risks are identified, an assessment of their likelihood and impact is undertaken as defined in the key below. Each risk is then assigned to a risk owner, who is responsible for monitoring and acting upon the risk. This is done in a consistent manner to give a balanced view of the risk levels associated with the different service options.

7.11 The mechanisms by which risks can be dealt with are:

- **Prevention** Act to prevent the risk occurring or having an impact on the project;
- **Reduction** Reduce the likelihood of the risk occurring or limit its impact;
- **Transference** Pass the risk to a third party (e.g. use of insurance or penalty clauses);
- **Contingency** Plan of action to come into force when a risk materialises;
- **Acceptance** Accept the possibility that the risk may occur (believing that either the risk will not occur, or that the countermeasures are too expensive).

7.12 One or more of these mechanisms should be identified in the action and controls column in the Risk Log, together with details of what action is to be taken.

Using the risk assessment matrix

7.13 When assessing a risk, the risk owner will have knowledge of the action plans or controls currently in place or potentially available, and can be guided by this information. Values should be assessed for the identified 'likelihood' of occurrence (A) and the severity of the 'Impact' (B). By multiplying 'A' and 'B' together you get the rating score, which gives an indication of how important the risk is. Proximity of the risk, although not scored in its own right, may impact on the likelihood, impact, or both, when scoring.

Table 7.2: Risk assessment matrix

LIKELIHOOD (A)						
	Very likely 5	5	10	15	20	25
	Likely 4	4	8	12	16	20
	Feasible 3	3	6	9	12	15
	Slight 2	2	4	6	8	10
	Very unlikely 1	1	2	3	4	5
		Insignificant 1	Minor 2	Significant 3	Major 4	Critical 5
		IMPACT (B)				

Likelihood of occurrence (A)		Severity of impact (B)	
1	Very unlikely (hasn't occurred before)	1	Insignificant (have no effect)
2	Slight (rarely occurs)	2	Minor (little effect)
3	Feasible (possible, but not common)	3	Significant (may pose a problem)
4	Likely (has before, will again)	4	Major (will pose a problem)
5	Very Likely (occurs frequently)	5	Critical (immediate action required)

- **Green risks** (low) score between 1 and 8, and are the least urgent risks; this does not mean that they should not be monitored, as all 'green' risks have the potential to become 'amber' or even 'red' risks. The 'risk owner' should agree the method, frequency and media of monitoring to be used.
- **Amber risks** (medium) score between 9 and 12. Amber (medium) risks are potentially the red risks of the future. They have a higher likelihood and impact assessment potential and therefore monitoring should be more frequent than a 'green' low rated risk.

Amber risks can move up or down so frequent monitoring will ensure your mitigating actions are working.

- **Red risks** (high) score between 15 and 25. **Red risks are high maintenance!** All red risks need careful repeated monitoring if the objective or benefit is to be realised.

Risk log

7.14 The risk log brings together all the risks that have been identified within the service areas of the TAMP.

7.15 The risk log also details the strategic risks that are applicable to the TAMP and risks that are applicable to the TAMP itself.

7.16 The estimated financial cost of each risk is detailed within the Risk Log for the service area risks. This financial cost, combined with the target risk score, enable the risks to be prioritised.

Risk output

7.17 The TAMP management process will consider all recorded risks. Action plans will be produced which will describe how these risks are to be managed, the control measures, and who will be the risk owner.

7.18 Risk exposure and action plans will be periodically reviewed and revised to monitor changes in risks and to ensure the control measures are still suitable. Where the residual risk that remains once the control measures are in place appears to be unacceptable, there will be a need to escalate the risk and its ownership to a higher management level.

Risk reporting and review

7.19 The review of risks is required to ensure that the risk management option selected remains relevant.

7.20 If the monitoring shows that the risk management actions were not controlling the risk, and a better option is available, this new action should be adopted and the risk log revised to record the changes.

7.21 The risk log should be periodically reviewed, the frequency varies on the risks included but is typically between three months and a year. It should be remembered that the risk management process is dynamic and constantly evolving.

7.22 The service area risks are reviewed at the relevant Project meetings to ensure risks are managed and actioned.

Key risks

7.23 The identification of important risks associated with the TAMP can be summarised as:

Table 7.3: Possible risks that impact on the TAMP implementation

Risk	Summary description
Financial	Availability of financing
Economic	Changes in budget provision
Political	Changes in political power and policies
Legislative	Changes in legislation
Legal	Delays associated with the procuring and awards of contracts
Professional/Managerial	Policy decisions inappropriate
Environmental	Adverse environmental impacts and hazards
Technological	Engineering or design failure
Social	Major disruption
Customer/Citizen	No customer gain
Physical	Unforeseen difficulties
Partnership/Contractual	Inappropriate operation, higher operation and maintenance costs.
Competitive	Delays due to competition
Construction	Faulty construction, cost escalation and delays
Safety	Poor maintenance decisions
Personnel	Inability to appoint staff due to no appropriate skills in the workplace.

Climate change

7.24 Somerset County Council is taking a strong leadership role in tackling the local causes and effects of climate change through a number of award winning initiatives, now consolidated into “Responding to Climate Change in Somerset”, the County Climate Change Strategy (pictured below).

7.25 This document sets out SCC’s strategy to co-ordinate actions and to introduce further measures within Somerset to ensure that infrastructure and services are resilient to the effects of climate change and to reduce emissions of greenhouse gases.

7.26 Climate change is an issue that is present now and for the future. The impact is uncertain but is a topic that should have risk assessments carried out.

7.27 Man made climate change is an ever evolving issue and the consequences are potentially severe. The risks identified within this TAMP must be reviewed on a regular basis and amended to reflect changing circumstances.

7.28 There will always be extreme weather events such as heat waves and floods. Indications are that the frequency for these could increase in the future with:

- Warmer, wetter winters;
- Hotter, drier summers;
- Extreme rainfall events;
- Rising sea levels and tidal surges.

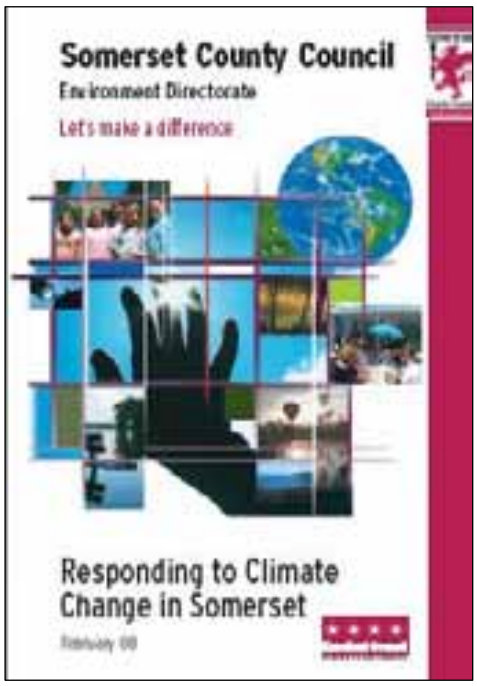
7.29 SCC has made a commitment for all its Service Areas to assess potential impacts and opportunities of climate change on service delivery and prepare appropriate action plans.

7.30 Where applicable, service areas have highlighted climate change issues within the Lifecycle Plans and included climate change risks within the Risk Log.

7.31 The impact of climate change on highways could be significant. Listed below are eight effects which pose the biggest risks from climate change to the highway network:

- Pavement failure from prolonged high temperatures;

- Increased length of the growing season leading to a prolonged and/or more rapid growth of the soft estate;
- Lack of capacity in the drainage system and flooding of the network;
- Surface damage to structures from hotter and drier summers;
- Scour to structures from more intense rainfall;
- Subsidence and heave on the highway from more intense rainfall;
- Scour and damage to structures as a result of stronger winds and more storms;
- Severe damage to light-weight structures from stronger winds and more storms.



8. Lifecycle planning

8.1 Introduction

8.1.1 Lifecycle plans document how options are selected for different asset types. They aim to identify the lowest long-term cost for the work required to close the performance gap between current and target performance levels of these assets, and to sustain the performance at the desired level. They enable the optimum resource requirement to be identified to provide the minimum whole life cost for that asset type.

8.1.2 The plans seek to optimise the cycle of activities that the assets will experience throughout their lives, including planning, design, construction, operation, maintenance, rehabilitation/reconstruction, and disposal. They can be used to identify specific maintenance needs through the various stages of the asset life, and provide a link to the short-term planning process.

8.1.3 The asset lifecycle plans set out in this TAMP are:

Carriageways ● Footways and cycleways ● Highway structures ● Highway drainage ● Verges and landscaped areas ● Highway lighting ● Road signs ● Road markings and studs ● Traffic control systems ● Public Rights of Way

8.1.4 Ancillary asset lifecycle plans also include the following:

Safety fencing ● Cattle grids ● Arrester beds ● Winter service ● Depots

New asset creation

8.1.5 Most new assets are created in one of three ways:

- Major schemes, mainly funded by the DfT;
- Integrated transport schemes (from LTP2);
- Developer adoptions, using Section 106 and 278 agreements.

8.1.6 All major and integrated transport schemes are designed to the Highways Agency's Design Manual for Roads and Bridges (DMBR), and the Manual of Contract Documents for Highway Works (MCHW).

8.1.7 Developers design and construct new schemes to the Estate Roads in Somerset Design Guide (The Red Book), in conjunction with the Estate Roads in Somerset Specification Construction Notes (The Green Book). These are both based on the DfT's Manual for Streets.

8.1.8 These standards ensure maximization of the life of the asset, thus reducing the whole life cost. The updating of the current Estate Roads in Somerset Design Guide has been identified as a service improvement initiative to start in 2009.

8.1.9 New development has a significant impact on SCC's highway assets every year. Significant lengths of new roads, footways and cycle routes are built, as sites are developed for houses, business, and other uses. This process also introduces additional drains, gullies, signs, lines, structures, traffic signals, and street furniture.

8.1.10 All additional assets, and alterations to them, are managed through adherence to the relevant development plans and frameworks. These apply a coherent approach to highways development control and estate road design advice, using relevant national and local policies, supplementary planning documents and design guides. New highway assets associated with development are managed from inception to adoption through key administrative processes, including Section 106 agreements (Town and Country Planning act 1990), and Section 38 and 278 agreements (Highways Act 1980). SCC has chosen to adopt the Advance Payments Code legislation (Section 219-225 Highways Act 1980). This

puts a duty on SCC to ensure that monies are secured in respect of the cost of private street works.

8.1.11 It is crucial to achieve appropriate quality of design and materials for construction and use, and in the longer term for planning the costs and implications of maintaining and managing the asset. SCC has a comprehensive technical and safety audit, and a supervision capability, which are used to ensure new highways are safe, well designed, readily maintainable and have appropriate longevity. Once constructed to approved specifications, new highways are adopted for maintenance by SCC, and an adoption package is created including any relevant CDM documentation, and notification of sites of special engineering difficulty. This information is then recorded and distributed for use by SCC's records and maintenance teams for management of the highway network.

Highway Inspections

8.1.12 There are two different types of highway inspection undertaken by Somerset County Council:

- Safety inspections
- Condition inspections

8.1.13 Highway safety inspections are primarily undertaken to identify defects which are hazardous to highway users and which must be dealt with as a priority. The standards and policies relating to safety inspections are contained within the Highway Safety inspection Manual.

8.1.14 The County Council has a system of categories for the purposes of regulating the frequency of highway inspections and the level of maintenance. This categorisation depends on a number of factors such as historical traffic /pedestrian patterns, freight routes and access to local communities.

8.1.15 The frequency of inspection is set out below:

Carriageway Hierarchy		Somerset County Council frequency
2	Strategic Routes	1 Month
3a	Main Distributor	1 Month
3b	Secondary Distributor	1 Month
4a	Linking road	3 Month
4bi	Local Collector road (S.C.C. introduced category)	6 Month
4bii	Local Access road / Local road – Urban	6 Month
4bii	Local Access road / local road – Rural	Annual

Inspection frequencies: carriageway driven

Footway Hierarchy		Somerset County Council frequency
F1	Main shopping centres; Heavily pedestrianised area; Busy pedestrian routes.	1 Month
F2	Other shopping areas; Well used routes to local shopping centres, tourist attractions, large schools and business and industrial centres	3 Month
F3	Other urbanised areas; Busy village/rural centres; Linking footways not included in category F1 or F2	6 Month
F4	Little used urban such as short estate roads and cul de sacs; Little used rural	Annual

Inspection frequencies: footway walked

Cycleway Hierarchy		Somerset County Council frequency
A and B	Both on and remote from carriageway	6 Month
C	Trails	Reactive

Inspection frequencies: cycleways

8.1.16 Highway condition inspections are undertaken on individual highway assets to primarily determine routine works programmes. These inspections are detailed in the individual lifecycle plans.

Lifecycle plan content

8.1.17 The lifecycle plans document specific actions for managing each phase of an asset's life from creation to disposal, and in doing so recognise the interdependency of the phases. For example, they recognise how investment in routine maintenance affects the renewals required, or how original construction details affect future demands for maintenance.

8.1.18 Each lifecycle plan has the following sections:

- **Creation or acquisition** Assets are created or acquired in response to one of three demands:
  - Development: where existing assets are improved and new assets created as part of new development;
  - Capacity: where the current system is operating above its capacity, and a solution is the creation of a new asset (e.g. the widening of a road to allow for increased traffic);

    - Performance: The explicit measurement of levels of service will lead to information on where these levels are not being met, which may identify the need for additional asset capacity;

- **Routine maintenance** A brief description of the routine maintenance used to maintain the asset in its serviceable condition; Routine maintenance is the regular, ongoing day-to-day work that is necessary to keep assets operating, including instances where elements of assets fail and need immediate repair to make operational again. The basic minimum service level is delivered through Planned Highway Safety Inspections. The intervention criteria are set out in detail in the Highway Safety Inspection Manual. Any reports of defects from other sources are inspected and repaired strictly in accordance with the manual. Defects that do not meet the safety criteria are currently assessed to determine their priority for repair or maintenance.
- **Renewal or Replacement** Involving the whole asset, or elements of it. Renewals and replacements are the major treatments that are used when routine maintenance alone cannot sustain the asset. The identification of renewals/replacements and in particular their timing is a fundamental element of lifecycle planning. Advance asset management provides data to support the selection of the optimal time for a specific treatment;
- **Upgrading** Where appropriate, descriptions of proposals to upgrade the asset or part of it to meet future needs;
- **Disposal** If appropriate, descriptions of the process and circumstances of how obsolete assets are decommissioned or demolished;
- **Non-Asset options** If applicable, proposals to manage demand, or amend standards and targets, details of methods for reducing asset usage, or acceptance that the desired performance cannot be met.
- **Treatment options** Details of the treatment options available and how they are selected

8.2 Lifecycle planning – Carriageway

Introduction

8.2.1 The carriageway is the principal asset of the highway network both in terms of function and financial value. The carriageway asset can be described as the 'fabric' of the road and includes the road structure, including the foundation, structural layers and surface of the road. It also includes a number of ancillary assets such as edge support including kerbing and any formation drainage. Where kerbing is used to delineate the edge of a footway this is included in the footway and cycleway asset group. On road cycle lanes are included as part of the carriageway lifecycle plan. For the purposes of this lifecycle plan only those roads maintained by the County Council in its capacity as highway authority are included.

Extent of carriageway asset

8.2.2 The carriageway asset is extensive serving all the communities in the county. The construction of carriageways varies greatly. Many principal (A) roads, and the more recently built roads have been designed and built to engineering standards; however most roads have evolved over many years in terms of layout and construction. A significant proportion has limited construction thickness with materials and techniques that are no longer available. Consequently a modern equivalent asset may be of significantly thicker, or a different construction than the existing asset. Construction and maintenance records do exist for much of the road network but is limited for historic information. The carriageway asset is largely made up of bituminous materials, with some limited use of concrete, and some modular surfaces in some residential, conservation areas and town centres. It is likely that is some areas tar bound materials may be present in deeper layers of the road construction. These are now considered a hazardous material and great care should be taken to leave them undisturbed.

8.2.3 The carriageway asset is managed by both class and hierarchy. Class is used by the Department for Transport (DfT) for the purposes of national Indicator reports; however a maintenance hierarchy has been developed based on usage of the road. Widths of the roads vary significantly by class, hierarchy and urban/ rural environment.

Table 8.2.1 summarises the length of carriageways.

Table 8.2.1: Carriageway asset by district and road class (km)

District	A roads	B roads	C roads	Unclassified
West Somerset	83.6	115.3	296.2	456.6
Taunton Deane	83.7	56.2	378.4	585
Sedgemoor	122.5	60.1	232.9	573.8
Mendip	180.5	109.1	487.1	745.2
South Somerset	191.8	116.9	722.6	928.1
Total	662.1	457.6	2208.2	3288.7

8.2.4 Roads have also been categorised into a maintenance hierarchy that reflects their individual importance and usage (Table 8.2.2).

Table 8.2.2: Carriageway asset by district and hierarchy

District	National primary routes	County main distributor	County secondary distributor	Local inter-connecting roads	Local collector road	Local road
West Somerset	0	139.1	75.1	55.8	207.8	473.1
Taunton Deane	11.4	122.1	6.4	121.1	197.7	644.5
Sedgemoor	30.1	133.7	27.9	110.7	172.4	605.5
Mendip	81.5	188	51.9	114.2	273.8	812.6
South Somerset	36.2	234.5	49.2	68.1	495	1076.5
Total	159.2	817.4	210.5	469.9	1346.8	3612.8

8.2.5 Under the New Roads and Streetworks Act and Traffic Management Act the road network is also categorised by reinstatement category. This is based on traffic flows and traffic sensitivity which describes the impact of highway works in terms of delays and disruption. In addition there are a number of other hierarchies used for operational purposes, such as the winter treatment routes, freight and public transport networks. These hierarchies, whilst important in programming works, do not influence the lifecycle plan.

8.2.6 In addition to those roads maintained by Somerset County Council (SCC) there are unadopted roads that remain in private ownership that the public have rights over. In some cases the SCC has powers with respect to these private roads, but is not responsible for their maintenance. These roads are excluded from this lifecycle plan.

Asset creation and acquisition

8.2.7 The carriageway asset is not subject to significant change in lengths; however new assets are created through schemes promoted by SCC and by development proposals.

8.2.8 SCC's strategic vision for transport is set out in LTP2. A new Local Transport Plan will be published in 2011 which will set out the vision into the future. LTP2, identifies a programme of improvements that may create new assets to address concerns about capacity and congestion, or other performance concerns. Improvements may include new sections of roads, more local improvements involving new layouts/junctions or local widening or measures designed to change local patterns of use.

8.2.9 Where new development requires new transport infrastructure, it is provided through Land Use planning processes. Such infrastructure is secured through legal agreements under S106 of the Town and Country Planning Act, and S38, 228 and 278 of the Highways Act. These agreements are used for major road improvements, as well as residential and industrial estate roads. Over the last 4 years an average of 13.5km of road per year has been added to the network through adoptions. This new development is funded by the developer, who typically agrees to build the road to SCC specifications. On completion the road is adopted by SCC

8.2.10 In the creation or acquisition of new assets, consideration should be given to the revenue implications of maintaining them.

Climate Change

8.2.11 Somerset County Council has already experienced the effects of climate on highway maintenance operations in recent years which have caused damage, accelerated deterioration, disruption and increased costs. The Department for Transport commissioned TRL to improve the understanding among local highway engineers of the implications of the predicted change in climate parameters, such as rainfall and temperature, for highway pavements and how the impacts might be minimised. The predicted effects are:

- Drier hotter summers
- Milder wetter winters
- More extreme rainfall events
- Rise in sea levels

8.2.12 All of these effects will impact on the carriageway asset in different ways. Road pavements are particularly vulnerable to water and temperature.

8.2.13 Water can enter the pavement materials, and depending on the materials used and the quality of construction the process known as stripping can occur, where the bitumen separates from the aggregate. This typically happens below the surface levels and may not be visible until serious failures have occurred.

8.2.14 Higher temperatures can have a number of effects. Higher temperatures, combined with increased ultra violet light from solar radiation can cause hardening of the bituminous materials, which can result in more brittle surfacing materials which will be more susceptible to cracking and fretting. Higher temperatures may also affect the mechanical properties of the surfacing materials through softening of the binder at high temperatures leaving the road surface more liable to deformation. The TRL report suggests that a 1 degree increase in pavement temperature could reduce the life of a pavement by 20%.

8.2.15 Generally drier hotter summers, may also have an effect on soil moisture levels, which in turn may cause significant soil shrinkage, with an associated risk of heave during wetter periods. On clay soils this presents a significant risk of premature failure.

8.2.16 Extreme rainfall events can cause significant impairment to otherwise sound pavements, but by their nature are very difficult to mitigate against. Rising sea levels present a risk to coastal carriageways with the risk of failures, particularly where the occurrence coincides with storm surges.

8.2.17 The general thoughts on mitigating the effects of climate change for carriageway assets is to specify high quality repairs, use material that are more resistance to high temperatures, and ensure a high quality of workmanship. There may be other measures to mitigate particular effects, for example management of road side trees could reduce the susceptibility to soil moisture changes.

Routine maintenance

8.2.18 Routine maintenance activities are identified through a variety of methods which should ensure that the asset remains safe and available for the user. Much routine maintenance is based on historical precedent, with visual and empirical information to support activities. Routine maintenance tends to focus on SCC's statutory duty to maintain roads in a safe condition, without explicitly addressing customer demand. Routine maintenance falls into 3 categories; scheduled, planned and reactive.

Scheduled

8.2.19 This involves a range of cyclical activities, and can include safety, service and specialist inspections, weed treatment, sweeping and cleaning, ploughing road edges to maintain width and programmed work to respond to defects raised through inspections. The frequencies for scheduled maintenance activities can vary and be seasonal for some activities. Many of these activities, whilst not explicitly undertaken to improve carriageway condition, have a preventative effect on the carriageway asset. Often user opinion about levels of service can be influenced by these scheduled activities, and service levels can fall below user expectations. These scheduled activities have a preventative effect against impairment due to the effects of climate change, and the importance of scheduled maintenance is therefore increasing.

Planned maintenance

8.2.20 Planned maintenance describes activities that are programmed in advance, based on information about condition derived from inspections, condition assessment or feedback from users. Plans can be developed for the short, medium and long term and typically are local treatments to deal with specific problems. A balance needs to be struck between the scale of planned maintenance, and more strategic maintenance based on asset management principles. An example would be when a road surface needs patching for safety purposes. There is a point when a renewal of the surface would be a better whole life cost option, even though it is more expensive in the short term than treating just the

defective areas. Well planned routine maintenance contributes significantly to maintaining carriageway condition, through addressing carriageway failures at an early stage and preventing deterioration. Routine planned maintenance includes localised patching, edge strengthening and re-profiling to improve drainage, sealing and filling open joints and work to reset covers and repair damage around ironwork.

8.2.21 As part of a planned maintenance regime it is important to consider the impact of utility works on condition and ensure that utility companies meet their obligations to reinstate the carriageway following works, but also to ensure that their apparatus is properly maintained.

Reactive maintenance

8.2.22 Reactive maintenance covers works necessary to maintain assets in a safe condition to the standards set by the Highway Network Management Plan and Highway Safety Inspection Manual, or in response to a weather event or other emergency where a rapid response is required. Reactive maintenance needs can be identified through safety and other inspections or feedback from users. They are not planned in advance and typically are more costly than delivering the same work through a planned maintenance process, and often, due to the urgency, have a shorter life than an equivalent planned treatment. Where reactive maintenance is required due to damage caused by third parties best endeavours are used to recover the cost of any works.

Table 8.2.3: Summary of routine maintenance standards

Activity type	Activity	Standards
Inspections	Scheduled safety inspections	Describe by hierarchy – frequency/walked/ driven
	Service inspections	As undertaken
	Streetworks inspections	Response to undertaker activity and to comply with NRSWA
Reactive maintenance	Emergency repairs	As set out in the Highway Safety Inspection Manual.
Scheduled maintenance	Siding/ploughing	Term contract standards
	Weed treatment	
	Cyclic (if applicable)	
Planned maintenance	Local patching/ edge repairs etc	Any term contract standards. Sustainability targets set out in the term contract for recycling and waste

Renewal or replacement

8.2.23 Renewal or replacement of the carriageway is the key part of lifecycle planning, minimising the whole life costs. Through condition assessment and timely intervention the preferred maintenance strategy is to renew carriageways at the optimum time by the provision of new layers that add strength and provide surface characteristics such as enhanced skidding resistance. This prevents further deterioration, without increasing capacity. Replacement or part replacement of the asset occurs when it has reached a condition that it is no longer viable or cost effective to renew the asset. For this strategy to be successful a robust process of optimisation and prioritisation of proposed schemes is needed, based on realistic budget and cost projections. The main factors that influence the whole life cost of an individual carriageway include:

- Type and quality of construction.
- Extent and type of deterioration and impairment.
- Type and volume of traffic.
- Environment and exposure to extremes in conditions.
- Quality and timeliness of routine maintenance interventions.
- Quality of medium and long term treatments.

- Extent of utility activity and quality of reinstatements.

8.2.24 The relationships between the above are complex and continually evolving with new materials, techniques and user expectations. These developments will be kept under review for future development of this lifecycle plan.

8.2.25 Historically the strategy for maintaining a new carriageway asset has been as follows:

- To specify a high quality of initial construction and maintenance and ensure compliance through supervision.
- To undertake timely routine maintenance to maintain condition.
- To undertake condition assessment using a variety of visual and automated surveys.
- To plan and implement preventative maintenance in a timely manner to prevent acceleration in deterioration.
- To use condition data to plan and implement cost effective solutions to prolong carriageway life.

8.2.26 The above highlights the importance of condition assessment in determining the timing and specification of optimum treatments. The techniques available for condition assessment are constantly developing, and the requirements for national and local reporting similarly change over time. The current condition assessment regime is set out on the following page, which covers structural, safety and serviceability requirements for the carriageway.

Table 8.2.4: Condition assessment

	Road Class			
Survey type	**A roads**	**B roads**	**C roads**	**Unclassified**
SCANNER	Every year in 1 direction. NI168	Every year in 1 direction NI169	Every year 50% in 1 direction NI169	N/A
Deflectograph	3 – 5 year cycle	3 – 7 year cycle	Determined on condition and traffic volumes	N/A
SCRIM	100% Local indicator	50%	N/A	N/A
CVI	N/A	N/A	N/A	25% per year Local indicator based on BV224b

Notes:

- SCANNER: DfT guidance is provided on survey coverage (extent/direction) for the production of national indicators 168 and 169. SCANNER provides data on rutting, texture, profile and cracking which is used in calculating the national indicators, but other characteristics are also collected. More details on the interpretation of this data can be found in section 6.20.
- CVI utilises data capture devices to produce BV224b, which is no longer a national indicator.
- A cyclical programme for Deflectograph surveys is developed that involves surveying roads on a 3/5/7 year cycle based on condition and importance of road. This programme is reviewed annually.
- SCRIM surveys are carried out annually to produce a local indicator of roads below investigatory levels.

8.2.27 The behaviour of carriageways is such that a section of road does not fail in a uniform manner along its length, and an effective maintenance scheme may involve treating sections that are in good condition, but adjacent to failed areas of carriageway. Intervention criteria can be adjusted to match available budgets, but in doing this there has to be an

acceptance that service levels will be lower, and that there is a risk of building a 'backlog'. The process adopted to use condition data to develop structural schemes is described in paragraphs 6.20 to 6.41.

Table 8.2.5: Renewal / replacement activities

Activity type	Activity	Standard
Renewal	Surface dressing Provision of antiskid surfacing Kerbing Haunching/edge support Planned patching (including pre surface dressing patching) Overlay Shallow inlay (<100mm)	Condition data Programmes derived centrally/locally Designed to provide >10 years life for surface treatment Contract performance criteria
Replacement	Deep inlay (>100mm) Reconstruction	Condition data Programme derived centrally Designed to provide >20 years life

Upgrading

8.2.28 Upgrading of carriageway assets may occur as part of LTP schemes, or S278 agreements to facilitate development. This may involve strengthening the asset, improving the surface quality to provide higher skid resistance and better noise performance, or reprofile it to deal with increased traffic volumes, to encourage cycling or to promote public transport. Increasingly proposals to upgrade carriageways using natural stone or other modular surfaces are promoted for wider social/economic benefits. When any upgrade is considered it is important to consider how to optimise the whole life cost for the carriageway including the future maintenance implications of the upgrade. This may be additional routine maintenance costs for some material choices, or greater third party insurance risks on some environmental surfaces.

Disposal, reallocation and downgrading carriageway assets

8.2.29 Disposal of carriageway assets is only possible through a complex legal process if it can be demonstrated that the asset no longer has a use. When considering renewal schemes there may be opportunity to reduce the width of the asset in some places and still meet service levels. This may provide an option to reallocate road space to other users, e.g. cyclists or pedestrians, and if appropriate it should be considered and costed as an option. By using a road hierarchy to manage the carriageway network there may be opportunity to reclassify some assets, and in so doing explicitly change the service standards required for a particular section of carriageway.

Treatment options

8.2.30 Road surfaces can be repaired, renewed or replaced. Repair typically will be a local treatment to a specified area, and can be done on a reactive or planned basis. Reactive repairs are usually in response to a safety defect and tend to be more expensive with a shorter life. In determining response times for safety defects consideration should be given to the trade off between risk to the road user and the quality of repair achieved. Research by the TRL indicates that road users understand the need for this trade off and may accept a compromise in response times if the quality of repair is improved.

8.2.31 Some treatments can protect the road surface, for example surface dressing seals the road surface preventing damage due to the ingress of water, and others may have a single objective, e.g. retexturing to improve skid resistance. Renewal of the road surface can involve a number of different treatments that provide a new surface, and replacement involves the removal of some or all of the structural layers.

Table 8.2.6: Treatment life and costs (April 09 prices)

Treatment	Expected treatment life	Cost* (unit)
Reactive patching Use hot material	 5 years	 £50 per repair
Reactive repair to kerb/ironwork Kerb Gully Manhole	 2 years 2 years 2 years	 £40 linear m £90 item £135 item
Planned patching Hand lay Machine lay	 5 – 10 years 10 years	 £40 square m £50 sq. m
Planned haunching	10 years	£28 lin. M
Planned kerbing	>15 years	£25 lin. M
Retexturing (to improve skid resistance)	2 – 3 years	£2 sq. m
Surface dressing	7 – 10 years	£7 sq. m – including prep work
Microsurfacing	7 – 10 years	£7 sq. m – including prep work
Planned resurfacing – overlay	15 – 20 years	£13 – £17 sq. m (varies with road hierarchy)
Planned resurfacing – structural overlay	20 – 25 years	£22 sq. m
Planned resurfacing – inlay	10 – 15 years	£30 sq. m
Planned resurfacing – deep inlay	20 years	£45 sq. m
Reconstruction	25 – 40 years	£67 sq. m

*Note: Costs are estimates based on generic rates for work based on existing contracts.

8.2.32 The expected treatment life, and costs are an average. Prices for a particular scheme will vary depending on extent of treatment, site constraints and traffic management requirements. The costs include works costs, design and supervision fees and other overheads. They do not include user costs due to delays; however for particularly traffic sensitive schemes consideration should be given to including user costs as part of optimising the whole life treatment.

8.2.33 Following the provision of a new surface currently a typical maintenance regime would include:-

- End of work inspection;
- Safety inspections at prescribed frequency;
- Condition assessment using appropriate method;
- Routine maintenance including weed control in channels, sweeping cleansing and drain clearance;
- Planned routine maintenance including patching, repairs around ironwork.
- Consider surface treatment after 12 – 15 years depending on condition with the aim of surface dressing at an early stage to arrest further deterioration;
- After 1 dressing continue to inspect/carry out condition assessment. For more lightly trafficked roads a second dressing should be planned, whilst busier roads may require resurfacing.

8.2.34 This regime is intended to be indicative only, and the timing and treatment of future repairs will depend on the outcomes of safety and service inspections, as well as condition assessment.

Option identification

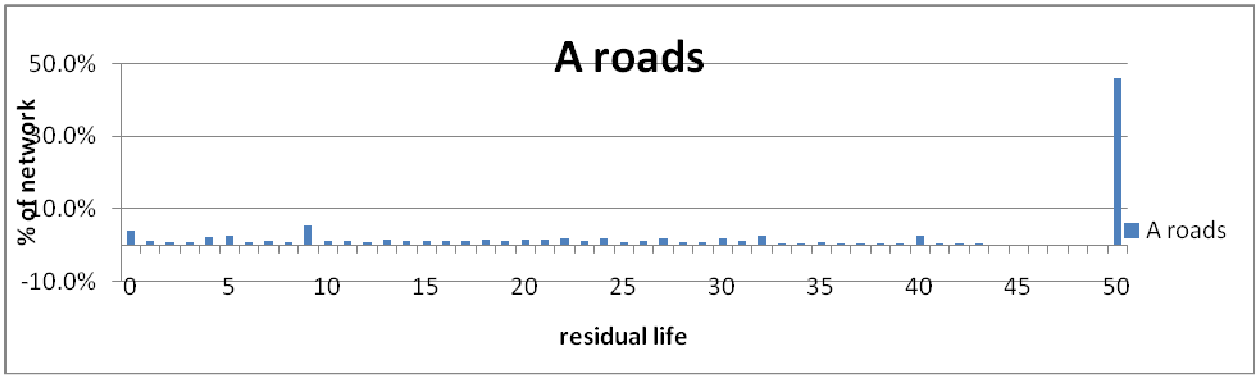
8.2.35 SCC have been using a financial/deterioration model for a number of years which uses condition data, deterioration profiles, generic treatment types and realistic work costs to analyse the impacts of different investment levels on the national and local indicators.

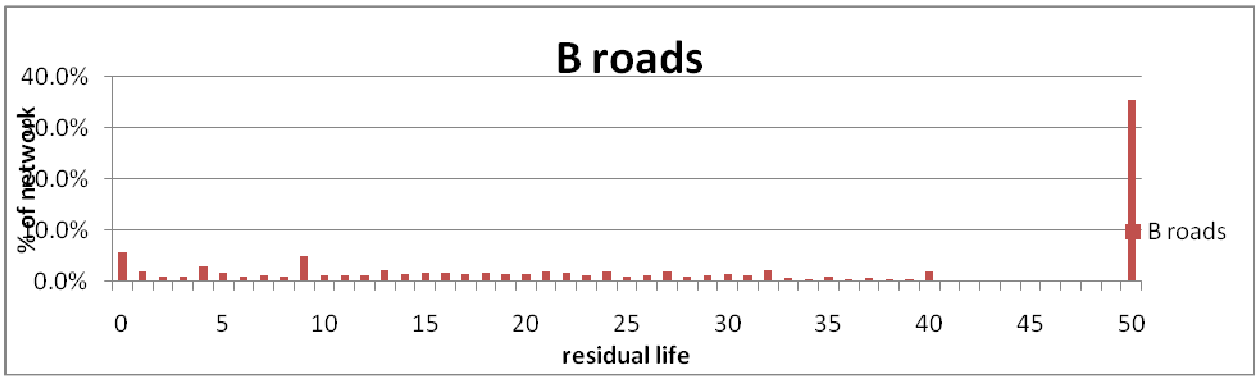
8.2.36 The model has been used to set a target for condition using all survey data and establishes spend profiles over a period of time to achieve these targets. The most recent available condition data is for 2008/09, which will be used to report national and local indicators. This condition data indicates that SCC is in the second quartile for the national indicator for A roads, the 3rd quartile for, B and C roads, and before the BVPI was superseded, the top for unclassified roads, using the 2007/08 quartile bands. SCC's ranking for these indicators were used by the DfT to determine the capital funding that SCC receive through the LTP maintenance block up to 2011.

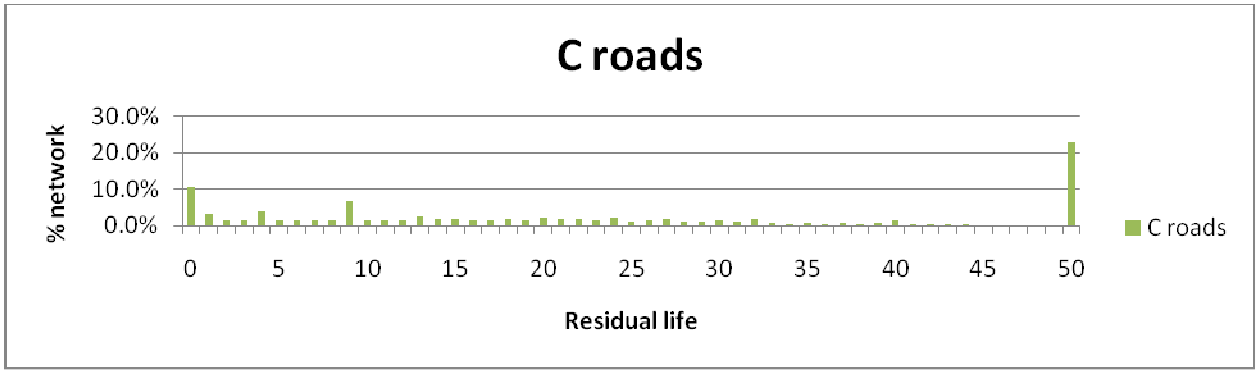
8.2.37 The model predicts the funding required over a specified timescale in order to meet the defined scenarios. Two models have been run, firstly to hold the current condition for the next 10 years on all condition indictors, and secondly to remove all defects in a year.

Residual life profiles

The condition data from the SCANNER can be represented as residual life using the deterioration model for each road class. These are built up from the constituent condition parameters for every 10m section of road.







Investment scenarios

Table 8.2.7: Description of scenarios for financial / deterioration model

Scenario	A roads	B roads	C roads	Unc. Roads
1: Maintain steady state for ten years	Maintain current NI 168, current Deflectograph and SCRIM performance	Maintain current NI169 current Deflectograph and SCRIM performance	Maintain current NI169 performance	Maintain current BV224b performance
2: Remove all defects within 1 year	NI168 = 0 This scenario accepts that there will remain 5% SCRIM deficiency; as there will be sites that on investigation do not warrant treatment.	NI169 =0 This scenario accepts that there will remain 5% SCRIM deficiency; as there will be sites that on investigation do not warrant treatment.	NI169 = 0	BV224b = 0

Model Outputs

8.2.38 The following is a summary of the model outputs. The actual investment profiles vary year to year but are expressed in average amounts for the 10 year period. These figures are based on April 2009 prices

Table 8.2.8: Model prediction of funding to achieve scenarios

Scenario	A roads	B roads	C roads	Unc. Roads	Total
1: Steady State: preserve the current condition. Average annual cost for 10 years	£4,848,535	£3,005,995	£13,008,587	£4,011,388	£24,874,505
2: Remove all defects in 1 year	£27,440,037	£17,254,199	£105,770,970	£17,321,190	£167,786,325

8.2.39 Variations on the scenarios, can be run and assess the impact of changes in funding levels over the period. For scenario 1 the figures quoted are the annual cost averaged over the 10 year period in 2009 prices.. There are annual fluctuations in cost, which indicate the variation in condition profile, and the process of trending data to model the process of deterioration.

8.3 Lifecycle planning – Footways and cycleways

Introduction

8.3.1 The footway and cycleway asset includes all footways and cycleways adjacent to and remote from the carriageway, but excludes 'on carriageway' cycle lanes that are included in the carriageway lifecycle plan. The Footway and Cycleway asset includes kerbing and edging associated with the asset group, the structure including any foundations, structural layers and surface. On many newer schemes 'shared surfaces' are provided where the distinction between footway and carriageway is deliberately blurred. In conservation areas, footways can include historic features such as steps, drainage channels, railings etc. that are important to area's character, but not currently part of this lifecycle plan. Often these features do not meet current design standards, but have to be preserved. In addition, footways are used to enhance public space, with seating, bike stands, litter bins and public art. These features need to be considered separately for lifecycle planning purposes. Footways also include features for mobility impaired users, such as tactile paving.

Extent of asset

8.3.2 The footway asset is extensive serving both urban and rural communities, with the majority of the footways in the urban areas. The construction of footways varies greatly, with most generally being of bituminous construction; however there is a significant length of modular, block or flag construction. Block and flag construction varies in the type of construction and materials used and many of these footways can be found in conservation areas and shopping precincts. Most urban footways have been constructed to a design/ standard detail, whilst in rural areas; many footways have evolved and may have limited construction thickness. Most footways also have concrete kerbs, although in many towns natural stone kerbing is used. The provision of kerbing and edging is important to support the footway, but also to delineate road space for users. Cycleways tend to be more recent, and have varied construction. Many cycleways are shared surfaces with footways or recreational trails. Cycleways tend to be of similar construction to the footways, except for recreational trails which are often of an unsealed crushed rock finish.

8.3.3 The footway and cycleway network is managed using a hierarchy. Given the difficulty in accurately assessing the classification of footways using pedestrian counts, which can be variable the hierarchy is described by the environment. Widths vary with the hierarchy, with wider footways typically being in the F1 and F2 category.

Table 8.3.1: Footway hierarchy

Category	Description
F1	Main shopping centres; heavily pedestrianised areas; busy pedestrian routes
F2	Other shopping areas; and well used routes to local shopping centres, tourist attractions, large schools and businesses and industrial centres etc.
F3	Other urbanised areas, and Busy village/rural centres. Linking footways not included in category 1 or 2.
F4	Little used urban such as short estate roads and cul de sacs. Little used rural.

Table 8.3.2: Cycleway hierarchy

Category	Description
A and B	Both on and remote from carriageway
C	Trails

8.3.4 The length of the footway and cycleway asset in kilometres is as follows:

Table 8.3.3: Length of cycleway by district

District	Cycleway (Total)
West Somerset	6.5
Taunton Deane	51.2
Sedgemoor	27.2
Mendip	23.5
South Somerset	23.1
Total	131.5

Table 8.3.4: Total length of footway by type

	Footway F1	Footway F2	Footway F3	Footway F4
Total	61.0	62.0	2069.5	555.7

8.3.5 The extent of the footway asset reflects that held in the inventory and currently inspected; and includes link footways. However there may be further link footways not currently included on the inspection schedules. Some public rights of way in urban areas are surfaced and included in the above.

8.3.6 In addition to the asset maintained by SCC there are footways that have never been adopted and remain in private ownership. Particular consideration should be given to those footways constructed by District Councils in their housing authority role, as any such footways may be maintainable at public expense, but not included on SCC's inventory. In some cases SCC has powers with respect to these private roads and footways, but not responsibility for maintenance. Such footways are excluded from this lifecycle plan.

Asset creation and acquisition

8.3.7 The main processes by which footway and cycleway assets are created is as for the carriageway. Typically, any improvement that creates new footway or cycleway assets aims to promote accessibility and alternatives to the car, or performance concerns.

Climate Change

8.3.8 The effects of climate change on footways and cycleways will largely be similar to those described for the carriageway. However with typically thinner pavements the effects of high temperatures causing hardening may be more pronounced, especially on footways susceptible to damage due to vehicular overrun.

8.3.9 Longer growing seasons due to milder wetter winters also present a risk with more vegetation growth causing damage.

Routine, scheduled, planned and reactive maintenance

8.3.10 Maintenance activities for footways and cycleways broadly reflect those applicable to carriageways (see paragraphs 8.2.18 to 8.2.22); however one important distinction is that footways don't tend to deteriorate due to usage, but more to abuse, particularly due to vehicle overrun and parked vehicles and environmental damage. Therefore routine maintenance that prevents this abuse, and deals with weed growth etc is important in preventing impairment.

Safety inspection

8.3.11 Safety inspection regimes for footways take particular regard for the risk of trip, slip and fall claims, which can cause injury to users. Whilst not reported in accident statistics the impact of such incidents can be significant, and represent a risk to SCC in terms of claim costs. Flag and modular pavements can be a particular problem in that failure can be sudden, with safety defects appearing with little warning. These surfaces are vulnerable to utility work, and monitoring of reinstatement quality on modular surfaces is an important activity

Renewal or replacement

8.3.12 The process of renewal or replacement of the footway or cycleway is the key part of lifecycle planning and is broadly the same as those described for the carriageway asset, with the exception that condition assessment regimes are less sophisticated. In many cases, footways may be renewed when the adjoining carriageway is treated. If the footway and carriageway asset are both in need of treatment this is the most cost effective way to carry out the work, and contributes to improved user satisfaction. There will be occasions when the preferred carriageway treatment requires kerbs to be raised, however the footways are not in a condition that warrants treatment. Where this occurs, consideration will be given to the best whole life cost treatment for both asset groups.

8.3.13 Condition assessment is important in determining optimum treatments. However there is no longer a BVPI for footway condition (BVPI187 having been withdrawn in 2007). The collection of data for BVPI187 was onerous, it had limited network coverage and was of limited relevance as a decision making tool. As a consequence the surveys have been discontinued in Somerset. At present there is no automated survey technique for footways or cycleways. It is anticipated that in 2010 the UK Roads Liaison Group will launch a new footway survey known as 'Coarse Network Survey' which should provide a tool for condition assessment and allow comparison between authorities. This survey is unlikely to be used for national indicator purposes, however should provide a repeatable survey regime that will allow prioritisation of schemes, and the development of lifecycle planning models.

Table 8.3.5: Renewal / replacement activities

Activity type	Activity	Standard
Renewal	Slurry sealing Kerbing realignment/ replacement Planned patching Overlay	Condition data Programmes derived centrally/locally Designed to provide >10 years life for surface treatment Contract performance criteria
Replacement	Reconstruction	Condition data Programme derived centrally Designed to provide >20 years

Upgrading

8.3.14 Upgrading of footway and cycleway assets may occur due to the same reasons outlined in the carriageway lifecycle plan. Increasingly proposals to upgrade footways using natural stone or other modular surfaces are promoted for wider social/economic benefits. When any upgrade is proposed, it is important to consider its future revenue implications. This may be additional routine maintenance costs for some material choices, or greater third party insurance risk on some modular surfaces.

Disposal, reallocation and downgrading assets

8.3.15 The processes for disposal are as described in the carriageway lifecycle plan.

Treatment options

8.3.16 Footway and cycleways surfaces can be repaired, renewed or replaced and the principles are as described in the carriageway lifecycle plan.

Table 8.3.6: Treatment life and costs (April 2009 prices)

Treatment	Expected treatment life	Cost*
Reactive patching		
Use depot grade material	10 years	£70 per repair
Safety maintenance		
Temporary ramps to remove trip hazard	2 years	£50 per repair
Vegetation control	2 years	£5 per repair
Reset modular/block paving	2 years	£30 per repair
Reactive repair to kerb/ironwork		
Kerb	2 years	£40 linear m
Service cover	2 years	£70 item
Manhole	2 years	£110 item
Planned patching		
Hand lay	5 – 10 years	£20 sq. m
Planned edge strengthening	10 years	£20 lin. M
Planned kerbing		
Reuse	>15 years	£10 lin. M
New kerbing	25 years	£25 lin. M.
Slurry sealing	7 – 10 years	£5 sq m.
Planned resurfacing – overlay	15 -20 years	£10 sq. m
Reconstruction	25 – 40 years	£25 sq. m
Restore modular/block paving surface	20 years	£20 sq. m

* Note: costs are estimates based on generic rates for work based on existing contracts.

Option identification

8.3.17 Given the limitations in the methods used for condition assessment option identification tends to be based on historic practice and visual surveys. The current process described in 6.41 – 6.42 uses insurance claims records, safety defects and an assessment of risk and future deterioration to score specific sites which are then ranked. Whilst this makes good use of existing data it is based on safety inspectors' records and may not fully represent the best way of prioritising schemes. It is therefore recommended that SCC consider adopting the coarse network survey in 2010 and commence surveying in 2010. Using this survey data a prioritisation model can be developed that considers a number of factors including:

- Insurance claim history and cost
- Footway/cycleway hierarchy

- Condition assessment (using CNS)
- Valuation of footway assets and assessment of depreciated replacement cost.
- Linkage to other planned maintenance or improvement schemes

8.3.18 Without robust condition data there is not an equivalent financial/ deterioration model to that used for carriageways. It is possible to estimate lifecycle costs based on generic treatment regimes, using the principles set out in the TRL report 'Whole life value of footways and cycle tracks' however this does not directly link to service levels, or provide opportunities for optimisation.

8.4 Lifecycle planning – Highway structures

Introduction


Hele Bridge

8.4.1 Somerset County Council aspires to "provide excellent services that are accessible, responsive and sustainable to ensure Somerset is a healthy and vibrant place to live, work and visit". The County's bridge and retaining wall stock is vital in achieving this vision. Without a maintained and functioning structure stock commerce, leisure, education and the most basic day to day functions would be untenable for those who reside and operate in the County. The County's heavy dependency on an aging and expanding structure stock, which binds both rural communities and urban populations together, places very different, ever changing and wide ranging challenges on their management.


Silk mills

8.4.2 The management of highway structures is carried out in accordance with the Highways Agency Design Manual for Roads and Bridges, and their Specification for Highway Works. Contract documents and procedures for all tendered contracts are prepared in accordance with the Agency's Manual of Contract Documents for Highway Works. Departures from the advice contained in these documents are recorded in Feasibility Reports, Approval in Principle documentation, and Departure from Standard or Tender Appraisal Reports.

8.4.3 Assets included in this Lifecycle plan are;

- Bridges and culverts of span 900mm and above;
- Subways and underpasses;
- Piped or 'Irish' fords;
- Pedestrian bridges within the highway;
- Walls sustaining the highway, or other 'highway' walls retaining adjacent property where failure would have a significant affect on the highway;
- Structural (reinforced) embankments;
- Buried structures (large chambers);
- Other miscellaneous structures (e.g. gantries, anti-incursion measures for railways, etc.).

There are over 2,000 highway bridges owned and maintained by SCC, and about 20km of highway sustaining walls. Of this total approximately 75 are Listed Structures, and 25 are Ancient Monuments.

8.4.4 The standards* deployed in delivering functions and duties include:

- 'Code of Practice for the Management of Highway Structures';
- 'Inspection Manual for Highway Structures';
- The Design Manual for Roads and Bridges (DMRB);

- Highways Agency Specification for Highway Works;
- Highways Agency Manual of Contract Documents for Highway Works;
- SCC Standards (e.g. Estate Roads Design Standards for Developers);
- DfT Standards and guidance, e.g. Managing the Accidental Obstruction of the Railway by Road Vehicles;
- Local derivatives or variants of advice and guidance e.g. DfT Parapet Ranking, and The Wallingford Procedure for scour study and derivatives.

8.4.5 Maintaining existing and usually old, 'non standard' structures in varied circumstances often demands 'departures' from standards to achieve fit for purpose and cost effective solutions. The proposed implementation of Eurocodes from 2010 may introduce differing challenges and priorities to some of those identified in current documentation albeit that these will not be appropriate for all current activities.

8.4.6 Highways structures are often a feature of towns, rural communities or the local scene. Treatments aimed at purely satisfying structural technical objectives can be inappropriate in aesthetic terms. Care is taken to respond to community, heritage and environment needs, and frequently treatments are engineered from first principles to develop the most appropriate local solution, whilst addressing the technical issues.

8.4.7 When treatments are needed innovations are sought, but care is also taken to reinvest learning from previous work. Thanks in part to the development of electronic archives, the Bridge Register and Database Record is building a powerful source of information on previous schemes.

8.4.8 Sometimes issues arise that are unusual or complex. The CSS network provides a regional Bridge Conference that provides an informal advice network that can assist in finding solutions. The Conference is also the means by which national advice is cascaded.

8.4.9 The first national Code of Practice for the management of highway structures was published in September 2005. The Code sets out the basic legal obligation as follows:

'There is a statutory obligation on highway authorities to maintain the public highway. The obligation embraces the two essential functions of 'Safe for Use' and 'Fit for Purpose'. The two functions are not the same:

- **Safe for Use** requires a highway structure to be managed in such a way that it does not pose an unacceptable risk to public safety;
- **Fit for Purpose** requires a highway structure to be managed in such a way that it remains available for use by traffic permitted for the route'.

8.4.10 The Code then sets out a number of recommendations for good practice to deliver the legal obligations in three milestones:

- One: Safe for Use;
- Two: Fitness for Purpose;
- Three: Good Management Practice.

8.4.11 SCC is seeking to implement the Code of Practice, and has made progress against the first two milestones. It is proposed to complete work on these two milestones, along with progress on milestone three by the end of 2010/11 (funding permitting).

Issues and trends

8.4.12 Since 1996, the revenue budget for Bridge Maintenance has been significantly lower than required to carry out either the full inspection programme, or to attend to all reactive and preventative maintenance works identified. A large backlog of works, presently known as the 'Workbank', has consequently built up, and this is expanding as inspection work

proceeds. This has, in part, been addressed through capital funded Structural Bridge Maintenance and Strengthening. There is, however, a growing list of smaller scale but essential routine maintenance works and repairs to attend to.

8.4.13 The economic growth to 2008 has placed greater pressure on the highway network. An aging stock of highway structures has been subjected to greater traffic density, whilst a changing climate has also taken its toll, particularly on old masonry structures. Technology progress in the area of Satellite Navigation has also presented challenges. Evidence suggests some large vehicle drivers have ignored signs and crossed width, weight or height limited bridges on the instructions of their 'sat navs', often causing serious damage.

Under SCC procurement arrangements, 'Client' and 'Designer' roles are performed by SCC, occasionally with external consultancy input. Construction services are sourced externally.

Deterioration model

8.4.14 The deterioration of highway structures is dependent on component materials, age, condition, exposure and function. Masonry walls, particularly those built over 100 years ago, deteriorate at an accelerated rate with frequent failures. This is due in part to climatic changes, as well the difficulties and high cost of maintenance.

Creation and acquisition

8.4.15 New highway structures, including bridges and walls, are created by major highway developments. This might comprise public road schemes (such as relief roads) and private developments (such as new housing estates).

8.4.16 Structures can also be acquired through transfer from other authorities and bridge owners, whilst some structures are 'found'. These 'finds' tend to be previously unrecorded structures, where there is no viable alternative to SCC assuming maintenance responsibility. Whilst ownership and maintenance responsibility is uncertain, some structures are recorded as 'goodwill' sites, where SCC undertakes essential works, but without acknowledging or claiming responsibility.

Routine Maintenance

8.4.17 The management of the structure stock, including inspection and monitoring, identifies treatment works required. Routine bridge maintenance is identified from inspection criteria specifically aimed at targeting the following:

- Safety of all highway users;
- Structural deterioration that can be arrested with a better value of investment now, rather than later in the programme;
- Structural deterioration that might impair access.

8.4.18 The elements catered for by routine maintenance are listed below:

- Programme of reactive maintenance works (e.g. road traffic collision repairs);
- Small programme of preventative maintenance works (e.g. vegetation removal);
- Small programme of amenity works;
- Client and Designer Duties under the CDM Regulations 2007;

- The creation of briefs for capital maintenance activities (renewal, replacement and upgrading);
- The receipt and lodging of post construction records of treatments (including CDM Regulations 'Health and Safety Files) on the Bridge Register and Database Record;
- Immediate emergency measures or activities.

8.4.19 Where routine maintenance work is beyond the budgetary scope of 'routine maintenance', it is identified for the LTP2 capital programme. This work encompasses the activities listed below (other activities can emerge at short notice), and is described in the 'Renewal or Replacement' and 'Upgrading' sections below.

- Bridges in locations where road casualties are occurring;
- Bridges failing to meet load carrying requirements;
- Reducing the risk of 'Accidental Road Vehicle Incursion onto Railways';
- River foundation damage (also known as 'scour' or 'washout');
- Weak parapets and edge protection;
- Bridges and structures where size, vehicle clearance and road alignment may present a potential hazard;
- 'Over bridges' with 'fragile' supports;
- Significant reinforced concrete deterioration;
- Significant metal corrosion;
- Long term water ingress through older structures;
- Other serious/progressive structural deterioration.

Routine maintenance plan

Table 8.4.1 Calculation of how much is needed to maintain all asset sub-groups

Sub Group	Quantities	Units Cost £'s	Gross Replacement Cost (GRC) £'s	*Steady State Value £'s
Retaining Walls (sq m)	44592.31	£2,176	£97,032,861	£543,959
Culvert (sq m)	45262.12	£920	£41,641,153	£233,437
Bridges (sq m)	120911.99	£3,223	£389,699,342	£2,184,626
Footbridges (lin m)	1118.30	£6,058	£6,774,663	£37,978
Tanks (sq m)	0.00			
Fords (sq m)	0.00			
Miscellaneous	0.00			
Total			**£535,148,020**	**£3,000,000**

Note:

- Steady State has been achieved since 2003/04 with annual budget of approx £3m, with average CIBav of 80.5 being achieved. Steady state is therefore assumed to be achieved at this £3m figure, with a 2% p.a. demographic growth.

Table 8.4.2 Cyclic management and maintenance intervention activities

	Capital Steady State (today's standard)	Quantities	Life	Yearly quants.	Unit costs £k	Sub-total annual costs £k
Management	Planned Inspections	2530	2	1265	0.1	126.5
	Structural Testing/Monitoring	To be developed in association with BD79 activities				
	Specialist Activities (e.g. diving, confined spaces etc.)	780	6	130	1.5	195
	Structural Assessments or ascertaining structural deficiencies	2530	A	75	2.5	187.5
	Parapet Risk Assessments	2140	A	200	0.15	30
	Scour Risk Studies	1840	A	200	0.5	100
	Railway Incursion Risks Studies	100	10	10	0.15	1.5
	Scoping for physical interventions	2530	10	253	0.5	126.5
Maintenance Interventions	General Maintenance (e.g. repointing, concrete repairs etc.)	2150	20	108	3.5	378
	Painting	670	40	17	5	85
	Vegetation Removal	2530	5	506	1.1	557
	Pump Maintenance	6	1	6	1	6
	Graffiti Removal (Subways Only)	18	A	18	1.5	27
	Timber Element Replacement	240	40	6	10	60
	Total					**1880**

Notes:

- All yearly activity quantities will be affected by significant changes to the structure, its condition or usage. Frequency may also be governed by changes to Standards and Codes of Practice. Those with an "A" in any column are more susceptible to these influences.
- All data is subject to continuous review and improvement and quantities have been rounded to reflect this. Figures given are the best available as of Jan 2009.
- Costs are a best estimate but every site is different bringing different demands, skills and budget commitments. The activities listed do not differentiate between bridge type, size, location, usage, scope of works or uniqueness.

Inspections SCC has historically relied primarily on its programme of general inspections. These have been carried out every 2 years in accordance with the 'Inspection Manual for Highway Structures' (CSS, 2007)

8.4.20 The 'Inspection Manual for Highway Structures' (CSS, 2007) confirms that a Principal Inspection (PI) needs to be carried out for all bridges and structures every six years by a qualified engineer. This has not been possible in Somerset owing to budgetary constraints. However, the inspection regime has been developed to take opportunities afforded by the capital programme. PIs were started around 1990, as part of the capital funded Assessment and Strengthening Programme. Bridges built in 1973 or later were identified for a separate capital funded PI.

8.4.21 The General Inspection (GI) work has been enhanced to include the completion of Bridge/ Structure Condition Indicator (BCI) data forms which, with defect records, are now downloaded to the SCC Bridge Data Resource. The 'Enhanced GI' process helps to manage the risk of a curtailed inspection regime.

8.4.22 There is scope for some economy of resources by scheduling the more vulnerable structures for PI at the recommended 6 year interval, but decreasing the frequency where the usage is less onerous or the structure type is more robust. This is based on the expected continuation of the Capital Programme for this work.

8.4.23 It is proposed, subject to funding availability, that each bridge and wall is reviewed and allocated to a priority and frequency of PI2 (see table 8.4.1), in accordance with the criteria listed.

Table 8.4.3 Summary of existing / proposed standard highway structure inspections

	Frequency	Structure category
General Inspection	Every 2 years	All structures
Proposed Frequency for Principle Inspections (PI2)	Every 6 years*	Any structures with signs of significant structural deterioration. Unusual type or material (cast iron, stone slabs, etc.) Weight Limited bridges Bridges on strategic/primary/heavy load routes Bridges at scour threat sites High or vulnerable retaining walls (>3m retained height) Historic (Ancient Monuments, Listed, locally important)
	Every 12 years*	Other masonry arch bridges span >1.8m Older beam and slab bridges (steel or reinforced concrete) Footbridges alongside/over roads Medium-risk retaining walls (<3m to >2m retained height)
	Every 18 years*	Modern longer span beam and slab Lower-risk retaining walls – low height (<2m retained height)/ modern/robust)
	Every 24 years*	Short span 0.9 to 1.8m bridges and culverts (confined space/diver led) Reinforced concrete box culvert or similar robust sections at subways and watercourses.

* Note: the adequacy of this frequency shall be kept under review.

8.4.24 SCC's Highway Inspectors also patrol the highway network at regular internals (maximum yearly), and will report obvious highway structure faults. Additionally, the community around highway structures, road users and partner organisations (e.g. police, district councils, Environment Agency, railway companies etc.) helpfully provide reports on structure concerns. These are always followed up by a Special Inspection by Bridges' Team staff.

8.4.25 SCC is also involved in regional efforts to improve inspection standards and consistency of data such as the BCIs, and to introduce bridge inspector training.

Load assessment This is the process of structural appraisal and calculation to determine the load carrying capacity of a structure. Since 1991 this work has been capital funded, owing to the increase in loading associated with the EU Derogation that led to 40/44 tonne vehicles being permitted in January 1999. Around 1,400 bridges have been assessed, leading to a bridge strengthening programme and, in some cases, weight restrictions. The information provided is key data for the day to day management of the bridge stock, and the traffic permitted to use it.

Monitoring At risk' or sensitive sites are monitored in a variety of ways. These range from sophisticated telemetric gauging of cracks, movement or electrochemical activity, to physical/visual gauging of defects such as cracks. Where confidence is improved, monitoring of certain sites may be reduced. Some monitoring of structures is carried out in lieu of, or to permit the deferral of, capital improvements and these works are funded by the capital programme. It is proposed to develop the programme of 'sub-standard bridge monitoring', to be more compliant with the requirements of BD79 (Design Manual for Roads and Bridges).

Renewal and replacement

8.4.26 When highway structures or their components come to the end of their useful life, or fail in some way, they require renewal or replacement. This work aims to restore the structure or component to an 'as new' condition. The standards deployed for this work are:

- The Design Manual for Roads and Bridges;
- SCC Standards (e.g. Estate Roads Design Standards for Developers);
- Various CSS Guidance;
- Other relevant standards;
- Approved 'departures' from codified standards.

8.4.27 This work tends to be capital funded, and the opportunity is usually taken to upgrade the asset by enhancing its strength, durability and functionality. This work also includes elements that constitute 'upgrading' (see below).

8.4.28 Opportunities will also be taken to improve or create features to meet changing stakeholder needs. These might include assisting access for more vulnerable (non-car) users, such as easing ramp grades to bridges and providing or widening footways. The Somerset Highways Biodiversity Action Plan will also be influential, with schemes often including measures to protect and or enhance habitats.

Upgrading

8.4.29 Sometimes inadequacies in structures demand upgrading work. This can be a result of bridge strength assessments, or changing technical standards that identify or quantify risks that need addressing. An example is the work arising from the Selby Train Disaster, where some bridges over railways will require measures to reduce the risk of incursion by road vehicles onto the railway.

8.4.30 The most significant area of upgrading has been the bridge strengthening programme, where 1,400 bridges are undergoing strength assessment. Around 200 bridges have been strengthened since this capital funded programme started in 1992. Relatively few bridges have been weight restricted, as restrictions are not completely reliable in excluding unsuitable traffic.

Disposal

8.4.31 Highway structures on rare occasions become redundant or disused, and may be demolished or 'filled in'. This has happened with some bridges and also highway supporting walls, where an embankment can replace a formal structure. Care must be exercised to ensure easements and rights of way are dealt with appropriately, and other long term potential for alternative uses of routes or land are not compromised.

Non-Asset options

8.4.32 There are methods of reducing direct asset interventions for highway structures. These can be cost effective, since work to highways structures can be costly and disruptive. Examples of these non asset interventions are:

- Debris screens;
- Protection booms;
- River management – e.g. weirs to slow flow and reduce erosion of bridge or retaining wall foundations;
- Physical self-enforcing traffic restrictions – e.g. bollards and high containment kerbs;
- Traffic management restrictions – i.e. Height, Length, Weight and Width;
- Traffic markings and advice.

Performance monitoring and management

8.4.33 There are no national indicators (NIs) or Best Value Performance Indicators (BVPIs) that relate to the management of highway structures. However, a national 'Guidance Document for Performance Measurement of Highway Structures' has recently been published, which proposes the introduction of four performance measures:

- Condition Performance Indicator;
- Availability Performance Indicator;
- Reliability Performance Indicator;
- Structures backlog.

8.4.34 It is unlikely that the DfT will adopt these as NIs. However, SCC sees value in the Condition Performance Indicator together with the valuation of the Structures Backlog. The proposed availability and reliability indicators have not been widely adopted, and there is doubt as to their value. Experience has been obtained with the use of the Condition Performance Indicator (BCI), but work is required to improve consistency regionally if the indicator is to be used for benchmarking. More work is also required on the Workbank which will provide figures for the backlog.

8.4.35 The following table provides a comprehensive list of measures for performance monitoring and management of highway structures functions. The rows tinted green are those where facilities currently exist to measure performance.

Table 8.4.4: Highway structure performance measures

Measure	Definition	Reference	Benchmark
Service visible to the public	Number of days p.a. with traffic control in place for over 24 hour continuous operation on (A and B) roads	BVPI 100	National and Region
Operational	% of bridges not meeting the required carrying capacity	SW B2 and CSS National	Regional and National
	Annual maintenance expenditure on bridges as % of stock value	TBA	Local
	% of bridge incident reports dealt with within 2 working days	TBA	
	Maintenance expenditure p.a. on retaining walls as % of stock value	TBA	
	Measuring Client Satisfaction with the design teams Service, Product and Absence of Defect	NHDBVBC KPIs I, 2 and 3	Local and National
	Predictability of design costs	KPI4	National and Region
	Predictability of design time	KPI5	
	Predictability of construction costs	KPI6	
	Predictability of construction time	KPI7	
Value for money	Average maintenance cost to maintain each bridge excluding workbank	TBA	National
Asset management	% routine inspections carried out on time	TBA	Local
	Average CIB for bridge stock	CIB_{av}	Region
	Critical CIB for bridge stock	CIB_{crit}	
	% of bridge stock with average CIB less than 70	CIB_{av}	Local
	% of bridge stock with average CIB less than 60	CIB_{av}	
	% of bridge stock with critical CIB less than 75	CIB_{critv}	
	% of bridge stock with critical CIB less than 65	CIB_{crit}	

	% of bridge stock with average CIB greater than 90	CIB_{av}	
	% of bridge stock with critical CIB greater than 95	CIB_{crit}	
	Average CIRW for retaining wall stock	$CIRW_{av}$	
	Critical CIRW for retaining wall stock	$CIRW_{crit}$	
	% of retaining wall stock with average CIRW less than 70	$CIRW_{av}$	
	% of retaining wall stock with average CIRW less than 60	$CIRW_{av}$	
	% of retaining wall stock with critical CIRW less than 75	$CIRW_{crit}$	
	% of retaining wall stock with critical CIRW less than 65	$CIRW_{crit}$	
	% of retaining wall stock with average CIRW greater than 95	$CIRW_{av}$	
	% of retaining wall stock with critical CIRW greater than 90	$CIRW_{crit}$	
	Average value of workbank per bridge	Outstanding bridge works value	
	Depreciated Asset Value £ (depreciated replacement cost)	Bridge – DRC 1	National
	Depreciated Asset Value as a % of the Gross Replacement Cost	Bridge – DRC 2	

8.4.36 Certain performance measures have been in place for a number of years and the following table records them.

Table 8.4.5: Performance: past achievement and future targets

Reference	2003/ 04	2004/ 05	2005/ 06	2006/ 07	2007/ 08	2008/ 09	2010/ 11
SW B1: Bridge Stock condition indicator	80av 75crit	79av 71crit	81av 71crit	82av 76crit	81av 75crit	82av 78crit	
SW B2: % of bridges not meeting the required carrying capacity	8%	18%	19.3%	12%	12%	13.9%	
SW B3 (Availability) and B4 (Reliability) Introduced in 2005/06 but not widely adopted in the SW	No data	No data	No data	No data	No data	No data	
SW B5: Structures Workbank value (will become backlog when non essential work is deducted)	No data	No data	No data	£15m	£15m	To be added	
SW B6: % of capital bridge schemes delivering other benefits (Refer to LTPF4 form)	No data	31%	24%	22%	7%	To be added	
Retaining Wall Stock condition indicator	No data	72av 56crit	70av 57crit	75av 58crit	77av 59crit	77av 58crit	

Reference	2011 target	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2017 target
SW B1: Bridge Stock condition indicator	85av 79crit						88av 82crit
SW B2: % of bridges not meeting the required carrying capacity	10%						8%
SW B3 (Availability) and B4 (Reliability) Introduced in 2005/06 but not widely adopted in the SW	Indicator likely to be dropped						
SW B5: Structures Workbank value (will become backlog when non essential work is deducted)	£14m						£12m
SW B6: % of capital bridge schemes delivering other benefits (Refer to LTPF4 form)	25%						25%
Retaining Wall Stock condition indicator	81av 63crit						84av 66crit

Performance gaps

Inspection and monitoring

8.4.37 If SCC can find resources to carry out a limited principal inspection programme as described above, its progress would be monitored against targets. It is also proposed to measure the compliance with the 'Management of Sub-standard Bridges code BD79.

Works

8.4.38 Quality of workmanship requires performance management, possibly linked with contract incentives and/or penalties.

Asset knowledge

8.4.39 SCC already monitors the progress of BCIs. However, more consistent results and less 'jumpiness' in data will indicate greater confidence levels in the asset condition data, and thereby greater confidence in asset valuation and depreciation models.

Climate Change

8.4.40 The County's structure stock contains a wide range of material types, having been developed over many centuries and may not prove to be adequate for future environmental and economic conditions without intervention. This aging stock has historically coped well to climate change. However, it is reasonable to assume that future challenges will alter its deterioration profile.

8.4.41 Past operational requirements may not be sufficient for future usage; recent flooding events are a prime example of this. Wetter winters and hotter summers may impose conditions beyond that envisaged at original design and hasten deterioration and failure of bridges and retaining walls alike. Changing legislation associated with climate change is a current hot topic and is already impacting on scheme considerations and priorities. Greater capacity and innovative schemes may need to be designed to cope with flooding occurrences and threats and the Environment Agency's anticipated flooding event requirements.

8.4.42 The Bridges Section has always placed a high importance on sustainability issues in its scheme choice; repairing whenever possible. The majority of the County's structure stock has proven to be sustainable though failure, especially masonry retaining walls, has recently been prevalent following sustained or sudden heavy rain. When designing for the future, therefore, it may now be necessary to adopt more replacement activities to future proof our stock against changing environmental demands.

Future developments

8.4.43 Progress towards compliance with the Code of Practice is seen as the key future development. There will be key management decisions on the balance between managing risk and investment.

8.4.44 The present bridge database has served SCC well, but will benefit from a review to improve its potential. The electronic Permanent Filing system has also been a great access, and would similarly benefit from a review, upgrading its functionality to improve asset management activities.

8.4.45 The Bridge Team are working with the Public Rights of Way (PRoW) Team to help manage the risks associated with structures on the PRoW network. It is likely that PRoW structures of higher risk will be subject to an inspection and maintenance regime of a similar standard to structures on the main highway network. This development is being driven and managed by the Rights of Way Section.

8.4.46 Subject to resource availability, implement a PI2 inspection programme in accordance with the requirements of table 8.4.1.

8.4.47 The BCI scoring could be improved by targeting specific types of works prior to inspections occurring. It is desired that a rolling vegetation removal and minor repairs gang could operate ahead of the County Bridge Inspector.

8.4.48 The Bridge Team is involved in regional efforts to improve inspection standards and consistency of data such as the BCIs, and to introduce bridge inspector training.

8.4.49 Subject to resource availability, it is proposed to develop the programme of ‘sub-standard bridge monitoring’, to be more compliant with the requirements of BD79 (Design Manual for Roads and Bridges).

8.4.50 Changing challenges and resource pressures mean that the Workbanks require additions, updating, maintenance, development and revised prioritisation consideration. An example of these issues include:-

- the County’s response to the Pitt Report
- Emergency, reactive and other unforeseen scheme involvement following events like structural collapse, flooding and RTAs.

8.5 Lifecycle planning – Highway surface water drainage

Introduction

8.5.1 Highway surface water drainage systems are designed to:-

- Prevent the accumulation of surface water on carriageways, footways and cycleways;
- Prevent pollution from highway drainage affecting watercourses;
- Reduce future maintenance liability by minimising water damage to the highway structure;
- Prevent nuisance to adjoining landowners by flooding.

8.5.2 The provision of highway drainage systems and the routine maintenance of them is paramount to the structure of the highway network and accessibility to the network.

8.5.3 The drainage asset comprises highway gullies, kerb offlets, associated pipework, soakaways, catchpits, grips and ditches, and outfalls. Also included are sustainable urban drainage systems (SUDS) and balancing ponds.

8.5.4 Highway surface water drainage is designed only to carry surface water from the road surface. In many cases, the drainage systems are overwhelmed by surface water from adjacent agricultural land, roof water and private property. In many flooding incidences, highway drainage is rarely the single contributory factor and the need to coordinate actions between private landowners and other statutory and non-statutory organisations is becoming more frequent.

Creation and acquisition

8.5.5 These fall into 2 broad areas:

- Schemes promoted by SCC;
  - Major schemes
  - Local Transport Plan
  - Structural Maintenance
  - Minor Works
- Private developers' schemes.

8.5.6 SCC schemes are mainly promoted through the structural maintenance programme to alleviate flooding at a specific site.

8.5.7 Highway drainage may need to be provided by private developers as part of planning consent and approved by the Highways Development Control Team. In most cases, commuted sums are rarely required. Developers are only charged for flow-control devices (e.g. hydrobrakes and attenuated systems).

Highway gullies and kerb offlets

8.5.8 The purpose of gully cleansing is to remove accumulated detritus in the gullies to ensure the rapid removal of water from the road surface. The continued efficient function of the gullies and their connections depends partly upon the location, the presence of industry and agricultural land, the degree of tree cover, level of rainfall, the extent of kerbing and the frequency of sweeping.

- Rural gullies – Clean gullies once a year on planned maintenance programmes except for known problem areas that should be dealt with as necessary.

- Urban gullies – Clean gullies every eighteen months on planned maintenance programmes except for known problem areas that should be dealt with as necessary.

8.5.9 No regular and planned cleansing arrangements are made for kerb offlets, manholes, soakaways, catch pits, interceptors or cattle grids. This is carried out on a reactive basis as required.

8.5.10 Material arising from all road drainage emptying and cleansing operations are disposed of in accordance with Environment Agency requirements.

Outfalls, ditches, grips and Highway surface water carrier drains (pipework)

8.5.11 Outfalls, highway ditches, grips and pipework are being maintained on a reactive basis in response to service requests or identified maintenance need. Sites where regular flooding occurs have been identified and remedial measures taken to alleviate the problems where possible.

8.5.12 However, the current policy is under review and the proposed maintenance regime will be to re-cut grips once per year and check and clean outfalls once per year. Publicly maintainable ditches to be re-cut as required. Where ditches are privately owned, the Highway Authority will contact the landowner requesting the works to be carried out.

Culverts

8.5.13 These are contained in the lifecycle plan for structures.

8.5.14 The routine works undertaken on the drainage asset have been sub-divided into activities, the standards of which have been displayed in tabular form and are followed by details on objectives and response arrangements (see Table 8.5.3 below).

Table 8.5.1 Summary of routine maintenance service standards

Activity type	Service standard	Code of practice standard – Well Maintained Highways (2005)
Gully emptying	**Rural gullies** Clean gullies once a year. **Urban gullies** Clean gullies every 18 months. Increased in a reactive basis for those identified as requiring a greater frequency of cleansing.	In low risk areas by default all gullies should be cleaned once a year and arrangements for non-functioning gullies to be recorded for more frequent or detailed attention. Increased frequency at known trouble spots to be built upon experience.
Kerb offlets	Jet once per year or as often as is necessary to ensure efficient working.	In low risk areas, jetted by default annually. As often as is necessary to ensure efficient working.
Culverts and manholes	No regular and planned cleansing arrangements This will be carried out on a reactive basis as required.	In lower risk areas inspect every 5 years by default and cleaned as necessary
Soakaways and catchpits	No regular and planned cleansing arrangements This will be carried out on a reactive basis as required.	In lower risk areas inspect every 5 years by default and cleaned as necessary
Interceptors, holding tanks	No regular and planned cleansing arrangements are made. This will continue to be carried out on a reactive basis as required. The frequency of cleaning oil interceptors will depend on their design and location and will need particular consideration on a site – specific basis.	Depends on design and location, will need particular consideration on site specific basis
Piped drainage	No regular and planned cleansing arrangements This will be carried out on a reactive basis as required.	Clear when required, but by default not more than 10 year intervals.
Ditches and grips	Highway maintainable ditches to be re-cut as required. Grips once per year and check and clean outfalls once per year	Grips and highway authority ditches should be cleared of vegetation and dug out when required.
Private	Where a ‘positive’ drainage system	Responsibility of adjoining landowners

ditches	enters a roadside ditch it will be checked once per year and cleaned on a needs basis. Maintenance of all other ditches will remain the responsibility of adjoining landowners.	

Asset lifecycle options

Renewal/Replacement

8.5.15 Having determined a failed section of the drainage asset, whether capacity failure or structural failure, its replacement should be considered based upon drainage investigation works, local knowledge and best design practice. This may result in renewal of existing provision or significant enhancement.

Upgrading

8.5.16 Upgrading is normally considered in conjunction with the renewal and replacement process. For every significant maintenance and integrated transport scheme being promoted the opportunity should be taken to review the surface water drainage facilities and carry out necessary works.

8.5.17 For every structural maintenance scheme that involves resurfacing, the existing highway surface water drainage is jetted and surveyed to ensure it is serviceable.

Disposal plan

8.5.18 Drainage assets very rarely become redundant except when there is upgrading works. This is normally considered in association with renewal and replacement. Existing drainage provision is seldom removed and is either utilised as part of the new design or disconnected and left in-situ.

Non-Asset options – Treatment options

8.5.19 **Do minimum** The do minimum activities are the routine activities carried out in order to ensure the safe passage of highway users:

- Cleansing activities;
- Drainage Investigation; and
- Odd new provision grips, ditches, gullies and offlets.

8.5.20 This will ensure that the statutory function of SCC is secured in service delivery but there would be no enhancement or protection against long-standing drainage issues or increased precipitation predictions. This will also continue a programme of reactive maintenance rather than proactive.

8.5.21 **Medium life** Reinforcement of existing system with additional capacity:

- Pipeline repair to return capacity;
- Partially pipeline upgrade;
- Additional gullies; and
- Additional soakage capacity.

8.5.22 This will ensure that the statutory function of SCC is secured in service delivery together with a planned and programmed maintenance and enhancement strategy.

8.5.23 **Long life** Significant renewal or enhancement:

- Provision of new drainage systems;
- Pipeline upgrade to increase capacity.

8.5.24 This will ensure that the statutory function of SCC is secured in service delivery together with a robust planned and programmed maintenance and enhancement strategy safeguarding the asset for future predicted increases in precipitation.

Performance gaps

8.5.25 Where infrastructure is installed, i.e. new gullies to deal with localised flooding, these sometimes fail to be recorded on the asset inventory. This is particularly so when new assets are installed as part of routine maintenance activities. This can cause problems for future maintenance or when utilities request location details of underground apparatus. If such apparatus cannot be accurately located, there is a risk of damage to drainage pipes. A system of providing 'as-built' information for routine maintenance works where they affect the inventory is currently being used to minimise missing inventory data.

8.5.26 Installing new drainage infrastructure can have an effect on downstream surface water capacity. All new drainage schemes that utilise the existing infrastructure maintained by others (e.g. the water companies) should have the appropriate licence for connection.

8.5.27 Records of grips and underground systems such as soakaways, catchpits and pipes are limited or mostly incomplete. However, a method of asset information capture has recently been developed for underground drainage infrastructure and 1526 kilometres of pipe work has been mapped to date.

8.5.28 The yearly frequency of roadside grip clearance keeps most grips in a reasonable condition. Debris often collects in the mouth, preventing the flow of water into the grip and it is difficult to clean through to the outfall ditch in several cases.

8.5.29 Blockages in grips and gullies are more common since road-sweeping standards in rural areas have reduced, causing more localized flooding and possibly leading to public dissatisfaction. The District Councils are responsible for street sweeping under their duties described by the Environmental Protection Act.

8.5.30 The County Council's flood and water management strategy is currently being drafted which sets out wide-ranging measures on how the County Council will manage and mitigate flood risk. In so doing, it is essential that 'base data' is acquired to understand where the risks exist together with the relative impact of the associated risk. A great deal of effort has recently been made to capture data identifying local flood risk. This will ultimately help inform future programmes of work and the need to seek remedial action by external stakeholders (e.g. landowners that all uncontrolled surface water run-off, lack of ditch maintenance, etc).

Performance monitoring

8.5.31 There are no statutory indicators identifying the condition of highway drainage systems.

8.5.32 The Routine and Environmental Project Team has adopted a public satisfaction indicator derived from the National Highways and Transportation survey (Question 18.9 – Keeping drains clear and working). The survey, which runs to twelve pages, starts with questions asking how important, if at all, members of the public regard different aspects of Roads and Transport Services and how satisfied or dissatisfied they are with each one. The summary results can be seen in table X below:

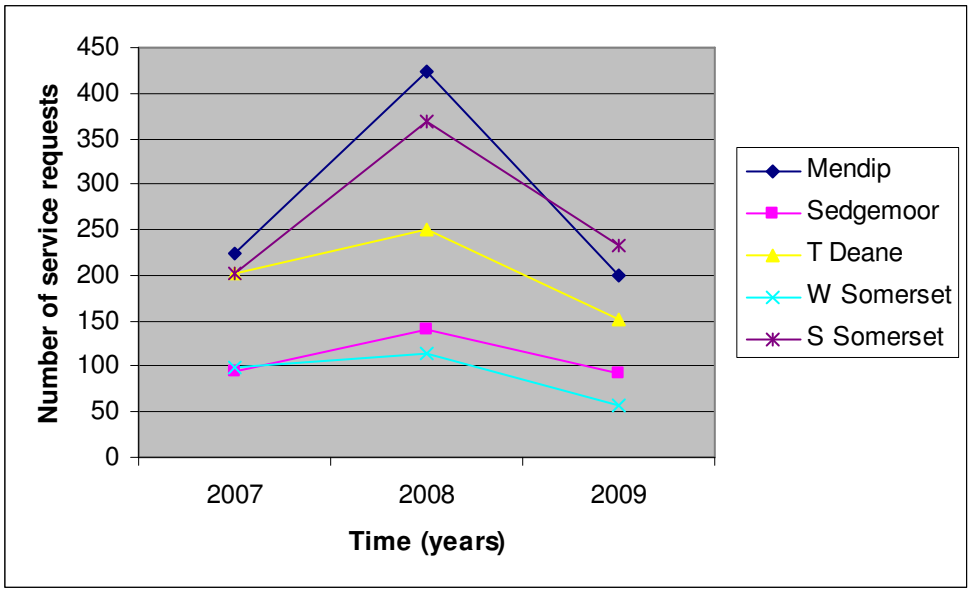
National Highways and Transport Public Satisfaction Survey 2009
Somerset CC

Indicator Reference	Benchmarking Indicator	Score (out of 100)	Ranking (of 78)	Scope to Improve	CC rank (of 24)	Year on Year
	06. Highways maintenance BI					
HMBI 01	Condition of road surfaces	43.69	44	+17.78	14	-2.81
HMBI 02	Cleanliness of roads	57.94	34	+8.20	16	-1.78
HMBI 03	Condition of road markings (e.g. white lines)	62.10	24	+6.87	8	+0.87
HMBI 04	Condition and cleanliness of road signs	59.92	46	+9.11	12	+2.19
HMBI 05	Speed of repair to street lights	59.97	43	+8.02	13	-0.88
HMBI 06	Speed of repair to damaged roads and pavements	35.07	36	+13.00	13	-2.22
HMBI 07	Maintenance of highway verges, trees and shrubs	47.25	54	+18.00	13	-0.53
HMBI 08	Weed killing on pavements and roads	49.61	44	+16.78	7	-0.65
HMBI 09	Keeping drains clear and working	48.21	44	+13.88	11	+2.09
HMBI 10	Deals with obstructions on pavements	92.24	9	+8.44	2	-0.12
HMBI 11	Keeps roads clear of obstructions such as skips/scaffolding etc	56.18	27	+8.17	11	-1.13
HMBI 12	Deals with illegally parked cars	46.02	16	+17.98	4	+2.80
HMBI 13	Undertakes cold weather gritting (salting) and snow clearance	56.59	20	+7.22	7	-10.38
HMBI 14	Cuts back overgrown hedges obstructing the highway	45.54	59	+18.37	16	-1.21
HMBI 15	Deals with mud on the road	46.62	60	+18.98	17	-1.43
HMBI 16	Deals with abandoned cars	53.29	28	+9.00	8	+0.12

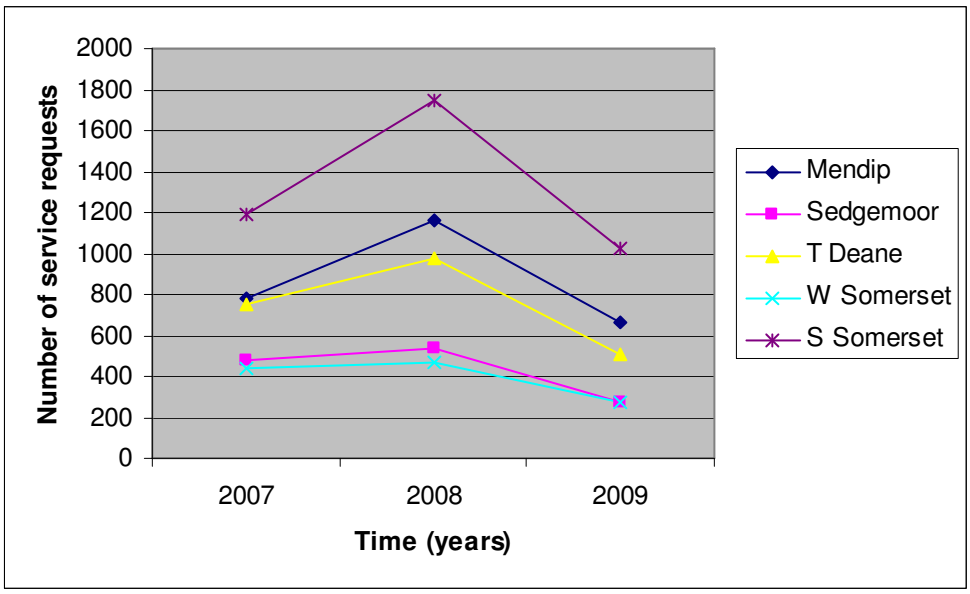
8.5.33 It is clear that there is scope for improvement in public satisfaction and the Project Team has agreed a 2% public satisfaction improvement target year-on-year. Measures for improvement will be discussed as part of the new highway maintenance contract.

8.5.34 However, the number of service requests are monitored and reports can be generated to analyse for service-related trends. In recent years there has been a general countywide increase in the number of service requests related to flooding and blocked gullies although from 2008 – 2009 Somerset saw a decrease in requests from the previous year. Global warming would suggest that there will be a long term trend of increased flooding in the decades to come but there remains considerable scope for short term fluctuations in the number and severity of flooding within Somerset. Refer to graphs 8.5.1 and 8.5.2 below ('T Deane' = Taunton Deane).

Graph 8.5.1: Number of service requests relating to flooding (recorded on Confirm)



Graph 8.5.2: Number of service requests relating to blocked gullies (recorded on Confirm)



Issues

8.5.35 The provision of highway drainage systems, and the routine maintenance of them, is paramount to the structure of the highway network and accessibility to the network.

8.5.36 SCC signed the Nottingham Declaration on Climate Change in February 2007. This commits SCC to take further actions in respect of climate change and the SCC County Plan also requires the production a Climate Change Strategy for Somerset.

8.5.37 In essence, a combination of key messages from the Intergovernmental Panel on Climate Change and a scoping study titled 'Warming to the Idea' summarises the predicted climate changes for the South West Region by the 2050s:

- Sea level rise – much of Somerset is low lying;
- Warmer, wetter winters (winters 5 to 15% wetter (10 to 30% wetter by the 2080s));
- Summers 15 to 30% drier (25 to 55% drier by the 2080s);
- Winter and spring precipitation becomes more variable;
- More intense storms and heavy rainfall in winter becomes more common;
- Snowfall totals decrease significantly;
- Hotter drier summers and more extreme weather events.

8.5.38 The combination of higher winter rainfall and greater storm activity will produce an increase in the likelihood of flooding with potentially severe impacts on coastal and low lying areas.

8.5.39 Additionally information provided by the UK Climate Impact Programme and the Environment Agency shows that global warming increases the risk of flooding and coastal erosion in Somerset and specifically refers in their report to the increase in the frequency of severe rainfall events affecting river catchments and urban surface water systems.

Developments

8.5.40 Develop a list of 'sensitive' sites that require more frequent gully cleansing.

8.5.41 Review highway flood map and correlate cleansing activity to known flooding problems on the highway network.

8.5.42 Among the recommendations contained in the Pitt Report is that a local register of all the main flood risk management and drainage assets (overland and underground) should be

compiled by the relevant local authority, including an assessment of their condition and details of the responsible owners. Somerset Highways has already started to map the drainage on digital plans – this will be reviewed for timeliness and adequacy of information.

8.5.43 The interim conclusion of the Pitt Review is that local Surface Water Management Plans, as set out under Planning Policy Statement 25: Development and Flood Risk, should provide the basis for managing surface water flood risk. These plans should be coordinated by the local authority and be risk-based, considering all sources of flooding.

8.5.44 Develop an inventory for kerb offlets and develop a programme of regular maintenance for jetting and cleansing (similar to the gully emptying regime).

8.5.45 As a minimum, the desirable condition for the highway drainage network is to have all gullies, spillways, grips and drainage units working, and all pipework, chambers and ditches clear and free running. In general, drainage systems installed in the County have been installed to cope with a 1 in 5 year rainfall event. As a result of the incidents of flooding in the County, there is an increasingly strong argument design and install surface water drains to cope with 1 in 10 or even 1 in 20 year rainfall events. This standard will ensure that, under normally encountered rainfall, highways will be free from standing water that might cause a danger to vehicles. However, there is a cost associated with up-sizing pipes and this will have to be judged at each future site to consider whether the relative increased costs adequately managed and offset the risk of flooding.

8.5.46 It is not fully understood the reasons behind the national increase in service requests relating to blocked gullies however one of the following, or combination of, could be possible:

- Better publicity of Council services;
- Climate change;
- Poor service provision;
- Familiarisation of the highway maintenance management system leading to better or more disciplined recording.

8.5.47 Consider the effect of increasing the street cleansing regime. Whilst this is a function of the District Councils under the Environmental Protection Act, there may be scope for cooperation in this service to help prevent detritus entering the surface water systems.

8.5.48 Consider future budgeting and increase the routine maintenance to restore systems to a serviceable condition.

8.5.49 Capture asset information on existing SUDS in Somerset in light of the Flood and Water Management Bill.

8.6 Lifecycle Planning – Verge and landscaped areas

Introduction

8.6.1 Verge and landscape areas include all 'soft' assets such as the verges, trees, shrubs and so on. Specifically, the maintainable items associated with this asset group include:

- Highway trees;
- Trees on adjacent land within falling distance of the highway;
- Rural verges;
- Urban verges; and
- Hedges

8.6.2 The verge is generally the part of the highway that exists between the carriageway and the highway boundary, excluding the footway and cycleway. The verge may be made up of grass, mud, unbound stone or landscaped.

8.6.3 These assets also provide a vital safety function being generally created and maintained in line with national standards for visibility. In rural settings they can also provide useful refuges for pedestrians and horse riders. In all environments they may act as a conduit for highway and utility apparatus, thereby limiting the distribution of road, cycleway and footway surfaces.

8.6.4 Verges and landscaped areas contribute to the quality of life, its sustainability and its biodiversity and also help define the nature of its highway network. These are viewed as important assets and their preservation for future generations is a key SCC task.

8.6.5 The Somerset Highways Biodiversity Action Plan (SHBAP) is a guide by which biodiversity is taken into account in the planning and carrying out of all maintenance operations on county roads, new highways schemes and Rights of Way work. The SHBAP is being reviewed to create a working document as opposed to a reference document, and to comply with recent legislation. The current SHBAP can be viewed at the following link:

8.6.6 The SHBAP is being reviewed to create a working document as opposed to a reference document, and to comply with recent legislation.

Service standards

Grass cutting

8.6.7 Highway verges are cut a minimum of one swathe width (around one metre width) to provide a safe refuge for pedestrians, preserve visibility and assist the flow of surface water along road channels. Visibility sight lines are also cut to meet safety requirements at road junctions and bends. 'A' and 'B' roads are cut twice a year and 'C' and unclassified roads are cut once depending on seasonal growth.

8.6.8 Grass cutting of highway verges in urban areas is undertaken by the District Councils. SCC makes a contribution towards the cost of amenity grass cutting.

Table 8.6.1: Summary of verge lengths cut by SCC

Area	A and B roads (km)	C and unclassified roads(km)
Sedgemoor	178	774
Mendip	943	1643
Taunton Deane	88	476
West Somerset	124	296
South Somerset	557	2066
Total	**1890**	**5255**

8.6.9 Verges of local wildlife significance are treated in a manner which supports the flora or fauna identified at that site.

Table 8.6.2: Biodiversity sites requiring 'special' attention

Area	Biodiversity sites (No.)
Sedgemoor	11
Mendip	3
Taunton Deane	9
West Somerset	14
South Somerset	12

8.6.10 Where funds allow, SCC carries out verge maintenance across the whole of the verge up to the highway boundary. This generally consists of a flail cut removing self-seeded trees, brambles and all other unwanted vegetation. This has significant benefits to the local ecology by providing opportunities for wild flowers to re-emerge and become established. The safety of the travelling public is also safeguarded by removing trees by early intervention and therefore contributing to passive safety.

Siding of verges

8.6.11 The verges adjacent to footways and carriageways are sided (or ploughed) as a reactive measure and carried out as and when required.

Trees

8.6.12 There is no comprehensive record of the position and condition of trees that are within the highway. Neither is there a record of those privately owned trees within falling distance of the highway that can also impact upon its use. SCC does hold records of trees planted in the highway under licence, which are the responsibilities of District or Parish Councils.

Landscaped areas, hedges and shrubberies

8.6.13 Records of newly created landscape areas are held on plans within the Area Office but are not currently on a countywide GIS database.

Noxious weeds

8.6.14 The location of these hazards is variable being dependent upon climate, soil conditions and adjoining land use.

8.6.15 Weed spraying is carried out to all kerbed sections of carriageway to prevent damage to the road and footway structure, to prevent obstructions to drainage and to maintain a safe environment for the travelling public. Unless required by legislation, SCC's policy of weed management is one of control, not eradication. This is done approximately twice a year using sprays that take into account the safety of operatives and the public, timing of control, size of infestation, effectiveness, and the effect on the environment. The requirements of any legislation will also affect the type of control. The first treatment this year will commence mid-April for duration of approximately six weeks. The second treatment is planned for mid August to the end of September, subject to growing conditions and weather.

8.6.16 The invasive species currently being treated in Somerset are Japanese Knotweed, Himalayan Knotweed, Himalayan Balsam and Giant Hogweed.

Routine maintenance plan

8.6.17 The routine works undertaken on the 'soft estate' have been subdivided into work type, activities, the standards of which have been displayed in tabular form, and are followed by details on objectives and response arrangements. The generic objectives for the 'soft estate' are as follows;-

Safety

- Prevent obstruction to user visibility and traffic signs;
- Prevent falling branches affecting highway users; and
- Prevent root growth affecting surface regularity

Serviceability

- Reduce the potential for service interruption; and
- Provide a quality of user experience

Sustainability

- Help landscape conservation;
- Help mitigate climate change effects;
- Support habitat and bio-diversity; and
- Prevent root growth affecting surface regularity, structure and highway drains

Table 8.6.3: Summary of routine maintenance service standards

Activity type	Service standard	Code of practice standard – Well Maintained Highways (2005)
Grass cutting	Highway verges are cut a minimum of one swathe width (around one metre width) to provide a safe refuge for pedestrians, preserve visibility and assist the flow of surface water along road channels. Visibility sight lines are also cut to meet safety requirements at road junctions and bends. 'A' and 'B' roads are cut twice a year and 'C' and unclassified roads are cut once, subject to seasonal growth.	In visibility areas and first swathe from edge of carriageway dependant on rate of growth but normally twice a year
Highway trees	Expert inspection and assessment of condition, action taken on dangerous trees after consideration of type and vehicle usage, and suitable sites identified for tree planting schemes. Following an initial survey a repeat inspection to be determined.	As identified from inspection regime, seeking expert advice from Arboriculture Officer. Take necessary action as soon as reasonably possible. Ideally have an arboricultural inspection every 5 years.
Hedges and landscaped areas	Where there are no verges and the roads are immediately bordered by a bank or hedge, a vertical cut of seasonal growth is made to a sufficient height to accommodate vehicular traffic using the road. The trimming is generally restricted to a maximum of two swathes and the adjoining landowner is responsible for the maintenance of the higher levels to discourage an 'umbrella' effect of growth encroaching over the highway.	Infrequent provided that visibility sight lines and road signs are not obscured. Often the responsibility of adjoining landowners. As far as possible void bird-nesting season.
Weeds	Weed spraying is carried out to all kerbed sections of carriageway to prevent damage to the road and footway structure, to prevent obstructions to drainage and to maintain a safe environment for the travelling public.	Reference to legislation and treatment of Ragwort, Broad leaved dock, Curled dock, Creeping thistle, Spear thistle. Reference to Weeds Act 1959 and Wildlife and Countryside Act 1981.

Creation and acquisition

8.6.18 These fall into 3 broad areas:

- SCC schemes
- Private developers
- 'Historic' sites

SCC schemes

8.6.19 These generally include areas within the highway that have been planted as part of mitigation works when the highway scheme was implemented. For example, this could be a new hedge, shrub and tree planting on an embankment or on adjacent land as part of a new road scheme.

8.6.20 Any newly created areas such as grass verges are managed by Area Office and incorporated on to the routine maintenance programme.

Private developers

8.6.21 These typically include areas within the highway that have been planted by Developers to discharge their planning conditions. The Highways Development Control Team approves these. Once established and handed over by the Developer, Area Office staff via the routine maintenance fund manage any remaining newly created areas such as grass verges.

'Historic' sites

8.6.22 These may be a long-standing part of the highway corridor, or they may have been acquired as part of older developments. They are managed by Area staff via the routine maintenance fund utilising specialist advice from forestry and biodiversity staff as appropriate.

Renewal or replacement

8.6.23 SCC does not replace trees on the highway. However, applications for planting will be considered and licensed accordingly.

Upgrading

8.6.24 There is no method for upgrading of any environmental feature as part of the routine maintenance programme.

Disposal plan

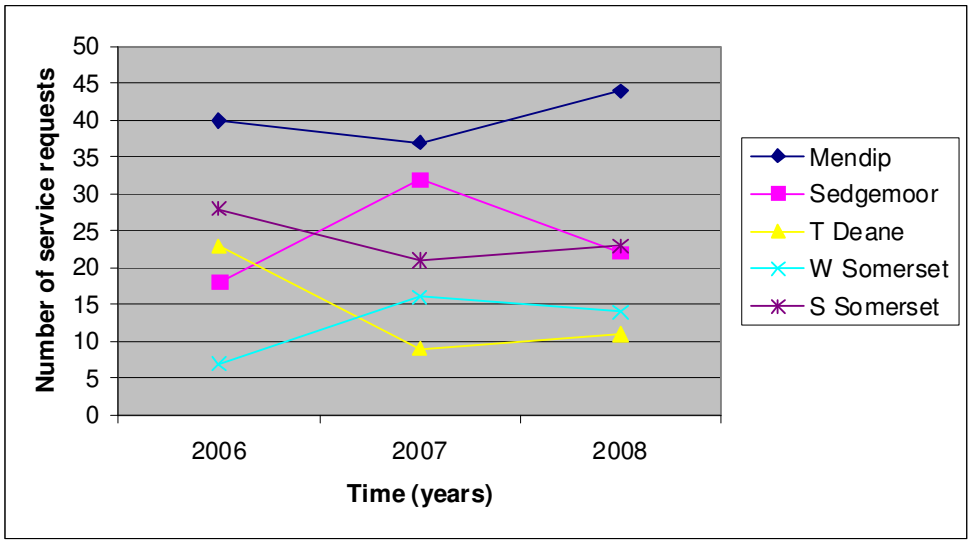
8.6.25 Verge assets very rarely become redundant except when there is an upgrading of the road network. Trees are, however, removed when damaged or diseased and there is a high risk of branches or trunks falling onto or within the highway boundary. Disposal is usually in the form of removal of planting (trees and shrubs) with no provision for replacement.

Performance monitoring

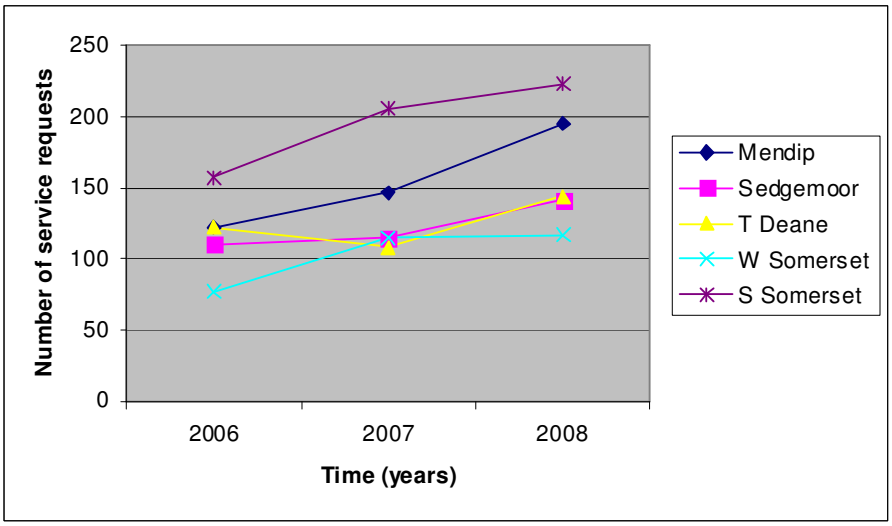
8.6.26 The Routine and Environmental Project Team has adopted a public satisfaction indicator derived from the National Highways and Transportation survey (HBMI 07 – Maintenance of highway verges, trees and shrubs and HBMI 08 – Weed killing on pavements and roads). The survey, which runs to twelve pages, starts with questions asking how important, if at all, members of the public regard different aspects of Roads and Transport Services and how satisfied or dissatisfied they are with each one. It is rewarding to note that both indicators suggest a high level of performance which should be maintained. Measures for continual improvement will be discussed as part of the new highway maintenance contract due to commence of 1 April 2010.

8.6.27 There are no statutory performance indicators associated with verges and landscape areas. However, the volume of service requests is monitored and reports can be generated to analyse the service-related trends. It is clear in recent years SCC's performance has been steady, with the number of service requests being consistent in volume and within acceptable tolerances. Refer to the following graphs.

Graph 8.6.1: Number of service requests relating to weed killing (recorded on Confirm)



Graph 8.6.2: Number of service requests relating to verge maintenance (recorded on Confirm)



Non-Asset options – Managing demand

8.6.28 Under section 96 of the Highways Act 1980, consent can be given to Parish/District Councils to plant retain and maintain shrubs, plants or grass and trees. The Area Offices also consider applications from individuals for planting trees and shrubs on the highway. However, under section 142 of the Act, a licence may be granted to permit the occupier or owner of any premises adjoining the highway to plant, retain and maintain shrubs, plants or grass in the highway. Other individuals cannot be licensed.

Performance gaps

8.6.29 Whilst areas of grass cutting are detailed on the GIS mapping, there is no robust and quantitative asset register containing the areas of grass cutting. Whilst this has not stalled the delivery of the service, the records would be better defined by having a complete inventory. To date, the costs of accurately determining the full extent of the maintainable verge outweigh the benefits.

Future developments

8.6.30 The verge maintenance service provision is well established and in most respects works well. This notion is supported by a relatively low demand quantified by the volume of service requests across the County. Whilst the current regime works well, it would be strengthened by committing to an annual full width verge cut on all parts of the network. This would not only benefit the safety of the travelling public, but also support biodiversity.

8.6.31 There is some inconsistency across the district areas regarding weed killing and amenity grass cutting. As part of the future development of TAMP, the routine and environmental maintenance project will undertake a gap analysis and identify new policies in line with best practice.

Deterioration model – Treatment options

8.6.32 **Do minimum** The do minimum activities are the routine activities carried out in order to ensure the safe passage of highway users:

- Annual schedule based grass cutting including biodiversity areas.
- Safety based work on planting areas.

8.6.33 This will ensure that SCC's statutory function is secured in service delivery but there would be no enhancement or protection against long-standing vegetation issues

8.6.34 **Medium life** Reinforcement of existing service with no enhancement:

- Removal of isolated weak areas of planting scheme;
- No renewals.

8.6.35 This will ensure that SCC's statutory function is secured in service delivery together with a planned and programmed maintenance, but no strategy for enhancement.

8.6.36 **Long life treatment** Remedial works removal/renewal of planting schemes or self-seeded trees.

- This will ensure that SCC's statutory function is secured in service delivery together with a robust planned and programmed maintenance.

Climate Change

8.6.37 The predicted changes may increasingly favour many of our most pernicious arable weeds. However research suggests the difference in the current scenario is that extremes of weather will make landscapes behave differently, and hence, determine how they will be used and require new ways of management.

8.6.38 The roadside verges will be under threat if hotter, drier summers and unpredictable winters become the norm. Sea levels are rising too combining with other climatalogical and social factors to create more frequent flooding, stronger winds, storms and droughts. A changing climate is leading to changes in biodiversity, loss of species, increased watercourse flows, more vigorous vegetation growth, coastal retreat and other changes to the natural environment including pest invasions.

8.6.39 It has recently been stated by the UK Climate Impacts Programme that *"the thermal growing season is now longer than at any time since 1772"*. So, this appears to dictate that grass cutting regimes must be extended by at least one full cut of the highway network each year. This will clearly have budgetary consequences and possibly safety consequences of not addressed.

8.7 Lifecycle planning – Highway lighting

Introduction – Contribution to SCC's strategic objectives

8.7.1 Good quality street lighting can make a major contribution to key objectives that will deliver Somerset County Council's vision to "provide excellent services that are accessible, responsive and sustainable to ensure Somerset is a healthy and vibrant place to live, work and visit". SCC recognises the need to invest and modernise its Street Lighting services to reduce road casualties and reduce crime and the fear of crime. SCC's requirements will be addressed by delivering a sustained level of investment to improve the standards of street lighting and of illuminated signs and bollards.

8.7.2 As a rural authority, Somerset has a low crime incidence rate. However there are a number of locations within the urbanised areas which have crime and community safety issues. SCC's Community Safety Strategy aims to tackle actual crime and the negative perceptions that often prevent people from living as fully as they should. LTP's have a vital role to play by delivering well-designed transport improvements that reduce the fear of crime. This could be delivered through improved lighting and CCTV installations completed in conjunction with LTP improvement schemes.

8.7.3 The current inventory indicates that SCC owns and maintains 47,644 lighting columns, 4,717 illuminated traffic signs, 1,671 bollards and 42 feeder pillars. Around 51.1% are over 15 years old. SCC has been proactive in maintaining its stock and over 98% of lighting is working as planned. SCC also has a continuing capital replacement programme. SCC's current Highway Lighting Policy Document 7.4.1.20.04 – Replacement (February 2006), ensures that units are only replaced for the reasons of structural test failures, life expired equipment, vandalism, Road Traffic Collision (RTC) and equipment failure. The replacement asset programme is prioritised in accordance with ILE Technical Report 22, Managing a Vital Asset; Lighting Supports (2007).

8.7.4 The Highway Network has a variety of uses and there are a number of issues surrounding the provision of highway lighting such as road safety, crime and fear of crime. Although these issues are common and accepted within conurbations, there are rural communities that have campaigned to ensure that their village remains intrinsically dark, and who opposed to any lighting proposals in their vicinity. With this in mind the Highway Lighting Policy Document 7.4.1.20.04 – Replacement is adhered to at all times, and ensures that units are only replaced on a one for one basis.

Creating, acquiring and upgrading plan

8.7.5 All lighting columns currently at the end of their useful life are replaced and modernized in accordance with Highway Lighting Policy 7.4.1.20.11, Term Lighting maintenance contract 2008 – 2011 and the Roads Liaison Group ,Well lit Highways Code of practice for Highway Lighting Management (2004).

8.7.6 Assets are created or updated due to the following:

- Adoption of roads;
- New schemes;
- Replacement of stock beyond its useful life.

Required work

- 25% (12,031); backlog of streetlights needing replacement.
- 9% (426) signs currently needing replacement;
- Specialist street lights required (e.g. heritage);
- Cabling;
- Continuous programme of asset replacement in compliance with ILE Technical Report 22, Managing a Vital Asset; Lighting Supports (2007), structural test results and local requirements;
- Lantern replacement every 12 Years (Lantern is also replaced as part of column replacement i.e. every 25 Years).

Table 8.7.1: Backlog of work due to under funding in previous years
(Figures applied November 2009)

Backlog work	Quantities	Unit costs £000's	Total cost £000's	% of backlog
Electrical test failures >25 yrs old	1246	1.15	1433	10.4
Electrical test failures <25 yrs old	392	1.15	451	3.3
Failures of BS Male spigots >25 yrs old	280	1.15	322	2.3
Failures of BS Male spigots <25 yrs old	141	1.15	162	1.2
Failure of concrete columns >25 yrs	690	1.15	793	5.7
Failure of concrete columns <25 yrs	809	1.15	930	6.7
Failure of Stewart & Lloyds columns >25 yrs	588	1.15	676	4.9
Failure of Stewart & Lloyds columns <25 yrs	52	1.15	60	0.4
Remainder of those >25 yrs	7407	1.15	8517	61.6
Illuminated signs >25 yrs estimated	426	0.6	256	3.5
Total Backlog	**12031**		**13600**	

Service standards

8.7.7 The basic minimum service level is delivered through the Term Lighting Maintenance Contract, Roads Liaison Group Well Lit Highways Code of Practice for Highway Lighting Management, Highway Lighting Policy documents and Specification.

8.7.8 Pro-active maintenance is undertaken in accordance with the Term Lighting Maintenance Contract as follows:-

- Bulk lamp change every three years
- Planned inspections
- Reactive maintenance
- Structural testing in accordance with ILE Technical Report 22, Managing a Vital Asset; Lighting Supports
- Replacement of asset programme (the basis of this programme is on replacing those units that have been identified as presenting the greatest risk of structural failure)

Table 8.7.2: Calculation of how much is needed each year for steady state replacement

Capital steady state (today's standard)	Quantities	Life	Yr quantities	Unit costs £000's	Sub-total annual costs £000's
Structural testing	47644	25	1905	0.05	95
Testing specific type/ categories	2382	N/A	2382	0.05	119
Whole column replacement	47644	35	13621	1.15	1565
Paint etc.	24390	10	2439	0.04	98
Illuminated signs (including bollards)	6388	25	255	0.6	153
Luminaire change	48047	18	2669	0.35	934
Wall bracket replacement	1022	15	68.13	0.8	55
Cabling repair – units with private network	761	30	25	1	25
Total					**3,044**

Routine Maintenance

8.7.9 The purpose of Highway Lighting Maintenance is to provide a safe and efficient system of Highway Lighting that ensures the continued safety of all Road users. It also assists to meet Police requirements for the reduction of crime, to reduce the level of night-time road traffic accidents and to engender a feeling of comfort and security in the community.

Issues and trends

8.7.10 The overall condition and age of the existing lighting, illuminated traffic sign and bollard stock is causing concern. Problems are being experienced with particular types of equipment and severely deteriorating stock needing urgent replacement. Currently about 21.4% of the lighting stock is life expired, and over the prescribed design life of 25 years. Electrical, visual, structural and non-destructive structural testing is presently being carried out on sample stock identified through age and type profiling.

8.7.11 Concern regarding light pollution has led to the implementation of replacement equipment being specified that will reduce light pollution. To date over 31% of SCC stock meets this requirement.

8.7.12 Formal EU tendering procedures have been used to award Term Lighting Maintenance contracts. The current contract is performance based and was awarded in September 2008 for three years, with the option of a three year extension.

8.7.13 Specialist Contractors are employed to carry out structural testing and any other testing not included within the Term Lighting Maintenance Contract.

Existing standard

8.7.14 SCC Term lighting maintenance contract.

8.7.15 Well-lit Highways Code of Practice for Highway Lighting Management (2007).

Minimum standard

8.7.16 As existing Standard.

8.7.17 All other relevant SCC Policy and Standards documents.

Best value code of practice standard

8.7.18 In accordance with Well-lit Highways Code of Practice for Highway Lighting Management.

Review actions

8.7.19 Review procedure annually.

8.7.20 Continually review contract clauses for continuous improvement within subsequent contract documentation.

Maintenance plan

8.7.21 Maintenance works are shown in Table 8.7.4.

Table 8.7.3: Calculation of how much is needed to maintain all asset sub-groups

	2008-09 budget £000's	2009-10 budget £000's	20010-11 £000's projection	Steady state projection £000's	Demographic growth/ inflation
Capital steady state	722	643	656	3,366	2%
Capital replacement from revenue	336.30	300.00	306	306	2%
Reactive maintenance	250	250	255	255	2%
Special maintenance	250	250	255	255	2%
Term maintenance Contract	900	900	918	918	2%
Non-Recharge damage	250	250	255	255	2%
Sub Total	**2,708**	**2,593.00**	**2,645**	**5,355**	
Energy	1,375.00	1, 430.00	1,458	1,457	2%
Total	**4,083**	**4,023.00**	**4,103**	**6,812**	

Table 8.7.4: Performance – past achievement and future targets (Non Contractual)

Measure	Definition	Reference	Benchmark
Service visible to the public	Average number of days taken by the District Network Provider to rectify street light faults	BVPI 215b – although this is not a measure of the highway authority	National
Value for money	Total average of all costs to maintain a street light	SL 10 (includes renewals and refurbishments)	Region
Asset management	% of street lighting supports replaced per annum	SL 30	Region
	% of street lighting supports over 25 years old	SL 31	Region
	Depreciated Asset Value £ (depreciated replacement cost)	SL – DRC 1	National
	Depreciated Asset Value as a % of the Gross Replacement Cost	SL – DRC 2	National

Ref	Target	2005	2006	2007	2013 target	2019 target
BVPI 215b	Reducing	10.87 days	13.7 days	16.07 days	10	10
SL 10	Optimal	£48.28	£86.14	£93.42	£150.75	£133.86
SL 30	4% at 25 yrs replacement	3.37%	4.84%	6.64%	5%	5%
SL 31	0% for 25 yr life columns	28.45%	26.41%	23.71%	3%	0%
SL – DRC1	Increase	£16.15 m	£19.35 m	£22.55 m	£27.55 m	£32.56 m
SL – DRC2	Increase	24%	29%	34%	42%	50%

Current contractual arrangements

8.7.22 The Term Lighting Maintenance Contractor is Balfour Beatty Infrastructure Services Limited until September 2011, with a possible extension of three years. This contract is for the provision of a routine pre-set maintenance regime for existing lighting points and illuminated signs to ensure that at least 98% of the lights are working as planned. This contract includes for the provision and maintenance of an electronic fault reporting system, and a robust database that generates performance information. This contract also delivers separate services for cable renewal and repair to other unit items. They also administer the energy budget.

8.7.23 The Highway Lighting team advises developers on design and installation procedures for additional lighting units installed on their development. An increase in stock of approximately 1% annually results from highway adoption of these sites.

Illuminated traffic signs and illuminated bollards

8.7.24 There are 4,717 illuminated traffic signs (ITFS) and 1,671 illuminated bollards (IB) that are maintained within the highway lighting term lighting maintenance contract (TLMC). Design of all ITFS and IB schemes is the responsibility of others, and the highway lighting team deal solely with their maintenance and replacement. Variable message and traffic-actuated signs are managed and maintained by SCC traffic control.

Issues and trends

8.7.25 The siting of all ITFS and IBs are such that they are inherently susceptible to road traffic accident damage and vandalism. Specification of equipment and installation will comply with current SCC requirements and take account of the above in terms of whole life costing.

8.7.26 On approval of new installation designed by others, all authorised equipment is added to SCC maintenance database. Additional revenue costs associated with maintenance and energy of new installations are met by SCC.

8.7.27 Light emitting diode (LED) lamp technology is being introduced within SCC equipment particularly with regard to school warning lamps, signs difficult to access for maintenance purposes, and belisha beacons crossing units.

Existing standard

8.7.28 Equipment will comply with SCC, Term Lighting Maintenance Contract (TLMC) specification.

Minimum standard

8.7.29 SCC TLMC specification.

8.7.30 Well-lit Highways Code of Practice for Highway Lighting Management (2007).

8.7.31 Compliance with SCC Asset Management Plan.

8.7.32 Third parties should be heading towards the provision of electronic plans in an agreed SCC format for the implementation of designs

Best value code of practice standard

8.7.33 In accordance with Well-lit Highways Code of Practice for Highway Lighting Management.

Review actions

8.7.34 Review procedure annually.

8.7.35 Review technology.

8.7.36 Review design specification in accordance with amendments to TLMC documentation.

Disposal

8.7.37 Highway lighting assets very rarely become redundant except when there are upgrading works. However there is ongoing national pressure through environmental and financial considerations for all to reduce energy consumption and CO^2 emissions.

8.7.38 Currently trials are being conducted on the provision of part-night operation and complete removal of lighting systems. Any policy changes that result could have a direct affect on this lifecycle plan.

8.7.39 It is specified within the Term Lighting Maintenance Contract that redundant equipment must be disposed of taking into account current standards and legislation. Below are a few of the examples of materials that must be disposed of correctly.

- Asbestos
- PCBs/Electrical Equipment
- Concrete Columns
- Steel work

Performance monitoring

Table 8.7.5: Performance – past achievement and future targets (Contractual)

	Definition	Reference	Benchmark
Service visible to the public	% of street lights working as planned	SL 1 (previous BVPI 98)	National and Region
Service visible to the public	Av number of days taken by the highway authority to rectify street light faults	BVPI 215a	National

Ref	Target	2005	2006	2007	2013 target	2019 target
SL 1	Between 0.5 and 1	0.67%	0.66%	0.63%	0.5%	0.5%
BVPI 215a	Reducing	6.67 days	6.47 days	3.4 days	2	2

Deterioration model

8.7.40 Highway Lighting units deteriorate generally through:-

- Age
- Corrosion/Rusting
- Metal fatigue/Cracking
- Vandalism
- Canine urine
- Vehicular strikes
- Ground conditions
- Gritting/Salting of the highway
- Grass cutting
- Specific design problems

Optimisation and budget considerations

Options appraisal

8.7.41 SCC has examined a number of options as part of its Best Value service review, to improve the contribution street lighting makes to key corporate strategies and objectives. SCC has approved the continuing use of the Term Lighting Maintenance Contract for retention on value for money in lighting maintenance.

Table 8.7.6: Options available

Option	Description
Do nothing	No renewal programme and only reactive maintenance of existing stock
Do minimum	Introduce additional investment to seek to sustain the delivery of the current service in the medium term
Partial replacement	Introduce investment to replace significant proportion of the lighting infrastructure needing replacement
Fast track replacement	A fast track investment to bring the whole of the lighting infrastructure up to appropriate structural standards.
Full replacement	Replacement of the entire stock within a 5 year period

8.7.42 The ‘Do nothing’ option is not appropriate for SCC’s objectives.

Table 8.7.7: Projected spend to recover backlog of outstanding work and begin replacement to hold the steady state

Backlog work	Total cost estimated £000's	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Electrical test failures > 25 yrs old	1,433	130	130	130	130	130	130	130	130	130	130	132.72
Electrical test failures < 25 yrs old	451	75	75	75	75	75	-	-	-	75.74	-	-
Failures of BS Male spigots > 25 yrs old	322	160	161.96	-	-	-	-	-	-	-	-	-
Failures of BS Male spigots < 25 yrs old	162	-	162.13	-	-	-	-	-	-	-	-	
Failure of concrete columns < 25 yrs	793	180	180	180	180	-	73.4	-	-	-	-	-
Failure of concrete columns > 25 yrs	930	200	200	200	200	-	130.23	-	-	-	-	-
Failure of Stewart and Lloyds < 25 yrs	676	-	-	-	-	250	250	-	176.11	-	-	-
Failure of Stewart and Lloyds > 25 yrs	60	-	-	-	-	-		-	59.79	-	-	-
Remainder of those > 25 yrs Old	8,517	1400	1300	1200	1100	800	700	500	400	400	400	316.96
Illuminated Signs > 25 yrs	256	-	-	-	-	-	100	-	155.6	-	-	-
TOTAL £000's needed	**13,600**	**3,366**	**3,206**	**3,088**	**3,261**	**3,263**	**3,281**	**3,427**	**2,948**	**2,993**	**2,574**	**2907**
Luminaire replacement	-	674	606	817	771	634	753	792	642	769	610	840
Replace lighting columns	-	547	391	486	805	1,374	1,144	2,005	1, 384	1,618	1,434	1,618

Table 8.7.8: Summary of total spend (£000's) needed to recover backlog and continue with maintenance (taking account of 2% growth)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Capital steady state	656	669	682	696	710	724	739	753	738	784	799
Capital Replacement from Revenue	306	312	318	325	331	338	345	352	359	366	373
Reactive Maintenance	255	260	265	271	276	282	287	293	299	305	311
Special Maintenance	255	260	265	271	276	282	287	293	299	305	311
Term Lighting Maintenance	900	918	936	955	974	994	1014	1034	1054	1076	1097
Non recharge Damage	255	260	265	271	276	282	287	293	299	305	311
Energy	1403	1431	1459	1488	1518	1548	1579	1611	1643	1676	1710
Backlog	2711	3206	3088	3261	3263	3281	3427	2948	2993	2574	2907
Total required	**6741**	**7316**	**7278**	**7538**	**7624**	**7731**	**7965**	**7577**	**7684**	**7391**	**7819**

Performance gaps

8.7.43 Although a 40 year financial model has been developed, this does not provide a priority for carrying out replacement works when insufficient funds are available. This priority works model needs to be developed.

Risk associated with service delivery

8.7.44 The replacement of Highway Lighting units in a programmed manner ensures that SCC has acted responsibly in the management of an asset that has the potential to be a danger to the human life, flora and fauna. Without this ongoing programme the following dangerous occurrences will be more frequent and possibly could result in serious injury or even death.

- Full or partial structural failure;
- Electrical fault;
- RTC, vandalism damage or corrosion creating unsafe sharp edges.

8.7.45 In addition to these risks to person health and safety, the performance figures that have been obtained would no longer be sustainable resulting in a poor level of service being offered to customers.

8.7.46 Energy costs for unmetered supplies are volatile, and increases may have an impact on the funding available for service delivery

Future developments

- Remote monitoring;
- Use of equipment for Telecommunication installation;
- Consider passively safe columns for high-risk accident sites;
- Part-night Operation (i.e. operation timing from dusk to 12:00 pm and 05:30 to dawn);
- Dimming (reduction in energy consumption by dimming the lighting after peak traffic periods);
- Removal (i.e. in intrinsically dark villages where appropriate).

8.7.47 It is anticipated that 13,689 lighting columns and 277 illuminated signs and bollards will need to be replaced within five years.

Climate Change

8.7.48 The County's lighting stock contains a wide range of material types, having been installed over many years and some have already proven to be inadequate for future environmental and economic conditions without intervention. Additionally it is reasonable to assume that future challenges could extend the current backlog of work.

8.7.49 Current specifications are deemed to be adequate to cope with future climate change, however this only equates to just over 20% of the current stock and currently there is no way of knowing if other structure types other than those that have already been identified will deteriorate excessively.

8.7.50 The Highway Lighting Group has placed a high importance on sustainability issues in its replacement specification choice. The majority of the County's lighting stock has proven to be sustainable, however sudden structural failure has not been eradicated, therefore, it may now be necessary to adopt more replacement activities to future proof our stock against changing environmental demands.

8.7.51 Due to the nature of the asset future policy on CO^2 emissions, which has a direct effect on climate change, may well be amended to reduce the number of lighting columns currently maintained. Therefore possibly reducing the backlog of work due to their removal.

8.8 Lifecycle planning – Road signs

Introduction

8.8.1 The purpose of maintaining this asset is to provide a safe highway for users through the provision, replacement, repair and maintenance of advance warning, regulatory and information signs and bollards. This facilitates the free flow of traffic by managing movement through associated Traffic Regulation Orders (TRO), providing information and through warning users of potential hazards. All signing as erected and maintained should be in accordance with the Traffic Signs Regulations and General Directions 2002 (TSRGD).

8.8.2 The maintainable items associated with this asset include: Warning Signs, Regulatory Signs, Information Signs, Directional Signs, Finger arms, Bollards and Marker Posts.

Issues and trends

8.8.3 Reductions in revenue funding create risks for this project. Being unable to fund maintenance on existing non illuminated signs could cause safety issues for highway users. There are increased pressures on the budget with the cost of Traffic Management increasing due to new Chapter 8 legislation, and the year on year increase in works and operational costs. The pressure of maintaining newly installed sign plates as part of safety schemes needs to be considered when allocating yearly budgets. An increase in the number of units to be maintained will reduce the funds available per asset.

8.8.4 Sign clutter has also been identified as an issue, and the need to ensure that before any sign is replaced, consideration is given to whether the sign is still required, whether the size could be reduced, or whether the information could be incorporated into an existing sign or onto an existing post. This could also assist with the budget gap in the future.

Creation or acquisition

8.8.5 New Road signs are erected in the following circumstances:

- As part of a new highway development;
- In response to public/Parish Council/Member through the Traffic Management Minor works budget;
- As part of the sign review/de-clutter programme.
- To address a Traffic Management or Road Safety issue funded through the Local Transport Plan (LTP);
- Amendments to policy or changes in standards – the TSRGD.

8.8.6 In adding enforceable signage to the network a TRO is required. This legal document supports any enforceable traffic or highway measure to ensure safety, accessibility and minimum disruption to highway users.

8.8.7 TROs are required for a range of restrictions including:

- Waiting and loading
- One-way streets
- Speed limits
- Weight and width restrictions
- Access and turning restrictions
- Cycle and bus lanes.

Routine maintenance

8.8.8 The criteria for non illuminated sign maintenance inspections are:

- To identify safety defects which are hazardous to highway users and which must be dealt with as a priority;
- To identify defects which should be tackled to avoid problems developing into safety defects, and which can be dealt with as part of a routine maintenance programme;
- To provide evidence that SCC has fulfilled its statutory obligation to maintain the highway in a safe condition.

8.8.9 Any regulatory/warning/directional sign that has sustained any damage, or that is not legible such that the signing is not effective, or poses a hazard to highway users, will be recorded as a safety defect.

Table 8.8.1: Interaction between safety maintenance project and Highway Inspection Manual – Signs

Detail	Strategic route, main or secondary distributor	Linking road	Local collector roads	Local roads
Sign causing hazard	Immediate	24 Hours	24 Hours	24 Hours
Regulatory	24 hours	24 hours	24 hours	24 hours
Warning	28 days	28 days	28 days	28 days
Directional	90 days	90 days	90 days	90 days

8.8.10 Any sign, post or marker post that is damaged, unstable, ineffective or poses a hazard to highway users will be recorded as a safety defect. This includes posts that are severely rusted to an extent that holes are visible.

Table 8.8.2: Interaction between safety maintenance project and Highway Inspection Manual – Posts

Detail	Strategic route, main or secondary distributor	Linking road	Local collector roads	Local roads
Post causing hazard	Immediate	24 Hours	24 Hours	24 Hours
Damaged/unstable	28 days	28 days	28 days	28 days
Rusted Post	28 days	28 days	90 days	90 days
Marker Post	7 days	28 days	28 days	28 days

8.8.11 Road signs, posts and bollards are assessed for condition during both safety and service inspections. As SCC has embarked upon a proactive sign cleaning and amenities regime, a reduction is being achieved in the quantity of illegible and obscured plates.

General safety inspections

8.8.12 General safety inspections cover a variety of activities, including:

- Monthly main road surveys which cover the Strategic routes, main and secondary distributor roads;
- 3-monthly C+ road surveys which cover the linking roads;
- Annual rural roads inspections which include the local collector roads;
- Monthly and 3-monthly town walks inspections;
- 6-monthly urban rural parish roads inspections;
- Cycle ways inspections.

Specific visual surveys

8.8.13 Specific visual surveys are driven surveys on the main routes carried out during September at night time. Defects identified as part of this inspection include the reflectivity level of the plate, whether the plate or post has been twisted, damaged, etc, or if the sign plate face has been obscured by vegetation. All defects identified will be rectified within a 3 month period.

Reactive

8.8.14 Reactive road sign inspections may also be initiated by:

i) Report from 3rd party – i.e. member of the public

ii) Report from SCC staff

iii) Report from planned safety inspections

8.8.15 The maintenance of signs falls into 2 categories:

Reactive maintenance

8.8.16 Defective signs that may affect safety are replaced as a priority. For example, missing or defective warning and mandatory signs are replaced on a reactive basis.

Programmed maintenance

8.8.17 Annual sign maintenance programmes take place on a prioritisation basis depending on the budget allocation. These include:

- Sign cleaning, main road programme
- Sign review /de-clutter programme
- Replacement of direction signs, prioritised
- Finger arm painting and refurbishment
- Marker post and bollard replacement

Renewal or replacement

8.8.18 The need for renewal or replacement of road signs is identified through:

- Changes to the highway infrastructure;
- Sign review/de-clutter programme.
- New traffic management schemes;
- Changes to standards.

8.8.19 The expected life of a sign is currently identified and checked on an ad hoc basis and through product guarantees.

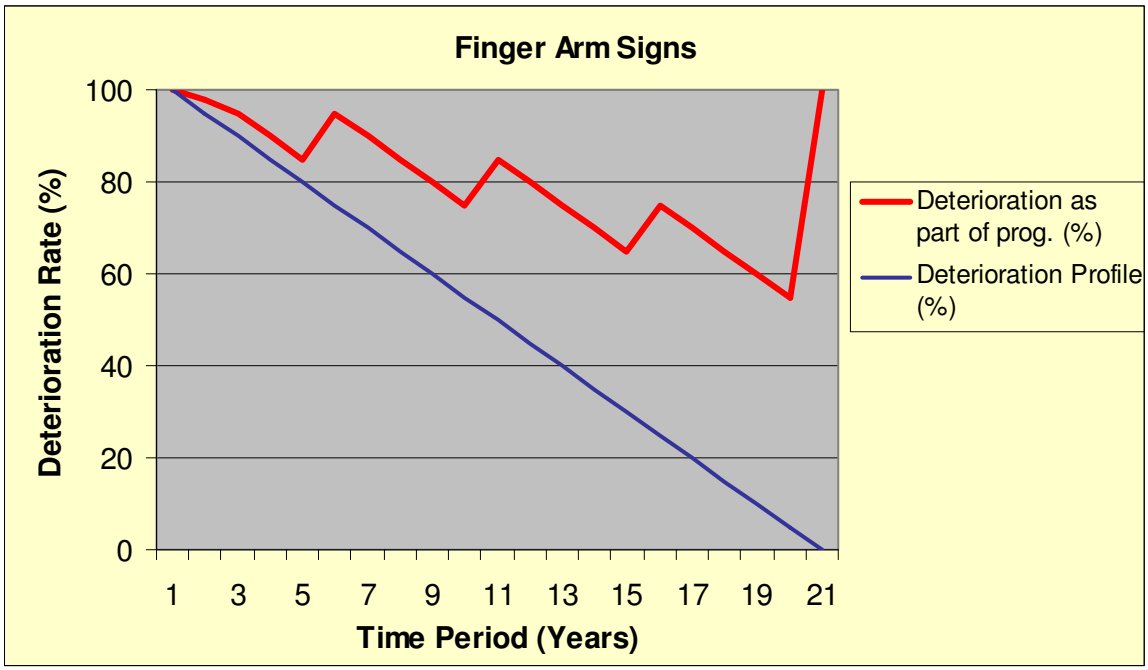
8.8.20 An initial assessment identified that there are locations where the environment can affect the condition of the plate. Monitoring the performance of vulnerable sites showed that localised areas are subject to detritus and algae build up.

8.8.21 The reflective properties of sign plates deteriorate faster where signs are located close to the verge of busy narrow main roads. Plates positioned on a wide verge are less likely to be affected by salt spray during winter months. Routes which experience these problems are added to sign cleaning programmes completed at the end of the winter season.

8.8.22 Tourism/local amenity signage (i.e. village hall) is wholly funded by the applicant who is also responsible for the future maintenance of such signs.

8.8.23 Road Traffic Accidents can also cause damage to road signs and where possible costs for repairs/replacements will be pursued and re-charged to the driver.

Graph 8.8.1: Finger arm signs deterioration models



Upgrading

8.8.24 When a sign, post or bollard has been identified for replacement, consideration is given to whether improvements or rationalisations can be made. Signs may still exist complying with the previous design specification and not to the TSRGD. Inspections will identify any significant short falls between current design standards.

8.8.25 There are several groups of signs which fall into this category such as:

- Specification changed for blue boarder directional plates
- Redundant 'No Waiting At Any Time' plates
- Upgrade to Passively safe signposts where speed limits and post dimension dictate. (Passively safe sign posts have the potential to reduce the severity of personal injury.)
- Upgrading of materials to increase the reflectivity of sign plates. New materials are constantly being developed to improve visibility.

8.8.26 The Traffic Management Team is currently starting work on an A and B speed limit review as requested by the Department of Transport (DfT) in Circular Roads 01/2006. This guidance requires speed limits to be evidence led, self–explaining and seek to reinforce people's assessment of what is a safe speed to travel. They should encourage self-compliance and not be seen by drivers as being a target speed at which to drive in all circumstances. This project will identify the need for changes to current speed limits and the associated signing.

8.8.27 Some types of signing are sometimes subject to vandalism. Site assessments determine whether this is likely to occur. An anti-graffiti film can be applied to prevent damage being caused. Manufacturers have also developed an anti-dew coating which can be applied to meet the needs of individual sites.

8.8.28 Finger arm painting and cleaning is undertaken as part of planned works. If the asset needs to be replaced, then this is done by using cast aluminium to comply with Corporate Policy of protecting and enhancing the natural environment.

8.8.29 Special projects with various partners are undertaken to enhance the highway environment, i.e. the Quantock Hills Local Heritage Initiative, where work was carried out with the local community and AONB officers to restore many of the historical finger arm posts.

Disposal

8.8.30 Signs are removed when they become obsolete or require replacement. Signs will be re-used if possible on other schemes. Damaged or obsolete signs are currently disposed of in landfill. Consideration needs to be given to future recycling

Manage demand

8.8.31 As part of new or re-signing schemes, consideration is given to reducing signage. This is done by consolidating plates to reduce sign clutter or removing redundant plates. We are embarking on a continuing sign review/de-clutter programme.

Treatment options

- **Do minimum** Not to replace road signs. This is high risk and could create safety and traffic management issues.
- **Medium term** Clean and refurbish signs
- **Long life treatment** Replacement of signs

Performance gaps

8.8.32 The asset data for road signs has been collected over the past 15 years. The data cannot be relied upon as the inventory had not been updated for many years. The road signs inventory data and knowledge level is shown in Table 5.5: Asset inventory knowledge level (see Appendix 4, page 165).

8.8.33 The expected life of signs and posts are not currently identified or checked.

8.8.34 Consideration needs to be given to the use of passive safe sign posts where necessary.

8.8.35 Consideration needs to be given to future funding of non illuminated signs to enable maintenance programmes to meet LTP targets.

8.9 Lifecycle planning – Road markings and studs

Introduction

8.9.1 The use of road markings and studs facilitates the free flow of traffic by managing movement through defined junctions, lanes, edge of carriageway lines, vehicle parking and through warning of potential hazards. The maintenance of this asset through replacement, repair and maintenance of visible, legible and appropriate reflective road markings and studs is essential to provide a safe highway for all users. All road markings and studs should be installed and maintained in accordance with the Traffic Signs Regulations and General Directions 2002 (TSRGD).

8.9.2 The maintainable items associated with this asset include: lines, road studs, markings, lettering and symbols on roads, footways and cycleways.

Issues and trends

8.9.3 Reductions in revenue funding create risks for this project. Being unable to fund maintenance on existing road markings and road studs could potentially cause safety issues for highway users. There are increased pressures on the budget with the cost of Traffic Management increasing due to new Chapter 8 legislation, and the year on year increase in works and operational costs. The pressure of maintaining newly installed road markings and studs as part of safety schemes needs to be considered when allocating yearly budgets. An increase in the number of units to be maintained will reduce the funds available per marking/stud.

Creation or acquisition

8.9.4 New Road markings and studs are placed in the following circumstances:

- As part of a new highway development;
- In response to public/Parish Council/Member through the Traffic Management Minor works budget;
- To address a Traffic Management or Road Safety issue funded through the Local Transport Plan (LTP);
- Amendments to policy or changes in standard – The TSRGD.

Routine maintenance

8.9.5 The inspection criteria for road markings and studs are:

- To identify safety defects which are hazardous to highway users and which must be dealt with as a priority;
- To identify defects which should be tackled to avoid problems developing into safety defects, and which can be dealt with as part of a routine maintenance programme;
- To provide evidence that SCC has fulfilled its statutory obligations to maintain the highway in a safe condition.

8.9.6 The service standards are derived from the requirements of the LTP2 and by taking account of the recommendations in the Best Value Code of Good Practice. The table below is an extract from the Highway Safety Inspection Manual (January 2006).

Table 8.9.1: Minimum service level through planned highway safety inspections

Asset item	Carriageway	Strategic route, main or secondary distributor	Linking road	Local collector roads	Local roads
Road Markings	>70% worn	7 days	7 days	28 days	90 days
	>30% or <70% worn	90 days	90 days	90 days	6 months
Studs	>10% non-reflective	Renewal before winter	Renewal before winter	Renewal before winter	Renewal before winter

8.9.7 SCC carries out visual inspections to determine whether a marking needs replacing more urgently than being added to a planned programme.

8.9.8 The table below indicates the interaction between the Road Markings and Road Studs project and the Highway Safety Inspection Manual.

Table 8.9.2: Interaction between safety maintenance project and Highway Inspection Manual

Scope of typical hazards	Inspection type
If 30% of the road marking has worn away or if a section of the marking has been obscured as a result of works on the highway.	Identified during a Planned Highway Safety Inspection by a competent Inspector
Poor reflectivity and condition of studs Missing studs	Identified during a detailed road markings/road studs survey by a competent Inspector
Poor condition which may lead to a hazard	

8.9.9 Road markings are assessed for condition during both safety and service inspections. As SCC has embarked upon a proactive maintenance regime, far fewer locations are occurring where the condition falls below the intervention levels described in both the safety and service manuals. The need for maintenance of road markings and studs is identified through:

General highway safety inspections

- Driven monthly main roads surveys which cover the Strategic routes, main and secondary distributor roads;
- Driven 3-monthly C+ road surveys which cover the linking roads;
- Driven annual rural roads surveys which include the local collector roads and local roads;
- Walked annual and 6 monthly rural parish roads inspections;
- Walked monthly and 3-monthly town centre roads inspections;
- Walked 6-monthly urban parish roads inspections;
- Cycleways inspections.

Specific visual surveys

- Driven annual main road survey – this is carried out during September at night time and identifies poorly reflective road studs. Road stud replacement is based upon condition. Sites falling below intervention levels will be replaced with the emphasis on replacing whole routes or significant sections rather than small areas.
- Driven annual main road survey – this is carried out in February during day time and identifies worn road markings, lane and edge lines. Sites falling below

intervention levels will be replaced with the emphasis on replacing whole routes or significant sections rather than small areas.

- Walked annual urban polygon surveys – these are programmed to take place during May to identify worn junctions and road markings within large urban areas.

Reactive

8.9.10 Reactive road marking and studs inspections may also be initiated by:

i) Report from 3rd party i.e. member of the public

ii) Report from SCC staff

iii) Report from planned safety inspections

8.9.11 The maintenance of road markings falls into 2 categories:

Reactive maintenance

- Defective lines that may affect safety are replaced as a priority.
- Missing or defective warning and mandatory road markings are replaced on a reactive basis.

Programmed maintenance

- Annual maintenance programmes for road markings and studs takes place on a prioritisation basis depending on the budget allocation. These include:
  - A and B road spray programme (centre and edge lines) when over 30% worn – 2 year programme
  - Other road spray programme – when over 30% worn
  - Rural junction polygon programme – 5 year programme
  - Urban junction polygon programme – Regular programme not identified
  - Yellow line programme – Regular programme not identified
  - Road stud replacement programme

8.9.12 SCC is also learning where lines are deteriorating faster than the replacement programme and these specific locations will be programmed for more regular replacement. An example would be at sites where vehicles regularly cross the longitudinal lines at right hand turns.

Renewal or replacement

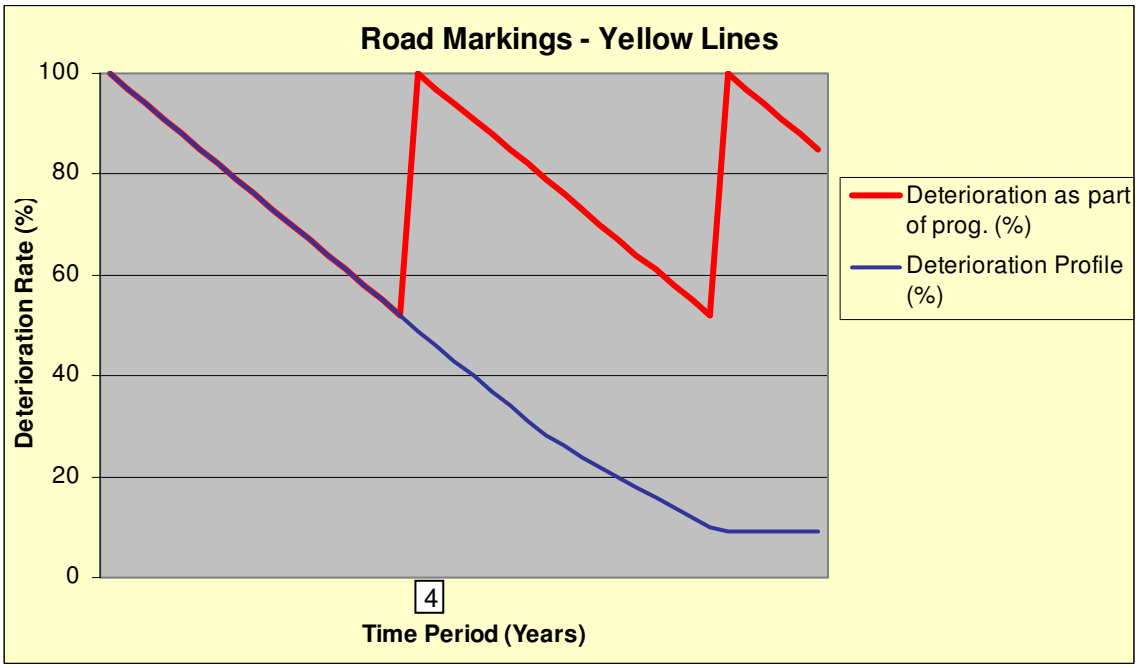
8.9.13 The need for renewal or replacement of road markings and studs is identified through:

- Changes to the highway infrastructure
- New traffic management schemes.
- Resurfacing/surface dressing operations
- Changes to standards

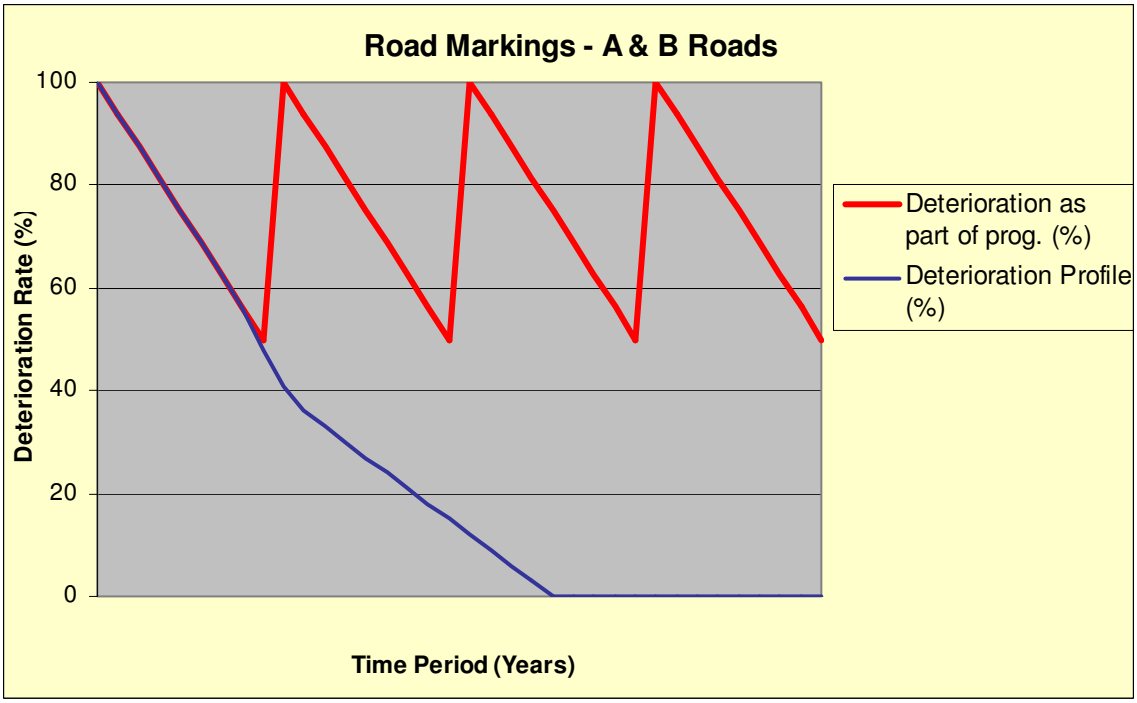
8.9.14 The expected life of lines is currently identified and checked on an ad hoc basis and through product guarantees, although records are now being kept.

8.9.15 Lines and markings deteriorate predominately through vehicle overrun. An initial assessment of deterioration showed that the road markings loosely followed the road hierarchy. There are clearly some locations where more rapid deterioration is experienced such as by extreme effects of traffic braking or manoeuvring such as quarry routes at well-used right hand turn lanes. Some routes do not wear quite as fast as others because the road may generally be wide enough so that vehicle overrun does not occur as often.

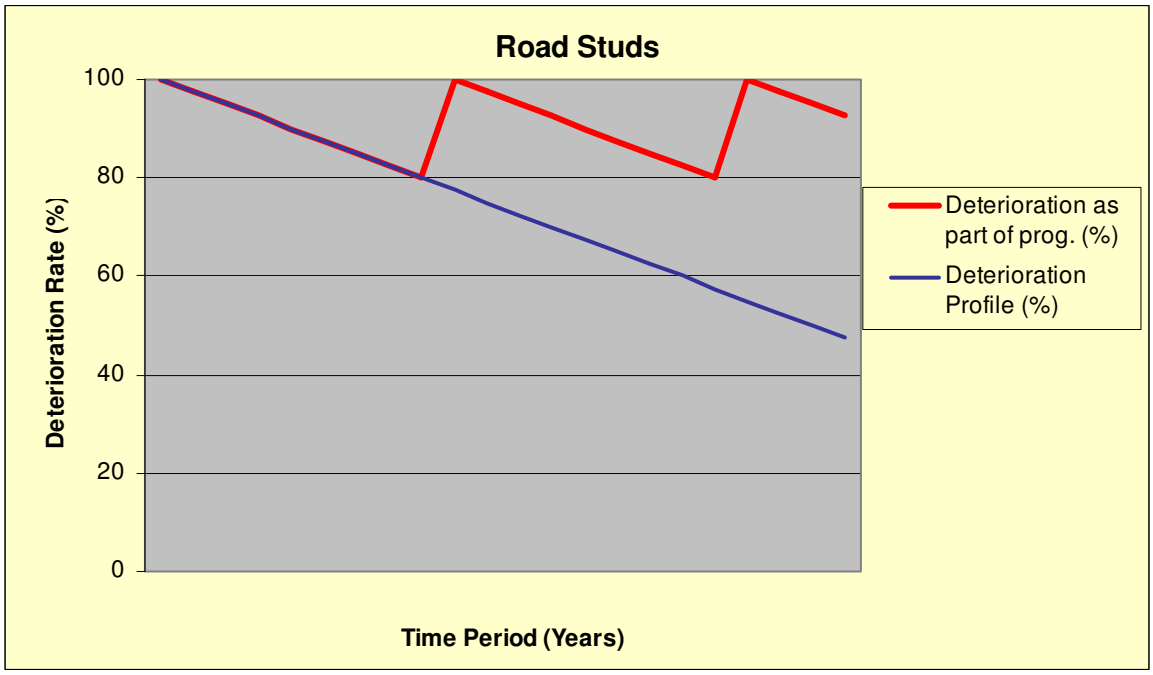
Graph 8.9.1: Road markings deterioration model – Yellow lines



Graph 8.9.2: A & B road markings deterioration model



Graph 8.9.3: Road studs deterioration model



Upgrading

8.9.16 When road markings have been identified for replacement/renewal consideration is given to whether improvements can be made or if the road marking/stud is to the latest standard.

8.9.17 Busy strategic routes should be refurbished using extruded white material, which is more durable than the sprayed thermoplastic material when the frequency of vehicle manoeuvres over the line is high.

8.9.18 Criteria to be met when refurbishing yellow lines:

- If the route lies within a conservation area then the replacement line should be yellow colour Number 310 (Primrose). If the lines are more than 70% worn then the replacement line should be laid to a width of 50mm. If the lines requiring refurbishment are still visible then the replacement line should match the line present on site.
- Locations that do not fall within a conservation area should be refurbished in yellow colour Number 310 (Primrose). If the lines are more than 70% worn then the replacement line should be laid to a width of 75mm. If the lines requiring refurbishment are still visible then the replacement line should match the line present on site.

8.9.19 Adhesive Stimsonite 953 studs should not be used on narrow busy routes where they would be susceptible from constant overrun. 301 road studs are more durable and robust; their reflectivity is also much higher.

8.9.20 Cats' eyes with Halifax rubbers are now being replaced with the new 590 rubber depressible inserts which give a superior, long lasting performance and are highly reflective.

Disposal

8.9.21 Road markings and studs rarely become redundant except when there are upgrading works. Methods of removal include:

- Scabbling;
- Hydroblast;
- Thermoplastic blacking out;
- Lifting road studs.

8.9.22 Where lines and studs are no longer required, they will be removed rather than left to fade or deteriorate, unless a Risk Assessment allows otherwise.

Manage demand

8.9.23 Road markings and studs are reviewed when the highway is resurfaced or surface dressed. These operations provide an opportunity to manage and coordinate any changes required to move redundant or upgrade sub standard markings.

Treatment options

- **Do minimum** Not to replace road markings/studs. This could be high risk and create safety and traffic management issues. However, there are some markings that would be low priority.
- **Medium term** Spray lining, stick on Stimsonite road studs.
- **Long life treatment** Extruded or screed lining, 301 or 590 road studs

Performance gaps

8.9.24 The asset data for road markings and studs has been collected over the past 15 years. The data cannot be relied upon as the inventory had not been updated for many years. The road markings and studs inventory data and knowledge levels are shown in Table 5.24: Asset inventory knowledge level (page 70).

8.10 Lifecycle planning – Traffic control systems

Introduction

8.10.1 The traffic control system asset consists of traffic signals at road junctions, pedestrian crossing facilities (commonly referred to as Pelicans, Puffins or Toucans), Wig-Wags outside fire and ambulance stations, and interactive electronic signage. It also encompasses CCTV systems, bus priority equipment and Automatic Number Plate Recognition (ANPR) equipment. Vehicle activated signage was inherited towards the end of 2006.

8.10.2 Traffic control system installations are sophisticated and subtle combinations of civil engineering (junction layout, kerbing, tactile paving, underground power and communications ducting etc), systems hardware (signal poles and heads, controllers, vehicle activated signs etc) and software (SCOOT – Split Cycle Offset Optimisation Technique, MOVA – Microprocessor Optimised Vehicle Activation, the Fault Management System (FMS) etc). Equipment and 'intelligence' are constantly being developed and improved in line with rapid technological development. There are ranges of life expectations for the various elements which are difficult to measure and indeed to predict.

8.10.3 This array of signal assets helps to maintain the safe flow and interaction of vehicles, cycles and pedestrians. These assets convey instructions to road users in a manner, which is clearly visible, both by day and by night. It is extremely important therefore that SCC maintains these to ensure that they remain safe, efficient and effective.

8.10.4 Under the Highways Act 1980 SCC has a statutory duty of care to all users on the highway network, and to provide passage for all vehicles. In addition, the Traffic Management Act 2004 places a duty on all Highway Authority Traffic Managers to ensure the expeditious movement of traffic across their own network and those of other Authorities.

Key Performance Indicators

8.10.5 Performance indicators include Mandatory (LTP) and Local Indicators (LPI). Outcome indicators in the LTP2, for all of which traffic control systems will have significant and frequently crucial influence, include

- LTP3 (Cycling trips),
- LTP4 (Mode share of journeys to school),
- LTP5 (Bus punctuality),
- LTP6 (Changes in peak period traffic flows in urban centres),
- LTP8 (An air quality target related to traffic),
- LPI 5 (Congestion – average vehicle delay), and
- LPI 6 (Pedestrian activity in Taunton town centre).

Extent of asset

8.10.6 The table below uses data from the database to show a breakdown of equipment by type and area.

Table 8.10.1: SCC signals inventory

Asset type	District					
	Sedgemoor	Mendip	West Somerset	Taunton Deane	South Somerset	Total
Junctions and shuttle systems	20	23	2	36	23	104
Stand alone Pelican/Puffin/ Toucan Crossing	23	25	7	33	35	124
CCTV Sites	3	1	0	4	1	9
Vehicle Activated Signs	4	1		5	14	24
Bus Gates				2		2
ANPR Sites				14		14
Total	**47**	**50**	**9**	**94**	**73**	**277**

Inspections

8.10.7 Inspections are carried out in accordance with the standards and recommendations of the Department for Transport, and codes of practice. A rolling programme has now been instigated to ensure asset condition data is kept up to date and also to ensure the efficient operation of sites. Stock conditions are collated visually through the safety or service inspections and those requiring treatment prioritised for replacement or refurbishment depending upon the risk factor explained below.

Risk assessments

8.10.8 An assessment was carried out in 2006 with the aim of identifying which sites had the greatest operational consequence if they failed. A risk rating factor was derived from site characteristics of traffic and pedestrian flow, traffic and pedestrian speed, manoeuvres, traffic management arrangements, special circumstances and repair period. The factor was then calculated from the likelihood of injury occurrence and severity.

8.10.9 As sites age the problems and repair period will vary and consideration of the structural elements should be taken into account. To this end a scoring system is being put in place linked to the age of all equipment on site and its condition. This will enable accurate prioritisation of proactive maintenance work with minimal manual data manipulation.

8.10.10 Demands on the asset stock arise from one or more of the following basic mechanisms:

- Failures and defects from ageing and deterioration of components in the network;
- Increased traffic and thereby increased asset use and installation;
- Required replacement of equipment due to vandalism, collision damage, wild-life, etc;
- Implementation of new service standards for programmed work;
- Targets for completion within timeframe of strategic policies;
- Changes to technology and the replacement of obsolete equipment;
- Changes in existing safety standards

Creation and acquisition

8.10.11 New assets are generally created or acquired under one of the following circumstances

- Private developers' schemes where traffic control equipment is required as part of the planning consent.
- To address a traffic management or road safety issue funded through the LTP.

- Major schemes such as the North West Taunton Package or East of Taunton Park and Ride.

Routine maintenance activities

8.10.12 Routine maintenance is the regular day-to-day work necessary to keep assets operating.

8.10.13 All traffic signal installations are remotely monitored in County Hall using a Remote Monitoring System (RMS) or Urban Traffic Control (UTC) system and faults are reported automatically to the term maintenance contractor using a fault management system (FMS). The UTC system controls a large percentage of sites in Taunton, Yeovil, Bridgwater and Wells, with likely expansion to other towns in future.

8.10.14 The RMS receives a normal range of 4000 to 7000 communications every quarter from the on-site equipments via the Prefect (remote monitoring) system (a peak of over 13,000 in January 2001 was due to a memorable thunderstorm). Of these, 300 to 700 are faults which need to be repaired or rectified by SCC's term maintenance contractor. The faults break down into a range of categories for priority of repair also relating to time of day/day of week fault was reported. These can be simplified to:

- Urgent (e.g. whole installation or individual signal lamps out, controller failures) and
- Non-urgent (e.g. regulatory sign bulbs, pedestrian button wait lamps).

8.10.15 Faults can be a result of usage or damage. Either category can be minor or major in terms of simplicity or complications, which drive cost.

- Minor Faults due to usage – 'wear and tear' (e.g. bulb or controller failures), decay (rusted poles), or damage (e.g. loops damaged during re-surfacing). Repair relatively simple (e.g. replacing bulbs) – reactive maintenance under contract.
- Major Faults due to age, usage or obsolescence. Repairs costly; reactive or proactively planned dependant upon specific circumstances and budget.
- Significant damage (crash damage, vandalism). Repair costly, generally rectified reactively using proactive maintenance budget (e.g. reconfiguring and reconstructing civils works and signal equipment at the site).

Proactive maintenance

8.10.16 Proactive maintenance is planned to replace equipment as budget constraints allow. Decisions on replacements are based on numerous factors including age and condition of the site, the availability of spares for maintaining the site and the risk factor described above.

8.10.17 A signal-controlled junction or pedestrian crossing has a design life of approximately 15 years. Other items such as vehicle-activated signs have shorter design lives of perhaps 5-10 years. Many installations last longer than their designed lives, but become increasingly unreliable and obsolete. The state of SCC's intelligent traffic control systems is changing in pace with rapid technological improvement – advancing micro-control systems and processor intelligence. This poses a significant maintenance burden maintaining, refurbishing or upgrading equipment.

8.10.18 The table below represents the number of sites which have exceeded their design life of 15 years based on the age of the controller. These figures do not take into account those sites where the controller has been replaced due to either upgrades or accidents but the rest of the infrastructure exceeds 15 years. These figures are based on current positions and do not forecast future proactive maintenance as funding level cannot be predicted.

Table 8.10.2: Estimated numbers of sites exceeding design life based on current situation

	Stand alone Pelican/Puffin/ Toucan Crossing	Junctions and shuttle systems
Over 15 Years in 2010	16	13
Over 15 Years in 2011	20	20
Over 15 Years in 2012	23	23
Over 15 Years in 2013	28	29
Over 15 Years in 2014	30	32
Over 15 Years in 2015	31	34

Disposal

8.10.19 Signals are rarely taken out of use. Removal of signal assets will normally only occur as a result of other safety or traffic engineering projects. When the signal hardware is removed, its value is normally no more than scrap metal. However, if any equipment is taken down which is in good condition and has potential for re-use, it is stored.

Non-Asset options

8.10.20 No non-asset options are presently considered in managing the demand on the network.

Identification of service options

8.10.21 Financial restraints have dictated that maintenance has not kept apace with degeneration. Recent bids for increased funds (MTFP 2006-09 and PFI 2003) have been unsuccessful. Capital funding has been received and this has gone some way to improving the situation. However the level of funding has reduced year on year and as can be seen in Table 8.9.3 this capital investment needs to be increased if the asset condition is to be improved, or at least prevented from deteriorating further.

8.10.22 Structural integrity and condition for all stock is questionable, much in-service stock has exceeded its design life. In the event of failure causing injury to a person or property the implications would have to be faced and costs met by SCC. The current backlog will increase indefinitely until such time sufficient funding is provided to ensure electrical and structural integrity of all stock.

8.10.23 For this lifecycle plan, it is assumed that all equipment should be replaced at the end of the service life as given below.

- Signals – replace whole site every 15 years,
- Pedestrian crossings – replace whole site every 15 years,
- All other equipment – replace every 10 years maximum.

8.10.24 In cases where underground duct networks are well constructed the life expectancy of the ducting should be approximately 30 years.

Lifecycle asset treatment options

8.10.25 The main issues which impact on treatment options are:

- Sets of signals become obsolete when spare parts can no longer be obtained.
- Underground cables degrade over time and in some sites these are costly to replace; ideally all signal junctions should utilise a fully ducted cable network to allow cable renewal without road works.

8.10.26 The treatment types and options normally considered are:

- **Long life/structural** - This involves replacements and is based on cost effective analysis to prolong the whole system life and reduce future costs. These include:
  1) Replacement of installations and major components,
  2) Major refurbishments inclusive of replacement of fully ducted cable networks,
- **Medium/intermediate treatments** - Limited replacement or refurbishment of signal, system and components to extend the life of installation. These include:
  1) Replacing minor components with optimised and durable ones,
  2) Reconfiguring signal equipment.
- **Do minimum** - Routine and reactive treatments that keep the signal, system and components in functional order.

Climate Change

8.10.27 The location of signals and their control equipment is often dictated by external forces. As such they can rarely be located to minimise the effect of climate change. However where flooding poses a risk it is sometimes possible to construct the site in such a way as to minimise the impact of any flooding event. This has already been implemented at a site in Frome.

8.10.28 Due to the nature of the asset its energy consumption is large and consequently, so are the associated carbon emissions. To help minimise this as well as reducing costs, we are now implementing a policy of only installing extra low voltage controllers and equipment in all new sites. This significantly reduces the energy requirements and therefore the associated carbon emissions.

8.10.29 Also the use of SCOOT in the major urban centres continues to minimise congestion and therefore again helps reduce the carbon emissions produced within the authority.

Recommendations

8.10.30 **The level of service framework** needs to be developed further with a clearer idea of how each level of service is defined.

8.10.31 **A maintenance strategy** has been developed. However further work is required to incorporate asset health performance indicators into the asset information database.

8.10.32 **Asset health performance indicators** have been developed but further work is required to incorporate these into the asset information database.

8.11 Lifecycle planning - Rights of Way

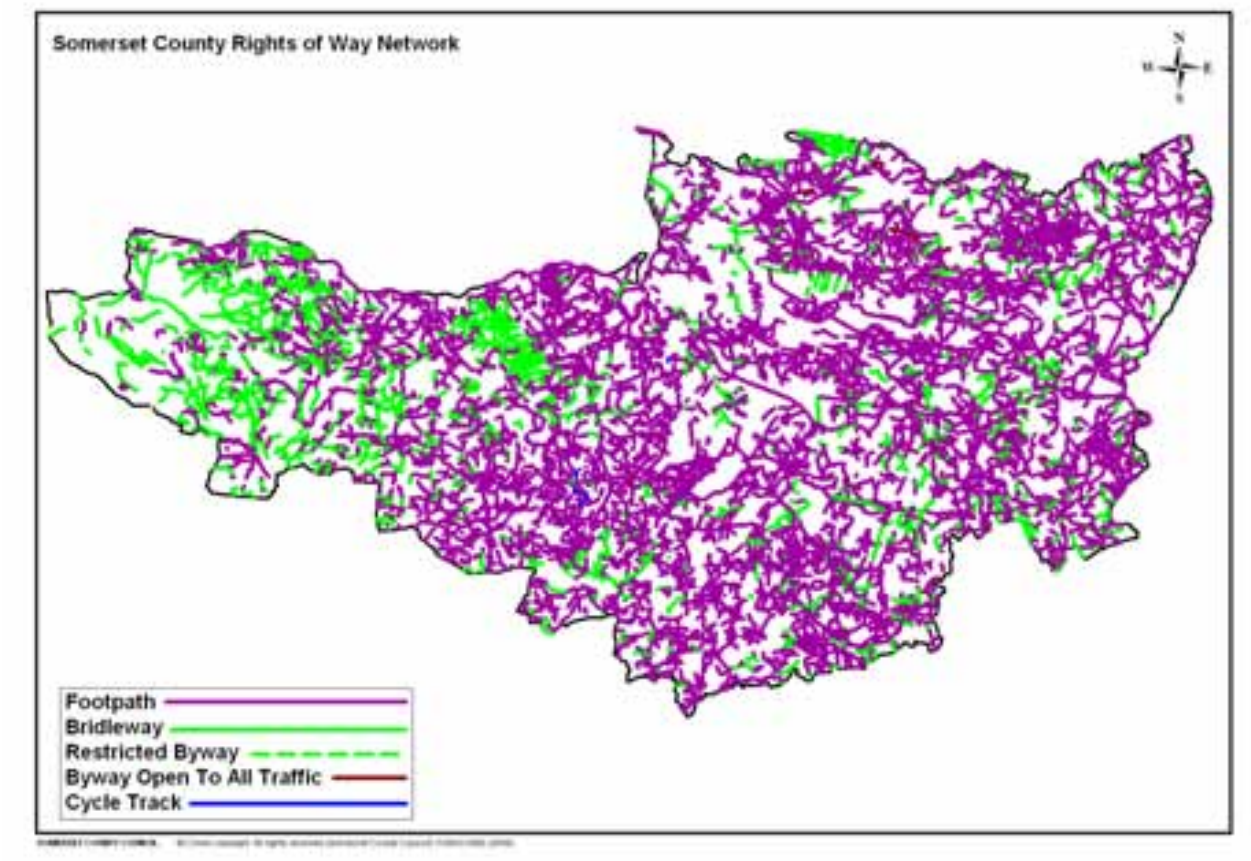
Introduction

8.11.1 Somerset has one of the longest rights of way networks in the country. With over 9000 paths the total length stands at 6129 km. The following table shows the lengths and percentages for the different categories of Public Rights of Way (PRoW) in Somerset.

Table 8.11.1: Rights of Way network by status

Category of PRoW	Kilometres	% of total network
Footpath	4821	78.6
Bridleway	1001	16.3
Restricted Byway	299	4.9
Byway Open to All Traffic (BOAT)	8	0.1
Total	6129	100

Figure 8.11.1 Somerset County Rights of Way network



8.11.2 The RoW Maintenance & Enforcement Policy (MEP) & The Rights of Way Improvement Plan (RoWIP) are the primary documents that set out the management of the maintenance function carried out by the County Council.

8.11.3 As Highway Authority, Somerset County Council has a duty to maintain the rights of way network. Under an agency agreement part of the maintenance & enforcement function is devolved to Exmoor National Park Authority (ENPA)

ENPA agency agreement covers 756 km of PRoW, exceptions from the agreement are bridges with a span exceeding 6m, stone bridges with a span exceeding 2m, some surfaced path maintenance, Definitive Map Legal Events Orders and part of enforcement function.

South Somerset District Council and Mendip District Council agency functions revert to SCC on 01 April 2010, whereupon, excluding ENP, SCC will directly administer the maintenance & enforcement function countywide.

8.11.4 An informal agreement exists whereby responsibility for the inspection and surface maintenance of some surfaced PROWS rests with Somerset Highways. All other functions relating to these surfaced paths rest with the Rights of Way team, this agreement is currently being formalised.

Network Maintenance & Development Funding

8.11.5 The statutory maintenance function (including payments made to agents) and annual vegetation clearance work is funded by a revenue budget of £392,000 (as 2009/10 allocation) The two greatest spends from this revenue budget are:

- Funding ENPA agency- 2010/11 allocation to be confirmed
- Estimated Annual vegetation clearance contracts excluding ENPA approximately £107,000

8.11.6 Capital funding is allocated for significant bridge and structure works plus any other major maintenance schemes, throughout the county that are outside the revenue funded works. Over a 5 year programme the estimated cost of necessary replacement or significant repairs is £320,600 per annum. Allocation for 2010/11 to be confirmed.

8.11.7 Improvement schemes and non-statutory works addressed through the Rights of Way Improvement Plan (RoWIP) are funding by a revenue budget of £15,500 or through other external sources of funding.

8.11.8 Integrated Transport Block capital funding delivers improvements to LPI3 as set out in LTP2. A condition of this funding is that 28% must deliver urban fringe improvement works (any PRoW within 2km of an urban area) A further £100k LTP Capital funding is provisionally allocated for 2010/11, funding beyond 2011 is unconfirmed.

Table 8.11.2 Rights of Way Maintenance & Development Expenditure forecast

	2010/11 £	2011/12 £
Maintenance Revenue Forecast		
ENPA Agency	TBC	TBC
Annual vegetation schedules (excluding ENPA)	107,000	107,000
Routine Maintenance		
RoWIP Revenue Forecast	15,500	15,500
Administration	4,000	4,000
RoWIP project work	11,500	11,500
LTP Capital funding forecast	100,000 (provisional allocation)	Unconfirmed
Ease of use improvement works – Urban Fringe	28,000	N/A
Ease of use improvement works – Rural	72,000	N/A
Bridge & Structure Capital forecast	Unconfirmed	Unconfirmed
RoW bridge & structure programme	N/A	N/A
Total	248,000	138,000

Creation or Acquisition

8.11.9 The existing Rights of Way Asset is fairly static. All furniture present on the network at the time of the 'relevant date' are accepted as existing lawful limitations. Non-restrictive assets such as retaining walls, surfaced paths etc exist on the network but fall outside the definition of a 'limitation'

8.11.10 Subsequent creation of new limitations and assets can occur from the following:

- Authorisation for the erection of new stiles/ gates, structures are required for stock control purposes, as following section 147 HA 1980.
- Barriers can be authorised under Highways Act 1980 sections 115b & 66 as amended by the Countryside RoW Act 2000 section 70.
- Authorisation of change of surface (SCC RoW Authorisation procedure).
- Diversion of existing PRoW may create or delete assets. District councils predominantly carry out TCPA 1990 diversions although local authorities also have powers to divert RoW under Highway Act (HA) 1980. The county council makes approx 15 public path diversion orders per annum. The District Councils and ENPA make approximately 40 public path diversion orders per annum.

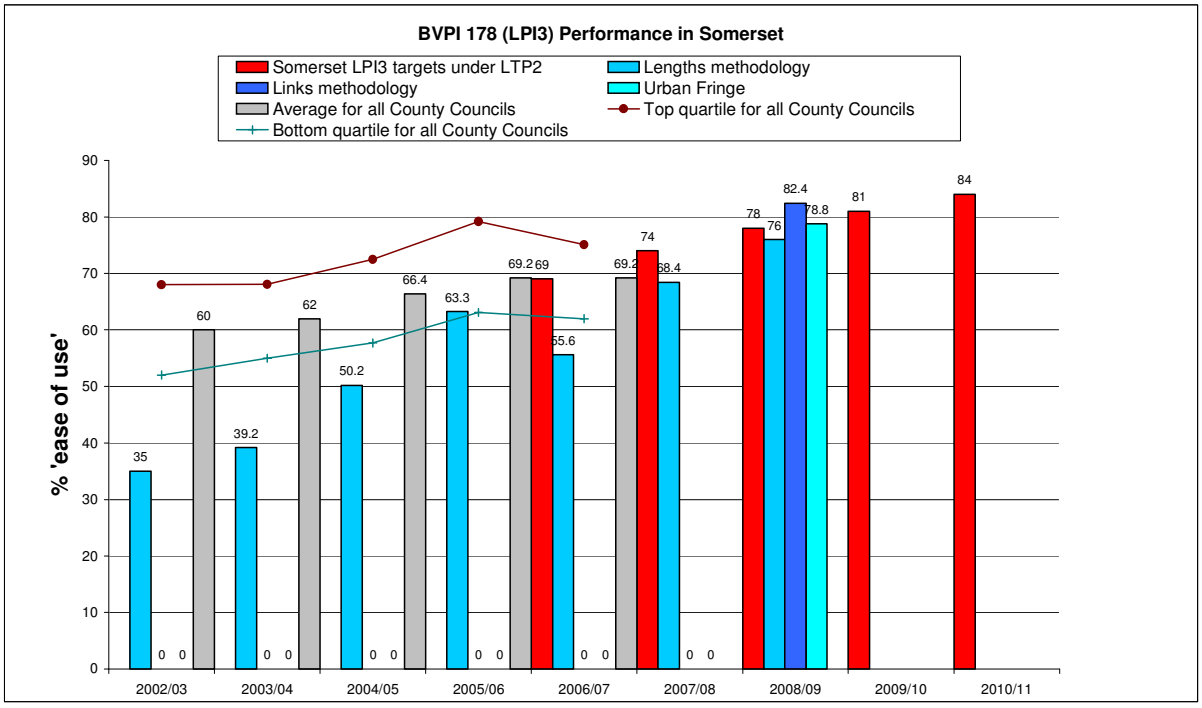
- Through the modification process new routes may be created, upgraded, downgraded, diverted or varied, which may result in the creation or inclusion of additional assets. It is estimated that the target of determining 12 Definitive Map Modification Orders during 2009/10 will be achieved by the Definitive Map Team.
- Improvement schemes.
- Natural changes to ground conditions or watercourses may require new boardwalks, bridges or causeways, or other structures to be installed by SCC.
- Deterioration of natural ground conditions may require stabilisation through retaining walls, surface works or other structures.
- Larger developments may result in the creation of further assets on the network. In these cases responsibility should rest with the developer, subsequent landowner, Management Company or other third party or SCC. In cases where SCC will become liable for a significant new asset then an agreed commuted sum will be sought.

8.11.11 Should representation be made regarding existing unauthorised limitations, these will require either a retrospective authorisation or SCC will exercise its powers to remove unauthorised limitation. The number of structures removed per annum under enforcement procedures is 5. The number of new limitations authorised per annum is 30.

Service Standards

8.11.12 The only performance indicator relating the maintenance of the Rights of Way network is 'Ease of Use', formerly BVPI 178. 'Ease of Use' is a Local Performance Indicator (LPI3) in LTP2.

Figure 8.11.2: Ease of use performance indicator



8.11.13 In light of BVPI 178 being dropped from the National Indicator set, all LAs are now using the highway links methodology as this is seen as a more logical and realistic measurement of the 'ease of use' of the rights of way network. The County Surveyors Society (CSS) has agreed to this slight change in methodology for benching and to aid regional consistency. As a result of this regional, and possibly national, change in methodology for benchmarking purposes both the original CSS methodology and the highway links methodology was implemented in 2008/09 for the remainder of the LTP2 period.

8.11.14 The minimum network sample as set out in BVPI 178 guidelines was 5% of an authority's network. However it was felt that 5% of Somerset's substantial network (over 6000km) did not truly reflect the state of the network, therefore an increased sample size of 10% of the total network was introduced for the 2007/08 survey onwards. This increased sample size gives a more reliable indicator result and provides a satisfactory inspection regime (see 8.11.18)

The bridge stock represents the most significant asset within the PROW network. As of 27 January 2010 the current condition of the bridge stock is considered poor. 16 significant RoW bridges are closed as continued use would present a significant danger to the public.

Following the structural survey of vehicular bridges on the network, 111 are considered to be in a poor condition and 19 in a dangerous condition.

It is estimated that over the next 5 years £1,603,000 capital funding is required to address the necessary significant repair or replacement of 54no. vehicular bridges, 17no. stone arch bridges, 64no. bridges with a span of 6m-10m and 21 bridges with a span of over 10m.

Routine Maintenance

Routine maintenance on the RoW network is predominantly the repair or replacement of furniture and bridges, vegetation clearance (both scheduled annual clearance programme and ad hoc clearances) path surface reinstatement or improvement and drainage works. All maintenance works are prioritised as set out in Maintenance & Enforcement Policy (MEP) 1.1 and the Rights of Way Improvement Plan (RoWIP) Action 4.2 and has been further clarified by procedure document; Prioritisation of Public Rights of Way maintenance and enforcement work.

8.11.15 Exceptions to prioritisation procedure are:

- S130A HA 1980 allows members of the public to serve notice on the County Council to take action to remove certain obstructions from specific PRoW. If the complainant is not satisfied that the obstruction has been removed there is recourse to seek an Order from the Magistrates Court to remove the obstruction.
- S56 HA 1980 allows members of the public to serve notice on the county council requiring publicly maintainable highways and bridges to be repaired. The complainant can apply to the magistrate's court for an order requiring the county council to repair the route.
- Capital funded works for the repair/replacement of significant bridges and structures.
- Rights of Way development projects
- Annual vegetation clearance scheduled works

Network Inspection

8.11.16 LPI3 survey - The increase in sample size of the 'Ease of Use' indicator to 10% (see 8.11.15) ensures a complete inspection of the RoW network over a 10 year period. Each inspection covers 2.5% of the network each quarter, and highlights any outstanding maintenance issues, the 'Ease of Use' criteria categorise these issues, all issues are then prioritised and addressed accordingly.

8.11.17 Trails Audit - An enhanced inspection programme is in place for trails promoted directly by SCC. These are The Coleridge Way, West Somerset Coast Path and the River Parrett Trail which are audited twice per annum; issues arising are prioritised and addressed accordingly. All other promoted routes (i.e. Parish promoted walks) are covered within the 10 year network inspection programme.

8.11.18 Bridge Inspection - A separate maintenance regime has been established for all bridges on the Rights of Way network:

Table 8.11.3:Rights of Way bridge inspection overview

Bridge Type	Number (approx)	Standard inspection	Enhanced inspection	Inspection by
Fords and stepping stones	**31**	N/A	N/A	Covered in 10 yearly inspection
Culverts equal to or less than 2m span (excluding type 2 culverts)	**1098**	N/A	N/A	Covered in 10 yearly inspection
Non vehicular bridges equal to or less than 2m span (excluding culverts)	**980**	3 years	N/A	DC/ENPA/SCC
Non vehicular bridges, excluding stone arch bridges, span over 2m & equal to or less than 6m	**1516**	3 years	N/A	DC/ENPA/SCC
Non vehicular bridges, excluding stone arch bridges over 6m span	**274**	3 years	6 years	SCC RoW
Type 1 Bridges with private vehicular use equal to or over 2m span	**745**	3 years	6 years	SCC RoW (2 yr inspection only) SCC ST (6yr inspection only)
Type 2 Bridges with private vehicular use less than 2m span (inc multiple span culverts and culverts over 1m span)	**24**	3 years	N/A	SCC RoW
Stone arch bridges non vehicular, over 2m span	**34**	3 years	6 years	SCC RoW (2 yr inspection only) SCC ST (6yr inspection only)
Total	**4702**			
Bridges include Bridle, causeway, culvert, foot, vehicular, other, sleeper, stone arch				

Note:

- Span refers to distance between parapets and not overall length of bridge
- Parties identified above as 'inspection by' are responsible for all appropriate actions following identification of any bridge defect.
- Other non-spanning structures such as stepping stones/ fords and culverts are deemed adequately low risk to be excluded from this regime and would be addressed within the network survey inspections.
- The first assessment of significant vehicular bridges on the RoW network by the Highways Structures Team has been completed. In total 470 bridges were surveyed and identified defects have been prioritised within the RoW 5 year bridge programme. 19 bridges were considered to represent a significant danger to the public and an additional 111 were considered to be in Poor condition.

8.11.19 **Other Structures Inspections** An inspection regime addressing all other structures on the Rights of Way network is to be established by 2010. This will primarily address the inspection of ROW retaining walls however other structures may also include tunnels and boardwalks, which are considered as requiring an enhanced inspection in addition to the 10% annual network inspection.

8.11.20 **Public Reports** The public report a significant proportion of network defects and issues, 3250 issues were reported during 2008/09.

8.11.21 **Parish Path Liaison Officer (PPLO) reports** There have been 470 fault reports logged by Parish Path Liaison Officers (PPLO) since the launch of the scheme in 2007.

Fault Resolution

8.11.22 The targets set within the RoW Service Plan for fault resolution following prioritisation (inclusive of all faults identified in Network Inspection are:

- High Priority faults to be resolved within 3 months
- Medium priority faults to be resolved within 6 month
- Low priority faults to be resolved within 12 months

Achievement of these targets is monitored monthly and areas of non-achievement are identified and addressed.

Renewal or replacement

8.11.23 *'It is the duty of the landowner to ensure that any stiles and gates are kept in a good state of repair. The County Council's duty only extends to ensuring that the landowner complies with this obligation and to provide a grant of 25% towards repairing or replacing such structures. The County Council has a discretionary power to extend this grant.'* - Highways Act 1980 Section 146.

8.11.24 *'When considering the replacement or installation of new gates and stiles, the County Council will seek the least restrictive option following the priority principle of BS 5709 of gap, then gate, then stile; The Council will not permit replacement furniture of a more restrictive character. Where the Council requests a less restrictive option it will seek to meet any extra costs involved (e.g. where a kissing-gate is installed to replace a stile) either from internal or external funding sources.'* - CroW Act 2000 Section 69 & Highways Act 1980 Sections 175A & 145' (extract from 1.3 SCC RoW MEP).

8.11.25 In line with the Disability Discrimination Act (DDA) & BS 5709 SCC encourages landowners to permit less restrictive furniture to replace existing limitations through RoW furniture removal/replacement procedure.

8.11.26 The County Council is responsible for most footbridges over natural watercourses, but where a public footpath or bridleway crosses a bridge, over which there are private vehicular rights the landowner and other interested parties may also be responsible for certain maintenance and repairs. The County Council may consider a discretionary grant towards these works. The Rail Authority, Environment Agency, British Waterways and other bodies retain maintenance liability for many of their structures, the County Council would make no contributory grant towards maintenance of these structures. The Council would still retain responsibility for the surface of the path over these structures.

8.11.27 Whilst there is no prescribed measure as to the condition of assets regarding their renewal or replacement it is considered that adequate measures are in place within the network, bridge and other structures inspection programmes to highlight required repair or replacement works to the appropriate field officer. The majority of reports of damaged furniture or failing structures are reported directly by the public.

Asset Lifespans

8.11.28 The following represents the expected lifespan of the most occurring assets on the rights of way network.

Table 8.11.4: PROW Asset lifespans

Asset	Estimated life expectancy (years)
Stile kit, pre morticed, tenoned & treated	20
Stile, timber cut & assembled on site	10
Timber treated signpost	25
Timber gates – treated (generic)*	20
Steel 1 piece gates* galvanised	35
Steel 2 in1gates pedestrian galvanised	25
Steel 2 in 1 gates bridle galvanised	20
Timber framed steps	10 –15 years before significant repair
Treated timber bridge kits	20
Timber sleeper bridge	15
Steel framed bridge kits	>35 dependent upon routine timber component replacement
Stone/masonry bridge	>100 dependent upon routine maintenance
Sealed surfaced paths	25 years before significant repair
Compacted stone paths	5-10 years before significant repair
Unsurfaced footpaths	N/a

* There are many further variations within these broader categories.

Upgrading

8.11.29 Where replacement of an existing asset is required SCC considers replacing timber furniture and bridge with steel equivalents (particularly steel pedestrian/kissing/bridle/field gates, and bridges) for improved structural reliability and extended lifespan. In some locations (within Areas of Outstanding Natural Beauty (AONBs) and Exmoor National Park (ENP)), or at landowners request timber furniture is retained. Steel components of bridge usually have timber elements (deck and handrails) as this is aesthetically pleasing. There is an initial cost benefit in using timber components on steel bridges although these parts will require routine maintenance & replacement. However these timber components do have a shorter lifespan compared to wholly steel structure.

8.11.30 In locations where frequent repairs or replacement are required specification upgrades are considered. For example frequently vandalised stiles may be replaced with steel alternative, frequently stolen roadside timber signposts may be replaced by aluminium signs fixed into a concrete base.

Disposal

8.11.31 In line with the DDA, when considering the replacement or installation of new gates and stiles, the County Council will seek the least restrictive option following the priority principle of BS 5709 of gap, then gate, then stile.

8.11.32 Where bridges and other structures are no longer required (i.e. through diversion of watercourse, development etc) obsolete assets will be removed by appropriate third party or by the county council.

8.11.33 The county council does not have any power to remove lawful limitations on the network without landowner consent. However should representation be made regarding unauthorised limitations, these will require either a retrospective authorisation or SCC will exercise its powers to remove obstruction. Approximately 5 unauthorised structures are removed per annum under enforcement procedures.

8.11.34 Surfaced RoW are often maintainable by a third party. It is estimated that of the 1117km of surfaced RoW (sealed surfaced & mixed/tarmac) approx 30% may be maintained by the Highways department, the remaining 70% privately maintainable. However in many cases the absence of any such agreement or evidence of third party interest, necessitates the repairs to be carried out by SCC in order to meet our duty of care.

8.11.35 Ways over which there are private vehicular rights will receive no higher level of maintenance other than is necessary for the use which is made of the path by the public. *See 1.4 SCC RoW MEP*

8.11.36 Annual vegetation clearance is currently the second greatest expense from maintenance revenue. A continuous review of annual vegetation clearance will ensure that any potential cost saving, from a reduction in length or number of cuts are made where appropriate.

8.11.37 Following completion of project to assess the condition of 470 RoW bridges with a span over 2m which can potentially carry vehicles; it should be considered whether the inspection and/or maintenance liability of some significant bridges could be transferred to Highways Structures team for greater consistency of asset management.

Performance Monitoring

8.11.38 The performance indicator relating to the maintenance of the Rights of Way network is ‘Ease of Use’, formerly BVPI 178. ‘Ease of Use’ is a Local Performance Indicator (LPI3) in LTP2.

8.11.39 A review of fault resolution achievements as set out in the Service plan is carried out monthly.

Performance gaps

8.11.40 Current performance measurements of Ease of use and monthly fault resolution achievement reviews are considered sufficient to measure service performance at present.

Future developments

8.11.41 Address transfer of maintenance & enforcement function from SSDC & MDC to SCC, to ensure service provision is not compromised.

8.11.42 Address Bridge Programme Capital funding shortfall

8.11.43 Further liaison within SCC & with Local Planning Authorities to improve procedure for RoW input into significant developments.

8.11.44 Cross check that there is no duplication of inventory with the current highways structures database.

8.11.45 Finalise the division of responsibility for surface maintenance of surfaced paths.

8.11.46 In liaison with Highways Structures team further consider whether inspection and maintenance of the most significant bridges could be transferred to Highways Structures team for greater consistency of asset management.

Climate change implications

8.11.47 An increase in flash floods and raised water levels will threaten riverside paths potentially undermining riverbanks carrying PROW. As of Autumn 2009 there are 3 know riverbank collapses carrying PRoW, all requiring significant remedial works to restore.

8.11.48 Higher sea levels and storm surges will have a similar effect on our coastal paths. The majority of these paths are promoted as part of the West Somerset Coast Path and it is necessary to carry out any remedial works on a high priority basis.

8.11.49 Increased flow and higher water levels may result in a higher number of bridge failures.

8.11.50 Flash floods and periods of heavy rainfall also cause washout and significant deterioration of PRoW surfaces, particularly compacted stone surfaces. Significant damage can occur in a very short period, in some cases washout debris is deposited onto an adjoining county road, therefore presenting a risk to road users.

8.11.51 A higher frequency in the occurrence of storms and high winds could cause more wind-felled trees to obstruct PROWs.

8.11.52 There are various preventative measures that can be taken to reduce the impacts of flash flooding/ surface wash out and riverbank erosion however these would require a significant capital investment in the network.

8.12 Lifecycle planning – Ancillary assets

8.12.1 Safety Fencing

Introduction

8.12.1.1 Safety Fencing is provided to protect highway users from road traffic or hazardous locations.

Creation or acquisition

8.12.1.2 This asset is created or acquired due to the following:

- Adoption of new roads;
- New schemes;
- Safety improvements;
- Change in code of practice/standard.

8.12.1.3 Safety fencing shall be designed in accordance with:

- BS7669: Part 3: 1994/TD19/06;
- Delivering Best Value in Highway Maintenance – Code of Practice for Maintenance Management (The Code of Practice).

Condition monitoring/Routine maintenance

8.12.1.4 Routine maintenance inspections are undertaken in accordance with BS 7669: Part 3. Inspections of safety barriers are undertaken every 2 years. (New installations are inspected after 5 years then every 2 years). Mounting heights are checked every 5 years. Tensioning bolts of steel tensioned safety fence are checked and reset to correct torque every 2 years (in conjunction with routine maintenance inspection).

Renewal or replacement

8.12.1.5 Routine maintenance inspections will identify where renewal of part or all elements of a safety fence installation is required. The majority of safety fence repairs result from road traffic accidents where the integrity of the installation is affected.

Upgrading

8.12.1.6 There are various safety fence installations within the County which do not conform to current standards. The risk log details the proposed actions (see Appendix 4, page 172).

Disposal

8.12.1.7 Safety fencing is provided for a specific purpose and will only be decommissioned and/or demolished if proved by safety audit that it is not required. Disposal is normally considered in association with the disposal or significant redesign of the asset the safety barrier protects.

Asset lifecycle options

Table 8.12.1.1: Life of safety fence asset

Type	Life of Asset (years)
Open Box Beam	15
Untensioned Corrugated Beam	15
Tensioned Corrugated Beam	15
FlexBeam	15

8.12.1.8 The table below details the lifecycle options for safety fencing:

Table 8.12.1.3: Lifecycle options

Do minimum	1. Routine maintenance only e.g. re-tensioning and replace bolts 2. Repair RTA damage, considering integrity of adjoining lengths
Medium-life treatment	1. Planned replacement of isolated sections of fencing.
Long-life treatment	2. Planned replacement of total lengths of safety fence.

8.12.1.9 SCC issues annual needs based budgets and an initial allocation of £50,000 has been defined for the maintenance of safety fences. This allocation is not sufficient to maintain all safety fencing therefore repairs have to be prioritised.

8.12.1.10 There is no capitalised budget for the structural maintenance of safety barriers. All works on this asset type is normally undertaken as routine in response to safety/service inspection.

8.12.1.11 Occasionally installation or upgrade is undertaken as part of works on another asset such as structures. In these circumstances the cost is borne by that scheme.

8.12.1.12 SCC has identified that a safety fencing policy needs to be defined to ensure design, build and maintenance of the asset is managed. This policy is currently being formulated. The policy will be used to aid future lifecycle analysis. An assumption to the age of the stock, together with a whole life cost strategy for their renewal, will also have to be established.

8.12.2 Cattle Grids

Introduction

8.12.2.1 A Cattle Grid is a grid of parallel metal bars designed as an obstacle to prevent hoofed animals from passing while allowing vehicles to pass unhindered. Cattle Grids also have an associated gate to allow passage for horses and movement of live stock.

Creation or acquisition

8.12.2.2 This asset is created or acquired due to the following:

- Adoption of new roads
- New schemes
- Safety improvements
- Change in code of practice/standard

8.12.2.3 New cattle grids should be designed in accordance with:

- BS4008:1991

8.12.2.4 Somerset's existing cattle grids are detailed in Table 8.12.2.1 (see Appendix 4, page 179).

Condition monitoring

8.12.2.5 Routine maintenance inspections are undertaken annually by a trained highway inspector.

Maintenance

8.12.2.6 BS4008:1991 states that maintenance requirements for cattle grids fall into 3 categories:-

i) Condition of structural components;

ii) Damage to bypass facilities;

iii) Routine maintenance.

8.12.2.7 Maintenance

a) Structure members should be checked for corrosion, wear and deformation and replaced where necessary.

b) Guard fencing, gates and ancillary equipment should be inspected and maintained to ensure their proper function.

8.12.2.8 Routine maintenance

a) Fixings should be checked and tightened where vibration may cause loosening of structural members.

b) The pit should be kept clear of weeds, leaves rubbish and debris to deter stock from attempting to cross. Ideally cattle grids should be cleansed at the same time as the annual gully emptying operations.

c) Associated signing replacement or repair.

Renewal or replacement

8.12.2.9 Routine maintenance inspections will identify where renewal of part or all elements of a cattle grid is required.

Upgrading

8.12.2.10 There are various cattle grid installations within the County which do not conform to current standards. The risk log details the proposed actions.

Disposal

8.12.2.11 Cattle Grids are provided for a specific purpose and will only be decommissioned and/or demolished if proved by safety audit that it is not required.

Asset lifecycle options

8.12.2.12 The table below details the lifecycle options for arrester beds:

Table 8.12.2.2: Lifecycle options

Do minimum	Routine maintenance only e.g. empty cattle grid pit.
Medium-life treatment	Replace structural members.
Long-life treatment	Total replacement/upgrading of cattle grid.

8.12.3 Arrester Beds

Introduction

8.12.3.1 An Arrester Bed (or 'escape lane') is designed to stop errant vehicles, usually on steep gradients.

Creation or acquisition

8.12.3.2 This asset is created or acquired due to the following:

- Adoption of new roads
- New schemes
- Safety improvements
- Change in code of practice/standard

8.12.3.3 Arrester Beds should be designed in accordance with:

- DoE – Design Manual for Roads and Bridges – Technical Advice Note Volume 6 TA57/87

Condition monitoring

8.12.3.4 Routine maintenance inspections are undertaken every 3 months by a trained highway inspector.

Maintenance

8.12.3.5 Technical Advice Note TA 57/87 states that the maintenance requirements for arrester beds fall into two categories:

i) Works required following the use of the beds

ii) Routine maintenance

Maintenance due to usage

a) When a vehicle uses the facility, bed material may be thrown onto the carriageway and this may constitute a nuisance or danger to pedestrians and traffic. Removal by road sweeping will be required.

b) Raking is necessary to reshape, smooth the surface and loosen the aggregate after each use.

Routine maintenance

a) Periodic replacement of the bed material will be necessary when accumulated fines alter the grading of the material.

b) Weed control is required to prevent vegetation taking root and affecting the arresting function of the bed material.

c) Cutting back of vegetation which is encroaching the arrester bed.

d) Associated signing replacement or repair

Renewal or replacement

8.12.3.6 Routine maintenance inspections will identify where renewal of part or all elements of an arrester bed is required.

Upgrading

8.12.3.7 The upgrading of arrester beds (e.g. to conform to current standards) has been identified as an option for the future. The risk log details the proposed actions.

Disposal

8.12.3.8 Arrester Beds are provided for a specific purpose and will only be decommissioned and/or demolished if proved by safety audit that it is not required.

Asset lifecycle options

8.12.3.9 The table below details the lifecycle options for arrester beds:

Table 8.12.3.2: Lifecycle options

Do minimum	Routine maintenance only e.g. cut back vegetation, scarify gravel bed.
Medium-life treatment	None identified.
Long-life treatment	Total replacement of arrester bed.

8.12.4 Depots

Creation or acquisition – Build or purchase a new asset

8.12.4.1 Demand for highway depots arises from the need to store materials, equipment, fuel and plant in a convenient location for delivery of highway maintenance services. Without depots the contractor would be prevented from working effectively and efficiently with a consequent increase in cost. Depots also provide changing and showering facilities for operatives, including drying rooms for wet personal protective equipment.

8.12.4.2 Depots have been created and acquired over many years and their existence is highly valuable to SCC. To create a new depot a number of hurdles have to be jumped, the most difficult being acquisition of capital , finding a suitable site and obtaining planning permission for what is, in effect, a bad neighbour.

Routine maintenance – Carry out routine maintenance to maintain the asset in a serviceable condition

8.12.4.3 Depots form part of the property asset managed by SCC Property Services. They are subject to annual inspection where defects and maintenance needs are identified and prioritised and, when funding permits, maintenance works are carried out. Decisions about frequency of inspection and prioritising maintenance are taken by Property Services having regard mainly to the protection of the asset infrastructure. For example, a leaking roof will always take priority over deteriorating paintwork.

8.12.4.4 Depots also house a considerable number of staff from the contractor and from SCC. These offices are treated in the same manner as any other SCC office. However, for the contractor's areas a full repairing lease operates so the cost of some of the maintenance falls to the contractor.

8.12.4.5 Depots contain facilities such as wash down bays, material storage bays and overhead lighting which need maintenance from time to time. These facilities are not generally inspected in building surveys and their creation, maintenance and replacement is generally identified by operational staff

Renewal or replacement – Carry out work to return the asset to its "as new" capacity and condition

8.12.4.6 Occasionally depots are sold off and replacements built. This is rare for the reasons above.

8.12.4.7 There is a need for a depot in Taunton. Under the current contract this is provided by the contractor, maintenance and replacement will be managed, funded and undertaken by the contractor at no additional cost to the council.

8.12.4.8 **Upgrading – Improve the asset above its original standard**

8.12.4.9 Upgrading will occur occasionally; e.g. SCC has recently added salt barns to some depots.

Disposal

8.12.4.10 SCC does not intend to dispose of any depots. However, in the event of a disposal, SCC would seek to maximise the capital sum from the sale. It could not be assumed that the capital sum would be available for a replacement.

Non-Asset options – Manage demand

8.12.4.11 This is not really an option, unless a contractor were to decide that his usage was not going to be as great as current usage.

Treatment options – Maintenance

8.12.4.12 Depots are mainly leased to the contractor. There is little choice in maintenance options. SCC is required to invest in maintenance of the infrastructure to avoid major repair bills, and to maintain all of the operational parts of the depots. Otherwise SCC may be in receipt of a compensation claim from the contractor who is unable to operate effectively on the highway because of a lack of maintenance.

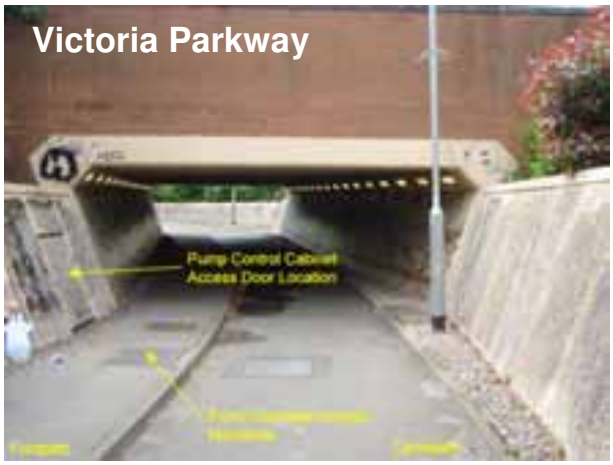
8.12.4.13 The maintenance recommendation would be to continue the current maintenance regime.

8.12.5 Lifecycle planning – Pumping Stations

Introduction

8.12.5.1 Somerset County Council is responsible for a very limited number of the pumping stations in Somerset.

8.12.5.2 The asset provides positive drainage intervention at locations where gravity methods are not adequate. This enables unfettered usage of specific subways and underpasses by the general public and/or the management of the County's highway and private property flooding liabilities. These specific locations are:



Ref	Name	Location	Function
2231001	Tone Subway (no 3)	Taunton	Subway flooding control
2231301	Obridge Subway (no 2)	Taunton	Subway flooding control
2231901	Victoria Parkway	Taunton	Subway flooding control
3300210	Huntworth Gate Business Park Sewage Pump	Bridgwater	Flooding liability to business park
4370201	Subway 1 Woods Batch	Street	Subway flooding control
4390503	Dyehouse Lane Culvert	Glastonbury	Retention pond balancing (Unconfirmed liability)
4390601	Lowerside Pedestrian Underpass	Glastonbury	Subway flooding control

Creation or acquisition

8.12.5.3 This asset is created or acquired due to the following:-

- New schemes;
- Adoption or ownership changes;
- Change in responsibilities.

Condition monitoring/Routine maintenance

8.12.5.4 Routine maintenance inspections will be undertaken in accordance with recommendations made by the specialist pumping station inspection engineer; this is expected to be yearly. Pumping station failures will be immediately investigated.

Renewal or replacement

8.12.5.5 Routine maintenance inspections will identify the immediate or planned maintenance requirements for each site.

Upgrading

8.12.5.6 Routine maintenance inspection findings, parts availability and pump effectiveness will dictate the need for upgrading.

Disposal

8.12.5.7 Pumping stations are provided for specific purposes at specified sites. It is not believed that current environmental trends will make these assets types redundant in the foreseeable future.

Asset lifecycle options

8.12.5.8 Pumping stations are a new asset type. Different sites utilise pumps from different manufacturers and until an inventory has been produced the asset life is unknown.

Table 8.12.5.2: Life of Pumping Station

Type	Life of Asset (years)
Pump manufacturer and type	Currently unknown
Pump control mechanism manufacturer and type	Currently unknown
Sumps – clean out	Currently unknown

8.12.5.9 The table below details the lifecycle options for pumping stations:

Table 8.12.2.3: Lifecycle options

Do minimum	• Repair as failures and site flooding occurs.
Medium-life treatment	• Undertake yearly maintenance inspections; replacing only failing or failed elements and parts. • Clean out sumps.
Long-life treatment	• Undertake the maintenance regime in strict accordance with the pump and hardware manufacturer's recommendations • Clean out sumps.

Asset lifecycle options

8.12.5.10 Currently this asset type is not allocated to a specific department nor does it have a budget assigned to it. The Highway Structure's section is using their budget to maintain this asset to the "do minimum" option; however, the subway and underpass sites require a more proactive management. Consequently the Highway Structure's section is looking at minimising the County's liability exposure by implementing a Medium-life treatment option for all confirmed SCC responsibility sites.

Winter service

8.12.5.11 Lifecycle plans have been developed for the following SCC owned assets that are used in the delivery of the winter service:-

- Dedicated gritters and snow ploughs;
- Demountable gritter bodies;
- Snow ploughs and blowers (farmers/contractors);
- Salt barns.

Dedicated gritters and snow ploughs, and demountable gritter bodies

Creation or acquisition

8.12.5.12 Dedicated gritters are purchased to either replace time-expired or uneconomic vehicles, or to expand the fleet to form a more expansive Precautionary Salting Network as a service enhancement. Any purchase of new vehicles provides an opportunity to take advantage of the latest technological advances and improvements with benefits for safety and efficiency.

8.12.5.13 Dedicated gritters are supplied with their own dedicated snow plough and spare ploughs are stored at each depot. Demountable gritter bodies are stored at each depot and fitted to general purpose highway maintenance lorries supplied by the service provider as required. They are supplied with a storage/installation frame and are generally used as a back up resource.

8.12.5.14 An inventory of dedicated gritters, snow ploughs and demountable gritter bodies and their locations is maintained in Appendix J of the 'Winter and Emergency Service Operations Directory', which is revised and republished annually.

Routine maintenance

8.12.5.15 Routine servicing of dedicated gritters takes place on a regular basis. In addition minor and major repair work is undertaken on a reactive basis as problems come to light. These tasks are generally carried out by the fitters based at each depot workshop.

8.12.5.16 Basic safety checks are carried out by the drivers prior to each operational run and the vehicles are washed down at the end. However the later practice is currently being phased out with the introduction of the use of 'Safe Coat' salt by Salt Union where the inclusion of a small amount of molasses into the mix gradually produces a protective coating on the metalwork which would be removed by washing down.

8.12.5.17 Under the current Network Management Contract charges for these services are made on a fixed rate p.a. per vehicle with the rate increasing with the age of the vehicle.

Renewal or replacement

8.12.5.18 As the vehicle age increases the condition deteriorates due to wear and tear, corrosion and accident damage. Routine maintenance costs increase in line with the contract and reliability problems and breakdowns also increase with implications for the effective delivery of the service. The effect of these problems is monitored by means of the monthly Winter and Emergency Service Project Meetings where major and minor breakdowns and the KPI for 'Completion of Routes in 2.5 Hours' (generally indicative of vehicle reliability) are reported.

8.12.5.19 From past experience, the optimum replacement period for gritters is around twelve years and the ongoing projected costs of these purchases should be allowed for in forward budgets. Demountable gritter bodies and spare snow ploughs have longer typical life spans due to their simpler technology and less frequent usage.

Upgrading

8.12.5.20 There is continual development in the competitive gritter manufacturing and supply industry. Planned replacement of the fleet presents an opportunity to take advantage of the latest developments and innovations in vehicle efficiency, driver comfort and safety, communications, corrosion protection, telemetry and salt distribution methods. Many of these innovations are available in a 'bolt on' format which provides opportunities for in-service upgrading.

Disposal

8.12.5.21 When the vehicles reach an age where they are uneconomic to maintain or become unacceptably unreliable they are disposed of by means of auction or scrapping.

Snow ploughs and snow blowers (farmers/contractors)

Creation or acquisition

8.12.5.22 Snow ploughs and blowers are purchased by SCC and supplied to farmers and contractors who are on the Service Provider's list of approved sub contractors for snow clearance operations on the highway, as and when directed by the Service Provider. They are purchased to replace time expired, damaged or unserviceable pieces of equipment or to increase the number of available farmers and contractors for this operation.

8.12.5.23 Due to the general increase in the capacity and power of modern agricultural machinery there has been a reduction in the size of the list. Consequently no new equipment has been purchased for some time, with any replacements being supplied by managing existing stock, and utilising spares stored at depots.

8.12.5.24 A summary inventory of snow ploughs and blowers is maintained in the 'Winter and Emergency Service Policy Plan', revised and republished annually. The Service Provider maintains a detailed inventory of the number and locations of whole snow plough stock.

Routine maintenance

8.12.5.25 Routine servicing and trial fitting to tractors of snow ploughs and blowers takes place annually. These tasks are carried out by fitters based at each depot, travelling out to farmyards or contractors' yards where the plant is stored.

Upgrading

8.12.5.26 Most practical upgrading would probably be covered under general routine maintenance (changing of skirts etc.). In terms of major upgrading it would probably be more cost efficient to replace with a new unit.

Disposal

8.12.5.27 When the vehicles reach an age where they are uneconomic to maintain or become unacceptably unreliable, they are disposed of by scrapping.

Non-Asset options – Investigate alternative de-icing products

8.12.5.28 The market for de-icing products should be kept under review taking into account costs/ benefits/environmental impact etc. Such products include:-

- Traditional rock salt
- Traditional rock salt pre-wetted with brine
- Traditional rock salt with added molasses

- Potash
- Directly applied brine
- Directly applied urea

Winter service policy

The winter service policy should be kept under review taking into account changes in legislation, best practice advice, member and public expectations and available budget.

9. Work plans

9.1 SCC fully complies with legislation such as the Traffic Management Act (TMA) concerning the expeditious movement of traffic, and the New Roads and Streetworks Acts (NRSWA) where a duty to coordinate works is placed on Highway Authorities.

9.2 SCC has developed a Highway Scheme Proposal Register (HSPR), which can depict all highway scheme proposals together with Statutory Undertakers (SUs) works such as Gas, Water and Electricity etc. on map layers viewable by all staff.

9.3 Scheme proposal lists (work banks) are necessary to plan effectively and manage the highway network, aiding in compliance with the above legislation. Once scheme lists have been finalised, they are entered into the HSPR and can be viewed by the Traffic Management service in coordinating SCC's legislative duties.

9.4 The HSPR can be used to:

- Identify areas of conflict on the network;
- Filter schemes of a certain type;
- Filter schemes with different date information;
- Be read in conjunction with other layers such as events affecting the highway;
- Coordinate major works;
- Plan timing of works.

9.5 The HSPR has been developed to provide environmental information on biodiversity. This ensures all proposed works are checked against known sensitive areas, and the works structured and planned to minimise environmental impact, or ensure the correct environmental and wildlife licences are obtained.

9.6 The proposed highway scheme lists (see Appendix 4, starting page 179) should be treated as provisional, and may be subject to change dependent on budget allocations, clashes due to other priority works by SUs that may occur on the network, and the occurrences of major emergencies, which will require the diversion of funding.

10. Highway infrastructure asset valuation

10.1 "Whole of Government Accounting" (WGA) guidance requires that SCC values its highways, and that this value is contained within SCC's accounts. The TAMP takes account of national guidance namely;

- CSS Framework for Highways Asset Management, 2004 by the County Surveyors' Society (CSS) and Technical Advisors Group (TAG);
- Guidance document for Highway
- s Infrastructure Asset Valuation 2005 by the CSS/TAG Asset Management Working Group;
- Guidance document Local Authority Transport Infrastructure Assets Review of Accounting, Management and Finance Mechanisms, published in 2010 by the Chartered Institute of Public Finance and Accountability (CIPFA).

10.2 The need for asset valuation is described as:

- Emphasising the need to preserve highway infrastructure by placing a monetary value on it;
- Demonstrating good stewardship by monitoring assets over time;
- Supporting WGA, and promoting greater accountability, transparency and improved stewardship of public finances;
- Supporting highway asset management;
- Placing the value of highway assets in context with other SCC assets.

10.3 Asset valuation is the calculation of the current monetary value of an asset. This value is defined as the Depreciated Replacement Cost (DRC), which is the Gross Replacement Cost (GRC), less the Accumulated Asset Consumption (AAC) where:

- The GRC is the cost of replacing the asset with a Modern Equivalent Asset, using standardised unit rates;
- The AAC is the depreciation in value due to ageing, usage, deterioration, damage, reduced service levels and obsolescence.

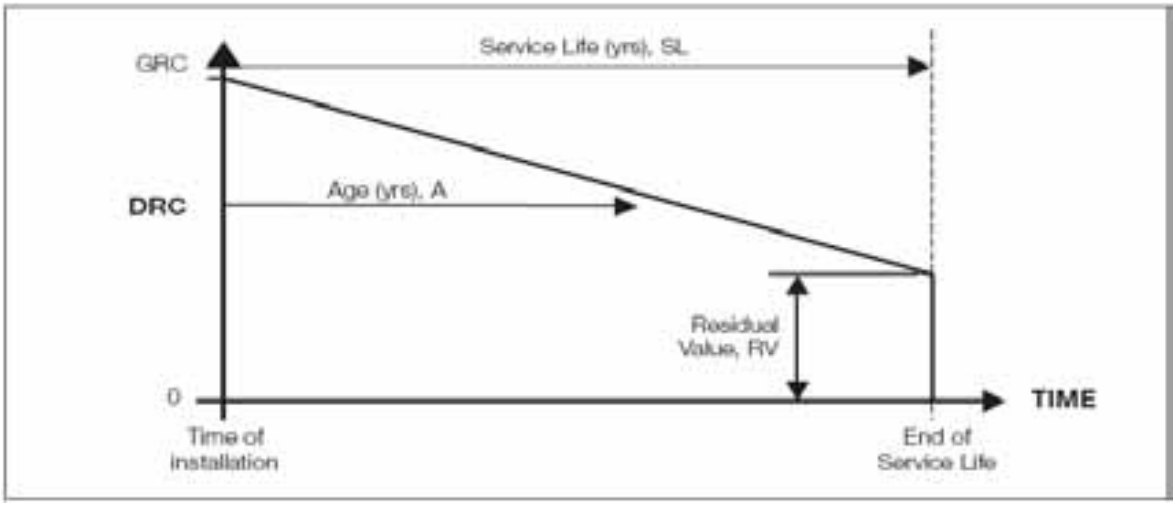
10.4 It is worth noting that in this TAMP the AAC is not equivalent to the backlog. The backlog is the value of work required to achieve the desired levels of service. This will be calculated in future versions of the TAMP when the required levels of service have been set.

10.5 Two different methods of valuation are used for highway assets:

1. Unit rates are used to produce the GRC for the infrastructure asset that, as a whole, is maintained at a specified level of service by the continuing replacement and refurbishment of its components. This is used for carriageways, including associated footways and minor assets such as lines, signs and drainage, and for highway structures. The depreciation is the level of annual expenditure needed to maintain the level of service of the asset. This is known as Renewals Accounting
2. Modern Equivalent Asset costs are used to calculate the GRC for assets that have finite service lives. These assets consist of traffic control systems, highway lighting and public rights of way.

10.6 A Conventional method for determining the depreciation of these asset types is employed using the age profile and the service life of the assets.

Graph 10.1: Typical straight line depreciation used in Conventional valuation



At the time of installation the asset has its as new value (GRC) over time this value steadily reduces until at the end of its life its only value is its scrap value or residual value.

Unit rates

10.7 SCC has been proactive in this process, working with others in the Southwest to derive and agree regional unit rates for Gross Replacement Cost (GRC) of the roads and structures elements. These have then been maintained using the Baxter Indices. Baxter Indices are used in building, specialist engineering and civil engineering contracts to allow for changes in the cost of labour, plant and materials. Future versions of the TAMP are likely to use generic unit rates provided by CITFA.

Table 10.1: South West asset valuation unit rates

Asset group	Work type	GRC rate unit	GRC rate				
			Initial value	Baxter Indices			
				1.0556	1.0612	1.0342	1.0200
			2005/06	2006/07	2007/08	2008/09	2009/10
Carriageway	New and Full Recon	£ /sq m	216	228	242	250	255
Bridge	New Build	£ /sq m	2782	2937	3117	3223	3287
Footbridge	New Build	£ /lin m	5229	5520	5858	6058	6179
Retaining wall	New Build	£ /sq m	1878	1982	2104	2176	2220
Culvert	New Build	£ /sq m	794	838	889	920	938

Carriageway valuation

10.8 The carriageway is by far the most valuable component of the highway asset.

Table 10.2: Carriageway valuation

Asset type	Quantity	Units	Unit Rate £	GRC £
Carriageway	32,115,619	Square metre	255	8,189,482,845

Table 10.3: Carriageway accumulated asset consumption (AAC)

A Roads		
	2010	Defect free
Cost to remove SCRIM defects	£10,036,337	
SCRIM condition		5%
Cost to remove network defects	£17,403,628	
Network condition		0%
Total cost	**£27,439,965**	
B Roads		
	2010	Defect free
Cost to remove SCRIM defects	£3,388,692	
SCRIM condition		5%
Cost to remove network defects	£13,865,508	
Network condition		0%
Total cost	**£15,628,804**	
C Roads		
	2010	Defect free
Cost to remove network defects	£105,770,970	
Network condition		0%
Total cost	**£105,770,970**	
U Roads		
	2009	Defect free
Cost to remove network defects	£17,321,190	
Network condition		0%
Total cost	**£17,321,190**	
All roads total		
		Defect free
Total road cost	£167,786,325	
Minor road assets depreciation*	£33,120,000	
Total carriageway AAC	**£200,906,325**	

*Lines, signs, drainage etc. – estimate

Table 10.4: Carriageway gross depreciated cost (DRC)

Asset type	GRC £	AAC £	DRC £
Carriageway	8,189,482,845	200,906,325	7,988,576,520

Structures valuation

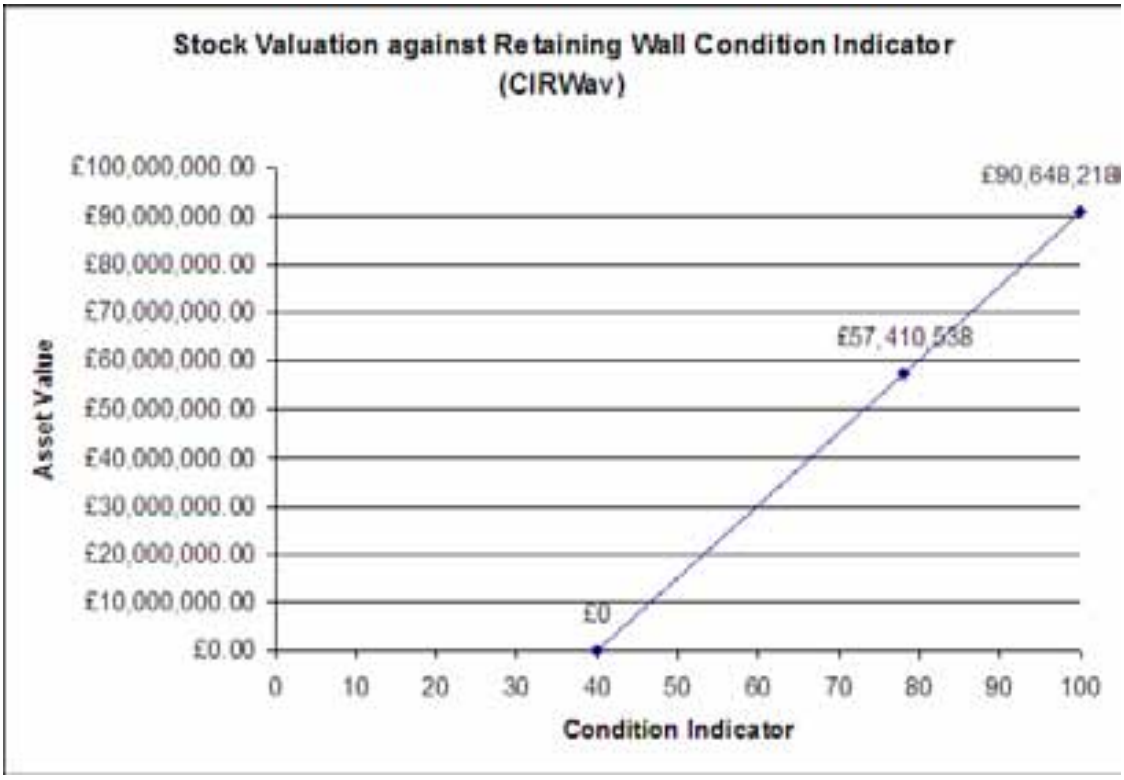
Table 10.5: Structures Asset Valuation

Asset Type	No. of Asset	No. of Units	Units	Unit Rate	GRC (£)	CLAV	DRC (£)	AAC (£)
Bridge (span > or = 1.5)	1087	77131	sq m	3,287	253,529,597	84.16	186,611,338	66,919,452
Multi span bridge (largest span > or = 1.5)	187	36994	sq m	3,287	121,599,278	84.16	89,504,337	32,096,556
Culvert (span 0.9 to 1.5)	543	19450	sq m	938	18,244,100	84.16	13,428,601	4,815,541
Multi span culvert (largest span < 1.5)	79	4693	sq m	938	4,402,034	84.16	3,239,806	1,161,805
Road drainage (single spans less than 0.9)	62	1704	sq m	938	1,598,352	84.16	1,176,708	421,972
Tunnel	5	76	sq m	3,287	249,812	84.16	182,816	65,558
Underpass/Subway Pedestrian	17	1453	sq m	3,287	4,776,011	84.16	3,515,697	1,260,741
Underpass/subway vehicular	8	581	sq m	3,287	1,909,747	84.16	1,406,547	504,393
Special structure - irish ford	11	31	sq m	938	29,078	84.16	21,634	7,758
Special structure - ford	84	237	sq m	938	222,306	84.16	163,734	58,716
Special structure - footbridge (with fords)	19	1045	lin m	6,179	6,457,055	84.16	4,753,256	1,704,533
Structural earthworks/reinforced soils	22	38	sq m	2,220	84,360	78	53,147	30,769
Retaining wall with retained height 1.5 or greater	6	39997	sq m	2,220	88,793,340	78	56,236,174	32,557,785
Retaining wall with retained height less than 1.5	3	835	sq m	2,220	1,855,920	78	1,174,365	679,895
Totals					**503,750,990**		**361,468,160**	**142,282,830**

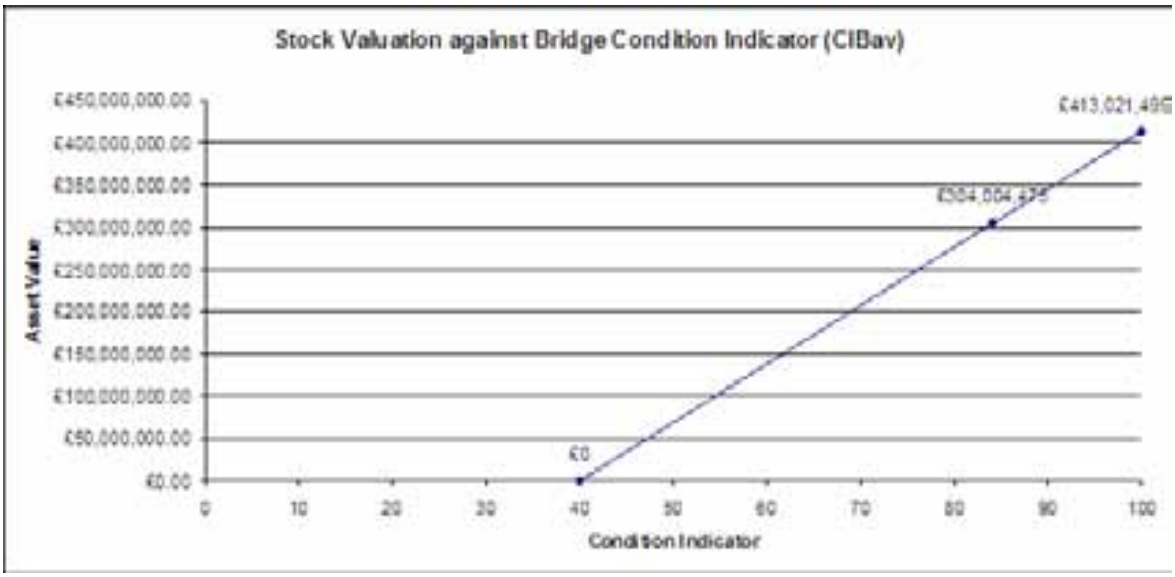
Structures accumulated asset consumption (AAC)

10.9 The Accumulated Asset Consumption (AAC) (Depreciation) has been valued £142,282,830 for all structures. Therefore, the depreciated replacement cost has been estimated to be £361,468,160. The graphs below show that there is variation in the Condition Indicator components (bridges and walls) of the calculated depreciation.

Graph 10.2: Stock valuation against retaining wall condition indicator (CIRWav)



Graph 10.3: Stock valuation against bridge condition indicator (CIBav)



10.10 The calculation of consumption was based on there being a linear relationship between the gross replacement value of the asset at a BCI value of 100 and a zero valuation at a BCI value of 40. This enabled the consumption to be calculated given that the current average BCI value is 82. Further work has now been carried out by others in order to determine a methodology for the amount of work required to restore the average condition of the bridge

stock to the optimum figure. This approach is likely to be more realistic than assigning a design life of 120 years to highway structures and assuming a linear deterioration over time, given that most highway structures have an indefinite life. However, this does not apply to components, and further work is required to consider the effect of component deterioration on the asset value.

10.11 Restoration of the bridge stock to a defect free condition is not an entirely realistic proposition. Whilst work will be targeted to improve the overall condition, the investment will be directed at reducing the 'backlog' of significant structural defects and shortfalls, so that the structures can be deemed fundamentally safe and fit for purpose.

Table 10.6: Structures gross depreciated cost (DRC)

Asset type	GRC £	AAC £	DRC £
Structures	503,750,990	142,282,830	361,468,160

Highway lighting

Table 10.7: Valuation

Asset Sub-Group	Quantity	Units	Unit Rate £	GRC £
Columns	46,622	No.	1150	53,608,450
Illuminated Signs (Including Bollards)	6388	No.	600	3,832,800
Wall Lights	1022	No.	800	817,600
Cable Repair – units with Private Network	761	No.	1000	761,000
			Total	59,019,850

Table 10.8: Gross depreciated cost of highway lighting

Sub Group	Number Beyond Useful Life	% Beyond Useful Life	Remainder 50 % Through Life	50% Life Value £	Depreciated Asset Value £
Columns	11,605	24.89	35,017	20,132,200	20,132,200
Illuminated Signs (Including Bollards)	426	6.67	5,962	1,788,600	1,788,600
Wall Lights	0	0	1,022	408,800	408,800
Cable Repair – units with Private Network	0	0	761	380,500	380,500
				Total	22,710,100

Table 10.9: Accumulated asset consumption

Asset type	GRC £	AAC £	DRC £
Highway Lighting	59,019,850	36,309,750	22,710,100

10.12 The asset is valued using the Conventional Method as recommended in the Highway Infrastructure Asset Valuation Guide for formal reporting.

Table 10.10: Gross replacement cost

Sub-group	Quantities	Unit costs £000's	Gross replacement cost (GRC) £000's
Columns	46,622	1.15	53,608
Illuminated signs (Including bollards)	6,388	0.6	3,833
Wall lights	1022	0.8	818
Cabling repair – units with private network	761	1	761
Total	**54,793**		**59,020**

Table 10.11: Depreciated asset value

Sub-group	Number beyond useful life (Nov 2009)	Asset value £000's	% beyond useful life	Remainder 50% through life	50% Life value £000's	Depreciated asset value £000's
Columns	11605	0	24.89	35,017	20,132	20,132
Illuminated signs (Including bollards)	426	0	6.67	5,962.	1789	1789
Wall lights	0	0	0	1,022	409	409
Cabling repair – units with private network	0	0	0	761	381	381
Total	**12,031**	**0**		**42,762**	**22,711**	**22,711**

Table 10.12: Variance from target depreciated asset value

Sub-group	Gross replacement cost (GRC) £000's	Depreciated asset value £000's	% value of GRC	Target depreciated asset value (50%) £000's	% variance from target
Columns	53,608	20,132	37.55	26,804	-24.89
Illuminated signs (Including bollards)	3833	1789	46.67	1916	-6.67
Wall lights	1022	409	40.00	409	0
Cabling repair – units with private network	761	381	50.00	381	0
Total	**59,224**	**22,711**	**38.35**	**29,510**	**-23.04**

Table 10.13: Projected depreciation based upon proposed spend at year 2018-19

Sub-group	Gross replacement cost (GRC) £000's	Depreciated asset value £000's	% value of GRC	Target depreciated asset value (50%) £000's	% variance from target
Columns	64,067	30,190	47.12	32,034	-5.76
Illuminated signs (Including bollards)	4581	1752	38.25	2290	-23.49
Wall lights	977	342	35.01	489	-29.98
Cabling repair – units with private network	909	318	35.01	455	-29.98
Total	**70.534**	**32,602**	**46.22**	**35,268**	**-7.56**

Table 10.14: Projected depreciation based upon proposed spend at year 2023-24

Sub-group	Gross replacement cost (GRC) £000's	Depreciated asset value £000's	% value of GRC	Target depreciated asset value (50%) £000's	% variance from target
Columns	70,735	40,688	57.52	42,441	-4.13
Illuminated signs (Including bollards)	5057	1843	36.44	3,034	-39.27
Wall lights	1079	310	28.72	657	-52.86
Cabling repair – units with private network	1004	288	28.72	602	-52.14
Total	**77,875**	**43,128**	**55,38**	**46,734**	**-7.70**

Public rights of way valuation depreciation

Table 10.15: PRoW valuation depreciation

Sub-asset group	GRC £	Depreciation £
Path	44,310,000	549,000
Bridge	11,006,350	1,739,500
Furniture	8,632,600	420,000
Other	3,803,500	84,500
Totals	**67,752,450**	**2,793,000**

Table 10.16: PRoW gross depreciated cost (DRC)

Asset type	GRC £	AAC £	DRC £
PRoW	**67,752,450**	**2,793,000**	64,959,450

Traffic control systems valuation

Table 10.17: Traffic control systems valuation (estimate)

Asset type	GRC £m	Depreciation/ backlog £m	Current asset value £m	Comments re depreciation
Traffic control systems	52	27	25	Based on asset condition

Table 10.18: Traffic control systems gross depreciated cost (DRC)

Asset type	GRC £	AAC £	DRC £
Traffic control systems	52,000,000	27,000,000	25,000,000

Table 10.19: Estimated value of county asset (2008 prices)

Type	No.	Ave value £000s	Total value £000s
Junctions and shuttle systems	102	260	26,520
Stand alone Pelican/Puffin/ Toucan Crossing	118	60	7080
CCTV Sites	9	15	135
Vehicle Activated Signs	19	15	285
Bus Gates	2	80	160
ANPR Sites	14	15	210
County Hall Equipment	Systems – SCOOT, RMS, FMS, CCTV screens, dedicated BT lines hub etc.	N/A	500
Total	**264**	N/A	**34,890**

This asset value estimate of £35 million does not include the full cost of rebuilding and redesigning installations. It has been estimated based on current specifications, with no allowance for traffic growth. For instance a crossing currently provided for pedestrians has not been given an estimated value for conversion to enable cycle use requiring land-take and significant civil engineering works. The estimated values are based on as-built replacement rather than all new design and build provision at a new site, which can cost substantially more.

Summary

Table 10.20: Highway gross depreciated cost, asset consumption and depreciated replacement cost

Asset type	GRC £m	AAC £m	DRC £m
Carriageways	8190	201	7990
Structures	504	142	361
Highway lighting	59	36	23
PRoW	68	3	65
Traffic control systems	52	27	25
Totals	**8873**	**409**	**8464**

10.13 The Gross Replacement Cost (GRC) for Somerset's roads is in the order of £8.9 billion with a cost to remove all defects of approximately £409 million.

10.14 The current valuation is based on carriageway and structural unit rates determined regionally in accordance with the CSS/TAG guidelines. The Highways Asset Management Financial Information Group (HAMFIG) and CIPFA and currently proposing the use of nationwide standard valuations based primarily on road length alone. If this proposed method of valuation is accepted nationally and used to calculate Somerset's GRC, the valuation is likely to be significantly lower than the valuation using the current method. Early indications show that this alternative valuation method would produce a GRC for Somerset of £5.5billion pounds.

10.15 The current asset value, the Depreciated Replacement Cost (DRC) can be used on an annual basis to monitor the stewardship of the assets. If the DRC increases, there is an underlying rise in the value of the highway asset; a decline in the DRC can indicate that not enough is being invested in maintaining the highway network. This in turn can be used to highlight the impact of effective budget allocation, and to forecast where expenditure can achieve the maximum benefit to the network.

11. Monitoring, review and improvement

Introduction

11.1 Carefully constructed performance measures are an essential asset management tool, helping to guide and inform decisions. Performance monitoring, review and improvement will be used:

- To drive forward and assist in service improvement;
- To ensure improvements are delivered in a robust and measurable way;
- To underwrite and demonstrate improvements, with output, outcome and public satisfaction performance measures;
- To enable external comparison and share best practice.

Monitoring

11.2 The following methods of performance monitoring will be used:

- Random Auditing: customer satisfaction surveys reflecting demand aspirations, sample condition surveys and ad hoc inspections;
- System Audits: performance management information will be driven from management software systems, such as Confirm;
- Monthly and Annual Monitoring: to obtain periodic performance statistics;
- Compliance Monitoring: contractual performance information.

Review

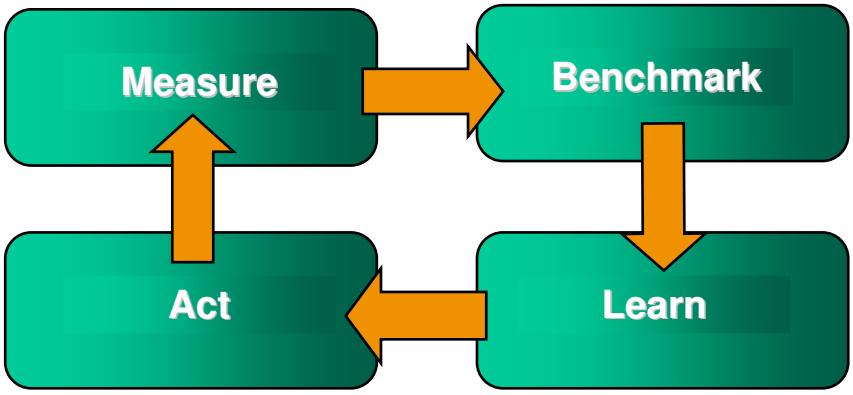
11.3 Asset Management is structured to support a process of continuous improvement. The performance monitoring and reporting regime will be used to review the plan and its processes. The review activities will include:

- Ongoing Performance Review – looking at the results, the factors contributing to performance, and the options for dealing with poor performance;
- Annual review – the TAMP will be reviewed and improved every year, with an expectation of having all sections fully developed by the 2011 TAMP.

Improvement

11.4 The preparation of this TAMP is enabling a series of key improvements to be identified, which will advance SCC's asset management practice. The improvement plan details the specific actions to be taken, and outlines which level of service the actions are intended to benefit. This will ensure that the focus is maintained on the outcome of the improvement, and the ultimate benefit it may provide to the customer.

11.5 Improvement can only be driven by a continuous improvement cycle of measuring, benchmarking, learning and acting on the data.



Improvement Plan

11.6 Areas identified for improvements fall into two distinct categories:

Development areas for inclusion in future versions of the TAMP

Levels of service

- Determination and agreement of costed stakeholder requirements for Levels of Service. This will be addressed in the next TAMP.
- Gap analysis of current Levels of Service and those required.
- Development of an asset condition level of service.

Prioritisation

- Gap analysis of the levels of service to form the basis of the prioritisation of budget allocation across different asset types.
- Develop cost benefit ratios for non-surfacing works.

Highway surface water drainage

- Look at development control issues including sustainable drainage systems (SUDs).

Traffic control systems

- Carry out full valuation and depreciation.

Highway infrastructure asset valuation

- Make amendments to valuation process resulting from CIPFA guidance and methodology on calculating valuations when published.

Recommendations arising from this TAMP

Prioritisation – Budget allocation

11.7 Capital expenditure is currently £25 million of which £4.5million is LTP2 improvements and Integrated Transport schemes. There is also £16.5 million of capital LTP2 funding, supported by a further £4 million from SCC, which is spent annually on structural maintenance schemes. Only £1.5 million of the LTP2 funding is grant. The remainder is borrowing supported by government. Revenue provision is included for a number of services, e.g. winter maintenance, routine and safety maintenance. In 2008/09 the revenue provision for works was £11.8 million.

11.8 Develop plan of action to use the £1 million Asset Management pledge from Atkins as part of the new contract.

Highway surface water drainage

- Identify and monitor performance indicators relating to the condition of the highway drainage system.
- Develop a list of ‘sensitive’ sites that require more frequent gully cleansing.
- Review highway flood map and correlate cleansing activity to known flooding problems on the highway network.
- Continue with mapping of drainage on to digital plans with regards to the Pitt report.

- Develop inventory for kerb outlets and develop a programme of regular maintenance for jetting and cleansing.
- Develop a local Surface Water Management Plan.

Traffic control systems

- A Level of Service framework needs to be developed so that the management of the assets are linked to a particular level of service.
- Asset information improvements to be made in collating and classifying asset information into route hierarchy, groups and sub-groups, for which appropriate condition information should be determined in line with the levels of service.
- A Maintenance strategy needs to be developed.
- Asset health performance indicators to be developed to facilitate the structural monitoring of the asset stock.

TAMP 2009 Improvement action plan

As part of the TAMP 2009 Improvement cycle specific action points were generated in order to improve asset management in Somerset. The outcomes of these action point are included under Appendix 5 and demonstrates how the process of creating and updating the TAMP on an annual basis drives improvement in Asset Management within Somerset.

Appendix 1 Glossary

The following list explains acronyms which appear in the 2010 Somerset TAMP

AAC	Accumulated Asset Consumption
AONB	Area of Outstanding Natural Beauty
BC	Benefit Cost Ratio
BCI	Bridge Condition Indicators
BD79	Highway structures: Inspection and maintenance. Assessment. Management of sub-standard highway structures
BOAT	Byways Open to All Traffic
BPIP	Bus Punctuality/Improvement Partnerships
BS	British Standard
BVPI	Best Value Performance Indicators
▪ **BVPI 100**	Number of days temporary traffic controls or road closures caused by road works per km of traffic sensitive routes
▪ **BVPI 178**	Ease of use of rights of way
▪ **BVPI 187**	Footway condition indicator
▪ **BVPI 224b**	Condition of Non Principal Roads (Unclassified)
▪ **BVPI 99c**	Total slight casualties
CCTV	Closed Circuit Television
CDM	Construction and Design Manual
CI	Condition Index
CIB	Condition Indicators for Bridges
CIPFA	Chartered Institute of Public Finance and Accountability
CIRW	Condition Indicators for Retaining Walls
CIST	Condition Indicator for Structure Stock
CRoW	Countryside and Rights of Way Act
CSS	County Surveyors Society
CVI	Coarse Visual Inspections
DC	District Council
DDA	Disability Discrimination Act
DfT	Department for Transport
DMBR	Highways Agency's Design Manual for Roads and Bridges
DoE	Department of Environment
DRC	Gross Depreciated Cost
DVI	Detailed Visual Inspections
ENP	Exmoor National Park
ENPA	Exmoor National Park Authority
ESRI	Environmental Systems Research Institute
EtoN	Electronic Transfer of Notices
FG	Field Gate
FMS	Fault Management System
GI	General Inspection
GIS	Graphic Information Systems
GPS	Global Positioning Satellite
GRC	Gross Replacement Cost
HA (1980)	Highways Act (1980)

HD	Highway Design
HERMIS	Highway Engineering Routine Maintenance Management System
HLNMS	Highway Lighting Network Management System
HMIS	Highway management information system
HNMP	Highway Network Management Plan
HSPR	Highway Scheme Proposal Register
IB	Illuminated Bollards
ITFS	Illuminated Traffic Signs
ITS	Intelligent Transport Systems
KG	Kissing Gate
KPI	Key Performance Indicator
LAA	Local Area Agreement
LAs	Local Authorities
LDF	Local Development Framework
LED	Light Emitting Diode
LPI	Local Performance Indicator
LTP 8	Air Quality – Taunton and Yeovil
LTP2	Local Transport Plan
LTP3	Local Transport Plan (2011)
MCHW	Manual of Contract Documents for Highway Works
MEP	(Rights of Way) Maintenance and Enforcement Policy
MOVA	Microprocessor Optimised Vehicle Activation
MRM	Multi-Functional Road Monitor
NHDBVBC	National Highways Design Best Value Benchmarking Club
NI	National indicator
▪ **NI 168**	Principal road condition
▪ **NI 169**	Condition of Non Principal Roads (Classified)
▪ **NI 47**	Total killed and seriously injured casualties
▪ **NI 48**	Child killed and seriously injured casualties
NMD	Network Management Duty
NMP	Network Management Plan
NRSWA	New Roads and Streetworks Act (1991)
OS	Ordnance Survey
OSGRs	Ordnance Survey National Grid Coordinates
PI	Principal Inspection
PMS	Pavement Management System
PPE	Personal Protective Equipment
PPLO	Parish Path Liaison Officer
RAV	Road Assessment Vehicles
RCI	Road Condition Index
RMMS	Routine Maintenance Management Systems
RMS	Remote Monitoring System
ROR	Restructuring Or Resurfacing
RoWIP	Rights of Way Improvement Plan
RTC	Road Traffic Collision
SCANNER	Surface Condition Assessment for the National Network of Roads
SCC	Somerset County Council

SCOOT	Split Cycle Offset Optimisation Technique
SCRIM	Sideway-force Coefficient Routine Investigation Machine
SD	Surface Dressing
SE2	Salting before formation of ice (pre-salting network)
SEC	Southern Electric Contracting
SHBAP	Somerset Highways Biodiversity Action Plan
SSDC	South Somerset District Council
SUDS	Sustainable Urban Drainage Systems
SUs	Statutory Undertakers
SW B1	Bridge Stock condition indicator
SW B1a	Bridge stock condition indicator BCI average
SW B1b	Bridge stock condition indicator BCI critical
SW B2	% of bridges not meeting the required carrying capacity
SW B3	Availability (Introduced in 2005/06 but not widely adopted in the SW)
SW B4	Reliability (Introduced in 2005/06 but not widely adopted in the SW)
SW B5	Structures Workbank value (will become backlog when non essential work is deducted)
SW B6	% of capital bridge schemes delivering other benefits
SW SL1	% of streetlights not working
SW SL10	Total average cost of maintaining a street light
SW SL16	Estimated backlog as % of total stock (Street Lights)
SW SL2	Average number of failures per lamp per annum (Street lights)
SW SL3	% of failures due to SCC equipment (Street Lights)
SW SL31	% street lighting supports over 25 years old
SW TS2	% of premature lamp faults per year (Traffic Signals)
SW TS4	% of sites with more than 6 faults per annum (Traffic Signals)
TAG	Technical Advisors Group
TAMP	Transport Asset Management Plan
TaSTS	Towards a Sustainable Transport System
TCPA	Town and Country Planning Act
TCS	Traffic Control Systems
TD	Technical Directive
TLMC	Term Lighting Maintenance Contract
TMA	Traffic Management Act
TRL	Transport Research Laboratory
TRO	Traffic Regulation Order
TSRGD	Traffic Signs Regulations and General Directions 2002
UTC	Urban Traffic Control system
VM	Value Management
WC	Wheel Centre
WDM	*Not an acronym; a company contracted by SCC to conduct road condition surveys*
WGA	Whole of Government Accounting
WT	Wheel Track

Appendix 2 References

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- **Air Quality Action Plans (Taunton and Yeovil)**
- **Bridgwater Transport Strategy**
- **Countywide Parking Strategy**
- **Cycling Strategy**
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Winter and Emergency Service Operations Directory
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Contacts and obtaining information

Somerset County Council positively values diversity, and celebrates cultural and social differences. Our Equal Opportunities Promise is to provide all services of equal quality, which meet your needs and fulfil your rights. You can expect to be treated fairly, with respect, dignity and understanding, whoever you are, whatever your background.

A CD-Rom containing the document is available upon request. This document is also available on request in Braille, large print, tape and discs and can be translated into different languages; or we can provide a member of staff to discuss the details.

If you would like to discuss the TAMP in more detail, please contact:

Asset and Service Improvement Manager, David Jones on 01823 483075

or email: DLJones@Somerset.gov.uk

Alternatively you may write to:

42 Upper High Street,

Taunton,

Somerset,

TA1 3PY

www.somerset.gov.uk **June 2010**