Warwickshire Local Transport Plan 2011-2026

Transport Asset Management Plan

Version 1.2

April 2011

Warwickshire County Council

Prepared By:

Transport Planning
County Highways
Bridge Maintenance
Traffic Projects
Public Rights of Way

Contents

Foreword by Councillor Alan Cockburn

This is the County Council's second Transport Asset Management Plan (TAMP), and sets out how we intend to manage, maintain and improve the transport network in Warwickshire. The Plan covers all of the key transport assets which the County Council is responsible for, including carriageways, footways, highway drainage, street lighting, bridges, traffic signals, signs and public rights of way.

The transport system must be fit for purpose in order to serve the needs of local residents, business and those visiting the area. Increasingly we need to manage and maintain the network to respond to environmental change, particularly extremes of weather. We must ensure that we invest in the transport network in a timely manner, and that the resources which we have available are used to provide the maximum benefit both now and in the future. Ensuring the ongoing safety of all users of the transport network remains a high priority for the County Council.

It is not intended that the Plan be a static document. The Action Plan sets out a programme of improvements, and these will be kept under review on a regular basis.

We look forward to delivering the Plan in conjunction with our partners.

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Chapter 1 – Introduction

1.1 What is Asset Management?

1.1.1 Asset management is a strategic 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 users of the transport network.

1.1.2 Asset management has been an established process within Warwickshire for almost 40 years. The County Council was one of the first local authorities to introduce condition assessments in the 1970's for all of its carriageways. The assessment systems have changed over the years, but the results have helped ensure that money for structural maintenance has been targeted at the most appropriate roads. Similar processes have been adopted for other key assets, particularly in planning for their life-cycle replacement.

1.1.3 Quality management of the network is fundamental to the economic, social and environmental vitality of a community. The County Council recognises that maintenance solutions that are achievable must evolve to ensure that best value and best practice are realised for future generations.

1.1.4 Successful asset management relies on good data. The County Council has relatively good data on most of its transport assets. For some assets data is comprehensive and current. For others, work is being undertaken to bring it up to a similar standard. Further improvements to the County Council's datasets on its transport assets are identified in this Plan.

1.2 What does asset management mean for the County Council?

1.2.1 The County Council is committed to applying the principles of asset management through the processes of long term planning and whole life costing, to ensure best value and smart future programming and funding decisions are taken. Key elements of infrastructure asset management include:

- Taking a life-cycle approach;
- Developing cost-effective management strategies for the long term;
- Providing defined levels of service and monitoring performance;
- Managing risks associated with potential asset failures;
- A sustainable approach to the use of physical resources; and
- Continuous improvement in transport asset management practices and processes.

1.3 Other Asset Management Initiatives

1.3.1 The County Council has a Corporate Property Strategy which covers the period 2008-2018. This relates to all property owned by the Authority, and includes facilities such as highway maintenance depots. This Transport Asset

Management Plan (TAMP) should be viewed as a daughter document to the Corporate Property Strategy.

1.4 What is the Purpose of the TAMP?

1.4.1 The County Council recognises that ensuring the condition and safety of the transport network is a front line service which residents and visitors to the County expect. A good quality TAMP will assist the Authority in understanding the value and liability of the existing asset base, and allow decisions to be made in an informed way that will not compromise its value for future generations. Through the adoption of smarter working practices, the County Council aims to bring about cost savings in terms of both ongoing investment in the existing transport network and its medium/long term renewal.

1.4.2 The TAMP aims to set out not only the practices and systems that are currently being applied to the management of the transport asset, but also the aspired levels of service and their associated funding requirements.

1.4.3 An asset management plan is a multi-disciplinary document that is designed to bring together a number of potentially disparate but related asset management activities such as planning, engineering and technical practices and financial management, with a view to delivering desired levels of service in the most cost-effective manner.

1.5 What are the main drivers behind the production of the TAMP?

1.5.1 The requirement to produce a TAMP was first highlighted in the Full Guidance on Local Transport Plans published by DfT in December 2004. This required all Transport Authorities to produce a statement in their Provisional LTP2 submissions on their proposed approach to producing a TAMP. Following further guidance from DfT, these statements were revised for the Final LTP2 submissions in March 2006. Guidance on the production of LTP3 issued by DfT in July 2009 reaffirmed the need for the TAMP to be reflected in the Local Transport Plan.

1.5.2 Work on the production of the County Council's first TAMP began in 2004. A project group was established to take forward the preparation of the Plan. This project group contained representatives from all of the main transport assets, including Highway Maintenance, Bridge Maintenance, Intelligent Transport Systems and Public Rights of Way. The County Council's Traffic Manager has also formed part of the group. Overall responsibility for the production of the TAMP was led by the County Council's Transport Planning Group, who are also responsible for preparing the Local Transport Plan.

1.5.3 The document has been reviewed by the original project group in order to produce a second iteration of the TAMP. As well as informing the preparation of LTP3, the review has served to bring the document up to date at a time when pressure on public sector funding has increased. It is hoped

that by having a current Plan, the Authority will be in a stronger position to deliver best value with the resources that it has available. The reduction in funding has implications not only for short term asset maintenance, but also for its medium and longer term replacement. This is particularly pertinent for assets such as traffic signals and street lighting.

1.6 Other Issues that the Plan is designed to highlight

1.6.1 In addition to the strategic aims of the TAMP set out above, the Plan aims to describe and explain a number of other issues, including:

- Identifying the range of services provided by the County Council in relation to transport and mobility, and explaining why we do what we do;
- Outlining any potentially significant negative effects arising from the activity, such as increased risk of liability claims or corporate manslaughter;
- Identifying the various assets which make up the overall transport network, how they will be managed in relation to future demand or changes in levels of service and standards (for example the demands which traffic growth places on the asset);
- Identifying additional asset capacity, and how this will be funded and delivered; and
- Identifying how the maintenance, renewal and replacement of assets will be undertaken and how the costs will be met, including highlighting where funding gaps are likely to occur in the future.

1.7 Why is Asset Management important?

Background

1.7.1 Asset management is now an established tool in the transport planning process. The Department for Transport have strongly indicated the need for Transport Asset Management Plans to be fully integrated into the third round of Local Transport Plan submissions.

1.7.2 Since 2006, all local authorities have been required to produce a valuation of their highway assets. Under these requirements, local highway authorities are expected to determine not only the value of their assets, but also monitor year on year whether they are depreciating or not following investment. There is therefore now an intimate relationship between asset management and asset valuation. Guidance on highway infrastructure asset valuation was published by the CSS in July 2005. Further guidance was produced by TRL in 2006. The Chartered Institute of Public Finance and Accountancy (CIPFA) has recently reviewed the accounting and finance arrangements for local government transport infrastructure assets, and found that comprehensive transport asset management could help deliver both efficiency gains and service improvements.

1.7.3 It appears at present that Government has no intention of using the valuations provided within TAMPs in Council accounts. These accounts

typically include a figure for infrastructure, which in effect includes an amount for transport quoted at a depreciated historical cost. It purports to be a figure for the value of infrastructure assets, but in reality it is only based on the amount of money that has been spent on assets since this type of accounting began in 1994. It is therefore not currently possible to directly relate the figures quoted in Council accounts to the value of the different transport assets set out in the TAMP. It is likely that in the future there may be pressure to use the figures within Council accounts. At this point, there will be a need to review the accuracy of the valuations provided within the TAMP, possibly including a benchmarking exercise across other authorities. Malcolm to review this section.

The Prudential Code

1.7.4 The prudential code provides the opportunity for authorities to undertake 'spend to save' projects where they can prove that this is the prudential approach for the council. Asset management is a critical element in the justification of any such measure for highway management.

Good Practice

1.7.5 Having a Transport Asset Management Plan is now considered a pre-requisite of delivering a good highway management service. It is therefore important that the County Council continually improves and reviews its asset management practices. This plan forms the cornerstone of the formal adoption of asset management principles and techniques within Warwickshire, and will be the tool used to benchmark our performance.

1.7.6 The process of asset management is in itself a tool that will enable continuous improvement. In addition to the requirements above, it is simply considered to be good practice and will enable the County Council to enhance the service which it provides.

Safety and Asset Management

1.7.7 The economic cost to the community of injury accidents in Warwickshire is around £200 million per annum. Improving the safety of a road through maintenance that gives high priority to proactive casualty reduction can save the community money. As such, the economic cost of injury accidents is an important consideration in asset management, because a safer road is a much more valuable asset *in monetary terms* than a less safe one.

1.8 Summary of the Asset

1.8.1 The County's transport network is made up of:

- 3,850km of carriageway;
- 2,638km of footway adjacent to the carriageway, and 193km of off-highway footway;

- 100km of unsurfaced unclassified E roads, and 5km of unsurfaced unclassified D roads;
- 2,800km of public rights of way, including footpaths, bridleways and byways open to all traffic;
- 1,447 bridges, of which 1086 are owned by the County Council;
- 106 retaining walls, of which 51 are owned by the County Council;
- 401 culverts, of which 383 are owned by the County Council;
- 120,000 gullies, an estimated 500km+ of pipes, and a currently unknown length of highway gully connections, carrier drains and ditch-courses;
- 48,890 streetlights;
- 5,211 assorted illuminated signs, 1,910 illuminated bollards and 240 Vehicle Activated Signs;
- 33 Variable Message Signs; and
- 301 traffic signal junctions and pedestrian crossings.

Figures in yellow to be confirmed

1.8.2 Along with the core assets set out in the this document, the County Council also has responsibility for a number of other transport facilities and infrastructure, including:

- Certain bus shelters within the County;
- A bus-based Park and Ride site in Stratford-upon-Avon;
- Land at specific public transport interchanges, for example the car park at Warwick Parkway and Coleshill Parkway railway stations and Atherstone Bus Station;
- An Urban Traffic Management and Control system in Stratford-upon-Avon;
- Cycle and motorcycle parking;
- Certain street furniture;
- Trees that grow within the limits of the public highway;
- Casualty Reduction Measures and safety barriers;
- Fences and hedges;
- Traffic Regulations Orders (lines and signs); and
- Records relating to the existence and extent of the public highway and the Public Rights of Way Network.

1.8.3 These assets continue to place a significant burden on the County Council in terms of their ongoing maintenance and replacement. Innovative ways of funding the maintenance of these assets have had to be adopted by the Authority.

1.8.4 Adoption of new roads provided to serve development and new transport infrastructure delivered through the LTP continue to expand Warwickshire's asset base year by year.

1.8.5 Details of the current condition of the core assets are set out in Sections 2-10 of this Plan.

1.9 Expenditure and Funding Needs

Capital Funding

1.9.1 Table 1.1 provides details of LTP and other capital expenditure that has been spent on maintenance in Warwickshire since 2006/07. Indicative allocations for highways capital maintenance between 2011/12 and 2013/14 are set out in Table 1.2.

Table 1.1 – Transport Capital Maintenance Funding, 2006/07 – 2010/11

LTP Capital Funding	**2006/07 outturn (£,000)**	**2007/08 outturn (£,000)**	**2008/09 outturn (£,000)**	**2009/10 outturn (£,000)**	**2010/11 predicted (£,000)**
Structural Maintenance of Roads/Street Lighting	6,129	6,421	6,262	6,456	6,202
Structural Maintenance of Bridges	1,635	2,398	2,903	2,153	1,041
Total	7,764	8,819	9,165	8,609	7,243
Prudential Borrowing/ WCC Capital Funding (exc. external contributions)	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
Structural Maintenance of Roads/Street Lighting	2,547	1,958	1,789	1,756	1,955
Structural Maintenance of Bridges	0	0	0	0	0
Total	2,547	1,958	1,789	1,756	1,955
Grand Total	**10,311**	**10,777**	**10,954**	**10,365**	**9,198**

Table 1.2 – Indicative Allocations for Maintenance Expenditure, 2011/12 – 2013/14

Maintenance	**2011/12 (£,000)**	**2012/13 (£,000)**	**2013/14 (£,000)**
Structural Maintenance of Roads and Bridges			
Total			

To be completed once budgets have been agreed in February 2011

Revenue Funding

1.9.2 Historically the capital funding received through the LTP process has been supplemented by revenue funding from County Council funds. £2m of funding for Safety and Maintenance was committed for an initial three-year period beginning in 2007/08. This has been extended for a further four years from 2010/11 for the lifetime of the current political administration. Revenue funding has also been historically committed towards schemes to reduce the risk of flooding in the County.

1.9.3 There is an increasing pressure on County Council revenue budgets as the infrastructure which makes up the transport network expands through the LTP process and as part of new development. The maintenance and replacement implications of all new assets are considered as part of the whole-life costing process. Information provided in the TAMP will be used where possible to assist this activity.

1.10 Summary of the Asset Value

Replacement Cost of the Asset

1.10.1 Table 1.3 below sets out the estimated replacement cost of the core transport assets which the County Council is responsible for.

Table 1.3 – Estimated Replacement Cost of the Core Transport Assets in Warwickshire

Asset	**Estimated Replacement Cost**
Carriageway	£3,200,000,000
Footway	£375,800,000
Unsurfaced Unclassified Roads	£1,618,400
Public Rights of Way	£23,900,000
Bridges, Retaining Walls and Culverts	£690,000,000
Channels, Gullies, Pipes and Ditches	£50,000,000+
Streetlights	£49,000,000
Illuminated signs, bollards and Vehicle Activated Signs	£7,960,000
Intelligent Transport Systems	£1,722,000
Traffic Signals and Pedestrian Crossings	£25,135,000
Total	**£??**

Figures in yellow to be confirmed

1.10.2 Estimated depreciated replacement cost estimates for the core assets will be produced in time for the next review of the TAMP.

1.11 The Transport Asset Management Plan

1.11.1 It is envisaged that this iteration of the TAMP will have a timescale aligned to the Implementation Plan contained in the Authority's third LTP, i.e. 20011/12 to 2013/14. Some information contained in the Plan will be updated annually. It is envisaged that the next full review of the TAMP will commence in 2013/14. Some of the work programmes contained within the TAMP will have a longer duration than three years. The Action Plan contained at the end of this document sets out the key work programmes and their timescale for delivery.

1.11.2 It is anticipated that the TAMP will be a tactical document that links the strategic goals of the County Council with the LTP and more detailed operational and business plans. These include:

- The Corporate Business Plan, Medium Term Financial Plan and Annual Budget;
- The Corporate Property Strategy;
- The Local Transport Plan;
- Directorate and Group Service Plans; and
- Maintenance Policy documents.

1.12 Service Delivery and Management Arrangements

General

1.12.1 The highway network is generally managed according to the road hierarchy (i.e. A, B, C, D and E roads). Funding for maintenance is generally allocated to the areas of greatest need within the road hierarchy, regardless of geographical and political circumstances. Adopting this approach has resulted in a much improved carriageway and footway condition across the County, and has been reflected in the performance of the Authority in terms of its BVPI's.

1.12.2 Highway maintenance Agency Agreements previously existed in Nuneaton and Bedworth Borough, Rugby Borough and Warwick District. These Agreements were terminated at the end of March 2003. Since April 2003, the complete highway maintenance function has been managed centrally, as is the procurement of major structural maintenance schemes and street lighting maintenance. Local area offices, located at Coleshill, Budbrooke and Wellesbourne, undertake routine maintenance functions.

Network Management Duty

1.12.3 The Traffic Management Act adds a duty on all local highway authorities (the Network Management Duty), which requires local traffic authorities to do all that is reasonably practicable to manage the network effectively and keep traffic moving. The highway network is not only an asset for the movement of traffic, but also the essential services that lie over and under its surface.

1.12.4 The duty requires local highway authorities to consider the practicality of securing the "expeditious movement of traffic", in other words, a network that is working efficiently without unnecessary delay to those traveling on it. The duty is placed alongside all of the other things that the highway authority must consider, and it does not take precedence. The duty reflects the importance placed on making best use of existing road space for the benefit of all road users. In performing the duty the highway authority should consider any policy that would contribute to the more efficient use of the network, or that would avoid, eliminate or reduce congestion or disruption.

1.12.5 The compilation of the Transport Asset Management Plan will assist in performing the duty, in that it considers all of the highway assets managed and maintained by a local highway authority and sets clear standards of service. The standards consider the planning of and carrying out of maintenance, and assist in performance monitoring.

Highway Management Information System

1.12.6 For a number of years, highways maintenance in Warwickshire has benefited from the use of an integrated Highway Management Information System (HMIS) The main business objective of implementing a HMIS within the Directorate has been the provision of a clear integrated approach:

- To meeting Highways Management Requirements, as opposed to isolated systems;
- To monitor the provision of highways management and maintenance effectively; and
- Having access to information to co-ordinate the different activities involved.

1.12.7 HMIS is a powerful tool for gathering information from different sources and keeping a historical record of all changes. A flexible system allows the road network to be viewed and interrogated at different levels for different purposes. In this way, individual Groups within the Directorate are provided with a complete picture of the highway network for their needs.

1.12.8 Whilst the initial vision for the system in 1998 involved a “single” system that could access all information relating to all assets on the highway network, the sheer diversity of highway maintenance activities within the Directorate and the lack of suitable software from one single source has led to a number of suppliers providing various packages. Routine and Structural Maintenance teams together with Street Works Management and the management of the Network Gazetteer use software modules from a single supplier – EXOR; Street Lighting maintenance is managed using Mayrise products; Bridge Maintenance management software is supplied by WDM Ltd. Some areas do not use integrated electronic systems simply because software is not available. As new software packages develop it is clearly an aim to move all areas into one integrated facility.

1.12.9 Such a system is probably a number of years away, but initial progress has been made with many aspects of the Street Lighting management (in Mayrise) linking with some areas of the EXOR highway maintenance software.

1.12.10 HMIS continues to evolve as more modules are developed to meet the ever widening needs of highway maintenance, both to meet Government requirements for reporting performance and to provide cost effective management of the network.

Staff Resources and Partnership Working

1.12.11 The level of staff resources and the range of expertise available in house to a local authority are necessarily limited. The County Council currently has a partnership contract with Arup for consultancy services which expires in 2013. Through this partnership the County Council can draw on the expertise and resources of an international consultancy. As well as staff secondments, the County Council is able to call on Arup to provide traditional consultancy support such as commissioning specific pieces of research or undertaking technical studies.

Roles and Responsibilities

1.12.12 To summarise therefore the roles of the respective parties are:

County Council:

- Develop, publish, and keep under review the TAMP;
- Manage funding issues;
- Manage enquiries from stakeholders and the general public;
- Establish policy and procedures;
- Appoint and manage consultants and contractors;
- Audit work undertaken;
- Carry out the duties of the Traffic Manager;
- Carry out certain design works; and
- Carry out inspection, assessment and maintenance works (in conjunction with Balfour Beatty and specific Client staff).

Consultant (currently Arup):

- Carry out certain design, inspection, assessment and maintenance works in conjunction with County Council staff in Design Services; and
- Carry out research and studies on behalf of the Authority.

Contractor (currently Balfour Beatty):

- Execute maintenance works; and
- Ensure appropriate work quality and satisfy defect liability requirements.

1.13 Risks and Threats

1.13.1 The principal risks to not maintaining the transport network in an appropriate condition relate to liability claims, corporate manslaughter claims, and road safety.

1.14 The Approach to Producing a Transport Asset Management Plan

1.14.1 A six stage approach was adopted in the production of the first Transport Asset Management Plan (TAMP), this being:

- Stage 1 – Review and documentation of current practices;
- Stage 2 – Critical assessment of current practices, highlighting areas of deficiency and areas for improvement;
- Stage 3 – Evaluation of the differences between the current and desired practice (gap analysis);
- Stage 4 – Identification of an Improvement Action Plan based on the gap analysis;
- Stage 5 – Consultation; and
- Stage 6 – Review of TAMP based on views received, and publish.

1.14.2 This second version of the TAMP provides an update to all areas of the document.

1.15 Key Stakeholders

1.15.1 The key stakeholders with an interest in this Plan are as follows:

- Department for Transport;
- Highways Agency;
- County Councillors;
- District/Borough Councils;
- Town/Parish Councils;
- Residents/visitors to the County;
- Community representatives;
- Local business and commerce;
- Audit Commission;
- Emergency Services; and
- Utility Companies.

1.16 Structure of the Plan

1.16.1 The remainder of this document provides details of the core assets which go to make up the transport network of the County, and sets out how these assets will be managed over the next three years.

1.16.2 The Plan describes how the core assets are currently managed, and identifies desirable improvements to data, practices and systems, and programming of work. It provides important information that will require updating and revising on a regular basis. As such, the Plan is a ‘living document’ and should be referred to by all of those involved in the planning and implementation of asset management.

1.16.3 The following core assets are covered in the remainder of this document:

- Carriageways;
- Footways;
- Highway Drainage;
- Street Lighting;
- Illuminated Signs, Bollards and Vehicle Activated Signs;
- Highway Structures;
- Traffic Controls and Intelligent Transport Systems;
- Public Rights of Way; and
- Unsurfaced Unclassified Roads.

1.16.4 Other assets to be covered by the TAMP in due course are summarised in the final section of the document. Work on these will be undertaken as resources allow.

Chapter 2 – Carriageways

2.1 What is the asset?

2.1.1 The County Council is responsible for most of the public highway within the geographical boundaries of Warwickshire. Motorways and trunk roads are the responsibility of the Department for Transport (Highways Agency) and are not considered in this Plan.

2.2 Carriageway construction

2.2.1 Carriageways in Warwickshire are mostly constructed using conventional flexible materials, these being rock aggregate and bitumen. A very small proportion of the network is constructed using cement concrete. It is unlikely in the current economic climate that concrete as a future carriageway construction material will be used in any quantity. With a plentiful supply of quarried aggregate within close proximity of Warwickshire, the use of bituminous macadams and asphalts will remain the most common and economic method of construction and maintenance.

2.2.2 The choice of maintenance treatment is increasingly important in order to derive as much value from it. Economic value in terms of cost of the work undertaken and also environmental value in terms of the service life need to be balanced. For a number of years, various maintenance schemes have been undertaken using recycled carriageway materials. Most recycling options carry an immediate monetary premium, which has an effect on the amount of network that can be treated within a single annual budget. Significant consideration also has to be given to non-financial factors that may provide long term advantages but are not reflected in comparative construction costs. At present, construction with new material still has the short to medium term financial advantage but as development of recycling and the use of different waste materials progresses, inclusion of materials from the sources in future construction and maintenance schemes will be considered.

2.3 Carriageway lengths

2.3.1 Since the first TAMP was produced, advances in computerised mapping has enabled greater accuracy in recording information and consequent reporting. The Highways Management Information System (HMIS) holds all of the relevant data from which our information is derived. These databases are maintained on a regular basis.

2.3.2 The highway network for which the Authority is responsible continues to grow. Since the first TAMP, a number of Trunk Roads have been downgraded (de-trunked) and the responsibility for their maintenance has passed to the County Council. We have gained some 45 kilometres of de-trunked A Road network, an increase of 10.4% in the Principal network. There are currently no plans by the Department for Transport to de-trunk any further parts of their network in Warwickshire.

2.3.3 There has also been a recent addition of approximately 6 kilometres of new Principal Road due to the opening of the Rugby Western Relief Road in September 2010. The overall network also continues to increase steadily as private development creates new highway infrastructure both for industrial use and on new housing estates.

Table 2.1 – Historical Total Length of the Warwickshire Road Network

Date	Calculated network length (km)
July 2003	3614.2
Feb 2005	3793.2
April 2006	3802.3
Jan 2009	3812.3
November 2010	3849.6

2.3.4 The current lengths (as at November 2010) of each road class in Warwickshire are shown in Table 2.2.

Table 2.2 – Current Road Lengths in Warwickshire

	North Warwickshire Area		Nuneaton and Bedworth Area		Rugby Area		Warwick Area		Stratford Area		Total		
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	All
A Roads	52.732	1.543	16.290	14.745	44.241	32.396	42.902	40.181	146.911	43.717	303.076	132.583	435.659
B Roads	49.489	28.668	12.562	27.468	76.386	15.352	41.285	25.395	123.418	29.848	302.841	126.730	429.571
C Roads	133.045	36.923	2.355	13.178	95.814	19.994	86.512	29.352	361.240	85.801	678.966	185.248	864.214
D Roads	139.562	137.515	9.395	280.805	113.466	236.412	112.162	323.994	352.955	304.073	727.540	1282.799	2010.339
E Roads	14.698	0.803	0	0	16.890	0.735	12.607	0	61.994	2.119	106.189	3.656	109.845
Total	389.226	205.452	40.602	336.195	346.797	304.889	295.468	418.921	1046.518	465.559	2118.612	1731.016	3849.628
%age of Area total	65.45%	34.55%	10.78%	89.22%	53.22%	46.78%	41.36%	58.64%	69.21%	30.79%	55.03%	44.97%	100.0%
Total	594.678		376.797		651.686		714.389		1512.077		3849.628		
%age C'ty total	15.4%		9.8%		16.9%		18.6%		39.3%		100.0%		

2.4 Carriageway widths

2.4.1 In order to make best use of Inventory data, information has to be as accurate as possible. Whilst the carriageway width information which the County Council hold is derived from actual measurements of network samples, it is acknowledged that to undertake wholesale network

measurement to the extent of providing increased accuracy will require a significant resource to achieve.

Table 2.3 – Area of Carriageway Network within Warwickshire

Road classification	Average width	Total area
A Roads	7.968m	3,471,330m²
B Roads	7.187m	3,087,327m²
C Roads	5.67m	4,900,094m²
D & E Roads	5.449m	11,552,883m²
Total	6.317m	23,011,624m²

2.4.2 Clearly the aim has to remain to acquire ever increasing accuracy in measured information, but in light of current economic forecasts this activity will inevitably take a much lower priority in the overall highway maintenance function. We consider that these published values are sufficiently accurate at the network level to allow us to maintain the highway network in an efficient manner.

2.5 Future Asset

2.5.1 New developments for both housing and industry bring regular small increases in the maintainable highway network. With no plans for any significant additional major highway network such as new bypasses or de-trunking, any future network length increases are expected to be confined to natural development of new housing and industrial estates and will generally be unclassified roads. The rate of increase in this category of our network is expected to be no greater than we have experienced in the last 10 years. Future rates of expansion are dependent primarily upon economic factors, but a similar increase of 3.5% over the next ten years (70+km) would be a reasonable forecast.

Table 2.4 – Unclassified network length (2000–2010)

Date	Network length (km)
July 2000	2044
August 2001	2040*
July 2003	2065
February 2005	2101
April 2006	2111
January 2007	2107*
January 2009	2112
October 2010	2120

** Nominal fluctuations in measured lengths can be attributed to continuing improvements in measurement accuracy, technical developments in software and regular reviews of data.*

2.6 What is the current condition of the asset?

2.6.1 Carriageways deteriorate at differing rates due to many factors. Initial construction details, workmanship, traffic loading, weather conditions and utility service installation all play a part in the deterioration of the carriageway structure.

2.6.2 For those parts of the network that have been specifically constructed, it is generally accepted that a life of at least 20 years is normal before significant maintenance is required. Timely execution of minor maintenance treatments at intervals during that 20 year period can extend this life.

2.6.3 However much of the network has evolved over a number of centuries and has not received any formal design consideration. Consequently, construction materials, thicknesses and alignments are very mixed. Where roads have been designed, the chosen life depends upon many factors. On major routes, new construction is designed for a minimum 40 years; on estate roads and similar minor roads, due to minimum requirements in physical construction methods and pavement thickness a design life of 60 years can be achieved.

2.6.4 To measure carriageway deterioration many techniques are employed. These techniques can be divided into two sub groups – testing and visual inspection.

2.6.5 We continue to make regular condition inspections of the carriageway network; visually on the whole network, and for the A, B and C roads using machine surveys (SCANNER). SCRIM testing is also carried out to measure skidding resistance of the carriageway surface on the more heavily trafficked parts of the network.

2.6.6 Condition Indicators are produced annually from each of these inspections and the information is used in planning future maintenance needs and to provide national benchmarking statistics. Current data is reported in detail in the Annual Highway Network Condition Report. Latest headline values are shown in Table 2.8.

2.6.7 Research work at national level is currently focussing upon the use of condition information as a tool for calculating asset value, and is being incorporated into annual reporting requirements as an element to the Whole of Government Accounts requirements (see paragraphs 2.17 and 2.18).

2.6.8 Increasing attention is being given to the effect that Utility openings in the carriageway structure are having upon the overall life of the pavement. Whilst utilities are permitted to lay their apparatus in the highway, there is currently little understanding as to what reduction in pavement life is caused by such intrusions. Clearly where utility works regularly happen – mostly in urban areas – it may be more cost effective to simply continue keeping the

carriageway safe through successive minimal treatments rather than attempting to provide a 20 year (or longer) designed pavement structure, which will never reach that life due to the likelihood of being dug up regularly.

2.7 The Various Testing and Inspection Regimes Undertaken.

2.7.1 Carriageway testing and inspection continues to play an important role in providing information to inform the decision making process in formulating annual maintenance programmes and will become even more important as future maintenance budgets become significantly reduced.

2.7.2 Carriageway **testing** is undertaken using a variety of specialist machines, each for a specific purpose. These are as follows:

SCRIM

2.7.3 SCRIM (**S**ideways-force **C**oefficient **R**outine **I**nvestigation **M**achine) measures the skidding resistance of the carriageway surface. As road surfaces wear under traffic, the skidding resistance reduces. Traffic wear is caused primarily by heavy goods vehicles, so testing is confined to those parts of the network that have high volumes of commercial traffic. Testing is carried out annually at pre-determined periods throughout the late spring, summer and early autumn months. Research has proven that skid resistance reduces over this period through prevailing weather conditions, and improves again during the winter. Testing is therefore undertaken to determine the lowest values of skidding resistance.

2.7.4 The results inform the decision making process when formulating annual surface treatment programmes, and also provides a defence against claims that the Authority is failing to undertake it's statutory functions.

2.7.5 The Authority has written it's own Skidding Resistance Testing Strategy as recommended by the Code of Practice for Highway Maintenance, and follows this when undertaking investigations into those sites that fall below defined test criteria. A new national guidance document is anticipated to replace HD28/04. Our strategy will be reviewed when this replacement is published.

2.7.6 We also produce annual performance information measuring the amount of network that falls below a predetermined investigation level. Small annual fluctuations in this value are normal and can be expected. The aim is to provide a long term sustained reduction in the figures through appropriate targeted treatments.

Table 2.5 – Length of the Road Network below the Defined SCRIM Investigation Level

2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
22.5%	32.3%	24.9%	19.1% **	21.3% **

** The latest published national average of the Principal Road network (2007 to 2009 3-year average) that is below Investigation Level is 25%. (*Road Condition England 2009* publ. DfT)

SCANNER

2.7.7 SCANNER (**S**urveys for the **C**ondition **A**ssessment of the **N**ational **NE**twork of **R**oads) measures the surface condition of the carriageway. Whilst relatively new in it's current guise, it is based upon technology that has been in development and use by TRL on behalf of central Government for a number of years. SCANNER is an automated tool used to gather information on a number of parameters that contribute to the knowledge on network condition. Presently confined to collecting data on the carriageway only, rutting, cracking, surface texture and shape (longitudinal profile) are the main features and defects recorded. Each of these features, when present in sufficient quantities, contribute towards the measurement of the condition of the road.

2.7.8 SCANNER testing is currently mandatory on A, B and C Roads for National Indicator (NI) purposes and is carried out to nationally laid down frequencies – network coverage on a two year cycle. After a period of changes to testing equipment and data processing parameters, reasonably consistent year on year reporting is now possible.

2.7.9 In addition to informing the NI process, SCANNER outputs are used in greater detail together with all other testing and surveys to determine areas of further investigation for structural maintenance work.

2.7.10 SCANNER results are currently expressed on a points system, with each 20m length of carriageway gaining a score. The higher score broadly indicates a more immediate need for maintenance treatment and also a probable higher unit cost of treatment.

2.7.11 Development work by SCANNER contractors is working towards using smaller vehicles to enable economic coverage on the more minor network. If this is successful, it is possible that collection of NI data by SCANNER for unclassified roads will become mandatory in the future.

2.7.12 Within the wider Asset Management discipline, SCANNER data is also being used to determine the depreciated value of the network (DRC). Methodologies have been developed nationally by CIPFA and endorsed by HM Treasury and will be incorporated into UKPMS from April 2011 as mandatory reporting requirements.

Deflectograph

2.7.13 Deflectograph surveys were undertaken for many years to determine the residual life of the road structure. Testing is an early indicator of when structural treatment is likely to be required. With the development of additional forms of condition testing, we no longer carry out Deflectograph.

2.7.14 The carriageway surface condition is also measured by various manual techniques, each resulting in differing result values. Carriageway **inspections** consist of the following:

Coarse Visual Inspections

2.7.15 Although mandatory performance figures are now produced from SCANNER surveys, we continue to undertake Coarse Visual Inspections using the national criteria. The advantage of these inspections is that they cover the complete width of the carriageway surface (whereas SCANNER (the machine based equivalent) is only able to cover the fixed width of the measuring bar mounted on the vehicle) and give reliable results in important areas such as carriageway edge defects and surface cracking – both defects that feature significantly when maintenance is being considered. The national criteria are used in order to continue producing consistent year on year results for our own performance monitoring.

2.7.16 Coarse Visual Inspections are carried out by a dedicated team of experienced inspectors from a slow moving vehicle, with the occasional need to proceed on foot. Minimum frequency of inspection is once every two years with the higher categories of network being inspected annually. This frequency of inspection gives a good balance when considering the age of some of the data collected and the cost of gathering it, so that overall we have good quality information for determining medium and long term structural maintenance programmes.

National Road Maintenance Condition Survey

2.7.17 The National Road Maintenance Condition Survey that had been in existence since 1977 was discontinued by central Government in 2007. This has yet to be replaced as an overall performance measure of the national road network.

2.7.18 The Department for Transport continues to receive data voluntarily from local authority SCANNER surveys and undertakes statistical analysis to provide similar performance information on a national and regional basis, but this is confined to Principal and non-Principal roads, and is reported in an annual Transport Statistics Bulletin. Some statistics are collated nationally for the unclassified network but the data for this is more reliant upon individual Authorities continuing to undertake surveys on the unclassified network and in a consistent manner. Warwickshire provides data to all of these analyses.

Other Inspections

2.7.19 Other regular surveys are carried out for a range of purposes, e.g. Safety Inspections and Serviceability Inspections. Examined in the right way, the outputs from these can also be used as part of the assessment of the overall indication of carriageway condition, although there are no formal criteria by which any standard can be determined.

2.7.20 Safety Inspections are not part of any formal condition assessment. Defects that are identified from Safety Inspections (e.g. potholes, trips, loose or rocking slabs, displaced kerbs, damaged or missing ironwork, standing water, missing or damaged road signs or bollards, or any other condition that could be a danger to road users) are recorded, with individual priorities for further action or specific treatment. We undertake Safety Inspections in order to meet our statutory requirements under the Highways Act. These are undertaken by our Term Maintenance Contractor (currently Balfour Beatty). As part of the recent Term Maintenance contract renewal, we have taken the opportunity to review how Safety Inspections are to be carried out in future in order to improve efficiency. We have identified areas where by combining Safety Inspection and Serviceability Inspection activities with a “find and fix” operation, we have created a proactive streamlined approach to dealing with safety defects quickly and efficiently. As experience with these combined activities increases we will continue to review it and consider further improvements as they are identified.

2.7.21 Other ad hoc inspections are carried out in response to public complaints and to deal with specific issues. These inspections do not form part of any overall condition assessment except that records of complaints and actions can be used to highlight particular areas of most frequent problems.

2.7.22 As an input into knowledge of the network condition, other information is available to the Engineer. Both Insurance and Crash data are used to build up as clear a picture as possible. The Authority holds a register of Third Party Claims for incidents on the public highway. This enables hot spots to be flagged up where higher incidences of claims are being made. More detailed inspection of these areas together with specific details of the claims can indicate where maintenance problems are developing, and enables early planning of treatment in order to reduce or eliminate further claims.

2.7.23 Crash data is used to highlight locations where a greater than normal incidence of crashes have taken place.

2.7.24 The condition of the network can be reported from all of these various inspections/tests although it must be pointed out that, as each measures different aspects, there is no correlation between each type of result. Nor is any one measure of condition absolute, with specific boundaries beyond which a measured value is considered to require immediate maintenance activity. All of the test results require engineering judgement to interpret them.

2.7.25 The ultimate decision on where maintenance work is carried out and what is carried out is dependent upon a combination of the different condition measures available, together with input from other less objective sources.

2.8 National Performance Indicators

2.8.1 Formal year on year indicators of overall carriageway condition are determined using UKPMS to produce National Indicators (formerly Best Value Performance Indicators). The figures produced are calculated to national criteria using nationally approved and accredited systems. Thus it is possible to compare with reasonable confidence performance across County boundaries. Warwickshire's nationally reported BVPI and NI are detailed in Tables 2.6 and 2.7 below.

Table 2.6 - Summary of Warwickshire national performance indicators 2000/01 to 2004/05

	2000/01	2001/02	2002/03	2003/04	2004/05
BV 96	2.1%	3.1%	9.2%	6.9%	27.79%
BV 223	-	-	-	-	-
NI 168	-	-	-	-	-
BV 97a	8.45%	8.39%	17.9%	18.19%	17.72%
BV 224a	-	-	-	-	-
NI 169	-	-	-	-	-
BV 97b	5.47%	7.39%	17.07%	18.54%	14.94%
BV 224b	-	-	-	-	-
BV 187	-	-	81.9%	75.98%	34.78%

Table 2.7 - Summary of Warwickshire national performance indicators 2005/06 to 2009/10

	2005/06	2006/07	2007/08	2008/09	2009/10
BV 223	5%	6%	4%	-	-
NI 168	-	-	-	5%	5%
BV 224a	9%	7%	3%	-	-
NI 169	-	-	-	5%	5%
BV 224b	14.6%	14%	14%	-	-
BV 187	34.36%	32%	27%	-	-

From 2006/07, all National Indicator figures are reported to whole number percentages.

2.8.2 BVPI's were renamed National Indicators in 2008. In addition the number of Indicators measuring highway performance was reduced to two - for the Principal and non-Principal network. No national comparison now exists for the unclassified network, although we continue visual condition

inspections to the original BVPI standards. This enables us to maintain provision of up to date long term condition trend information for our unclassified roads, and also to identify areas of most need on what is the majority of our maintainable network. We are also able to continue informal comparisons with many Authorities who also continue to survey their networks to those same standards.

2.9 Local Condition Indicators

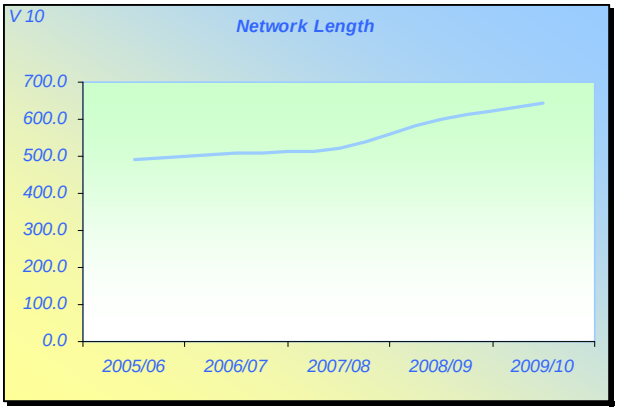
2.9.1 In addition to the nationally reported Indicators, the County Council has developed a number of Local Indicators relating to highway condition beyond the headline Indicator, The aim is to record year on year condition information at the local level in as consistent a way as possible, using fixed parameters to gain accurate comparisons over time. The results are a valuable information asset contributing to long term network knowledge and maintenance performance enabling up to date decisions to be made on appropriate maintenance treatments.

2.9.2 A number of years ago, the condition of the network was improving. Over the last three years this trend has changed and now there is a clear indication that the overall length of network above the maintenance threshold is increasing.

Table 2.8 – Whole Network Condition (A-D Roads)

	2003/04 *(Yr. D)*	2004/05 *(Yr. E)*	2005/06 *(Yr. F)*	2006/07 *(Yr. G)*	2007/08 *(Yr. H)*	2008/09 *(Yr. I)*	2009/10 *(Yr. J)*
Whole Network (A to D Roads)	17.3%	15.4%	13.8% *491.8km*	13.6% *509.6km*	14.2% *522.7km*	16.9% *598.0km*	17.7% *644.8km*

Lower values are better



2.10 How does the condition of the carriageway network compare with other Authorities?

2.10.1 The latest figures from the Department for Transport's Statistics annual transport statistics bulletin show that when compared against other County

Councils, Warwickshire is below average for it's Principal road network and above average for it's non-Principal road network.

Table 2.9 – Comparison of National Indicators 2008/09

	NI 168	NI 169	ex BV224b
Warwickshire	5%	5%	17%
County Councils (average)	4.39%	8.49%	14.79%
All Authorities (average)	4.71%	8.58%	14.81%

(from *Road Condition England 2009* publ. DfT)

- For Principal Roads (NI 168) Warwickshire is =69th out of 150 (previously 24th out of 148);
- For non Principal Roads (NI 169) Warwickshire is =33rd out of 150 (previously 31st out of 148); and
- For unclassified roads (ex BV224b) Warwickshire is 87th out of 123 (previously 83rd out of 148).

2.10.2 Whilst national performance figures allow Authorities to check themselves against their peers, the results should not be regarded in terms of success or failure of individual Authorities. Each Authority will have their own policies with regard to highway maintenance that have been formulated with due regard to many different local factors and local priorities, that may not have the same strategic importance in neighbouring Authorities. Such different policy priorities will clearly have a bearing when comparing performance figures between Authorities.

2.10.3 As the condition of the highway network is inextricably linked to the amount of investment in it's maintenance, the aim in Warwickshire continues to be careful stewardship of the highway network by carrying out the most cost effective treatment in order to enhance the asset value within the budget available. We will continue to use annual performance measures to monitor progress

2.10.4 The County Council is a member of the Midlands Service Improvement Group (MSIG), where amongst many activities aimed at service improvement, these common condition indicators are shared with other group members.

2.11 What is the desirable condition of the asset?

2.11.1 The desirable condition of the network is one that minimises annual maintenance costs and also maintains a steady state with the minimum expenditure. Whilst it is possible to maintain a steady state with higher funding levels, this could be interpreted as uneconomic. In order to achieve such an aim economically, firstly requires a reduction in the maintenance backlog to a level that is capable of being treated within a practical time span and at minimal cost per km, rather than having a long term "wish list" of justifiable schemes that have ever decreasing chances of being executed the

longer the list becomes, and eventually costing substantially more due to the more severe treatment required.

2.11.2 In some areas, there is a desire to have an enhanced environment, usually in major tourist areas and town centres. Consequently, construction standards employ more decorative materials which have a higher initial construction cost and also a higher residual maintenance cost. In order to maintain such areas to these desired standards entails allocating higher budgets per comparable area of network.

2.11.3 The current desirable life for a flexible carriageway is 40 years. Annual treatment rates therefore would be 2.5% (equivalent to approximately 100km). In order to determine forward plans for works programmes that can be carried out in a planned and efficient manner, a further 2.5% of the network should be identified as in need of structural maintenance treatment. (i.e. the programme of work for the following year). Thus a desirable situation is one where a rolling programme of 5% of the network is identified to be in need of treatment, and - equally important - that funding is in place to treat at least half of that pool of work each year.

2.12 What is an acceptable condition?

2.12.1 Results from a condition assessment should reflect as many parameters as possible to enable the Engineer to make a balanced view on prioritising future maintenance work. It is clearly economically sensible to have different standards of maintenance, and therefore different conditions, depending upon the importance of the road.

2.12.2 In recent years considerable emphasis has been placed upon comparing the condition of the network against all other Authorities in the country. Comparison with other authorities is discussed elsewhere in this section of the TAMP.

2.12.3 With annual maintenance budgets not maintaining parity with inflation, particularly within the construction sector, and increasing external pressures such as higher energy costs, flooding, waste management and insurance claims, there comes a point where the current standard of condition cannot be maintained. That is not to say that the network becomes unsafe, it is that there has to be agreement that either desired standards have to be funded through increased budgets or the acceptable standard is reduced in line with the finances available. It should be pointed out that a diminution of standard as measured by condition surveys does not mean a compromise in safety for the user.

2.12.4 Additionally, as available budgets are less able to treat the desired amount of network, the pool of work required to maintain a given level of condition will increase the type of maintenance treatment to treat that pool will become more expensive per kilometre as treatment get deferred and condition deteriorates further.

2.13 Other areas of indication

2.13.1 The County Council already undertakes public consultation through regular questionnaires, particularly following planned structural maintenance works. A public satisfaction target is published and results are reported through the LTP process. For carriageways the latest Public Satisfaction figures are as follows:

Table 2.10 – Public Satisfaction from Household Surveys

Net Satisfaction from Household surveys (%)	2000	2005	2007	2010 Target
Rural Road Surfaces	-14	+2	+6	+10
Town Centre Road Surfaces	+16	+22	+18	+45

Source: WCC Area Committee Reports, July 2010

2.13.2 The acceptable condition of the network can mean different things to different people, mainly as a result of individual perceptions. For the Authority as a whole, simply to have a network that is safe for people to use and a network that can be maintained in that safe condition with current resources represents a stable situation. In terms of user perception, work is currently in progress at TRL investigating the relationship between user perception and existing condition assessment.

2.13.3 Condition surveys (both visual and machine based) together with Safety and Serviceability Inspections build up a bank of data to enable informed decisions to be made with regard to the most suitable treatment to be investigated. Work is currently in progress on system development to both capture as much data as possible within sensible financial limits, and also to make good use of that data to provide robust information to enable the best programme of maintenance works to be formulated.

2.13.4 We produce a Network Condition Annual Report to record year on year condition information using fixed parameters, in order to gain comparisons over time that are reliable and consistent. The results are valuable information assets which contribute to targeting suitable maintenance treatments at the most appropriate locations.

2.13.5 A five year forward programme of structural maintenance work has been developed, which is reviewed each year. Currently it contains sites that represent 94.6km (2.62% of the total length) of network that is proposed for maintenance treatment.

2.15 What is the present replacement value of the carriageway asset?

2.15.1 First calculations of the Gross Replacement Cost (GRC) asset value in 2007 were based upon locally derived parameters and gave a figure of £1.65bn.

2.16.2 Since that first valuation, national valuation parameters have been set as a result of project work by the Highways Asset Management Financial Information Group (HAMFIG) carried out under the auspices of CIPFA (the Chartered Institute of Public Finance and Accountancy) and endorsed by HM Treasury. Using these parameters and latest network quantities (as at June 2010), the current gross replacement cost of the Warwickshire road network is **£3.2bn**. These values use construction unit rates that have been derived from national figures and can therefore be considered robust. This value has also been reported for the 2009/10 Whole of Government Accounting requirements.

2.16.3 A significant proportion of this value (£1.1bn) is derived from accounting for all additional assets on the highway including street furniture, lighting and signs, which under the CIPFA valuation method is currently all inclusive. The net carriageway figure for 2009/10 of £2.06bn compares extremely well with our initial valuation of £1.65bn in 2007, when the increase in network and inflation are taken into consideration. Future annual valuations will be reported to these national parameters determined by CIPFA.

Table 2.11 – Carriageway Network calculated Gross Replacement Cost

October 2007	**November 2010**
£1.650m	£2.060m

2.16.4 Whilst it is not possible to state that these latest figures have absolute accuracy, the parameters used are nationally based and can therefore be considered robust.

2.18 What is the depreciated replacement value of the asset?

2.18.1 In the last few years, as with the development of national methodology for calculating the GRC of the network, parallel work has been undertaken to produce a workable method for calculating depreciation. A measure of depreciation gives a good picture as to the likely maintenance needed (in financial terms) the highway requires in order to continue to fulfil it's function.

2.18.2 The reporting of depreciated replacement cost (DRC) for carriageways will be a mandatory requirement from 2011 as additional information to National Indicators. UKPMS will be the platform through which all of these annual calculations and reports will be provided.

2.18.3 UKPMS Technical Note 46 sets out the parameters for the calculations. UKPMS software providers are at present building these requirements into their computers systems so that users can produce the appropriate information at the end of the financial year 2010/11.

2.18.4 Briefly, use is made of all of the condition data that Authorities already hold - and continue to collect for other purposes - and provides an opportunity

to calculate DRC without having to resort to gathering even more information with it's commensurate additional costs. However, in order to fulfil future mandatory requirements, continuation of current inspections and testing will be required, as will the collection of more accurate inventory data - particularly for footway widths and lengths will need to be collected by the end of 2011/2012 - so as to comply with the Whole of Government Accounting (WGA) methodology for Transport Infrastructure valuation.

2.19 What is the Gap?

2.19.1 In the first TAMP we reported the backlog of treatment as £27 million. Using those same broad brush parameters today, the equivalent CI value is 17.7% representing a network length of 644.8km. To reduce this to the previously stated desirable level of 5% (now 192km) will require maintenance treatment to 453km of the network (an increase of 50%) at £99,000 per km making the gap, or backlog, a total of £44.8 million. This represents a worsening in the condition of the network over the last four years by approximately £11 million each year.

2.19.2 With the calculation of depreciated replacement using national parameters yet to be carried out, the calculated backlog by this method is currently unknown. As the new methodology takes account of many more factors that influence the deterioration of the carriageway, and like GRC uses a national database of measured information, it is expected that a figure that is as accurate as possible will be produced. It is not expected that it will be lower than already reported.

2.20 How can the gap be reduced through changes in practice to bring about savings, or through the generation of additional funds?

2.20.1 We have been using an asset management approach to maintaining the highway network for many years, which has allowed us to target finite resources to where the benefit will be greatest. The evidence of this has been consistently acceptable performance figures that are comparable with national averages.

2.20.2 Whilst the calculated financial need for maintaining the network can be easily produced, available funding to undertake the required amount of maintenance does not match the need. Consequently there is increasing focus on the primary function of simply maintaining the network in as safe a condition as possible for all road users.

2.20.3 Reducing treatments that contribute towards improving the network will inevitably result in worsening of annual performance figures and this is beginning to show in the overall length of network now needing maintenance treatment.

2.20.4 We are continuing to use resources in the best possible way and continue to re-use materials where an economic case for doing so is proven. With the ever increasing focus on recycling of materials, use of more non-

original products is being demanded at the political level. It must be borne in mind however, that simply re-using existing waste products is not always economically viable. Quite often supplies of new product can be procured at vastly reduced real costs to the Authority. Clearly, re-using materials is environmentally sound, but where the cost to the taxpayer is significantly increased, caution must be exercised so that such recycling is not undertaken solely for it's own sake. Without external drivers such as landfill tax and aggregate taxes, waste minimisation also becomes an uneconomic activity and budget allocations will need to reflect any extra cost in following a sustainability agenda.

2.20.5 A common sense approach to maintenance work must consider programming work to make best use of available resources. Timely intervention of an appropriate treatment will:

- Reduce the number of unexpected defects – leading to a reduction in insurance premiums and the need for specific funds for paying or refuting claims;
- Extend pavement life and reduce the amount of more expensive future treatments; and
- Demonstrate competitive work costs by utilising the most economic method of procurement.

2.20.6 Co-ordination with others (e.g. utilities, promoters of new features etc) where maintenance work is planned is important, so that where possible all parties undertake everything at same time. The Traffic Management Act 2004 goes a long way to helping this aim, whereby utilities and Local Authorities are required to communicate with each other regarding future planning of works.

2.20.7 It is imperative to ensure that any work is carried out to the required specification. Additionally, it is known that by increasing thicknesses of surfacing materials during maintenance works, a significant increase in pavement life is achieved which is positively disproportionate to the extra cost of the work. Consideration will be given to increasing specifications where appropriate that add 'significant value' to the outcome. However, whilst an extra construction cost is marginal for long term gain this may be a waste as, it is rare that a pavement in a local environment reaches a full life due to utility activities destroying the structural integrity well before 20 years has passed. Unlike motorways and to a certain degree, trunk roads, local roads carry a significantly higher amount of utility apparatus – especially in urban areas. Utility 'invasion' of the carriageway structure in order to legitimately maintain their plant has a detrimental effect upon the residual life of that structure. Consequently, there is little advantage in some areas in designing carriageway structures to any significant design life. There must be sufficient flexibility to also consider aiming for shorter design lives in high risk areas. A 'graded' design life should be employed having considered the risk of utility activity at the particular location, varying from less than 10 years in high risk areas to 40 years (or even more) in very low risk areas.

2.20.8 In the early stages of UKPMS development in the mid 1990's, Condition Projection was one of the main aims of its functionality. The principal of Condition Projection is to combine all of the available data on the condition and usage of the network to produce a reasonably accurate model of its future performance. As networks deteriorate at differing rates, timely repair is more of an art than a science. The intention of Condition Projection is to provide the Engineer with a tool to enable better targeting of particular treatments and also suggest appropriate timescales for carrying out those treatments – in short, optimising the use of financial resources in the best possible way. An example of this is that currently the prioritising of maintenance schemes stems primarily from a 'worst first' philosophy. Condition projection introduces a value for money parameter into the equation which could mean that the worst length of the network in terms of its condition index may not be the most economically beneficial to treat at that time. As the subject is complex, consequent national research to produce a workable national model has been sporadic and expensive, and has yet to offer any reliable solutions. Work on this subject continues, now mostly sponsored by private consultants and software companies.

2.20.9 The aspirations set out in the first version of the TAMP are no less valid in the present economic climate, but we are having to readjust priorities and timescales to match the funding available. There will also have to be a readjustment in expectations and an inevitable reduction in maintenance standards unless significant financial resources become consistently available to allow long term planning and execution of maintenance activities.

Chapter 3 – Footways

3.1 Introduction

3.1.1 This section covers surfaced footways which are the responsibility of the County Council, and can include footways alongside carriageways, footways away from carriageways and some surfaced footpaths. The County Council recognises the importance of providing high quality facilities for pedestrians especially within town centres, in order to support a number of wider objectives such as economic and social vitality.

3.2 What is the asset?

3.2.1 The footway asset covered in this section of the Plan is regarded as the lengths of (mostly) macadamed construction adjacent to carriageways and forming part of the highway. These lengths of footway are generally referenced by taking the same road number as the adjacent carriageway. Additionally, similarly constructed paths not adjacent to carriageways and generally (but not exclusively) running through housing areas also form part of this asset group. These will usually be referenced by having a separate road number distinct from the numbering scheme for carriageways, and in this section are referred to as 'off-highway' footways.

3.2.2 Generally, all of these constructions are primarily for pedestrian use, although increasingly a number of sections have been converted to shared use with off-carriageway cycle routes.

3.2.3 Quantifying the amount of maintainable footway is based upon representative information. In order to make best use of inventory data, information has to be as accurate as possible. Whilst the footway information we hold is derived from actual measurements of network samples, it is acknowledged that to undertake wholesale network measurement to the extent of providing increased accuracy will require a significant resource to achieve. Clearly the aim has to remain to acquire ever increasing accuracy in measured information, but in the light of current economic forecasts this activity has to take a much lower priority in the whole highway maintenance function.

3.2.4 In the first TAMP we calculated that the footway network solely adjacent to carriageways was in the region of 2,638km with an average width of 1.745m, giving a total surface area of 4,600,000m². These figures were derived from a significant number of measurements taken over a number of years during RoadFax surveys for maintenance purposes.

3.2.5 Resources are not currently available to undertake a full investigation to confirm a more accurate length of footway network than this figure. This still remains a long term aim, but has to be set within the context of overall highway maintenance priorities and available funding. The cost of gathering more accurate information has to be balanced against the benefit to be gained from its acquisition.

3.2.6 As an interim, CIPFA as part of it's Code of Practice for Transport Infrastructure Assets has produced national factors for reporting the footway asset for Whole Government Accounting requirements.

3.2.7 Using this national default information against our carriageway network lengths results in a footway surface area of 5.22 million m², an increase of 10.2% from our own calculation method (as a check against our previous figures using up to date information the revised footway asset using our original calculation parameters produced a footway network length of 2,715km and a total area of 4,738,000m²). For future consistency we will use the values derived from the CIPFA methodology as our base information until more detailed information becomes available.

3.2.8 In addition, off-highway footways contribute a small route length. These are categorised as 'F' roads in the network gazetteer. F Roads are mostly footways that are **not** adjacent to carriageways, perhaps running to the rear of properties for various access purposes. Work is ongoing to identify such footways that are maintainable by this Authority, and in recent years there has been a significant increase in our 'F' road network from 42km to 193km. The area of this 'F' designated network has been calculated using the CIPFA default values noted above and has produced a total of 489,000m²

3.2.9 The total footway network is thus calculated as 3,536km and 5.7 million m².

Table 3.1 – Footway Network Length and Area

Road Class	**Length (km)**	**Area (m²)**
A Roads	404.0	768,713.9
B Roads	232.4	458,182.2
C Roads	365.4	701,278.5
D Roads	2,198.0	3,281,849.0
E Roads	10.6	13,694.9
F Roads	326.1	489,197.1
Total	**3,536.5**	**5,712,915.7**

3.2.10 Of the footway network adjacent to carriageways, originally only the Category 1, 1a and 2 footway network was defined, and taken as those footways having the highest footfall based upon a Pedestrian Corridor network. The publication of the Maintenance Code of Practice (Well Maintained Roads) gives a more detailed narrative to the different categories of footway. In the light of this we have undertaken a review of those initial

Category 1 and 2 footways, and using definitions based upon the Code of Practice we have developed a more representative network of Category 1 and 2 footways. Other sections of footway have been included that now meet the new criteria to the extent that there has been an increase in overall Category 1 and 2 footway network length from approx 60km to 180km, with another 40km identified from a preliminary check as likely to be categorised as Category 2. The remainder of the footway network will be categorised (Category 3 and 4) as resources permit

Table 3.2 – Footway Maintenance Categories

Footway Category	**Length (km)**
Cat 1	48.3
Cat 2	129.0
To be categorised	3359.2
Total	**3536.5**

3.3 What is the current condition of the asset?

3.3.1 In order to determine the condition of any asset, a form of regular inspection must be undertaken. A single inspection will only give a broad indication of condition, whilst regular inspections at frequent intervals will provide a more accurate indication of trend in condition. To determine true indicators of condition, such inspections must be carried out consistently, both in accuracy and format.

3.3.2 At present, no machine based footway inspections exist, so all footway inspections are visual. Footway inspections consist of the following:

Safety Inspections

3.3.3 These are carried out in accordance with the Code of Practice (Well Maintained Highways), and serve the primary purpose of locating defects that could cause damage or harm to footway users. Use of the data to indicate overall footway condition is extremely limited, but it can be used to highlight where persistent minor patching work is being carried out, so indicating a possible need for work of a more substantial nature being a better solution.

Detailed Visual Inspections

3.3.4 These are comprehensive surveys of the surface condition of the footway network. As the title indicates, these surveys are detailed in that they collect observations of many types of defect and also determine the severity of those defects. The defects are recorded in accordance with national definitions and procedures laid down as part of UKPMS. Inspections are

carried out on foot by dedicated and accredited teams of experienced surveyors.

3.3.5 With a more representative categorisation of the footway network now in place, there has been an increase in the amount of visual inspections being carried out. Walked Safety Inspections have been aligned more closely to the Category 1 footway network which is inspected on a 4 week cycle. The Category 1 and 2 network is also subjected to a full Detailed Visual Inspection on a two year cycle.

3.3.6 DVI surveys are used to support the TAMP by helping to determine a required level of budget and investment over time, in order to achieve and then maintain the desired level of service and condition of the network.

3.3.7 In past years, results from DVI were used to publish the footway Best Value Performance Indicator (BVPI 187). As with carriageways, BVPI's were renamed National Indicators in 2008. In addition the performance indicator for footways was dropped from the list of mandatory indicators. We still continue to produce a local indicator to the same criteria as BV187 in order to inform our own footway maintenance programmes and monitor ongoing performance. Annually reported Condition Indices (CI) to BV187 criteria are detailed below in Table 3.3.

Table 3.3 – Condition Indices for Category 1 and 2 Footway Network

Location	**2005/06** *(Yr. F)*	**2006/07** *(Yr. G)*	**2007/08** *(Yr. H)*	**2008/09** *(Yr. I)*	**2009/10** *(Yr. J)*
All Town centres (BV187 equivalent)	34.36%	31.75%	29.54%	27.16%	18.4%

Lower value is better

3.3.8 For BV187, a threshold value of 20 was used to indicate the amount of the footway network in need of maintenance treatment. Of necessity, global condition indicators only give a partial picture as to the overall condition of any network. The threshold for reporting footway condition was set nationally and is considered to be at a level where even the most superficial maintenance treatment is indicated as required.

3.3.9 Further research* undertaken by the Transport Research Laboratory added a graded view of condition to give a more detailed indication of the severity of footway condition. Increasing values of CI have been compared with engineering judgement, and value bands at 35 and 80 were derived to indicate the likely types of maintenance treatment to be expected when those CI values are achieved. These are summarised in Table 3.4.

* *"Guidance on the Requirements for the Production of Highways Asset Management Plans and a Simple Valuation Methodology" - TRL Published Project Report PPR/INN/036/5 para 6.7.2*

Table 3.4 – Condition Index Values and their Engineering Definition

UKPMS DVI Condition Index Value	Engineering Definition
0 – 20	No maintenance required
20 – 35	Minor surface improvements required
35 – 80	Resurfacing required
80+	Reconstruction required

3.3.10 This is considered to be of significant use to the engineer locally in quantifying specific maintenance treatments, especially when maintenance funding is limited.

3.3.11 Armed with these engineering definitions, we review our footway DVI data at the 35 and 80 CI values to determine percentages of network above each of those thresholds. This enables a more equitable distribution of footway maintenance funding to the most appropriate treatments.

Table 3.5 – Footway Condition Indices

Footway CI Value	2004/05 *(Yr. E)*	2005/06 *(Yr. F)*	2006/07 *(Yr. G)*	2007/08 *(Yr. H)*	2008/09 *(Yr. I)*	2009/10 *(Yr. J)*
20	34.78%	34.36%	31.75%	29.54%	27.16%	18.4%
35	23.52%	22.44%	21.82%	21.41%	19.72%	8.0%
80	1.64%	1.15%	1.00%	1.3%	1.44%	0.1%

Lower value is better

3.4 How does the condition of the footway network in Warwickshire compare with other Authorities?

3.4.1 The latest available national BVPI comparison, is obtainable on the Audit Commission website and covers the years 2004/05 to 2007/08 (the final year). Warwickshire's comparison is shown below in Table 3.6.

Table 3.6 – Comparison of BV187 Scores

BV187	2004/05	2005/06	2006/07	2007/08
Warwickshire	35%	34%	32%	27%
County Councils (average)	28%	26%	24%	22.2%
All Authorities (average)	25%	24%	24%	22.4%

3.4.2 With the demise of a national footway indicator in 2008, it is no longer possible to obtain comparison on a national level. However, as with carriageways, headline comparison against other Authorities can be misleading due to each Authority having their own policies with regard to highway maintenance that have been formulated with due regard to other non

highway related factors which may not have the same strategic importance in neighbouring Authorities. Such different policy priorities will clearly have a bearing when comparing performance figures between Authorities.

3.4.3 Whilst national comparisons can be useful, it is far more important for the needs of the local customer/user to take precedence in the local environment.

3.5 What is the desirable condition of the asset?

3.5.1 The Highway Authority is responsible for the whole public thoroughfare in terms of both carriageway and footway, and therefore aims to maintain each element at similar levels of functionality. It is logical then to desire an asset condition that is broadly similar, i.e. one where the user perceives both carriageway and footway to be in the same condition. This may not however manifest itself in the same measurement of condition by current methods.

3.5.2 Footways are an important part of the highway asset in Warwickshire. Unlike carriageways, footways provide all customers with the facility of personal transport. More importantly, for many sections of the community without access to a car, footways provide the only means of independent mobility, if only to get to public transport facilities.

3.5.3 Additionally, through strategies to improve individual health and increase the environmental awareness of transport use, the use of footways is being encouraged by the County Council for short local journeys.

3.5.4 It is therefore of significant importance that the condition of the footway network is maintained to high levels of user satisfaction.

3.5.5 At present it is unclear what the desirable condition of the footway network is in terms of a measured condition. The desirable condition is not necessarily a perfect condition; a desirable condition also has to be affordable. It is futile setting expectations beyond what is realistically possible. Inevitably, the desirable condition of the network will always exceed reality, particularly where funding is limited. Thus our approach to maintaining the footways in the best possible way is twofold:

- Formal inspections - Safety Inspections and Condition Inspections; and
- Prioritised programmes of maintenance works.

3.5.6 From these inspections, together with information from local area staff, annual programmes of work are formulated for a variety of treatments.

3.5.7 There is a clear desire to reduce the number of defects recorded during Safety Inspections to nil; there is a desire to increase Public Satisfaction in the perceived condition of the footway network; there is also a desire to reduce the Condition Index value (derived from DVI Condition surveys) by the setting of ambitious yet realistic target values in the Local Transport Plan.

3.5.8 It should also be noted from previous public consultation that the simple appearance of a footway is important to users – whether it is in a well maintained condition or not.

3.5.9 Maintenance specifications provide for an overall level of serviceability using materials that provide a good level of durability, balancing cost against performance. Aesthetics have not historically been of primary importance. Economic development and regeneration objectives of achieving a more amenable environment can lead to an increase in visitors which in turn generates growth. However, to maintain such features in keeping with their original enhanced design and purpose demands a higher level of maintenance cost that adds an increased burden onto the highway maintenance budget.

3.6 Target

3.6.1 The fundamental desire is to improve the condition of the footway network in a way that is affordable and sustainable.

3.6.2 With annual maintenance budgets not maintaining parity with inflation, particularly within the construction sector, and increasing external pressures such as increasing energy costs, flooding, waste management, and insurance claims, there comes a point where the current standard of condition cannot be maintained. That is not to say that the network becomes unsafe, it is that there has to be acceptance that either desired standards have to be funded through increased budgets or the acceptable standard is reduced in line with the finances available. With footways however, it is clear that a reduction in surface quality is of far more concern to the user than a similar reduction on carriageways. The potential for personal injury and consequent claim against the Authority is greater on an uneven footway.

3.6.3 Additionally, as available budgets are less able to treat the desired amount of network, the pool of work required to maintain a given level of condition will increase and the type of maintenance treatment to treat that pool will become more expensive per kilometre as treatment get deferred and condition deteriorates further. Considerable improvement in slurry sealing as a product and better training of operatives in laying, has made it suitable for an ever increasing variety of locations. Consequently more use is made of slurry sealing as a cost effective maintenance solution on footways.

3.7 What is the value of the asset?

3.7.1 First calculations of the Gross Replacement Cost (GRC) asset value in 2007 were based upon locally derived parameters and gave a figure of £249.9m.

3.7.2 Since that first valuation, national valuation parameters have been set as a result of project work by the Highways Asset Management Financial Information Group (HAMFIG) carried out under the auspices of CIPFA (the

Chartered Institute of Public Finance and Accountancy) and endorsed by HM Treasury.

3.7.3 Using these parameters and allowing for more accurate network data together with construction costs that have outpaced general inflation levels, the current gross replacement cost of the footway network is **£375.8m**, an increase in footway value of 50.4% from previously reported figures. This compares with a calculated increase in the value of the carriageway network of 24.8%.

Table 3.7 – Footway Network calculated Gross Replacement Cost

October 2006	November 2010
£249.9m	£375.8m

3.7.4 Whilst it is not possible to state that these latest figures have absolute accuracy, the parameters used are nationally based and can therefore be considered robust. As with carriageways, future annual valuations will be reported to these national parameters.

3.8 What is the depreciated replacement value of the asset?

3.8.1 In the last few years, as with the development of national methodology for calculating the GRC of the network, parallel work has been undertaken to produce a workable method for calculating depreciation. A measure of depreciation gives a good picture as to the likely maintenance need (in financial terms) the highway requires in order to continue to fulfil it's function.

3.8.2 The reporting of depreciated replacement cost (DRC) for footways will be a mandatory requirement from 2011 as additional information to National Indicators (although there will be no National Indicator for footways). UKPMS will be the platform through which all of these calculations and reports will be provided. UKPMS Technical Note 46 sets out the parameters for the calculations. UKPMS software providers are at present building these requirements into their systems so that users can produce the required information at the end of the financial year 2010/11.

3.8.3 Briefly, use is made of condition data that Authorities already hold - and continue to collect for other purposes, and provides an opportunity to calculate DRC without having to resort to gathering even more information, with it's commensurate additional costs. However, in order to fulfil future mandatory requirements, more accurate inventory data for footway widths and lengths will need to be collected by the end of 2011/2012 that complies with the Whole of Government Accounting (WGA) methodology for Transport Infrastructure valuation.

3.8.9 Until national requirements via UKPMS software are available, the method used in the first TAMP can be applied to our updated data. With more

up to date network information, thus the DRC value of half of the GRC equals £187.9 million

3.9 What is the Gap?

3.9.1 Footway condition surveys have been extended to now include the Category 2 footway network. However, this is still a relatively small proportion of the whole footway network and, of greater significance, is what is generally believed to be the better parts of the footway network.

3.9.2 Consequently, it is expected that the overall condition of the footway network will, in Condition Index terms, exhibit a higher (worse) value when condition surveys are extended to lower categories of network.

3.9.3 With the calculation of depreciated replacement using national parameters yet to be carried out, the gap by this national method is currently unknown. As the new methodology takes account of many factors that influence the deterioration of the footways, it is expected that a figure that is as accurate as possible will be produced. It is not expected that this figure will be lower than previously reported.

3.9.4 Until values based upon national parameters become possible, the previously reported calculation method is still the most valid information available.

Table 3.8 – Indicated generic treatments for footways (2009/10) from Footway Condition Inspections

Generic treatment	%age of network
Slurry Sealing	10.4%
Resurfacing	7.9%
Reconstruction	0.1%

from Table 3.5 above

3.9.5 Whilst these values are taken from a very small sample of the footway network, an overall figure of 0.1% likely to need reconstruction nevertheless still represents about 5,713m². 7.9% of the network is at a defect level which indicates a resurfacing treatment is more likely; this represents about 451,000m² (equivalent to 10.4% of the network) indicating a slurry sealing treatment represents 594,000m².

3.9.6 In financial terms such indicated treatment requirements would need in the region of £370,000 for reconstruction, £15.8m for resurfacing and £1,485,000 for slurry sealing; making a total of some £17.7m. A significant aspect of these figures however is that they are based upon condition information for what is considered the better parts of the footway network. As

noted above, an overall higher need is expected when condition data for the wider network is obtained.

3.9.7 Footways, unlike carriageways, are generally constrained by adjacent features such as kerbing and building thresholds. Therefore to simply overlay a footway with a new surface course is rarely possible without significant alterations to adjoining features. Such an operation thus becomes uneconomic, and treatment gets deferred. Footway maintenance tends to be restricted to either a thin sealing of the existing surface or complete excavation and reconstruction; intermediate treatments are rare. The financial requirement indicated above for resurfacing is therefore likely to be much higher in practice as the eventual treatment would be nearer to a reconstruction in both execution and cost.

3.10 How can the gap be reduced through changes in practice to bring about savings, or through the generation of additional funds?

3.10.1 We have been using an asset management approach to maintaining the highway network for many years, which has allowed us to target finite resources to return the most benefit. The evidence of this has been in a steady improvement in performance figures from an initial level of recognising greater investment was needed to improve the footway network.

3.10.2 Whilst a calculated financial need for maintaining the network has been produced, the likelihood of actually having that amount to spend in the current economic climate is bleak. Consequently there is increasing focus on the primary function of simply maintaining the network in as safe a condition as possible for all users.

3.10.3 We are continuing to use resources in the best possible way and continue to re-use materials where an economic case for doing so is proven.

3.10.4 The aspirations set out in the original TAMP are no less valid in the present economic climate, but we are having to readjust priorities and timescales to match the funding available. There will also have to be a readjustment in expectations and an inevitable reduction in maintenance standards unless significant financial resources become available to allow long term maintenance. However, as stated above, on footways a reduction in surface quality has the potential for greater personal injury to the user than a similar reduction on carriageways.

3.10.5 Maintenance allocations are always subject to short term change. Reliable forecasting of maintenance need is imperative in order to focus attention on the long term requirement, which then demonstrates the need for consistent maintenance funding. However there is also an allied need to demonstrate that whatever funding is achieved, it is spent in the best possible way.

3.10.6 The most significant area of deficiency is one of knowledge of the network and its condition. Whilst quantities can be attributed to features based

upon collective knowledge and individuals experience, an accurate assessment of the complete footway network will only be possible following the wide scale collection of inventory data and condition inspection. Clearly to do this entails a significant cost, so the levels of detail must be tailored to the benefit to be gained from such information

3.10.7 With the ever increasing focus on re-use of materials, ever greater use of non-original products is being called for to meet many environmental targets. It must be borne in mind however, that simply recycling existing waste products is not always economically viable. Quite often supplies of new product can be procured at vastly reduced real costs to the Authority. Without external drivers such as landfill tax and aggregate taxes, waste minimisation becomes an uneconomic activity and budget allocations have to absorb the extra cost in following a sustainability agenda. One advantage with footway construction/maintenance is that the specification for materials is less onerous than for carriageways. Therefore there is scope for using surplus carriageway maintenance material in footway refurbishment works. Having now established a small scale recycling facility, we have made good use of recycled construction materials in footway maintenance schemes in recent years.

3.10.8 A common sense approach to maintenance work must consider programming work to make best use of available resources. Choice of the most suitable maintenance treatment, and its timely application will:

- Reduce the number of unexpected defects – leading to a reduction in Insurance premiums and need for specific funds for paying claims; and
- Extend pavement life and reduce the amount of more expensive future treatments.

3.10.9 Additionally, determining optimum frequencies of regular routine maintenance activities such as sweeping, weed killing and cutting back edge intrusion will add to the effective use of limited funds.

3.10.10 A particular problem with footways is the accelerated deterioration that is caused by inappropriate use (parked vehicles). It is recognised that in a lot of locations it is prudent to park vehicles off the carriageway even though the action may be illegal. The accelerated deterioration of footways in such cases must be balanced with the invisible benefit of providing unofficial parking facilities.

3.10.11 Co-ordination with others (e.g. utilities, promoters of new features etc) where maintenance work is planned is important, so that where possible all parties undertake everything at same time and before maintenance works are carried out. The New Roads and Street Works Act 1991 (and its associated Codes of Practice) together with The Traffic Management Act 2004 go a long way to helping this aim, whereby utilities and local Authorities are required to communicate with each other regarding future planning of works.

Chapter 4 – Highway Drainage

4.1 What is the asset?

4.1.1 The highway drainage asset currently consists of:

- Approximately 120,000 gullies;
- Spillways and grips (constructed open channels into verges);
- Drainage units in kerbs and footways; and
- A currently unknown length of highway gully connections, carrier drains and ditch-courses.

4.1.2 Though no inventory of highway drainage pipework exists, it is thought that we have in excess of 500km of pipe of various sizes across the County.

4.1.3 In addition, whilst it is assumed that the majority of roadside ditches are the responsibility of the adjacent land owner, some may be highway ditches if their primary purpose is to drain the highway. Even those that are the adjacent land owners responsibility might be considered a highway asset.

4.1.4 The County Council is also responsible for pipe crossings under the road. Larger crossings are considered as part of the bridge stock but smaller pipes (under 900mm) are maintained as part of the highway drainage. The number of these pipe crossings within Warwickshire is currently unknown.

4.2 What is the current condition of the asset?

Gullies and Connecting Pipework

4.2.1 Most gullies are designed with a silt trap to collect debris washed into them. The silt trap helps to keep the connecting pipes and carrier drains clear. In the past few years the gully silt traps have been emptied once a year.

4.2.2 Recent data suggests the number of gullies present on the highways of Warwickshire could be in the region of 120,000. The number of these which are not working is currently unknown, though previous data would suggest more than 7% may be faulty. Jetting programmes introduced in 2007 to begin to tackle these non-working gullies suggest that approximately 75% of those jetted can be cleared.

4.2.3 In addition to the gullies which are blocked, there are other gullies that have collapsed so that the gully emptying machine cannot empty the silt traps. The number of these gullies is uncertain but may be in the region of 1000. Most of these collapsed gullies will be the narrow ‘birdbath’ type. When planned highway maintenance schemes are carried out, it is usual to incorporate the replacement of these types of gully, if they exist on site.

4.2.4 A further problem with some gullies is the condition of the gully grate and frame. Some gratings are rusted, some are ‘dished’ which are not ideal

for current traffic, and some are inadequately set on the gully pot, which can cause surface potholes around the grating.

Spillways and Grips

4.2.5 There are limited records of the locations and condition of spillways and grips. Spillways and grips require periodic clearance to ensure they continue to work effectively. There is evidence in rural areas (from the condition of road edges that deteriorate where they are subjected to standing water) that there is a backlog in grip clearance.

Drainage units in kerbs and footways

4.2.6 There are limited records of the locations and condition of the drainage units in kerbs and footways. It is presumed that the majority of these are in adequate condition as they will be repaired as and when they are blocked or damaged.

Main carrier drains and Catchpits

4.2.7 Problems with carrier drains include blockages, due to silting or tree roots, and breakages, particularly caused by utility companies during the installation of new pipes and cables.

4.2.8 Any drainage problems caused by faults on carrier drains are recorded and actions to deal with the fault are included in works programmes. Following the Summer 2007 floods, a more formal system has been introduced to record all known drain defects on a central database to monitor backlogs of work. At present the database contains details of a number of locations where drains need investigation and repair.

4.2.9 There are no routine inspections of carrier drains, and so the database of known problems may be an underreporting of the total number of problems.

4.2.10 Catchpits are designed to reduce silting in the carrier drains by allowing any silt entering the pipes to be caught as water passes through the catchpit. To enable this to work the catchpits need emptying when the sump is full of silt. At present there is no routine system for emptying catchpits. There have been reports from projects where chambers have been inspected, that the lack of maintenance is the cause of restrictions to flow or complete blockages in some cases.

Ditches

4.2.11 Ditches become silted up restricting water flow along them, but also causing blockages to outfalls from gullies and to the inlet to continuing piped systems at headwalls.

4.2.12 Action is taken to ensure ditches are cleared when silting causes problems on the highway.

4.2.13 There is evidence to suggest that incidents of highway flooding during heavy rainfall could be reduced by deepening or clearing ditches. As there are no routine inspections of ditches the extent of the problem is not currently known.

Pipe Crossings

4.2.14 Blockages in pipe crossings usually cause an immediate problem with flooding of land adjacent to the highway. Such blockages are dealt with as they occur, and so it is believed that most pipe crossings are operating satisfactorily.

4.2.15 Some pipe crossings may be partially silted up and not operating to full capacity, but as there are no formal inspections of pipe crossings the extent of any problems is not known.

4.3 What is the desirable condition of the asset?

4.3.1 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 at least Q5 standard (i.e. able to cope with a 5 year storm). As a result of the incidents of flooding during 2007 there is a debate as to whether pipes, and particularly pipe crossings, should ideally be to Q10, Q20 or even a higher standard.

4.3.2 This standard will ensure that, under normally encountered rainfall, highways will be free from standing water which might cause a danger to vehicles. Water can also cause a problem for pedestrians where it forms puddles or where it is splashed onto footways by passing traffic. In some locations blocked drainage systems can result in flooding to land and/or properties.

4.3.3 There are locations where very heavy rainfall caused flooding of properties in 2007. Most of this flooding was caused by rising levels in water courses and rivers or run-off from surrounding land. There were however a few locations where flooding occurred when the highway drainage system was unable to cope with the volume of water on the road. In these instances the water causing the flooding generally came from surrounding fields onto the road. An example is at Wootton Wawen, where properties were flooded on five occasions in 2007. In these instances the drainage systems ideally need to be able to perform to a higher standard.

4.3.4 The ideal condition of gully tops is to have them in a condition that does not cause a danger to passing traffic. Thus they need to be flat, of adequate strength and securely set onto the gully.

4.3.5 In recent years the theft of gully gratings, due to the high value of metals, has been more prevalent. When refitting gully gratings and frames

there has been a move towards hinged and thus more theft resistant gratings, for this reason.

4.3.6 On many roads, particularly unkerbed minor roads, standing water on the highway weakens the subgrade of the road. This in turn can reduce the life of the road. In these cases water can generally be removed by cutting grips and ensuring that ditches are working. On some roads, standing water can only be removed by reshaping the road through patching or resurfacing. Although there is evidence that roads, particularly road edges, have failed due to standing water, the real extent of the problem is not currently known.

4.4 What is the value of the asset?

4.4.1 Without an accurate inventory of the complete drainage asset, estimates of value are at best an initial guide. Multiplying the cost of installing a gully by the number of gullies currently estimated to exist is £23 million. Adding in 500km of pipework at a construction cost of £50 per metre is a further £25 million. Ditches and other related assets (such as headwalls, manholes and catchpits) will increase the total to a figure in excess of **£50 million**. A more accurate valuation will only be possible following the compilation of a detailed inventory of the drainage asset.

4.4.2 Although the condition of the asset will clearly deteriorate with time, much of the asset will have a very long life. Even the brick culverts that exist, and which are known to deteriorate over a period of time have a likely life of around 100 years or more.

4.4.3 An estimate of the amount that might be required to bring the drainage system to an adequate standard would be between 10-20% of the total value, or £5-10 million. This will be far more if there is a desire to increase the present capacity of drainage systems to reduce incidents of flooding (although flooding does generally only occur in isolated places).

4.4.4. An accurate assessment of the amount required to bring the drainage system to an adequate standard would require a full survey of the drains and incidents of flooding and an estimate of the costs of putting right all defects and capacity problems.

4.5 How can the gap be reduced through changes in practice to bring about savings, or through the generation of additional funds?

4.5.1 The 2010/11 budget for drainage maintenance was around £1.25 million. This included funding for gully emptying, jetting and drainage repairs and includes additional funding which was approved through the Area Committee process. Funding has been made available in 2006, 2007, 2008, 2009 and 2010 to deal with specific drainage improvements.

4.5.2 Up until 2006, a budget was made available to empty all gullies once a year. In 2007 a reduced number of gullies were emptied to allow some extra jetting to be carried out to clear blocked gullies. This has demonstrated that

this simple operation can achieve a 75% success rate at unblocking inoperative gully connections.

4.5.3 A full evaluation of the backlog of drainage repair will be necessary to ensure a complete picture of all the repair work required. A list of the backlog has been prepared and the dedicated drainage gangs are working through this list on a priority basis. However, as problems are solved, new ones are continually added to the list. This means a backlog is likely to continue into the foreseeable future.

4.5.4 The approach to resolving backlogs of work will be to prioritise the work in the backlog lists based on costs and benefits from the repair.

4.5.5 A full and accurate backlog list would require an inventory of the highway drainage asset. However, producing an inventory of manholes, pipes, ditches and all other drainage assets will need a significant resource. The cost of producing a more accurate inventory will need to be balanced against the benefits that might accrue from having the inventory. One of the benefits of having an inventory would be a reduction in investigative work to locate drains before repairs can be carried out.

4.5.6 There has been a start to collecting drainage inventory, focusing on known flooding locations. CCTV surveys, jetting and mapping work is almost always the start of significant flood investigations. The information collected not only serves to guide the design and planning of flood alleviation projects, but has also been kept on file with a view to developing a GIS map based database in the future.

4.5.7 In 2010, the map based inventory started to be transferred to the County's WOMBAT mapping software and it is hoped that this trial can trigger the start of full transfer of all the information collected to date.

4.5.8 After a successful "Transport Asset Management: Element 2" bid to DfT in 2010, a project is underway to electronically collect and store a map based inventory of all gullies in the County. New software and hardware has been procured, and data collection has started with the intention of having the bulk of the gully stock surveyed by the end of the 2010/11 financial year.

4.5.9 When the gully inventory is complete the data will be used to manage the gully maintenance regime. The maintenance regime will be driven from devices within the gully machine cab. The status of each gully will be recorded by the operator against the asset record. This information will then be used to:

- Develop a needs based variable frequency cyclic maintenance regime;
- Create a maintenance history against each gully; and
- Creating programmes of work for jetting and general repairs.

4.5.10 By establishing a permanent electronic mapped record of the location, type and status of each gully we believe that we can develop a gully

maintenance regime that will provide a far better service, at the same cost, than is currently the case.

4.5.11 It is envisaged that the new hardware and software could then be used to extend the inventory to include manholes, catchpits, headwalls, etc. A more substantial inventory could be developed over a period of time, allowing more focussed and planned maintenance work to be carried out.

4.5.12 It has been suggested that a cyclic maintenance programme for all of the County's highway drainage asset should be introduced which might include cleaning and jetting of catchpits and pipes and cleaning out of ditches and grips to an annual, bi-annual or even less frequent programme. The costs of this would need to be compared to the benefits in order to establish if such a programme of routine work can be justified.

4.6 Conclusions

4.6.1 There is a known backlog of drainage work, but at present the full cost of the backlog of drainage work can only be a very broad estimate based on the available information.

4.6.2 Limited information is readily available on the drainage asset (location and condition of the gullies, drains etc). Decisions will need to be made about the benefits of improving the inventory, the cost of collecting and recording the information, and the benefits that might accrue from doing this.

4.6.3 An electronic asset management approach is now being developed which will drive changes to the way maintenance work is planned and carried out in the future. Efficiencies and cost savings are a real possibility as more data becomes readily available to aid in the organisation of cyclic maintenance regimes and the planning of drainage repairs.

Chapter 5 – Street Lighting

5.1 What is the asset?

5.1.1 As at October 2010, the County Council own 48,890 street lighting points. These range from 4/5m high columns to 6, 8, 10, and 12m columns, to many heritage style columns, wall brackets and subway lights.

5.1.2 In 2006 the County Council completed a detailed survey of its street lighting columns. The information collected included column manufacturer, lantern manufacturer, year installed (approximate), column material, lamp type and wattage, and details of any protection systems such as paint and/or whether or not the column is galvanised. The information gathered has greatly assisted in managing the asset, and is updated as and when changes are made to the lighting stock and discrepancies found.

5.2 What is the current condition of the asset?

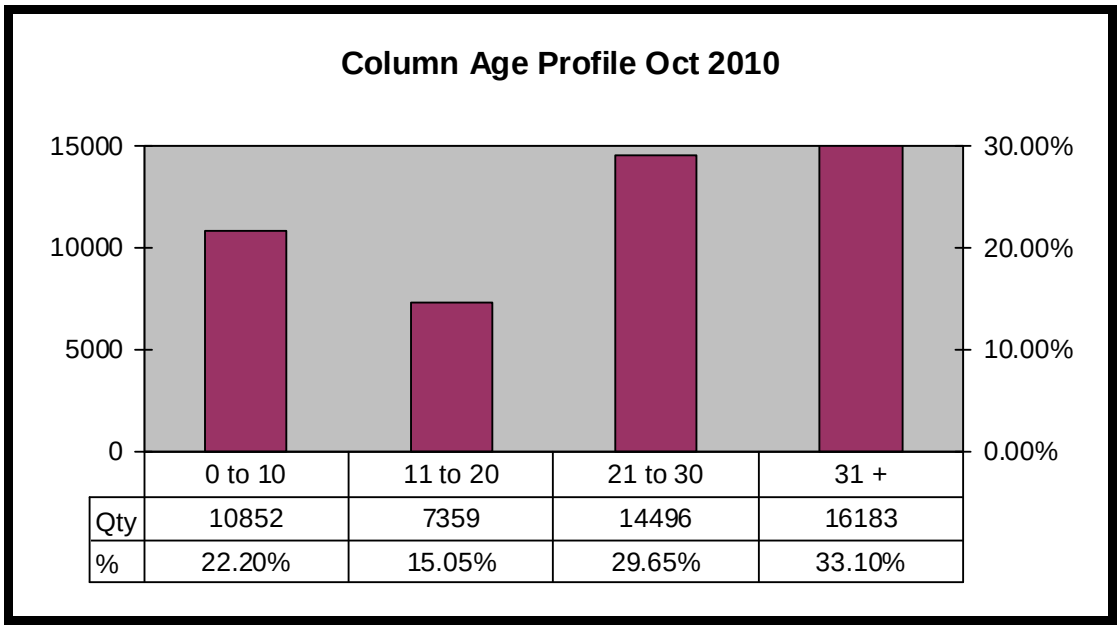
5.2.1 The design life for a street lighting column is, unless otherwise specified, generally 25 years. Warwickshire is no different to the majority of other Local Authorities around the country which have an ageing lighting stock. The age profile of the lighting stock in Warwickshire is set out in Table 5.1 and Figure 5.1.

Table 5.1 – Street Lighting Age Profile

Age Range	**May 2006**	**Oct 2010**	**Change**
0-10 years	5,251	10,852	5,601
11-20 years	7,012	7,359	347
21-30 years	20,148	14,496	-5,652
31+ years	14,433	16,183	1,750
Total	**46,844**	**48,890**	**2,046**

5.2.2 Table 5.1 illustrates that there has been a total increase of columns from 2006 to 2010 of 2,046 units. The other variances are from columns being replaced, new columns being adopted and inventory amendments.

Figure 5.1 – Street Lighting Column Age Profile



5.2.3 With regard to column materials, there are various types in place in Warwickshire including steel, concrete, aluminium, composite and wood. Table 5.2 shows the quantities of each material used within the County.

Table 5.2 – Column Material Quantities

Material	**Quantity**	**%**
Aluminium	1971	4.0%
Cast Iron	1386	2.8%
Concrete	2396	4.9%
Fibreglass	13	0.0%
Stainless Steel	103	0.2%
Mild Steel	41943	85.8%
Wood Pole brackets	518	1.1%
Wall Mounted	560	1.1%
Total	**48890**	**100.0%**

5.2.4 The County Council has had a structural testing regime in place for sometime, however in 2008 a four year framework contract was introduced for the structural testing of lighting columns. Since the contract was set up the contractors, CMT (Testing) Ltd, have tested approximately 11,000 columns. By the end of the current testing contract in 2013 we aim to have all available tubular mild steel columns over 25 years old tested and certificated.

5.2.5 We have produced a hierarchy of columns, which as and when funding becomes available will be targeted for replacement. These are:

1. Columns which have failed the structural testing.
2. Concrete columns – these are generally 40 years old and some have a known manufacturing defect, however we currently have no method of testing them.
3. Cast Iron columns – These are generally 80 years old being old, and while we have had no columns collapse we have no method of structurally testing them.
4. Sectional Steel Columns – These are generally 40 years old and are installed on main traffic routes which have been de-trunked. We have no method of structurally testing these columns.
5. Columns which support flower baskets/CCTV cameras etc. These columns should be replaced with a type more suitable for such attachments.
6. Columns on footpaths which require scaffolding to maintain. These should be changed to a type which allow easier maintenance.

5.2.6 With regard to lighting quality, there are various types of lighting sources which have different applications. In general terms, Warwickshire has various quantities of the following light sources. These are briefly described below, with the detailed breakdown within Warwickshire set out in Table 5.3.

- **Low Pressure Sodium (SOX)** – Monochromatic Orange light used extensively all around the country. Efficient reliable lighting, but does have very poor colour rendition and can leave areas looking quite unattractive at night time. The British Standard for road lighting BS5489:2003 and BS EN 13201:2003 bases the desired figure in each the lighting classes on lamps with a colour rendering (R_a) of no less than 20. Due to SOX lamps being a monochromatic light source they do not have an R_a value and therefore we should not use these when installing new lighting schemes.

- **High Pressure Sodium (SON)** – Can be described as Golden White Colour light which is more attractive than SOX lighting and offers slightly better colour rendition and facial recognition. Very reliable light source but generally uses approximately twice as much electricity as SOX. Has been widely used in Warwickshire as an upgrade from SOX lighting and on new developments.

- **Mercury (MBF)** – This light source contains potentially harmful chemicals and is gradually being phased out with all production ending in 2015. Warwickshire County Council have actively been replacing these lanterns wherever possible. Generally 80W Mercury lanterns have/are replaced with 70W SON lanterns which have a circuit saving of 10W every time one is replaced. This equates to a saving of approximately 41.3kWh (Kilowatt-hours) per annum. At our present unit cost of 8.5p per kWh this yields an annual saving of around £3.51.

- **White light sources such as Metal Halide, Compact Fluorescent etc (CDM/CDO/PLL/HPI etc)** – Quite inefficient light sources that emit high quality lighting with regard to colour rendering and facial recognition. Unfortunately it is necessary to use more lighting points than other light

sources to achieve the necessary lighting levels. This type of lighting has been superseded by CosmoPolis and LEDs.

- **CosmoPolis (CPO-TW)** – This is another white light source which has been developing over the last five years. The wattages are generally lower than previous white light sources and due to the reduced energy the County Council have been specifying this light source on new developments and complete replacement schemes since 2008. With the increasing quantities throughout the country the cost has decreased. Since August 2010, the County Council started specifying this on all column replacements where possible.

- **Light Emitting Diodes (LED)** – This technology has been evolving over the last 10 years and has been adopted by Warwickshire County Council for illuminating road signs and bollards for some 5 years. As well as being very low wattage the LEDs have a lifespan of between 50,000 and 100,000 hours. This long lifespan means there is no requirement for a bulk lamp change and clean and therefore leads to a reduction in maintenance costs. Over the last two years advancements in technology have allowed the use of LEDs in road lighting. Following successful trial schemes, the County Council has started specifying these on footpath lighting schemes. Currently due to the cost of the equipment the County Council has not trialled any lanterns on road lighting schemes, but as and when the cost reduces to an acceptable level trials will be carried out with a view to utilising the technology further.

Table 5.3 – Lamp Types and Quantities in Warwickshire

Lamp Type	**Quantity**	**Percentage**
Low Pressure Sodium	18,637	37.8%
High Pressure Sodium	28,675	58.0%
Mercury	570	1.2%
White Light Source - Ceramic Metal Halide, Compact Fluorescent etc	967	2.0%
LED	30	0.1%
CosmoPolis	381	0.8%
Other	128	0.3%
Total	**49,358**	**100%**

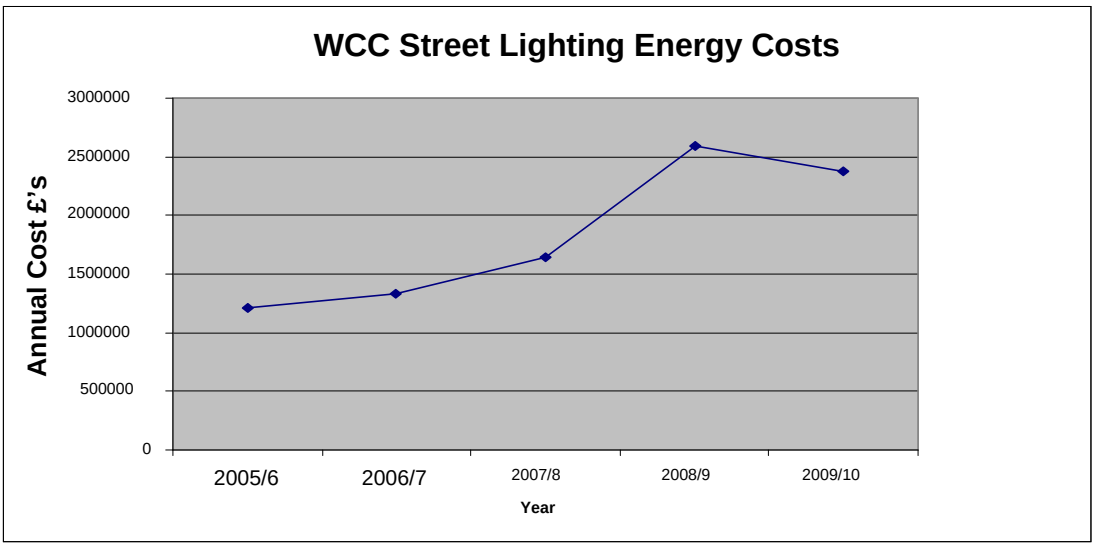
5.3 Energy Requirements

5.3.1 Warwickshire's energy is purchased by ESPO based on dynamic half hourly trading, with Siemens currently acting as our meter administrator (MA). A new Photo Electric Control Unit (PECU) array is due to be commissioned in November 2010. With the installation of the new PECU array, the County Council will be going to tender for an MA capable of administering street lighting Central Management Systems.

5.3.2 Energy costs have fluctuated over the last five years from approximately £1,370,000 in 2006/07 to £2,100,000 in 2010/11, peaking at

approximately £2,600,000 in 2008/09. The figures show how unpredictable the energy market is and as such the County Council is always looking at how to cut the amount of energy used.

Figure 5.2 – Street Lighting Energy Costs



5.3.3 Due to the costs of electricity, there is a general trend throughout the country to start varying lighting levels and Part Night operation of street lighting. The County Council conducted an initial trial of varying lighting levels in 2008. Whilst successful in proving the principle of variable lighting, the technology chosen proved slightly unreliable and therefore did not progress any further than the trial. A second trial using a central management system (CMS) is currently underway and is proving successful in monitoring and operating the lamps. The second stage of the project installed variable lighting modules to these units in November 2010.

5.3.4 The County Council is currently considering the use of a CMS for the introduction of Part Night Operation throughout the County. This would affect approximately 80% of the County's lighting stock and would involve the switching off of lighting between the hours of midnight and 05.30. At the current energy rate of 8.5p kWh this has the potential to cut our energy bill by approximately £540,000 which equates to 25%. In CO_2 terms this equates to approximately 4,500 tonnes or 35% of our current emissions.

5.3.5 As well as their intended use as supports for street lighting lanterns, there has in recent times been a large number of requests to use street lighting columns for other functions including the support of flower baskets, festive decorations, CCTV, and vehicle activated signals. All street lighting columns should be in a structurally sound condition and be designed to withstand the loading the equipment adds.

5.4 What is the desirable condition of the asset?

5.4.1 In short, the desirable state for Warwickshire's lighting stock is:

- For the entire inventory to be in good condition and generally less than 30 years of age;
- For there to be no Mercury lanterns remaining in the County;
- For there to be no Concrete columns in the County;
- For columns to be regularly painted and well kept aesthetically; and
- That any columns which are required to support attachments such as flower baskets and banners are designed for the purpose.

5.4.2 There are demands on Street Lighting resources which generally speaking are not complimentary. Many stakeholders request improved lighting in areas for security reasons which generally increases the electricity requirement due to higher Wattage lamps and/or more lighting points being necessary. The other major requirement is for the County Council to be as energy efficient as possible which can not always be accommodated when people are constantly looking for better lighting. Lighting improvements are made when funds are available either through County Council budgets or from external funding.

5.5 What is the value of the asset?

5.5.1 As noted earlier, there are approximately 49,000 street lighting columns in Warwickshire. As the average cost for replacing a column is in the order of £1,000 it is therefore estimated that the asset replacement value is around £49,000,000.

5.5.2 Ideally there is a need to spend around £1,500,000 per annum over 30 years to reduce the age profile of the Street Lighting and Illuminated Traffic signs stock to bring it all under the 30 year old threshold. The lighting would be replaced in order of priority as set out above.

5.6 How can the gap be reduced through changes in practice to bring about savings, or through the generation of additional funds?

5.6.1 In order to reduce the need for future maintenance spending, the County Council's Street Lighting Section are continually looking at what is specified both for maintenance and for Section 38 developments, specifically in relation to:

- Aluminium lighting columns that have a life expectancy of over 70 years, which can be easily recycled at the end of their life, and are made from approximately 90% recycled material;
- Better quality lanterns that have electronic gear which can increase lamp life reliability, slightly reduce electricity consumption, and are made from materials that can be easier recycled at the end of their life;
- Photocells which use ¼ Watt instead of 1 Watt Photocells used until recently;

- Remote monitoring equipment which will save on night patrols and thereby speed up the time which we know about faults, eradicate safety issues of patrol staff, and remove the car emissions generated by patrol staff;
- Better quality lamps that have a longer cycle between Bulk Lamp Change and Clean and better reliability; and
- LED street lighting lanterns which have a long life of over 50,000 hours, and require no bulk lamp changing.

Chapter 6 – Illuminated Signs, Bollards and Vehicle Activated Signals

6.1 What is the asset?

6.1.1 As at October 2010, the County Council own 240 Vehicle Activated Signals, 1,910 Illuminated Bollards, and 5,211 assorted Illuminated signs including Pedestrian Refuge Indicators, Belisha Beacons, and supplementary lighting used at Pedestrian Crossings.

6.1.2 Each Area Engineer is continuing a survey of all illuminated signs within their allocated area in order to ensure that the current inventory is accurate as possible. This survey is ongoing.

6.2 What is the current condition of the asset?

6.2.1 The stock of Illuminated Bollards are generally in good condition. Where existing bollards require replacing they are being fitted with new LED technology units which are more energy efficient.

6.2.2 There is an ever increasing quantity of Vehicle Activated Signals being installed as part of traffic calming schemes. These are also generally in a very good condition with them being so relatively new – most have been installed in the last 5-7 years.

6.2.3 Unfortunately the County Council currently has a limited inventory of the condition of illuminated traffic signs. It is felt however that there is a significant quantity of illuminated signs that either need to be replaced completely or have sign plates and/or lanterns replaced. However it is also felt that there are many illuminated signs which are relatively new and in good condition.

6.3 What is the desirable condition of the asset?

6.3.1 In short, the desirable state for Warwickshire's Illuminated Traffic Sign, Vehicle Activated Signal, and Illuminated Bollard stock is for:

- The entire inventory to be in good condition and generally less than 30 years of age;
- There to be no Mercury sign lanterns remaining in Warwickshire;
- Sign posts to be well kept aesthetically;
- All sign plates to be in good condition with no deterioration or damage;
- All sign and bollard lights to be operating correctly;
- Vehicle Activated Signals to be operating correctly;
- Bollards to be in place and correctly installed; and
- All units to be LED lamps where possible.

6.4 What is the value of the asset?

6.4.1 The average cost of replacing an illuminated traffic sign or illuminated bollard is in the order of £1,000. Therefore, as we have 7,120 signs and bollards it is estimated that the asset replacement value is around £7,120,000. The average cost for replacing Vehicle Activated Signals (VAS) is in the order of £3,500 per signal. As we presently have 240 VAS it is estimated that the asset replacement value is around £840,000. This gives a total estimated asset replacement value of £7,960,000.

6.5 How can the gap be reduced through changes in practice to bring about savings, or through the generation of additional funds?

6.5.1 In order to reduce the need for future maintenance spending, the County Council's Street Lighting Section specify LED sign lights and bollards where possible. This reduces energy and maintenance costs by prolonging life and removes the need for an annual bulk lamp change and clean.

6.5.2 The County Council is currently working through a project to de-illuminate all signs which are no longer required to be lit. Any new signing schemes are checked to ensure no signs are lit unnecessarily.

Chapter 7 – Highway Structures

7.1 Introduction

7.1.1 This section of the TAMP provides details of how Warwickshire County Council's Bridge Maintenance Group manages the stock of bridges and other highway related structures.

7.1.2 It includes descriptions and details of the following facets of the system:

- The purpose and benefits of an Asset Management Plan;
- The principles of asset management;
- The database of the assets;
- Links to the financial planning of works; and
- The future development of the Asset Management Plan.

7.1.3 It is emphasised that the Plan is a flexible and continually changing document.

7.2 What are the Assets?

7.2.1 The assets included in this section of the Plan are:

- The bridges which carry or cross highways;
- Footway, bridleway and cycleway bridges (except as noted below);
- Culverts which carry or cross highways; and
- Other highway related structures, in particular retaining walls.

7.2.2 Assets of this nature that are located wholly or partly within Warwickshire and are owned by the County Council or other owners are included in this section of the TAMP.

7.2.3 It should be noted that most footway and bridleway bridges which are not part of the road network are the responsibility of the County Council's Countryside Recreation Group and are covered in the section on the Public Rights of Way network.

7.3 Purpose of and Need for the Plan

7.3.1 This section of the document forms part of a larger Transport Asset Management Plan which in turn will contribute to the County Council's management of its overall transport assets.

7.3.2 The purpose of asset management is to provide a systematic framework to manage the assets in order to provide the required levels of service in the most cost effective way.

7.3.3 Local Authorities are required to prepare a TAMP as part of the Local Transport Plan process.

7.3.4 Asset Management fits within the current framework for 'Whole Government Accounting', with the objective of promoting greater accountability and transparency.

7.3.5 The Prudential Code requires local authorities to consider option appraisal and asset management to demonstrate that plans are affordable, prudent and sustainable.

7.4 Benefits

7.4.1 The Asset Management process provides a greater degree of management control and understanding. Additionally, it allows the consequences of under-funding to be demonstrated, providing justification for appropriate levels of funding to be provided.

7.5 Basis and Principles

7.5.1 The Asset Management system is based on the following key principles:

1. Stakeholder focused – Stakeholder requirements will be used to define goals objectives and levels of service.
2. Strategic – A long term strategic view of requirements will form part of the system.
3. Integrated – Links will be established with the management of all other asset types.
4. Networked System – The performance of the whole asset base will be maximised.
5. Whole Life – Where appropriate, the whole life of the asset will be considered.
6. Holistic – Wider economic, social and environmental impacts will be considered.
7. Sustainability – The asset base will be preserved and replenished in a sustainable way.
8. Targeted – Works will be prioritised using an assessment of needs and benefits together with condition indicators.
9. Performance Based – The condition of the assets will be linked to and monitored against strategic goals and objectives.
10. Risk Based – The likelihood and consequences of asset failure will be assessed and managed.

7.5.2 Source documents used in the preparation of this section of the TAMP include:

- Management of Highway Structures – A Code of Practice (Roads Liaison Group September 2005);
- Guidance on Local Transport Plans (Department for Transport, July 2009);
- Guidance Document for Highway Infrastructure Asset Valuation (CSS/Technical Advisors Group Asset Management Working Group – July 2005); and
- Maintaining a Vital Asset, UK Roads Liaison Group – November 2005.

7.6 Goals and Objectives

Levels of Service and Performance Targets

7.6.1 All bridges and highway structures should be safe and fit for purpose with minimal restrictions in place.

7.6.2 The overarching bridge maintenance policy is to avoid any deterioration in the bridge stock. This is the stated intention in the current Warwickshire Local Transport Plan.

Measurement of Bridge Condition

7.6.3 All structures are inspected on a two-year cycle so that deterioration can be monitored. In addition to these General Inspections (GI's), more detailed Principal Inspections (PI's) are carried out together with a series of underwater and confined space inspections where appropriate.

7.6.4 The inspection programme leads to the production of Bridge Condition Indicators (BCI's) in accordance with ADEPT (Association of Directors of Environment, Economy, Planning and Transport (formerly CSS)) recommendations, which have been adopted as a national standard.

7.6.5 BCI's are divided into two categories for each structure:

- BCI ave – Average Stock Condition; and
- BCI crit – Condition of Critical Elements.

These indicators can be averaged for all structures to provide figures for the entire bridge stock.

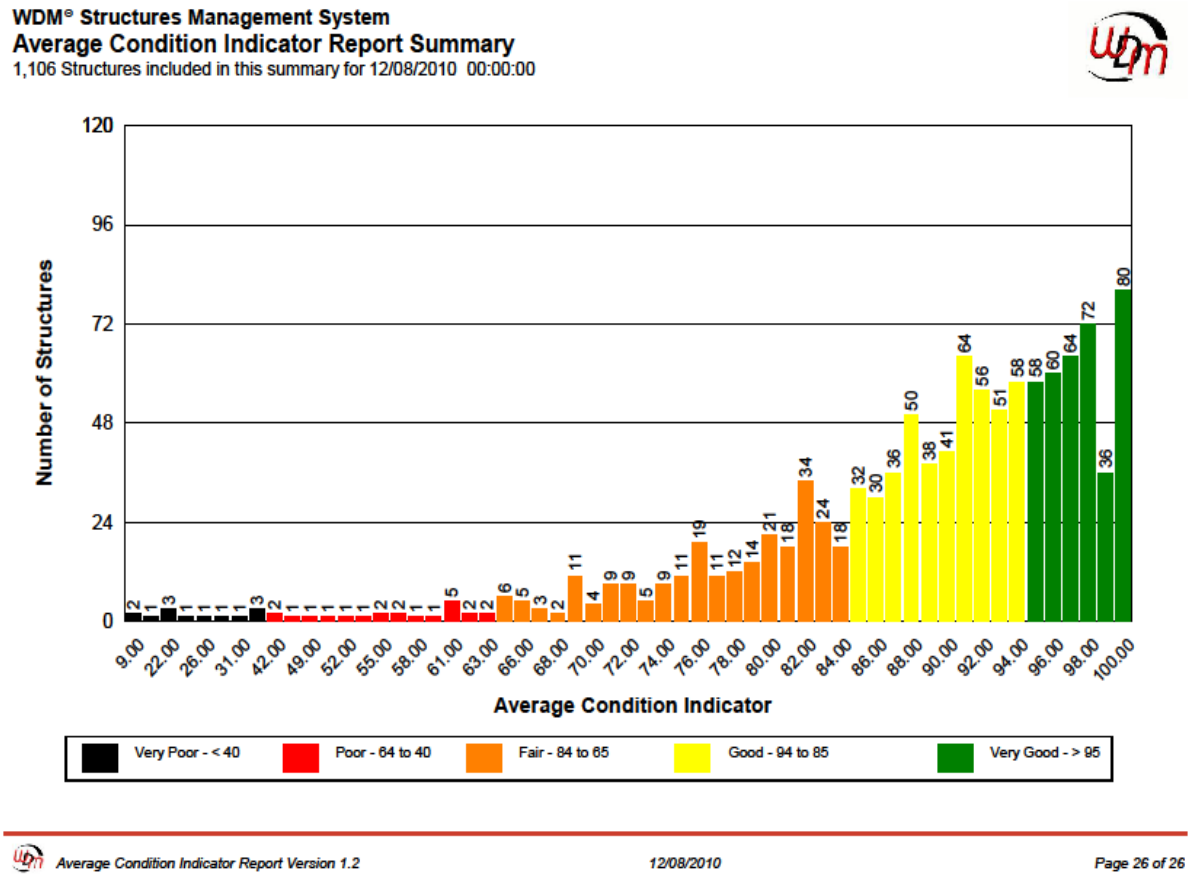
7.6.6 BCI values are classified as very good, good, fair, poor, very poor and severe.

7.6.7 The current BCI values for structures in Warwickshire are 89.25 ave. and 82.60 crit., which fall within the "good" category. Figure 7.1 shows the spread of BCIs.

7.6.8 The proportion of the bridge stock falling within the various BCI categories is as follows:

- Very Good 33.5%
- Good 41.3%
- Average 22.5%
- Poor 2.0%
- Very Poor 1.2%

Figure 7.1 – Average Condition Indicator Summary



7.6.9 Other Indicators may also be calculated – the Availability Performance Indicator relates to the effects of imposing restrictions on a structure and Reliability Performance Indicator relates to the probability and consequences of failure of a structure. Guidance on these indicators is currently under revision and so figures have not yet been finalised.

7.7 Asset Base and Characteristics

Database

7.7.1 The County bridge and structure stock is managed using a dedicated electronic structures management system (SMS), which holds summary information including photographs of all structures, inspection history, assessment details and repair history. The database automatically calculates bridge condition indicators and asset values and can sort and analyse bridge-related information into any combination of chosen information fields.

7.7.2 All bridge record drawings are retained. All historic drawings have been converted to electronic format.

7.7.3 There has previously been a lack of information on retaining walls in the database and a data gathering programme is in progress. Details of previously unrecorded retaining walls are being added to the database. During 2009/10, all retaining walls on A and B Roads were located and recorded. In many cases, ownership of these structures is unclear.

7.7.4 The system is continually being expanded and updated, and will in future include minor works invoicing and management and financial control of the structures workbank. From May 2011, all bridge maintenance work will be included in the County Highway Maintenance contract and SMS will be electronically linked to a larger management system with greater capability for ordering and invoicing work packages.

Breakdown of Assets

7.7.5 Tables 7.1 provides details of all highway structures within Warwickshire and their ownership.

Categorisation of Assets

7.7.6 The categories of structure used in the database are those as defined by the Midlands Service Improvement Group (MSIG).

7.7.7 In Warwickshire, culverts with a span of less than 900mm are maintained by County Highways Group rather than bridge maintenance.

7.7.8 In 2009 it was agreed that, subject to the availability of sufficient funding, a number of the larger or more complex bridges on the Warwickshire Public Rights of Way Network would be incorporated into the highway bridges database to assist in establishing a systematic inspection and maintenance routine. 324 bridges have so far been added to the database

7.7.9 It has been suggested that with the proposed change in status of British Waterways, responsibility for maintenance of some or all of their structures may transfer to the relevant highway authority in the future. This would represent a very significant increase in the bridge stock and would require substantial additional funding.

Table 7.1 – Highway Structures in Warwickshire (as at September 2010)

Bridges

Owner	Structure Type											
	Culvert	Arch	Concrete up to 5m	Concrete 5-10m	Concrete >10m	Metal	Timber	Subway	Jack Arch	Trough	Post Tensioned	Deck Removed
WCC	383	336	143	72	56	70	10	9	2	1	2	2
Network Rail	0	68	1	19	10	41	0	1	19	1	0	0
Rail Property	0	16	0	1	0	2	0	0	4	0	0	0
British Waterways	0	64	0	12	1	3	0	0	0	3	0	0
Others	18	27	8	4	9	16	7	0	2	2	0	2
	401	511	152	108	76	132	17	10	27	7	2	4

Retaining Walls

Owner	Retaining Walls
WCC	51
Network Rail	0
Rail Property	0
British Waterways	0
Others	55
	106

Bridges By Span

Owner	Largest Single Span									
	Up to1.5m	1.5-3m	3-5m	5-7.5m	7.5-10m	10-15m	15-20m	<20m	TBC	
WCC	415	248	139	100	64	62	35	23	0	1086
Network Rail	3	2	8	26	69	33	14	5	0	160
Rail Property	0	0	2	0	15	4	2	0	0	23
British Waterways	0	2	7	47	18	9	0	0	0	83
Others	17	18	10	5	11	9	3	3	19	95
	435	270	166	178	177	117	54	31	19	1447

7.8 Asset Value

7.8.1 Asset Valuation is the calculation of the current monetary value of an authority's assets.

7.8.2 Asset value for highway structures is taken as the cost of a complete replacement structure excluding any public utility works or land acquisition, reduced by the cost of any outstanding maintenance works. The new structure is generally taken to be the most appropriate modern design except in the case of heritage structures where only a like for like replacement would be acceptable.

7.8.3 The value of the assets is calculated using the following method:

- The replacement costs of various types of structure are calculated using actual construction costs. These costs are related to the gross areas of the structures and are factored to allow for inflation to a base year;
- An approximate relationship is derived between area and replacement cost for each class of structure using a constant base year;
- Each structure in the database is allocated an asset value using the relevant figures for its type and area;
- For heritage structures, additional factors are applied to take account of their different nature; and
- Allowance is made for any known outstanding remedial work.

7.8.4 In order to benchmark asset values, published information from other authorities and groups of authorities is monitored.

7.8.5 The system is regularly updated to take account of new construction information and inflation.

7.8.6 The current asset value of each structure is calculated within the Structures Management System.

7.8.7 The current total asset value is **£690m** (based on August 2010 figures). The value has increased primarily because of the inclusion of structures on de-trunked roads and the inclusion of a number of newly built structures on the Rugby Western Relief Road.

7.9 Future Demand

7.9.1 In planning strengthening and maintenance works, account is taken of any likely future changes in the usage of structures. For example, the construction of a new bypass could reduce the traffic levels on a particular bridge. Conversely, a new development may increase the usage, and a contribution may be sought from a developer for improvement works.

7.10 Lifecycle Plans

7.10.1 The concept of lifecycle planning is not as clear-cut with structures as with roads, which deteriorate over time and are then replaced. Many structures, particularly heritage structures are expected to last almost indefinitely and their maintenance is geared towards this. There are however routine maintenance issues to be planned, for example pointing of masonry joints, waterproofing etc.

7.11 Work Plan

7.11.1 The County Council prioritise maintenance and strengthening work on bridges and other structures based on:

- LTP and national transport objectives;
- Engineering judgement;
- Bridge Condition Indicators;
- Specific inspections of reported problems;
- Consultation; and
- Available funding.

7.11.2 The need for strengthening works generally stems from assessments, but the same consideration of available funding, engineering judgement and consultation all apply to their prioritisation.

7.11.3 Increasing use of the structures management database will be made to prioritise work, but there will still be an important element of engineering judgement in the process.

7.11.4 A list of schemes is prepared for each financial year, and named schemes with an overall cost in excess of £100,000 has to be approved by the County Council's Cabinet. It is not realistic to prepare a totally fixed programme for future years because urgent schemes appear as a result of inspections or accidental damage, and the limited funding that is available must be targeted where it is most needed.

7.11.5 Starting in 2010, major projects are being undertaken:

- To assess the risks and effects of major flooding events on the bridge stock; and
- To examine the strength and suitability of bridge parapets, particularly on the older bridges.

These projects are likely to lead to additional work on the bridge stock

7.12 Financial Plan

7.12.1 Bridge Maintenance funding is allocated on an annual basis. A financial plan is drawn up and submitted to Councillors for approval. As noted above, changes to the programme of work are inevitable during the year and the plan

is regularly reviewed and updated. Any significant changes to the programme must be approved by Cabinet.

7.12.2 The basic financial plan is expanded into a detailed schedule of work and responsibilities. Flexibility is required to cater for unforeseen works which arise.

7.12.3 A widely accepted target figure for annual bridge maintenance is 1% of the gross replacement cost. In Warwickshire, this would equate to approximately £6m per annum. In recent years, funding has been reduced from around £3m per year to £2m, and during 2010 the figure for capital spending was further reduced to £1m. This will allow only the most essential maintenance works to be carried out and will increase the backlog of work to be carried out.

7.12.4 An increase in funding to the desirable level would allow the following areas of work to be tackled:

- The collection of additional data for the structures database, particularly in respect of retaining walls;
- Increasing the frequency of routine Principal Inspections;
- A review of assessments to establish if results are still valid. In some cases improved results may be achieved using more sophisticated techniques and in others, continuing deterioration or changes in usage may lead to a downgrading of previous results;
- Carrying out of a greater number of strengthening and remedial schemes;
- Carrying out more preventative measures such as painting of steelwork;
- Responding more quickly to emergency situations such as flood damage or vehicle damage without affecting the routine works; and
- Carrying out additional desirable but non-essential works such as graffiti removal.

7.12.5 The consequences of not having these resources would be:

- We would have less than complete information on our structures which would not allow necessary works to be economically programmed and prioritised;
- The assessment information would become more unreliable with the passage of time, meaning that the loadbearing capacities of some bridges could be overestimated;
- The overall condition of the bridge stock could decline if remedial works did not keep pace with deterioration;
- The backlog of required works would increase, particularly in the light of reduced preventative maintenance; and
- There would be less capacity to respond to emergency situations.

7.12.6 If the situation were to continue for a number of years, there would be the possibility of additional weight restrictions or even closures of bridges,

needing to be implemented. These could have very severe consequences for the travelling public and for businesses.

7.12.7 If remedial works are not carried out at the appropriate time, the cost escalates. For bridges, a lack of maintenance would push the cost of remedial works towards the replacement cost and therefore reduce the asset value.

7.13 Highway Structures Asset Management Improvements

7.13.1 The main improvements required to the Asset Management system are:

- Inclusion of more financial information and automatic prioritisation of schemes in the structures management system (SMS);
- Preparation of a detailed inventory of retaining walls within the County;
- Refinement of the asset valuation process;
- Inclusion of a robust process to consider the effects of possible reduced funding in future years;
- Greater transparency and clarity of the process to assist Councillors in decision making; and
- Establishing clear links between transport related assets and other County Council assets so that a clear overall picture is obtained.

7.13.2 There are clearly significant resource implications for the achievement of these improvements, particularly the collection of data on the existence and condition of retaining walls. For this reason, the programme of data collection will be spread over a number of years.

7.14 Risks to the Plan and their Management

7.14.1 The following are seen as the main risks to the Highway Structures Asset Management Plan:

- Changes in national or local government guidance; and
- A lack of resources to carry out the large volume of work required.

7.15 Monitoring, Review and Continual Improvement

7.15.1 The Highway Structures Asset Management Plan will be continuously reviewed and improved. As explained above, the database is constantly changing as a result of inspections and works carried out.

7.15.2 It is anticipated that the total asset value will be formally stated on an annual basis. It is expected that there will be significant variations in the figures for the first few years as the process is refined. If funding continues at a low level for some years then the asset value of the bridges will decrease as the overall condition deteriorates.

Chapter 8 – Traffic Controls and Intelligent Transport Systems

8.1 Objectives, Aims and Goals

8.1.1 Traffic signals and intelligent transport systems (ITS) directly address transport needs by improving the efficiency of the road network, thus providing a better environment for the business economy. The management of road congestion through the use of such measures can also have a positive benefit by reducing CO_2 emissions.

8.1.2 It is a legal requirement and duty of care that traffic signal junctions and pedestrian crossing facilities are maintained and inspected at regular time intervals. It has also become vital to Local Authorities to adopt ITS to support the delivery of network management duties placed on them by the Traffic Management Act 2004.

8.1.3 The traditional realm of the traffic signal junction, previously largely limited to junctions in urban areas, has extended to rural roundabouts that were previously thought to provide greater capacity, but which have subsequently suffered from congestion and deteriorating road safety. Priority junctions in more rural locations, where higher approach speeds exist, have also been found to benefit from a system that allows conflicting traffic to be segregated more effectively. In Warwickshire as elsewhere, the volume of traffic continues to grow, and it has become increasingly important to provide a safe environment for pedestrians and cyclists. The result is that new pedestrian and cycle crossing facilities may be appropriate now that were not considered necessary at the time a junction was first constructed.

8.1.4 The provision of controlled crossings allow vulnerable members of our community with the independence to cross busy roads on their own. These types of facilities can improve access to local services to the whole community. They can also allow children to either walk or cycle to school which can result in:

- Improved physical fitness;
- Children being more alert on arrival at school;
- An opportunity to interact with others on the route to school; and
- An opportunity to learn road safety (become streetwise).

8.1.5 The main goals for the County Council focus on managing congestion on key local routes, ensuring Warwickshire's transport networks are able to cope with and adapt to incidents, improving local air quality, tackling climate change by promoting alternatives to the car and improving accessibility and road safety.

8.2 Traffic signal junctions and pedestrian crossings

8.2.1 The primary objective in providing traffic signal control at a junction is to reduce the conflict between opposing traffic streams, as these conflicts can

result in traffic delay and accidents. Traffic signal installations are designed to minimise the occurrence of both of these.

8.2.2 The plan for the management of the traffic signal and pedestrian crossing equipment assets includes the following objectives:

- To work in partnership with the County Council's maintenance Contractor to deliver a high level of service to the public using the highway network, by ensuring that faults with the equipment are repaired promptly;
- To ensure that traffic signals and pedestrian crossings are working effectively and efficiently, to maintain safety and to minimise the delays to the public; and
- To address the increasing backlog for the replacement of traffic signal and pedestrian crossing equipment that is operating in excess of the County Council's life expectancy.

8.2.3 The Department for Transport specifications state a design life of 15 years for traffic signal equipment. The County Council's experience confirms this figure for life expectancy.

8.3 Intelligent Transport Systems

8.3.1 Intelligent Transport Systems (ITS) is increasingly playing a major role in supporting the delivery of national goals related to the enhanced mobility of people and goods, safer travel, better social inclusion and improvement in air quality. ITS is now widely adopted in some form by authorities to deliver specific objectives linked to these goals and doing so in a cost-effective manner.

8.3.2 ITS offers a range of services and tools to the Network Manager, operators and the end-user (i.e. the public) to make suitable decisions for managing traffic on the network and making travel plans. These services are based on leading edge technology systems that enable the collection of data from roadside sources and then the timely dissemination to users. Therefore, ITS has the effect of 'increasing' capacity on the road network and facilitate the usage of other modes such as public transport. The indirect effect of managing traffic on the roads appropriately and helping to increase use of other modes of transport means that air quality is improved by reductions in pollution levels.

8.3.3 Warwickshire currently has ITS systems deployed that enable the monitoring and control of the network as well as facilitating the provision of information services to the public. Details of the ITS systems implemented in the County are detailed later on in this section of the TAMP.

The most common tools are:

- **Urban Traffic Control** – a system which co-ordinates traffic signal timings in a network to reduce delays or emissions;
- **Car Park Management** – variable message signs which help drivers to find spaces in car parks;
- **Bus Priority** – a method of providing priority at traffic signal junctions for buses (or emergency vehicles);
- **Travel Information** – the provision of information to travellers to help them plan their journeys;
- **Automatic Number Plate Recognition** - automatically monitoring journey times of vehicles on specific routes; and
- **CCTV** - monitoring the road network for traffic management purposes.

8.4 ITS Links to Wider Corporate Objectives and stakeholders

8.4.1 The delivery of ITS supports the specific local aims and priorities of the Authority. ITS plays a key role in helping to deliver these priorities, the key transportation areas of focus include:

- Significantly enhance the quality of public transport services in the area and increase bus patronage. Achieving this goal will support the objectives of keeping congestion to a manageable level and improving accessibility to the transport system for the public. Therefore, a strong focus is planned on developing ITS to support these areas over the LTP period;
- Improve the systems and processes in place to adequately manage congestion, incidents and overall traffic flow on the network which also leads to more safer roads for the public; and
- Managing emission levels at key points on the urban and inter-urban network and suitably handle demand management – especially in tourist areas such as Stratford-upon-Avon and Warwick.

8.5 Purpose of ITS Strategy

8.5.1 The ITS Strategy is set in the context of the wider national and local policy background, and is refreshed on a regular basis.

8.6 Current ITS systems in Warwickshire

8.6.1 Warwickshire has a long and successful association with ITS demonstrated by participating in the UTMC 29 demonstrator programme in Stratford-upon-Avon, as well having a range of ITS services related to traffic control and management and travel information provision to the public. These have supported meeting the wide transportation objectives for the County.

8.7 Inventory

8.7.1 The number of traffic signal junctions and pedestrian crossings in Warwickshire (as at March 2010) is shown in Table 8.1.

Table 8.1 – Inventory of Traffic Signal Junctions and Pedestrian Crossings

Description	Total no.
Traffic signal junctions with 'nearside' pedestrian facilities	43
Traffic signal junctions with 'farside' pedestrian facilities	26
Traffic signal junctions without pedestrian facilities	28
Single Pelican crossings	61
Dual Pelican Crossings	6
Single Puffin Crossings	90
Dual Puffin Crossings	7
Single Toucan Crossings	36
Dual Toucan Crossings	2
Pegasus Crossings	1
Wig Wags	1
Total	**301**

8.7.2 The number of intelligent transport systems in Warwickshire (as at March 2010) is shown in Table 8.2:

Table 8.2 – Inventory of Intelligent Transport Systems

Description	Total (No)
Urban Traffic Control System (Siemens)	1
Common Database (Siemens)	1
Common Database (Argonaut)	1
Fault Management System (Siemens)	1
Web Server – Voyager (provided by the Argonaut system)	1
Remote Monitoring System (Siemens)	1
Car Park Management System – instation (Siemens)	1
Car Park Management System – car park management signs (Siemens)	33
Car Park Management System – car park management locations (Siemens)	25
Automatic Rising Bollard System – instation (APT)	1
Automatic Rising Bollard (APT)	8
Automatic Rising Blocker (APT)	1
Outer Variable Message Signs Freetext (Data Display)	3
Journey Time and Road Works System – provided as a pluin for Siemens Common database	1
Journey Time System – cameras (PIPS)	7
Real Time Passenger Information	13
CCTV	6
Air Quality Management Units	4

8.7.3 The principal assets to be maintained are traffic signal junctions, pedestrian crossings and intelligent transport systems located on the highway network.

8.7.4 There are currently 76 traffic signal junctions and pedestrian crossings operating under the County Council's Urban Traffic Control (UTC) System. The UTC System provides a traffic signal management facility that includes the use of real time traffic flow information to optimise and co-ordinate traffic signal timings and reduce traffic delays.

8.7.5 There are currently 170 traffic signal junctions and pedestrian crossings operating that are linked to the County Council's Remote Monitoring System.

8.7.6 The remaining traffic signal junctions and pedestrian crossings operate independently.

8.7.7 A summary of the traffic signal junction and pedestrian crossing records are stored electronically on two databases by the County Council:

1. Microsoft Access database, which contains information on site details, basic equipment detail, type of monitoring and dates of any upgrades; and
2. Microsoft Excel database, which contains the list of street equipment at each installation.

8.7.8 Hard copy files for each installation are stored in the Barrack Street offices in Warwick. These hold the following information as a minimum:

- Correspondence;
- Layout drawing;
- Annual inspection and periodic reports; and
- Controller specification.

8.7.9 A high proportion of files are incomplete, especially with regard to 'as built' drawings and cabling information. The paper copy documentation is vulnerable to being lost, misfiled or destroyed in the event of a fire or water damage.

8.7.10 The traffic signal databases and hard copy filing system are all updated when a new installation is added to the asset inventory.

8.8 Asset Valuation

8.8.1 The value of the assets owned by the County Council based on average replacement values of traffic signals and pedestrian crossings is shown in Table 8.3.

Table 8.3 – Asset Valuation of Traffic Signals and Pedestrian Crossings

	Average Unit Value
Traffic Signals with “nearside” pedestrian facilities	£135,000
Traffic Signals with “farside” pedestrian facilities	£125,000
Traffic Signals without pedestrian facilities	£105,000
Pelicans	£60,000
Puffins	£65,000
Toucans	£65,000
Wig-Wag System	£55,000

8.8.2 It is estimated that the asset replacement value of traffic signals and pedestrian crossings is approximately **£25,135,000.**

8.8.3 The average costs of intelligent transport systems is shown below in Table 8.4.

Table 8.4 – Asset Valuation of Intelligent Transport Systems

	Average Unit Value
Automatic Bollards	£12,500
Urban Traffic Control System	£45,000
Comet Database	£22,000
Car Park Management System - Siespace	£50,000
VMS - car park	£28,000
VMS - information	£45,000
Fault Management System - Prefect	£5,000
Remote Monitoring System	£5,000
Comet Database - Argonaut	£5,000
Web Server	£7,000
Automatic Number Plate Recognition	£25,000
Traffic LAN Communications equipment incl UPS and KVM	£35,000
Real Time Passenger Information	£6,000
CCTV	£20,000
Air Quality Management Units	£4,000

8.8.4 It is estimated that the asset replacement value of intelligent transport systems is approximately **£1,722,000**.

8.9 Periodic Inspections and Maintenance

8.9.1 The Traffic Signals Maintenance Contractor carries out annual and periodic inspections of each traffic signal junction and pedestrian crossing installation, plus a bulk lamp change and clean every six months. Inspection sheets are completed by the Contractor to record the results of the inspection and these are provided to the County Council for checking and action.

8.10 Periodic Electrical Testing

8.10.1 The electrical safety of each installation is assessed once a year. The Traffic Signals Maintenance Contractor carries out this work and provides the results of the testing to the County Council.

8.11 Value of the Asset

8.11.1 A comprehensive survey of the physical condition of each installation is currently ongoing. It is proposed that once completed, this survey will then be carried out every five years for each installation. The results from the survey will assist with the annual review of equipment condition as part of the process for prioritising planned maintenance work.

8.11.2 The age profile of the traffic signal junctions and pedestrian crossings in Warwickshire (as at March 2010) is shown in Table 8.5.

Table 8.5 – Age profile of traffic signal junctions and pedestrian crossings

	Number of sites						
Age (years)	**Signals**	**Pelicans**	**Puffins**	**Toucans**	**Pegasus**	**WigWags**	**Total**
0 - 5	32		64	20	1	1	118
6 - 10	43	22	32	11			108
11 - 15	12	22		6			40
16 +	10	23	1	1			35
Total	**97**	**67**	**97**	**38**	**1**	**1**	**301**

8.11.3 A consistent scoring system is used to rank the condition of installations. The system is based on scoring the following five features of a traffic signal/pedestrian crossing installation:

- Controller;
- Ducting and access chambers;
- Signal heads and Push Button Units;
- Detectors (loops and MVD's); and
- Poles and Brackets.

8.11.4 Each of the above features are scored out of 5 points, thus giving a total maximum installation score of 20 points.

8.11.5 The scoring model awards 5 points to equipment in new condition and 1 point to equipment considered at the point of expiry.

8.12 Controller Configuration Assessment

8.12.1 Changes relating to the use of the highway network (e.g. traffic growth, new developments etc.) are constantly affecting traffic flows on the network, and thus over time controller configurations can become inconsistent with the

demands on the installation. Out of date controller settings can lead to unnecessary increased delays and road safety problems if not attended to.

8.12.2 The County Council currently has no proactive policy on periodically checking the validity of controller configurations, but does react to complaints and issues raised through analysis of accident records.

8.13 Maintenance Requirements

8.13.1 The Traffic Signals Contractor carries out all maintenance work on the installations.

8.13.2 County Council staff supervise the Contractor's activities and manage the operation of the equipment. Works orders are issued for chargeable work through the County Council's Orders and Payment system and fault reports are raised through the Fault Management system (Prefect).

8.13.3 The Contractor operates an on call fault repair service between 05:00 hours and 21:00 hours, 7 days a week including Public Holidays except Christmas Day (Contract hours), with attendance on site **within 2 contract hours** of notification of urgent faults.

8.13.4 The Contractor operates an on call fault repair service between 05:00 hours and 21:00 hours, 7 days a week including Public Holidays except Christmas Day (Contract hours), with attendance on site **within 8 contract hours** of notification of non-urgent faults.

8.13.5 Full repair to urgent faults are carried out within 12 Contract hours from the time of fault notification. For non-urgent faults this period is within 24 Contract hours from the time of fault notification. However, for urgent faults the signals must be restored to a working order (i.e. signals lit and changing) in the form of a temporary repair within 6 Contract hours from the time of the notification of the fault. A full repair will still be required within 12 Contract hours.

8.13.6 The Traffic Signals Contract specification puts a duty on the Contractor to maintain the equipment in a safe operational condition. The Contractor is paid an annual fee per installation type to rectify all faults, except for damage and for replacement of equipment that is agreed to be obsolete.

8.13.7 The County Council pays the Traffic Signals Contractor an annual payment to maintain the traffic signal installations and additional payments for any chargeable repairs. The value of the maintenance work carried out increases annually due to the following pressures:

- The number of new installations added to the inventory;
- The increasing age of the equipment;
- The increasing complexity of installations; and
- The increasing problem of accident damage and the difficulties in recovering repair costs from those responsible for the damage.

8.14 Maintenance Backlog

8.14.1 The traffic signal maintenance backlog consists of those installations which exceed the County Council's expected operation life of 15 years, for electrical safety and operational reasons should be replaced. The number of installations included in this backlog as at the end of March 2010 was 35, and this is expected to rise to 62 by 2015 based on current resource levels.

8.15 Safety

8.15.1 Traffic signal safety is provided through the following processes:

- Design processes in accordance with local and national guidance and design regulations;
- Safety Audits;
- Periodic Inspections;
- Electrical Safety Testing;
- Ad hoc investigation of accident statistics; and
- Investigation of complaints.

8.16 Installation Records

8.16.1 The effectiveness of maintenance activities is reduced by the lack of accurate, good quality drawings and controller specifications/configuration records.

8.17 Gap Analysis

Performance Gaps – Condition

- Use of installation condition data and Key Performance Indicator (KPI) data.
- Regular (annual) review of asset deterioration, maintenance backlog.
- Assessment of cost effectiveness of operations and Term Contract performance.
- Lack of regular controller configuration reviews.
- Vulnerability of paper records.

Performance Gaps – Demands

- Network Management Systems to comply with the Traffic Management Act 2004.
- Agreements on Service levels and funding levels.
- No link between aspirations for new installations and ability to pay the operating costs.
- Existing commuted sums from developers do not cover whole life costs of installation maintenance.

8.18 Asset Value

8.18.1 Taking into account the age and condition of the traffic signals and pedestrian crossings, it is estimated that the current value of the asset is **£21,843,000**. Therefore the Gap Analysis is **£3,292,000.**

8.18.2 Taking into account the age and the condition of intelligent transport systems, it is estimated that the current value of the asset is **£1,205,000**. Therefore the Gap Analysis is **£517,000.**

8.19 Demands

8.19.1 Traffic Signal installations are expected to provide a safe and efficient control of conflicting traffic demands, including facilities for pedestrians and the vulnerable members of our community.

8.19.2 The Traffic Management Act 2004 places a statutory duty on Highway Authorities to manage their networks with the objectives of minimising congestion and unnecessary delays. Well maintained traffic signal installations whose operation is co-ordinated with other network management activities can help the County Council comply with the legislation.

8.19.3 Safety of operation for the road user is the highest priority when considering the provision of resources. Any unsafe installations will either be repaired or replaced. If budgets are not available for either repair or replacement, then unsafe installations will be decommissioned until funding is available.

8.19.4 The provision of pedestrian crossings and traffic signal schemes are justified by the following methods:

- **Safer Routes to School** – where the aim is to encourage more children to walk and/or cycle to school with less dependence on the use of the car.
- **Casualty Reduction Schemes** – where the rate of return from likely casualty savings is sufficient to justify the expenditure on a crossing.
- **Developer Funded Schemes** – where crossing facilities are required to mitigate anticipated traffic impact of developments and/or anticipated increases in pedestrian flows.
- **Facilities installed on Key Pedestrian or Cycle Corridors** – where crossing facilities may be considered as part of a package of measures on a strategic walking and/or cycling corridor.
- **Facilities funded by Area Committee Delegated Budget** or other budget intended to address local priorities – this is to address local priorities as opposed to strategic ones, i.e. where a scheme does not satisfy the criteria for funding from the capital programme, but where there are special local circumstances that it would be appropriate to provide a crossing. In this case the decision to fund a crossing must be informed by a consideration of the whole-life costs of the crossing, including the likely annual revenue costs of maintenance and energy.

8.19.5 There is no link between the County Council's policy on building new traffic signals installations (mostly cycle and pedestrian facilities) from the Capital programme, and the budgets that are required to operate and maintain the new facilities.

8.19.6 Developers are charged commuted sums depending on the nature of the scheme. The commuted sum contribution provided for traffic signal junctions and pedestrian crossings facilities covers three main areas, these being maintenance, routine inspections and end of life cycle replacement. The charges are listed below:

	Gross Replacement Cost (GRC) per junction
Traffic signal junction with remote monitoring	£ 87,750
Traffic signal junction with UTC	£ 89,000

Maintenance and operational costs of Pelican, Puffin and Toucan crossings.

	Gross Replacement Cost (GRC) per pedestrian crossing
Puffin and Toucan crossings with remote monitoring	£ 40,000
Puffin and Toucan crossings with UTC	£ 41,250

8.19.7 Over the last four years, 39 new installations have been added to the inventory list. This represents an average increase of 10 installations per year. This level of growth is expected to continue for the foreseeable future, and is expected to cause increasing funding problems for maintenance activities.

8.20 Risks

Physical Risk

- Electrocution
- Accident damage
- Corrosion
- Installation component failure
- Installation controller failure
- Obsolete equipment
- Cable fault
- Detection fault

- Electrical Supply Failure
- Controller Configuration fault
- Collision involving vulnerable road users
- Collision involving vehicles
- Damage by other operators on the highway

Business Risk

- Traffic Signal operations are high profile and attract public attention immediately
- Image of the County Council
- Lack of experienced staff members

Financial Risk

- Growing backlog of ageing installations
- Lack of maintenance and timely action is more expensive in the long term
- Revenue fund not available to maintain or operator the equipment

Environmental Risk

- Poorly maintained traffic signal installations increase pollution levels
- Extremely high pollution levels could lead to network closures
- Use of low energy equipment – initial capital costs are high – needs to translate into lower energy charges

Network Management Risk

- Poorly maintained Traffic Signal installations cause increased costs to the Warwickshire economy
- Traffic Management Act 2004
- Reliable journey times
- Impacts on Public Transport services

8.21 Performance Measurement

8.21.1 Key Performance Indicators are to be developed and agreed with the maintenance Contractor. These KPI's will help monitor and improve the service that is being provided.

8.22 Legal Requirements

8.22.1 Under the Traffic Management Act 2004, the County Council has a legal requirement to ensure the road network is working effectively and efficiently.

8.22.2 The County Council has a duty under section 23(3) of the Road Traffic Regulation Act 1984 to maintain pedestrian crossings and pedestrian facilities at junctions. The Act does not specifically mention traffic signal junctions.

However, if we fail to maintain traffic signal junctions and an accident results, there is no doubt that we would be held liable in the law of negligence or even for corporate manslaughter. Both negligence and manslaughter are based on the existence of a duty of care. This is not statutory duty (although the Government is committed to legislating on corporate manslaughter) but it is no less a legal duty than a statutory duty.

8.22.3 The Disability Discrimination Act 2005, requires facilities provided at pedestrian crossings and traffic signals to be fully functional to assist pedestrians who have a disability to cross the road.

8.23 Revenue Funding To Manage the Asset

8.23.1 In order to manage this asset, ideally revenue budget should increase automatically on an annual basis to reflect the additional schemes that are being implemented via the capital budget. However, if the funding is limited to manage the assets, it is likely that over a number of years the failure rate of installations will increase. This may result in an increase in traffic congestion and also an increase in injury accidents when the traffic signals or pedestrian crossing are not working.

8.23.2 If the funds are limited over a number of years, it may be necessary to divert funds from other areas within the revenue budget of Traffic Projects Group. However, if no funding mechanism becomes available for the operation, maintenance and inspection needs and the pressure still exists, then it may become necessary to stop implementing new capital schemes and/or switching some existing sites off.

8.23.3 If the budget pressure submission is not approved this will lead to the following outcomes:

- Possibility of stopping the implementation of new capital schemes;
- Reduce Service Level by not monitoring the site via communication network;
- Eventual decommissioning of sites; and
- Potential increase in failure rate of installations resulting in increases in traffic congestion and an increase in claims following personal injury when traffic signal or pedestrian crossing equipment are not fully working.

Chapter 9 – Public Rights of Way

9.1 What is the Asset?

9.1.1 Public rights of way are recorded in the Definitive Map and Statement, which is a legal document. The Map and Statement are continually changing as more routes become recorded, created, diverted or extinguished. It is estimated that there are around 140 miles of unrecorded rights of way which will be added to the map in the next twenty years. This equates to a growth of the asset of 8%. A summary of the existing asset is set out in Table 9.1 below:

Table 9.1 – Public Rights of Way Network

	Number	**Length (miles)**	**% of network**
Public Footpath	2,911	1,442	82.5
Public Bridleway	393	303	17.3
Byway Open to all Traffic	8	3	0.2
Total	**3,312**	**1,748**[1]	**100**

[1] This is equivalent to 2,800 km.

9.1.2 The rights of way network is accompanied by the following associated infrastructure, where responsibility lies with the County Council:

- 5,000 roadside signposts (mainly wooden);
- 10,000 waymarkers and posts;
- Signs for route management, e.g. ‘keep dogs under control’;
- Structures for route management, e.g. motorcycle barriers;
- Bridges/culverts over natural watercourses; and
- Surfacing and drainage.

9.1.3 The following infrastructure is also associated with the rights of way network, where responsibility for maintenance rests with a third party, but where the County Council has powers to improve:

- Bridges or culverts over ditches, canals etc;
- Gates; and
- Stiles.

9.1.4 Figures given for infrastructure are approximate as there has never been a full network survey, and there is currently no inventory or inspection regime.

9.2 What is the Current Condition of the Network?

9.2.1 The BVPI for the network measures the amount of public rights of way that are ‘open and easy to use’. Figures for 2002-2005 were as follows:

2002	56.5%	2004	61.5%
2003	59%	2005	50.7%

9.2.2 Sampling is undertaken at 5% per annum, with 2.5% surveyed in May and 2.5% surveyed in November, in line with national guidance. However, with the distances of rights of way involved, the sample is too small to be statistically relevant. For example, the 2005 survey produced a record breaking poor result in May, whilst giving a record breaking good result in November. Overall the score dropped in an apparently significant way.

9.2.3 Each path has an individual file giving (some) maintenance history, which is supported in some instances by photographs.

9.2.4 Reports of problems on paths are all logged. 865 were recorded in 2005/6.

9.2.5 There are a number of identified problems on the network where significant resources will be needed to bring paths back into use. These problems include, but are not restricted to:

- Obstructions by dwellings;
- Obstructions by agricultural or commercial buildings;
- Missing bridges over major rivers; and
- Paths physically destroyed by the creation of lakes.

9.2.6 In addition, resources are devoted each year to preventing and resolving ploughing and cropping obstructions.

9.3 What is the Desirable Condition of the Asset?

9.3.1 The desirable condition of the asset is 100% of the network open and available to use, according to BVPI criteria, with full network survey complete, verified inventory and an established inspection regime.

9.3.2 Additional to this would be a fully defined legal record with recorded widths (extent), including analysis of blacktop routes and a management plan which defines who within the County Council is responsible for each part of the asset.

9.4 What is the Value of the Asset?

9.4.1 Approximately £160,000 has historically been spent per annum on infrastructure items such as surfacing and minor bridge works. The County Council has invested a significant proportion of this money in improvements to the network such as installing easy-to-use gates instead of stiles. Once the item is in place, maintenance responsibility rests with the land manager. In addition, money has been spent on control of vegetation and enforcement activity where landowners do not meet their responsibilities. Pressure on

funding over the next few years will mean that some of this work will no longer be carried out.

9.4.2 The land over which footpaths run is almost always in private ownership and so has no intrinsic monetary value.

9.4.3 The value of the network to the public is harder to measure. It is estimated that money is brought into the local economy though recreational path use. This includes money spent in local pubs and shops, as well as accommodation and retail sales of leisure equipment such as walking boots, bicycles etc. Table 9.2 below sets out the estimated value of the asset at present:

Table 9.2 – Estimated Value of the Public Rights of Way Network

Asset	**Quantities (estimated)**	**Cost**	**Value**
Signposts and Waymarkers	15,000 no	£50 each	£750,000
Major Bridges and Culverts >900mm	25 no	£200,000 each	£5,000,000
Minor bridges & culverts >900mm	775 no	£10,000 each	£7,750,000
Bridges and Culverts <900mm	1,200 no	£1,000 each	£2,000,000
Surfacing and Drainage*	420 km	£20 per metre	£8,400,000
Total			**£23,900,000**

* Much of the network has a natural surface. This figure is based on an estimate that 15% of the network has a man-made surface.

9.4.4 Other infrastructure which has proved impossible to value at this stage includes:

- Steps;
- Barriers and other structures;
- Miscellaneous information signs; and
- Liability for some gates, e.g. wheelchair accessible gates.

9.5 How Can the Gap be Reduced?

9.5.1 The County Council is required to have a Rights of Way Improvement Plan (ROWIP) under Section 60 of the Countryside and Rights of Way Act 2000. The statutory guidance issued by both Defra and DfT encourages integration between the LTP and the ROWIP. The opportunity has therefore been taken to review Warwickshire's ROWIP (Countryside Access and Rights of Way Improvement Plan or CAROWIP, first published in 2006) and include its successor within the LTP.

9.5.2 The result of this review is the Rights of Way and Recreational Highway Strategy. It has been written within the LTP framework and focuses on the strategic aims of the authority. Unlike the first ROWIP, it does not contain detailed actions, but will instead be supported by a specific ROWIP Implementation Plan which will provide the necessary detail. The ROWIP Implementation Plan will run concurrently with the LTP Implementation Plan and cover a three year period. This will provide the flexibility to enable the County Council to respond to changing circumstances and priorities. This Implementation Plan is on hold pending imminent changes to the rights of way service provided by the Authority and will be prepared in 2011.

9.5.3 The gap can also be reduced by working in partnership with others within the County Council, Parish and District/Borough Councils, plus special interest groups will enable us to secure best value from our resources.

Chapter 10 – Unsurfaced Unclassified Roads

10.1 What is the Asset?

10.1.1 In Warwickshire the majority of non-black-topped roads or Unsurfaced Unclassified County Roads (UUCR) are identified by a number prefixed with the letter ‘E’, and are generally referred to as ‘E roads’. However, a small minority of UUCR have been allocated a number prefixed with the letter ‘D’, or ‘D roads’, which can be confusing given that the majority of D roads are black-topped.

10.1.2 In highway law, the legal status of Unclassified County Roads, whether they have a tarmac surface or otherwise, is undefined. However, it is assumed that all are public vehicular highways until proven otherwise. UUCRs are primarily used for recreation, and as such they form an integral part of the public rights of way network. With only eight Byways Open to All Traffic (BOAT) being recorded on the Definitive Map and Statement in Warwickshire (equating to a total of 3 miles), UUCRs are particularly important to those who wish to access the countryside by vehicle, a hobby that appears to be on the increase.

10.1.3 Within the County Council, unsurfaced E roads are managed by Countryside Recreation, whilst County Highways manage D roads.

10.1.4 In Warwickshire, there are 112 unsurfaced E roads amounting to approximately 100km of public highway, whilst there are up to 5km of unsurfaced D roads.

10.1.5 In addition, there are certain types of infrastructure associated with the UUCRs, including:

- Roadside signs and waymarkers;
- Road traffic management signs, i.e. weight limits, ford signs and speed restriction signs etc.;
- Bridges and fords; and
- Surfacing (i.e. stone) and drainage.

10.2 What is the Current Condition of the Asset?

10.2.1 Countryside Recreation took over the responsibility for managing unsurfaced E roads in 2002, and a full general condition survey was completed in 2004. On the whole, the network was found to be in reasonable condition for its recreational use, although it was not uncommon for routes to be affected by minor ruts and/or occasional potholes.

10.2.2 Those routes that were discovered to be adversely affected by numerous deep ruts, to such an extent that public access was severely restricted, have been repaired. However, like any highway that is in continuous use, maintenance is an ongoing issue. During wet conditions in particular, deep rutting and potholes are not uncommon and highways can

deteriorate rapidly. Potholes on routes providing access to private residential properties are a particular concern because 'standard' road cars are less able to deal with un-even surfaces, unlike 4 wheel drive vehicles and 'off road' motorbikes which tend to be the vehicles of choice for recreational UUCR users.

10.2.3 Following the full survey, unsurfaced E roads will be inspected once every ten years, once in spring and again in autumn to monitor change, although routes may be inspected more frequently if problems are reported by members of the public. Unsurfaced D roads are not regularly inspected.

10.2.4 On average, 2000 metres of E roads (equivalent to 2% of the network) is identified each year as requiring significant surfacing works, and 1500 metres (equivalent to 1.5% of the network) is identified as requiring minor repairs (e.g. pothole repairs). These figures are based on maintenance figures and requests received between 2004/5, 2005/6 and 2006/7. Demand to repair roads currently exceeds the budget available, and increasing use of Traffic Regulation Orders is necessary until such time as funds can be found for repair.

10.2.5 In February 2007, a prohibition of traffic order was made in the interest of public safety on one route which runs along the bed of a major river for part of its length. The order was made following a dive survey which confirmed that the river, where it coincides with the road, was 1.5 metres deep at it's deepest point, with approximately 30 metres being one or more meters deep. The river's topography and depth make the road impassable to all users.

10.2.6 Signing and waymarking is generally good (except where the status of the route is in dispute, and is repaired/maintained on demand (low cost). Traffic Management signs and other measures (bollards etc) are few, and are also dealt with individually.

10.2.7 Bridges are generally maintained by the County Council's Bridge Maintenance Group, and most are in good condition. There are however several canal bridges, maintainable by British Waterways, which have traffic restrictions (weight or class of user) on them due to their poor condition.

10.2.8 Ford inspections have been carried out across the County, and a number of warning signs were installed in 2005. With the exception of the riverbed route described above where use is prohibited, they are generally in reasonable condition.

10.2.9 A further, detailed network survey would be required to calculate the meterage and condition of different surface types.

10.3 What is the Desirable Condition of the Asset?

10.3.1 The desirable condition of the network is that all routes are passable to all users with reasonable ease, and that they are free of major obstruction and well signed. Given the recreational nature of these highways, it is not

considered unusual, or unacceptable for routes to be subject to minor ruts and potholes, or the occasional deeper rut if these can be bypassed with reasonable care and safety by non-motorised users.

10.3.2 If routes become rutted or potholed and remedial works are necessary, repairs should be commensurate with the level and type of use it is subject to, whilst being sympathetic to the natural and built environment. When a route is subject to increased traffic and a natural surface no longer provides a sustainable surface, stoning may be required.

10.3.3 Stoned surfaces require top-dressing every three years to prevent deterioration. Failure to carry this out may cause the route to deteriorate to such an extent that more extensive (and costly) repairs have to be carried out.

10.3.4 Routes providing access to residential properties will require a higher standard of maintenance to ensure they remain passable for 'standard' road vehicles. In a limited number of cases, where routes provide the sole access to residential or commercial premises, and where the traffic merits it, a blacktop surface is appropriate.

10.4 What is the Value of the Asset?

10.4.1 Unbound surfaces require maintenance (top dressing) every three years to sustain the quality of the surface. UUCRs with a natural surface are likely to require maintenance only as a consequence of excessive use.

10.4.2 Intensive use, such as development traffic, or access to residential and commercial premises can reduce maintenance intervals to as little as six months.

10.4.3 Table 10.1 below sets out the estimated value of the Unsurfaced Unclassified Road Network.

Table 10.1 – Estimated Value of the Unsurfaced Unclassified Road Network

Asset	**Quantities (estimated)**	**Cost**	**Estimated Value**
Signposts (status)	250	£50 each	£12,500
Signposts (for restrictions)	10	£90 each	£900
Bridges and Culverts <900mm	21	£5,000 each	£105,000
Surfacing	50km	£24 per m	£1,200,000
Drainage	50km	£6 per m	£300,000
Total			**£1,618,400**

10.5 How Can the Gap be Reduced?

10.5.1 In a limited number of situations, where a stone surface is subject to persistent and frequent pothole repairs due to the level of traffic it

accommodates (usually where that route is needed for access to residential properties), the route should be added to the surfacing programme to be black-topped. Over the lifetime of the black-top surface, this would reduce the maintenance cost considerably.

10.5.2 Several of the routes are believed to have only footpath or bridleway rights. Careful research and correct recording of these lower status routes will enable the County Council to resist pressure to ‘improve’ the surface of these routes.

10.5.3 Capital investment can result in improvements to the surfacing of routes which are unable to sustain the current level of traffic. Once the initial investment is made, less money needs to be spent on regular repairs. However, the standard of the UUCR network is directly linked to budget and unless additional funds are made available, it is predicted that the standard of the asset will slowly deteriorate over time.

Chapter 11 – Other Assets

11.1 Introduction

11.1.1 Along with the core transport assets set out in the preceding chapters of this document, the County Council also has responsibility for a number of other facilities and infrastructure, including:

- Certain bus shelters within the County;
- A bus-based Park and Ride site in Stratford-upon-Avon;
- Land at specific public transport interchanges, for example the car park at Warwick Parkway and Coleshill Parkway railway stations, and Atherstone Bus Station;
- Cycle and motorcycle parking;
- Certain street furniture;
- Trees that grow within the limits of the public highway;
- Casualty Reduction Measures and safety barriers;
- Fences and hedges;
- Traffic Regulations Orders (lines and signs); and
- Records relating to the existence and extent of the public highway and the Public Rights of Way Network.

11.1.2 As part of the future development of the TAMP, the Plan will be expanded to cover these assets in more detail.

Chapter 12 – Action Plan

12.1 Introduction

12.1.1 The Action Plan below summarises the key actions that have been identified to develop and implement the TAMP. Where possible, timescales for delivering the actions are identified. These will be kept under review by the TAMP officer steering group on an annual basis.

Action	Responsibility	Date to be achieved	Notes
General			
Continue to hold meetings of the TAMP officer steering group	Transport Planning	Hold meetings annually	
Keep the TAMP under regular review	TAMP officer steering group	December 2013	
Establishing clear links between transport related assets and other County Council assets so that a clear overall picture is obtained	TAMP officer steering group	December 2011	
Refinement of the asset valuation process	TAMP officer steering group	December 2011	
Inclusion of a robust process to consider the effects of possible reduced funding in future years	TAMP officer steering group	December 2011	
Greater transparency and clarity of the process to assist Councillors in decision making	TAMP officer steering group	December 2011	
Carriageway			
Prioritise the collection of Inventory data based on gaining improvements in operational efficiency, and collect data as resources permit	County Highways	Ongoing	
Continue working with other agencies and Utilities to ensure that maintenance is planned and carried out in conjunction with other activities on the highway	County Highways, Traffic Manager and Utility companies	Ongoing	
Continue to prioritise maintenance allocations based on an asset management approach to the most cost effective treatment	County Highways	Ongoing	
Continue to develop robust forecasting of network condition for future maintenance needs to secure appropriate funding year on year	County Highways in conjunction with national standards	Ongoing	
Continue to review specifications that aim to reduce the need for future maintenance	County Highways	Ongoing	

Footway			
Prioritise the collection of Inventory data based on need and improvements in operational efficiency, and collect data as resources permit	County Highways	Ongoing	Category 1 and 2 footways have been identified
Continue to prioritise maintenance allocations based on an asset management approach to the most cost effective treatment	County Highways	Ongoing	
Review the collection of condition information based on need and improvements in delivering an asset management led maintenance programme	County Highways	December 2011	
Highway Drainage			
Update gully inventory	County Highways	April 2011	
Develop general highway drain inventory for flood risk areas	County Highways	Ongoing	
Develop an asset management approach to cyclic maintenance of the drainage asset	County Highways	April 2012	
Street Lighting			
Completion of Central Management System trial	Street Lighting	November 2010	
Decision on implementation of part night operation of street lighting	Street Lighting	November 2010	
Policy to be prepared on the use of lighting columns for hanging baskets	Street Lighting	December 2011	
Illuminated Signs, Bollards and Vehicle Activated Signs			
Complete survey of all illuminated signs and bollards throughout the County	Street Lighting	March 2012	
Highway Structures			
Inclusion of more financial information and automatic prioritisation of schemes in the structures management system (SMS)	Bridge Maintenance	Ongoing	
Preparation of a detailed inventory of retaining walls on the ‘C’ and ‘D’ road network	Bridge Maintenance	March 2014	‘A’ and ‘B’ road network complete
Traffic Controls and Intelligent Transport Systems			
Prepare and submit an annual report on the asset deterioration, along with schemes to be included in the next years refurbishment programme and maintenance	Traffic Projects	June 2011	
Keep records up to date	Traffic Projects	Ongoing	
Carry out controller configuration reviews on a five year rolling programme	Traffic Projects	September 2011	
Undertake an annual review of road traffic casualty cluster sites as part of the prioritisation of maintenance schemes	Traffic Projects	March 2011	
Public Rights of Way			
Carry out actions contained within the ROWIP Implementation Plan, including progress towards collection of full asset inventory information.	Rights of Way Team	March 2014	
Complete collection of inventory information for all routes included in Definitive Map.	Rights of Way Team	March 2021	

Work in partnership with stakeholders and special interest groups to secure best value from the resources available.	Rights of Way Team	Ongoing	
Unsurfaced Unclassified Roads			
Consider adding heavily trafficked Unsurfaced Unclassified Roads to the surfacing programme to be black-topped	County Highways	Ongoing	
Other Assets			
Expand the TAMP to cover the other assets in more detail	Transport Planning Group/County Highways	December 2011	

Appendix A – Terms and Abbreviations

Terms

The following terms are used in this Plan:

Asset Management - A strategic 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.

Asset Valuation - The calculation of the current monetary value of an authority's assets. It excludes therefore any consideration of the value to the community in terms of the economic and social benefits of providing a means for people to travel in order to work, socialise and live.

Levels of Service - A statement of the performance of the asset in terms that the customer can understand. Levels of service typically cover condition, availability, capacity, amenity, safety, environmental impact and social equity. They cover the condition of the asset and non-condition related demand aspirations, i.e. a representation of how the asset is performing in terms of both delivering a service to customers and maintaining its physical integrity at an appropriate level.

Risk Management - The formal assessment of risks with the potential to affect delivery of the service via a process of identification, assessment, ranking and control planning.

Gross Replacement - A strategic approach that identifies the optimal cost allocation of resources for the management, operation, preservation and enhancement of the highway infrastructure to meet the needs of current and future customers.

Deterioration - The change in physical condition of an asset resulting from use or ageing.

Depreciation - The consumption of economic benefits embodied in an asset over its service life arising from use, ageing, deterioration, damage or obsolescence.

Depreciated - The current value of the asset, normally Replacement Cost calculated as the Gross Replacement Cost minus accumulated depreciation and impairment.

Service Options - Options available for an asset or groups of asset in terms of alternative levels of service.

Abbreviations

The following abbreviations are used in this Plan:

AMP	Asset Management Plan
AIS	Asset Information Strategy
AV	Asset Valuation
BOAT	Byway Open to All Traffic
BPM	Business Process Maps
BVPI	Best Value Performance Indicator
CAMP	Corporate Asset Management Plan
CPS	Corporate Property Strategy
CSS	County Surveyors Society
CVI	Coarse Visual Inspection
DfT	Department for Transport
DRC	Depreciated Replacement Cost
DVI	Detailed Visual Inspection
GAAP	Generally Accepted Accounting Principles
GIS	Geographical Information Systems
GRC	Gross Replacement Cost
HAMP	Highway Asset Management Plan
KPI	Key Performance Indicators
KSI	Killed and Seriously Injured
ITS	Intelligent Transport Systems
LoS	Level of Service
LTP	Local Transport Plan
RAB	Resource Accounting and Budgeting
TAG	Local Government Technical Advisors Group
TAMP	Transport Asset Management Plan
SCANNER	Surface Condition Assessment of the National Network of Roads
UKPMS	United Kingdom Pavement Management System
WGA	Whole of Government Accounts

Appendix B – Consistency with other Policy Documents

The TAMP has been prepared so as to be consistent with the following national and local policy documents:

National

- Guidance on Local Transport Plans – DfT (2009);
- Guidance on the Requirements for the Production of Highways Asset Management Plans and a Simple Valuation Methodology – TRL (2006);
- Guidance Document for Highway Infrastructure Asset Valuation – County Surveyors Society/TAG Asset Management Working Group (2005);
- Highway Asset Management Worldwide Experience and Practice – County Surveyors Society (2004);
- Framework for Highway Asset Management – County Surveyors Society (2004); and
- Management of Highway Structures: A Code of Practice – Roads Liaison Group (2005).

Local

- Warwickshire Final Local Transport Plan (LTP) 2011-2026, including:
  - Road Safety Strategy
  - Cycling Strategy
  - Network Management Duty Strategy
  - Highway Maintenance Strategy
  - Bridge Maintenance Strategy
  - Intelligent Transport Systems Strategy
  - Parking Strategy
  - Powered Two Wheeler Strategy
  - Public Transport Strategy
  - Safer Routes to School and School Travel Plan Strategy
  - Walking Strategy
- Warwickshire Rights of Way and Recreational Highway Strategy 2011-2026;
- Warwickshire Highway Maintenance Policy Review 2007; and
- Warwickshire Corporate Property Strategy 2008-2018