1 INTRODUCTION

This document sets the strategic direction that the Shropshire Council will adopt in support of the asset management mission. This strategy considers what is required in terms of asset management activities (the framework) as well as what is required for each type of asset in order to meet the challenges identified.

2 THE CHALLENGE

The highway network in Shropshire is extensive, comprising over 5,100 km. This network has evolved over generations rather than having been constructed to known standards. Consequently, knowledge about the network is incomplete and the network itself is highly diverse in terms of its characteristics and performance leading to areas of strength and vulnerability.

The Highways Act (1980) imposes a duty on the highway authority to maintain highways at public expense. To fulfil it is necessary to take such reasonable care to secure that the highway is not dangerous for traffic. The extensive and diverse nature of the network produce particular challenges for the authority in fulfilling this duty.

The highway network supports almost all travel in Shropshire whether by motor vehicle, public transport, cycle or on foot. For many rural communities, there exists few reasonable routes to connect them with key services. When these are not available, the communities can be subject to long diversions or even severed from services. The availability of the road network is therefore vital.

The highway network is an intrinsic element of the environment, both contributing to its visual appearance and impacting on areas in the vicinity of the highway in terms of noise, water, air pollution. In ensuring that Shropshire is a great place to live, learn, work and visit, the environmental impact from the highway must be considered.

The extensive highway network requires significant amount of funding both to fulfil our duties under the highways act but also to fulfil our social role as custodians of the asset for future generations. The majority of funding is a capital grant from central government for investment in the asset, with revenue funding supporting the day-to-day operation of the asset. With pressure on public finances increasing both in central government and locally, sufficient funding for the highway network needs to be secured in order to fulfil the mission.

3 ASSET MANAGEMENT FRAMEWORK

The Highway Infrastructure Asset Management Guidance published by UK Roads Liaison Group (UKRLG) sets out a framework which describes all asset management activities and processes that are necessary to develop, document, implement and continually improve asset management practices. These activities and the approach to their delivery should be clearly documented and accessible to relevant stakeholders, but the guidance recognises that individual authorities need to be flexible in the application of the framework to accommodate their own requirements.

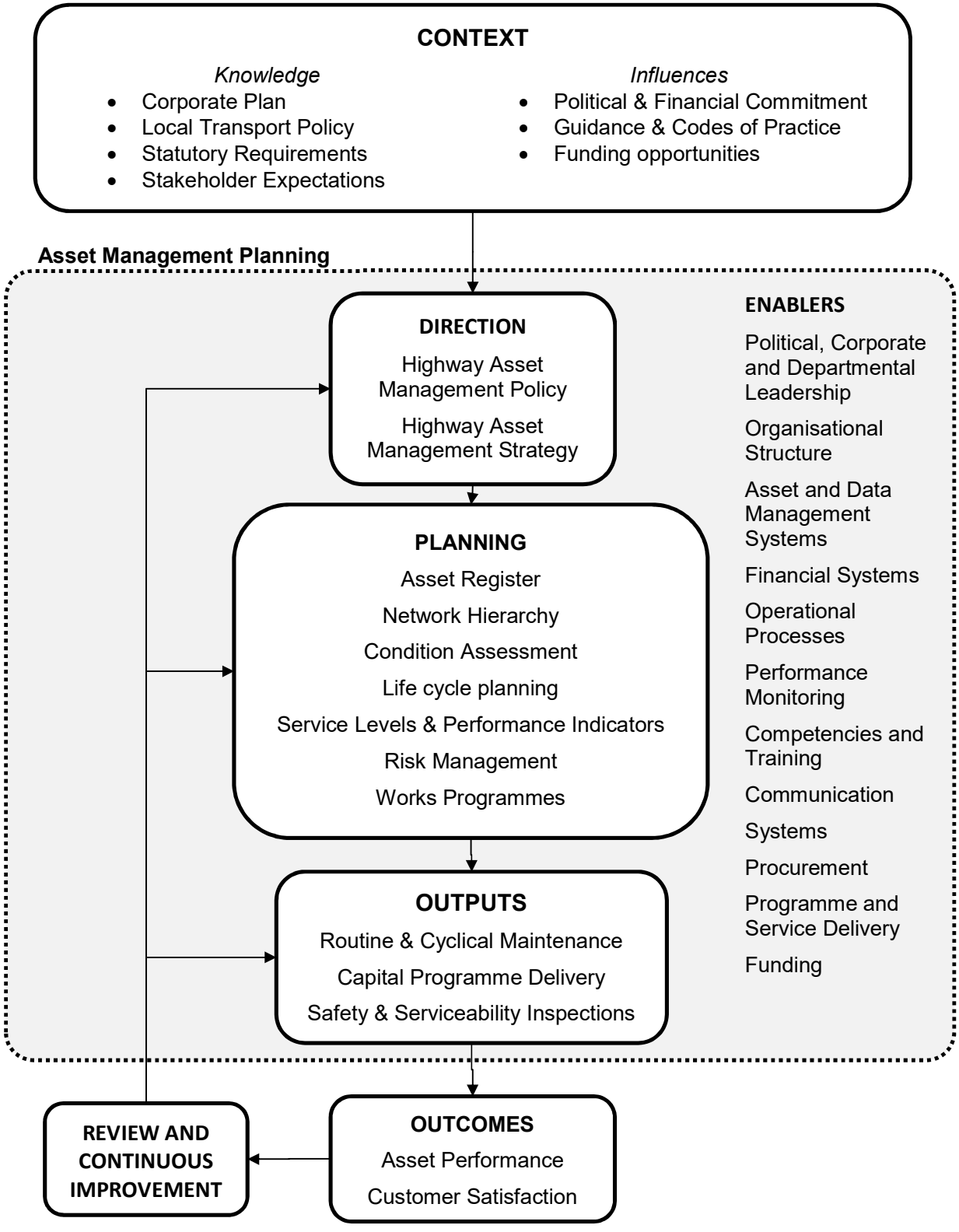
The guidance recommends that the framework is developed by individual highway authorities to meet their needs, aspirations and their starting point on the asset management journey.

Organisational context: This establishes the context for highways asset management in Shropshire. The context links the Council's vision and other priorities with the asset management mission and objectives.

Asset management planning: Sets out the strategic planning using the policy and the strategy but is also where the aspirations for the highways asset and the levels of service are defined. Planning involves all aspects of tactical planning including asset registers, life cycle planning, setting service levels, risk management and defining works programmes (including treatment selection). Outputs are the specific actions arising from the planning activities.

Enablers: Enablers are the activities which promote positive asset management. Leadership is critical as are appropriate systems for managing asset data and information. Performance monitoring confirms the direction of travel towards our objectives and facilitates communication with stakeholders.

Figure 1. Asset Management Framework



4 STRATEGIC ACTIONS

Considering the activities in the framework, Figure 1, the following strategic actions for asset management planning activities are set out in order to address the challenge:

- We will undertake a regular review of our asset management **policy and strategy** to ensure that progress is being made and these documents remain relevant to our business needs.
- We will ensure our **asset registers** are fit-for-purpose and clearly support our asset management activities. Key data regarding our assets should be appropriately detailed, complete, accurate and current. Key data requirements are set out in the highways asset data management plan. Our approach to the asset data lifecycle is set out in the asset data strategy covering the capture, storage, use and disposal of asset data.
- We will deploy an appropriate **network hierarchy** that is sufficiently detailed in order to capture the key characteristics and risks on the network whilst providing a clear method for operational processes.
- We will undertake **condition assessment** of our assets in accordance with national requirements or best practice and using a risk-based approach.
- We will develop understanding about our key assets using **life cycle planning** to inform maintenance strategies using whole life costs and to identify risks to performance, environment and future funding needs.
- We will set and monitor **service levels and performance** and we will communicate our performance to stakeholders.
- We will manage **risk** across asset groups and operations using a risk-based approach and ensure that there is an appropriate level of resilience. Risks will be reviewed in accordance with the agreed schedule and where required escalated in accordance with the corporate risk management strategy.
- We will develop integrated **works programmes** that balance competing needs across the highway network and communicate these to stakeholders.

In addition, we have identified the following activities for the asset management enablers.

- We will develop and maintain a comprehensive set of **operational processes** that provide clarity for stakeholders, improved consistency and greater resilience.

- We will identify the **competencies** required of our staff and prioritise **training** within the funding available.
- We will actively **communicate** with stakeholders in line with a communications plan.
- We will develop and operate contracts and partnerships to ensure that our **procurement, programme** and **service delivery** activities are optimised.
- We will identify and communicate long term **funding** requirements and seek additional funding where required.

5 OVERVIEW OF OUR RISK-BASED APPROACH

Well-managed highway infrastructure recommends that “a risk-based approach should be adopted for all aspects of highway infrastructure maintenance, including setting levels of service, inspections, responses, resilience, priorities and programmes.” The specific approach taken will depend upon the aspect being addressed however, the following steps provide an overview of the general approach that will be adopted for policy formation, programme management and project delivery.

1. The risk-based approach shall be defined using personnel with appropriate competencies.
2. The objectives for managing risk shall be identified in line with the local transport and asset management policy.
3. Risks shall be identified together with the likelihood and impact using asset data. Such data may include:
    - Inventory
    - Condition data
    - Relevant operational data such as accidents, traffic disruption, 3rd party risks
    - Claims
    - Relevant standards, research and guidance
    - Knowledge of criticality
    - Stakeholder interests
4. Levels of risk will be assessed using a method aligned to the Council’s approach to opportunity risk management.
5. Options for the mitigation of risk will be assessed including costs, benefits and secondary risks and proposals for mitigation developed in line with the corporate approach and defined objectives.
6. Where required, mitigation options will be implemented.
7. Where required, residual risks will continue to be monitored.

6 GROUP BASED ASSET MANAGEMENT STRATEGIES

Shropshire's highway network provides the backbone of its economy and that the maintenance of its highways in an appropriate condition is paramount. One of the primary roles for highways network is to provide connectivity for communities across the county. Management of improvements and maintenance of the highways network is influenced by both condition as well as use of the assets, and Shropshire Council takes a proactive approach to balancing the needs of less trafficked roads against the larger, main roads that provide key linkages between town centres and promote economic development.

An underlying principle of sound asset management practice adopted by Shropshire Council is the use of preventive maintenance measures, in particular the use of efficient cost surfacing treatments on both the urban and rural road network. These approaches are set out in the asset-specific strategies following.

For each asset, a brief description of the condition of the asset is provided, followed by a statement of the desired outcome this strategy seeks to achieve (which is aligned to the overall objectives). The maintenance approach required to deliver each outcome is then described.

The matrix below provides an overview of the outcomes of the strategy for each of the major asset types. Where no outcome is displayed, no significant change is planned:

	Carriageways	**Footways & Cycleways**	**Structures**	**Drainage**	**Street Lighting**	**Traffic Signals**
Extent					Adopting new lighting	Adopting new signals
Condition					Reducing the average age of the asset	
Information		Improving our inventory		Improving our cleansing data	Improving our cable inventory	
Operation	Cyclical preventative maintenance regimes	Cyclical preventative maintenance regimes	Improved life cycle planning	Risk based cleansing approach	Increased use of low energy light	Optimised maintenance regime

With the exception of street lighting and traffic signals, the extent and condition of the major assets in this strategy is aimed to be maintained; a steady-state approach. It is important to highlight that while this strategy is not directly linked to funding, its aims have been validated against the funding levels currently in place and the current prices in our term maintenance contract. In other words, the strategy has challenging, but achievable goals. It follows that changes in funding levels and/or prices to carry out work will have an impact on the actual outcome of this strategy.

6.1 Carriageways

Carriageways form the majority of the highway asset, these range from busy A class roads to minor lanes; some carriageways remain unmetalled. The structure of these assets has been evolved rather than designed; consequently, the construction is not consistent even when some knowledge of the pavement exists.

An overview of Shropshire roads (carriageways) is shown below:

Length of Network (km)

Class	Rural	Urban	Total
A	352	98	450
B	427	136	563
C	1,592	173	1,765
Unclassified	1,727	645	2,372
Total	4,098	1,052	5,150

Rural C & Unclassified roads are narrow county lanes and comprise 3,319 km or 65% of the network.

Current Challenges:

Asset condition is average considering the network as a whole; the network condition indicators are comparable with other rural shire authorities.

However, there are concerns about the condition of some minor roads. These minor roads, typically consisting of little pavement structure, are at most risk of rapid deterioration due to the ingress of water and overloading. Investment in these roads is more challenging to justify with the other demands on more popular routes, however these roads remain crucial links for our communities.

Desired Outcome:

Carriageway condition is maintained with minimum whole life cost supported by steady state investment.

Proposed Asset Strategy:

Lifecycle Planning will be adopted to establish a baseline funding requirement for the network. The level of funding is a key factor in the delivering of our asset management outcomes and this will enable the Council to have a transparent view of our aspirations aligned with the funding available.

We will prioritise investment according to the observed demand on the network. Demand can be users experience of the network (condition) or financial costs in fulfilling our statutory duties (risk). Investment shall be targeted where the money will return greatest return.

Minimising the whole life cost of constructing and treating carriageway assets will be a key consideration. Also, where major intervention is required, repairs will be sufficient for at least 10 years. For new carriageways, most commonly constructed as part of new developments, we will seek to ensure that these assets do not need treatment for at least 15 years.

Maintenance should be undertaken just before the onset of rapid deterioration and before structural treatments are required. Resurfacing and surface treatment only are desired. The use of preventative surface treatments shall be optimised and these are done at the right time. We will seek to establish a cyclical approach to surface treatment which is conservative in order to protect against water ingress and localised rapid deterioration.

Reactive repairs should be done ‘right first time’.

6.2 Footways & Cycleways

Although the majority of footway and cycleways are in urban areas, almost a third of footways are in rural areas providing links within and between villages. Almost all footways and cycleways are bituminous, although there are significant lengths of flagged and block footways in urban areas. While carriageways provide the main component of the highway, footways are essential to connect homes and businesses and for many vulnerable road users, footways are their only means to travel and access public transport.

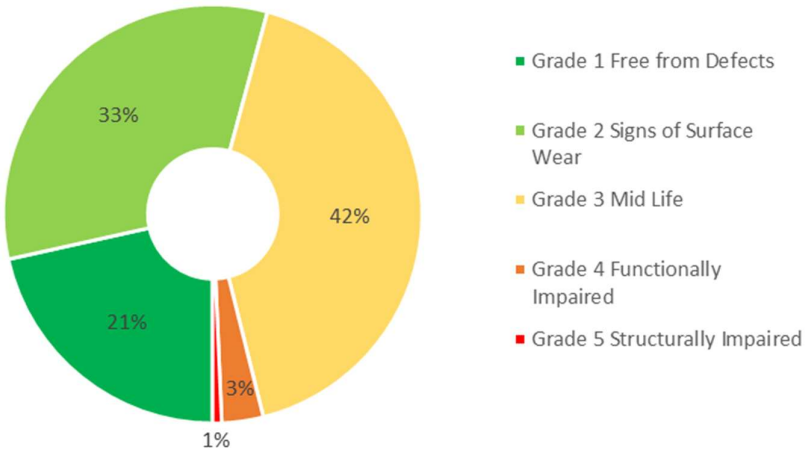
Table 1 below describes the different types of footway and cycleway present in Shropshire. Around 128,000 m2 are declared for use as cycleways.

Table 1. Area of footway and cycleways maintained (m^2)

Construction	Urban	Rural
Bituminous	1,938,303	1,048,137
Flagged	121,436	3,175
Block	37,864	3,904
Concrete	14,570	6,256
Total	2,112,173	1,061,472

Current Challenges:

We have just completed a four-year programme to produce the first comprehensive condition survey of footways. We plan to continue to survey, 25% of footways every year. The condition of footways as a whole is rated as good.



Desired Outcome:

Footway and cycleway condition is maintained at current levels at minimum whole life cost supported by steady state investment.

Proposed Asset Strategy:

We will establish a baseline funding requirement for the network using sound life cycle planning.

Using a network level survey, identify areas of deterioration and prioritise work according to risk. The definition of risk shall include economic value in town centres and utility for vulnerable road users where flagged footways may present particular risks.

Areas where overrun is a major factor should be considered for strengthening. Localised treatment should be considered first, longer lengths of resurfacing shall be selected only where economically justified.

In terms of programming maintenance and improvement works, schemes will be considered in localities to minimise the impact on communities.

On the bituminous footway and cycleway network, establish a cyclical approach to surface treatment which is conservative in order to protect against water ingress and localised rapid deterioration. Identify which footways are no longer used and allocate these with a new low use hierarchy.

6.3 Structures

The Council is responsible for a wide range of structures. consisting of 835 highway bridges or culverts with a span of 1.5 m or greater, 175 highway bridges or culverts with a span less than 1.5 m, approximately 1,500 walls retaining a height of 1.35m or greater and 50 cattle grids.

Current Challenges:

Detailed asset data exists for the majority of structures except for the retaining walls. A programme of retaining wall data collection was started in 2006 and covered approximately two-thirds of the highway road network and identified c1500 retaining walls associated with the highway, although liability and ownership issues have yet to be determined. With current funding only available to undertake responsive and an annual programme of inspection/ monitoring of highway bridges, the cost to complete the retaining wall exercise would be high and its needs would have to be questioned in the current financial climate.

The current bridge stock of c1000 highway bridges has an average bridge stock condition score of 80 (April 2015), which is considered to be in a 'good' condition. Unless the current level of funding is maintained, there is the potential for a rapid decline in bridge condition and backlog of maintenance works.

Desired Outcome:

Our aim is to maintain the highway bridges and structures stock condition score in a steady state of repair by adopting appropriate maintenance strategies and interventions (ie planned preventative, planned do minimum, unplanned reactive or do nothing) which will deliver value for money against a backdrop of reducing capital and revenue budgets.

We will aim to meet statutory duties and maintain the bridge stock in a safe and serviceable condition by undertaking annual routine maintenance and continuing with the present 3-year strengthening/ replacement forward programme of works.

Proposed Asset Strategy:

We will adopt a risk-based approach to prioritise our inspection, sub-standard monitoring of weak structures and works programmes in accordance with the new Well-Managed Highway Infrastructure, Code of Practice (October 2016) which requires full implementation from 1 October 2018.

The current prioritised maintenance works schedules and strengthening programmes are based on works priority, cost and strategic weighted factors such as network hierarchy, obstacle crossed, heritage status and length of structure. This bespoke toolkit will continue to be used to demonstrate the desired outcomes are being delivered in the most cost-effective manner with the funding available. However, we are looking to refine our in-house toolkit to take into account other key weighted factors such as strategic resilient network and maintenance strategy

Going forward, our aspirations are to adopt the CIPFA's Structures Asset Management Planning Toolkit (Structures Toolkit) or develop an alternative tool for developing lifecycle planning and prioritisation needs; to assist with asset valuations and financial planning; and identify the appropriate level of funding required for future maintenance and strengthening. At present we are still evaluating the most appropriate software (or toolkit) which can deliver our asset management needs in to the future.

6.4 Street Lighting

Shropshire Council currently maintains 19,579 street lights. Of these, approximately a quarter are over 35 years old and just 16% of the stock are low energy lighting. The majority of the existing columns are mild steel columns, there are also a significant number of reinforced concrete columns (1134 or 6%).

Current Challenges:

An ageing asset with a high percentage of columns reaching the end of their life. Although there has been recent investment, a minority of lighting across the county is low energy. In terms of customer satisfaction, there is a relatively low level of satisfaction with street lighting in Shropshire as determined by the NHT survey. Given the average age of the infrastructure along with low levels of low energy lamps, reduction of costs in the short term is significantly challenging.

One area identified as a matter of concern, due to the gap of asset information, relates to the Authorities cable network for street lighting. This is being addressed and the information managed to enable scheduled maintenance to be undertaken and plans provided to third parties on request, reducing risks relating to nearby works in the highway.

Data capture electronically needs to be refined and developed further recording more detailed asset information by our term Contractors, which is the basis of all good inventories, streamlining the process and removing the need for double handling.

Desired Outcomes:

- Planned improvement of the lighting stock including the provision of long life columns.
- Provision of low energy LED lighting, generating 60% energy savings

- Improved customer satisfaction.
- Reduced operating costs through the deployment of LED lighting equipment and a Central Management System (CMS).

Proposed Asset Strategy:

- To support the Council asset management aims of Safety and Sustainability.
- We will to adopt the principles set out in 'Well -Managed Highway Infrastructure" for street lighting to help achieve the delivery of Best Value services.
- The development of a life cycle planning strategy, this will be designed to show what activities are necessary during different stages of an asset's life, and to move from a reactive maintenance regime to a planned, sustainable asset management-based approach.
- To improve the lighting asset leading to reduced operating costs and carbon emissions through the development and implementation of a funded long-term replacement programme.
- To prioritise the replacement of concrete columns which can present a high risk of failure.
- To consider using aluminium columns where possible subject to local needs such as in conservation areas.
- The ageing street lighting column asset has led to the development of our "Invest-to-Save" proposal. The outcome will be a programme that will ensure that no columns are over 35 years old, columns that are failing structural tests will be replaced as a priority and there will be a reduction in the risk of catastrophic column failures. This is to limit liability claims and minimise maintenance requirements.
- To continue improving the way our Term Contractors collect data electronically and the way this information will be provided and analysed to maximise its usefulness.
- To establish and maintain up to date and accurate inventory of all the authority's cable networks as part of its asset management system.

6.5 Traffic Signals

There are currently 122 traffic signal installations within Shropshire, performing an important role in managing traffic flow, improving safety and providing road crossings for pedestrians and cyclists. Investment in Shropshire's Urban Traffic Management and Control (UTMC) is significantly enhancing the management capabilities of existing traffic signals to ease congestion and improve maintenance response times.

Current Challenges:

Generally, the equipment associated with traffic signals in Shropshire is now in relatively good condition, with only the smaller projects of upgrading pedestrian crossings required over the next 3 years and a couple of major junctions in the next 5 years requiring Capital fund allocation.

In 2012 a gap analysis project following the METE (Management of Electronic Traffic Equipment) document was undertaken identifying the areas that required development looking at short, medium and long term plans. The recommendations identified following the review need to be quantified and implemented, forming the basis of the Street lighting and traffic signals asset management strategy.

The Confirm system holds much of the asset information needed for the asset management strategy. However, other information lies outside this system, notably in terms of detailed highways inventory information (held in a series of Excel spreadsheets) for Traffic Signals and Electronic signs.

Reviewing budget allocations against the demands of competing maintenance issues and maximising the use of both capital and revenue resource.

Desired Outcomes:

- Planned and cyclic maintenance of the traffic signal asset stock to minimise operating and replacements costs and to extend asset life.
- To maintain the asset so that the stock is less than 20 years old.
- To manage the risk of failure of these assets to within acceptable levels.

Proposed Asset Strategy:

Develop and implement the work already undertaken following the 2011 Code of Practice METE (Management of Electronic Traffic Equipment) document which establishes a series of good practice policies and procedures for the management and maintenance of fixed location electronic traffic equipment and has the principles of asset management at its core.

Further use of energy and cost saving technologies within the traffic signals assets such as completion of replacement programme of LED lighting heads for old-style halogen signal heads, and identification and implementation of traffic signal sites using extra low voltage (ELV).

We will identify those sites where the age of the installation and/or availability of replacement parts would present a high risk of failure or financial cost to remedy. This list of sites will be used to prioritise future investment in this asset.

6.6 Drainage

This encompasses a wide range of assets, varying from piped systems to open watercourses, which assist in the council's duty to safely drain the highway and provide opportunities for the council to meet its obligations under the Water Framework Directive.

Current Challenges:

Whilst asset data exists with regard to the majority of highway gullies, information on the associated outfall systems, of various types, into which they discharge is very limited. The collection of such data is high cost and a data collection exercise for the entire asset cannot be justified. A risk-based approach to the collection of highway drainage asset data is therefore taken.

Desired Outcome:

To meet statutory duties and maintain a safe, in flood risk terms, highway by continuing to assess and prioritise high risk flooding issues and programme them accordingly. Opportunities to work in partnership with other organisations and to deliver other benefits, such as those required by the Water Framework Directive, will also be sought.

- Highway drainage schemes which can deliver the highest outcome measure scores will receive the highest priority when it comes to the programming of their design and construction.
- Construction of highway drainage schemes will result in the delivery of the following outcome measures
- Fewer residential and business properties being at risk of flooding (measured as the number of residential or business properties protected)
- Fewer flooding related highway safety concerns (measured as the distance of highway better protected from flooding)

- Reduced pollution of watercourses through the transport of pollutants through highway drainage systems.

Proposed Asset Strategy:

The existing prioritised highway drainage works programme will continue to demonstrate that outcome measures are being delivered in the most effective manner.

Whenever new drainage assets are provided the as built details are added to the asset register. The objectives of the Water Framework Directive are taken fully into account to for all new drainage schemes: to maintain water levels, to reduce water contamination, to improve diversity in the water environment and to be sustainable.

For the existing highway drainage systems, there are no proposals to record all outfalls; however, where any investigation to improve drainage is required, that information is captured and recorded. The intention is to maintain existing drainage gullies so that they do not become 100% full of silt so that they will always retain to ability to trap silt in runoff water.