

Highway Infrastructure Asset Management Plan

Report of the Director of Climate Change, Environment and Transport

Please note that the following recommendations are subject to consideration and determination by the Cabinet (and confirmation under the provisions of the Council's Constitution) before taking effect.

1) Recommendation

That the Cabinet be asked to:

- (a) adopt the updated Highway Infrastructure Asset Management Plan and associated Annexes;
- (b) provide the Director of Climate Change, Environment and Transport, in consultation with the Cabinet Member for Highway Management, delegated authority to make minor amendments to the Highway Infrastructure Asset Management Plan and associated Annexes.

2) Introduction

The updated Highway Infrastructure Asset Management Plan and associated Annexes (The Plan) is the next important suite of documents that sit alongside the Highway Asset Management Policy and Strategy, which were approved by Cabinet in April 2022. (Report available here: [Highway Infrastructure Asset Management Policy and Strategy](#), Minute *143 refers [Cabinet 13 April 2022](#)).

The Plan allows for more focus and detail to be applied to key asset groups, describing the asset management tools and processes that the Service uses to plan, operate and monitor their ongoing management and maintenance. The Plan is attached to this report as Appendix B.

Through national performance measures such as the Incentive Fund, the Service reflects a very strong maturity level in terms of its approach and adoption of asset management practices, a review is an important process to ensure good practice and a positive culture is incorporated and maintained.

Updates to national guidance, notably a revised code of practice 'Well-managed Highway Infrastructure' has also steered this review and heavily influenced its structure. Link available here: [Code of Practice | CIHT](#)

3) Highway Infrastructure Asset Management Plan

3.1 Strategic Asset Management

The key elements of strategic asset management are:

- Individual Asset strategies are required for each asset group and should be appropriate
- Asset Plans must be aligned with larger corporate priorities
- Risk, cost and performance over time must be balanced
- Cultural challenges should be considered just as much as technical challenges.

This Plan is derived from the Asset Management Policy and Strategy, which were approved by Cabinet in April 2022. The Plan provides more detailed information relating to how the organisation's asset management objectives can be achieved and how asset life-cycle decisions are put into practice.

The Plan introduces key asset management concepts and associated individual Annexes have been developed for twelve key asset groups, which allows for focused maintenance strategies to be applied.

The Annexes have been developed by lead officers and are consistent in their structure, however due to the nature and maturity level of a particular asset group they can also be detailed in their form. This allows for them to provide important functions as internal processes reinforcing and fostering an asset management culture across the Service, as well as being publicly transparent in their approach.

The Plan, and in particular the Annexes are in place to evolve over the two-year period which is emphasised in the 'Improvement Actions' section within each Annex, recognising the changing environment the Service exists within as well as the desire to challenge ourselves and be the best we can for the people of Devon.

The Plan builds on the important message already communicated through the Asset Management Strategy, that with current funding levels the Service is managing decline in relation to its highway assets. It is therefore essential that community support continues and is encouraged in order to help minimise this inevitable decline.

3.2 Code of Practice

The UK Roads Leadership Group's code of practice on managing highways infrastructure was published in 2016 and sets out best practice for highway infrastructure management. It has been endorsed by the Department for Transport (DfT) who have, in recent years, linked packages of funding to the adoption of the code by highway authorities. As such, Devon has structured its approach to mirror this code.

3.3 Maintenance Strategies

Due to the current level of investment into highway assets, decline of some roads is unavoidable. The Service has developed a framework of Maintenance Strategies ranging from 'improved condition' through to 'safety only'.

Strategy	Description
Improved condition of priority assets	Targeted investment e.g. Drainage cleaning
Maintaining Steady State	Sustaining the current level of service e.g. A and B roads
Reducing Serviceability	Allowing an asset to gradually deteriorate from its current level of service e.g. Minor Road Network
Minimal Maintenance	Safety and routine maintenance only e.g. Unclassified Roads

Table. 1: Maintenance Strategies

These Maintenance Strategies can then be applied to the various asset types to create a set of Maintenance Standards. The example for carriageways can be seen below. Visual descriptions (what a road user would expect to see) have been added to ensure consistency across the county and help manage expectations.

Provision of Safety Related Issues Only	Provision of Safety and Serviceability Related Issues		Provision of Safety, Serviceability and Sustainability Issues
Red	Orange	Yellow	Green
Carriageway surface uneven and rutted with multiple localised repairs and defects of a non-safety nature. In rural areas suitable only for use by agricultural and similar vehicles.	Carriageway surface irregular. Limited evidence of recent resurfacing. Significant localised repairs and defects of a non-safety nature.	Carriageway surface generally well maintained. Busier roads will be regular with localised repairs and defects of a non-safety nature.	Carriageway surface regular with very few localised repairs or defects of a non-safety nature.

Table. 2: Carriageway Annex - description of typical appearance

The table below shows the road classifications versus the intended maintenance standard, with more strategic Maintenance Category (MC) 3 and 4 roads i.e. 'A' roads reflecting the higher maintenance standard.

Consistency of application is very important, with the Service keen to work alongside communities to be clear that due to the current financial situation not all roads can be maintained to the same standard, and it is vital to jointly identify the most important roads. Maintenance standards can then be applied accordingly to ensure that the road network is being managed effectively and to the benefit of as many users as possible.

Carriageway Hierarchy	Carriageway Maintenance Standard
MC3	Green
MC4	Green
MC5	Yellow
MC6	Yellow
MC7	Yellow
MC8	Orange
MC9	Orange
MC10	Red
MC11	Red

Table. 3: Carriageway Annex – Maintenance Standards

3.4 Innovation

The Plan also recognises and reflects the existing and developing good practice within the Service, such as:

- Investment in street lighting technology such as LED replacements, part-night lighting and use of green energy.
- Materials, such as early adoption of warm asphalt and use of Methyl Methacrylate (MMA) high performance road markings;
- Triage inspections for safety defects reducing duplication and increasing efficiencies;
- Working with universities (Exeter, Cardiff, Bristol) to develop the resilient network.

4) Options/Alternatives

Retain existing Highway Infrastructure Asset Management Plan – Rejected.

Failure to fully refresh and align the revised Plan with the approved Asset Management Policy and Strategy will impact the ability of the Service to contribute to the objectives of the Strategic Plan, and likely to lead to a potential reduction in DfT capital funding through the inability to effectively meet funding criteria.

5) Consultations/Representations/Technical Data

5.1 National Highways and Transport Public Satisfaction Survey

In preparation of The Plan attention to the views of the public has been considered.

The National Highways and Transport (NHT) Public Satisfaction Survey reflects public perception of performance, importance and the desire for various activities to be funded.

2022 results show that condition of the highway network and the speed and quality of repairs are important to the public. The overall perception of highway maintenance in Devon has improved slightly and matches that of the national

average. Furthermore, in comparison to similar county councils in a comparator group, Devon remains slightly above the average. Analysis shows that the Service has strengths in street lighting maintenance and footway repair, however the public would like to see more funding directed to improving the condition of roads.

The complete survey can be seen here: [2022 Survey Public Reports \(nhtnetwork.co.uk\)](https://nhtnetwork.co.uk)

Community representation was invited through the network of Parish and Town Councils. No response was received to the request for help to shape the Plan and suggestions for improvement.

5.2 Corporate Infrastructure and Regulatory Services Scrutiny Committee

A Standing Overview Group (SOG) of the Corporate, Infrastructure and Regulatory Services Scrutiny Committee was held on the 8 February 2023 to consider the draft Plan.

The SOG asked the Scrutiny Committee on 23 March to make the following recommendations to Cabinet:

- (a) that the Highways Infrastructure Asset Management Plan contains further reference to taking opportunities for joint working with districts, towns and parishes on wider aspects of road maintenance such as litter picking; and*
- (b) that a map system to allow councillors to easily identify the maintenance category of Devon roads be developed (alongside the plans to provide councillors with access to the asset condition map).*

The report of the SOG of 8 February 2023 is available at [Standing Overview Group \(SOG\): Highways Asset Management Plan](#).

The Scrutiny Committee resolved that the above recommendations be commended to the Cabinet subject to the addition of the following to recommendation (b):

and that Members be permitted the ability to discuss with Officers the Maintenance hierarchy of roads.

[\(Agenda and minutes of Scrutiny Committee, 23 March 2023](#) minute*106 refers).

The Plan has been updated to incorporate the recommendations.

5.3 Independent Peer Review (WSP)

The Engineering Design Group has a long term partnership with WSP. In addition to providing technical design services WSP have supported the development of similar Plans for other authorities. A draft Plan was issued to WSP requesting feedback and critical challenge on our approach to longer term planning and specifically the following:

- Presentation and layout
- The overall structure and approach
- Alignment with national guidance and Code of Practice.

Summary of findings

The draft document was reported to be a well written and thorough document that is well structured and aligns well with the requirements of the guidance and the Code of Practice.

A number of recommendations were made and have been incorporated into The Plan as follows:

- Procurement section
- Target audience clarification
- Review and governance clarification
- Link to Asset Management Strategy objectives
- Further risk-based approach clarification.

5.4 Internal Review

A draft Plan was issued to all staff within Highway Management introducing the document and highlighting its main structure and guiding principles. General feedback was requested.

Following this feedback a number of minor amendments were made, largely centred around improving clarity, and grammar which did not substantially alter the context.

6) Strategic Plan

A key Asset Management concept is ensuring a 'line of sight' to broader corporate aims and objectives. As such the main planning horizon has also been set to run to 2025.

The Council's 'Best Place' priorities flow through this Plan, with 'Respond to the Climate Emergency' being a strong example of this. Through our work with Exeter University, we are incorporating carbon calculators into our maintenance activities which will over time help create benchmarks informing our design processes and providing the data to make better and more targeted evidence based decisions.

A further example is how The Plan through its maintenance activities addresses the priority to 'Help Communities to be Safe, Connected and Resilient'. In addition to the strong emphasis on Network Safety the Service is continuing to promote community self-help schemes and volunteering. This is particularly important to enable a local response to highway needs that would otherwise not be addressed in the current financial situation. These include the following;

- Road Warden Scheme
- Snow Warden Scheme
- Parish Paths Partnership Scheme
- Community Enhancement Fund.

7) Financial Considerations

7.1 National Picture

In order to provide context to the main overarching Asset Management Strategy of ‘managing decline’ it is appropriate to provide the current national picture, and what impact that has to Devon.

The findings of ALARM Survey 2022 ([ALARM-survey-2022-FINAL.pdf](#) ([asphaltuk.org](#))), which relate to the 2021/22 financial year, show that the backlog of carriageway repairs to fix local roads in England and Wales has reached £12.64 billion, which is further compounded by increased costs caused by rising inflation.

Other salient points from this survey include;

- Local councils would have needed an extra £1 billion last year just to reach their own target road conditions, before even thinking about tackling the backlog of repairs
- Almost one in five local roads could need to be rebuilt in the next five years – nearly 37,000 miles of the network
- One pothole is filled the equivalent of every 19 seconds
- Roads are only resurfaced on average once every 70 years.

7.2 Devon

The impact these national challenges have on the Devon Network is profound.

The table below shows that since 2012/13 the annual revenue settlement given to Highways for maintenance of Devon roads had gradually fallen from around £35 million in 2012/13 to approximately £25 million in 2022/23. Coupled with inflationary change, in particular the rapid increase in inflation seen in 2022/23, this has meant that the budget for highway maintenance has halved in real terms compared to a decade ago. This also has the knock-on impact of forcing change in priorities with safety taking higher consideration and proactive works being stopped, contributing to a more rapid deterioration of roads.

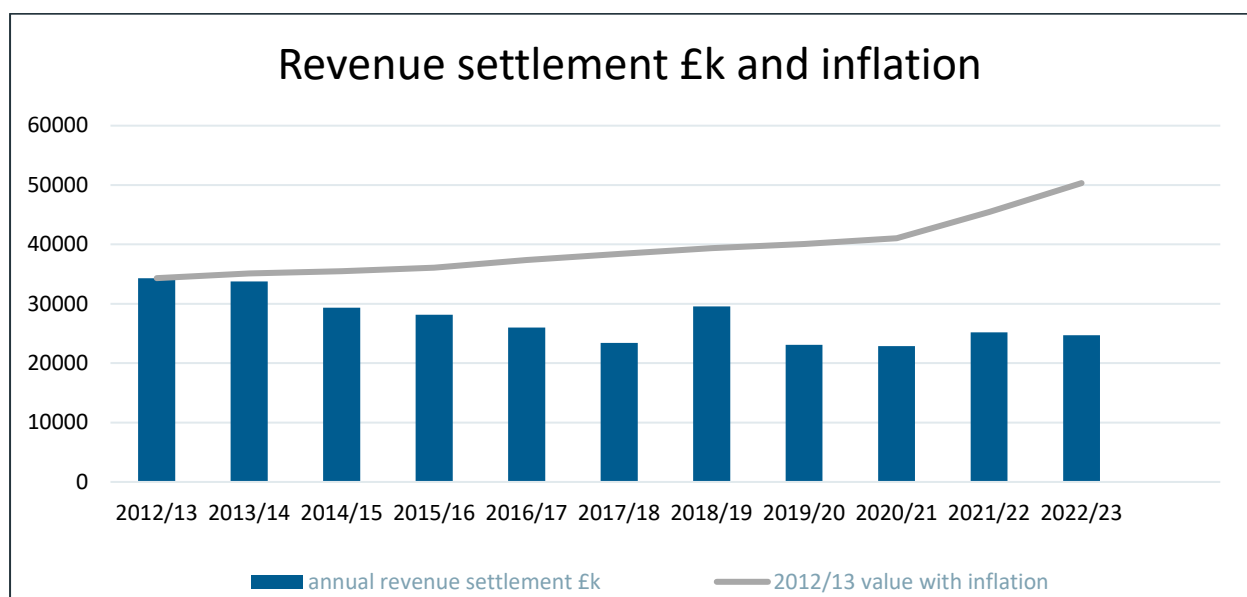


Fig. 3: Revenue Funding Comparisons

As seen below, Capital funding from the Department for Transport for asset renewal had, until 2019/20, been mostly consistent and in-line with inflation with a large boost in 2020/21. However, from 2021/22 there was a fixed three-year settlement of funding that does not increase with inflation. Following the Spring Budget announced on the 15 March the Department for Transport has confirmed that Devon will receive an additional £9.391m taking the 2023/24 budget to £62.225m. The percentage of unclassified roads considered 'poor condition' has been on the rise since 2021/22, reversing the downward trend seen since 2014/15.

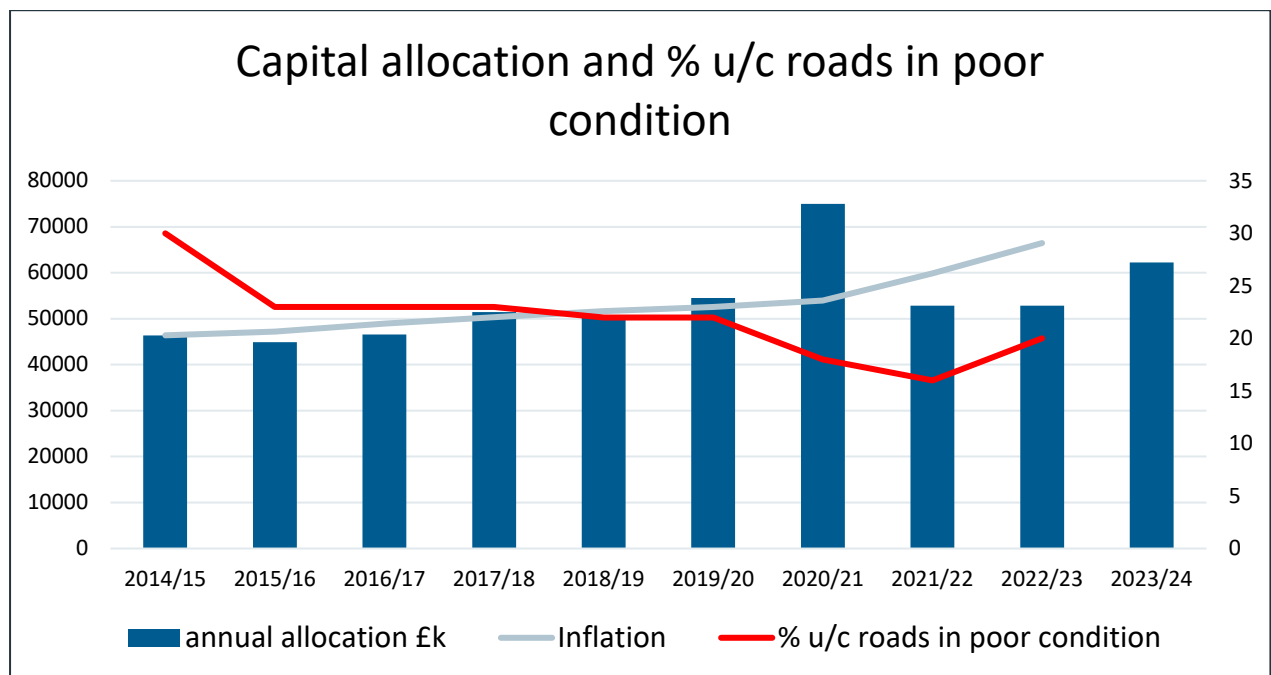


Fig. 4: Capital Funding Comparisons

Further examples of the impact of these funding challenges can be seen below:

- Appropriate funding levels allocated to the more strategic network to maintain current conditions levels, while managing a decline in the more minor network.
- Potholes are likely to become more prevalent, leading to a rise in unplanned and disruptive maintenance.

Despite these pressures, the Service has continued to focus on review and improvement of current working practices to increase efficiency and reduce disruption, recognising that in the absence of adequate funds, the Service must prioritise.

The Plan is a key component in ensuring that key asset groups have the right maintenance strategies in place, that fit within a wider framework of prioritisation and transparency.

8) Legal Considerations

The documents have been developed to ensure the Council continues to meet its statutory obligations as the Highway Authority and the relevant highway legislation including the Highways Act 1980 and the Traffic Management Act 2004.

9) Environmental Impact Considerations (Including Climate Change)

This revised Plan fits within a wider framework of documents including the Highway Asset Management Policy and Strategy, which were approved by Cabinet in April 2022. As part of this approval an Impact Assessment was prepared which can be seen here: [Highway Infrastructure Strategy and Policy - Impact Assessment \(devon.gov.uk\)](https://www.devon.gov.uk/highway-infrastructure-strategy-and-policy-impact-assessment)

This impact assessment contains an Environmental Analysis.

The maintenance of the highway network and its use by the public has historically generated a significant proportion of the County Council's carbon emissions. The importance of reducing carbon emissions globally is recognised and has become a key focus for the Council.

The Plan includes a section on Sustainability, which recognises the Council's Environmental Policy [Environmental policy - Environment \(devon.gov.uk\)](https://www.devon.gov.uk/environmental-policy-environment) with progress against the environmental objectives reviewed on an ongoing basis, which can be seen here: [Environmental performance progress - Environment \(devon.gov.uk\)](https://www.devon.gov.uk/environmental-performance-progress-environment)

The Plan goes on to provide practical examples of how the approach to maintenance also aims to meet these objectives within the following areas:

- Carbon
- Materials, Products and Treatments
- Quality Management
- Environmental Management
- Materials Utilisation
- Waste Management and Recycling
- Noise Reduction, Air Quality and Pollution Control
- Nature Conservation and Biodiversity
- Environmental Intrusion

10) Equality Considerations

Where relevant, in coming to a decision the Equality Act 2010 Public Sector Equality Duty requires decision makers to give due regard to the need to:

- eliminate discrimination, harassment, victimisation and any other prohibited conduct;
- advance equality by encouraging participation, removing disadvantage, taking account of disabilities and meeting people's needs; and
- foster good relations between people by tackling prejudice and promoting understanding

in relation to the protected characteristics (age, disability, gender reassignment, marriage and civil partnership (for employment), pregnancy and maternity, race/ethnicity, religion or belief, sex and sexual orientation).

A decision maker may also consider other relevant factors such as caring responsibilities, rural isolation or socio-economic disadvantage.

This review of The Plan fits within a wider framework of documents including the Highway Asset Management Policy and Strategy, which was approved by Cabinet in April 2022. As part of this approval an Impact Assessment was prepared which can be seen here: [Highway Infrastructure Strategy and Policy - Impact Assessment \(devon.gov.uk\)](https://www.devon.gov.uk/highway-infrastructure-strategy-and-policy-impact-assessment)

This impact assessment contains an Equality Analysis.

Members will need to consider the Impact Assessment for the purposes of this item/meeting.

11) Risk Management Considerations

Successful implementation of the Devon Asset Management Framework requires an understanding of the impact and consequences of strategic risks. Analysing risks provides information on the effect events will have on the desired performance of an asset.

The Plan outlines the approach to risk taken by the Service, including its key principles and considerations. Appendix A to this report taken directly from The Plan further explains the principles of this risk-based approach.

Under these guiding principles each Asset Group also has a section dedicated to highlighting specific risks that may prevent or inhibit the Service achieving its asset management aims for that Asset Group.

12) Reasons for Recommendations

The Highways Infrastructure Asset Management Plan and associated Annexes have been revised to reflect the latest industry guidance and National Code of Practice. Adopting The Plan will help enable the Service to maximise its grant funding allocations from government for highways maintenance and ensure the Service is managing its highway asset in an effective and efficient manner.

A well-defined asset management approach enables the County Council to demonstrate it has a clear methodology for valuing highway infrastructure assets and determining their condition.

The Plan will be a key document used by the officers, consultants, and contractors enabling the effective management and maintenance of the highway asset. It will provide Elected Members with the background to help decision making, and it is available to members of the public so that they can understand the challenges faced by the Service in managing the highway asset and the reasons for the actions being taken.

It is unavoidable that deteriorating condition will lead to an increase in revenue funded reactive repairs and increased future planned maintenance costs. In the long term there will also be an impact on the selection of journey routes and the reliability of journey times.

By adopting good asset management practice the above impacts will be minimised.

Enabling the Director of Climate Change, Environment and Transport, in consultation with the Cabinet Member for Highway Management, to make minor amendments to the Highway Infrastructure Asset Management Plan and associated Annexes will allow for the flexibility needed to ensure it can continue to develop. The Plan has been developed as 'living' documents recognising the asset management journey the Service is on and the need to evolve, as well as to adapt to changes in legislation and guidance.

Meg Booth

Director of Climate Change, Environment and Transport

Electoral Divisions: All

Cabinet Member for Highway Management: Councillor Stuart Hughes

Local Government Act 1972: List of background papers

Nil

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Highway Infrastructure Asset Management Plan – Final

Appendix A to CET/23/28

The Plan: Risk based approach

Principle	How we do it
<p>Be aligned with the Council's corporate objectives, legislative requirements, and corporate approach to risk and management of risk</p>	<p>The Highway Infrastructure Asset Management Strategy describes the Service's approach to risk and management of risk, which is aligned with corporate objectives and legislative requirements, by using a Risk Recording DCC Risk Management (devon.gov.uk) that includes corporate and service area risk registers.</p>
<p>Understand risk in a highways service and its application to all areas of operations, including people, infrastructure, data, finance, and suppliers</p>	<p>The Highways, Infrastructure Development and Waste Services Risk Recording (devon.gov.uk) contains details of the main risks in the highways service, their status and mitigation and is reviewed regularly.</p> <p>A risk-based approach is the foundation of all areas within the highways service, including response to defects, inspection regimes and lifecycle planning as set out in this Highway Infrastructure Asset Management Plan and the Highway Safety Policy.</p>
<p>Understand the potential risks and their likely significance to users, stakeholders, the Council and to the data and information held</p>	<p>The Service is continually collecting data on the highway asset through inspections, surveys and reports. Through analysis, this provides an understanding of risk which is used to develop the lifecycle strategies for each asset.</p>
<p>Understand the inventory, function, criticality, sensitivity, characteristics and use of the various assets comprising the highway network</p>	<p>The Service uses an integrated highways management system to collect, store, manage, and report on highway assets.</p>
<p>Establish hierarchies and maintenance standards with appropriate funding</p>	<p>Functional hierarchies have been assigned to carriageways in the county, which are outlined in the Highway Asset Management Policy and Strategy - Roads and transport (devon.gov.uk) section of this Plan and in the Annexes where applicable.</p>

<p>Implement the agreed levels of service</p>	<p>The Highway Infrastructure Asset Management Policy establishes the importance of levels of service in achieving the aims of the Council's strategic plan. The Highway Infrastructure Asset Management Strategy explains how levels of service are established and defines the levels of service statements and how they will be achieved and considers cross-asset prioritisation. This Highway Infrastructure Asset Management Plan describes how levels of service will be implemented through maintenance standards, investment strategies for each asset, and provides a performance management framework for reviewing and monitoring.</p>
<p>Competencies used to develop and implement the risk-based approach</p>	<p>The minimum standards of training and development that are required to enable officers to operate competently has been evaluated and is held on a central register known as the Annual Training Matrix. An annual staff appraisal is undertaken to assess staff competency as part of performance monitoring against their job role, when training and development needs are also identified.</p>
<p>Regular evidence-based reviews</p>	<p>The Service continually reviews its policies and procedures, both formally as dictated by the periods stated within those documents, and informally as an ongoing process. Asset management data, functional hierarchies, and the application of a risk-based approach, including inspection types and frequencies, are regularly reviewed to ensure the most efficient use of resources.</p>

Version Control		
Version	Date	Summary of Changes
0.1	10.03.2023	For consideration by Cabinet

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Contents

Foreword	
1 Introduction	1
1.1 Principles and Context of the Plan	1
1.2 Status of the Plan	1
1.3 Maintenance Practice	1
1.4 Scope of the Plan	3
1.5 Limitations to the Plan	3
2 Policy Framework	4
2.1 Development of Asset Management Policy	5
2.2 Stakeholders and Communication	5
3 Strategy and Hierarchy	6
3.1 Highway Infrastructure Asset Management Strategy	6
3.2 Network Inventory	7
3.3 Functional Hierarchy	8
3.4 Resilient Network and Minimum Winter Network	10
3.5 Critical Infrastructure	11
3.6 Lifecycle / Designing for Maintenance	11
4 Risk-Based Approach	12
4.1 Principles and Considerations	12
4.2 Developing the Risk Based Approach	13
4.3 Competencies and Training	15
4.4 Inspections and Surveys	15
4.5 Management Systems, Recording and Monitoring of Information	15
4.6 Safety Inspections	18
4.7 Defect Recording and Repair	18
4.8 Reporting by the Public	19
5 Network Resilience	19
6 Performance Management	20
6.1 Performance Measures	20
6.2 Performance Measures	25
7 Financial Management, Priorities and Programming	25
7.1 Financing of Highway Maintenance	25
7.2 Asset Valuation	25
7.3 Priorities and Programming	26

8	Sustainability.....	28
8.1	Sustainability and Highway Infrastructure Maintenance	28
8.2	Materials, Products and Treatments.....	29
8.3	Quality Management and Sector Schemes	30
8.4	Environmental Management.....	30
8.5	Materials Utilisation	30
8.6	Waste Management and Recycling.....	31
8.7	Noise Reduction, Air Quality and Pollution Control	31
8.8	Nature Conservation and Biodiversity	31
8.9	Environmental Intrusion.....	32
9	Procurement	32
10	Improvement Actions	32
11	Conclusions	33

Annexes

- Annex 1 – Carriageways (Road Surface)
- Annex 2 – Footways
- Annex 3 – Cycleways
- Annex 4 – Drainage
- Annex 5 – Fences and Barriers
- Annex 6 – Trees and Soft Landscape
- Annex 7 – Road Markings and Studs
- Annex 8 – Signs and Other Traffic Assets
- Annex 9 – Park and Ride Sites
- Annex 10 – Public Rights of Way
- Annex 11 – Structures
- Annex 12 – Traffic Signals and Street Lighting

Foreword

The highway network is the most valuable physical asset that the County Council manages and maintains. It is central to enabling safe and resilient links for people to connect with their communities and to lead to healthy, prosperous lives.

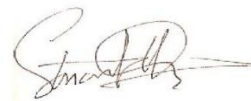
This Plan, together with the Highways Infrastructure Asset Management Policy and Strategy, identifies highway assets and develops a framework to enhance existing good practice and improve the effectiveness of decision making.

Like all authorities, Devon is facing significant financial pressures and it is critical that there is a clear understanding of the links between levels of service delivery and funding.

The documents clearly link to the Council's new Corporate Strategy, 'Best Place', and have been updated to take account of national codes of practice and the latest Highways asset management guidance. The Council has a leadership role in reducing carbon usage in Devon. Therefore, our highway related decision-making processes are developing to encourage communities to use less fossil fuels. We can contribute by making active travel a realistic alternative for both business and pleasure journeys on our network. In addition, reducing carbon emissions in highway materials and maintenance repairs will become as important in our decision making as both quality and cost.



Meg Booth
Director, Climate Change, Environment
and Transport



Stuart Hughes
Cabinet Member for Highway
Management



1 Introduction

1.1 Principles and Context of the Plan

This Plan is part of a suite of Highway Infrastructure Asset Management documents which have been designed to align with the Well Managed Highway Infrastructure – Code of Practice (October 2016) and are tailored to the specific local needs in Devon. The Plan describes how the Council’s Highway Infrastructure Asset Management Strategy (2022-2025) ([found here](#)) will be delivered.

The Plan will be used by the Council’s staff, consultants, and contractors for reference when managing and maintaining the highway asset. It will provide Elected Members with the background to help decision making, and it is available to members of the public so that they can understand the challenges faced by the Council in managing the highway asset and the reasons for the actions being taken.

Along with the other Highway Infrastructure Asset Management documents, the Plan is available as an electronic document online. There will be live hyperlinks to places in the Plan and to other documents that are referenced.

The Plan will be updated as and when needed and will be reviewed on an annual basis.

1.2 Status of the Plan

This Plan covers a main planning horizon from 2023 – 2025 to align with the Council’s ‘Best Place’ strategy. Cabinet approval will be sought for this update however, following this, elements of the Plan will be updated dynamically to better match the changing environment we operate in.

A version control process is in place that allows changes to be tracked and help identify when key decisions were made. The process provides clarity about the currency of versions, which versions were in place at a particular time, and prevents superseded information from being used. To administer the process, individual owners have been assigned to the Plan and each of the twelve Annexes. They are responsible for managing the overall version control of these documents. Minor revisions that do not change the substance of the document, for example spelling or grammatical corrections, do not need formal approval. Major revisions which change the context, content, or substance of the document, require the document to be formally approved. An Asset Management Panel will meet at six-monthly intervals and, if required, will make recommendations for the Director of Climate Change, Environment and Transport to authorise in consultation with the Cabinet Member for Highways Management.

1.3 Maintenance Practice

The Council undertakes maintenance types that contribute in varying degrees towards the core objectives of safety, serviceability, and sustainability which are described in [Section 4.4](#). The main types of maintenance activity are summarised in Table 1 below:

Maintenance Type		Function	Activity	Responsibility
1	Regulatory	Inspecting and regulating the activities of others	Highway Safety Inspections	Network Response Team
			Structures	Structures Asset Team
			Streetworks	Network Operations Team
2	Reactive	Responding to safety related incidents and reports	Defects, potholes, obstructions	Network Response Team Structures Asset Team Public Rights of Way
3	Resilience and Emergencies	Managing disruption and implementing recovery	Severe weather emergencies, civil emergencies, landslip or collapsed walls, oil spills, subsidence	Network Operations Team Structures Asset Team Neighbourhood Team
4	Winter Service	Maintenance in adverse weather	Gritting and snow ploughing	Winter Service Team
5	Routine	Regular scheduled works	Minor patching and drainage repairs	Highway Asset Programme Delivery Team
			Cyclical	Highway Asset Programme Delivery Team and Neighbourhood Team
			Lamp replacement	Traffic Management Group
			Bridge maintenance	Structures Asset Team
6	Programmed	Flexibly planned schemes primarily of reconditioning or structural renewal	Principal roads ¹	Highway Asset Team
			Non-principal roads ²	Neighbourhood Team Highway Asset Team
			Footways	Highway Asset Team Neighbourhood Team
			Cycleways	Public Rights of Way Neighbourhood Team
			Public Rights of Way and Maintenance Category 12 roads	Public Rights of Way
			Drainage	Highway Asset Team Neighbourhood Team
			Patching	Highway Asset Team Neighbourhood Team
			Wet/Dry Collision Sites	Highway Asset Team
			SCRIM remedial sites	Highway Asset Team

Maintenance Type	Function	Activity	Responsibility
		High Friction Surfacing (HFS)	Highway Asset Team
		Tree inspections	Highway Services Team Neighbourhood Team
		Structures	Structures Asset Team
		Preventative	Highway Asset Team

¹ Principal Roads are A roads and motorways (Highways Act 1980)

² Non-principal roads are B roads, classified unnumbered roads and unclassified roads

Fig. 1: Main Types of Highway Maintenance Activity

1.4 Scope of the Plan

The Plan includes Annexes for the key asset groups. Each Annex uses the same format and contains information on: Asset Inventory, Asset Performance, Maintenance Strategy, Levels of Service and Investment Strategy, Programme Development, Risks, and Improvements Actions. The 12 key asset groups are:

- Carriageways,
- Footways,
- Cycleways,
- Drainage,
- Fences and Barriers,
- Trees and Soft Landscape,
- Road Markings and Studs,
- Traffic Signs and other Traffic Assets,
- Park and Ride,
- Public Rights of Way,
- Structures, and
- Traffic Signals and Streetlighting.

1.5 Limitations to the Plan

The Plan does not provide detailed technical reference for all aspects of highway infrastructure maintenance, nor does it repeat technical guidance available elsewhere.

It refers to, but does not deal in detail, with:

- Highway improvement and new construction,
- Network management duty, including managing of utilities, and
- Management of street cleansing.

2 Policy Framework

The Highway Infrastructure Asset Management Plan ('the Plan') is part of a suite of documents that define the Council's approach to Highway Asset Management.

Figure 2 shows how these documents fit into the asset management framework which is detailed in the Strategy. It is built around four areas:

- Organisational Context - The context for highway infrastructure asset management, the organisation, and the environment within which the highway service is delivered, comprising National Guidance and Policies, legal and financial considerations, stakeholder expectations as well as Local Guidance and Policies, which include the Council's Strategic Plan 'Best Place' and emerging Highways and Traffic Management Service Plan.
- Planning - The key activities and processes for asset management planning, including developing the asset management policy and strategy, performance management, asset data, lifecycle planning, work programming.
- Enablers - The enablers that support the implementation of the Asset Management Framework including communications, leadership and organisation, competencies and training, risk management and performance management.
- Performance and Delivery - Delivery of the operational highway procedures and practices and the annual programme of work in accordance with the Highways and Traffic Management Service Plan.

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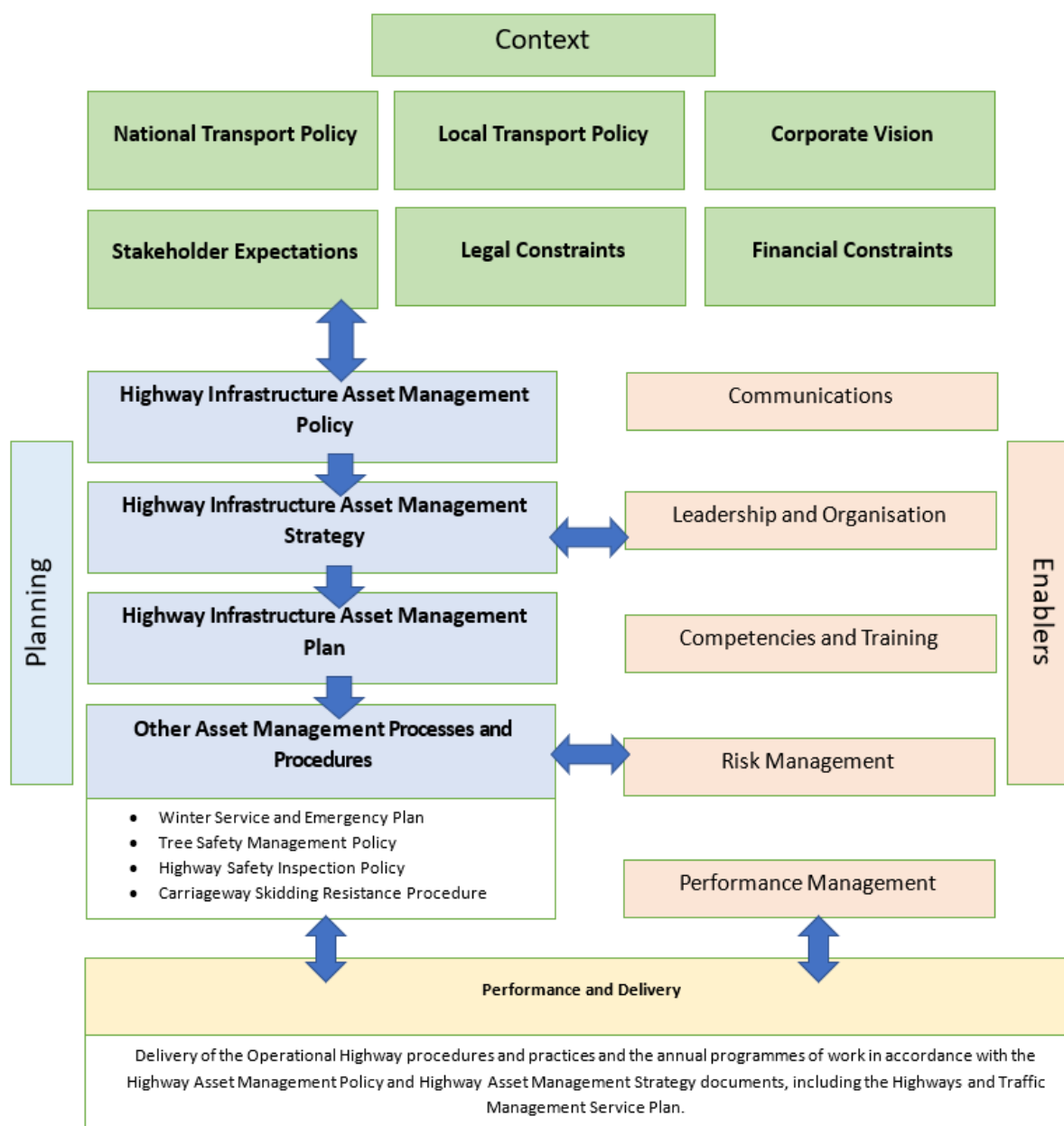


Fig. 2: The Asset Management Framework

2.1 Development of Asset Management Policy

The Council's Highway Infrastructure Asset Management Policy sets out the high-level principles of the management of highway assets in Devon to ensure the requirements of the Highways Act 1980 are satisfied in a way that helps tackle the priorities identified in the Strategic Plan.

2.2 Stakeholders and Communication

Underlining the importance of Stakeholder engagement to the Council, a Communication Strategy is being developed. This will set out criteria on how to communicate better with its stakeholders.

Section 6.0 of the Highway Asset Management Strategy identifies the Stakeholders with an interest in highway asset management, including elected members, employees, contractors, and agents, and explains how the Council engages them in

two-way communication to understand their needs and build commitment and pride in the work it does.

The Council recognises through its network management duty that there are other organisations that undertake operations on the highway. In order to minimise disruption and maintain reputation, the Council encourages that coordination takes place as much as possible, particularly with districts, towns and parishes on wider aspects of road maintenance such as litter picking, winter service and grass cutting. For example, this is proactively encouraged on larger schemes, such as the A380 and A361, where we aim to deliver multiple maintenance activities to optimise occupation of the strategic network.

3 Strategy and Hierarchy

3.1 Highway Infrastructure Asset Management Strategy

The Council's Highway Infrastructure Asset Management Strategy follows the UK Roads Leadership Group Highway Infrastructure Asset Management Guidance. The Strategy sets out the Council's approach to highway asset management, which follow the principles of the Policy to ensure that high-level objectives are met.

The Strategy explains that the Council's highway asset management framework is guided by national codes of practice and policies, and that it is also strongly influenced by the Council's own policies and The Strategic Plan, including the Council's commitment to the Devon Climate Declaration in response to the climate emergency.

The table in Figure 3 lists the key objectives that are stated in the Strategy and identifies where it is explained how they will be delivered, either in the Plan, the Annexes, or in the Annual Highway Maintenance Progress Report to Cabinet. The table also lists objectives from some of the linking documents where appropriate and identifies where these are referenced.

Objective of the Strategy	Where the Objectives are referenced		
	Plan	Annexes	Annual Maintenance Progress Report
Continue the development of a carbon calculator tool to identify opportunities and priorities for reducing the carbon emissions associated with the maintenance of all highway assets.	✓		✓
Regularly collect and maintain good quality asset condition survey data to inform the development of a Highway Infrastructure Asset Programme.	✓	✓	✓
Take a long-term view using a systematic, risk-based approach based on defined levels of service for each asset.	✓	✓	
Consider the whole life costs of maintaining an asset; we will look at	✓	✓	

Objective of the Strategy	Where the Objectives are referenced		
	Plan	Annexes	Annual Maintenance Progress Report
what will provide best return on the money we spend in the long term, rather than a 'worst-first' short term maintenance treatment.			
Encouraging and enabling communities to influence and undertake elements of the service.	✓	✓	
Understand the lifecycle of each asset and use this knowledge to plan when is the best time to do maintenance to keep the asset in a safe and serviceable condition and when it is time to replace it with new.		✓	
Measure and review Highway Infrastructure Asset Management Plan performance to promote continuous improvement and influence spending on different assets.	✓	✓	
Develop maintenance programmes using asset condition data as the starting point and utilising local intelligence where appropriate.	✓	✓	✓
Present an Annual Maintenance Programme annually to Cabinet for investment decision making approval.			✓
Work towards a carbon net zero position by 2030.	✓	✓	
Contribute to increases in bus priority (Bus Back Better).		✓	
Create a step change in levels of cycling and walking (Gear Change).		✓	

Fig. 3: References to Strategy Objectives in the Plan

3.2 Network Inventory

Highway authorities have a legal duty to keep a register of roads that are maintainable at public expense, primarily for Land Charges searches. There is also a requirement to maintain information for the purposes of:

- Identifying streets described as traffic sensitive, where work should be avoided at certain times of the day,
- Identifying structures and other features described as special engineering difficulty, and
- Identifying reinstatement categories used by statutory undertakers in the reinstatement of their street works.

Accurate inventory information is required to submit updated information to Government each year on road lengths maintained and is also used for valuation purposes.

Data management is also fundamental to the overall asset management process. There are three types of data that are required to establish a cost effective and adequate maintenance regime:

- Inventory – the number, location, size, type, age and make up of each asset.
- Condition – measurement and rating of the condition of the asset.
- Use – details of how the asset is used.

The Council has therefore developed an inventory that enables it to:

- Monitor and report on the condition of the highway network,
- Assess the expected life of assets or their components,
- Assess current levels of service and develop future levels of service,
- Assess current and future performance indicators,
- Model future maintenance options and identify future investment strategies,
- Develop long-term forward work programmes and associated budget requirements,
- Carry out valuation assessments of each of the assets and calculate depreciation, and
- Monitor and report on inspection regimes.

Details of inventory collection and data management for each asset type are described in the Annexes.

3.3 Functional Hierarchy

The Council is responsible for a variety of roads and footways, from high volume dual carriageways in congested urban environments to single lane rural roads connecting small settlements and villages.

Constraints on funding and resources mean that it is not possible to maintain every part of the network to the same standard. However, the asset condition should be commensurate with the type and location of a road or footway, and there should be consistency throughout the county and as closely as possible with neighbouring authorities. For example, Primary Routes in the county that carry large volumes of traffic at high speed should be maintained to a higher standard than unclassified Service Roads in very rural locations that carry occasional traffic.

It is fundamental to the application of this concept that a network hierarchy is established. The network hierarchy is based on asset function and is the foundation of the Council's risk-based maintenance strategy. It is crucial in establishing levels of service and to the statutory network management role for developing, co-ordinating and regulating occupation.

The Council's hierarchy reflects the whole highway network and the needs, priorities, and actual use of each infrastructure asset and is determined by its functionality and importance. Individual asset hierarchies are defined within each asset group, but all

are related so that each asset type can be considered in relation to others and to the whole highway network.

The road hierarchy is used to determine many of the asset management activities that take place on the network, such as the frequency and type of inspections, and response times and types of treatment. Figure 4 shows the Maintenance Categories of the Devon Highway Network. This is also available as a publicly accessible [map](#).

Maintenance Category	Definition on Devon Road Network	Function
1	Motorway	Maintained by National Highways
2	Primary National - Trunk Road	Maintained by National Highways
3	National Primary Route	National strategic routes for through and long-distance travel (A roads)
4	County Primary Route	Main access routes connecting principal settlements.
5	Secondary County Route	Main access routes to large settlements and recreational attractions.
6	Local Distributor	Main access routes to smaller settlements and recreational attractions.
7	Collector Road	Rural – Access routes to small villages and other significant traffic generators. Urban – Industrial main collector roads & through routes and Residential collector roads. Access to schools, hospitals, facilities for the disabled, main shopping areas, libraries, car parks and tourist attractions. Shared surfaces with heavy pedestrian traffic. Local roads serving limited numbers of properties.
8	Minor Collector Road	Rural – Roads serving small hamlets and scattered communities. Urban – Roads serving shopping areas, business premises, industrial estates and residential areas
9	Service Road	Rural – Local road serving only a few properties Urban – Narrow collector roads and shared surfaces
10	Minor Service Road	Rural – Local road serving only one property Urban – Cul-de-sac serving less than 20 properties.
11	Minor Lane	Rural – Serving fields only or duplicating other routes. Urban – Back Lanes

Maintenance Category	Definition on Devon Road Network	Function
12	Track	Not used by normal vehicular traffic (Predominantly managed as part of Public Right of Way network)

Fig. 4: Maintenance Categories of the Devon Highway Network

The Annexes contain the hierarchy of other assets where applicable.

The core objectives for managing the highway asset are:

- Network Sustainability - Minimising cost over time; maximising value to the community; and maximising environmental contribution.
- Network Serviceability - Ensuring availability; achieving integrity; maintaining reliability; resilience; and managing condition.
- Network Safety - Complying with statutory obligations; and meeting users' needs for safety. Customer Service user experience/satisfaction; communication; information; and levels of service.

Focussing on these objectives and appropriate outcomes for the functional hierarchies of urban and rural carriageway and footway, Maintenance Standards have been established for each asset where applicable. This has been done by considering what each Maintenance Standard would look like to a road user, and then determining how they can be achieved on each Maintenance Category of route with the resources that are available. Figure 5 shows the four Maintenance Standards that have been used in the tables that can be found in the Annexes where applicable.

Maintenance Standard 1	Provision of Safety, Serviceability and Sustainability
Maintenance Standard 2	Provision of Safety and intermediate level of Serviceability
Maintenance Standard 3	Provision of Safety and minimal level of Serviceability
Maintenance Standard 4	Provision of Safety only

Fig. 5: Maintenance Standards

3.4 Resilient Network and Minimum Winter Network

A resilient network has been defined based on the Minimum Winter Network, which is defined in the [Winter Service and Emergency Plan](#) as:

- 'A' roads,
- The main access to 24-hour emergency premises, and
- The main access to the primary market and coastal towns.

This Network does not simply follow road classification or categorisation, but includes the routes crucial to economic and social life of the local and wider area, taking account of repeat events (e.g. flooding), and local factors. Maintenance and other measures are prioritised on the Resilient Network to maintain economic activity and access to key services during disruptive events.

The Resilient Network is periodically reviewed to ensure that it remains relevant and contains the most critical routes and highway assets.

3.5 Critical Infrastructure

Critical infrastructure assets are a crucial part of the highway network. Their failure would result in significant impact to the local and potentially national economy. One of the potential risks to the function of critical infrastructure is climate change, including impacts of flooding, rising temperature, changing sea levels, high winds, and drought.

The Council is developing a register of its Critical Infrastructure which will consider their position in the asset hierarchy and may assign maintenance categories that are different to similar but non-critical assets. This will include structures that are on the Resilient Network, road restraint systems protecting railways from road vehicle incursion, reservoirs, and the Slapton Line (A379).

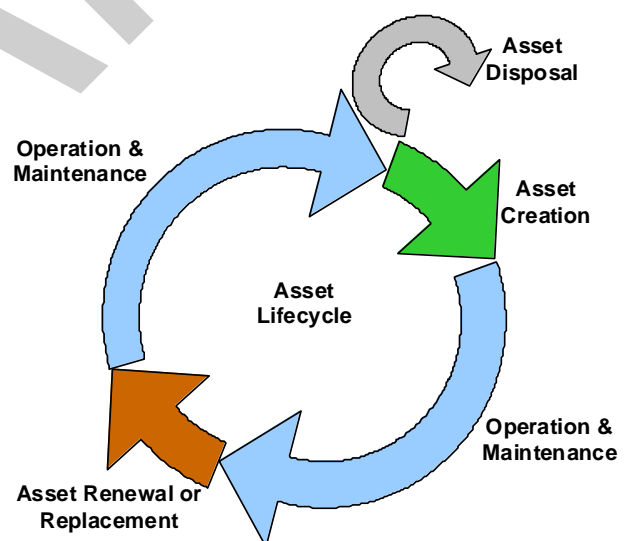
3.6 Lifecycle / Designing for Maintenance

Asset management requires a sound understanding of how an asset is likely to behave and deteriorate throughout its lifecycle.

The lifecycle of a highway infrastructure asset covers the following stages:

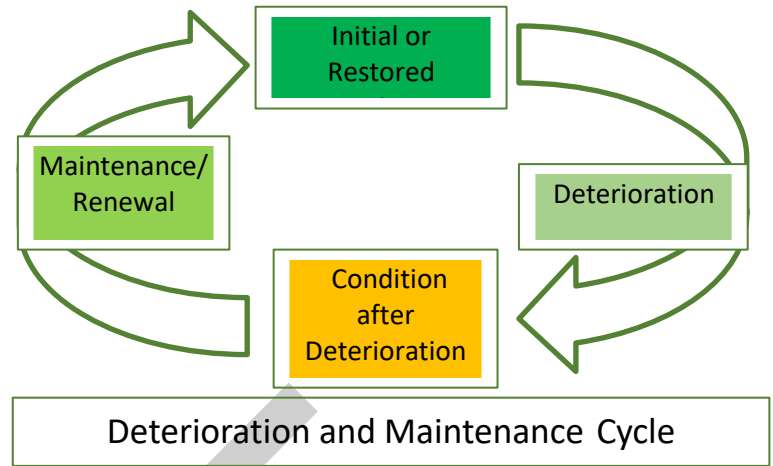
- Creation or Acquisition
- Routine Maintenance
- Renewal or Replacement
- Decommissioning

By predicting the future performance of an asset, or group of assets, during each stage of the lifecycle based on investment scenarios and maintenance strategies, lifecycle plans can be developed that support the asset management strategy.

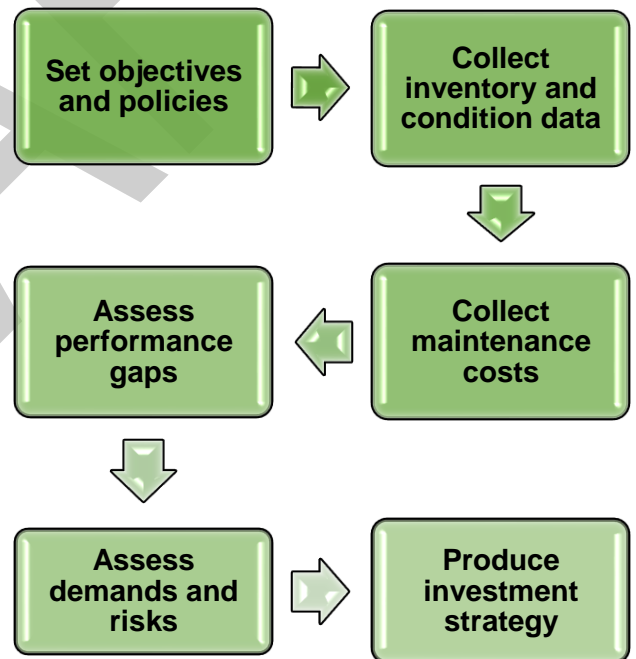


The Council uses lifecycle planning to decide which maintenance activities are required within what timescales to maintain the asset and ensure it provides the level of service that is required. Lifecycle planning also helps to support investment decisions and substantiate the need for appropriate and sustainable long-term investment.

The Council’s lifecycle strategies are included within the Annexes and contain the details of how highway assets are managed over the long term to deliver best value. With highway assets the focus tends to be on the Deterioration / Maintenance Cycle rather than Creation or Renewal as the vast majority of assets are historical (i.e., roads and bridges) which the Council has maintained for many years.



Understanding the corporate objectives and policies is vital to the development of lifecycle strategies as this determines the focus for funding. A complete inventory is necessary to document the assets that exist and their current condition, and this forms the basis of determining the standards that the Council would like to achieve. By comparing the current level of performance with the desired level of performance, a ‘gap’ can be established. This is considered along with an assessment of the future risks and demands on the asset to establish different maintenance scenarios. The cost of different types of maintenance treatments therefore needs to be appreciated to allow various investment strategies to be modelled as part of assessing best whole life cost.



The lifecycle strategies we have developed for our key asset groups can be found in the Annexes. The strategies are updated as information is gathered and analysed. They form a long-term approach for managing our assets, with the aim of optimising processes and providing the required performance while minimising whole life costs.

4 Risk-Based Approach

4.1 Principles and Considerations

The Council has adopted a risk-based approach to the management of highway infrastructure maintenance, including setting policy and strategy, establishment of inspection and condition assessment regimes, determining priorities and

programmes, procuring the service and the management of all associated data and information.

This is undertaken against a clear and comprehensive understanding and assessment of the risks and consequences and is in accordance with local needs (including safety), priorities and resources.

4.2 Developing the Risk Based Approach

The principles of the Council’s risk-based approach to highway infrastructure asset management are explained in Figure 6 below:

Principle	How we do it
Be aligned with the Council’s corporate objectives, legislative requirements, and corporate approach to risk and management of risk	The Highway Infrastructure Asset Management Strategy describes the Council’s approach to risk and management of risk, which is aligned with corporate objectives and legislative requirements, by using a Risk Recording DCC Risk Management (devon.gov.uk) that includes corporate and service area risk registers.
Understand risk in a highways service and its application to all areas of operations, including people, infrastructure, data, finance, and suppliers	The Highways, Infrastructure Development and Waste Services Risk Recording (devon.gov.uk) contains details of the main risks in the highways service, their status and mitigation and is reviewed regularly. A risk-based approach is the foundation of all areas within the highways service, including response to defects, inspection regimes and lifecycle planning as set out in this Highway Infrastructure Asset Management Plan and the Highway Safety Policy .
Understand the potential risks and their likely significance to users, stakeholders, the authority and to the data and information held	The Council is continually collecting data on the highway asset through inspections, surveys and reports. Through analysis, this provides an understanding of risk which is used to develop the lifecycle strategies for each asset.
Understand the inventory, function, criticality, sensitivity, characteristics and use of the various assets comprising the highway network	The Council uses an integrated highways management system to collect, store, manage, and report on highway assets.

Principle	How we do it
Establish hierarchies and maintenance standards with appropriate funding	Functional hierarchies have been assigned to carriageways in the county, which are outlined in the Strategy and Hierarchy section of this Plan and in the Annexes where applicable.
Implement the agreed levels of service	The Highway Infrastructure Asset Management Policy establishes the importance of levels of service in achieving the aims of the Council's strategic plan. The Highway Infrastructure Asset Management Strategy explains how levels of service are established and defines the levels of service statements and how they will be achieved and considers cross-asset prioritisation . This Highway Infrastructure Asset Management Plan describes how levels of service will be implemented through maintenance standards, investment strategies for each asset, and provides a performance management framework for reviewing and monitoring.
Competencies used to develop and implement the risk-based approach	The minimum standards of training and development that are required to enable officers to operate competently has been evaluated and is held on a central register known as the Annual Training Matrix. An annual staff appraisal is undertaken to assess staff competency as part of performance monitoring against their job role, when training and development needs are also identified.
Regular evidence-based reviews	The Council continually reviews its policies and procedures, both formally as dictated by the periods stated within those documents, and informally as an ongoing process. Asset management data, functional hierarchies, and the application of a risk-based approach, including inspection types and frequencies, are regularly reviewed to ensure the most efficient use of resources.

Fig. 6: The risk-based approach to highway infrastructure asset management

4.3 Competencies and Training

The service has evaluated the minimum standards of training and development that are required to enable officers to operate competently. This is held on a central register (known as the Annual Training Matrix) and reviewed annually.

An annual Training and Development Programme is subsequently prepared and delivered, ensuring that the minimum standards in the matrix are met. Preparation of such a programme will consider the requirements needed to deliver Devon's Asset Management Strategy, Policy and Plan.

4.4 Inspections and Surveys

The most crucial part of highway infrastructure maintenance is the establishment of an effective regime of inspection, survey, and recording. It is defined following an assessment of the relative risks associated of each location, agreed level of service and condition.

Inspections and surveys provide the basic information for addressing the core objectives of highway maintenance:

- Network Safety – addressed through regular, planned Safety Inspections focussing on safety-related defects.
- Network Serviceability – addressed through Ad Hoc Inspections, and part of Safety Inspections, in response to requests from a stakeholder and condition data, to ensure that an asset is providing the agreed level of service.
- Network sustainability – through condition surveys undertaken in accordance with our lifecycle plans, to provide information on the current performance and an indication of the likely future performance.

The annexes to this Plan contain the inspection and survey regimes for each particular asset type.

4.5 Management Systems, Recording and Monitoring of Information

The Council uses an asset register to record inventories of its highway assets. In addition to maintaining an inventory, the asset register is also used for recording service requests, complaints, and reports or information from users and third parties.

The Council's highway asset data is held in an Integrated Highways Management System (IHMS). The IHMS is comprised of:

- Scheduling software and tools that allow the inspections to be completed, to be scheduled and then created/produced,
- Mobile Inspection software which takes the scheduled inspections, completes them and creates 'works' within the Defects system as well as updating records in the inspection management system (inspection dates / inspector / driver etc.), and
- Mobile mapping software is also used for things other than Inspections (e.g. scheme adjustment, surface dressing assessment, enquiry management and defect creation, grit bins and tree inventory).

This IHMS enables key asset data to be collected, stored, managed, and reported for the highway network, structures, and street lighting. The system is accessible to staff and members of the public via the Public Interface Portal (PIP), an open portal

on the Council's web pages, for the public to report enquiries. The PIP functionality is under regular review to consider aspects such as:

- improved live information on the status of inventory items such as if a grit bin has been filled or when a gully was last cleaned, and
- improved customer journey for the public to report issues with asset inventory items.

Records of inspection, reactive maintenance and customer contact are recorded on the IHMS. The data is used when undertaking any assessment and review of the highway asset. Surveys are commissioned across the network to obtain carriageway (road) condition data. This information is analysed using UK Pavement Management System (PMS).

The software modules in the IHMS include:

- Customer Service System (CSS) – used for managing customer enquiries and assisting with the management of insurance claims.
- Defects System – Management of reactive safety work instruction and the defence of insurance claims,
- Environmental and Landscape Management (ELM) – used for managing tree inventory and inspections,
- Financial and Contract Management – a module to enable costs for commissioned works to be managed and paid, integrated in the IHMS with the Works Ordering element.
- Finest interface – A system link that enables automatic raising of invoices and payment direct into the Council's payment system,
- Inspections – used for managing safety, tree and other planned inspection types,
- Inventory Manager System (IMS) core enterprise – for managing networks and storing asset inventory,
- Mobile Mapping applications – used for various inspections and data inventory collection purposes,
- Mobile Working & Inspections – Management of Inspections that ensure compliance with the Council's Highway Safety Policy,
- National Street Gazetteer (NSG) – used to store vital data for statutory undertakers (Utilities companies) to effectively programme their works,
- Pavement Management System (PMS) & UKPMS – accredited systems for handling road and footway condition data,
- Schemes Manager – uses road condition data to assist with scheme identification and management of schemes, also provides a tool for the management of schemes through review and works processes, integrating with the Works Ordering where appropriate to tie orders to schemes,
- Street Works Inspections – A module that enables inspections against street works activities to be managed, which connects to Schemes Manager,
- Street Works System – a historic works application system and payment module for permit fees and managing skip applications,
- Structures Management System (SMS) – used for managing bridges and structures inventory and works,

- Term Maintenance Contractor's System interface – a system that sends a works order to a 3rd party works optimisation system, and also allows updates for works to be reported back into the IHMS, and
- Works Ordering – for managing the repair of defects and planned works, integrated with the Financial and Contract Management system.

Other systems are operated for some specific functions, including:

- Lighting Management System – used for managing inventory and works for street lighting, lit signs and bollards,
- Drainage – an asset data system for operations, recording them on a stored inventory, and
- Traffic Regulation Orders and Collisions – An interactive web app providing live access to data.

In order to store data effectively and efficiently it must be referenced geographically. The Council has developed and must maintain a number of digitised 'networks' which allows asset data to be captured and organised. Network referencing assets enables knowledge of the assets that are owned, what extent of the land is highway (extent of the Council's responsibilities) as well as what condition those assets are currently in. It also helps in programming work. An example of this is how a safety inspector will record a highway defect against a specific road section so that a gang can be sent to the right location with the right materials to make the repair the first time. Hazards and risks at the location can even be identified so that the gang know what traffic management they will need to keep themselves safe whilst making the repair.

Two networks are maintained to represent the Council's Highway:

- the National Street Gazetteer (NSG), and
- the PMS network.

The NSG is a record of all of the roads which is managed closely with the local district councils to ensure that it is updated as new roads are adopted from developers. This network is used for managing streetworks by utility companies as well as forming the backbone of our IHMS.

The PMS network is used within the IHMS specifically for managing road condition data from inspection records and annual road condition surveys as well as recording completed capital structural maintenance works. It is different to the Local Street Gazetteer because it is defined by the physical characteristics of the highway rather than junctions and street names.

The Council's Service Data Management Strategy sets out how data is managed within the systems described above. An independent peer review of the Council's asset data and systems was undertaken in 2021. The objectives were to:

- Identify risks associated with the current processes in place for managing asset data,
- Seek opportunities for improvements in the management of asset data that are aligned with the asset management objectives,

- Establish whether the existing systems remain fit-for-purpose and whether these systems are likely to support the County Council's needs now and in the coming years,
- Establish how existing asset data and systems have been deployed to develop understanding of the asset through modelling and life cycle analysis, and
- Seek opportunities for making improvements to this understanding.

The review found that comprehensive asset data is available to enable the Council to carry out the duties set out in the Asset Management Plan. The data is extensively shared internally and is available externally to Members and public through the Public Information Portal. The review identified that some improvements could be made and offered some recommendations which the Council is working towards implementing.

4.6 Safety Inspections

Highway Safety Inspections are undertaken in accordance with the [Highway Safety Policy](#), which sets out the risk-based regime that has been developed with consideration to:

- Frequency of inspection,
- Items for inspection,
- Type of traffic and intensity,
- Method of inspection, and
- Nature of response.

In addition to the Highway Safety Policy, the Council manages other risk-based inspections of the highway assets which follow the principles set out above to ensure that appropriate responses are identified and taken to any issues that are identified. These are described in the following Policies and Procedures:

- Tree Safety Management Policy and Tree Safety Management Procedure,
- Inspection of Highway Structures Policy,
- Street Lighting to control street lighting levels with resulting energy and carbon savings,
- Public Rights of Way, and
- Skid Resistance Strategy and Skidding Resistance of Carriageways Policy and Procedures.

4.7 Defect Recording and Repair

The [Highway Safety Policy](#) explains the defect investigatory criteria that has been developed and how defects shall be recorded and the timescale for repair (where applicable). A level of response to defects that provide a risk to users is determined based on a risk assessment.

The annexes to this Plan provide more detail on the repair regime for each asset type where applicable.

4.8 Reporting by the Public

Members of the public are able to provide feedback on the highway network using multiple media methods, including online facilities such as the '[report a problem](#)' webpage, general enquiry forms and by telephone.

5 Network Resilience

Resilience is defined by the Cabinet Office as the 'ability of the community, services, area or infrastructure to detect, prevent, and, if necessary to withstand, handle and recover from disruptive challenges.' There are four components to resilience which are drawn on to reduce the risk of failure, especially on the Resilient Network:

- Resistance – preventing damage (e.g. a flood wall),
- Reliability – operation under a range of conditions (e.g. earthworks stabilisation),
- Redundancy – availability of backups or spare capacity (e.g. a suitable diversion route), and
- Recovery – enabling a fast response and recovery (e.g. temporary bridges).

Risks facing the highway network include:

- Human diseases – especially with regard to their impact on business continuity,
- Flooding – including pluvial, fluvial, groundwater and coastal,
- Severe weather – both in the context of seasonal norms and sudden impact events,
- Major industrial accidents – especially where they touch the highway network,
- Widespread electrical failure – impacting technology resilience,
- Major transport accidents – the ability to mitigate, respond and recover
- Disruptive industrial action,
- Terrorist, malicious or criminal attacks or civil protest,
- Cyber security – a specific impact on intelligent and automated systems,
- Severe wildfires, and
- Severe space weather – such as solar flares, which could disable the electricity grid.

At a corporate level, the Council has a [Climate Change Strategy](#) and has undertaken a [Weather Impacts Assessment](#) (WIA) to raise awareness of the importance of planned adaptation to weather under a changing climate amongst officers, senior managers and elected members. Although the WIA highlighted a small selection of vulnerabilities, it found that generally the Council is resilient to extreme weather because its existing business continuity and emergency planning arrangements function well and there is an overwhelming desire and commitment from staff to maintain service continuity.

The impact of climate change is considered in the highways service risk register which identifies the capacity and capability available to respond to extreme weather events. The evidence continues to build for more extreme weather at increased frequencies.

An assessment of service resilience was undertaken in 2014 following flooding of the Council's highways. The document, [Service Resilience in a Changing Climate](#), considers how the Council's Highway Management could be affected by gradual changes in weather and more intense severe weather over the 21st century. The assessment concluded that climate change will have widespread negative effects on the Highways Management service, which will increase the maintenance backlog.

Severe flooding events, storm surges, coastal tidal issues and high winds were experienced in Devon and the wider South West peninsula during December, January and February of 2013-14. Initial clear-up costs were £3m. Rail links to South West severed at Dawlish transferring more pressure on the road network during the 2 month rebuild. The 'Beast from the East' and storm Emma snow events in March 2018 caused severe disruption to schools, hospitals, and businesses with Met Office red weather warnings being issued. Coastal storm damage affected highways with the A-road at Slapton being washed away, with an estimated repair bill of £2.5m.

Despite mitigation controls such as strategic planning, preparedness, and careful monitoring the risk remains a high risk to the authority.

The Council is continually adapting its practices to make it more resistant to climate change. An example is the potential to trial smart gullies, which may be run in three critical areas prone to flooding, identified by the Environment Team, that have been overlaid with data from Highways showing gullies that receive enhanced or reactive cleansing. The results could show how technology could be used to inform policy and transform reactive and cyclical maintenance.

The Council is also working on ways of adapting to climate change and finding alternative solutions that complement traditional engineering techniques. An example of this is in Exton where flooding of the highway (A376) causes significant access problems. Natural Flood Management (NFM) solutions are being explored upstream, along with small scale highway improvements to alleviate the ponding.

The Council's [Winter Service and Emergency Plan](#) describes the procedure for dealing with Major Emergencies and sets out the role that the highway service will have alongside other agencies who may include Police, Maritime and Coastguard Agency, Health Service and Department for Environment, Food and Rural Affairs.

6 Performance Management

6.1 Performance Measures

At the strategic level, the Council has adopted an approach to performance management that is closely aligned to the Department for Transport's Incentive Fund against which we have been self-assessing since it was established in 2015. The Incentive Fund aims to improve local authority asset management capabilities, with allocations determined by self-assessment questionnaires based on available evidence demonstrating performance and levels of maturity. The Council has selected eight key measures from the Incentive Fund questionnaire to create a performance management tool that follows national guidance and identifies: the model evidence required to be successful, the current status and priority actions. This is shown in Figure 7 below.

The tool uses three shades of green to rate our current status:

Colour	Rating	Attainment of Measure	Model Evidence
Light Green	1	Measure has not been met	Model evidence is not in place
Mid-Green	2	Measure has been met	Most model evidence is in place, and/or is in place and could be strengthened
Dark Green	3	Measure has been met	Strong model evidence is in place

Measure	Model Evidence	Current status	Priority action
The asset management approach has been communicated and is understood	Published documents Stakeholders identified Regular communications Opportunities to comment and feedback	HIAMP documents available. Formal communication arrangements with key stakeholders in place such as performance dashboard at regular scrutiny and parish and town council website and newsletter. Feedback has been received and acted upon e.g. defect response and works programmes.	Determine fixed milestones each year to review base documents including Annexe owners. Formalise point of contact for stakeholder engagement, communications, comment, and feedback. Review stakeholder list and formalise contact point. Review, update public interface information.
The authority has the competence and training required to deliver highway asset management effectively	Assess organisational competence Identify key roles and training needs Review resilience Enable succession planning	The national guidance has been followed in undertaking an Authority competence review in July 2020. The review demonstrated a good level of	Review and update competency matrix for principal AM roles and align with HMEP competencies. Develop training framework to ensure

Measure	Model Evidence	Current status	Priority action
		competence and resilience within the authority but identified resource capacity as an issue delaying regular review and updating policies.	future resource resilience as essential posts become vacant.
There is an asset investment strategy linked to funding and levels of service	Asset valuation annually Asset condition assessment annually Cross asset prioritisation approach Scenarios considered Outcomes identified including forecast of future condition	Annual review of asset group performance in terms of condition depreciation and level of service which together with risk informs funding allocation across asset groups	Continue to provide asset valuation annually using CIPFA interim solution and use until DfT provide alternative valuation tool. Improve data access tools for the practitioner to aid efficiencies in prioritisation, delivery, and cost. Use improved whole life costing (WLC) models to better inform and model future network scenarios using funding, condition, and potential risk as the drivers.
Levels of service are set and performance reviewed	Levels of service identified Stakeholder engagement in identification and setting of service level Annual review to assess if these are being achieved or exceeded	Levels of service are identified in the HIAMP linking to the Corporate Strategic Plan. Identified maintenance service standards with details of what a road user can expect.	Review current funding allocations to confirm, amend current achievable service delivery levels against expectations. Identify gaps, risks, and mitigations. Prepare contingency arrangements on service levels

Measure	Model Evidence	Current status	Priority action
			against current cost models.
The risks associated with delivering the Asset Management approach have been identified and are monitored	Risks are identified Controls are established Risk owners identified together with how frequently each should be reviewed	Risks have been identified within revised Plan and associated Annexes	Undertake review of gap analysis to establish any changes in potential risks through changes in service delivery.
Works are identified planned and programmed effectively	Two-year Works programmes are developed for each asset group Detailed programmes at scheme level are designed in advance Programmes are regularly reviewed and reprioritised appropriately in response to competing in-year pressures	Two-year Programme funding allocations scenarios are considered and agreed. Annual programmes are developed and schemes identified for work functions up to a year in advance. For planned work, Design briefs are issued, and design is undertaken, and orders issued to enable a 17-week lead-in.	Establish a longer term works programme for the principal road network using improved WLC and scenario modelling. Work towards establishing a 3-year outline programme on the minor road network. Minimise scheme deferment and improve delivery certainty on published programmed schemes
Our plans and processes are fully embedded to ensure least whole life carbon generation when selecting suitable materials/processes.	The authority has declared a climate emergency A toolkit is being used to measure carbon output Carbon reduction is being achieved through process changes and material selection decisions	Devon has declared a climate emergency and has a target of net zero by 2030. A design toolkit is being developed in partnership with Exeter University. Contractors are trialing a toolkit to measure carbon output on road works schemes. Vehicles are being replaced with electric	Use carbon emission outputs when developing network scenarios for future works programmes Develop process to assess carbon outputs at scheme/contract selection stage.

Measure	Model Evidence	Current status	Priority action
		/alternative Fuel options. Increasing use of recycling materials and warm asphalt	
The asset approach is reviewed regularly	Peer reviews Compliance with national standards and guidance Benchmarking with other local authorities Review of HIAMP documents	Peer review maturity assessment completed with WSP and benchmarked against 9 other local authorities Gap analysis of CoP Well managed highway infrastructure completed. Annual benchmarking through peer group National Highway and transport network reviewing customer survey and efficiency.	Increase liaison with peer authorities to understand areas of good practice. Undertake annual review of CoP WMHI to establish mitigation and actions. Determine fixed milestones each year to review HIAMP base documents including Annexe owners. Ensure any departure from national standards and guidance is formally documented Establish project plan and resource commitment to review all policies and formalise annual review process going forward.

Fig. 7: Performance Management Tool

The Council utilises several tools to help understand the performance of not only the network condition, but also the service delivered to its communities. Some examples include:

- NHT Survey,
- ALARM Survey,
- Condition Surveys,
- Streetworks Audits, and

- Incentive Fund.

The visualisation of performance is a key factor to Devon as it helps aid intelligent data led decision making practices. Devon currently achieves this by using PowerBI and other software mapping layer solutions, such as in Figure 8.

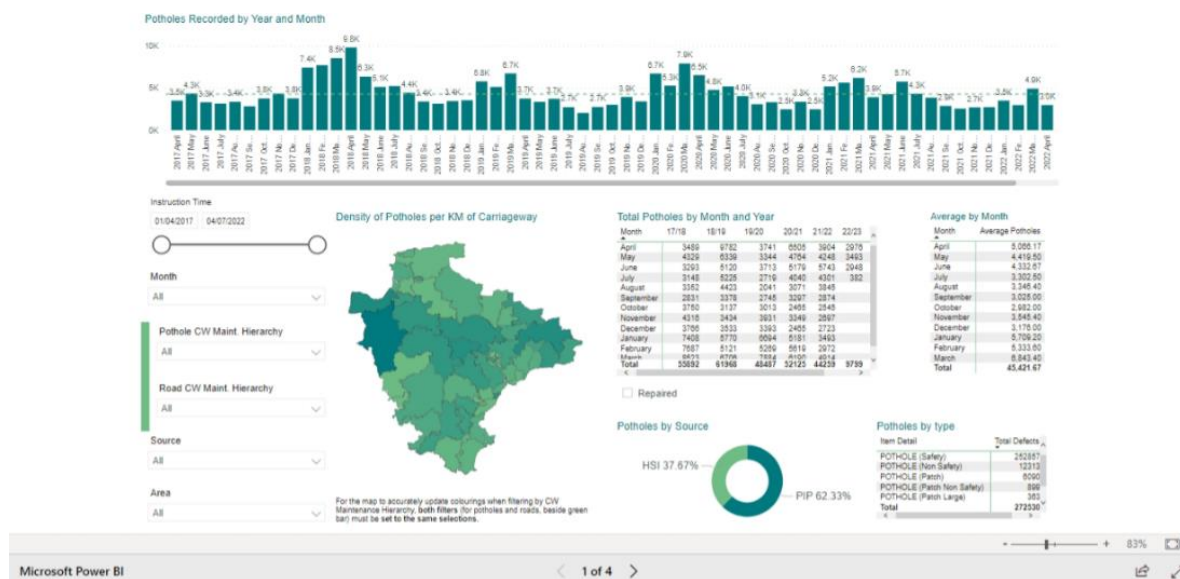


Fig. 8: Example of data visualisation software

6.2 Performance Measures

A further commitment to embed a robust performance management system across the entire service has been made. To aid this journey, a cross authority project with Oxfordshire County Council, aims to develop a set of service key performance measures. Such measures will be linked from business and customer needs, as well as driven from the developing Service Plan.

7 Financial Management, Priorities and Programming

7.1 Financing of Highway Maintenance

The approach to funding and investment is identified in the HIAM Strategy [Highway Asset Management Policy and Strategy - Roads and transport \(devon.gov.uk\)](https://www.devon.gov.uk/highway-asset-management-policy-and-strategy-roads-and-transport). As can be seen from the gross valuation below most of the annual depreciation occurs in carriageway and structural assets. It follows that the investment approach identifies that most of the available funding is targeted to these main asset groups. For both, there are well developed financial models that review different investment scenarios and predicts the impact these will have on conditions in the forthcoming years. There is more detail on this in the corresponding annexes. The approach to funding and investment strategy is less well developed for the remaining asset groups and the methodology is described in the individual annexes. The information informs the operating demands and the replacement and renewal needs for each asset. These demands are considered annually and met from the available revenue and capital budget respectively.

7.2 Asset Valuation

The highway infrastructure asset is the most valuable asset owned by the public sector in the UK. The significant levels of funding for the management of this asset

are under continuous scrutiny, with increasing pressure from government and the public for transparency, accountability and more efficient use of the limited resources available.

Asset Valuation information has been provided to the Department for Transport (DfT) on an annual basis and provides both the Gross Replacement Cost (GRC) of the authority's assets (what it would cost to rebuild from scratch) and the Depreciated Replacement Cost (DRC) (what it would cost to return the assets to new from their current condition) This data not only gives the government a detailed overview of the country as a whole but it is also a useful benchmarking measure between the County Council and neighbouring or similar sized authorities.

Highway infrastructure assets are measured at historical cost rather than at the asset measurement basis described as 'current value' and are generally inalienable assets, expenditure on which is only recoverable by continued use of the asset created. They work as a part of a continuous network that is maintained in a relatively steady state, though there may be distinctive parts of this network.

Since the figures for 2020-21 financial year highway infrastructure assets (reported DfT in 2021) were submitted, the national requirement for Highway Authorities to report to DfT on subsequent years has stalled and a review of the reporting model is currently underway. As an interim measure to cover the next 2 years the Chartered Institute of Public Finance & Accountancy (CIPFA) has prepared an interim Accounting for Infrastructure – Temporary Solution to accompany the changes to the Code of Practice on Local Authority Accounting in the United Kingdom (the Code)

Within Devon since 2021 we have continued to estimate our GRC and DRC highway asset values using estimated rates, past data and for structures current data through their Structures Asset Valuation and Investment tool (SAVI), this has provided an indicative overall asset valuation. This provides a GRC of £14.6 Billion and a DRC of £12.8 Billion. The intention is to adopt the CIPFA interim solution issued in January 2023 which will provide some level of comparison across the UK.

7.3 Priorities and Programming

The Council has different processes in place for decision making and lifecycle planning, which vary over the network hierarchy. Some examples of the asset systems and data are as follows:

- Principal Roads
 - Systems and data-based approach,
 - Scheme Manager within the IHMS,
 - Lifecycle model (hosted on the IHMS) Developed to include all Road types, and
 - Overlap with Local Asset Capital Programme (LACP described below).
- Footways
 - Scheme Manager analysis of footway network condition data in PMS (hosted on the IHMS).
- Non-Principal Roads
 - LACP, and
 - Although LACP is intended for minor roads, this process has some overlap with the A Road and Footway processes.

- Drainage
 - Cleansing frequencies determined by risk at a local level,
 - Gully renewals and repairs compiled from inspection reports, and
 - Overlap with LACP in identifying and prioritising drainage improvement schemes.

Local Asset Capital Programme (LACP)

The Local Asset Capital Programme (LACP) is a new way of prioritising schemes predominantly the Non-Principal network, introduced by the Council. It is a digitised process that brings different data sources and local knowledge together. It is an iterative process to identify and prioritise works, involving both the Council, Parish Councils and other local stakeholders. As the process is being deployed, the Council is capturing the lessons learnt and adjusting the process.

Figure 9 summarises the resources and data input of the LACP Process.

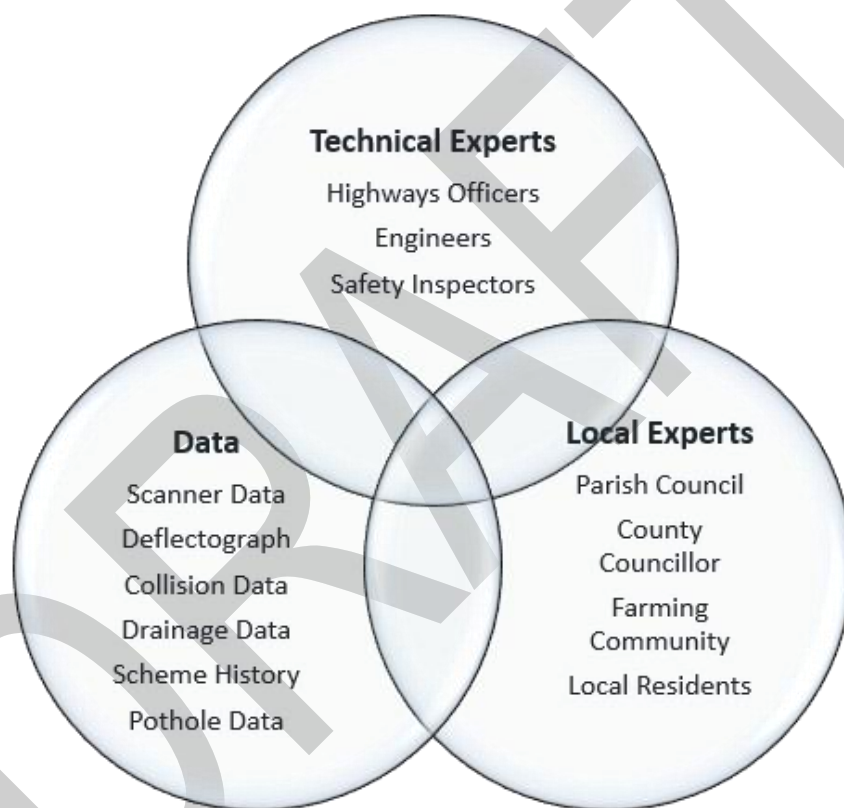


Fig. 9: LACP resources and data inputs

The aims and benefits of this approach include:

- Putting more weight towards customer and political input rather than solely actual asset condition.
- Enable work planning by road and route to avoid repeat visits for different work types, increasing efficiency and reducing disruption.
- Increasing confidence in the data and its usage.
- Making asset management principles more 'lived' rather than an on the shelf policy document.
- Increasing local team knowledge on the combined annual works programme. and

- Developing a three year forward list of priorities for planned work.

It is anticipated that this will be refined further during the life of the Plan taking account of resource capabilities. More detail, in relation to application of the LACP for Carriageways, can be found in Annex 1.

Asset Groups

Each annex describes the asset group approach to programme selection and prioritisation. This is developed from the maintenance strategy and investment strategy outlined within the annex. The service promotes some flexibility in approach encouraging teams to work collaboratively where efficiencies or improved customer experience can be achieved by bringing different strands of work together. For example, a road closure for safety inspection repairs may be utilised for a street lighting or road restraint replacement.

8 Sustainability

8.1 Sustainability and Highway Infrastructure Maintenance

The six priorities of the [Council's 'Best Place' Strategic Plan 2021 - 2025](#) are linked by the theme of sustainability, and this aligns with the [Local Transport Plan 2011 – 2026](#), which sets out the strategy to deliver a transport system that meets economic, environmental and social challenges.

The Council's Environmental Policy [Environmental policy - Environment \(devon.gov.uk\)](#) establishes nine commitments, and is implemented through a set of themed [action plans](#), including:

- Carbon Reduction Plan,
- Waste Management Plan,
- Plastic Strategy,
- Procurement Strategy,
- Countryside and Heritage Policy and Action Plan,
- Environmental Risk Strategy and Action Plan, and
- Water Strategy and Action Plan.

Progress against the environmental objectives of the Environmental Policy, including the Carbon Reduction Plan, are monitored and reviewed on an ongoing basis. Details are published through highlighted reports prepared for the Council's Environmental Performance Board, available at [Environmental performance progress](#).

Consideration of the economic, environmental, and social impacts is a key part of the planning and carrying out of highway maintenance and the Council's approach is under constant review and development.

An example is the guidance on decision-making principles for carbon cost versus scheme costs. In 2020, Devon began developing a carbon calculator in conjunction with Exeter University. This tool is used on schemes to estimate both carbon emissions and carbon cost against various treatment solutions. The tool also offers a calculation for the whole life cost of carbon so the longer-term impacts can be considered. This is a vital tool that can help us 'reduce or design out carbon'. Work is

also emerging with software suppliers to embed this approach into our core asset management systems mentioned in a previous section ([here](#)). Strict rules for managing the weighting of scheme cost against carbon savings are purposely not imposed during the 'learning phase' while sufficient carbon data sets are built.

Another example is the Council's carbon web form, which was launched in July 2022. This tool will help the service visualise carbon emissions at a granular level on data dashboards leading to informed data intelligent decisions making for reduced carbon operations, including material selection and treatment types. The approach includes a whole life costing of carbon approach, embedding asset management principles at the core of the system.

Whole life carbon costs are considered when selecting materials. Warm Mix Asphalt (WMA) uses less energy than hot mixes and has the potential to reduce embodied carbon by up to 15%. Its use is increasing in Devon and WMA is the default surfacing material on the Council's Term Maintenance Contract. The lower temperature material offers practical benefits too, enabling projects to be delivered faster as the asphalt takes less time to reach trafficking temperature which means roads can be opened to traffic earlier.

In 2022, the Council made a bid to [ADEPT](#) for Live Labs 2 funding from the Department for Transport to support the transition to zero carbon local roads. In 2023, it was awarded a share of £30M funding towards the A382 (including Jetty Marsh Link Road) project, which will be the UK's first carbon negative highway. More can be read about the project [here](#).

The Council has a Technical Appraisal Panel (TAP) that assesses and trials new innovations in highway maintenance and repair. The main focus of the group is to address corporate aims, such as carbon reduction, by establishing and approving a wider selection of treatments that can be used at various stages of the lifecycle. This may also bring about cost benefits compared to traditional forms of maintenance.

As part of the Council's commitment to operating its fleet in a low-carbon and sustainable manner, a programme to replace fossil fuelled vehicles with electric vehicles (EVs) has been established. Six EVs have been purchased by 2022. Opportunities to utilise alternative fuels, such as hydrated vegetable oils (HVO) have also been pursued, with a secondary project commissioned to collaborate with supply chains to share existing supplies. All HVO sources are sustainable and are only manufactured from food waste sources.

8.2 Materials, Products and Treatments

Devon's landscape character assessment ([DLCA](#)) describes the variation in character between different areas and types of landscape in the county.

Maintaining and improving the character of places can be of significant value to communities and to the local economy. The impact of highway maintenance on character, in terms of risk and opportunities, are considered as part of the lifecycle planning. Streetscape guidance is referred to and followed where feasible.

There are designated and un-designated heritage assets across the county, which can be within designated areas such as conservation areas, registered parks and gardens and world heritage sites. In the planning of highway maintenance, the

Council refers to the Highway Asset Register and Environmental Viewer (Historic Environment Records) which provide a complete record of the heritage assets ensuring that maintenance reflects statutory requirements.

8.3 Quality Management and Sector Schemes

The Council's internal engineering services delivery group, known as the Engineering Design Group (EDG), is responsible for the design, project management, procurement, supervision and contract management associated with the delivery of infrastructure schemes across the authority. The EDG is certified to ISO 9000/1 and is responsible for the maintenance of highway structures and supports highway maintenance in other ways, for example through the preparation of contract documents and offering design assistance.

The Council requires its contractors and suppliers to hold National Highway Sector Scheme (NHSS) certification to ensure work is carried out to the highest standard using properly trained and competent staff. NHSSs are complementary to ISO 9001. The Council's specifications require BBA HAPAS approved products to be used, ensuring that they comply with relevant regulations and standards.

The Devon County Council Materials Laboratory provides testing services on a variety of civil engineering materials to ensure they meet British and European standards including elements relating to safety and carries out site investigations to inform scheme and adoptable highway design. The Laboratory is accredited (Quality Assured), for a major part of its testing under the United Kingdom Accreditation Service (UKAS).

The Council has staff who are members of [ADEPT](#), working with other authorities and local enterprise partnerships to deliver clean, sustainable growth through recovery and regeneration, and ensure that best practice is shared.

8.4 Environmental Management

An internal Environment Review system is used by the Council, which includes an Environmental Risk Assessment that is undertaken at the beginning of the concept stage for all projects. This identifies environmental constraints on the project, informs the allocation of resources, and identifies further work necessary to satisfy statutory requirements or mitigate the impacts of the project.

8.5 Materials Utilisation

The maintenance of the highway network requires the selection of optimum treatments and materials to provide the most beneficial whole life cost solution. The selection of treatments and materials is made in an evolving environment where price, availability and sustainability pressures are constantly changing.

The cost and availability of materials have been under pressure in recent years and the reduced availability of labour and materials has led to significant price rises. These pressures include but are not limited to:

- Covid-19 has affected supply and disrupted workforces,
- Removal of red diesel from construction works,
- Increasing fuel costs,
- Shortage of haulage drivers,

- Construction demand fluctuations - sharp falls in the first half of 2020 followed by a steep recovery since,
- Supply chain bottlenecks due to global demand shocks,
- Increased administration at UK ports affecting imports and exports due to UK EU Trade and Cooperation Agreement, and
- Sharp rises in shipping costs and temporary surcharges.

The environmental challenges facing the earth have led to the authority declaring a climate emergency meaning that the highway service and their supply chain need to work towards a carbon net zero position by 2030, for this to be achievable we will need to reduce the overall carbon footprint of highway maintenance. This goal will only be achieved by selecting treatments and materials that have a low carbon impact across their service life.

The specifications used by the Council to procure highway service work already include measures to reduce carbon, these include:

- Warm mix asphalt included as default choice,
- Inclusion of recycled material in the production of asphalt, and
- Use of recycling for carriageway maintenance.

Furthermore, through relationships with its contractors and supply chain, the Council encourages the use of local materials where practicable.

8.6 Waste Management and Recycling

The Council's Resurfacing, Recycling and HFS Contract includes rates for in-situ and ex-situ recycling of materials.

Asphalt planings arising from highway maintenance activities are all re-used in the county and none are deposited into landfill.

The Term Maintenance Contract (TMC) includes three environmental Key Performance Indicators (KPIs), one of which measures the percentage of waste diverted from landfill.

8.7 Noise Reduction, Air Quality and Pollution Control

Statutory requirements with regard to noise, air or water pollution from maintenance operations are complied with through risk management and by employing precautionary methods. Where practical, good practice methods are adopted to mitigate inconvenience to the community.

The Council supports [district and unitary](#) authorities who are responsible for air quality monitoring. An example is in Ivybridge where on-street parking was causing traffic to queue which was contributing to poor air quality in the Air Quality Management Area. The parking was removed in 2021 through a Council led scheme, which has resulted in improved traffic flow leading to improved air quality.

8.8 Nature Conservation and Biodiversity

The Council has produced a ['Life on the Verge in Devon'](#) document which provides practical guidance on the steps required to manage a road verge for wildlife. Communities are encouraged to manage verges for wildlife where it is safe to do so

and not in conflict with the health and safety management of verges. A free step-by-step guidance document is available on the Council's Environment [webpages](#).

A number of important verges within the county have been designated by the Council as Special Verges due to their exceptional wildlife value or their value to communities. Currently, there are 112 Special Verges located throughout the county, each one with its own specific survey and management card. The location of Special Verges can be found at [Devon County Council's environmental viewer](#), under the Ecology/Geology tab.

Customers who are interested in helping manage a Special Verge are invited to email nature@devon.gov.uk for more information.

8.9 Environmental Intrusion

The Council has adopted a [protocol](#) and accompanying [guidance](#) for highway design and management in Devon's nationally and internationally protected landscapes. The principles of the guidance may be applied in all rural areas of Devon. Both documents were produced in 2011 in association with the Council's two National Parks, five Areas of Outstanding Natural Beauty (AONBs) and two Unesco World Heritage Sites.

9 Procurement

The procurement of maintenance activities and programme and service delivery is competitively, as well as publicly advertised, on either Contracts Finder or, for larger tenders, via Find a Tender Service (FTS).

Works are procured through a number of different contracts, namely Term or Framework. This includes a main Term Service Contract, and smaller framework contracts that procure activities such as Surface Dressing, Resurfacing, Recycling, High Friction Surfacing and Road Restraint Systems.

By ensuring maintenance activities can be split among different delivery partners, this maximises resource availability as well as recognises the more specialist requirements of certain maintenance delivery.

Each Contract is designed to ensure value for money, adherence to policies, specifications and alignment to the Council's Strategic priorities.

10 Improvement Actions

This Plan and the supplementary Annexes are live documents. They will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. The Plan and Annexes identify areas for improvement which are summarised as Improvement Actions at the end of each document. These Actions are managed following a process that aligns them to Strategic Goals and prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the asset management objectives are achieved are:

- Review of Network Hierarchy so that maintenance categories are relevant to the network and easily understood, and to allow for more targeted investment strategies to be developed.
- Continued development of the Communication Strategy to enable improved engagement with citizens and key stakeholders, and improve joint working with District, Towns and Parish Councils.
- Continued development of the Asset Data Strategy to prioritise and progress key actions.
- Review the Resilient Network so that it is relevant to the network and easily understood, and the Critical Infrastructure, to allow for more targeted investment strategies to be developed.
- Continued development of the Lifecycle Planning Module using accurate inventory and condition data to better understand future costs of managing the condition of the network to achieve levels of service.
- Improve coordination with other areas of the authority that are involved in strategic developments such as development control. Developments often may create new assets, which is adding to the asset inventory and maintenance liability.

11 Conclusions

The Council is facing many challenges. In relation to the management of the highway asset, these include:

- Contributing towards the Corporate Strategic Plan, 'Best Place',
- Meeting targets for the reduction in carbon, and
- Delivering levels of service under significant financial pressures.

In response, the Council needs to be agile and continually review its processes, looking for improvements and efficiencies through innovation and adopting new ways of working, such as engaging with communities to drive effectiveness and self-help solutions.

This Plan is underpinned by twelve annexes for the main Highway Assets that are each maintained by a lead expert allowing the annexes to evolve with time and be updated as live documents.

Annex 1 – Carriageways (Road Surface)

1	Introduction	1
2	Inventory and Hierarchy	1
2.1	Inventory	1
2.2	Network Hierarchy	2
3	Performance	5
3.1	Safety Inspections	5
3.2	Detailed Inspection, Network Assessment and Work Programme Identification	5
3.3	Condition Surveys	5
	SCANNER RAV Road Surveying (wdm.co.uk)	5
	Deflectograph W.D.M. Limited (wdm.co.uk)	6
	SCRIM - SCRIM® W.D.M Limited (wdm.co.uk)	7
	Visual Serviceability Inspections	8
	Reporting by the public	9
3.4	Current Performance	9
	Road Condition	9
4	Maintenance Strategy	12
4.1	Creation of a new asset	12
4.2	Routine and reactive maintenance	12
4.3	Renewal or replacement	14
	Types of Treatment	14
	Innovation	16
	Site Selection	16
4.4	Decommissioning of the asset	16
4.5	Maintenance Service Standards	17
4.6	Treatment Selection	17
5	Levels of Service and Investment Strategy	18
5.1	Lifecycle Model	19
5.2	Investment Strategy	20
6	Programme Development	20
6.1	Identifying Schemes for an Initial Works Programme	21
	SCRIM Sites	21
	Principal Roads	21
	The Local Asset Capital Programme (LACP)	22

Annex 1 - Carriageways

6.2	Optimising and Prioritising the Works Programme	24
7	Risks	24
8	Improvement Actions	25

Appendices

Appendix 1 – 1 Carriageway Treatment Selection Matrix

Version Control		
Version	Date	Summary of Changes
0.1	10.03.2023	For consideration by Cabinet

DRAFT

1 Introduction

Delivery of a safe and well-maintained highway network relies on good evidence and sound engineering judgment. Asset management is widely accepted as a means to deliver a more efficient and effective approach to management of highway infrastructure assets through longer term planning and ensuring that levels of service are defined and achievable within the resources available.

It is accepted that transport infrastructure is absolutely critical to the wellbeing and economy of the County and the wider UK and therefore the condition of the carriageway is of great importance. The National Highway Transport (NHT) surveys show consistently that carriageway condition and road safety are the most important highway services with condition being considered the most in need of improvement. If the Council is to support economic growth, and the health and wellbeing of the travelling public in Devon, it is essential that the Council ensures its highway infrastructure is fit for purpose.

Devon has the largest road network of any Local Highway Authority in England with a total of 12,900 km of road consisting of 8% A roads, 5% B, 35% C and 52% unclassified. Only 2,895 km of road are classified as urban with the remainder serving local communities within rural environments. In addition, the network is affected heavily by seasonal variations in traffic volumes with flows on roads of all types increasing significantly during the peak summer months. This contributes to congestion issues, particularly on our principal routes, and increases carriageway deterioration on our minor roads during these periods.

The construction of Devon's road network is diverse ranging from designed roads constructed to modern standards to those which have evolved over many years having originated from historic tracks whose construction is often limited to various layers of surface dressing and patching. This presents significant challenge when managing the asset and maintaining the network in a safe and useable condition.

In keeping with the recommendations of the CoP the core approach adopts a risk approach for all aspects of its highway infrastructure maintenance

2 Inventory and Hierarchy

2.1 Inventory

A detailed highway inventory is an essential prerequisite of establishing a cost effective and adequate maintenance regime.

The inventory is the foundation on which asset management is built and when analysed in combination with other information sources, for example, condition data, road casualty reports and traffic flows. It is also used in combination with intelligence gathered from stakeholders and experts to determine priorities. All of this provides crucial decision supporting information.

Inventory Set	Inventory Item
Carriageway (Road Surface)	Central Reserve
	Central Island

Inventory Set	Inventory Item
	Lay-by
	Roundabout
	Kerbs
	Channels
	Level Crossing
	Cattle Grid
	Gully
	Catchpit / Interceptor
	Manhole

Fig. 1.1: Highlighting various inventory items that are associated with the carriageway. Some of these items are also associated with drainage and will appear in further annexes.

2.2 Network Hierarchy

The development of a carriageway maintenance hierarchy is the foundation of a coherent consistent and auditable asset inventory as it provides the organisation structure to the inventory.

The hierarchy reflects the needs, priorities and actual use of each road and will be used as a tool in determining priorities maintenance standards, targets and performance.

The current hierarchy is detailed below and also highlights the various lengths of carriageway associated with each level.

Carriageway Maintenance Category	Hierarchy Description	Type of Road / General Description	Length of Category in Devon (KM)	Percentage of Network
1	Motorway	Maintained by National Highways	N/A	N/A
2a	Primary National - Trunk Road	Maintained by National Highways	N/A	N/A
3	National Primary route	National strategic routes for through and long distance travel (A roads)	373.4	2.9%
4	County Primary route	Main access routes	473.8	3.6%

Annex 1 - Carriageways

Carriageway Maintenance Category	Hierarchy Description	Type of Road / General Description	Length of Category in Devon (KM)	Percentage of Network
		connecting principal settlements.		
5	Secondary County route	Main access routes to large settlements and recreational attractions.	801.8	6.2%
6	Local Distributor	Main access routes to smaller settlements and recreational attractions.	1258.1	9.7%
7	Collector road	<p>Rural – Access routes to small villages and other significant traffic generators.</p> <p>Urban – Industrial main collector roads & through routes and Residential collector roads. Access to schools, hospitals, facilities for the disabled, main shopping areas, libraries, car parks and tourist attractions. Shared surfaces with heavy pedestrian traffic. Local roads serving limited numbers of properties.</p>	1545.3	11.9%

Annex 1 - Carriageways

Carriageway Maintenance Category	Hierarchy Description	Type of Road / General Description	Length of Category in Devon (KM)	Percentage of Network
8	Minor Collector road	Rural – Roads serving small hamlets and scattered communities. Urban – Roads serving shopping areas, business premises, industrial estates and residential areas	2068.1	15.9%
9	Service road	Rural – Local road serving only a few properties Urban – Narrow collector roads and shared surfaces	5043	38.8%
10	Minor Service road	Rural – Local road serving only one property Urban – Cul-de-sac serving less than 20 properties.	691	5.3%
11	Minor lane	Rural – Serving fields only or duplicating other routes. Urban – Back Lanes	151.6	1.2%
12		Not used by normal vehicular traffic (Predominantly managed as part of Public Right of Way network)	585.9	4.5%

Fig. 1.2: Indicating the hierarchy of road types with a general description.

A review is underway to ensure the descriptors for each category accurately reflects the type of carriageway it represents.

3 Performance

3.1 Safety Inspections

Safety inspections are undertaken to meet the key objective of Network Safety and they form a key aspect of the authority's strategy for managing liabilities and risks. They are used to identify defects likely to be hazardous or cause serious inconvenience to users of the highway network or the communities served, including defects requiring urgent attention and the appropriate response is determined using a risk-based approach.

The [Highway Safety Policy](#) details how safety inspections are undertaken, the frequency of inspection, investigatory criteria and required response period to an actionable defect. Relevant defects, treatments and Response Times are listed in the Highway Safety Policy.

3.2 Detailed Inspection, Network Assessment and Work Programme Identification

The network is regularly inspected by experts to identify and prioritise future works programmes. These inspections can take various forms but all are designed to collect visual data relating to the condition of the highway network so that works programmes can be formed and prioritised. Some of these inspections focus on detailed, specific elements of the highway inventory and can require specialist knowledge. Others can be more general looking at the condition of the asset along a particular route or an area.

3.3 Condition Surveys

The purpose of Condition Assessment is to address the key objective of Network Sustainability and to ensure that value for money is achieved when undertaking structural repairs.

By following asset management principles and providing information on the nature and severity of the condition, the timing and nature of appropriate treatments can be determined. Data from these surveys is also used in the production of National Indicators and repeatable condition surveys allow for analysis of trends within the network.

There are a number of different types of survey, each providing information from a differing perspective, and which in combination can provide a comprehensive picture of the condition of the asset.

Condition Surveys involve a diverse range of surveying and investigatory tools and equipment. A general overview of these surveys, along with links to more detailed descriptions can be found below.

[SCANNER RAV | Road Surveying \(wdm.co.uk\)](#)

SCANNER, (Surface Condition Assessment of the National Network of Roads) and MRM (Multi-functional Road Monitoring System), are machine-based surveys undertaken at normal road speeds that measures a range of road condition

Annex 1 - Carriageways

parameters using video and laser technologies. The vehicles are able to record a range of surface conditions including:

- Longitudinal and transverse profile,
- Surface Cracking,
- Rutting and depth,
- Texture depth,
- Gradient,
- Crossfall, and
- Curve radius.

All of this information is processed into a pavement management system (UKPMS) which is used by engineers to help assess condition and determine maintenance requirements. The data is also used to calculate road condition performance indicators and assess asset value.

These surveys are used on a majority of the highway network at given intervals, with higher class roads being visited annually by SCANNER.



Fig. 1.3: SCANNER from WDM Ltd

Deflectograph | W.D.M. Limited (wdm.co.uk)

These surveys are done through a Deflectograph machine which measures the deflection of the road surface under a load, which effectively determines the 'strength' of the carriageway. The data is no longer used as a national performance indicator for the Principal road network but can provide supplementary data for specific schemes requiring structural maintenance. With additional information about the road construction and traffic loading, the data can be used to determine residual life, design resurfacing treatments and understand future maintenance requirements.



Fig. 1.4: Deflectograph unit from WDM Ltd

SCRIM - SCRIM® | W.D.M Limited (wdm.co.uk)

SCRIM surveys (Sideways force Coefficient Routine Investigation Machine) measure wet road skidding resistance, which can then be compared to investigatory levels. It should be noted that there is no value at which a surface passes from being safe to unsafe; however, some sites due to geometric or other constraints often require higher levels of skidding resistance to reduce accident risks. This data is a prime factor in determining maintenance requirements on the Principal Road Network to ensure safety is maintained.



Fig. 1.5: SCRIM unit from WDM Ltd

Visual Serviceability Inspections

Recent changes in programme development to the Local Asset Capital Programme has also developed an emerging practice of local teams undertaking driven inspections within the Parishes, to give a visual score of the asset/route condition. This information is recorded in WDM and used in conjunction with detailed data from condition surveys and information collaboratively gained from Parish/Town councils to inform programme development.

The score given and map information is seen in the example below:



Fig. 1.6: Visual Serviceability Scoring



Fig. 1.7: Example of Visual Serviceability Inspection Plan Overlay

Reporting by the public

A valuable source of condition data is the information the Council gather from the public when safety defects are reported. The provision of location of defects enables the contractor to optimise gangs in organising repairs in an efficient manner. With thousands of potholes repaired each month the data can be manipulated to identify carriageway sections that have high numbers of potholes.

Problems can be reported on the Council's website which can be found on the [Report a Problem page](#).

This condition data is used together with machine-based condition surveys to identify potential treatment sites.

3.4 Current Performance

Condition surveys are primarily intended to identify deficiencies in the highway infrastructure which if untreated are likely to adversely affect the long-term performance and serviceability of the asset. They provide information on the nature and severity of deterioration which is used to determine appropriate maintenance treatments and inform the asset valuation process. These surveys are used to provide assessments of overall performance, maintenance requirements and relevant data for national performance indicators.

SCANNER survey data is processed through a UKPMS and scores are given to every 10m section of road depending on the amount of defect found and assembled into a Road Condition Index (RCI). The RCI scores are then broken down into three categories, RED – requiring planned maintenance soon, AMBER – likely to require investigation soon, Green – generally good condition.

More detailed information on technical survey data and the scoring systems can be found in the Department for Transport's [Technical Note: Road Condition and Maintenance Data](#).

Road Condition

Carriageway condition is reported nationally using Road Condition indices generated from machine survey data processed using an accredited United Kingdom Pavement Management System. The results of survey analysis are presented below:

A Roads

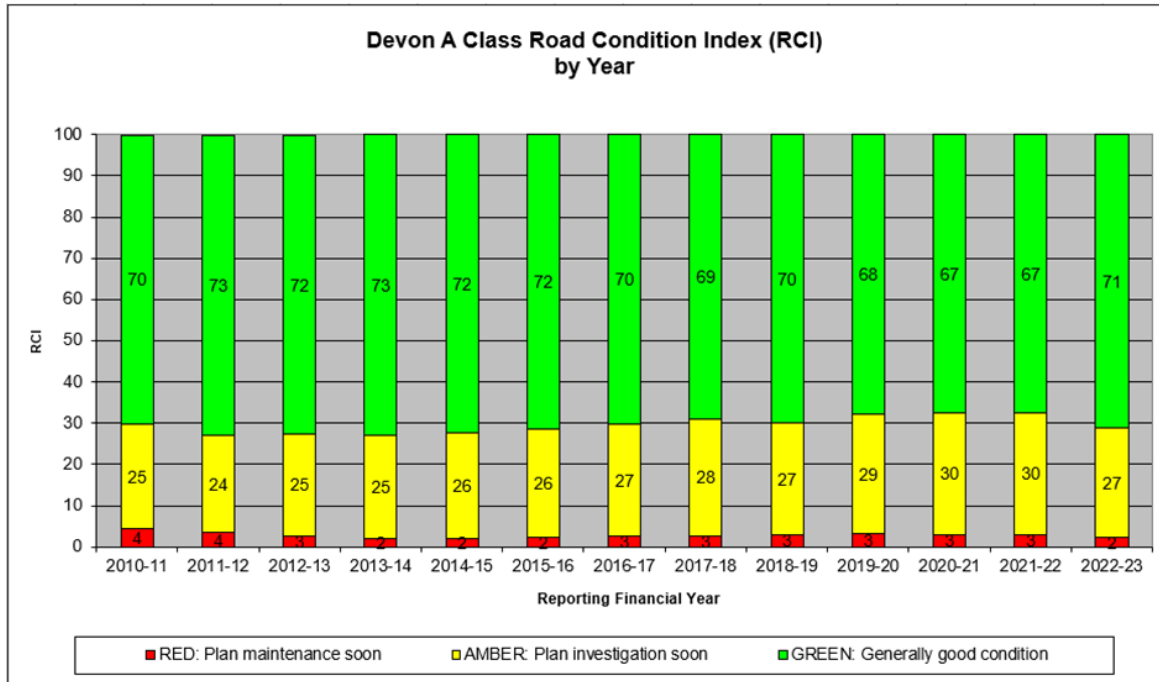


Fig. 1.8: Indicating the road condition specifically for A class roads from 2010/11 – 2022/23.

B Roads

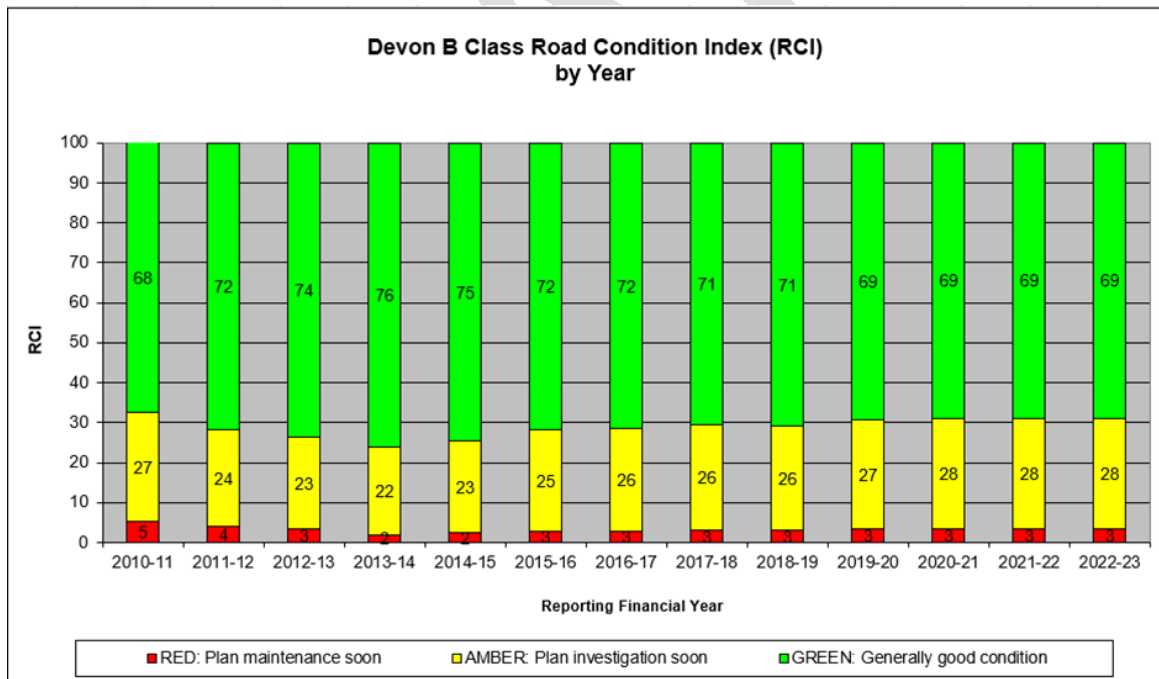


Fig. 1.9: Indicating the road condition specifically for B class roads from 2010/11 – 2022/23.

C Roads

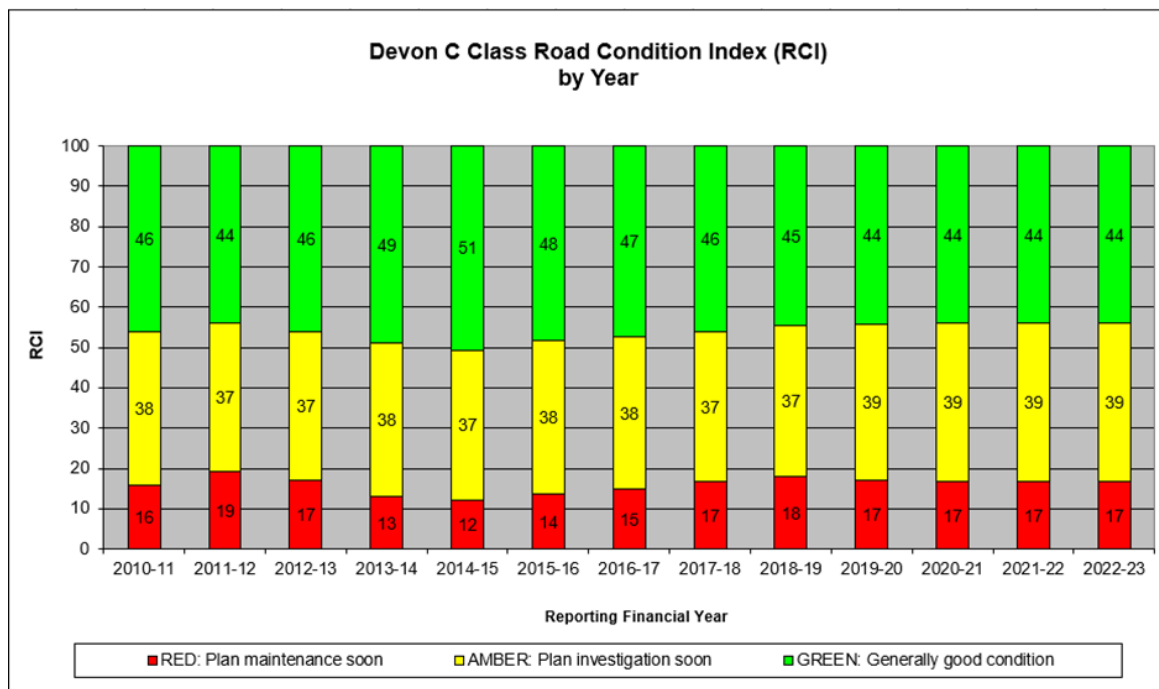


Fig. 1.10: Indicating the road condition specifically for C class roads from 2010/11 – 2022/23.

Unclassified roads

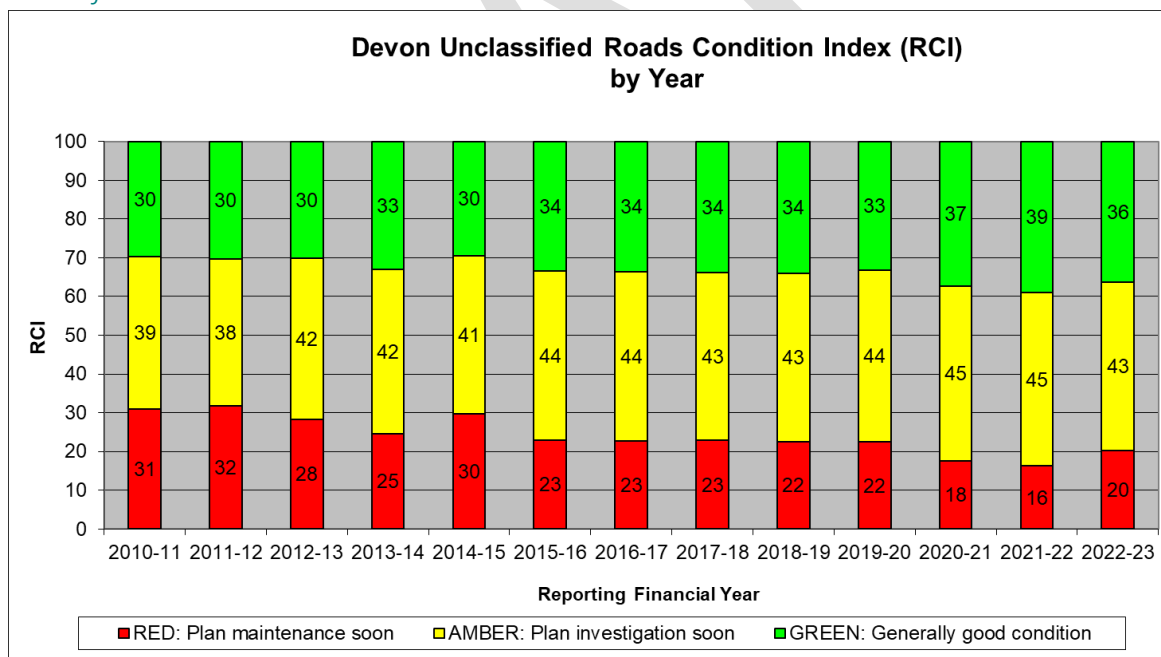


Fig. 1.11: Indicating the road condition specifically for unclassified roads from 2010/11 – 2022/23.

The DfT Technical Note: Road Condition and Maintenance Data provides definitions for the RCI categories and are as follows:

- Green – ‘Good enough’ - No need to plan maintenance
- Amber – ‘Continued deterioration’ - Needs investigating soon
- Red – ‘Really quite bad’ - Planned maintenance soon

The current RCI condition shows that in periods of better funding, the Council has been able to make significant reductions in the amount of RED category condition carriageway, particularly on the minor, unclassified network. In recent years where funding has been more restrictive, the Council has managed to maintain condition in the higher class, strategic roads however, there has been a decline in the unclassified network.

Whilst this is useful to understand the condition of the carriageway, Devon County Councils response to these categories would be more in line with the Maintenance Service Standards detail in section 4.5. As such, the Council is likely to target treatment in the amber categories where efficiencies can be gained in selecting lower cost treatments to prolong the life of the carriageway. By taking this asset management approach the Council stands the best chance of reducing the amount of carriageway that becomes Red in the coming years.

With the current levels of funding the Council currently has the following targets in terms of carriageway RCI condition.

Asset Group	Asset components	Performance Outcomes
A roads	Carriageway condition	Limit RCI RED category to 4%
B roads	Carriageway condition	Limit RCI RED category to 4%
C and Unclassified roads	Carriageway condition	Manage and limit increase in RED category condition by targeting Amber Category for cost effective maintenance. RED category managed for safety.

Fig. 1.12: Indicating maintenance targets and outcomes set by the council.

4 Maintenance Strategy

4.1 Creation of a new asset

Devon's carriageway asset is ever changing with predominant annual increases. New assets are created in a variety of ways, including:

- Council schemes to create new roads which are funded through capital investment. These generally consist of bypasses, major link roads and relief roads,
- Developer funded schemes can and do provide new carriageway particularly in the form of new housing and industrial estate roads. These are often adopted by the council once stringent conditions and specifications are met, and
- Regeneration and improvements schemes are another source which can result in additional carriageway being created through widening.

4.2 Routine and reactive maintenance

The council undertakes a range of cyclical highway maintenance activities which have the purpose of keeping the carriageway in good condition by allowing water to

drain effectively, thus maximising the design life, these activities include but are not limited to:

- Gully Cleaning,
- Ploughing (Edge Cleaning),
- Sweeping
- Ditching

Over the years, some of these activities have been reduced in frequency, due to financial pressure. Some activities, such as programmed weed spraying, have ceased altogether. Where there is an appetite some local parish and town councils have taken on some of these tasks as part of the Council-led self-help schemes. However, with the prospect of further restricted funding, the ability to undertake these activities will be further impacted. This in turn will see a reduced ability to deal with water on the carriageway, which is leading to accelerated deterioration, earlier intervention of defect repairs and a reduced lifespan of the asset.

The Council's highway inspection regime ensures that all the county's roads are inspected at various frequencies dependent upon their category within the maintenance hierarchy and in accordance with the authority's [Highway Safety Policy](#).

Works identified as a result of inspections are assessed against certain criteria such as, carriageway category, size, probability of interaction with highway user and potential severity to determine how they will be treated, all of which is described in the Highway Safety Policy. Such treatment could include immediate temporary or permanent repair, scheduled treatment based on level of posed risk, or even inclusion in a future works programme. These reactive repairs are carried out to ensure safety of the highway user but also, to prolong the life of the asset where possible.

Alongside safety repairs, inspections will also highlight serviceability issues that may need resolving in the short term in an effort to prevent a safety issue and to maintain the integrity of the asset where possible. Where budget allows the authority may employ 2 forms of routine carriageway maintenance in this way.

- Dragon Patching – a single vehicle and quick operation that uses flame to remove water and clean defects, followed by aggregate and binder sprayed into the affected area at high pressure to create the necessary compaction. These machines can treat numerous minor defects over a single day, and



Fig. 1.13: Dragon patcher in operation.

- Serviceability patching – a more traditional form of patching. Small teams using hand tools can patch small areas of defective carriageway up to 50m². These areas could be added to preventative programmes of work at a later date.

4.3 Renewal or replacement

With effective forward works planning and prioritisation, the Council aims to carry out both proactive treatments and major renewal or replacement at the right time for the right cost, ensuring the Council gets the maximum benefit for the cost.

Below are some examples of the type of treatment the Council make use of. The way these treatments are selected is indicated in section 4.6 below.

Types of Treatment

Recycling (Renewal/Replacement)

There are three main types of recycling used for highway maintenance:

- Ex-situ – Ex-situ recycled material comprises bound material suitable for the construction of pavement layers produced in a fixed or mobile mixing plant from graded aggregate processed from arisings from the excavation of roads, blended, where necessary, with other aggregate and additives and bound with bituminous binder and/or hydraulic binder material. These recycled materials are typically used to replace traditional binder and base course layers. The treatment is then followed with a surface treatment of either asphalt or surface dressing,
- Deep In-situ – The purpose of deep in-situ recycling, in conjunction with a new asphalt surface, is to strengthen the existing pavement by in-situ recycling using bitumen or hydraulic material as a binder. This is achieved by pulverizing the pavement, which may be asphalt, hydraulic bound mixture or unbound material and binding the pulverized layer together with bitumen emulsion, foamed bitumen or hydraulic material. Materials are recycled to depths of between 150 mm and 450 mm and then followed with an asphalt overlay, and
- Shallow In-situ – The purpose of shallow in-situ recycling is to improve and regrade the surface of the existing pavement by pulverizing to depths

between 75 and 150mm and then binding this material using bitumen emulsion, foamed bitumen, or hydraulic material.

Following the recycling process the surface is sealed using a surface dressing.

Reconstruction (Replacement)

This treatment involves the removal of the existing pavement layers to remediate structural failure of the carriageway. The depth of reconstruction is determined by the traffic flows, maintenance category and ground conditions, typically it will include the following layers:

- Base - Asphalt concrete dense bituminous macadam,
- Binder course - Asphalt concrete dense bituminous macadam, and
- Surface course - Asphalt concrete, SMA or HRA.

Where necessary the foundation layer will be replaced with a suitable depth of granular sub-base; and the correct design will give the structure of a carriageway a design life of 40 years, where the correct surface interventions are carried out during this time.

Resurfacing (Replacement)

- This treatment involves the introduction of a new asphalt surface, typically 40mm deep, to the road or footway. This is achieved by either removal of the time expired existing surface or by overlaying the existing surface where it is of sound condition and surrounding thresholds allow. Where current condition requires a binder course maybe included at a depth of 60mm either as isolated patching or across the whole scheme.
- Resurfacing provides a new running surface restoring skid resistance, surface profile and prevents the ingress of water to the lower pavement layers.

Surface dressing (Preventative)

- This is a surface treatment that consists of spraying a film of binder onto the existing road surface followed by the application of a layer of aggregate chippings. The chippings are then rolled to promote contact with the binder and to initiate the embedment in the underlying road surface.
- Surface dressing is a cost-effective way of restoring the road surface and sealing it against the ingress of air and water.

Lock chip (Preventative)

- In essence this is the same as surface dressing however, there is an addition of a bitumen-based coating over the dressing once the dressing has achieved some embedment.
- Due to the additional visits and processes this makes the treatment more expensive than normal Surface Dressing.

Micro Asphalt (Preventative)

- This is a surface treatment applied by machine in two layers to the existing road surface comprising of aggregates up to 6/10mm bound with bitumen emulsion and hydraulic binders. The treatment arrests deterioration by sealing surface from the ingress of air and water and by dealing with minor surface defects.

Annex 1 - Carriageways

Hand Applied Slurry Surfacing (Preventative)

- This is a surface treatment applied by hand in two layers to the existing carriageway surface comprising of aggregates up to 6mm, bound with bitumen emulsion. The treatment arrests deterioration by sealing surface from the ingress of air and water and by dealing with minor surface defects.

Asphalt Preservation (Preventative)

- This treatment for existing asphalt surfaces involves the spray application of a sealant treatment onto the road surface that consequently restricts water ingress and inhibits binder oxidation by providing a protective seal.
- This is a preventative treatment that is applied prior to deterioration of the existing asphalt surface.

Joint & Crack Repair (Preventative)

- This treatment option deals with open joints and cracks in the existing carriageway up to a width of 150mm. The area is filled using either a hot applied or resin system, the treatment seals the joint or crack to prevent the ingress of air and water and restores the surface profile.

Innovation

The Technical Appraisal Panel (TAP) assesses and trials new innovations in highway maintenance and repair, including carriageways. The main focus of the group is to address corporate aims, such as carbon reduction by establishing and approving a wider selection of treatments that can be used on the carriageway at various stages of the lifecycle. This may also bring about cost benefits compared to traditional forms of maintenance.

Site Selection

To inform the decision to ensure the correct design is selected for carriageway schemes the sites are investigated with the potential for core sampling along the scheme extents. Core samples are used to identify the current depth and condition of the existing pavement layers, also they are screened for the presence of coal tar. Where coal tar is identified, the core is fully analysed to determine whether the level is above the trigger point to classify the potential asphalt arisings as hazardous. The cost for the disposal of hazardous road arisings is prohibitive so the approach taken is to either design the scheme to negate the need to remove the hazardous material or where this is not possible the hazardous material is encapsulated using a recycling process.

4.4 Decommissioning of the asset

It is rare for carriageway assets to be decommissioned. This usually only occurs when roads are closed (or 'stopped up') because of major highway improvements or realignments. As a result of this, it is possible that sections of highway may fall into disuse or returned to the landowner of the subsoil beneath the highway.

The importance of maintaining an up-to-date asset inventory is recognised, taking into account the changes which do occur through planned activities and one-off events.

4.5 Maintenance Service Standards

Maintenance Service Standards were developed which define the Council provision for each asset type based on three levels:

- Safety,
- Safety and Serviceability or
- Safety, Serviceability and Sustainability.

These terms are defined further in [Section 3.3](#) of the lead section of this document.

These are defined in simple terms of what a road user could expect to see. This is very useful understanding the level of service in context of what is affordable.

Carriageway surface	Provision of Safety related issues only	Provision of safety and serviceability related issues	Provision of Safety, Serviceability and sustainability issues
What a road user would see	Carriageway surface uneven and rutted with multiple localised repairs and defects of a non safety nature. In rural areas suitable only for use by agricultural & similar vehicles.	Carriageway surface irregular. Limited evidence of recent resurfacing. Significant localised repairs & defects of a non safety nature.	Carriageway surface generally well maintained. Busier roads will be regular with limited localised repairs & defects of a non safety nature

Fig. 1.14: Indicating safety related issues and a description of typical appearance.

As pressures on budgets continue and become more restrictive, the ability of the Council to provide a service above that of safety is going to be severely impacted. This is illustrated in the tables below. Figure 1.15 illustrates the maintenance standards that can be expected on carriageways with current funding levels.

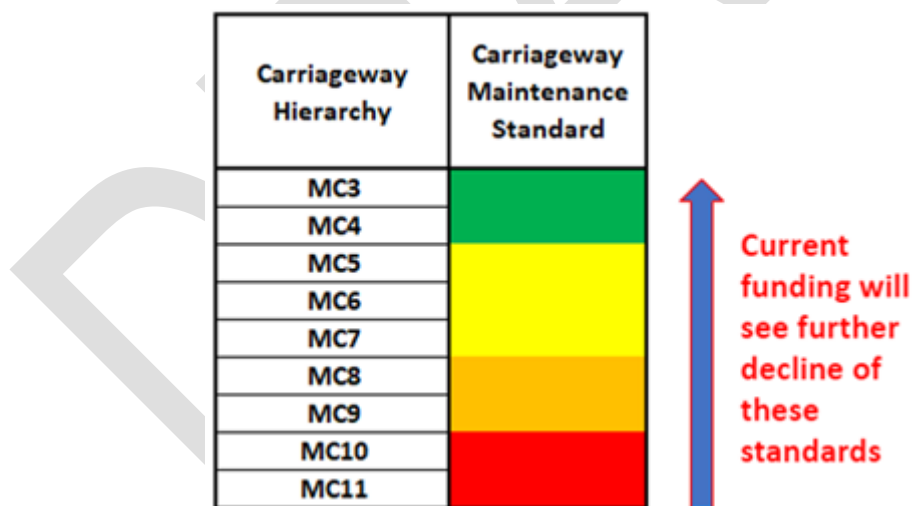


Fig. 1.15: Maintenance standards expected on carriageways

4.6 Treatment Selection

In conjunction with the maintenance service standards, the Council has also produced a treatment matrix which acts as a guide to the most appropriate materials/treatments to be used on the various categories of carriageway.

A link to the matrix can be found in [Appendix 1 - 1](#).

The matrix uses a colour coding system to indicate the approved treatments for each category:

Annex 1 - Carriageways

- Green = Approved treatment,
- Amber = Can be used with approval from Asset team, and
- Red = Not to be considered on category of carriageway.

This matrix also gives an indication as to the carbon impact of each treatment, which will be important in the decision making process as the Council moves forward with the Carbon reduction strategy. As more becomes known about carbon cost through the carbon calculators, this element of the matrix will be updated. It is also important to note that Warm Mix Asphalt is given as the default material, which should only be changed following approval from the service manager.

As new treatments and processes become available, following approval by TAP, this matrix can be further updated.

5 Levels of Service and Investment Strategy

Levels of Service demonstrate the relationship between the Council's corporate objectives, including the Strategic Plan for 2021 - 2025, and the performance of highway assets in terms of stakeholder requirements. The Levels of Service represent the fundamental service aimed at helping to deliver a road network which is as safe, reliable and as fit for purpose as possible within the current funding and resource constraints. Table 5.1 is an extract from the Strategy and shows the Levels of Service measures for carriageway surface along with an indication of how they relate to the Council's Levels of Service Statements.

Measure	Responding to the climate emergency	Be ambitious for children and young people	Support sustainable economic recovery	Tackle poverty and inequality	Improve health and wellbeing	Help communities to be safe, connected and resilient
Continue the development of the Community Road Warden Scheme (CRWS) by providing training, equipment and materials to local volunteers to assist with carrying out minor amenity maintenance activities and repairing non-safety defects.	✓		✓			✓
Respond within 2 hours to any occurrence or incident that poses a threat to life or renders the highway unusable or unsafe.			✓	✓		✓
Using road condition data and community feedback to develop and deliver an annual programme of	✓		✓	✓	✓	✓

Measure	Responding to the climate emergency	Be ambitious for children and young people	Support sustainable economic recovery	Tackle poverty and inequality	Improve health and wellbeing	Help communities to be safe, connected and resilient
carriageway structural maintenance repairs including resurfacing, patching and surface dressing to maintain roads within available budgets.						
Survey skidding resistance on A roads and investigate, monitor and repair deficiencies and/or put-up slippery road warning signs.			✓			✓
Operate a winter service of precautionary salting and snow clearance on strategic roads and when possible, on secondary routes as laid out in our Winter Service and Emergency Plan.			✓			✓
Support communities in their efforts to organise volunteers to clear snow and spread grit on routes considered locally important by providing support and training to snow wardens as well as equipment and bagged salt where applicable.			✓			✓

Fig. 1.16: Levels of Service

5.1 Lifecycle Model

An essential element of lifecycle planning is predicting the rate at which any given asset will be consumed. A deterioration profile can be developed from a variety of sources including historical performance, local knowledge and best practice. There is a complex deterioration model in use for carriageway condition.

Carriageways are a depreciating asset and constantly deteriorate. The primary factors in deterioration are the age of the carriageway, weather (particularly winter weather conditions) and traffic, particularly heavy goods. The cost of repairing that annual deterioration is known as Standstill or Steady State. Modelling of the carriageway component of the asset undertaken in 2020 indicated a need for approximately £50.6 million per annum to maintain carriageways in a steady state. The carriageway deterioration model has been developed with the Highway systems provider and is used to predict the future condition of the carriageway under a range of different funding and treatment scenarios.

The model has been developed to treat carriageways categorised as red and amber, as per Road Condition Index to model a typical treatment strategy which addresses both interventions on the worst sites, but also a preventative approach to intervene at a time before roads becoming more expensive to treat.

The model also calculates backlog (the cost of repairing all the RED sections of road network). Devon's carriageway backlog was previously calculated as £167 million, however this is currently being revised to better reflect delivery costs, especially in light of inflationary pressures.

5.2 Investment Strategy

The current performance of carriageway assets, detailed in Section 4.0, show that Devon's A, B and C roads are being maintained in a relatively steady state and good condition.

Unclassified roads combined with C roads, make up 87% of Devon's Road network. The performance summary shows that the unclassified network has a relatively high proportion in Red and Amber categories, that should be considered for maintenance work immediately. This reflects the fact that the level of available capital funding is insufficient to carry out structural maintenance on the entire road network of the Council.

The current budget does not provide sufficient funding to meet the annual cost of deterioration of the asset and consequently the condition of certain elements of the highway asset will get worse. The Council's strategy in this area will be to manage and mitigate that decline.

Whilst the funding prioritises the strategic routes, the authority's asset strategy has a wider remit in ensuring all communities have access to a road infrastructure which allows communities to 'Grow Up, Live Well, and Prosper'. It is necessary that the investment in the main roads is complimented by ensuring that good access to local communities is maintained. Therefore, an investment will continue to be made on roads outside of the A and B network that are included in the primary salting network, and other roads prioritised by several factors including:

- Asset need identified by data,
- Local information gained from communication with Town's and Parishes, and
- Expert knowledge from colleagues who understand the challenges of the local network.

This will help communities to feel Safe, Connected and Resilient in line with Best Place priorities.

Annually the Asset Management Team produce a Capital programme report for Cabinet which reviews progress on the current year's schemes and the next year's budget. The HSM Capital Budget and HSM Revenue Budget reports to Cabinet each year are built on and reaffirm the investment strategy for carriageways.

6 Programme Development

Devon Highways prepares an annual structured and prioritised forward works programme based on the investment strategy and available funding. Planning is important to operating a successful delivery programme, to aid efficiency, avoid

abortive work and reduce disruption on the network. It is desirable that HSM structural schemes are designed at least one year prior to delivery.

The in-year delivery programme still requires agility and flexibility and will change due to events (e.g. responding to weather events or the discovery of conflicts with other planned utility works, budgets). Schemes can be brought forward or deferred as required to help balance the programme in-year.

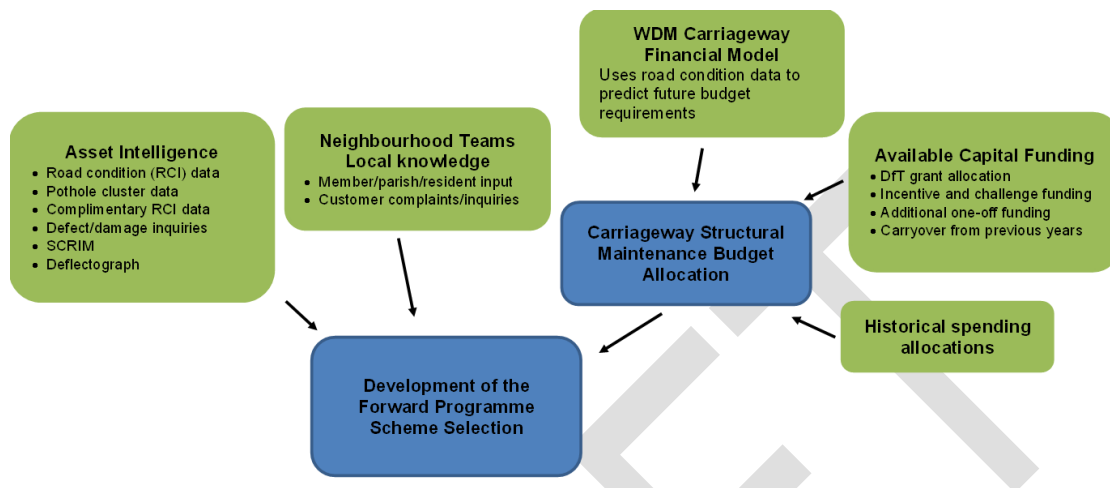


Fig. 1.17: Indicates the prioritised and forward works programme model.

6.1 Identifying Schemes for an Initial Works Programme SCRIM Sites

Devon limits routine annual SCRIM surveys to the principal road network only as it is considered neither affordable nor practicable for all roads on the highway network to be surveyed for skid resistance. The remaining untested network is covered under the strategy in the Annual Wet and Dry Collision Review, other roads identified as requiring further investigation are also be included in the programme of assessment.

It is not possible to treat all parts of the principal road network that are currently below the current standard therefore the work is prioritised and limited to potentially high-risk sites with a history of collisions. This includes sites with a reported skidding resistance deficiency and a history of collisions on wet surfaces, others with a high deficiency (greater than or equal to 0.15) and collisions on dry surfaces.

Principal Roads

There are a number of principal roads in the County that carry high vehicle flows and are of significant importance to the County's economic prosperity. These include the A361, A39 west of Barnstaple, A380 and the main commuter and LGV routes to Exeter.

When undertaking maintenance of these roads a structured planned approach based on lifecycle planning should be adopted based on the known date of last maintenance treatment. Scheme timing will be verified by machine survey data and on-site evaluation. It is anticipated that preventative maintenance treatments will need minimal preparatory work. Prior to 2012/13 formal maintenance history was not well maintained; however, since then the Asset Team has endeavoured to capture relevant information. Approximate dates of previous maintenance works may

be known to staff and where possible this should be considered in overall programming.

Maintenance schemes for these roads should be planned and designed well in advance and wherever possible be of a suitable scale. This scale is likely to be impacted by reducing budgets.

The remainder of the principal road network will have schemes developed primarily on the basis of machine survey and defect data combined with lifecycle planning. In addition to that, information gained from local teams around priorities and additional works will be taken into consideration. The aspiration is to produce schemes that address the site as a whole to reduce the need for multiple visits and increased disruption.

An issue in the identification of structural schemes has been the failure to appropriately identify and prioritise treatment of surface course failures where the defects arising do not trigger reactive safety repairs. Use of the Scottish MCIR (Maintenance Carriageway Indicator Resurfacing) has been promising and is being used to identify future works.

There is a need for reactive programming of failures either structural or surface which may be established through either survey or local report. Whilst these frequently do not generate safety defects, areas of delaminating surface compromise ride quality and can have a major impact on 2 wheel users. Surfacing schemes will be developed using a combination of MCIR indicator, reports of neighbourhood teams verified by site inspection. This means that some sites could be introduced to the programme at short notice. With reduced funding such occurrences of programme change will become more frequent, impacting more effective long-term planning.

'Wet and dry' skid sites identified by analysis of the SCRIM survey will be programmed and wherever possible integrated with the maintenance programmes.

The Local Asset Capital Programme (LACP)

Devon County Council has looked to breakdown some of the historic budgetary silos by introducing the Local Asset Capital Programme. Rather than budgets based on function or treatment, there has been a creation of area-based budgets which can incorporate a range of treatments, depending on the need of the area.

With the creation of the LACP process, greater emphasis has been placed on identifying and understanding local priorities when selecting works so that we can better serve.

The LACP process starts with a sample of the survey data collected:

- SCANNER data,
- Visual survey data, and
- Customer data (throughout the year).

SCANNER data is presented as a Road Condition Index (RCI), which is deemed to appropriately represent what is found on the ground and reinforces confidence in the data.

Using this data, the process then continues by (manually) scoring sections (junction to junction) on a mobile app (junction to junction), using a 1 to 6 score, where 1 is 'as new' and 6 is 'failed' state. Whilst scoring the sections, additional details are picked up such as the use of roads and this information is added to the map as handwritten notes. Any known drainage issues are also added to the app.

This map-based information can then be shared and discussed with Parish Councils and local experts where other important local intelligence is captured. This local intelligence includes the importance of local routes with the needs of the local residents.

Parishes identify their top priorities to the Council, which are then compiled over all the county. The Council looks at the data across all the parishes and prioritises all the selected areas. Taking the upcoming year's funding or likely funding available into account, this then results in a programme for the upcoming year.

Work is programmed for the year ahead, taking the yearly budget into account; however, about three years of work is identified in total, which will roll on into the next year's program.

Below is a diagram illustrating the information sources used to identify schemes for the LACP.

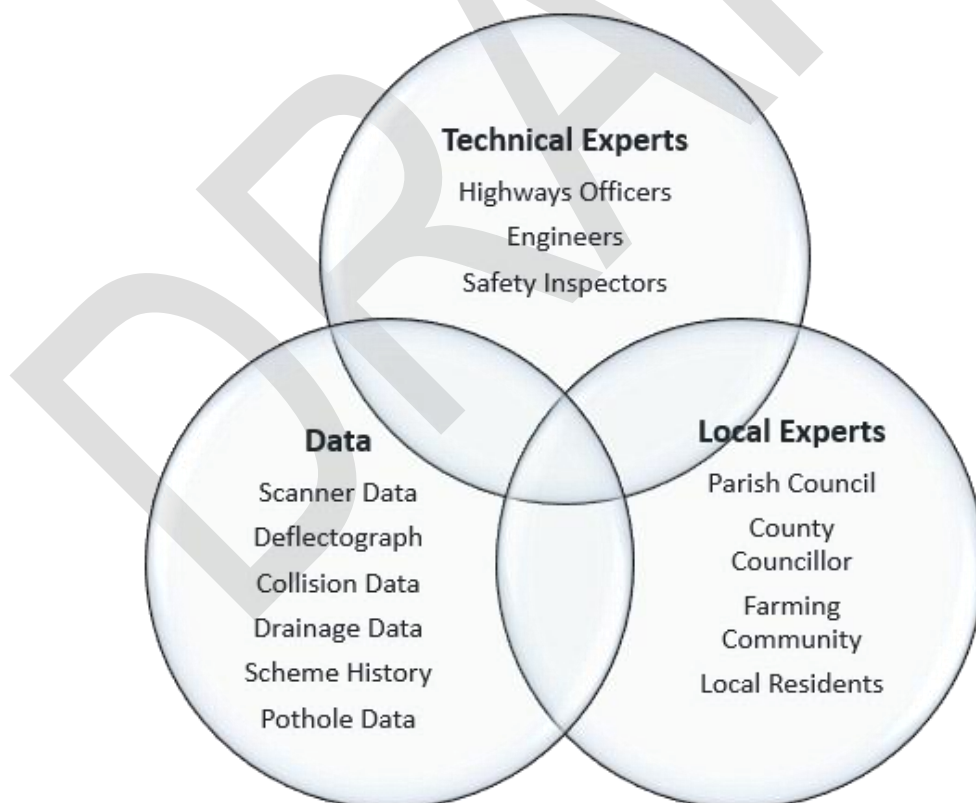


Fig. 1:18: LACP Information Sources

There is a diverse team involved in the identification and development of the LACP. To aid operational decision making, the Council has an internal guide to the teams involved and the roles they play.

6.2 Optimising and Prioritising the Works Programme

The LACP is still an emerging practice in determining the capital programme of works and may yet be developed further as learning and outcomes become apparent.

Currently, once schemes are identified by the teams, a process of optimising these schemes and prioritising them for the annual programme is followed.

The ultimate aim for this process is to identify a pipeline of work that can span 3 years, with associated prioritisation. From that pipeline it is possible to identify the top priorities that will comprise a programme of works in year 1.

As this is an emerging and organic process, work around how sites prioritisation takes place is still ongoing however, this looks to take elements from all the data sources to establish a programme that best fits the Asset Management goals of the Council, along with the needs of the local communities.

Due to the unpredictable nature of local highway maintenance, there is always scope for the annual programme to be impacted by previously unknown but urgent works. Effective prioritisation and programming of the work means that the Council is able to robustly justify any lower priority works that may need to be delayed in such circumstances.

The pipeline programme is also under regular review as conditions and other priorities may come into play.

7 Risks

Some of the risks that prevent or inhibit the Council achieving its asset management aims for carriageways are as follows:

- **Budget** – With insufficient Capital budget the Council will not be able to manage the deterioration in the network, thus only provide reduced levels of service. This will place greater pressure on Revenue budgets and also lead to more claims, reduced customer satisfaction and reputation damage or the Council. Also, restrictions on the Revenue budgets have also placed strain on appropriate asset management. With less capacity to undertake cyclical work on the carriageway and associated assets, the expected lifespan of the carriageway is often reduced, bringing about interventions such as safety related repairs at a much earlier stage.
- **Increased Costs** – Linked with budgets is the increase in costs to undertake the required work. In recent years, budget restrictions along with higher rates of inflation and other costs have seen a reduction in the amount of carriageway that can be treated each year. If this trend continues the deterioration rate and backlog of maintenance will increase.
- **Data** – If inventory and other data is not kept up-to-date and relevant it will not be possible for the authority to accurately model and plan for the deterioration of the network. This will lead to misdirection of funding and misapplication of asset management principles.

- **Climate** – Changes in climate conditions will affect the lifespan of the carriageways through increased deterioration.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Carriageways asset management objectives are achieved are:

- **Visual serviceability inspections** – This is an emerging practice which allows greater understanding of the network and some ratification of the data resulting from condition surveys. It is envisaged that this process will become more embedded in operations with agreed frequencies and scope.
- **Inventory data** – Accurate inventory data is fundamental to achieving asset management aims. Explore improved methods of inventory collection and updating to ensure the information is accurate.
- **Scheme justification and prioritisation** – Through the emerging LACP process justification and prioritisation has become an important element in establishing a robust programme. The Council is annually reviewing this process to ensure the schemes selected are in line with priorities set by it's own Asset Management plans, as well as serving the community needs.

Appendix 1 – 1 Carriageway Treatment Selection Matrix

DRAFT

General Carriageway Maintenance Treatments Attributed to Maintenance Categories

Note	Safety defects to safety policy. Safety defect repair must take priority and may, in some circumstances override the content of this schedule.	To be read in conjunction with the current policy and term maintenance contract specification
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Version 3.4
Nov-2021

Treatment	Reconstruction		Surface Treatments						Defect Repairs #			
	Recycling	Reconstruction	Resurfacing	Surface Dressing	Micro asphalt	Slurry Seal	High Friction Surfacing	Preservation	Patching	Potholes	Joint and Crack repair	
Carbon Impact	LOW	HIGH	HIGH	LOW	MED	LOW	MED	LOW	HIGH	MED	MED	
National Category	Devon Maintenance Category											
2	3	Ex-situ / deep in-situ recycling	WMA SMA where trafficked greater than one year. WMA AC prior to dressing	WMA Polymer SMA / Proprietary Materials / Polymer AC. Also on on high stressed areas on surface dressing sites.	Premium Dressings. Proprietary Dressings in urban or high stress situations.			Appendix G sites, Railway level crossings, Controlled pedestrian / cycle / horse crossings. Principal Road traffic signalled junctions with a pedestrian / cycle phase	Proprietary System	WMA SMA where trafficked greater than one year. WMA AC prior to dressing	AC Permanent	Proprietary system
2	4	Ex-situ / deep in-situ recycling	WMA SMA where trafficked greater than one year. WMA AC prior to dressing	WMA Polymer SMA / Proprietary Materials / Polymer AC. Also on on high stressed areas on surface dressing sites.	Premium Dressings. Proprietary Dressings in urban or high stress situations.	<50mph		Appendix G sites, Railway level crossings, Controlled pedestrian / cycle / horse crossings. Principal Road traffic signalled junctions with a pedestrian / cycle phase	Proprietary System	WMA SMA where trafficked greater than one year. WMA AC prior to dressing	AC Permanent	Proprietary system
3a	5	Ex-situ / deep in-situ recycling	WMA SMA where trafficked greater than one year. WMA AC prior to dressing	WMA Polymer SMA / Proprietary Materials / Polymer AC. Also on on high stressed areas on surface dressing sites.	Premium Dressings. Proprietary Dressings in urban or high stress situations.	<50mph		Appendix G sites, Railway level crossings, Controlled pedestrian / cycle / horse crossings. Principal Road traffic signalled junctions with a pedestrian / cycle phase	Proprietary System	WMA SMA where trafficked greater than one year. WMA AC prior to dressing	AC Permanent	Proprietary system
3b	6	Ex-situ / deep in-situ recycling	WMA SMA where trafficked greater than one year. WMA AC prior to dressing	WMA Polymer SMA / Proprietary Materials / Polymer AC. Also on on high stressed areas on surface dressing sites.	Premium Dressings. Proprietary Dressings in urban or high stress situations.	<50mph		Appendix G sites, Railway level crossings, Controlled pedestrian / cycle / horse crossings. Principal Road traffic signalled junctions with a pedestrian / cycle phase	Proprietary System	WMA SMA where trafficked greater than one year. WMA AC prior to dressing	AC Permanent or cold lay	Proprietary system
4a	7	Ex-situ / deep & shallow in-situ recycling	WMA SMA where trafficked greater than one year. WMA AC prior to dressing	WMA SMA/ AC on high stressed areas on preventative sites	Premium Dressings. Proprietary Dressings in urban or high stress situations.	<50mph	Urban sites where access for micro asphalt equipment is difficult.	Appendix G sites, Railway level crossings, Controlled pedestrian / cycle / horse crossings.	Proprietary System	WMA AC patching where trafficked greater than one year. WMA AC or patching prior to dressing	AC or cold lay or spray injection patching	Proprietary system
4a	8	Ex-situ / deep & shallow in-situ recycling	WMA AC	WMA AC on high stressed areas on preventative sites	Proprietary Dressings in urban situations.	<50mph	Urban sites where access for micro asphalt equipment is difficult.	Appendix G sites, Railway level crossings, Controlled pedestrian / cycle / horse crossings.		WMA AC or spray injection patching where trafficked greater than one year. WMA AC or spray injection patching prior to dressing	AC or cold lay or spray injection patching	Proprietary system
4b	9	Ex-situ / deep & shallow in-situ recycling	WMA AC	WMA AC on high stressed areas on preventative sites.	Proprietary Dressings in urban situations.	Urban sites only	Urban sites where access for micro asphalt equipment is difficult.	Appendix G sites, Railway level crossings, Controlled pedestrian / cycle / horse crossings.		WMA AC or spray injection patching where trafficked greater than one year. WMA AC or spray injection patching prior to dressing	AC or cold lay or spray injection patching	Proprietary system
4b	10	Shallow in-situ recycling		WMA AC on high stressed areas on preventative sites.		Urban sites only	Urban sites where access for micro asphalt equipment is difficult.	Appendix G sites, Railway level crossings, Controlled pedestrian / cycle / horse crossings.		WMA AC or spray injection patching where trafficked greater than one year. WMA AC or spray injection patching prior to dressing. On rural roads emulsion and chippings prior to dressing	AC or cold lay or spray injection patching	Emulsion & chippings rural sites. Hand applied slurry urban sites.
-	11	Shallow in-situ recycling					Urban sites where access for micro asphalt equipment is difficult.	Appendix G sites, Railway level crossings, Controlled pedestrian / cycle / horse crossings.		WMA AC or spray injection patching where trafficked greater than one year. WMA AC or spray injection patching prior to dressing. On rural roads emulsion and chippings prior to dressing	AC or cold lay or spray injection patching	Emulsion & chippings rural sites. Hand applied slurry urban sites.
-	12	Planings									Planings	

Key -		Recommended treatment.
		Treatment can be considered in liaison with the Asset Team.
		Treatment not considered suitable for maintenance category.
	#	WMA should be used as default choice unless agreed by the service manager.

Annex 2 – Footways

1	Introduction	1
2	Inventory	1
2.1	Inventory	1
2.2	Network Hierarchy	2
3	Performance	2
3.1	Current and historical condition	2
	Safety Inspections	2
	Condition Surveys	3
	Reporting by the public	3
3.2	Current Performance	4
	Safety Inspections	4
	Condition Inspections	4
	Reporting by the Public	5
4	Maintenance Strategy	5
4.1	Creation of a new asset	5
4.2	Planned maintenance	5
	Treatment options	6
4.3	Renewal or replacement	6
	The Council will renew or replace footways on the following basis:	6
4.4	Decommissioning of the asset	7
4.5	Maintenance Service Standards	7
4.6	Treatment Selection	9
5	Levels of Service and Investment Strategy	12
5.1	Levels of Service	12
5.2	Investment strategy	12
6	Programme Development	12
6.1	Identifying Schemes for an Initial Works Programme	12
6.2	Selecting and Optimising Schemes for the Forward Programme	13
7	Risks	13
8	Improvement Actions	13

Version	Date	Summary of Changes
0.1	10.03.2023	For consideration by Cabinet

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1 Introduction

Included in the Council's Strategic Plan for 2021-2025 is prioritising sustainable travel and transport, with emphasis on promoting opportunities for cycling and walking in the county. The desire for safe, serviceable, and sustainable footways is an essential part of the Strategy.

Footways have many benefits:

- They provide safe space for pedestrians, especially younger and elderly users,
- They separate pedestrians and traffic,
- They connect communities, schools, hospitals, and businesses,
- Walking promotes, wellness, active and sustainable travel, and
- Walking also helps us in reducing our carbon footprints.

Since the Government published its Gear Change plan in 2020, there has been additional focus and funding made available for active travel. £2 billion of funding has been committed for active travel over 5 years with the aim for 50% of all journeys in towns and cities to be walked or cycled by 2030. In support of these aims, local authorities are expected to produce Local Cycling and Walking Infrastructure Plans (LCWIPs) to enable a long-term approach to developing local cycling and walking networks.

In Devon, The Council is developing LCWIPs for the major urban growth areas where there is greatest scope to secure developer contributions to enable delivery of the scheme as well as for our leisure network of trails, which are an important part of improving peoples' health and wellbeing and supporting our rural economy.

The development of LCWIPs will have an impact on the nature and maintenance requirements of the County's footway asset group, and as such consultations with key stakeholders will continue to best understand this. Where possible the Council will also look for opportunities when undertaking planned maintenance to link into LCWIPs in order to maximise efficiencies and value for money.

2 Inventory

2.1 Inventory

A detailed highway inventory is an essential prerequisite of establishing a cost effective and adequate maintenance regime and is the starting point for valuation of the asset which is to be used for the Whole of Government Accounts (WGA) currently being implemented. The current Footway Gross Replacement Value (the cost of replacing the asset with its modern equivalent) is £421,406,000 and the Depreciated Replacement Cost (the cost of replacement of the highway in its current condition) is £333,513,100.

The inventory is the foundation on which asset management is built and when analysed in combination with other data, for example, condition, road casualties and traffic flows, it provides crucial decision supporting information.

2.2 Network Hierarchy

The development of a footway maintenance hierarchy is the foundation of a coherent consistent and auditable asset inventory as it provides the organisation structure to the inventory.

The hierarchy reflects the needs, priorities and actual use of each road and will be used as a tool in determining priorities maintenance standards, targets and performance.

A table of the Footway Maintenance Hierarchy and respective lengths of each hierarchy is shown below:

Footway Maintenance Hierarchy	Hierarchy Description	Type of Footway / General Description	Length of Hierarchy
1	Primary Walking Route	Busy urban shopping and business area and main pedestrian routes.	99 km
2	Secondary Walking Route	Medium usage routes through local areas feeding into primary routes, local shopping centres etc	144 km
3	Link Footway	Linking local access footways through urban areas and busy rural areas.	330 km
4	Local Access Footway	Footways associated with low usage, short estate roads to the main roads and Cul-De-Sac.	2,439 km

Fig.2.1: Footway Maintenance Hierarchy

3 Performance

3.1 Current and historical condition

The establishment of an effective regime of inspection, assessment and monitoring of asset condition is an essential component of an effective asset plan. The inspection types and condition assessment methods featured below are based on the national code of practice Well-managed Highway Infrastructure 2016. The guidance uses a risk-based approach to developing local practices.

Inspections are particularly important in the case of network safety where information may be crucial in respect to legal actions. A robust inspection regime therefore forms part of the Council's defence against claims and legal proceedings.

Safety Inspections

The current safety inspection regime can be found in the current Highway Safety policy, a link to which can be found [here](#).

The Council's standards for the frequency of footway safety inspections considers current national guidelines such as:

- Well-managed Highway Infrastructure: A Code of Practice issued (October 2016),

- Well Managed Highway Liability Risk issued March 2017, and
- Highway Act 1980.

Footway Maintenance Category	Hierarchy Description	Suggested frequency of inspections.
1	Primary walking route	monthly
2	Secondary walking route	3 months
3	Link footway	6 months
4	All other metalled footways	12 months

Fig.2.2: Categories, Description and Frequency of Inspection.

Condition Surveys

Footway Network Surveys (FNS) are carried out yearly on all categories of footway. They provide a detailed visual inspection for footways which delivers a comprehensive survey of the condition to support effective asset management.

The purpose of condition assessment is to address the key objective of Network performance and to ensure that value for money is achieved when undertaking structural repairs.

By following asset management principles and providing information on the nature and severity of impairment, the timing and nature of appropriate treatments can be determined. Data from these surveys are also used in the production of National Indicators and repeatable condition surveys allow for analysis of trends within the network.

Condition data is used to identify and generate potential footway LACP (Local Asset Capital Programme) schemes.



Fig. 2.3: Picture of surveyor on site, using OS maps on tablet to identify survey location.

Reporting by the public

A valuable source of condition data is the information the Council gather from the public when safety defects are reported. The provision of location of defects enables the contractor to optimise gangs in organising repairs in an efficient manner.

3.2 Current Performance

Condition surveys are primarily intended to identify deficiencies in the highway infrastructure which if untreated are likely to adversely affect the long-term performance and serviceability of the asset. They provide information on the nature and severity of deterioration which is used to determine appropriate maintenance treatments and inform the asset valuation process. These surveys are used to provide assessments of overall performance, maintenance requirements and relevant data for national performance indicators.

Safety Inspections

The table below shows the number of defects reported during safety inspections in recent years.

Year	Defects	Notes
2020/2021	9,141	
2021/2022	9,028	
2022/2023	6,418	To Jan 2023

Fig.2.4: Defects from Safety Inspections

Condition Inspections

Fig. 2.5 shows results from FNS between 2016 and 2021. The graph presents the length of each Footway Hierarchy against each of the four bands for Footway Condition. These are: As New, Aesthetically Impaired, Functionally Impaired, and Structurally Impaired.

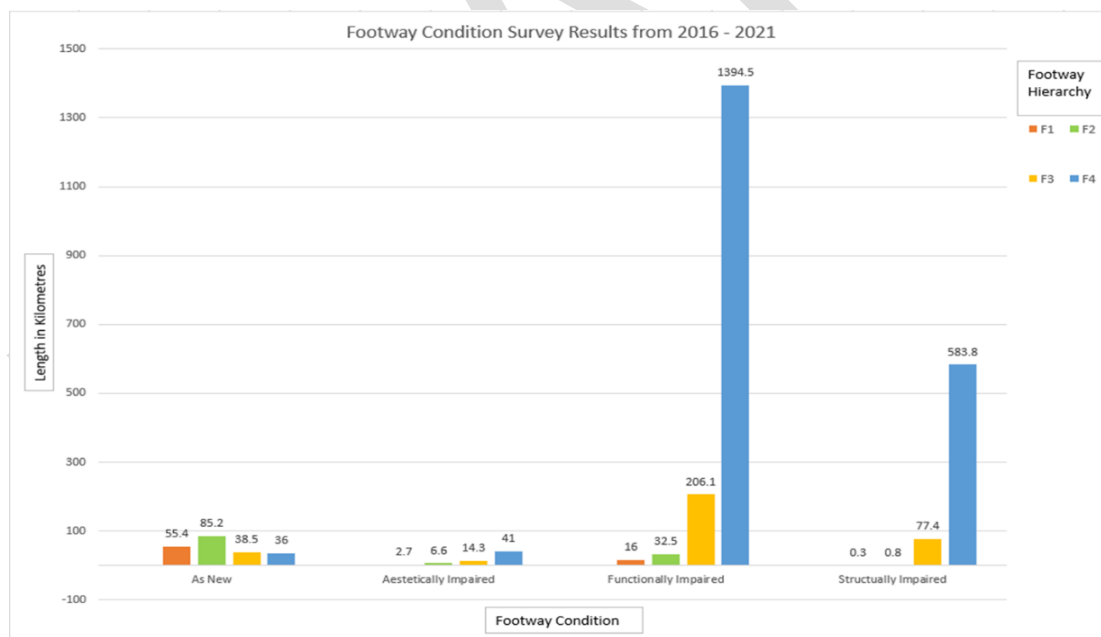


Fig. 2.5: Graph showing Footway Condition from FNS Inspections

The same data is represented in a tabular format in Fig 2.6 below, which shows the percentage of each footway category in each condition band.

Footway Hierarchy	Condition			
	As New	Aesthetically Impaired	Functionally Impaired	Structurally Impaired
F1	74.5%	3.6%	21.5%	0.4%

F2	68.1%	5.3%	26.0%	0.6%
F3	11.4%	4.3%	61.3%	23.0%
F4	1.8%	2.0%	67.8%	28.4%

Fig. 2.6: Table showing Percentage of each Footway Category in each Condition Band

Reporting by the Public

For a number of years, the Council has taken part in the National Highway and Transport (NHT) annual survey. This is a public perception survey completed with a statistically representative number of residents for each authority taking part. The graph in the figure below shows the results for overall satisfaction with Pavements and Footways. Although overall satisfaction remains slightly above the 50% level, it indicates that public perception has remained above average in Devon compared with other Councils.

The graph and table below shows Devon's results in each year they have taken part in the survey over the last five years and how they compare with the NHT Average, High and Low of all other Authorities to have participated.

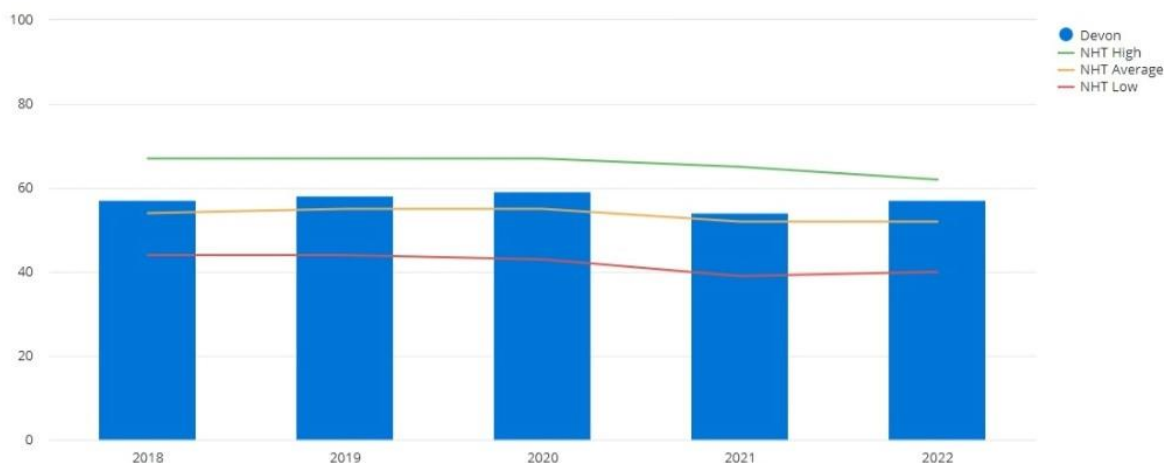


Fig. 2.7: NHT survey results. KBI 11 – Pavements and Footpaths (Overall)

4 Maintenance Strategy

4.1 Creation of a new asset

New footways are created in several ways including the following:

- When new highway infrastructure such as carriageways are built,
- As part of development works under sections 38, and 278 of the Highway Acts 1980,
- As part of major housing developments, and
- As part of the strategic plan to encourage active travel.

4.2 Planned maintenance

Programmed work includes the following:

- Replacing or renewal of defective slabs,
- Patching and replacing paving blocks or bricks,
- As part of slurry seal programme,
- As part of resurfacing or reconstruction programme, and
- Programmes created following regular inspections.

Treatment options

Selection of treatment types will take into consideration the performance requirement of the asset both in terms of fitness for purpose for users, numbers of users and the projected deterioration profile, and what subsequent treatment type can be considered for future interventions.

Below are some examples of the treatment types for footways that the Council makes use of. The way the treatments are selected is indicated in Section 4.6 below.

- Footway Flexible Reconstruction,
- Footway Flexible Patching,
- Footway Flexible Resurfacing,
- Footway Slurry Seal,
- Footway Proprietary Treatments and Specialist Surfacing,
- Footway Flags Reconstruction,
- Footway Flags Resetting,
- Footway Paviour Reconstruction,
- Footway Paviour Resetting, and
- Cobbles.



Fig. 2.8: Slurry seal being applied to a footway (Before, During and After)

4.3 Renewal or replacement

The Council will renew or replace footways on the following basis:

- Following recommendation from local teams.
- As part of Local Asset Capital Programme (LACP).
- Following inspection and other defect reports.
- As result of changes to the Council's strategic plans.
- Availability of funding.

4.4 Decommissioning of the asset

It is rare for footway assets to be decommissioned. This usually only occurs when roads are closed (or ‘stopped up’) because of major highway improvements or realignments. As a result of this, it is possible that sections of footway may fall into disuse or be returned to the landowner of the subsoil beneath the highway.

4.5 Maintenance Service Standards

Maintenance Service Standards were developed which define the Council’s provision for each asset type based on four levels:

- Provision of safety related issues only,
- Safety and Minimal Level of Serviceability,
- Safety and Intermediate Level of Serviceability, or
- Safety, and Serviceability and Sustainability.

These are defined in simple terms of what a road user could expect to see. This is especially useful in understanding the level of service in the context of what is affordable. Maintenance Standards are informed by condition assessments if available, against the stated Levels of Service in the Plan and the Council’s Strategic Plan 2021-2025 to encourage sustainable travel and transport.

Footways	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability and sustainability issues
What a footway user would see	Surface uneven and rutted with multiple localised repairs. Some defects of a non-safety nature.	Surface irregular. Limited evidence of recent resurfacing. Significant localised repairs. Some defects of a non-safety nature.	Surface generally well maintained. Limited localised repairs. Some defects of a non-safety nature.	Surface regular with very few localised repairs. Minimal defects of a non-safety nature.

Footways	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability and sustainability issues
Maintenance standards and activities.	Undertake limited condition surveys to inform of network valuation. Undertake minimum safety inspections and react to defects that represent an immediate or imminent hazard only. No routine or programmed maintenance.	Undertake condition surveys to inform of network valuation & support asset management prioritisation within available budget. Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Repairs mostly consisting of patching & dressing or spray patching. Limited routine & programmed maintenance dependant on budgets.	Undertake condition surveys to inform of network valuation & to support asset management prioritisation within available budget. Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Reduced routine & programmed maintenance. Repairs are usually patching & surface dressing with surfacing limited to high stress areas.	Undertake condition surveys to inform of network valuation. Some serviceability inspections to support the asset management approach for allocating resources for the management, operation, preservation, and enhancement of the carriageway to meet the needs of current and future customers. Routine & programmed maintenance undertaken to optimise future condition and to reduce the backlog of maintenance requirements.

Footways	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability and sustainability issues
Impact	Decline in structural residual life with increase in structural defects such as potholes, major cracking and rutting.	Decline in structural residual life with increase in structural defects such as potholes, major cracking and rutting.	Some structural defects such as potholes, cracking & rutting.	Minimal defects

Fig. 2.9: Maintenance Standards for Footways

As pressures on budgets continue and become more restrictive, the ability of the Council to provide a service above that of safety is going to be severely impacted. This is illustrated in the tables below. Figure 2.10 illustrates the maintenance standards that can be expected on footways with current funding levels.

Maintenance Standards – Rural Footways

Footway Hierarchy/ Environment	Footway
F1 Rural	Green
F2 Rural	Yellow
F3 Rural	Orange
F4 Rural	Red

Maintenance Standards – Urban Footways

Footway Hierarchy/ Environment	Footway
F1 Urban	Green
F2 Urban	Yellow
F3 Urban	Orange
F4 Urban	Orange

Fig. 2.10: Maintenance Standards expected on Footways

4.6 Treatment Selection

In conjunction with the maintenance service standards, the Council has also produced a treatment matrix which acts as a guide to the most appropriate materials/treatments to be used on the various categories of footway.

The matrix can be seen in Fig. 2.11 below.

The matrix uses a colour coding system to indicate the approved treatments for each category:

Annex 2 - Footways

- Green = Approved treatment,
- Amber = Can be used with approval from Asset team, and
- Red = Not to be considered on category of carriageway.

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Annex 2 - Footways

Note	Safety defects to safety policy. Safety defect repair must take priority and may, in some circumstances override the content of this schedule.					To be read in conjunction with the current policy and term maintenance contract specification			Approved DHB 9th July 2015 Version 3.1		
National Category	Devon Maintenance Category	Footway Flexible Reconstruction	Footway Flexible Patching	Footway Flexible Resurfacing	Footway Slurry Seal	Footway Proprietary Treatments and Specialist Surfacing	Footway Flags Reconstruction	Footway Flags Resetting	Footway Pavour Reconstruction	Footway Pavour Resetting	Cobbles
1(a) / 1	F1	Type F1 or Type F2	Type F1A or Type F9	Type F1A or Type F9		e.g. high friction or coloured surfacing, any form of imprinting into the surface or stick on surfacing	Standard size flags or PS/B or PS/C	Standard flags or PS/A	BP/1	BP/1	CP/1 or CP/2
2	F2	Type F1 or Type F2	Type F1A or Type F9	Type F1A or Type F9	Clause 918		Standard size flags or PS/B or PS/C	Standard flags or PS/A	BP/1	BP/1	CP/1 or CP/2
3	F3	Type F1 or Type F2	Type F1A or Type F9	Type F1A or Type F9	Clause 918		Standard size flags or PS/B or PS/C	Standard flags or PS/A	BP/1	BP/1	CP/1 or CP/2
4	F4		Type F1A or Type F9	Type F1A or Type F9	Clause 918			Standard flags or PS/A		BP/1	CP/1 or CP/2
	Only in exceptional circumstances and after Materials Laboratory approval										
	Permissible option										
	Flags, pavours, and cobbles replaced outside Conservation areas with flexible materials after consultation with stakeholders										

Fig. 2.11: Treatment Selection for Footways

5 Levels of Service and Investment Strategy

5.1 Levels of Service

The detailed levels of service for the footway asset have been defined in a Levels of Services Table which shows how they each link to the core service levels. When developing the footway levels of service, it was important to not only consider statutory responsibilities but to also take account of customer satisfaction and views of the Council. Budget constraints also help determine levels of service as it is important to manage the expectations of service delivery standards.

Measure	Responding to the climate emergency	Be ambitious for children and young people	Support sustainable economic recovery	Tackle poverty and inequality	Improve health and wellbeing	Help communities to be safe, connected and resilient
Inspect footways and cycleway at set frequencies and prioritise repairs to safety defects in accordance with the Highway Safety Inspection Policy.	✓	✓	✓	✓	✓	✓
Using condition data and community feedback to develop and deliver an annual programme of footway and cycleway maintenance repairs.	✓	✓	✓	✓	✓	✓

Fig. 2.12: Levels of Service

5.2 Investment strategy

Although a robust asset deterioration model exists for carriageways a similar model has not been developed for footways. This is in line with the relatively low risk and low historical spend on footways however development of a less complex model may assist in determining budget splits for footway spending. Footway spending is based more on historical spend assessments and on network length.

6 Programme Development

6.1 Identifying Schemes for an Initial Works Programme

When identifying schemes for an initial Works Programme, the following are some of the factors that are considered:

- Local needs identified by the Neighbourhood Teams as part of the Local Asset Capital Programme (LACP) process.
- Inspection reports from Neighbourhood officers and Data Technicians.
- Following complaints or claims, and
- Programmed or planned asset renewal works.

This is represented in the diagram below.

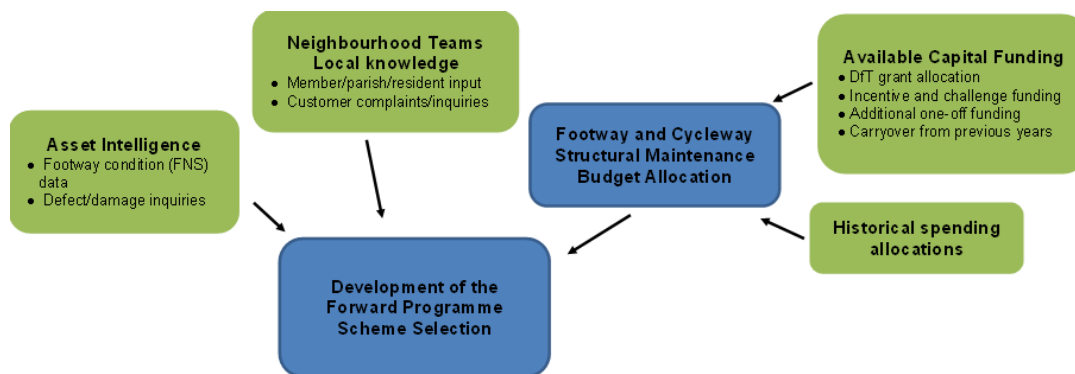


Fig. 2.13: Identifying Schemes for an Initial Works Programme

6.2 Selecting and Optimising Schemes for the Forward Programme

Funding for footway improvement schemes is available through the LACP programme. Sites are considered alongside other schemes in the LACP programme, taking footway hierarchy into account.

7 Risks

Issues which may prevent asset management objectives being achieved include:

- Funding and overall prioritisation are the main challenge in achieving our maintenance objectives. Currently there is insufficient investment overall so footways are likely to deteriorate if funding is not increased.
- Availability of suitable surfacing materials with correct Polished Stone Values (PSV).
- Climate change with more rainfalls and frequent storm events may cause accelerate damage to our footways.
- Increasing costs of materials and labour.

Other risks with funding availability to maintain footways include:

- Financial claims for compensation, increases complaints public dissatisfaction, and damage to the reputation of the council.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Footways asset management objectives are achieved are:

- Development of a risk-score matrix to better inform and justify decision making.
- Review use of latest technology for improved data collection.

- Develop an investment strategy for the footway asset.

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Annex 3 – Cycleways

1	Introduction	1
2	Inventory	1
2.1	Hierarchy	1
	Category A – Part of Carriageway	2
	Category B – Remote of Carriageway	3
	Category C - Cycle Trail (including off road sections of the National Cycle Network)	3
2.2	Inventory	3
3	Performance	4
	Asset Condition	4
	Reporting by the public	4
	Safety Inspections	4
	Serviceability Inspections	5
4	Maintenance Strategy	5
4.1	Creation of a new asset	5
4.2	Routine maintenance	6
	Treatment Options	6
	Winter Service	7
4.3	Renewal or replacement	7
4.4	Network Upgrade	8
4.5	Decommissioning	8
5	Levels of Service and Investment Strategy	8
5.1	Investments Strategies	8
5.2	Levels of service	8
6	Programme Development	9
6.1	Identifying Schemes for an Initial Works Programme	9
6.2	Prioritising the Works Programme	10
6.3	Selecting and Optimising Schemes for the Forward Programme	10
7	Risks	10
8	Improvement Actions	11

1 Introduction

In previous revisions of the Highway Infrastructure Asset Management Plan (HIAMP) the cycleway asset has been merged with others. In this revision of the plan cycleways have been separated in a first stage effort to highlight the increased importance of the asset, which is likely to gain more traction in years to come.

Cycleways are an important part of the highway network and contribute to the Councils overall strategic aims of allowing the residents of Devon to Grow up, Live Well and Prosper.

Cycleways are a diverse part of the network which can require varying levels of maintenance.

Since the Government published its Gear Change plan in 2020, there has been additional focus and funding made available for active travel. £2 billion of funding has been committed for active travel over 5 years with the aim for 50% of all journeys in towns and cities to be walked or cycled by 2030. In support of these aims, local authorities are expected to produce Local Cycling and Walking Infrastructure Plans (LCWIPs) to enable a long-term approach to developing local cycling and walking networks.

In Devon, The Council is developing LCWIPs for the major urban growth areas where there is greatest scope to secure developer contributions to enable delivery of the scheme as well as for our leisure network of trails, which are an important part of improving peoples' health and wellbeing and supporting our rural economy.

The development of LCWIPs will have an impact on the nature and maintenance requirements of the County's cycleway asset group, and as such consultations with key stakeholders will continue to best understand this. Where possible the Council will also look for opportunities when undertaking planned maintenance to link into LCWIPs in order to maximise efficiencies and value for money.

2 Inventory

2.1 Hierarchy

For the purpose of identifying where certain cycleways exist, Devon has adopted 3 main categories to guide maintenance and inspection.



Fig 3.1 Cycleway a part of a carriageway

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Category B – Remote of Carriageway



Fig 3.2 Cycleway remote of a carriageway

Category C - Cycle Trail (including off road sections of the National Cycle Network)



Fig 3.3 Cycle trail

2.2 Inventory

Obtaining an accurate inventory of all the cycleways in Devon has proven a challenge to the Council due to the diversity of the network. This is something the Council aims to improve in the future.

Annex 3 - Cycleways

Informal data does exist that gives an indication of the lengths of network within the main settlements of Devon however, confidence in the accuracy of this data is not absolute.

Type	Total length (km)	Exeter	Barnstaple	Exmouth	Newton Abbot	Tiverton
Traffic-free routes	362	92	26	14	11	10
On-road cycle lanes	53	30	10	1	1	1
Advisory cycle routes	809	67	39	19	13	30
Footpaths & Bridleways	1,218	8	1	0	1	9
Byways	114	0	0	0	1	0
Total	2,556	197	76	34	26	51

Fig.3.4: Lengths of cycle network by main settlement

For accessibility, the Council provides maps of the current cycle network though links on the [website](#).

3 Performance

3.1 Current and historical condition

Asset Condition

The establishment of an effective regime of inspection, assessment and monitoring of asset condition is an essential component of an effective asset plan.

Inspections are particularly important in the case of network safety where information may be crucial in respect to legal actions. A robust inspection regime therefore forms part of the Council's defence against claims and legal proceedings.

Reporting by the public

A valuable source of condition data is the information the Council gather from the public when cycleway defects are reported. The provision of location of defects enables the contractor to optimise gangs in organising repairs in an efficient manner. This condition data is used together with other data sources to identify potential treatment sites.

Safety Inspections

Our standards for the frequency of cycleway safety inspections consider national guidelines and legislation such as:

- Highways Act 1980
- Well-Managed Highway Infrastructure: A Code of Practice (October 2016) (NCoP)
- Well Managed Highway Liability Risk (March 2017)

The current safety inspection regime can be found in the current Highway Safety policy, a link to which can be found [here](#).

Serviceability Inspections

In relation to Trails a key guide is the [Public Rights of Way Condition Criteria](#) which informs annual inspection and identification of maintenance and improvement works

3.2 Current performance

Due to the nature of the network, particularly where cycleways are part of the carriageway, or locally shared footway, it is difficult to isolate the condition of this asset from others.

On dedicated cycle trails it is easier to understand the performance through recorded defects. Over the last 2 years, the recorded defects for maintenance category 16 linking cycleways is as follows:

- 2021 – 1,388
- 2022 – 1,174

This represents a reduction of approximately 15.5%.

The Nation Highways and Transport Network (NHT) survey is another resource that can be used to measure the performance of the authority over particular assets. In the 2022 survey it was highlighted that the most popular area of the service getting better was Cycle routes/lanes. Which reinforces the limited specific data available from defects.

4 Maintenance Strategy

4.1 Creation of a new asset

New cycleways can be created in a number of ways:

- New developments – As part of travel plans associated with new development planning permission. Many new housing developments are being obliged to provide high quality sustainable travel infrastructure, which often includes cycleways. These often link in to existing infrastructure that may require improvement/upgrading.
- Strategic upgrading of existing infrastructure – linked with the above, the local authority currently uses government incentives and capital funding to upgrade existing network to make it more accessible and appealing for sustainable travel. A good example of this would be the E4 cycle route that connects residential and travel hubs to the East of Exeter with the City Centre and the University.

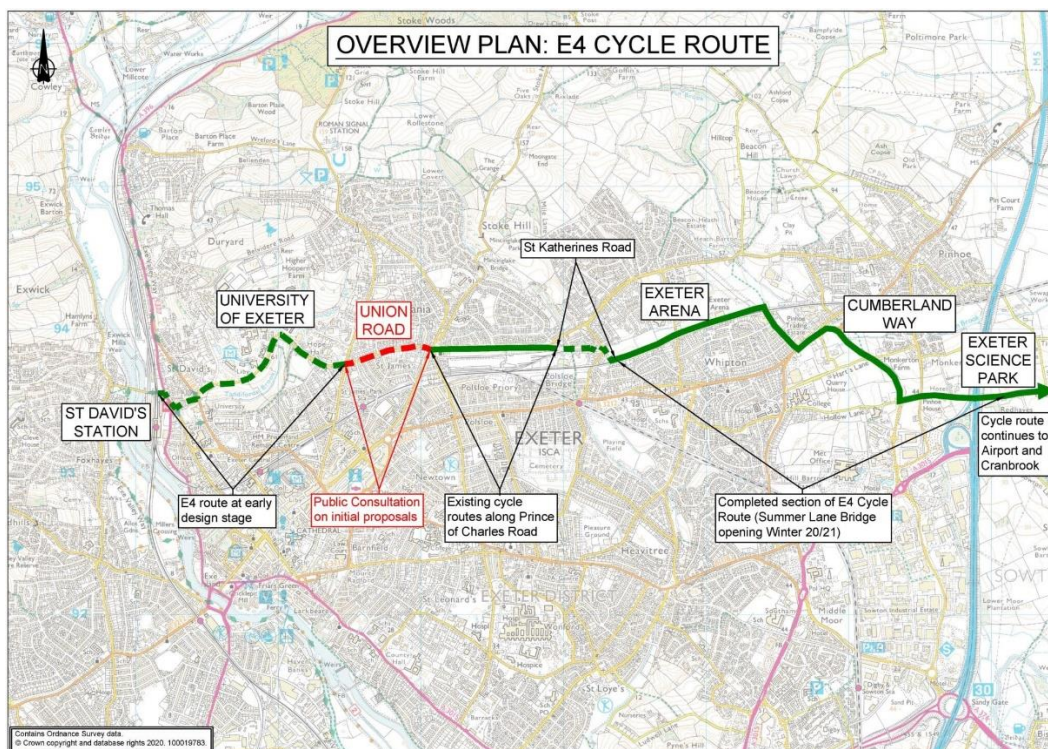


Fig. 3.5: E4 Cycle Route Plan

- Asset re-purposing – Another method of creating cycleway infrastructure is through the re-purposing of existing assets. This could include the prohibition of vehicular traffic along certain roads to ease sustainable and safer travel. In Exeter, during COVID, certain roads were subject to this very process, some of which have since been made permanent. An example of this is Magdalen Street in Exeter where two way vehicular traffic has now been made one-way in favour of a dedicated cycleway adjacent to the footway.

4.2 Routine maintenance

There are various forms of routine maintenance that can occur on the cycleway network, including:

- Surface defect/pothole repairs
- Surface patching
- Surface cleaning through sweeping – in conjunction with partner authorities
- Vegetation cutting
- Joint/Crack repairs
- Resurfacing/reconstruction
- Slurry repairs

Treatment Options

The location of the cycleway, along with the surrounding environment and current construction will dictate the routine treatment and frequency that is required. A cycleway in an urban setting set alongside other assets such as footways or carriageways may be subject to less vegetation clearance but more sweeping as part of a District or City council's cyclic operations. In contrast, a cycle trail that is remote from the carriageway may require more in the way of vegetation management to ensure the cycle trail is not restricted.

In terms of surface repair, cycleways that are remote of other assets, especially carriageways will be less prone to defects associated with vehicles. As such the surface types may range from bound surfaces to loose, granular material. The routine treatment of these surfaces will again be tailored to the need and the local environment.

Winter Service

As part of the commitment to encourage sustainable travel and make it safer, the authority has started a trial to proactively pre-salt strategic cycle routes around Exeter when sub-zero surface temperatures are forecast. To facilitate this the authority has commissioned the use of specialised equipment and solution. The effectiveness and cost benefit of the trial will be assessed after the winter period.



Fig. 3.6: Cycleway Pre-salting Vehicle

4.3 Renewal or replacement

When the cycleway is associated with other assets, such as carriageways or footways, then the options for renewal or replacement are generally linked with the associated asset.

Where cycleways are also part of the carriageway, the treatment methods and selection criteria contained within the Carriageway Annex can be referred to. As it is the carriageway that is likely to deteriorate more quickly than the cycleway it will often be that treatment method that takes precedent. The same can be said for cycleways that are remote of carriageways but associated with footways.

Cycle trails tend to comprise a more varied range of methods reflecting factors such as levels and types of use, landscape and heritage setting, and biodiversity and wildlife value. Some routes include access for horse riding (with a commitment to encouraging and supporting shared use) and so need to consider methods best suited to this combination of uses. An added factor is that the route may be permissive rather than by right and so could be subject to requirements linked to agreements with 3rd party landowners.

4.4 Network Upgrade

Whilst undertaking renewal or replacement activities opportunities to upgrade or improve the cycleway are often explored. This can take the form of:

- Bringing the cycleway up to current standards
- Improving usability and accessibility
- Improving safety
- Improving asset durability and sustainability

Such work is often undertaken with Transport Planning teams within the authority who will have a strategic understanding on the need. Such examples include the widening of the on-road cycleway along Pinhoe Rd, Exeter and the upgraded footway/cycleway in Burnthouse Lane, Exeter.

The Transport Planning team are also involved in identifying schemes for enhancing the cycle trail network. This includes close liaison with Sustrans as part of managing and developing the National Cycle Network (ref. [The National Cycle Network](#)). Priorities are also informed by the [Rights of Way Improvement Plan and Policy](#), with a steer provided through the Devon Countryside Access Forum (ref. [Devon Countryside Access Forum](#)).

4.5 Decommissioning

With the emphasis on promoting and providing access to sustainable transport, cycleways are very unlikely to be decommissioned by the authority. Assets may be superseded by new developments, which will be seen as an improvement/upgrade.

5 Levels of Service and Investment Strategy

5.1 Investments Strategies

There is currently a focus on investment to encourage and enable active travel through the creation of high-quality cycleway networks. Whilst this investment is directed at the creation of infrastructure, there is little provision for the ongoing maintenance.

Although a robust asset deterioration model exists for carriageways a similar model has not been developed for cycleways. This is in line with the relatively low risk and low historical spend on cycleways however development of a less complex model may assist in determining budget splits for cycleway spending going forward. Budget allocation is currently based more on historical spend assessments and on a need's basis.

5.2 Levels of service

Current level of service, informed by condition assessments if available, against the stated Levels of Service in the Plan, funding and Risk assessments.

Levels of Service demonstrate the relationship between the Council's corporate objectives, including the Strategic Plan for 2021 - 2025, and the performance of highway assets in terms of stakeholder requirements. The Levels of Service represent the fundamental service aimed at helping to deliver a road network which is as safe, reliable and as fit for purpose as possible within the current funding and resource constraints. Table 4.6 is an extract from the Strategy and shows the Levels

of Service measures for Cycleways along with an indication of how they relate to the Council’s Levels of Service Statements.

Due to the nature of the cycleway network, where a lot of the asset is associated with other assets, such a footways and carriageways, the maintenance standards, and the general condition of these cycleways will be linked with these assets. These service levels can be viewed in the carriageway and footway annexes.

Service standards for cycle trails are informed by the Public Rights of Way Condition Criteria as indicated in 3.1 above

Measure	Responding to the climate emergency	Be ambitious for children and young people	Support sustainable economic recovery	Tackle poverty and inequality	Improve health and wellbeing	Help communities to be safe, connected and resilient
Inspect footways and cycleway at set frequencies and prioritise repairs to safety defects in accordance with the Highway Safety Inspection Policy.	✓	✓	✓	✓	✓	✓
Develop and deliver an annual programme of footway and cycleway maintenance repairs.	✓	✓	✓	✓	✓	✓

Fig 3.7: Levels of Service

6 Programme Development

6.1 Identifying Schemes for an Initial Works Programme

For category A or Category B cycleways, the programme development will again be linked with the associated assets, such as footways and carriageways. This has been developed by the Local Asset Capital Programme (LACP), which places greater emphasis on identifying and understanding local priorities.

As well as understanding the local needs of communities through consultation, which can include a range of works across all assets, the local teams also consider a range of other data and information sources to identify potential works, this can include but not limited to:

- Safety inspection reports and data
- Customer reports
- Visual inspections

Alongside this, where works are programmed to other assets or infrastructure close by, opportunities may be sought to undertake maintenance or improvement to the cycleway network, which may otherwise prove too costly, or a lower priority.

Cycle trail work programmes are predominantly informed through the annual inspection regime, with consultation through the Devon Countryside Access Forum, and also potentially through other fora such as the Parish Paths Partnership.

6.2 Prioritising the Works Programme

For category A and B cycleways, the prioritisation of works will again depend largely on the associated assets. Due to the inherently low risk nature of cycleways and gradual deterioration, it is often the associated assets that dictate the need and the priority.

Factors included in this prioritisation will include but not limited to:

- Asset category (Carriageway/Footway Maintenance Category)
- Asset use and location (Traffic Flows, Urban Routes)
- Data condition (Scanner, Deflectograph etc.)
- Defect data (Potholes)
- Customer reports
- Community priority

Public safety and ease of use are the main considerations in prioritising cycle trail works. However, Devon County Council also has wider land management functions to factor. In addition to routine vegetation cuts, surface maintenance, and drainage, this can include activities such as habitat management, tree works, boundary fencing, car parks, waymarking and information signage.

6.3 Selecting and Optimising Schemes for the Forward Programme

The selection and optimising of cycleway schemes currently dependant on works programmes associated with other assets. Opportunities are taken to maximise these opportunities when funding allows however, with a reduction in overall funding, these opportunities to focus on the cycleway network may become more difficult.

Work has also taken place to work with other strategic teams to maximise the opportunities gained through new development, or strategic government funding grants. This work has been sporadic at times but with greater coordination could be maximised further in the future.

7 Risks

A big threat to achieving the maintenance objectives on cycleways is funding and overall prioritisation. Without sufficient focus and funding for the maintenance of this asset type the condition of the network is likely to deteriorate. In turn, this could have an impact on the overall objectives of promoting sustainable travel through the provision of high-quality routes.

In conjunction with the lack of funding for targeted maintenance, there is also increased activity in the creation of new assets. This is creating a much larger liability for the authority to maintain however; no additional provision has been made for the ongoing maintenance of these assets. This again could lead to a reduction in quality of the asset and may result in reputational damage to the authority.

Further identified risks can include:

- Availability of suitable surfacing materials with correct PSVs,

- Less frequent Serviceability inspections being undertaken may be exposing the authority to risks, such as more complaints, claims and customer dissatisfaction etc,
- Climate change with more rainfalls and frequent storm events may cause more damage to our footways,
- Availability of specialist contractors to carry out maintenance activities,
- Increasing costs of materials and labour.
- Reduction in the net book value of the asset,
- Reputational damage to the authority
- More frequent disruption to users due to increased emergency unplanned maintenance due to neglected or poorly maintained assets.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Cycleways asset management objectives are achieved are:

Hierarchy and Inventory - A primary focus for the authority is to make improvements in the data that is held on the cycleway inventory. It has been noted in section 2 that the data held on lengths of cycleway is sparse, unreliable and does not clearly indicate the inventory held across the 3 categories. Improvements in this area will create a better understanding of the network along with links to other assets, thus facilitating greater focus and prioritisation on the maintenance, bringing it more in line with a risk-based approach of asset management.

This may also lead to a review of the categories creating further opportunities for focus and prioritisation.

Travel Developments - Whilst cycling remains a focus for sustainable travel, there are other developments that may have an impact on the network and the way it is used. An example of which is the increased use of E-bikes, as well as the trial of E-scooters to facilitate shorter, urban journeys.

Identify the impacts of these developments as there could be an increased liability on the cycleway network. This in turn means that funding for these assets may need to become a greater priority to ensure the network is of sufficient quality and avoid reputation damage.

Training - With the improved links to other areas of the authority, there may be opportunities to undertake training and professional development for existing practitioners to better understand the importance of these assets and the impact on the network as a whole.

Identify training requirements to ensure suitable competency levels.

Annex 4 – Drainage

1	Introduction	1
2	Inventory	2
3	Performance	4
3.1	Safety Inspections	4
3.2	Serviceability Inspections	4
3.3	Performance Management	4
4	Maintenance Strategy	4
4.1	Creation of a new asset.....	4
4.2	Routine maintenance.....	5
4.3	Renewal or replacement.....	6
4.4	Decommissioning of the asset.....	6
4.5	Maintenance Service Standards.....	6
5	Levels of Service and Investment Strategy.....	9
5.1	Levels of Service	9
5.2	Investment Strategy.....	9
6	Programme Development	10
6.1	Identifying Schemes for an Initial Works Programme.....	10
6.2	Selecting and Optimising Schemes for the Forward Programme	10
7	Risks	11
8	Improvement Actions	11

Version Control		
Version	Date	Summary of Changes
0.1	10.03.2023	For consideration by Cabinet

1 Introduction

Highway drainage assets are considered an integral component to operating a safe and well-maintained carriageway which is why they are included as part of the carriageway lifecycle plan. Highway drainage systems are installed to capture surface water run-off to alleviate flooding and protect the fabric of the road. Getting water off the carriageway quickly is important in that it not only makes the road surface safer for drivers but also helps reduce deterioration of the road. Water egress and ingress into the road surface, the pumping action of tyres and freezing thawing damages and weakens the road surface leading to the development of potholes and the need for routine maintenance of the surface course.

Other objectives include preventing the formation of ice on the highway, elimination and preventing safety defects occurring on the carriageways, footways and cycleways, and preventing the ponding and flooding to buildings and commercial properties. The main responsibility is to ensure that the highway is available and safe to all users

This document should be read in conjunction with the current Devon Local [Flood Risk Management Strategy](#) (FRMS). As a requirement of the Flood and Water Management Act 2010, there is a duty for Devon as the lead Local Flood Authority to develop, maintain, supply and monitor a strategy for local flood risk management. The FRMS identifies the role of various Risk Management Authorities in managing the risk of flooding from different sources. The highway authority has a responsibility for managing the risk of flooding from surface water **originating on the highway**. A table outlining roles and responsibilities of Risk Management authorities and others such as landowners is available in the FRMS.

The impact of climate change will mean that winters may become warmer and wetter, summers hotter and dryer, there may be more frequent and intense extreme weather events. The effects of flooding, storms and extreme heat will affect our highway infrastructure including drainage assets. Our historical drainage systems may not cope very well resulting in potential flooding on highways and properties adjacent to the highway. The Council need to invest in drainage assets to reduce the impact of potential flooding. Regular inspections and maintenance and cleaning of our drainage assets is vital.

Due to global warming, heavy precipitation events are expected to increase in frequency and intensity under climate change. This will result in more extreme weather events such as flooding. This will cause damages to private & commercial properties, highway asset infrastructures and potential risks to lives, livestock and pollution of rivers and other water courses. There are moral and financial reasons why we should be investing more in our drainage assets.

The impact of climate change is one of the many challenges facing communities across Devon. More can be found in [Section 5 of the Lead Section on the Plan](#). Drainage networks that are designed based on historical climate regimes may be defunct in the future. This could lead to widespread pluvial flooding, aggravated by inappropriate land-use planning, increased paving, and loss of water storage space

2 Inventory

Who is responsible for what?

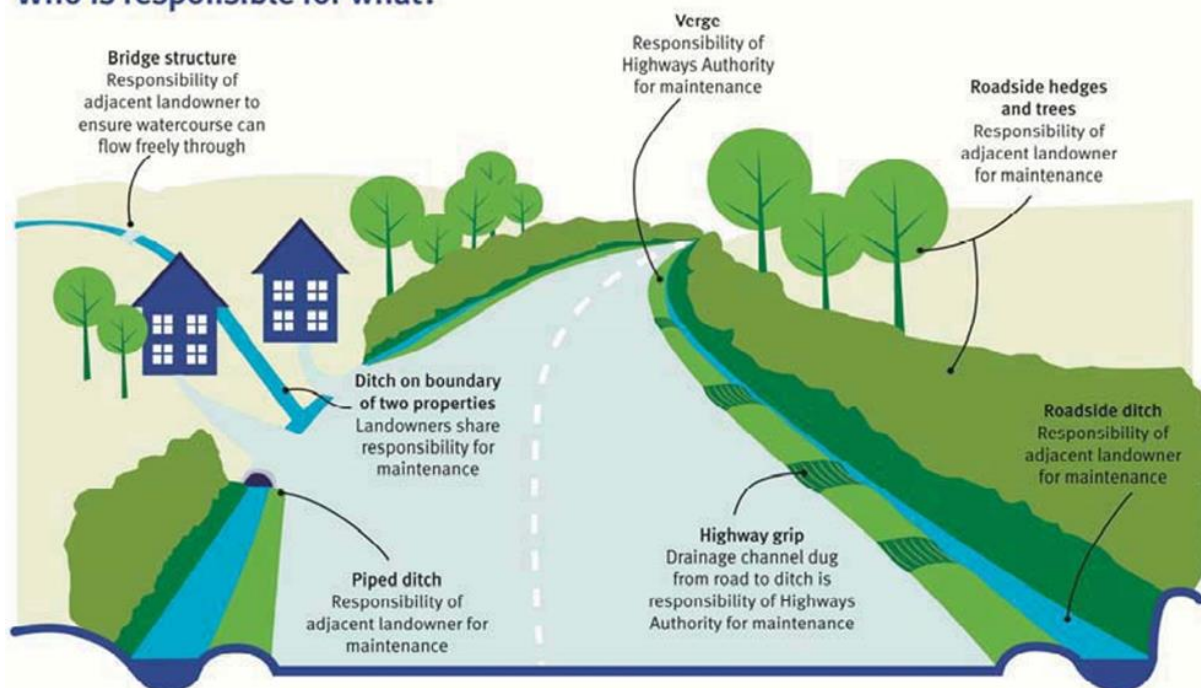


Fig 4.1: Image showing who is responsible for various assets alongside a typical highway

Digital drainage data is being collected and constantly updated by Devon County Council.

Drainage Asset Type	No. Assets
Ditches - Ditches on land near the highway help to carry water from the road (often from grips or gullies) into water courses. Typically, responsibility for maintaining ditches and easements sits with the local landowner (riparian owner) and not the Council, however the Council as the highway authority may contact local landowners to request ditch clearances	22,487
Grip - In rural areas the carriageway is generally drained by 'grips' cut into the verge which feed water into ditches. Grips are damaged from the passing of vehicles and filled in with silt and detritus during the year so an annual programme of re-establishing or re-cutting grips is undertaken to maintain their effectiveness. The amount of grip cutting is dependent on available resources and governed by the Council's Siding & Watertabling Policy .	19,765
Small Culvert – Culverts allow the movement of water underneath the road from springs, run-off, small streams, and seepage; as well as to assist in connecting ditches to water courses. Asset inventory data for culverts less than 1.5 metres in diameter is currently not held. Culverts larger than 1.5 metres in size are considered structures, unless it is a corrugated steel pipe then it is 0.9 metres and have been captured as part of the structures inventory. Little is known about the location or	Currently not recorded

Drainage Asset Type	No. Assets
condition of culverts and piped drainage runs under the road network. This asset is generally managed on a reactive basis although some known flooding hotspots receive regular jetting or gulley cleansing routine maintenance. Where resurfacing schemes are planned, drainage will be looked at and replacement or repair considered as part of the capital works.	
Catchpit / Interceptor - Often where a highway drainage system outflows into a natural watercourse a catchpit will be installed to remove grits, silts and excess sediment. Catchpits and associated pipes are cleaned on a reactive basis.	2,294
Channels/Swales - open drainage channels to receive and convey water discharging from the highways.	1,384
Manhole/chambers – mainly for inspections and maintenance.	81,988
Gullies - Gullies are the main asset drainage feature used to remove water from the road, so the frequency of inspection, cleansing and repair is critical to the safe operation of the network. Gullies on the main roads (the salting network) and all rural roads are cleansed on an annual basis to clear the build-up of any detritus or silt. Gullies on all other minor urban routes are cleaned on a 3-year cycle. Some gullies in known flooding hot spots are cleaned at enhanced frequencies	208,631
Buddle holes – Holes or pipes that carries water through a hedge or bank as part of road drainage system.	2,637
Easement – small openings on the side of the road to take water off the highway.	38,432
Ponds/attenuation Basins etc. – Stores runoff water during extreme rainfall events during peak flows and releasing it at a controlled rate during and after the peak flow as passed. Soakaways (including infiltration basins, below ground crated systems etc.)	Currently not recorded
SUDS- Sustainable Drainage Systems- manage surface water on, or as is practicably close to, the ground surface, in a way that mimics natural hydrological processes. Managing surface water in this way controls the rate and quantity of surface water runoff, improves its quality, and provides visual amenity and biodiversity benefits. Generally, the use of a variety of above-ground SUDS components, which manage rainfall close to where it falls, provide the greatest environmental benefits, and can cost less than traditional piped systems. Below is a link to Devon County Council’s guidance for	Currently not recorded

Drainage Asset Type	No. Assets
SUDS: https://www.devon.gov.uk/floodriskmanagement/document/sustainable-drainage-system-guidance-for-devon/#3-what-are-suds .	

Fig. 4.2: Number of different highway drainage assets

3 Performance

The establishment of an effective regime of inspection, assessment and monitoring of asset condition is an essential component of an effective asset plan. The inspection types and condition assessment methods featured below are based on the national code of practice 'Well-managed Highway Infrastructure 2016.

Inspections are particularly important in the case of network safety where information may be crucial in respect to legal actions. A robust inspection regime therefore forms part of the County Council's defence against claims and legal proceedings.

3.1 Safety Inspections

Safety inspections are undertaken to meet the key objective of Network Safety and they form a key aspect of the authority's strategy for managing liabilities and risks. They are used to identify defects likely to be hazardous or cause serious inconvenience to users of the highway network or the communities served, including defects requiring urgent attention and the appropriate response is determined using a risk-based approach.

The [Highway Safety Policy](#) details how safety inspections are undertaken, the frequency of inspection, investigatory criteria and required response period to an actionable defect. Relevant defects such as standing water, broken or missing ironwork and cracks or gaps are identified. Treatments and Response Times are listed in the Highway Safety Policy.

3.2 Serviceability Inspections

As part of cleansing programmes gully, grips, easement and buddle holes are inspected for function and condition.

When the Council carries out planned maintenance activities and major schemes on the highways, it inspects, cleans, and carries out repairs or replacement of drainage assets where necessary.

3.3 Performance Management

There are two key performance indicators which capture gully emptying and Grips, buddle holes and easements cleaning efficiency.

There are regular cyclic maintenance improvement meetings to monitor performance and asset condition.

4 Maintenance Strategy

4.1 Creation of a new asset

New highway drainage assets are added in several ways. These include:

- When new highway infrastructures such as carriageways, footways, or cycleways are created,
- As part of development works (both under sections 38 and 278 of the Highway Acts 1980) or major housing developments,
- Created in response frequent flooding events or in response to local service needs,
- As part of a Local Asset and Capital Programmes (LACP) scheme to alleviate recurring defects or problems on the highway,
- Under major structural schemes, and
- Work undertaken by the Flood risk team.

4.2 Routine maintenance

Routine maintenance such as gully cleansing is carried out in accordance with our [Gully Cleaning Policy](#).

- Urban gullies with sumps on the Priority Network shall be emptied and recharged to flush the system a minimum of once per year,
- Urban gullies without sumps on the Priority Network be flushed through to check they are functioning correctly a minimum of once per year,
- Urban gullies with sumps on other roads shall be emptied and recharged to flush the system a minimum of once every three years,
- Urban gullies without sumps on other roads shall be flushed through to check they are functioning correctly a minimum of once every three years,
- Rural gullies with sumps shall be emptied and recharged to flush the system a minimum of once per year, and
- Rural gullies without sumps shall be flushed through to check they are functioning correctly a minimum of once per year.

Where it has been assessed that a gully requires more frequent cleansing the frequency shall be increased. Examples of this are gullies in areas where flooding would affect buildings or known to flood the highway.

We aim to clean other drainage assets on an annual basis as follows:

- Grips, buddle holes, and easements annually, or prior to LACP schemes or major surfacing works.

Ditches along the side of the road are the responsibility of whoever owns the land on which they are situated and should be maintained in order to keep the ditch capable of carrying water away from the road. The council therefore clean on “as needs” basis.

Knowing where drainage assets are and how many of each type is helpful as we can programme maintenance activities on a cyclical basis. This provides assurance that these assets are inspected and in good working order. Cleaning or cleansing activities are usually all that is required but if further defects exist these can be captured as part of the cyclic operation. Highway users can view the following website to discover when a gully was last cleansed and the maintenance frequency for the next cleanse [here](#).

However, a proactive cleansing regime can only go so far and with budget pressures the frequency of cleansing is a challenge to maintain. Drainage assets operate in a dynamic environment and individual assets can suddenly be overwhelmed by weather events. A reactive approach is also needed to ensure flooded roads and surface water issues are managed appropriately. Public knowledge is crucial to keeping the network available in such circumstances. Highway users can use the website above to report a blocked drain or a flooded road:

The website also provides details of the current level of service that Devon Highways will respond to and enables users to report on a map-based system which also shows if others have reported a particular fault.

Additional cleaning and minor repairs to drainage assets may be carried out following complaints, flooding, claims or in known problem locations as identified by local teams.

4.3 Renewal or replacement

Repair or renewal of drainage assets are carried as part of planned schemes:

- As part of major structural or drainage scheme,
- As part of LACP schemes,
- As part of other resurfacing schemes,
- From safety inspection reports (routine and reactive),
- Complaints, claims and reported frequently flooding locations, and
- winter maintenance reports of flooding and ice formation on roads.

4.4 Decommissioning of the asset

Not done, except when highway is redundant as part of an improvement scheme.

4.5 Maintenance Service Standards

Maintenance Service Standards were developed which define the service of provision for each asset type based on three levels: Safety, Safety and Serviceability or Safety, Serviceability and Sustainability. These are defined in terms of what a road user could expect to see. This is useful in understanding the level of service in the context of what is affordable.

As pressures on budgets continue and become more restrictive, the ability of the Council to provide a service above that of safety is going to be severely impacted.

The tables below show the maintenance standards for Drainage on each road category.

Drainage (Gullies)	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability, and sustainability issues
What a road user would see	Gully may be blocked or overgrown. Grating and frame may be damaged and sunken.	Gullies working most of the time. Grating and frame condition may be poor.	Most gullies working particularly in high-risk areas. Grating and frames in satisfactory order.	Gully seldom not working. Grating and frame in good condition and set just below the road surface.
Maintenance standards and activities.	Some reactive cleansing in response to water flooding. No condition assessment.	Very limited routine cleansing in response to water flooding. Restricted scheduled inspection to ascertain condition and repair defects likely to impact on gully performance. Priority given to high-risk areas.	Limited routine cleansing in response to water flooding. Limited reactive inspection in response to flood warnings on designated routes. Limited routine scheduled inspection to ascertain condition & repair defects likely to impact on gully performance. Priority given to high and intermediate risk areas.	Routine cleansing in response to water flooding. Proactive inspection in response to flood warnings. Routine scheduled inspection to ascertain condition & repair defects likely to impact on gully performance. Extended programmes of maintenance undertaken to optimise future condition and to reduce backlog of maintenance requirements.

Drainage (Gullies)	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability, and sustainability issues
Impact	Impact - Likely failure of systems resulting in surface water. Increased likelihood of claims.	Impact - Some flooding and surface water Limited priority and investment. Limited mitigation of claims.	Impact - Some flooding and surface water Limited condition assessment enabling structured prioritised investment. Reduced mitigation of claims.	Impact - Occasional flooding and surface water Increased inspection frequency on wider network. Condition assessment enables for investment. Mitigation of claims and increased response to customer requests.

Fig. 4.3: Maintenance Standards for Drainage

Carriageway Hierarchy	Service Level
3 Rural	Green
4 Rural	Green
5 Rural	Yellow
6 Rural	Yellow
7 Rural	Brown
8 Rural	Brown
9 Rural	Brown
10 Rural	Red
11 Rural	Red

Carriageway Hierarchy	Service Level
3 Urban	Green
4 Urban	Green
5 Urban	Yellow
6 Urban	Yellow
7 Urban	Brown
8 Urban	Brown
9 Urban	Brown
10 Urban	Brown
11 Urban	Brown

Maintenance Standard 1	Provision of Safety, Serviceability and Sustainability
Maintenance Standard 2	Provision of Safety and intermediate level of Serviceability
Maintenance Standard 3	Provision of Safety and minimal level of Serviceability
Maintenance Standard 4	Provision of Safety only

Fig. 4.4: Maintenance Standards for Drainage for each Road Category

5 Levels of Service and Investment Strategy

5.1 Levels of Service

Current level of service, informed by condition assessments if available, against the stated Levels of Service in the Plan, funding and Risk assessments.

Levels of Service demonstrate the relationship between the Council's corporate objectives, including the Strategic Plan for 2021 - 2025, and the performance of highway assets in terms of stakeholder requirements. The Levels of Service represent the fundamental service aimed at helping to deliver a road network which is as safe, reliable and as fit for purpose as possible within the current funding and resource constraints. Table 4.6 is an extract from the Strategy and shows the Levels of Service measures for Drainage along with an indication of how they relate to the Council's Levels of Service Statements.

Service	Measure	Responding to the climate emergency	Be ambitious for children and young people	Support sustainable economic recovery	Tackle poverty and inequality	Improve health and wellbeing	Help communities to be safe, connected and resilient
Drainage	Investigate reports of highway flooding and damaged or blocked highway drains and take appropriate measures to keep water off the highway, alleviate or mitigate flooding as appropriate.	✓		✓	✓		✓
	Prepare a cyclical programme of gully cleansing.	✓		✓	✓		✓
	Jet drainage systems on a reactive basis as they are reported or found through inspection.	✓		✓			✓
	Carry out an annual programme of grip cleaning and cutting.	✓		✓			✓

Fig. 4.5: Levels of Service for Drainage

5.2 Investment Strategy

It is challenging to determine the level of funding required to maintain the drainage assets. Each year there is a planned cyclic approach to inspect and cleanse road

gullies, and other drainage features. This is funded through the revenue budget. Provision is also made to address defects identified with drainage assets by ensuring drainage jettors and minor works gangs are available throughout the year. Regrettably the funding available is insufficient to address all defects, such as road ploughing, blocked drains, broken and stuck gully covers, so such repairs are prioritised on a local basis.

Demands for drainage improvement works such as renewal of drains or improved drainage systems are funded from the capital programme. Repairs of this nature are largely integrated with road surface and footway needs and the overall investment is determined by the level of funding available and the overall quantity and condition of roads in each local area.

6 Programme Development

6.1 Identifying Schemes for an Initial Works Programme

Locations requiring renewal or new drainage assets are identified through highway inspections/observations, where an issue could arise/ occur resulting in highway flooding and possible structural damage. Locations where historical highway flooding or ponding on the road occurs, or where excessive surface water flows in the channels.

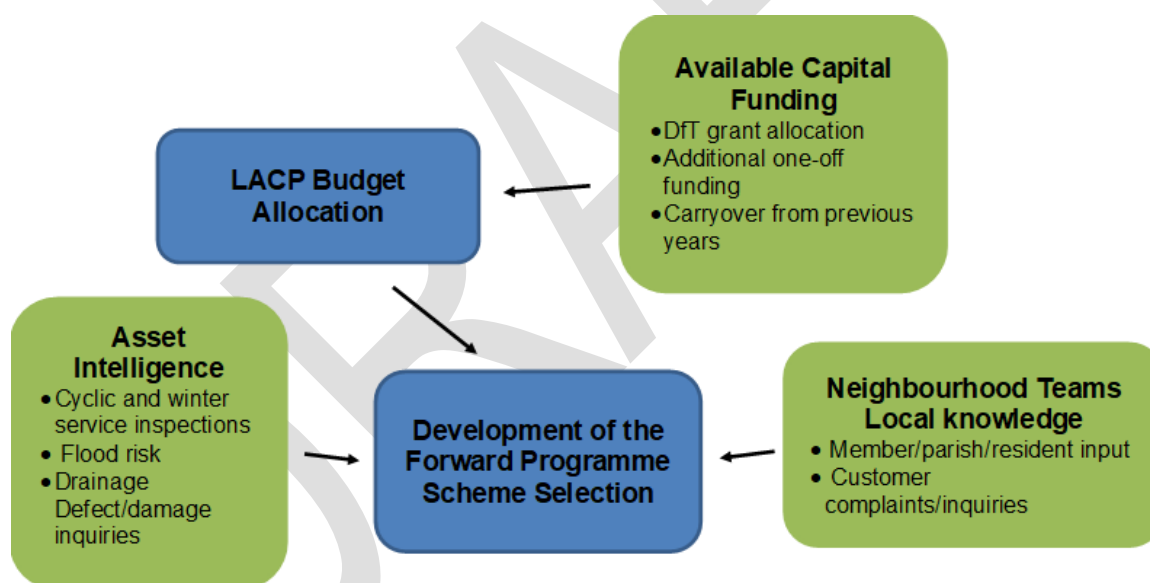


Fig.4.6: Identifying Schemes for an Initial Works Programme

6.2 Selecting and Optimising Schemes for the Forward Programme

Highway drainage improvement schemes are selected for Local Asset Capital Programmes (LACP) using the following guidance:

- Where highway surface water is contributing to residential or commercial property flooding,
- Where flooding or ponding on the highway is presenting a hazard to road users,
- Where seepage or water crossing the highway on bends and gradients is liable to cause aquaplaning or formation of ice,
- To eliminate damage to the highway surface requiring immediate works,

- Cyclic maintenance of drainage assets, and
- From highway inspections where defects are identified.

7 Risks

The greatest challenge is funding, understanding the implications of under investments on the overall condition of our drainage assets. Reduced maintenance standards impact the ability of the assets to function correctly which can accelerate deterioration of road and footway surfaces.

Capability of current drainage assets to cope with increased extreme weather events.

Increased run-off caused by changes in land use.

The likely consequences that we can expect are:

- Increase in the likelihood of flooding incidents on the highway,
- Increased risk of flooding & damage to properties and highway assets,
- Increased risk of embankment damage caused by drainage assets not functioning correctly,
- Increase in the cost of cleaning gullies, drainage systems and maintaining roads due to increased erosion and damage from water, and
- Roads being temporarily closed more frequently due to flooding, and for maintenance work to be undertaken, leading to negative economic and reputational impacts for the people of Devon and the Council.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Drainage asset management objectives are achieved are:

- Improve and increase asset data collection to better inform decisions for maintenance, and LACP capital investments i.e., frequency of cleansing of Gullies, Grips, Easements and Buddleholes,
- Develop a more targeted risk-based maintenance regime, clean problem gullies before storm events, understand cost of delivering effective maintenance policy and programmes,
- Review training needs to upskill our staff in designing and delivery of drainage schemes, and managing defective drainage assets, and
- Improve collaboration with the Flood Risk Teams and other stakeholders in Devon.

Annex 5 – Fences and Barriers

1	Introduction	1
2	Inventory	1
3	Performance	2
3.1	Boundary Fences, Environmental Barriers and Pedestrian Guardrails.	2
3.2	Road Restraint Systems.....	2
4	Maintenance Strategy	2
4.1	Boundary Fences, Environmental Barriers and Pedestrian Guardrails.	2
	Creation of a new asset.....	2
	Routine maintenance.....	2
	Renewal or replacement.....	2
	Decommissioning of the asset.....	3
4.2	Road Restraint Systems.....	3
	Creation of a new asset.....	3
	Routine maintenance.....	4
	Renewal or replacement.....	4
	Decommissioning of the asset.....	6
	Maintenance Service Standards.....	6
5	Levels of Service and Investment Strategy.....	8
5.1	Levels of service.....	8
5.2	Investment strategy	9
6	Programme Development	9
6.1	Identifying Schemes for an Initial Works Programme	9
6.2	Prioritising the Works Programme	9
7	Risks	9
8	Improvement Actions	10

Version Control		
Version	Date	Summary of Changes
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1 Introduction

This Annex considers the management of Safety Fences, Boundary Fences and Environmental Barriers. These shall all be inspected for integrity as part of the general highway safety inspection programme for carriageway, footways and cycleways.

Road Restraint Systems (RRS) are safety fences that require a more comprehensive inspection strategy as their purpose is to prevent the number and severity of injuries in the event that a vehicle leaves the road and would otherwise encounter a hazardous feature. Self-evidently in protecting a vehicle's occupants, a RRS also protects against damage to any highway asset located behind the system.

UKRLG in conjunction with the DfT have provided Design and Maintenance Guidance for use of RRS on local authority roads. [Design and Maintenance Guidance \(ciht.org.uk\)](https://www.ciht.org.uk) This Guidance Document provides the outline of an appraisal process to help authorities decide when a RRS is justified. This appraisal takes account of the many diverse influencing factors including risk assessment, alternative solutions, system feasibility, cost benefit analysis and the availability of funding. Road Restraint Systems are sub-divided into Vehicle Restraint Systems (VRS's) and Pedestrian Restraint Systems (PRS's).

Pedestrian guard-railing is a safety fence aimed at improving pedestrian safety by trying to prevent pedestrians from crossing the road at an inappropriate place or from straying into the road inadvertently. Guard-railing can also be used to offer some protection to pedestrians at locations where the swept path of large vehicles, such as buses and heavy goods vehicles, takes the vehicles close to the footway, sometimes overhanging it. The DfT has provided guidance in Local Transport Note 2/09 Pedestrian Guard-railing

2 Inventory

To proactively maintain the asset into the future, we will continue to build a comprehensive inventory and good understanding of condition, including the associated risks that come with failure. This will enable us to undertake assessment and to prioritise programmes of preventative maintenance, whilst monitoring and reviewing performance.

Ideally the asset register would hold information on all individual assets and include type, length, material type, age, speed limit, last inspection. Although we have some of this data for some fences and barriers there are many omissions and much of the information has not recently been verified. It is recognised that a large number of Boundary Fences are the maintenance responsibility of private landowners.

As the current maintenance strategy for Boundary Fences, Environmental Barriers and Pedestrian Guard-railing is limited to a reactive response to safety inspection concerns, improving this inventory data will remain a low priority for the service.

However, the maintenance strategy for Road Restraint Systems includes a risk-based service inspection and annual planned renewal and replacement. Consequently, inventory data on location, type and condition of these assets is much more critical.

Inventory plans have been recorded showing the system and terminal types and location of all Vehicle Restraint Systems on the Major Road Network (including overbridges), all road / rail incursion sites, all Trunk and Motorway overbridges and remaining maintenance category 3's to 6's. This data is also available within the highway asset inventory register

3 Performance

3.1 Boundary Fences, Environmental Barriers and Pedestrian Guardrails.

Routine serviceability inspections are not undertaken on these assets, so there is limited information on current condition. However, the safety inspections process will identify any defects that will render a fence or barrier dangerous. In such circumstances, the defect will be repaired, or made safe whilst a repair is arranged. Where defects result from accident damage, the Council will aim to recover costs from responsible third parties.

3.2 Road Restraint Systems.

Damage and defects are captured through safety inspection or following road crashes. Each year this results in approximately 40 repairs countywide with 75% affecting systems on the Major Road Network.

A risk-based inspection and repair regime has been developed and over the last 8 years, successive annual programmes of work have been targeted to identify and improve the performance of these systems. A specialist contractor has been engaged to inspect all main roads (maintenance category 3-6). Repairs are prioritised following a risk-based approach with all high-speed roads and road/rail incursion renewals completed as a priority.

4 Maintenance Strategy

How the asset is managed in each stage of the life cycle.

4.1 Boundary Fences, Environmental Barriers and Pedestrian Guardrails.

Creation of a new asset

These assets are created in association with highway improvement schemes or new developments. As with the creation of other highway assets it is important that consideration is given not just to their necessity but also the quality, durability and routine maintenance needs of the materials selected.

Routine maintenance

As there is currently no serviceability inspection regime, routine maintenance is rarely undertaken. Where treatment is identified by road users for aesthetic reasons, e.g. painting railings, communities are encouraged to use self-help initiatives to address this.

Renewal or replacement

Fences and barriers are renewed and replaced as necessary when identified by safety inspection or by crash knockdowns. Where possible, costs associated with vehicle damage are recovered from insurers. Consideration should be given to the necessity of replacement and renewal, how the asset has failed. Material selection is influenced by whole life cost and carbon usage.

Decommissioning of the asset

It would be unusual for fences or barriers to be removed unless they required replacement. However, as technical standards and the highway environment are subject to change, consideration should be given to bulk removal using the Minor Scheme Assessment (MSSA) process where replacement of a damaged section of barrier is deemed unnecessary.

4.2 Road Restraint Systems

Creation of a new asset

A United Kingdom Roads Liaison Group (UKRLG) Guidance Document has been prepared for use by highway authorities and their designers considering the introduction or replacement of RRSs on local roads [Design and Maintenance Guidance \(ciht.org.uk\)](https://www.ciht.org.uk). It describes a process to assist highway authority decision making with regards to investing in a RRS at a particular site. It includes the necessary supporting information to assist this process and takes account of risk, risk assessment methods, costs, benefits as well as further advice on performance specification and outline design.

The Guidance recognises that any RRS has an inherent element of risk and that this risk has to be balanced by the benefit of mitigating the severity of any accident at an affordable cost.

This Guidance Document applies to:

- New roads (and the adoption of roads),
- Road improvements e.g. widening, junction improvements,
- Where a new hazard is introduced, or an existing roadside feature is altered e.g. the addition of roadside features,
- Where the upgrade or replacement of a parapet is being considered,
- Maintenance schemes where a significant length of RRS is being replaced, and
- When the safety performance of a particular site has been questioned and risk reduction options are being assessed.

Speed Limit > 50mph	This Guidance	RRRAP CD 377
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Speed Limit <50mph	This Guidance	This Guidance
	< 5000 Average August Daily Traffic	> 5000 Average August Daily Traffic

Fig. 5.1: Applicable method for determining when an RRS is required.

Where traffic volumes exceed 5000 vehicle per day and speed limits exceed 50mph, the 'Road Restraint Risk Assessment Process (RRRAP)' which forms part of CD 377, Design Manual for Roads and Bridges will be used to enable the designer to determine at each specific site, the need for a vehicle restraint system and its performance requirements.

Routine maintenance

The design and selection of VRS solutions may mean that periodic maintenance should be undertaken, for example, re-tensioning corrugated beams at a given frequency. Specialist inspections enable the development of a routine maintenance regime. Currently such an approach is undertaken on the Major Road Network every 2 years. Further consideration should be given to extending a risk-based inspection process to identify routine maintenance for RRS systems on other road categories.

Renewal or replacement

A risk-based approach has been undertaken to systematically inspect and repair RRS over the last 8 years. Details are shown in the following table:

Priority No.	Criteria and location
1	1A - High risk sites A380/A361/A39 1B - Principal road timber post 1C - Review of road/rail high risk sites 1D - Timber post systems over motorway/trunk road network over bridges
2	Inspect all A road rail over bridge and adjacent rail systems and repair where necessary.
3	Inspect all remaining road rail over bridge and adjacent rail systems and repair where necessary.
4	Inspect all dual carriageway central reservation barriers and repair where necessary.
5	Inspect all m/c 3 high risk sites based on accident severity, commercial traffic data, speed limit and section type and repair where necessary.
6	Inspect all m/c 4 high risk sites based on accident severity, commercial traffic data, speed limit and section type and repair where necessary.
7	Inspect all remaining trunk road over bridge sites and repair where necessary.
8	Inspect all m/c 5 high risk sites based on accident severity, commercial traffic data, speed limit and section type and repair where necessary.
9	Inspect all m/c 6 high risk sites based on accident severity, commercial traffic data, speed limit and section type and repair where necessary.

Fig. 5.2: Table showing risk-based priority for RRS renewal or replacement.

This is a long-term inspection cycle that spans numerous years. Each year, a planned works programme is generated from this and other data sources such as road collisions and safety inspections.

An updated risk-based serviceability inspection is being developed for inclusion within the forthcoming maintenance contract. A scoring system will be used to assess condition and provide indicative repair timeframes.

In addition, the Council has implemented a joint process with Network Rail to demonstrate that they have ranked sites where roads cross or run alongside railways according to their relative risk and that they have considered how to manage that risk.

Annex 5 – Fences and Barriers

The Highway Authority also consider a bridge vulnerability scoring matrix in prioritising planned Road Restraint System upgrades.

Road Restraint Systems are repaired as necessary when identified by safety inspection or by crash knockdowns. Where possible, costs associated with vehicle damage are recovered.

Scheme design considers the accident risk, whole life cost, carbon usage in production, and future replacement strategy. For instance, the inclusion of sockets has proved highly effective in the rapid replacement of knockdowns, minimising temporary traffic costs and reducing traffic delays on busier sections of the main road network.

Decommissioning of the asset

Removal of Road restraint Systems can occur from time to time. This could result from reduction or removal of risk. For example, the introduction of passive road signage or a reduction in speed limit or by other Highway Engineering options at our disposal. Before proposing the installation of a replacement RRS the designer should consider either removing the hazard or reducing the hazard to an acceptable level

All timber posts (which are no longer used) are disposed of to a licensed tip (as a result of possible contaminants i.e. creosol), all steel materials such as posts, beams and fixtures are recycled.

Maintenance Service Standards

Maintenance Service Standards were developed which define the service of provision for each asset type based on three levels: Safety, Safety and Serviceability or Safety, Serviceability and Sustainability. These are defined in terms of what a road user could expect to see. This is useful in understanding the maintenance standard in the context of what is affordable.

As pressures on budgets continue and become more restrictive, the ability of the Council to provide a service above that of safety is going to be severely impacted.

The tables below show the maintenance standards for Fences and Barriers on each road category.

Carriageway Hierarchy	Service Level
3	Yellow
4	Yellow
5	Yellow
6	Yellow
7-10	Orange
11+	Red

Footway Hierarchy	Service Level
1	Orange
2	Orange
3	Orange
4	Orange

Key

Maintenance Standard 1	Provision of Safety, Serviceability and Sustainability
Maintenance Standard 2	Provision of Safety and intermediate level of Serviceability

Annex 5 – Fences and Barriers

Maintenance Standard 3	Provision of Safety and minimal level of Serviceability
Maintenance Standard 4	Provision of Safety only

Fig. 5.3: Maintenance Standards for Fences and Barriers for each Road Category

Fences & barriers	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability, and sustainability issues
What a road user would see	Fencing, Barriers, Pedestrian Guardrail and Vehicle Restraint Systems safe and looking untidy.	Fencing, Barriers and Pedestrian Guardrail safe and Vehicle Restraint Systems safe and in fair order	Fencing, Barriers and Pedestrian Guardrail safe and Vehicle Restraint Systems safe and in good order	All fences, barriers pedestrian guardrails and Vehicle Restraint Systems in good order.
Maintenance standards and activities	Undertake safety inspections and react to defects that represent an immediate or imminent hazard.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Limited routine maintenance based on hierarchy.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Risk-based service and specialist inspection prioritising condition led scheduled routine maintenance based on hierarchy.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Service & specialist inspections of Vehicle Restraint Systems and development of a risk-based programme for renewal/removal based on fit for purpose and condition analysis.

Fences & barriers	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability, and sustainability issues
Impact	No condition assessment to assess whether fit for purpose leading to increased possibility of failure and potential claims.	Limited programme of renewal/removal based on risk rating Some improvement to asset reducing the likelihood of failure and reducing claim potential	Limited programme of renewal/removal based on risk rating. General improvement to asset reducing the likelihood of failure and reducing claim potential	Improvement to asset reducing the likelihood of failure and minimising claim potential.

Fig. 5.4: Maintenance Standards for Fences and Barriers

5 Levels of Service and Investment Strategy

5.1 Levels of service

Levels of Service demonstrate the relationship between the Council’s corporate objectives, including the Strategic Plan for 2021 - 2025, and the performance of highway structures assets in terms of stakeholder requirements. The Levels of Service represent the fundamental service aimed at helping to deliver a road network which is as safe, reliable and as fit for purpose as possible within the current funding and resource constraints. Table 5.5 is an extract from the Strategy and shows the Levels of Service measures for Safety Fencing along with an indication of how they relate to the Council’s Levels of Service Statements.

Asset	Service	Measure	Responding to the climate emergency	Be ambitious for children and young people	Support sustainable economic recovery	Tackle poverty and inequality	Improve health and wellbeing	Help communities to be safe, connected and resilient
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Safety Fencing	Vehicle restraint systems, Guardrail, Fences	Assess safety fences when they are knocked down or damaged and repair, replace or remove as required.	✓						✓
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Fig. 5.5: Levels of Service for Safety Fencing

5.2 Investment strategy

There is currently no investment strategy in place for the renewal of Boundary Fences, Environmental Barriers and Pedestrian Guardrails due to the limited financial resource available.

The risk-based approach to replacement and renewal of Vehicle Restraint Systems is funded annually through the capital programme. The allocation is currently based on historical needs.

6 Programme Development

6.1 Identifying Schemes for an Initial Works Programme

Damaged and defective Boundary Fences, Environmental barriers and Pedestrian Guardrails are identified through safety inspection or by reported RTC's. These are forwarded to the Council's delivery team to progress with the necessary works which are carried out through their approved Fencing Contractors and/or Term Maintenance Contractor.

Damaged and defective Road Restraint Systems are also identified through safety inspection or by reported RTC's. In addition, condition surveys have been completed on all main roads (maintenance Category 3-6). This process considers the appropriateness of the current safety system. These locations receive a specialist serviceability inspection and where appropriate, programmes of maintenance, repair or replacement are designed by a specialist.

6.2 Prioritising the Works Programme

The programme of works follows a risk-based process prioritising high speed, high traffic roads and road /rail hazards.

7 Risks

Issues which may prevent asset management objectives being achieved:

- Financial risk – safety or specialist inspections may identify a demand for repair or renewal over and above the financial provision available,
- Availability of materials – programme delay could occur due to material shortages, particularly associated with steel production or importation, and
- Design lead-in time – Establishing ownership or responsibility and identifying an appropriate technical solution for each scheme may result in delay of implementation.

In all the above circumstances, works prioritisation and measures such as temporary traffic management and temporary speed limits may need to be implemented.

It is important to regularly review opportunity for removal of barriers that are no longer required, particularly with the financial cost and carbon production associated with continued maintenance.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Fences and Barriers asset management objectives are achieved are:

- Re-tensioning programme - an identified routine programme of RRS should be identified, risk-rated and funding provision secured,
- An RRS Capital Investment strategy should be developed by need and priority,
- Review of existing RRS risk-based approach. Consider use of scoring matrix to determine inspection priority and frequency and planned work programme. Consider Benchmarking and comparison with neighbouring authorities,
- Consideration of risk-rated temporary measures where repair works cannot be addressed due to funding, and
- RRS Inventory needs to be consistently monitored/updated to support routine maintenance, specialist inspection regime and investment strategy.

Annex 6 – Trees and Soft Landscape

1	Introduction	1
1.1	Trees	1
1.2	Soft Landscape	1
2	Inventory	1
2.1	Trees	1
2.2	Soft Landscape	2
3	Performance	3
3.1	Trees	3
3.2	Soft Landscape	4
4	Maintenance Strategy	5
4.1	Creation of a new asset.....	5
	Trees	5
	Soft Landscape	5
4.2	Routine maintenance.....	6
	Trees	6
	Soft Landscape	6
4.3	Renewal or replacement.....	7
	Trees	7
	Soft Landscape	7
4.4	Decommissioning of the asset.....	7
	Trees	7
	Soft Landscape	8
4.5	Maintenance Service Standards.....	9
5	Levels of Service and Investment Strategy.....	14
	Investment Strategy for Trees and Soft Landscape	14
6	Programme Development	14
6.1	Identifying Schemes for an Initial Works Programme	14
7	Risks	15
7.1	Climate change	15
7.2	Funding	15
7.3	Pests and Diseases.....	15
7.4	Invasive plants and injurious weeds	15
7.5	Third-party trees and vegetation.....	16
8	Improvement Actions	16

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DRAFT

1 Introduction

1.1 Trees

Trees are some of the biggest plants and the longest living species on the planet. Aside from their physical presence and the impact they have on our landscape, trees provide the following ecosystem services:

- They improve air quality by removing pollutants,
- They sequester and store carbon,
- They reduce flooding and surface water runoff and protect soil from erosion,
- They provide shade and regulate temperature in hot weather,
- They promote biodiversity by harbouring plants and wildlife, and
- They improve the aesthetic quality and provide less tangible benefits to health and wellbeing.

Some sources claim that trees can also reduce crime rates, enhance property values and reduce energy costs. Many of the benefits that trees offer increase with age, so it is important that they are looked after and reach maturity.

The Council works closely with central government, other organisations and neighbouring authorities on strategies and initiatives for the management of trees. The Council has a Tree Board that meets quarterly and provides governance to the management of trees in Devon. It oversees the activities around trees that affect the Council's Highways and Premises.

1.2 Soft Landscape

Road verges are often overlooked and undervalued. They are sanctuaries for wildflowers, pollinating insects, reptiles, amphibians and small mammals. They also provide essential green corridors which these species use to disperse. Furthermore, for many people, wildflowers on our roadside verges contribute greatly to their feeling of wellbeing. Some verges have been designated as Special Verges due to their exceptional wildlife value or their value to communities.

Roadside hedges in Devon are a unique part of the landscape. Evolved over many years for agriculture, they are now valued for their ecological, historical and amenity importance. As well as providing a dense wildlife habitat, hedges can prevent problems such as soil erosion.

Appropriate management of our roadside verges and hedges is essential. Without careful management, wildflowers on our road verges can be lost through too frequent cutting, or outcompeted by brambles, scrub and vigorous coarse grasses.

2 Inventory

2.1 Trees

The Council uses tree data from aerial imagery and remote sensing technology (Light Detection and Ranging or LiDAR) to create a tree inventory which is available on the Integrated Highways Management System (IHMS). Data has been collected on all trees over 3m in height within 20m of the Highway Maintainable at Public Expense (HMPE), and this has been processed to identify those trees that either overhang or are within falling distance of the HMPE. A screenshot from the IHMS showing a small sample of the highway tree dataset can be seen in Figure 6.1.

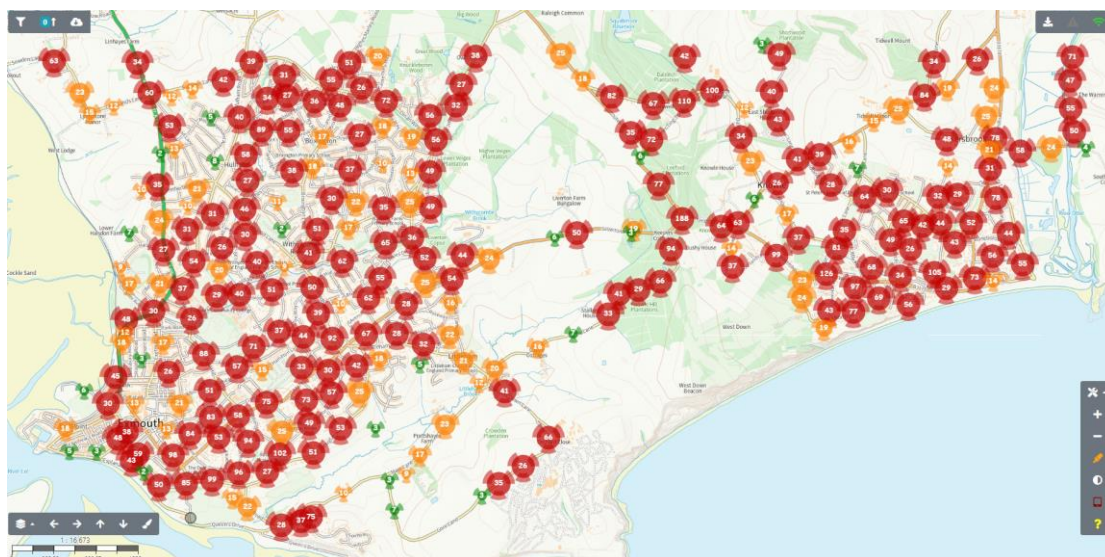


Fig. 6.1: Screenshot showing a sample of the Highway Tree Inventory

The Council defines a tree as having a diameter of 180mm or more at a height of 1.3m or more above ground level. Trees that are within falling distance of the highway are collectively termed 'Highway Trees'. Any tree between the highway limits (i.e. on HMPE) is considered to be a highway tree maintainable at public expense. Highway trees beyond the highway limits are private highway trees and are considered to be maintained by private landowners or the land occupier. This includes trees within hedges or hedge banks.

The Council is primarily responsible for highway trees maintainable at public expense and for ensuring that they present a tolerable risk to highway users and adjoining land users by becoming unstable, causing an obstruction, creating encroachment issues (e.g. trees growing too close to private property, roots causing damage to private property, or creating visibility issues). Some of the highway trees maintainable at public expense are street trees, which are trees on urban roads. These potentially present a higher target value because of their immediate proximity to pedestrians, parked vehicles and slower moving and or queuing traffic.

The landowner has a primary common law duty to take reasonable care of, and to ensure the safety of, all trees upon that private land. As a Highway Authority, the Council is specifically concerned with those private trees (private highway trees) that are within falling distance of the highway. Where the Council becomes aware of private highway trees, hedges or shrubs which are not safe, Section 154 of the Highways Act empowers the Council to deal, by notice, with any hedge, tree- or shrub growing on adjacent land which overhangs the highway and to recover costs.

2.2 Soft Landscape

There are approximately 2,000 hectares of roadside verge in Devon that are maintained by the Council. This excludes those verges which are owned and managed by National Highways (i.e. those on the M5, A30, A303, A35, and A38 trunk road).

Included within this area of maintained roadside verge in Devon are 126 Special Verges totalling approximately 39 hectares, each having its own specific survey and management requirements. All Special Verges have been designated by the

Council because of their exceptional wildlife value and or their value to communities. The location of special verges can be found at [Devon County Council's environmental viewer](#), under the Ecology/Geology tab. Survey and management information is available from nature@devon.gov.uk.

In addition, the Council also owns and maintains approximately 177 km of hedgerows across the county, as well as screen planting and formal planting such as on roundabouts.

3 Performance

3.1 Trees

The Council manages highway trees in accordance with its Tree Safety Management Policy and Procedures which describes the Council's responsibilities and approach to tree safety management.

Underpinning the Tree Safety Management Policy and Procedures is the risk-based Highways Tree Safety Management Procedure, which sets out how highway trees are managed by inspecting for safety defects and responding accordingly. More information on the inspection process can be found on the Council's webpages [here](#). Comprising our busiest and fastest roads, the maintenance category 3-5 network (typically our 'A' and 'B' roads) is routinely inspected by qualified Tree Inspectors, and receives scheduled checks undertaken during Highway Safety Inspections. This represents approximately 13% of the overall road network. Inspection of trees on the other 87% of the road network, which are the maintenance category 6-11 roads (i.e. minor roads), relies on scheduled checks carried out during Highway Safety Inspections (HSIs), in accordance with the [Highway Safety Policy](#). The public, and Highways staff, can also report on trees on all roads. These reports may result in the Council arranging an ad hoc check or expert ad hoc inspection, if necessary.

The Highways Tree Safety Management Procedure is managed by a dedicated Tree Safety Management team in the Council's Highway Services Team, who use specialist software to commission and oversee contractors appointed under the Council's Tree Management Framework contract to carry out inspections and surgery.

Reports are generated of the number of records from expert scheduled inspections and HSIs which gives an indication of the condition of trees in terms of safety defects reported. There is an ambition to provide a link in this Annex to an annual summary showing a comparison of the reports raised with previous years when it is available.

Moving forward, the Council intends to develop its understanding of the tree stock by evolving its inventory. For instance, the following opportunities are being considered:

- Capturing data on species, age and condition,
- Assessing the value of ecosystem services provided by highway trees (in terms of kg and £) with regard to carbon storage, carbon sequestration and pollution absorption,
- Identification of trees on maintenance category 6-12 roads for inclusion on the expert scheduled inspection route, and
- Identification of our veteran trees and community trees so they can be protected and cared for.

In 2022, the Council completed some restoration work to this thousand-year-old, iconic, ancient tree. The work was undertaken in close liaison with the Ancient Tree Forum and included some Halo release pruning to remove encroaching Beech trees that were smothering the Oak. A new prop was designed by the Structures Capital Maintenance team in the Council's Engineering Design Group. The original prop was bending and the last viable stem of the Oak was tearing out from the main stem and in danger of collapse. The prop was installed by a local Civil Engineering Contractor, with tree surgery and supervision by two Arboricultural Contractors on the Council's Tree Management Framework. The whole project was overseen and managed by the Council's Tree Officer. New epicormic growth is now forming on the tree and the project has been highly successful.

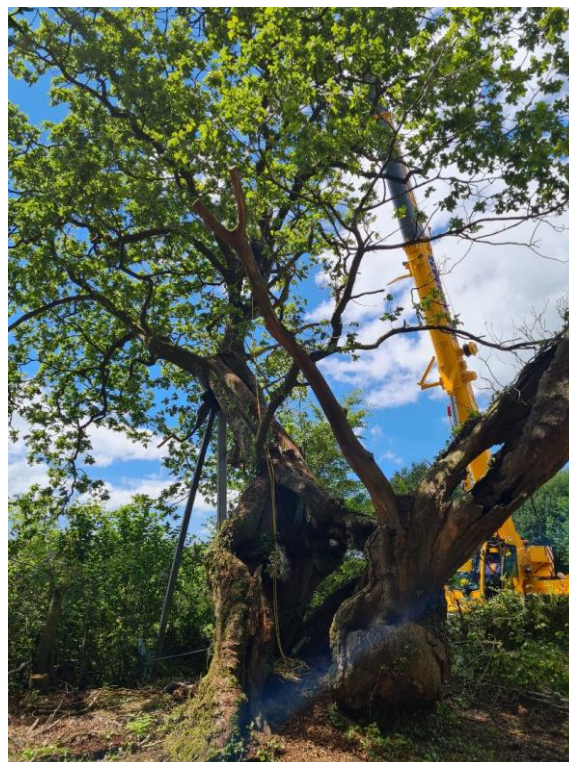


Fig. 6.2: Case Study – Ancient Tree Restoration ‘The Flitton Oak’.

3.2 Soft Landscape

Routine inspections are not undertaken on the Soft Landscape, so there is limited information on its current condition or performance in terms of biodiversity.

The Council is working with Exeter University on a project to understand the value of our Soft Landscape.

The Council's Grass Cutting Policy & Procedure describes the policy for achieving the specified objectives, which are:

- To maintain visibility areas / splays for highway users,
- To provide forward visibility to signs, and
- Community self-help to address local issues over and above the level of service will be encouraged.

In addition to the objectives stated in the Policy, there is an obligation to sustain essential landscape and ecological mitigation measures that have been secured on the Council's capital schemes through planning conditions and associated legal agreements. From November 2023, it will also be a mandatory requirement to have a 30-year commitment to sustain habitats/vegetation types created to deliver Biodiversity Net Gain.

Records are kept of reports from customers that are received of overgrown vegetation. They are maintained on a platform that allows the data to be visualised and interrogated to identify hotspots and trends. An image from the system showing reports of Overgrown Vegetation between 02 Apr 2021 and 31 Mar 2022 can be seen in Figure 6.3 below.

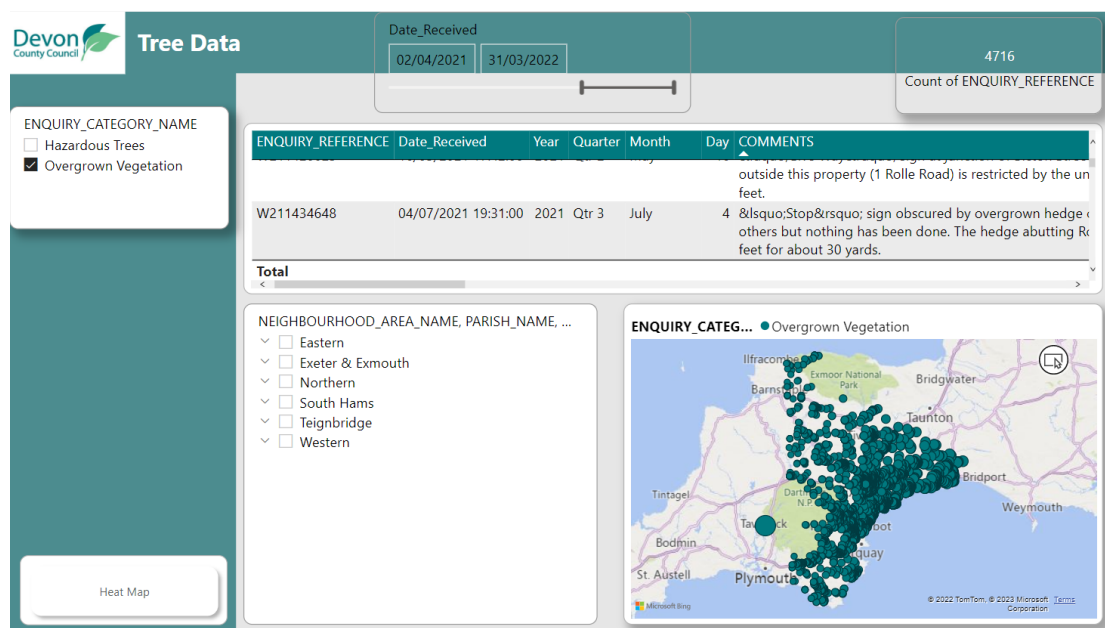


Fig. 6.3: Visualisation of Customer Reports

4 Maintenance Strategy

4.1 Creation of a new asset

Trees

Trees are added to the Highway Asset in several ways. These include:

- Planting as part of highway schemes with capital funding,
- Planting as part of development works (under both sections 38 and 278 of the Highways Acts 1980),
- Planting from Councillor's budgets,
- Acquisition of land containing existing trees for highway schemes, and
- Planting by the Council on land in its ownership sometimes with external grant funding, e.g. Tree Emergency Fund from the Wildlife Trust.

The Council is developing a Policy for the Replacement of Highway Trees. This will provide a framework and guidance for ensuring the species and location are carefully chosen to suit the local area, so that we get the right trees (i.e. type and quality is more important than overall number) and they do not become a problem to maintain.

The Council's Tree Officer is consulted by the Engineering Design Group (EDG) on planting proposals for highway schemes with capital funding and by Development Control during planning applications for development projects.

Soft Landscape

Soft landscape is added to the Highway Asset in two main ways. These are:

- As part of highway schemes with capital funding, and
- As part of development works (under both sections 38 and 278 of the Highways Acts 1980).

The Council's Ecologist, Landscape Officer, Highways and Public Rights of Way teams are consulted by the Council's Engineering Design Group (EDG) on planting proposals for highway schemes with capital funding and by Development Management during planning applications for development projects. Landscape and Ecological Management Plans are normally required to be submitted and agreed as a planning condition for such schemes. This includes vegetation management of sustainable drainage features such as attenuation basins and pond margins. These also require ongoing management, to allow maintenance access and sustain their biodiversity and amenity value.

Where schemes do not require planning permission, an internal Environmental Audit is carried out which considers the issues above.

4.2 Routine maintenance

Trees

The cyclical maintenance of trees is limited to cutting back from visibility splays to signs and junctions, on bends, and around street lighting to prevent defects that may create a danger or serious inconvenience to highway users (as defined by the Highway Safety Policy).

Other tree maintenance is reactive, undertaken to reduce risks identified during scheduled or ad hoc checks and inspections or reports from other sources. Action is taken to protect the highway or where there is a safety risk to properties neighbouring the highway. Powers exist under the Highways Act which enable the Council to take action on privately owned trees overhanging the highway where necessary.

The Council is exploring ways in which the cyclical maintenance of highway trees, including street trees, could be improved. This would allow works to be planned and undertaken at optimal times and may reduce or prevent problems from occurring that require costly and time-consuming reactive works to address. Potential options being considered include:

- Tree Warden schemes to take ownership of trees and carry out certain tasks including watering, and
- Communication with members of the public to increase general awareness of the value of trees and responsibilities.

Soft Landscape

The Grass Cutting Policy and Procedure identifies the frequency for grass cutting on rural and urban roads. The Neighbourhood Office is authorised to determine the timing of cutting and whether the maximum number of cuts is necessary. Any proposals of this nature must be co-ordinated through the Cyclical Performance Improvement Team (PIT)

Grass cutting above the maximum number of cuts identified in the Policy and Procedure is permitted, but this is deemed to be for amenity or environmental purposes and will be the responsibility of City, Borough or District Councils.

Additional cutting will be undertaken to facilitate other maintenance works, for example prior to surface treatment or ditch cleaning.

The Council does not routinely treat unsightly or noxious weeds. The Weed Control / Clearance Policy and Procedures explain that spraying in some drainage systems might be undertaken depending on location and hierarchy of the road, before constructing new footpaths, and as a preventative measure during highway maintenance works. Reports alleging that noxious weeds on Council land have caused growth or have spread onto private land will be assessed.

The Council has produced a [‘Life on the Verge’](#) webpage and document which provides guidance on the management of highway verges. This encourages communities to take an active role in the management of verges for wildlife. A Hedges and Verges [factsheet](#) is also available which explains owners’ and occupiers’ responsibilities and provides advice on how they should be maintained.

Where customer reports are received, these are dealt with on a reactive basis where safety defects are present, or where action is necessary to restore availability of the highway by removing vegetation causing an obstruction. A risk-based procedure is used to prioritise actionable reports depending upon their defect category, as defined in the Highway Safety Policy. This makes efficient use of resources and provides a range of responses that are proportionate to each situation.

The Council has an ambition to be more proactive in the identification of the locations where overgrown vegetation will require action. This will avoid safety defects from arising and allow the work to be managed in a more efficient and controlled way and better timed to suit biodiversity needs.

4.3 Renewal or replacement

Trees

The Council is developing a Policy for the Replacement of Highway Trees. Currently, the planting of new trees by the Council on land in its ownership, as listed in 4.1 above, is done with consideration to suitable locations, including sites that are highway land often where trees have been removed. County-wide guidance on the successful establishment of street trees and other guidance is available on the Council’s Environment [webpages](#).

In response to the impact of ash dieback, the Devon 3/2/1 formula is promoted which encourages at least 3 new trees for the loss of a large tree, 2 for a medium tree and 1 tree for a small tree. More details can be found on the [Devon Ash Dieback Resilience Forum](#) webpages.

Soft Landscape

The Council does not have a policy for the renewal or replacement of soft landscape.

4.4 Decommissioning of the asset

Trees

The Council operates a Tree Management Framework contract with a selection of local contractors who provide the services of expert tree surgeons. Under the Framework, the timber and waste arising from tree surgery on trees owned by the Council is either left safely on site or is removed by the Contractor.

Annex 6 – Trees and Soft Landscape

The Council is exploring other ways of dealing with arisings, depending on the volume and type of timber. Some objectives that are being considered include:

- reducing and better controlling the release of embedded carbon,
- enhancing biodiversity,
- providing additional revenue (e.g. wood fuel), and
- providing timber resource to local community groups (e.g. wood carvers, wood turners, for local art, street furniture).

Soft Landscape

Soft landscape is not usually decommissioned. In situations where the replacement of soft landscape with paving or hard surface is proposed, the impacts of loss of habitat are assessed and a consultation is undertaken. Where the planning process is applicable to highways/development schemes, mitigation is sometimes provided, for example bird boxes.

Tools are available that enable schemes to be compared and assessed for the impact on natural capital, which provide two outputs: Biodiversity Units and Ecosystem Service Value (in terms of kg and £). The Council is considering whether these could be used.

4.5 Maintenance Service Standards

Maintenance Service Standards were developed which define the service of provision for each asset type based on three levels: Safety, Safety and Serviceability or Safety, Serviceability and Sustainability. These are defined in terms of what a road user could expect to see as shown in Figures 6.4 and 6.5. This is useful in understanding the level of service in the context of what is affordable.

Trees	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability, and sustainability issues
What a road user would see	Tree surgery in response to reported safety defects.	Tree surgery in response to reported safety defects. Cyclical cutting of trees to visibility splays to signs, junctions and on bends.	Tree surgery in response to reported safety defects. Cyclical cutting of trees to visibility splays to signs, junctions and on bends. Removal of self-seeded trees in unsuitable locations.	Tree surgery in response to reported safety defects. Cyclical cutting of trees to visibility splays to signs, junctions and on bends. Removal of self-seeded trees in unsuitable locations. Proactive pruning and management of trees.
Maintenance standards and activities.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Limited routine maintenance based on road hierarchy.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Risk-based specialist inspections prioritising scheduled	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Risk-based specialist inspections and collection of inventory data,

Trees	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability, and sustainability issues
			<p>routine maintenance based on road hierarchy.</p>	<p>prioritising scheduled routine maintenance and planting based on road hierarchy.</p>
<p>Impact</p>	<p>Immediate or imminent hazards dealt with when reported.</p> <p>No assessment of condition or health of trees which gives no way of planning a programme of work.</p>	<p>Immediate or imminent hazards dealt with when reported.</p> <p>No assessment of condition or health of trees which gives no way of planning a programme of work.</p> <p>Limited routine maintenance will lead to some improvement of the asset and reduce the number of future defects from being reported</p>	<p>Immediate or imminent hazards dealt with when reported.</p> <p>Specialist inspections will enable development of a prioritised programme.</p> <p>Routine maintenance will lead to general improvement of the asset and reduce the number of future defects from being reported.</p>	<p>Immediate or imminent hazards dealt with when reported.</p> <p>Specialist inspections will enable development of a prioritised programme.</p> <p>Improvement to the asset will reduce the number of future defects from being reported.</p> <p>Understanding of the value of the asset e.g., in terms of carbon and biodiversity.</p> <p>Resilience to pathogens and</p>

Trees	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability, and sustainability issues
				enhancement of the diversity of species diversity.

Fig. 6.4: Maintenance Standards for Trees

Soft Landscape	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability and sustainability issues
What a road user would see	<p>Grass only cut to provide minimum safety visibility at junctions, bends and laybys.</p> <p>Hedges cut for safety on major roads at bends, junctions and laybys.</p>	<p>Grass only cut to provide minimum safety visibility at junctions, bends and laybys. Cut shorter and more frequently.</p> <p>Hedges cut for safety on major roads at bends. Junctions and laybys.</p>	<p>Grass cut on visibility splays, and on some verges.</p> <p>Hedges managed proactively.</p>	<p>Grass cut across full verge width where required and part width elsewhere.</p> <p>Hedges trimmed routinely.</p>

Soft Landscape	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability and sustainability issues
Maintenance standards and activities. (Includes landscape management of hedges, grassed areas, weeds.	Undertake safety inspection and react to defects that present an immediate or imminent hazard. Limited routine visibility cutting. No noxious or other weed treatment unless causing a safety issue.	Undertake safety inspection and react to defects that present an immediate or imminent hazard. Some routine visibility cutting. No noxious weed treatment. Limited other weed treatment.	Undertake safety inspection and react to defects that present an immediate or imminent hazard. Some routine visibility and verge cutting. Reactive noxious and other weed treatment.	Undertake safety inspection and react to defects that present an immediate or imminent hazard. Routine visibility and verge cutting. Routine noxious and other weed treatment.
Impact	Lack of habitat consideration and an increase in environmental issues. General untidiness and hidden litter. Increase in noxious and other weeds with infrastructure damage.	Lack of habitat consideration and potential environmental issues. General untidiness and visible litter when cut. Increase in noxious and other weeds with infrastructure damage.	Some environmental management and consideration of habitats. Limited weed control.	User satisfaction, improved claim & habitat management.

Fig. 6.5: Maintenance Standards for Soft Landscape

As pressures on budgets continue and become more restrictive, the ability of the Council to provide a service above that of safety is going to be severely impacted.

The tables below show the maintenance standards for Trees and Soft Landscape that can be expected across the highway network with the current levels of funding.

Carriageway Hierarchy	Maintenance Standard
3 Rural	
4 Rural	
5 Rural	
6 Rural	
7 Rural	
8 Rural	
9 Rural	
10 Rural	
11 Rural	

Carriageway Hierarchy	Maintenance Standard
3 Urban	
4 Urban	
5 Urban	
6 Urban	
7 Urban	
8 Urban	
9 Urban	
10 Urban	
11 Urban	

Key

Maintenance Standard 1	Provision of Safety, Serviceability and Sustainability
Maintenance Standard 2	Provision of Safety and intermediate level of Serviceability
Maintenance Standard 3	Provision of Safety and minimal level of Serviceability
Maintenance Standard 4	Provision of Safety only

Fig 6.6: Maintenance Standards for Trees and Soft Landscape for each Road Category

5 Levels of Service and Investment Strategy

Levels of Service demonstrate the relationship between the Council's corporate objectives, including the Strategic Plan for 2021 - 2025, and the performance of highway assets in terms of stakeholder requirements. The Levels of Service represent the fundamental service aimed at helping to deliver a road network which is as safe, reliable and as fit for purpose as possible within the current funding and resource constraints. Figure 6.7 is an extract from the Strategy and shows the Levels of Service measures for Trees and Soft Landscape along with an indication of how they relate to the Council's Levels of Service Statements.

Asset	Service	Measure	Responding to the climate emergency	Be ambitious for children and young people	Support sustainable economic recovery	Tackle poverty and inequality	Improve health and wellbeing	Help communities to be safe, connected and resilient
Trees and Soft Landscape	Highway verge	Carry out annual programme of grass cutting to maintain safe visibility at junctions and visibility splays	✓					✓
	Trees	Inspect highways trees and prioritise repairs to safety defects in accordance with the Tree Inspection Policy	✓				✓	✓

Fig 6.7: Levels of Service for Trees and Soft Landscape.

Investment Strategy for Trees and Soft Landscape

The risk-based approach to the safety management of highway trees and soft landscape is funded annually through the highway's revenue budget. The budget lines are currently based on historical needs.

6 Programme Development

6.1 Identifying Schemes for an Initial Works Programme

A works programme has not traditionally been developed for the maintenance of highway trees, which is reactive in response to reports of defects posing a risk to the safety of the public.

Cyclical programmes are developed for grass and hedge cutting in accordance with the Policy. More information can be found on the Council's webpages [here](#).

The Council has an ambition to improve the coordination of activities on the highway network and to work more efficiently, for example by capitalising on traffic management setups thereby minimising disruption and achieving best value. In

2022, projects on the A361 and A380 have been successfully completed where these major roads were occupied by the Council with sufficient notice provided for a range of maintenance activities to be planned and undertaken at the same time, including tree works and maintenance of the soft landscape.

There is a desire to expand this approach and for the maintenance of trees and soft landscape to be considered whenever the Council will be occupying the highway network, particularly the busier ('A' and 'B' roads), for significant periods during highway improvement schemes. Sufficient notice is required to enable works to be planned because of ecological and operational considerations.

7 Risks

The issues which may prevent asset management objectives being achieved in relation to Trees and Soft Landscape are summarised below.

7.1 Climate change

More frequent occurrence of extreme weather events, for example drought, flooding and storms, along with more variation in temperature, will put trees under greater stress. This could cause tree health to deteriorate increasing the risk of diseased or dangerous trees that require attention.

7.2 Funding

Financial pressure impacts the Council's ability to follow maintenance regimes for appropriate pruning and pollarding of trees, increasing the risk of trees obstructing the highway and/or causing a nuisance/damage to neighbouring properties, when they will require costly action to address.

Similarly, constraints on the cyclical maintenance of verges will allow self-seeded trees to grow to maturity in undesirable locations requiring costly intervention to manage when they eventually become safety defects.

Restrictions on funding limit the Council's ability to replant trees where they have had to be removed, this will be especially notable for street trees.

7.3 Pests and Diseases

Increasing numbers of pests and diseases are affecting the UK's trees. Some have devastating consequences that cause a decline in health. The unpredictable nature of these issues and difficulty in preventing their spread mean that they cannot be planned for. Surges in defects could be experienced, which will have to be managed reactively (e.g. ash dieback). As the spread of Ash Dieback has been so significant, and the potential for infected trees to cause damage, injury or loss of life, Ash Dieback is being managed via the Council's Risk Management System.

7.4 Invasive plants and injurious weeds

Invasive non-native plants are species that have been brought into the UK and can spread causing damage to the environment, economy, health or lifestyle.

Injurious weeds are native species that cause a problem to farming productivity.

Landowners could be prosecuted if invasive non-native plants or injurious weeds spread from their property and cause a nuisance or damage to other land or property.

7.5 Third-party trees and vegetation

Most highway trees and vegetation growing alongside the Council's highway network is privately owned, and landowners are responsible for their management and maintenance. The failure to maintain private trees and vegetation by the landowners, either through inability, lack of awareness, or unwillingness, will result in adverse impacts on the safety or serviceability of the highway.

It is neither feasible, in terms of resources, nor appropriate for the Council to undertake this work in default of the rightful duty holder.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Trees and Soft Landscape asset management objectives are achieved are:

- **Developing our understanding of the tree stock by evolving the inventory** - Opportunities being considered include capturing data on species, age, and condition, assessing the value of ecosystem services, identifying trees on maintenance category 6-12 roads for inclusion on the expert scheduled inspection route, and identification of our veteran trees and community trees so they can be protected and cared for.
- **Develop a policy and strategy for the replanting of highway trees** - This will provide a framework supporting the planning of a landscape for the future and helping tackle climate change, and guidance ensuring that species and locations for tree planting are chosen appropriately.
- **Exploring ways of improving the maintenance of trees to allow works to be planned and undertaken at optimal times** - This may reduce or prevent problems from occurring that require costly and time-consuming reactive works to address. Potential options being considered include taking maximum advantage of planned occupations of the highway for maintenance or improvement schemes, Tree Warden schemes, and communication with members of the public and engagement with school children.
- **Be more proactive in the identification of locations where overgrown vegetation will require action** - Develop a maintenance programme to avoid safety defects from occurring, allowing the work to be managed in a more efficient and controlled way and better timed to suit biodiversity needs.
- **Exploring ways of dealing with tree and vegetation arisings** - Reduce or better control the release of embedded carbon and enhance biodiversity and may provide additional revenue and a timber resource to local community groups.
- **Improving communication with landowners about their trees and vegetation** - Providing information and education on responsibilities and legal

obligations. If successful, this would significantly reduce the Council's time and costs spent dealing with privately owned trees and vegetation that are impacting the highway.

- **Working with the term maintenance contractor to improve the effectiveness of the Council's grass cutting programme** - For example, considering different ways of utilising tractors and flails.
- **Determine the value of the tree stock and soft landscape** - For example, with consideration to the carbon sequestered and stored, and present in terms of a fiscal value. The possibility of using tools to compare and assess the impact of highway schemes on natural capital using biodiversity units and ecosystem service value.

DRAFT

Annex 7 – Road Markings and Studs

1	Introduction	1
2	Inventory	2
2.1	Civil Parking Enforcement Markings.....	2
2.2	Markings (General).....	2
2.3	Markings (Regulatory)	2
2.4	Cats Eyes / Road Studs	2
3	Performance	3
3.1	Current and historical condition	3
3.2	Civil Parking Enforcement Markings.....	3
3.3	Markings (General).....	3
3.4	Markings (Regulatory)	3
3.5	Cats Eyes / Road Studs	3
4	Maintenance Strategy	3
4.1	Creation of a new asset.....	4
	Civil Parking Enforcement Markings.....	4
	Markings (General).....	4
	Markings (Regulatory)	4
	Cats Eyes / Reflecting Studs	4
4.2	Routine maintenance.....	5
	Civil Parking Enforcement Markings.....	5
	Markings (General).....	5
	Markings (Regulatory)	5
	Cats Eyes / Reflective Studs	5
4.3	Renewal or replacement.....	5
	Civil Parking Enforcement Markings.....	5
	Markings (General).....	5
	Markings (Regulatory)	5
	Cats Eyes / Reflective Studs	5
4.4	Decommissioning of the asset.....	6
	Civil Parking Enforcement Markings.....	6
	Markings (General).....	6
	Markings (Regulatory)	6
	Cats Eyes / Reflective Studs	6
4.5	Maintenance Service Standards.....	6

Annex 7 – Road Markings and Studs

5	Levels of Service and Investment Strategy	8
5.1	Levels of Service and Investment Strategy	8
	Road Markings	8
	Cats Eyes / Reflecting Studs	9
6	Programme Development	9
6.1	Identifying Schemes for an Initial Works Programme	9
6.2	Prioritising the Works Programme	9
6.3	Selecting and Optimising Schemes for the Forward Programme	9
7	Risks	9
7.1	Civil Parking Enforcement Markings	9
7.2	Road Markings (General)	9
7.3	Road Markings (Regulatory)	10
7.4	Cats Eyes / Reflecting Studs	10
8	Improvement Actions	10

Version Control		
Version	Date	Summary of Changes
0.1	10.03.2023	For consideration by Cabinet

1 Introduction

The primary purpose of traffic signs, road markings and other traffic management assets is to improve safety and inform highway users of any hazards or requirements as they move around the network.

There is a statutory requirement to maintain traffic signs and road markings in relation to the mandatory requirements set for road users, including those set out by Traffic Regulation Orders.

Traffic signs, road markings and other traffic management assets are critical not only to keeping the networks safe but for the Council to meet its statutory requirements under the Highways Act and the Traffic Management Act to keep the network moving.

These assets will communicate requirements relating to speed, hazards in the road ahead, where to park, load, or unload, and facilitate the payment for parking sessions maintaining an important income stream of approximately £3m per annum.

With increasing levels of autonomy in vehicles on our network the importance of road marking and studs in guiding driver and vehicle is likely to require a higher level of investment.

Changes to the Safety Defect Maintenance Policy in December 2020 has reduced the number of marking types that are inspected and maintained reactively.

These assets have not previously been recognised in the Authorities Highway Infrastructure Asset Management Plan. However, to maintain the network and make informed decisions on budget setting it is important to do so. This Annex outlines a proposal to develop asset management principles for this area over the next 5 years.

The impact of not maintaining our road marking and stud asset is an increased risk of claims against the Authority, failed enforcement (including enforcement undertaken using new Moving Traffic Enforcement powers), and reputational damage.

2 Inventory

The Council has historically held limited information relating to road markings and studs.

2.1 Civil Parking Enforcement Markings

The Council has a robust inventory relating to Civil Parking Enforcement markings held on a third-party software platform, no condition information is held. A public facing [map-based viewer](#) for these restrictions is also available.

A summary of linear meterage of each parking restriction type is publicly available on our open [data pages](#). The information is presented by restriction type, for example “no waiting at any time” (double yellow line), “no waiting” (single yellow line), and “loading only” (loading bay marking).

2.2 Markings (General)

The Council has commissioned survey work to capture markings inventory including centre lines, junction markings. This work is not yet complete.

This inventory will be mounted on the Buchanan Computing LineMap platform. No condition information is held.

2.3 Markings (Regulatory)

The Council has commissioned survey work to capture markings inventory including centre lines, junction markings. The Council is also digitising Traffic Regulation Orders relating to these markings. This work is not yet complete.

This inventory will be mounted on the Buchanan Computing LineMap platform. No condition information is held.

2.4 Cats Eyes / Road Studs

There is no up-to-date inventory currently held relating to cats eyes / road studs.

The Council is responsible for:

CPE restrictions including:

- 566km Double Yellow Lines,
- 106km Single Yellow Lines,
- 89km parking bays,
- 21,000 No Loading blips, and
- 219 School Keep Clears.
- 3,450 km of lining, including:
 - 2,032km Centre line,
 - 301km Give Way & Stop markings,
 - 416 disabled bays,
 - 985 Cycle symbols,
 - 275 Pedestrian symbols,
 - 1,296 Speed limit roundels,
 - 3,832 Road Hump markings,
 - 20,000 Other markings – including blocks of destination text and arrows, and
- In excess of 100,000 road studs (estimated) Split between stick on / Halifax.

These markings are required to ensure that 2060 live Traffic Regulation Orders are clearly understood by the public. The Orders include:

- 401 Orders relating to Parking restrictions,
- 992 Orders relating to Moving restrictions (for example “No Entry”), and
- 667 Orders relating to Speed limits.

The replacement value for lining alone (excluding additional traffic management) is in excess of £5.8million.

3 Performance

3.1 Current and historical condition

There is no overall condition assessment of markings and studs, this is an identified area for improvement. There is a need to gather more information to plan routine maintenance programmes for future years and inform areas of investment.

3.2 Civil Parking Enforcement Markings

There are no comprehensive records of lining condition in respect to the CPE asset. However, there are regular inspections as part of enforcement activities and the Council is able to respond well to reactive issues identified by Civil Enforcement Officers (CEOs).

These measures are deemed to be adequate.

3.3 Markings (General)

There is no comprehensive record of lining condition. However, there are periodic machine surveys of our 3, 4 and 5 road network providing a snapshot of line condition and prioritisation for future investment.

Outside of the 3, 4 and 5 road network, monies are provided for remarking of lining by parish area. Local knowledge provided by Neighbourhood Highways Teams is used to identify priority sites. The demand for remarking far exceeds the available budget and each year prioritisation of communities is needed to ensure equitable investment across the County. Once a programme has been developed, condition surveys are also carried out in each Parish to identify the lining requiring remarking.

Potential to utilise highway video surveys to assess condition of centre lines and studs is being investigated. These surveys are undertaken annually on “A” roads and at least every 3 years on “B” roads. This is a potential area for investment discussed further in Section 5 & 6.

These measures are an area for improvement.

3.4 Markings (Regulatory)

There is no comprehensive record of lining condition. However, there are periodic machine surveys of our 3, 4 and 5 road network providing a snap shot of line condition and prioritisation for future investment.

Neighbourhood Highway Teams have the annual opportunity to feed into the Parish Remark Programme. Their local knowledge will assist with prioritising the targeting of condition surveys.

These measures are an area for improvement.

3.5 Cats Eyes / Road Studs

There is no comprehensive record of lining condition. However, there are periodic machine surveys of our 3, 4 and 5 road network providing a snap shot of line condition and prioritisation for future investment.

These measures are an area for improvement.

4 Maintenance Strategy

How the asset is managed in each stage of the life cycle.

4.1 Creation of a new asset

Civil Parking Enforcement Markings

These assets are created in association with new parking schemes and improvements. All new assets (and changes to existing assets) will require a new Traffic Regulation Order. Source of request include:

- Annual HATOC Waiting Restriction Programme,
- Highway schemes with Capital funding,
- New developments / S106 / S278 monies, and
- Community / Member requests.

New assets will be discussed with Local Member and HATOC chair at a minimum.

New assets are captured in third party software, which also acts as a design and ordering tool.

Markings (General)

These assets are created in association with highway improvement schemes or new developments. These include:

- Highway schemes with Capital funding,
- New developments / S106 / S278 monies,
- Community / Member funded schemes,
- Road safety audits, and
- Community / Member requests.

New assets developed by the Traffic Management Team are in third party software, which also acts as a design and ordering tool. Other new assets for example new development or roads are not; this is an area for improvement.

Markings (Regulatory)

These assets are created in association with highway improvement schemes or new developments. Some new assets (and changes to existing assets) will require a new Traffic Regulation Order, for example bus lanes. These include:

- Highway schemes with Capital funding,
- New developments / S106 / S278 monies,
- Community / Member funded schemes,
- Road safety audits, and
- Community / Member requests.

Where a Traffic Regulation Order is required, new assets will be discussed with Local Member and HATOC chair at a minimum.

New assets developed by the Traffic Management Team are captured in third party software, which also acts as a design and ordering tool. Other new assets for example new development or roads are not; this is an area for improvement.

Cats Eyes / Reflecting Studs

These assets are created in association with highway improvement schemes or new developments. These include:

- Highway schemes with Capital funding,

- New developments / S106 / S278 monies, and
- Road safety audits.

4.2 Routine maintenance

Civil Parking Enforcement Markings

There is no formal serviceability service inspection regime, however all sites are regularly attended by Civil Parking Enforcement Officers and condition of the asset is checked before enforcement is carried out. Defects are recorded and reported to the technical team who arrange ad hoc maintenance of the asset.

There is a medium-term ambition to return to cyclic maintenance of this asset to reduce costs and improve condition.

Markings (General)

There is no formal serviceability service inspection regime, routine maintenance is rarely undertaken.

Where treatment is identified by road users or via a route review maintenance would be considered against available budgets or communities encouraged to fund / self-help.

Markings (Regulatory)

These markings are inspected in line with our highway safety inspection policy and will be maintained accordingly.

Treatment may also be identified by Police or Safety Camera Partnership when identifying defects during enforcement of speed limits or moving traffic offences.

With the adoption of moving traffic offences regular audits of signing and lining will be required at any site identified (and signed off) for enforcement. It is anticipated that a 3-month inspection will be sufficient to ensure robust enforcement.

Cats Eyes / Reflective Studs

There is no formal serviceability service inspection regime, routine maintenance is rarely undertaken. Condition surveys are carried out ad hoc.

4.3 Renewal or replacement

Civil Parking Enforcement Markings

Markings are renewed and replaced as necessary when identified by inspection or report.

Markings (General)

For lines that do not relate to mandatory instructions to drivers and that fall outside our Safety Defect Policy there is insufficient budget to renew or replace all markings when identified by inspection or report.

Markings (Regulatory)

Markings are renewed and replaced as necessary when identified by inspection or report.

Cats Eyes / Reflective Studs

Cats eyes / reflective studs are renewed and replaced as necessary when identified by inspection or report.

4.4 Decommissioning of the asset

Civil Parking Enforcement Markings

Removal of markings would typically be as a result of a change in Traffic Regulation Order. In some instances, changes may be brought about by new national Legislation.

Markings (General)

It would be unusual for markings to be removed. In some instances, changes may be brought about by route review to ensure consistency of markings and minimise impact on public realm.

Markings (Regulatory)

It would be unusual for markings to be removed. In some instances, changes may be brought about by route review to ensure consistency of markings and minimise impact on public realm.

Cats Eyes / Reflective Studs

It would be unusual for studs to be removed. In some instances, changes may be brought about by route review to ensure consistency of markings for example removal of a double white line system (where studs would have been mandatory).

4.5 Maintenance Service Standards

Maintenance Service Standards were developed which define the service of provision for each asset type based on three levels: Safety, Safety and Serviceability or Safety, Serviceability and Sustainability. These are defined in simple terms of what a road user could expect to see. This is very useful understanding the level of service in the context of what is affordable.

As pressures on budgets continue and become very restrictive, the ability of the Council to provide a service above that of safety is going to be severely impacted.

The tables below show the maintenance standards for Road Markings and Studs on each road category.

Maintenance Category	Road Markings and Studs
3	Yellow
4	Yellow
5	Yellow
6	Yellow
7-10 (when subject to Parish Remark programme)	Yellow
7-10	Orange
11+	Red

Key

Maintenance Standard 1	Provision of Safety, Serviceability and Sustainability
Maintenance Standard 2	Provision of Safety and intermediate level of Serviceability
Maintenance Standard 3	Provision of Safety and minimal level of Serviceability
Maintenance Standard 4	Provision of Safety only

Fig. 7.1: Maintenance Standards for Road Markings and Studs for each Road Category

Road Markings & Studs	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability and sustainability issues
What a road user would see	Road Markings & Studs safe and looking untidy.	Road Markings & Studs safe and in fair order.	Road Markings & Studs safe and in good order.	All Road Markings & Studs in good order.
Maintenance standards and activities	Undertake safety inspections and react to defects that represent an immediate or imminent hazard.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Limited routine maintenance based on hierarchy.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Risk-based service and specialist inspection prioritising condition led scheduled routine maintenance	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Service & specialist inspections of Road Markings & Studs and development of a risk-based programme for renewal/remov

Road Markings & Studs	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability and sustainability issues
			based on hierarchy.	all based on fit for purpose and condition analysis.
Impact	No condition assessment to assess whether fit for purpose leading to increased possibility of failure and potential claims.	Limited programme of renewal/removal based on risk rating. Some improvement to asset reducing the likelihood of failure and reducing claim potential.	Limited programme of renewal/removal based on risk rating. General improvement to asset reducing the likelihood of failure and reducing claim potential.	Improvement to asset reducing the likelihood of failure and minimising claim potential.

Fig. 7.2: Maintenance Standards for Road Markings and Studs

5 Levels of Service and Investment Strategy

Current level of service, informed by condition assessments if available, against the stated Levels of Service in the Plan.

5.1 Levels of Service and Investment Strategy

Road Markings

There is currently no investment strategy in place for the renewal of all markings (CPE, General, Regulatory) due to limited financial resource available.

Wider use of MMA lining material is being investigated due to its longer wear resistance to increase lifecycle, this material is not appropriate in all locations due to drying times and the quality of surface that it needs to be laid upon.

The maintenance of markings is reliant on identification by inspection or report.

Cats Eyes / Reflecting Studs

There is currently no investment strategy in place for the renewal of studs due to limited financial resource available.

Wider use of halifax / depressible style studs is being investigated to increase lifecycle and allow cost effective replacement of reflectors.

The maintenance of studs is reliant on identification by inspection or report.

6 Programme Development

6.1 Identifying Schemes for an Initial Works Programme

In the case of new assets relating to traffic management schemes or developer projects the programme will be dictated by the availability of budgets (typically on an annual basis) and Member / Developer expectation.

For the remarking of general road markings within, these will form part of the Parish Remark programme and priority identified by Neighbourhood Officers and also informed by public reports.

For the remarking of general centreline markings on category 3, 4 and 5, these will form part of an inspection regime (including visual and machine inspection) and priority identified typically on a “worst first” basis.

For the remarking of road studs on category 3, 4 and 5, these will form part of an inspection regime (including visual and machine inspection) and priority identified typically on a “worst first” basis.

6.2 Prioritising the Works Programme

In the case of new assets relating to traffic management schemes or developer projects the programme will be dictated by the availability of budgets (typically on an annual basis) and Member / Developer expectation.

For other matters relating to maintenance, works orders are created and provided to contractors to programme efficiently with other works.

6.3 Selecting and Optimising Schemes for the Forward Programme

There is scope to develop forward programmes to combine multiple components within a road closure / traffic management including markings, studs and signing.

Additionally, there are opportunities to avoid abortive maintenance work and disruption to the network where resurfacing or surface dressing is planned.

7 Risks

Issues which may prevent asset management objectives being achieved.

7.1 Civil Parking Enforcement Markings

- Limited funding (increasing supply chain costs), and
- Condition of road surface.

7.2 Road Markings (General)

- Limited funding (increasing supply chain costs),
- Limited inspection regime,

- Limited inventory, and
- Condition of road surface.

7.3 Road Markings (Regulatory)

- Limited funding (increasing supply chain costs),
- Limited inspection regime,
- Limited inventory, and
- Condition of road surface.

7.4 Cats Eyes / Reflecting Studs

- Limited funding (increasing supply chain costs),
- Limited inspection regime,
- Limited inventory, and
- Condition of road surface.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Road Markings and Studs asset management objectives are achieved are:

- Gathering and maintaining a robust inventory of marking asset (priority to be given to enforceable “moving traffic” markings), including all new assets within Devon,
- Digitisation of Traffic Regulation Orders relating to regulatory markings,
- Inspection regime for sites identified for “moving traffic” enforcement,
- Investigate capacity within Safety Inspection Team to identify non safety defects to inform future programme / investment,
- A programme of condition surveys cats eyes / road studs is developed,
- Investment in identifying the best interventions for use on each part of the network according to circumstances (for example MMA or depressible road studs),
- Lining investment strategy to be developed based upon newly gathered inventory, and
- Monitor and consider needs of increasing autonomy in vehicles using the network.

Annex 8 – Signs and Other Traffic Assets

1	Introduction	1
2	Inventory	2
2.1	Civil Parking Enforcement inc Pay and Display machines.....	2
2.2	Road Signs (General).....	2
2.3	Road Signing (Regulatory)	2
2.4	Vehicle Activated Signs	2
3	Performance	2
3.1	Current and historical condition	2
3.2	Civil Parking Enforcement inc Pay and Display machines.....	2
3.3	Road Signs (General).....	3
3.4	Road Signing (Regulatory)	3
3.5	Vehicle Activated Signs	3
4	Maintenance Strategy	3
4.1	Creation of a new asset.....	3
	Civil Parking Enforcement inc Pay and Display machines.....	3
	Road Signs (General).....	4
	Road Signing (Regulatory)	4
	Vehicle Activated Signs	4
4.2	Routine maintenance.....	4
	Civil Parking Enforcement inc Pay and Display machines.....	4
	Road Signs (General).....	5
	Road Signing (Regulatory)	5
	Vehicle Activated Signs	5
4.3	Renewal or replacement.....	5
	Civil Parking Enforcement inc Pay and Display machines.....	5
	Road Signs (General).....	5
	Road Signing (Regulatory)	6
	Vehicle Activated Signs	6
4.4	Decommissioning of the asset.....	6
	Civil Parking Enforcement inc Pay and Display machines.....	6
	Road Signs (General).....	6
	Road Signing (Regulatory)	6
	Vehicle Activated Signs	6
4.5	Maintenance Service Standards.....	6

Annex 8 – Signs and Other Traffic Assets

5	Levels of Service and Investment Strategy.....	8
5.1	Levels of Service	8
5.2	Investment Strategy.....	9
	Civil Parking Enforcement inc Pay and Display machines.....	9
	Road Signs (General).....	9
	Road Signing (Regulatory)	9
	Vehicle Activated Signs	9
6	Programme Development	10
6.1	Identifying Schemes for an Initial Works Programme	10
6.2	Prioritising the Works Programme	10
6.3	Selecting and Optimising Schemes for the Forward Programme	10
7	Risks	10
7.1	Civil Parking Enforcement inc Pay and Display machines.....	10
7.2	Road Signs (General).....	10
7.3	Road Signing (Regulatory)	10
7.4	Vehicle Activated Signs	10
8	Improvement Actions	10

Version Control		
Version	Date	Summary of Changes
0.1	10.03.2023	For consideration by Cabinet

1 Introduction

The primary purpose of traffic signs, road markings and other traffic management assets is to improve road safety and inform highway users of any hazards or requirements as they move around the network.

There is a statutory requirement to maintain traffic signs and road markings in relation to the mandatory requirements set for road users, including those set out by Traffic Regulation Orders.

Traffic signs, road markings and other traffic management assets are critical not only to keeping the network safe but for the Council to meet its statutory requirements under the Highways Act and the Traffic Management Act to keep the network moving.

These assets will communicate requirements relating to speed, hazards in the road ahead, where to park, load, or unload, and facilitate the payment for parking sessions maintaining an important income stream of approximately £3m per annum.

By not maintaining these assets there is a risk to drivers and associated litigation against the Authority.

With increasing levels of autonomy in vehicles on our network the importance of road signs in guiding driver and vehicle is likely to require a higher level of investment.

Changes to the Safety Defect Maintenance Policy in December 2020 has reduced the number of signing types that are inspected and maintained reactively.

These assets have not previously been recognised in the Authorities Highway Infrastructure Asset Management Plan. However, to maintain the network and make informed decisions on budget setting it is important to do so. This Annex outlines a proposal to develop asset management principles for this area over the next 5 years.

It is considered that Electric Vehicle charging facilities may be within the scope of this annex, however at this time the ambition to investigate solutions funded and maintained by third party partners.

The impact of not maintaining our signing and traffic management asset is an increased risk of claims against the Authority, failed enforcement (including enforcement undertaken using new Moving Traffic Enforcement powers), and reputational damage.

2 Inventory

Extent of asset, may be split into different asset types.

The Council has historically held limited information relating to traffic signs, road markings and other traffic management assets.

2.1 Civil Parking Enforcement inc Pay and Display machines

There is a robust inventory of Traffic Regulation Orders relating to parking restrictions, these are digitised in both text and map-based formats in the Buchanan ParkMap software suite. A public facing [map-based viewer](#) for these restrictions is also available:

There is no detailed inventory of signing however sufficient information to understand the amount and quality of signing on the network.

There is a robust inventory relating to Pay & display machine asset across the County.

2.2 Road Signs (General)

There is no up-to-date inventory currently held relating to general road signs.

2.3 Road Signing (Regulatory)

There is an inventory of Traffic Regulation Orders relating to restrictions that is under development, this will include digitised records in both text and map-based formats in the Buchanan ParkMap software suite.

There is no detailed inventory of signing relating to these restrictions, however this is identified as a priority as Moving Traffic Enforcement powers are adopted.

2.4 Vehicle Activated Signs

There a partial inventory of Vehicle Activated Signs, work is being undertaken to complete this inventory currently.

3 Performance

3.1 Current and historical condition

There is no overall condition assessment of traffic signs / road markings and other traffic assets, this is an identified area for improvement. There is a need to gather more information to plan routine maintenance programmes for future years and inform areas of investment.

3.2 Civil Parking Enforcement inc Pay and Display machines

There are no comprehensive records of signing and lining condition in respect to the CPE asset. However, there are regular inspections as part of enforcement activities and the Council is able to respond well to reactive issues identified by Civil Enforcement Officers (CEOs).

The Council is responsible for:

- In excess of 250,000 signs, including 7,915 illuminated road traffic signs,
- 121 Permanent & 12 Mobile Vehicle Activated Signs, and
- 295 Pay & Display Machines.

These signs are required to ensure that 2060 live Traffic Regulation Orders are clearly understood by the public. The Orders include:

- 401 Orders relating to Parking restrictions,
- 992 Orders relating to Moving restrictions (for example “No Entry”), and
- 667 Orders relating to Speed limits.

These measures are deemed to be adequate.

There is a live reporting system which ensures the functionality of the Pay & Display machine asset, identifying whether machines are functioning correctly and when cash collections are required.

The current performance in terms of pay & display machine asset is not deemed to be adequate, there are significant vulnerabilities due to the mechanical nature of the machines, such as coin and ticket jams. Cash collection also presents risks due to current recruitment issues within the contractor's team. Ongoing maintenance is costly.

The medium-term ambition is that a greater reliance on cashless infrastructure is investigated, reducing maintenance liability and costs and encouraging use of “pay by phone” apps etc.

3.3 Road Signs (General)

There is no comprehensive record of sign condition, ad-hoc surveys are undertaken and there is also scope for the public to report issues with damaged or missing signs.

These measures are deemed to be adequate.

3.4 Road Signing (Regulatory)

There is no comprehensive record of sign condition, ad hoc surveys are undertaken and these signs are also included in Safety Defect surveys. There is also scope for the public to report issues with damaged or missing signs

In general, these measures are deemed to be adequate. However, additional audits will be desirable with the adoption of moving traffic enforcement powers.

3.5 Vehicle Activated Signs

There is no comprehensive record of sign condition, ad-hoc surveys are undertaken and there is also scope for the public to report issues with damaged or missing signs.

These measures are deemed to be adequate.

4 Maintenance Strategy

4.1 Creation of a new asset

Civil Parking Enforcement inc Pay and Display machines

These assets are created in association with new parking schemes and improvements. All new assets (and changes to existing assets) will require a new Traffic Regulation Order.

Source of requests may include:

- Annual HATOC Waiting Restriction Programme,
- Highway schemes with Capital funding,
- New developments / S106 / S278 monies, and
- Community / Member requests.

New assets will be discussed with Local Member and HATOC chair at a minimum.

More information on our [Traffic Regulation Orders \(including the Annual HATOC Waiting Restriction Programme can be found here:](#)

Road Signs (General)

These assets are created in association with highway improvement schemes or new developments. These include:

- Highway schemes with Capital funding,
- New developments / S106 / S278 monies,
- Community / Member funded schemes,
- Road safety audits, and
- Community / Member requests.

Road Signing (Regulatory)

These assets are created in association with highway improvement schemes or new developments. All new assets (and changes to existing assets) will require a new Traffic Regulation Order. These include:

- Highway schemes with Capital funding,
- New developments / S106 / S278 monies,
- Community / Member funded schemes,
- Road safety audits, and
- Community / Member requests.

New assets will be discussed with Local Member and HATOC chair at a minimum.

Vehicle Activated Signs

These assets are created in association with highway improvement schemes or new developments. These include:

- Community / Member funded schemes,
- Road safety audits / Speed compliance action review forum (SCARF*), and
- Community / Member requests.

*More information can be found out about [our SCARF process here:](#)

4.2 Routine maintenance

Civil Parking Enforcement inc Pay and Display machines

There is no formal serviceability service inspection regime, however all sites are regularly attended by Civil Parking Enforcement Officers and condition of the asset is checked before enforcement is carried out. Defects are recorded and reported to the technical team who arrange ad hoc maintenance of the asset.

There is a medium-term ambition to return to cyclic maintenance of this asset to reduce costs and improve condition.

For Pay and Display machines there is a live reporting function to the back-office system (Smartfolio) which provides information of current status (for example if the machine is out of service or cash box full). There is a maintenance contract to keep machines in service and a replacement programme which sees machines typically replaced after 10 years service.

Road Signs (General)

There is no formal serviceability service inspection regime, routine maintenance is rarely undertaken (with the exception of triangular “Warning Signs” which would be identified as a Safety Defect).

Cleaning of any sign is no longer undertaken by the Authority due to budgetary pressures.

Where treatment is identified by road users or via a route review maintenance would be considered against available budgets or communities encouraged to fund / self help. For example Chapter 8 trained Parish Wardens may choose to undertake sign cleaning.

Road Signing (Regulatory)

These signs are included in routine safety inspections and will be replaced or repaired accordingly.

Treatment may also be identified by Police or Safety Camera Partnership when identifying defects during enforcement of speed limits or moving traffic offences.

With the adoption of moving traffic offences regular audits of signing and lining will be required at any site identified (and signed off) for enforcement. It is anticipated that a 3 month inspection will be sufficient to ensure robust enforcement.

Vehicle Activated Signs

There is no formal serviceability service inspection regime, routine maintenance is rarely undertaken.

Where treatment is identified by road users or via a route review maintenance would be considered against available budgets or communities encouraged to fund in some instances.

4.3 Renewal or replacement

Civil Parking Enforcement inc Pay and Display machines

Signs are renewed and replaced as necessary when identified by inspection or report. In the instance of damage relating to a vehicle collision, costs are recovered from insurers if possible.

Pay & display machines are replaced as they end their serviceable life typically replaced after 10 years service.

Road Signs (General)

For signs that do not relate to mandatory instructions to drivers and that fall outside our Safety Defect Policy there is insufficient budget to renew or replace all signs when identified by inspection or report. A small budget is provided to Neighbourhood Highways Teams to prioritise “non-safety defect” signs for replacement.

In some instances, funding will be provided by communities to maintain local signing such as fingerposts.

In the instance of damage relating to a vehicle collision, costs are recovered from insurers if possible.

Road Signing (Regulatory)

Signs are renewed and replaced as necessary when identified by inspection or report. In the instance of damage relating to a vehicle collision, costs are recovered from insurers if possible.

Vehicle Activated Signs

Signs are renewed and replaced as necessary when identified by inspection or report. This would be considered against available budgets or communities encouraged to fund in some instances.

In the instance of damage relating to a vehicle collision, costs are recovered from insurers if possible.

4.4 Decommissioning of the asset

Civil Parking Enforcement inc Pay and Display machines

Removal of signing would typically be as a result of a change in Traffic Regulation Order. In some instances, changes may be bought about by new national Legislation.

Removal of pay & display asset may be undertaken to reduce maintenance / replacement costs along with reducing impact on public realm. As noted, there is a strategy to reduce reliance on this technology and increase use of cashless and app-based services.

Road Signs (General)

It would be unusual for signing to be removed. In some instances, changes may be bought about by route review to ensure consistency of signing and minimise impact on public realm.

Route reviews are undertaken as financial and staffing resources permit. Sites are identified using local knowledge and will normally be within our A & B road network. The aim of a route review is to look at consistency of signing and remove any redundant signage.

Road Signing (Regulatory)

Removal of signing would typically be as a result of a change in Traffic Regulation Order. In some instances, changes may be bought about by new national Legislation.

Vehicle Activated Signs

It would be unusual for signing to be removed. At time of replacement highway conditions would be considered to ensure the sign is still relevant and budget is available, in some instances communities would be encouraged to fund.

4.5 Maintenance Service Standards

Maintenance Service Standards were developed which define the service of provision for each asset type based on three levels: Safety, Safety and Serviceability or Safety, Serviceability and Sustainability. These are defined in simple terms of what a road user could expect to see. This is very useful understanding the level of service in context of what is affordable.

As pressures on budgets continue and become very restrictive, the ability of the Council to provide a service above that of safety is going to be severely impacted.

Annex 8 – Signs and Other Traffic Assets

The tables below show the maintenance standards for Road Signs on each road category.

Carriageway Hierarchy	Road Signs (CPE & Regulatory)	Carriageway Hierarchy	Road Signs (General)
3		3	
4		4	
5		5	
6		6	
7 -10		7 -10	
11+		11+	

Key

Maintenance Standard 1	Provision of Safety, Serviceability and Sustainability
Maintenance Standard 2	Provision of Safety and intermediate level of Serviceability
Maintenance Standard 3	Provision of Safety and minimal level of Serviceability
Maintenance Standard 4	Provision of Safety only

Fig. 8.1: Maintenance Standards for Road Signs for each Road Category

Road Signs	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability, and sustainability issues
What a road user would see	Signing safe and looking untidy.	Signing safe and in fair order.	Signing safe and in good order.	All signing in good order.
Maintenance standards and activities	Undertake safety inspections and react to defects that represent an immediate or imminent hazard.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Limited routine maintenance based on hierarchy.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Risk-based service and specialist inspection	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Service & specialist inspections of signs and

Road Signs	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability, and sustainability issues
			prioritising condition led scheduled routine maintenance based on hierarchy.	development of a risk-based programme for renewal/removal based on fit for purpose and condition analysis.
Impact	No condition assessment to assess whether fit for purpose leading to increased possibility of failure and potential claims.	Limited programme of renewal/removal based on risk rating. Some improvement to asset reducing the likelihood of failure and reducing claim potential.	Limited programme of renewal/removal based on risk rating. General improvement to asset reducing the likelihood of failure and reducing claim potential.	Improvement to asset reducing the likelihood of failure and minimising claim potential.

Fig 8.2: Maintenance Standards for Road Signs

5 Levels of Service and Investment Strategy

5.1 Levels of Service

Levels of Service demonstrate the relationship between the Council's corporate objectives, including the Strategic Plan for 2021 - 2025, and the performance of highway assets in terms of stakeholder requirements. The Levels of Service represent the fundamental service aimed at helping to deliver a road network which is as safe, reliable and as fit for purpose as possible within the current funding and resource constraints. Table 8.3 is an extract from the Strategy and shows the Levels of Service measures for Traffic Signs along with an indication of how they relate to the Council's Levels of Service Statements.

Asset	Service	Measure	Responding to the climate emergency	Be ambitious for children and young people	Support sustainable economic recovery	Tackle poverty and inequality	Improve health and wellbeing	Help communities to be safe, connected and resilient
Traffic Signs and Road Markings	Traffic Signs	Repair or replace any safety signs knocked down or damaged by routine traffic accidents			✓			✓

Fig. 8.3: Levels of Service for Traffic Signs

5.2 Investment Strategy

Civil Parking Enforcement inc Pay and Display machines

There is currently no investment strategy in place for the renewal of signing due to limited financial resource available. The maintenance of signs is reliant on identification by inspection or report.

The exception is the investment in new Pay and Display machines, approximately £100,000 per annum is allocated for the replacement of machines on a “worst first” basis. This level of investment remains insufficient to maintain a suitable condition of asset. It is intended to reduce this budget with reduced reliance over the next 5 years on physical infrastructure and increase investment and promotion of cashless options.

Road Signs (General)

There is currently no investment strategy in place for the renewal of signing due to limited financial resource available. The maintenance of signs is reliant on identification by inspection or report.

Road Signing (Regulatory)

There is currently no investment strategy in place for the renewal of signing due to limited financial resource available. The maintenance of signs is reliant on identification by inspection or report.

Vehicle Activated Signs

There is currently no investment strategy in place for the renewal of signing due to limited financial resource available. The maintenance of signs is reliant on identification by inspection or report.

In some instances, communities will fund signing if the site has not been identified as a priority for treatment or budget is not available.

6 Programme Development

6.1 Identifying Schemes for an Initial Works Programme

In the case of new assets relating to traffic management schemes or developer projects the programme will be dictated by the availability of budgets (typically on an annual basis) and Member / Developer expectation.

For other matters relating to maintenance, reports will be considered against available budget and added to programme as appropriate.

6.2 Prioritising the Works Programme

In the case of new assets relating to traffic management schemes or developer projects the programme will be dictated by the availability of budgets (typically on an annual basis) and Member / Developer expectation.

For other matters relating to maintenance, works orders are created and provided to contractors to programme efficiently with other works.

6.3 Selecting and Optimising Schemes for the Forward Programme

There is limited scope for optimisation outside those signs identified as safety defects. The scope of works exceeds available budgets, forward programme is developed on engineering judgement and with the aim to provide an equitable service across the county focusing on our main conurbations and A&B road network. Works orders are created and provided to contractors to programme efficiently with other works.

7 Risks

Issues which may prevent asset management objectives being achieved.

7.1 Civil Parking Enforcement inc Pay and Display machines

- Limited funding (increasing supply chain costs),
- Limited inventory, and
- Vulnerability due to aging machine stock.

7.2 Road Signs (General)

- Limited funding (increasing supply chain costs), and
- No inventory.

7.3 Road Signing (Regulatory)

- Limited funding (increasing supply chain costs),
- Limited inspection regime, and
- No inventory.

7.4 Vehicle Activated Signs

- Limited funding (increasing supply chain costs),
- Limited inspection regime, and
- No inventory.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development

with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Signs and Other Traffic Assets asset management objectives are achieved are:

- Gathering and maintaining an appropriate inventory of assets (priority to be given to enforceable “moving traffic” signing),
- Digitisation of Traffic Regulation Orders relating to regulatory signing,
- Inspection regime for sites identified for “moving traffic” enforcement,
- Investigate capacity within Safety Inspection Team to identify non safety defects to inform future programme / investment,
- Investment in (and promotion of) cashless technology, along with decommissioning of physical pay & display infrastructure, and
- Monitor and consider needs of future autonomous vehicles.

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Annex 9 – Park and Ride Sites

1	Introduction	1
2	Inventory	1
3	Performance	2
3.1	Current and historical condition	2
4	Maintenance Strategy	2
4.1	Creation of a new asset	2
4.2	Routine maintenance.....	2
4.3	Renewal or replacement.....	2
4.4	Decommissioning of the asset.....	2
4.5	Maintenance Service Standards.....	2
5	Levels of Service and Investment Strategy	4
5.1	Levels of Service and Investment Strategy	4
6	Programme Development	4
6.1	Identifying Schemes for an Initial Works Programme	4
6.2	Prioritising the Works Programme	4
6.3	Selecting and Optimising Schemes for the Forward Programme	5
7	Risks	5
8	Improvement Actions	5

Version Control		
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0.1	10.03.2023	For consideration by Cabinet

1 Introduction

Park & Ride sites are not public Highway and are therefore not covered by the Highway Act 1984, they are however assets which are “Highway Managed At Public Expense” (HMPE) and there is a duty of care upon the Council to maintain them to a safe and reasonable standard.

There are 6 Park & Ride sites in the ownership of the Council:

- Honiton Road, Exeter,
- Sidmouth Road, Exeter,
- Digby, Exeter (Exclusive use for NHS staff),
- Digby (Park & Rail),
- Exeter Science Park (Park & Change), and
- Ivybridge (Park & Rail).

Additionally, there is a further facility in Barnstaple (Adjacent to Park School) which functions as a Park & Walk / Cycle for the town centre.

Matford Park & Ride is managed by Exeter City Council and Dartmouth Park & Ride by South Hams District Council.

Park & Ride sites provide an essential opportunity for people to travel smarter by taking a sustainable form of transport for the last leg of their journey and reducing congestion (and improving air quality) in our busiest communities.

In the 18/19 financial year, it was estimated that 1.35 million passengers used the Park & Ride services owned by the Council in Exeter every year. Public consultation has shown that there is public support for expanding the park & ride estate. (LTP 2011-26). It should be noted that the impact of the pandemic and changing working practices has reduced user numbers, with approx 0.6 million users, a reduction of 44% being recorded in 2022. Consideration of recent user trends is needed when planning any further sites.

The sites are funded from the On Street Parking Account.

These assets have not previously been recognised in the Authorities Highway Infrastructure Asset Management Plan. However, to maintain the network and make informed decisions on budget setting it is important to do so. This Annex outlines a proposal to develop asset management principles for this area over the next 5 years.

2 Inventory

There is no current inventory held in terms of the Park & Ride asset.

In order to develop a proactive response to maintenance for Park & Ride sites it is intended to build a comprehensive inventory of the component assets, these include:

- Streetlighting,
- Surface,
- Signs,
- Lines,
- Footway,
- Drainage,

- Trees / Hedges, and
- Fencing.

This will allow the sites to be properly maintained for the future and true costs to be understood when considering further sites in Devon.

3 Performance

3.1 Current and historical condition

As Park & Ride sites are not defined as public highway, routine safety inspections are conducted every 6 months (aligning with the regime for pedestrian facilities).

There is no overall condition assessment for Park & Ride assets, this is an identified area for improvement. There is a need to gather more information to plan routine maintenance programmes for future years and inform areas of investment.

There are no comprehensive records of the Park & Ride sites, for example information relating to construction or drainage, this is an identified area for improvement.

There is no programme for maintenance and only ad hoc remedial works are conducted.

4 Maintenance Strategy

How the asset is managed in each stage of the life cycle.

4.1 Creation of a new asset

These assets are created as part of the wider Local Transport Plan strategy lead by the Planning and Transportation team.

There is scope that these could also be created as part of a significant development on the outskirts of our major Market or Coastal communities.

4.2 Routine maintenance

As Park & Ride sites are not defined as public highway and do not have a clear distinction with facilities for vehicles and pedestrians they are currently inspected once every 6 months in line with other footway inspections. There is an ambition to review this inspection regime to ensure it is fit for purpose and provides a high-quality environment for users.

4.3 Renewal or replacement

Not applicable.

4.4 Decommissioning of the asset

Not applicable.

4.5 Maintenance Service Standards

Maintenance Service Standards were developed which define the service of provision for each asset type based on three levels: Safety, Safety and Serviceability or Safety, Serviceability and Sustainability. These are defined in simple terms of what a road user could expect to see. This is very useful understanding the level of service in context of what is affordable.

Park & Ride Site	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability and sustainability issues
What a road user would see	Park & Ride Site safe and looking untidy.	Park & Ride Site safe and in fair order	Park & Ride Site safe and in good order	All Park & Ride Sites in good order.
Maintenance standards and activities.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Limited routine maintenance based on hierarchy.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Risk-based service and specialist inspection prioritising condition led scheduled routine maintenance based on hierarchy.	Undertake safety inspections and react to defects that represent an immediate or imminent hazard. Service & specialist inspections of signs and development of a risk-based programme for renewal/removal based on fit for purpose and condition analysis.
Impact	No condition assessment to assess whether fit for purpose leading to increased possibility of failure and	Limited programme of renewal/removal based on risk rating. Some improvement to asset reducing the likelihood of	Limited programme of renewal/removal based on risk rating. General improvement to asset reducing the likelihood of	Improvement to asset reducing the likelihood of failure and minimising claim potential.

Park & Ride Site	Provision of safety related issues only	Provision of safety and minimal level of serviceability	Provision of safety and intermediate level of serviceability	Provision of safety, serviceability and sustainability issues
	potential claims.	failure and reducing claim potential.	failure and reducing claim potential.	

Fig 9.1: Maintenance Standards for Park and Ride Sites

5 Levels of Service and Investment Strategy

Current level of service, informed by condition assessments if available, against the stated Levels of Service in the Plan.

5.1 Levels of Service and Investment Strategy

There is currently no investment strategy in place for maintenance of park & ride sites.

The on-street parking account provides minimal funding to cover the payment of business rates and a small budget is agreed to provide ad hoc maintenance to hedges, fences, surface etc.

The maintenance of sites is typically reliant on identification by inspection or report.

This is an area of concern, and an overall maintenance strategy is required.

6 Programme Development

6.1 Identifying Schemes for an Initial Works Programme

In the case of new assets these are created as part of the wider Local Transport Plan strategy lead by the Planning and Transportation team. There is scope that these could also be created as part of a significant development on the outskirts of our major Market or Coastal communities.

For other matters relating to maintenance, reports will be considered against available budget and added to programme as appropriate. Issues identified as Safety Defects as part of routine inspections will be dealt with as part of that programme.

6.2 Prioritising the Works Programme

In the case of new assets these are created as part of the wider Local Transport Plan strategy lead by the Planning and Transportation team. There is scope that these could also be created as part of a significant development on the outskirts of our major Market or Coastal communities.

For other matters relating to maintenance, reports will be considered against available budget and added to programme as appropriate. Issues identified as Safety Defects as part of routine inspections will be dealt with as part of that programme.

6.3 Selecting and Optimising Schemes for the Forward Programme

Due to limited information on site condition and no overall investment strategy, there is limited scope for optimisation.

Works orders are created and provided to contractors to programme efficiently with other works.

7 Risks

Issues which may prevent asset management objectives being achieved.

- Limited funding (increasing supply chain costs),
- Limited inventory,
- Limited scope of inspection regime, and
- Vulnerability due to aging sites requiring significant investment.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Park and Ride Sites asset management objectives are achieved are:

- Gather a complete inventory for this asset, including drainage, surface construction and condition, streetlighting, lining, signing etc,
- Develop an investment strategy to ensure that sites are managed to an appropriate standard,
- Review inspection regime, and
- Consider the maintenance of this asset within the relevant asset groups.

Annex 10 – Public Rights of Way

1	Introduction	1
2	Inventory	2
3	Performance	4
3.1	Data collection techniques.....	4
3.2	Ease of use summary scores	6
4	Maintenance Strategy	6
4.1	South West Coast Path National Trail and England Coast Path	8
4.2	Permissive Paths.....	8
4.3	Off-road recreational trails	8
4.4	Maintenance Category 12 (MC12) Roads	9
4.5	Parish Paths Partnership (P3)	9
5	Levels of Service and Investment Strategy	9
6	Programme Development	10
7	Risks	11
8	Improvement Actions	11

Version Control		
Version	Date	Summary of Changes
0.1	10.03.2023	For consideration by Cabinet

1 Introduction

The Public Rights of Way and Country Parks service (PRoW & CP service) provide the lead for Devon County Council (the Council) on management and maintenance of the public rights of way network, off-road shared use trails (including cycleways), and unsurfaced unclassified county roads (uUCRs maintenance category 12). The PRoW & CP service is also responsible for management and maintenance Stover Country Park and the Grand Western Canal Country Park, and associated sites including Denbury Camp, White Cross and Knapp Copse.

The table in figure 10.1 (below) summarises the range of functions delivered through the PRoW & CP service. Country Park / Local Nature Reserve functions are subject to separate management plans, and so do not form a direct part of this plan.

With regards to Public Rights of Way, this part of the service (PRoW team), is responsible for management and maintenance of approximately 5,000km of public rights of way, 560km of uUCRs, and 225km of off-road recreational trails (such as the Exe Estuary Trail, the Granite Way and Tarka Trail). The network also includes Devon sections of 2 National Trails (the South West Coast Path and England Coast Path), and Access Land (for example access on foot to moors, heaths, downs, commons and some coastal areas).

To summarise, the PRoW team:

- maintains and keeps under review the legal record of public access rights and status for public rights of way (the Definitive Map and Statement),
- inspects the network, arranges maintenance and co-ordinates improvement works,
- liaises with landowners, including undertaking enforcement action where necessary,
- co-ordinates path diversions, creations and extinguishments and temporary closures on the network,
- manages the Parish Paths Partnership (P3) Scheme, supporting volunteers from Parish and Town Councils to undertake path surveys and carry out smaller scale maintenance and improvement tasks,
- is responsible for the statutory Devon Countryside Access Forum, and
- is responsible for day-to-day management and maintenance of Devon sections of the South West Coast Path National Trail / England Coast Path, and promoted regional routes such as the Two Moors Way.

Priorities are guided and informed by the Rights of Way Improvement Plan (RoWIP). In accordance with the Countryside and Rights of Way Act 2000, the current 10 year RoWIP is currently under review, with a report due to be published in early 2023 (ref. [Rights of Way Improvement Plan and policy - Public Rights of Way \(devon.gov.uk\)](https://www.devon.gov.uk/ro-wip)).

The RoWIP fits well with the Devon Strategic Plan – Best Place, and action to be fairer, healthier, caring, greener, and prosperous. Public Rights of Way form an important part of highway network activity. At the strategic level, this is of vital importance to:

- connecting people and places (including Active Travel),

- the local economy (with the network providing essential infrastructure in support of recreation, leisure, and tourism),
- carbon reduction, biodiversity, landscape, and heritage (particularly provision for non-car based travel, contribution to climate change avoidance and mitigation measures, and as a key component of green infrastructure), and
- physical and mental health and wellbeing (with benefits directly attributable to exercising outdoors and contact with nature).

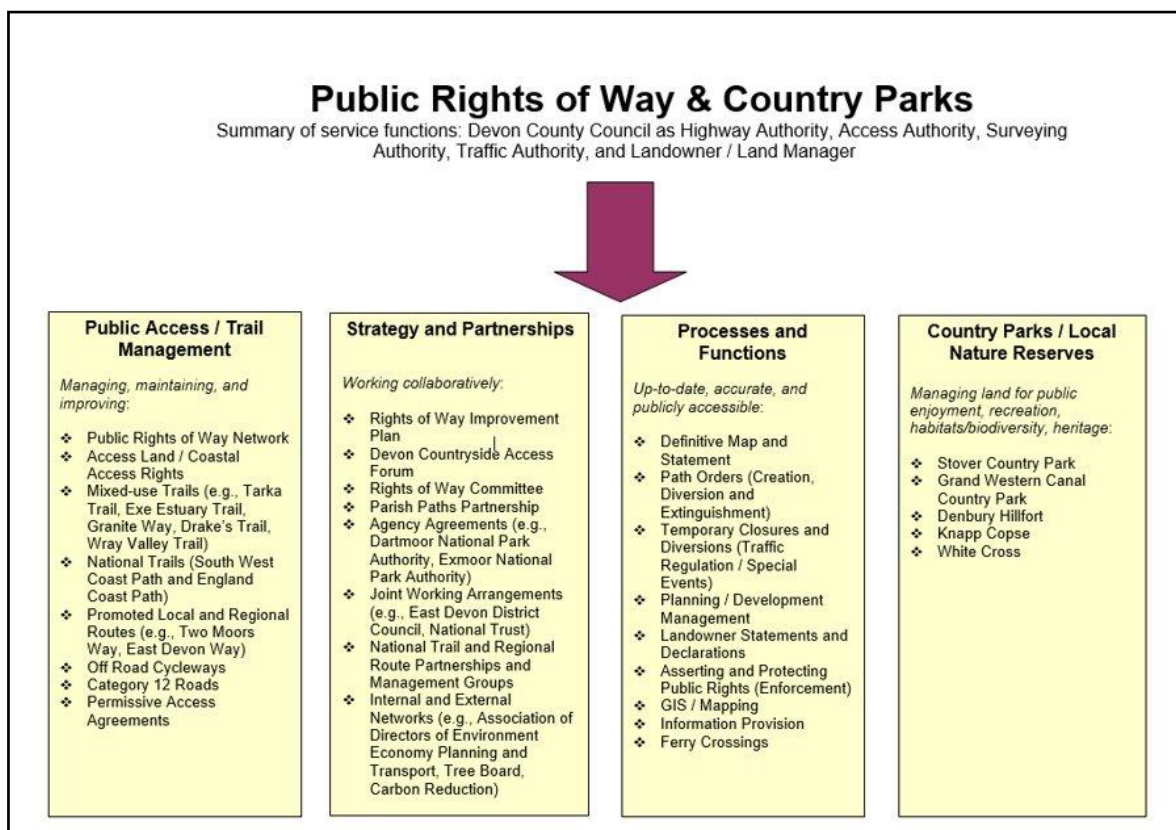


Fig. 10.1: Table showing functions delivered by PRow and CP service.

2 Inventory

Public Rights of Way (PRow) are ways over which the public have a right to pass and repass. These are highways maintainable at public expense (ref. [What are public rights of way? - Public Rights of Way \(devon.gov.uk\)](https://www.devon.gov.uk/what-are-public-rights-of-way)), and so subject to similar legislation as vehicular highways - including the Highways Act 1980.

The PRow network in Devon comprises:

- 3,686 km Public Footpaths - for walking, running, mobility scooters or powered wheelchairs,
- 1,218 km Public Bridleways - for walking, horse riding, bicycles, mobility scooters or powered wheelchairs,
- 33 km Restricted Byways - for any transport without a motor and mobility scooters or powered wheelchairs, and
- 80 km Byways Open to All Traffic - for any kind of transport, including cars (but they're mainly used by walkers, cyclists, and horse riders).

Annex 10 – Public Rights of Way

N.B., using Defra definitions as published at [Rights of way and accessing land: Use public rights of way - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/using-public-rights-of-way). The network lengths are for Devon, including Dartmoor and Exmoor National Parks, but excluding Plymouth and Torbay as the unitary authorities are responsible for their respective networks.

In addition to the above, the PRow team is also responsible for:

- Permissive Paths involving formal agreements between a landowner and the Council. Exact length is not published but comprises an additional (approximate) 45 km,
- Off-road recreational trails (including cycleways) include routes such as the Granite Way, Exe Estuary Trail and Tarka Trail, often also forming part of the National Cycle Network (NCN). The PRow team is responsible for more than 225 km of such trails,
- Maintenance Category 12 (MC12) roads comprise of 588 km of, typically, unbound road. These are generally unmetalled roads not normally used by vehicular traffic, but with value and importance for recreation and leisure use,
- Access land where public rights exist for walking, running, watching wildlife and climbing. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council; and (once legal processes are complete) will include Coastal Margin designated through the England Coast Path (ref. [Rights of way and accessing land: Use your right to roam - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/using-public-rights-of-way)).

This network is growing with new paths and trails being created – for example to meet recreational and active travel needs and to mitigate impacts from development.

The Council, as Highway Authority and Access Authority, is responsible for maintenance and enforcement of the PRow Network, and for public rights associated with access land. Some maintenance responsibilities are vested with the landowner (for example, the responsibility to keep paths clear of overgrowth, to maintain furniture such as gates and stiles in a safe condition); and some maintenance responsibilities rest with the Council (for example, keeping paths clear of up growth and maintaining the surface in a safe condition).

Alongside maintenance duties, the Council is also responsible for asserting and protecting the rights of the public, including preventing (so far as possible) the stopping up or obstruction of public paths (e.g., as set out through s 130 of the Highways Act 1980).

The Council, as Surveying Authority, is responsible for maintaining the Definitive Map and Statement (being the legal record of PRow) and keeping this under continuous review.

The data in figure 10.2 (below) is based on a full inventory of the PRow network undertaken between 2005 and 2007. This baseline was collated as a GIS layer but has not been systematically or routinely updated and so is in need of review.

PRow Inventory 2005/07	
Bridges	Stiles

PROW Inventory 2005/07			
Foot bridge	1,107	Ladder stile	296
Culvert	227	One step stile	1,846
Vehicular bridge	141	Two step stile	3,338
Constructed ford	32	Dog stile	47
Stepping stones	23	Stone stile	113
Bridle bridge	19	Metal stile	7
Unassigned type	264	Other	293
Total	1,813	Total	5,940
Fingerposts	9,054	Other structures	
Waymarker posts	13,171	Steps	1,243
Waypost	2,297	Boardwalk	155
		Handrails	168
Gates		Revetment	113
Field gate	6,132	Safety barrier	107
Pedestrian gate	915	Level crossing	28
Wooden gate	1,090	Unassigned type	89
Bridle gate	365		

Fig. 10.2: Table showing PROW inventory.

An estimated valuation of the baseline inventory was previously calculated for the 2005 – 07 data using a model developed by Kent County Council. At that time, the indicative replacement value for the furniture on the network such as stiles, various types of gates, other structures (gaps, rails, boardwalks, revetments etc.), fingerposts, waymark posts, sleeper Bridges, footpath bridges and bridleway bridges was £10,353,794.

3 Performance

3.1 Data collection techniques

The PROW Team currently includes 10 Wardens (9.8 FTE's), reporting to a senior PROW officer, to manage and maintain the network. Each Warden is responsible for the inspection, maintenance, enforcement and improvement of the assets within their area, as outlined on the Council's website at [Warden Areas](#).

The County Council has Agency Agreements with Dartmoor and Exmoor National Park Authorities (NPAs). The NPAs are responsible for the inspection, maintenance,

and enforcement of PROWs within their areas; however, MC12 roads, metalled surfaced paths, and the off-road recreational trails remain with the Council.

The Council also proactively works with parish and town councils (and other community based groups) through the Parish Paths Partnership (P3) – as outlined at [Parish Paths Partnership scheme - Public Rights of Way \(devon.gov.uk\)](#)

PROW Warden Inspections are based on a Warden inspecting each route in their area on the following frequency:

- PROWs and MC12 roads inspected on a three year cycle,
- Off road recreational trails inspected annually, and
- Sections of National Trails inspected annually.

In addition, specialist inspections are carried out by appropriately qualified Council or external staff to assess condition of more significant structural features such as bridges.

PROW warden inspections are supplemented by user/public reports via [Online Reporting](#), feedback from local volunteers (as part of the P3 scheme), and volunteers from interest groups such as the Ramblers, Sustrans, British Horse Society, Two Moors Way Association, and South West Coast Path Association.

The condition of the network is assessed by Wardens in accordance with guidance set out at [PRoW and MC12 roads Condition Criteria](#). This identifies standards that should be achieved.

PROW Wardens use paper copies of maps and note any comments upon them whilst inspecting. An electronic inspection spreadsheet is set up for each Warden to record details of their inspections (such as date of inspection, problems found, length of path passing at inspection, works required and date works completed). Detail about the condition of every piece of path furniture is not currently required to be collected.

Whilst the current methodology is reasonably effective, it could be beneficial to move to an electronic system. In addition to providing clearer, comparable data, this would allow for regular updates to the inventory. Options will be assessed, with subsequent system changes subject to resource implications and associated requirements.

PROWs are normally inspected on foot. Off-road recreational trails may be inspected by bicycle. MC12 roads can be inspected on foot, bicycle or in suitable vehicle.

The PROW Warden Inspection Spreadsheets are set up to enable an ‘ease of use’ percentage to be generated for the County (excluding the NPAs which report on their own ‘ease of use’ figure annually).

Ease of Use is a well-established term from the former Best Value Performance Indicator (BVPI) 178. Ease of use under BVPI178 was defined as “the percentage of the total length of [PROW] which is easy to use by members of the public”. A PROW was regarded as easy to use if it was:

- signposted or waymarked where it leaves a road and to the extent necessary to allow users to follow the PRow,
- free from unlawful obstructions and other interferences to the public’s right of passage (including overhanging vegetation), and
- with surface and lawful barriers (e.g., stiles and gates) in good repair and to a standard necessary to enable the public to use the way without undue inconvenience.

Other relevant criteria are also factored where applicable – for example the British Standard for Gaps, Gates and Stiles BS 5709 (2006 and 2018 editions), and National Trail Quality Standards, developed by Natural England (ref. [National Trails: management standards - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/national-trails-management-standards)).

3.2 Ease of use summary scores

Ease of Use (% Score)					
Year	2017	2018	2019	2020	2021
Public Rights of Way	96.6	97.5	97.9	97.9	96.2
Category 12 Roads	93.4	96.0	96.9	96.3	95.2

Fig. 10.3: The tables show the data collected by Wardens

4 Maintenance Strategy

The information set out below outlines the key factors in determining levels of service.

The previous HIAMP closely related to the Devon Strategic Plan, with priorities linked to the headings of Safe, Connected, Healthy, Prosperous, Resilient, and Sustainable. This continues to be directly applicable, with priorities in the current Strategic Plan identifying:

Responding to the climate emergency, especially:

- More opportunities for cycling and walking and horse riding,
- Helping wildlife and landscapes to recover,
- Encourage sustainable lifestyles, and
- Continue to reduce carbon emissions across all our services.

Supporting recovery and growth, especially:

- Secure investment in transport infrastructure, and
- Maintain, and where necessary, improve our highway network and improve sustainable transport options

Tackling poverty and inequality, especially:

- Promote community cohesion.

Improve health and wellbeing, especially:

- Give people greater opportunities for walking and cycling and horse riding to increase their physical activity.

Supporting people and communities, especially:

- Continue to support our vibrant community and voluntary sector,

- Enable a range of transport options, including public transport, and
- Engage directly with people in meaningful ways and encourage participation in decisions that affect them.

Management and maintenance priorities reflect, and support delivery of the objectives highlighted above, with onus on providing a network which is safe, reliable, and fit for purpose (within any necessary funding and resource constraints). This takes into consideration of current statutory duties and maintenance regimes, as well as the responsibilities of landowners.

A key reference is the Rights of Way Improvement Plan, with priorities developed and reviewed in liaison with stakeholders, including through the Devon Countryside Access Forum.

The Highways Act 1980 identifies certain landowner responsibilities for the provision and maintenance of path furniture such as gates and stiles; and a landowner can potentially claim at least 25% of the cost of replacement from the County Council. Information on this is outlined on GOV.UK at [Public rights of way: landowner responsibilities - GOV.UK \(www.gov.uk\)](https://www.gov.uk/public-rights-of-way-landowner-responsibilities).

The PRow Team will generally co-ordinate provision of path furniture in lieu of payment. This ensures that the furniture, and its installation, meets the British Standard for Gaps, Gates and Stiles (BS5709:2006 or 2018) and can avoid the need to take costly and time-consuming enforcement action against a landowner to secure removal of inappropriate structures.

In accordance with good practice (and as per the RoWIP), the PRow Team no longer supplies stile kits to landowners. Accessible gates, or preferably gaps, provide a far more inclusive measure enabling improved opportunities for people with restricted mobility. However, current legislation does not allow for the Council to insist that an existing stile is replaced with a gap or gate.

- The County Council has a duty to install a signpost where a PRow leaves a metalled highway,
- The County Council has a power to provide waymarking along a PRow in consultation with a landowner,
Bridge maintenance is normally the responsibility of the County Council. Exceptions may exist where, for example, a PRow follows a private track and makes use of a privately maintainable vehicular bridge. The PRow Team directly inspects some bridges and structures for example where there is a clear span of less than 6 metres and culverts and masonry structures with a diameter of less than 1.5 metres. Inspections are on a minimum of a three-year cycle.
EDG undertakes Principal Inspections of the larger bridges and structures as outlined in Annex 11 - Structures.
- The PRow Team delivers on the County Council's powers to divert, create and extinguish PRows in the interest of landowners and / or the public. New legislation resulting from the Deregulation Act will change this power to a duty, with landowners then having a right to apply for changes to the network and for the Council to determine the application within certain timescales,

- The PRow Team manages / processes Road Traffic Regulation Act 1984 temporary closures of the PRow network, and
- Policies and Actions for the management and maintenance of the PRow network are set out in the statutory Rights of Way Improvement Plan 2012. This 10-year plan is currently under review.

4.1 South West Coast Path National Trail and England Coast Path

The PRow team is responsible for the public rights of way and other paths that make up these National Trails where they cross Devon (with the exception of sections managed by Exmoor National Park Authority)

Natural England currently funds up to a maximum of 75% of the maintenance of National Trails and allocates grants on an annual basis. A formal agreement sets out higher condition requirements against an agreed funding formula. Devon sections are made up of 145 kilometres in north Devon and 185 kilometres in south Devon.

The route(s) passes through numerous towns including (north Devon) Lynmouth, Lynton, Ilfracombe, Barnstaple, Bideford; (south Devon) Plymouth, Salcombe, Dartmouth, Brixham, Paignton, Torquay, Teignmouth, Dawlish, Exmouth, Sidmouth, Seaton.

The route(s) also passes through nationally renowned coastal landscapes; cliffs, sandy bays, wooded estuaries, historic harbours.

Walking varies between easy and strenuous, depending on location.

The Path coincides with a number of regional routes including the Tarka Trail ([The Tarka Trail - Welcome to The Tarka Trail](#)), the East Devon Way ([East Devon Way - Explore Devon](#)), the Two Moors Way ([Two Moors Way - Devon's Coast To Coast](#)), and the Exe Estuary Trail ([Exploring the Exe | Exe Estuary Management Partnership \(exe-estuary.org\)](#)).

4.2 Permissive Paths

- Each path may have unique maintenance requirements depending on the respective legal agreement; but generally, the liability for maintenance will fall to the County Council, and
- A scanned copy of each agreement is stored by the PRow Team and details of each route are mapped on to GIS.

4.3 Off-road recreational trails

- The exact extent of this asset is not yet fully digitised. The PRow Team took responsibility for such trails in 2010 but without an accurate record of the asset. A programme has been put in place which seeks to pull together the County Council's legal agreements, leases, title deeds and restrictive covenants for off-road recreational trails. Once this has been completed there will be certainty over precisely which routes the County Council is responsible for and the extent of maintenance liabilities for each section of each route, and
- The majority of such trails are not highway but are managed in a similar way to PRow. As such, the paths are generally not covered by highways legislation. Maintenance liability for every section of trail will vary depending on what was agreed when the trail was established. This information may be

contained in the legal agreements, leases, title deeds, covenants etc. The County Council's liability may extend, for example, to maintenance of the path surface, bridges, boardwalks, adjacent fencing, vegetation (upgrowth and overgrowth), path furniture (gates), benches, art installations, verge cutting, drainage and ditches and signage.

- Currently some leases, licences and structures do not include equestrian use. This issue has been identified by the Devon Countryside Access Forum as an improvement need, with guidance on new schemes highlighting the importance of providing for equestrian use.

4.4 Maintenance Category 12 (MC12) Roads

MC12 Roads are simply vehicular highways that happen, for whatever reason, to have remained or have become unsurfaced and which do not serve property. Often, they are 'green lanes' with a hedge to each side, sometimes with an unsealed stone surface or a completely natural surface. Priority is given to:

- routes that form part of the regional route network, e.g. Two Moors Way,
- routes that provide access to a public right of way,
- routes that provide the only off-road access in a parish, and
- routes that provide links to villages, schools, health providers etc.

Through the 'Changing Lanes' process, some formerly-sealed roads are being re-categorised as MC 12 roads and so the County Council will have to manage their deterioration in a safe manner. Regardless of their condition, they are highways coming under the full auspices of the Highways Act 1980.

4.5 Parish Paths Partnership (P3)

The Parish Paths Partnerships Scheme is an initiative that encourages communities to look after the maintenance of their rights of way network. It has the support of the National Association of Local Councils and is Council funded. The Highway Authority works in partnership with Parish/Town Councils, landowners, and local voluntary groups to improve the condition of the local rights of way and keep them open and used. 167 parish councils participate to date.

Parish/Town Councils in the scheme receive a grant from the Council based on their mileage of paths. All P3 groups undertake an annual survey of the local network of paths and, from this, projects are planned and completed. The following web pages provides the details of the P3 scheme: <https://www.devon.gov.uk/prow/parish-paths-partnership-scheme/>.

5 Levels of Service and Investment Strategy

As set out above, service levels are guided by the Public Rights of Way Condition Criteria, and relevant national guidance including National Trail Quality Standards and British Standards. The RoWIP is also a key tool.

Subsequent work plan priorities are largely identified through inspection regimes, and also through community consultation through the Parish Paths Partnership scheme.

In addition to the identified improvement action to update the asset inventory, it is proposed that management plans be drafted for higher profile trails and cycle routes.

The table below summarises likely impacts should funding constraints require a reduction in service delivery;

Cost Cutting Measures	Impact on Service
Reduction in 'ease of use' from current 90 +% to 80%	Serious impact on the Council's reputation with increase in complaints from users and staff
Reduction in major bridge replacement	/money resource in dealing with subsequent issues
No enhanced maintenance of the National Trail or Regional routes	Significant impact on tourism reliant on good quality path network. (National and Regional routes are of major value to Devon's reputation as a holiday destination).
Reactive vegetation cutting only	Impact on national agendas such as Active Travel Strategy and Health & Wellbeing targets
Reduction of P3 grants and number of parishes participating in the scheme	Loss of good working relationships with other Agencies and parish councils
Termination of National Park agency agreements and East Devon District Council arrangement for the coast path	Potential claims from accidents arising from safety defects.
Reduced maintenance of cycle/ multi use trail network and MC12 network closures	Decline in safe off road cycle and horse-riding routes
	Decline in the Council's policy of encouraging path use by less able members of the community
	Increased costs from reactive maintenance resulting in Sect 56 HA action against the Council

Fi. 10.4: Likely impacts of reduction in service delivery

6 Programme Development

Annual improvement / capital programmes are put together based on need and deliverability; this being considered in accordance with objectives set out within the RoWIP.

Unlike road improvements, generally a PROW improvement will require substantial landowner liaison (for example, to negotiate issues such as access to the site with machinery, keeping worksites stock-proof and timing of works to minimise damage to neighbouring land).

Improvements to the cycle route / trail network can be more easily programmed where Devon County Council is also the landowner or land manager.

Works programmes are currently annual.

7 Risks

Risk management is most relevant with regards to climate change, local economy, health and well-being, and public safety:

- The county council has recognised the necessity of managing the network to reflect increased frequency of and damage to the network through severe weather events. This includes issues such as flooding, erosion, and high winds.
- The economic drivers – The importance of the Public Rights of Way Network (PRoW) to the local economy as demonstrated by the £157m direct spend by users of the South West Coast Path during 2012 and by the closure of the PRoW network during the Foot and Mouth crisis in 2001 which is estimated to have cost Devon's economy more than £400 million.
- Health and wellbeing strategies - There is clear evidence that well maintained, easy to use public rights of way encourage people to use them. In contrast, poorly maintained, damaged or closed routes discourage use and therefore discourage exercise and engagement with the natural environment. There is also clear and growing evidence demonstrating that an increase in exercise leads to a decrease in physical and mental health problems, with associated decreased burden on the NHS and public purse. For example, inactivity in England is estimated to cost the NHS an additional 1.06 billion each year and problems relating to overweight, and obesity cost an additional 5 billion each year.
- Meeting inspection frequencies – Appropriate inspection regimes, in combination with effective maintenance works are essential in meeting relevant statutory requirements, ensuring public safety, and minimising claims against Devon County Council for damages and personal injuries.
- Financial resilience / resources – Financial constraints and growth in the length of the network to be maintained create pressures in meeting and sustaining quality standards. This potentially impacts across all the risks outlined above.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Public Rights of Way asset management objectives are achieved are:

- Review and update the PRoW inventory and associated GIS layer,
- Identify software and hardware options to support inspections and condition assessments, and to keep the inventory up to date,
- Review and update records to clearly identify the extent of permissive agreements and legal status of recreational trails. This includes leases,

licences, and Devon County Council ownership. Utilise this data to inform trail specific management and maintenance plans,

- Improve functionality, accuracy, and response times for user reports,
- Review and where practicable, adjust seasonal vegetation cuts to further enhance biodiversity,
- Investigate materials and construction techniques for surface and drainage works to minimise carbon whilst optimising ease of use and environmental impact,
- Continuing work to address / remove physical obstacles to improve equity of access, and
- Prioritise path orders to facilitate diversions and creations to improve accessibility, enjoyment and land management.

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Useful References

1. [Outdoor access and recreation: Access and rights of way - detailed information - GOV.UK \(www.gov.uk\)](#)
2. [Public rights of way local authority responsibilities - GOV.UK \(www.gov.uk\)](#)
3. [Rights of way circular \(1/09\) - GOV.UK \(www.gov.uk\)](#)
4. [Definitive maps of public rights of way: change the legal records - GOV.UK \(www.gov.uk\)](#)
5. [The Natural Choice: securing the value of nature CM 8082 \(publishing.service.gov.uk\)](#)
6. [Devon Local Nature Partnership \(devonlnp.org.uk\)](#)
7. [Access - Devon Local Nature Partnership \(devonlnp.org.uk\)](#)
8. [State of Environment report - Devon Local Nature Partnership \(devonlnp.org.uk\)](#)
9. [Explore Devon's environment, wildlife and heritage - Explore Devon](#)
10. [New guidance on shared use routes | Cycling UK](#)
11. [Share, respect and enjoy the National Cycle Network - Sustrans.org.uk](#)
12. [Leaflets and downloads | The British Horse Society \(bhs.org.uk\)](#)

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Annex 11 – Structures

1	Introduction	1
2	Inventory	3
2.1	Asset Types.....	3
2.2	Asset Data.....	4
	Basic Inventory Data	4
	Legal Data	4
	Condition data	4
	Structural Assessment & Review data.....	4
	Workbank	4
	Repair history	4
	Health and Safety File Information	4
2.3	Inspections	5
	Safety Inspections	5
	General Inspections.....	5
	Principal Inspections.....	5
	Special Inspections.....	5
	Inspection for assessment.....	6
3	Performance	7
3.1	Performance Measures	7
	B1: Bridge Condition using BCI	12
	B3: Load Carrying Capacity.....	12
	B4: Overdue Bridge General Inspections (GI's)	13
	B5: Risk Management Approach for Bridge Principal Inspections (PI's) ...	13
	B6: Post Tensioned Special Inspections (PTSI's)	14
	B2 & B7: Retaining Walls	14
	Work Bank.....	14
4	Maintenance Strategy	15
4.1	Creation of a new asset.....	16
4.2	Routine and Reactive Maintenance.....	16
4.3	Renewal or replacement.....	17
4.4	Decommissioning of the asset.....	17
5	Levels of Service and Investment Strategy.....	18
5.1	Levels of Service	18
5.2	Investment Strategy.....	19

Annex 11 – Structures

6	Programme Development	21
6.1	Identifying Schemes for an Initial Works Programme	21
6.2	Prioritising the Works Programme	22
6.3	Structures Asset Valuation and Investment Tool (SAVI)	25
7	Risks	26
7.1	Climate change	26
7.2	Defects in Hidden Bridge Components.....	26
7.3	Funding	27
7.4	Bridge Safeguarding.....	27
8	Improvement Actions	28
9	References	32

Appendices

Appendix 11 – 1 Good Practice Guide BM3 Dealing with Graffiti

Version Control		
Version	Date	Summary of Changes
0.1	10.03.2023	For consideration by Cabinet

1 Introduction

Devon County Council (the Council) has the largest Local Authority managed highway network in the UK and is responsible for a bridge stock of over 3000 Council owned and unknown ownership bridges and nearly 2000 retaining walls with a Gross Replacement Cost of just under £1.5 billion. As Highways Authority, the Council also has an interest in other owner structures that span or support the highway, which include 724 bridges. Highway structures include bridges, culverts, subways, footbridges, retaining walls and miscellaneous structures such as reinforced earth embankments, sea walls, rockfaces and cuttings, sign and signal gantries, and traffic signal masts. In addition to the Highway structures, the Council owns Public Rights of Way (PROW) structures which are discussed in Annex 10 – Public Rights of Way.

The Engineering Design Group (EDG) Bridges and Structures Group is part of the Climate Change, Environment and Transport Group of the Council and provides the following services:

- Bridges and Structures Asset Management,
- Bridge and Structures Inspection and Maintenance,
- Design of new Highway and Cycleway bridges and structures, and
- Technical Approval Authority (TAA).

In accordance with the National Code of Practice 'Well-Managed Highway Infrastructure'¹ the following highway structures are the responsibility of the EDG Bridges and Structures Asset Management Team:

- Council bridges (footbridges, subways, underpasses, tunnels, cellars, vaults, culverts, pipes etc) with a span of 1.5m or more,
- Retaining walls associated with the highway with a retained height of 1.35m or more, and
- Gantries / cantilever structures / masts for signage, CCTV and traffic signals classed as a structure in CS 450 – Inspection of highway structures²,

In addition to the above, the EDG Bridges and Structures Asset Management Team are also responsible for the following:

- Corrugated steel pipes with a span of 0.9m or more, and
- Specific culverts with a span of less than 1.5m that are considered by the Flood Risk team to present a significant flood risk should they block.

Data on the actual current condition and performance of assets is obtained from inspections, testing and monitoring and assessment of structures. Since 2016 significant work has been undertaken by the EDG Bridges and Structures Asset Management Team to determine the condition and performance of the highway structures assets. This work has ensured that maintenance strategies and annual maintenance programmes of work focus on high risk and critical condition structures on key networks such as the Resilient Network and Major Road Network (MRN). Increasing pressure on budgets and resources combined with external factors such as climate change means that achieving asset management objectives and the levels of service that deliver a road network which is as safe, reliable and as fit for purpose as possible is becoming more challenging. Reviews have been undertaken

and actions have been identified to ensure that where possible asset management objectives are achieved.

DRAFT

2 Inventory

2.1 Asset Types

Highway structures are split into different asset types and comprise bridges (both vehicular and pedestrian), culverts, subways, retaining walls and miscellaneous structures such as reinforced earth embankments, sign and signal gantries, and traffic signal masts. The extent of Council owned and other owner Highway structures assets as of September 2022 is shown in Figure 11.1 below.

Type of Asset	Council owned & unknown ownership	Other owners
Bridge	3079	1086
Retaining Wall	1723	42
Gantry	2	0
Signal Cantilever	22	0
Slope Stabilisation & Rockface Management	55	2
Sea Walls	78	19
Art Sculpture/Monument	2	0
TOTAL	4961	1149

Fig. 11.1: Extent of Council owned and other owner Highway structures assets (Sept 2022)

Within Devon the type of bridge varies from traditional masonry arches to reinforced concrete, steel and timber bridges. Over a third of the County's bridges are masonry arches. Figure 11.2 below shows the number of bridges per construction type.

Primary Construction Type	Number
Arch	1931
Beam; Beam & jack arch; Beam and slab	237
Box; Box Girder	170
Cable stayed	3
Cantilever; Cantilever and suspended span	2
Clapper	95
Composite slab	76
Corrugated steel	2
Filler beam	2
Laminated beam	5
Opening	4
Pipe	76
Portal frame	5
Solid slab	335
Suspension bridge	1
Through girder	28
Troughing/Metal plate	31
Truss	12
Tunnel	3

Primary Construction Type	Number
Unknown	29
Voided slab	32
Grand Total	3079

Fig. 11.2: Number of Council and other unknown ownership bridges per construction type (Sept 2022)

2.2 Asset Data

The Council holds detailed asset information about its structure assets in the Bridge Management System (BMS) known as WDM's Structures Management System (SMS). The asset data held within the system can be summarised as follows:

Basic Inventory Data

This includes age, construction type, dimensions, location information; obstacle crossed i.e. road over rail. General and Principal Inspections are also used to check the validity of data held on individual structures. More detailed data is provided by Special Inspections and testing. Further information on the various types of inspection can be found later in this Section.

Legal Data

This includes ownership information, licences and legal agreements.

Condition data

General and Principal Inspections, supplemented by Special Inspections, testing and monitoring provide condition data.

Structural Assessment & Review data

Principal Inspections identify structures which need a structural assessment. The assessment quantifies the load bearing capacity of the structure in accordance with the appropriate current standards and identifies substandard structures, which require improving or monitoring or a weight restriction.

Workbank

This is a list of all identified work by the inspectors, which they either undertake or is put into a works programme.

Repair history

This is updated when works are undertaken and includes the date, type and cost of repair, including details of the element repaired.

Health and Safety File Information

On completion of a scheme relevant health and safety information to be taken into account during any subsequent project, such as as-built drawings and maintenance manuals, is uploaded into SMS.

The Asset inventory is also updated following significant maintenance work; completion of developer schemes; creation of new assets; or 'discovery' of existing structures.

2.3 Inspections

Inspections are carried out in accordance with the requirements of CS 450 – Inspection of highway structures² and the Council Inspection of Highway Structures Policy.

There are five types of maintenance inspection as detailed in CS 450².

Safety Inspections

As defined in CS 450², safety inspections are not specific to highway structures and generally cover all fixed assets on the highway network, including carriageways, footways, structures, drainage, verges and lighting. They are undertaken in addition to planned maintenance inspections either routinely by Bridge Inspectors, Neighbourhood Highway Officers and the Term Maintenance Contractor when driving the network or in response to reports of a defect by a third party such as accident/impact damage to a structure. Safety Inspections identify significant deficiencies or signs of damage which represent, or can lead to, a danger to the public or high maintenance costs and therefore require immediate or urgent attention. Actions from the inspections are dealt with as an immediate risk to public safety or prioritised for action in accordance with asset management principles.

General Inspections

General Inspections (GI's) of the entire bridge stock are currently undertaken on a nominal 2-yearly cycle to provide information on the physical condition of all visible elements to ensure the structures remain fit for purpose and safe to use.

Principal Inspections

More detailed Principal Inspections (PI's) are undertaken every 6 to 12 years, depending on bridge type and other risk-based factors, to provide information on the physical condition of all accessible parts of a highway structure. The Council has adopted a risk-based approach to Principal Inspections to increase the inspection interval on non-critical structures in accordance with the risk-based approach described in Chapter 8 of CS 450². Critical structures and those structures that are managed under Sub-standard structures managed under CS 470 - The Management of sub-standard highway structures³ are not eligible for increased Principal Inspection intervals.

As well as adopting the CS 450² risk-based approach to Principal Inspection intervals on non-critical structures, a risk-based priority framework has been developed as a means of prioritising structures for Principal Inspection when the number of structures due a principal inspection is more than the number of inspections which will be undertaken. Focus has been on PI's of complex and higher risk structures such as post-tensioned bridges, where undetected defects could result in sudden collapse, and road over rail bridges due to significant consequence of bridge failure over a live railway line.

GI's and PI's include dive inspection of underwater elements; roped access; and confined space inspections, which are all undertaken on a 2-year cycle.

Special Inspections

Special Inspections are required to provide more detailed information in response to the specific characteristics of the structure such as post-tensioned bridges; a recommendation identified by a GI or PI; certain events, such as the transit of a

significant abnormal load, or a flood; or a recommendation to consider parts of the structure more closely or at a more frequent interval than the normal general and principal inspection regime. Types of Special Inspection include defect monitoring, defects are monitored in accordance with the Council's defect monitoring procedure as described in the Council's Inspection of Highway Structures Policy. The procedure includes structures where there is an issue i.e. major cracking, short term until a scheme is implemented and longer term to determine whether there is an issue that needs to be resolved and included in a future programme. A rolling programme of Post-Tensioned Special Inspections (PTSI's) is undertaken in accordance with CS 465 - Management of post-tensioned concrete bridges⁴.

Inspection for assessment

As part of the Principal Inspection reporting, a structural review in accordance with CS 451 - Structural review and assessment of highway structures⁵ is undertaken to determine if an assessment is required. An Inspection for assessment provides the information required to undertake a structural assessment.

The results of inspections are recorded in accordance with the CSS (County Surveyors Society) Bridge Condition Index (BCI) procedures⁶, which is described in more detail in Section 3.0 Performance.

3 Performance

Data on the actual current condition and performance of assets is obtained from inspections, testing and monitoring and assessment of structures as described in Section 2 Inventory. Gathering good quality asset condition data enables the bridges and structures asset team to identify changes in condition of the assets, monitor performance and to respond to any urgent needs or emergencies. The data also informs the development of a Highway Structures Asset Programme and lifecycle plans as discussed in Section 6 Programme Development. This section describes the performance targets set by EDG Bridges and Structures Group, the performance measures used and the historical and current performance in relation to these measures.

3.1 Performance Measures

The Code of Practice¹ recommends that the following should be considered when identifying performance measures for use in asset management planning:

- Performance measures for highway structures that are already in use, such as Condition Performance Indicator (PI);
- Performance measures that have been developed, or are under development, for highway structures, such as Availability PI, Reliability PI and Structures Backlog; and
- Additional performance measures that may be needed to reflect the levels of service for the overall network and for measuring the effectiveness and efficiency of the planning and delivery processes.

The Condition PI is also referred to as the Bridge Condition Indicator (BCI) and is a measure of the physical condition of a structure, ranging from 100 (best condition) to 0, (worst condition).

The Bridge Stock Condition Index (BSCI) is the numerical value of all the bridge stock condition evaluated as an average of the BCI values weighted by the deck area (m²) of each bridge.

The interpretation of the Bridge Condition Indicator (BCI) values is given in Figure 11.3 below.

BCI Range	Condition BCI Score (all bridge elements)	Additional Comments
100 to 90 Very Good	The structure is in a “Very Good” condition overall.	<ul style="list-style-type: none"> Likely to be no significant defects in any elements.
90 to 80 Good	The structure is in a “Good” condition overall.	<ul style="list-style-type: none"> Mostly minor defects/damage but may also be some moderate defects.
80 to 65 Fair	The Structure is in a “Fair” condition.	<ul style="list-style-type: none"> Minor to moderate defects / damage. One or more functions of the structure may be significantly affected
65 to 40 Poor	The Structure is in a “Poor” condition.	<ul style="list-style-type: none"> Moderate to severe defects / damage. One or more functions of the structure may be severely affected
40 to 0 Very Poor	The Structure is in a “Very Poor” condition.	<ul style="list-style-type: none"> Severe defects / damage to a number of elements. One or more elements may have failed. Structure may be unserviceable.

Fig. 11.3: Interpretation of CSS BCI Values

The Availability PI is a measure of the reduction in the Level of Service provided, on a highway network, due to restrictions placed on highway structures. The Reliability PI is a representation of the ability of the structure stock to support traffic, and other appropriate loading, taking into account the consequence of failure. The structures backlog is the monetary value of work required to close the gap between the actual performance provided by an asset and the current required performance. Detailed guidance on performance measures is provided in the suite of Guidance Documents for Performance Measurement of Highway Structures⁷.

The use of the Condition Performance Indicator is now established and based upon reasonable experience, however, further work is required before the other three indicators can be adopted.

ADEPT (formerly The CSS Bridges Group) has developed the following suggested performance indicators:

- Bridges not meeting highway authority's required carrying capacity as a percentage of total stock,
- Annual maintenance expenditure on bridges as a percentage of stock value, and
- Annual maintenance expenditure on retaining walls as a percentage of stock value.

The EDG Bridges and Structures Group have set the following high level performance targets:

- All bridges and retaining walls on the MRN, Resilient Network and 'A' roads shall be BCI good +80 condition by 2028,
- All road over rail bridges shall be BCI good +80 condition by 2028;
- All bridges on the remaining network with a severe score shall be BCI fair +65 condition by 2028,
- All bridges on the remaining network with a poor and very poor score shall have a management plan in place by 2028,
- All bridges with a capacity less than 40T shall have a management plan in place by 2025 and where required shall be weight restricted or strengthened by 2028,
- Reduce the backlog of bridge GI's to all in date by 2025 and thereafter to maintain all GI's in date,
- All bridges identified as requiring a PI in accordance with the risk management approach shall have an in date PI in place by 2028,
- All Post Tensioned bridges shall have in date PTSI's by 2024 and a longer term management strategy in place by 2024, and
- 95% of vegetation shall be removed from retaining walls on the MRN, Resilient Network and 'A' roads to allow thorough inspection to be carried out by 2028.

The performance indicators for the high-level targets currently adopted by the EDG Bridges and Structures Group are shown in Figure 11.4 below.

PI Ref	Performance Area	Target	Performance Indicator (PI)	Accountable Manager	Frequency of data capture	Support actions and key strategies
B1a	Bridge Condition	All bridges on the MRN, Resilient Network and 'A' roads shall be BCI ≥ 80 by 2028	Report on condition of the bridge stock using the CSS BCI performance measure	Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B1b		All road over rail bridges shall be BCI ≥ 80 by 2028		Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B1c		All bridges on the remaining network with a severe score shall be BCI ≥ 65 by 2028		Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B1d		All bridges on the remaining network with a poor and very poor score shall have a management plan in place by 2028		Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B2	Retaining Wall Condition	All retaining walls on the MRN, Resilient Network and 'A' roads shall be BCI ≥ 80 by 2028	Report on condition of the retaining wall stock using the CSS BCI performance measure	Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B3a	Capacity	All bridges with a capacity less than 40T shall have a management plan in place by 2025	Report on % of bridge stock not meeting the required carrying capacity without a management plan in place	Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B3b		All bridges with a capacity less than 40T shall be weight restricted or strengthened by 2028	Report on % of bridge stock not meeting the required carrying capacity without a weight restriction	Principal Engineer (SAM)	Yearly	Management Plan Review meeting

PI Ref	Performance Area	Target	Performance Indicator (PI)	Accountable Manager	Frequency of data capture	Support actions and key strategies
B4	General Inspections (GI's)	All bridge GI's shall be in date by 2025	Report on % of bridge stock with an overdue GI	Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B5	Principal Inspections (PI's)	All bridges identified as requiring a PI in accordance with the risk management approach shall have an in date PI in place by 2028	Report on % of bridges requiring a PI with an overdue PI	Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B6a	Post Tensioned Special Inspections (PTSI's)	All Post Tensioned bridges shall have in date PTSI's by 2024	Report on % of Post Tensioned bridges with an overdue PTSI	Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B6b	Special Inspections (PTSI's)	All Post Tensioned bridges shall have a longer term management strategy in place by 2024	Report on % of Post Tensioned bridges without a management strategy in place	Principal Engineer (SAM)	Yearly	Management Plan Review meeting
B7	Vegetation Cover	95% of vegetation shall be removed from retaining walls on the MRN, Resilient Network and 'A' roads to allow thorough inspection to be carried out by 2028	Report on % of retaining walls with extensive (>50%) vegetation cover.	Principal Engineer (SAM)	Yearly	Management Plan Review Meeting

Fig. 11.4: Asset Management Performance Indicators (2022/28)

B1: Bridge Condition using BCI

Figure 11.5 below shows that there are 2523 bridges in the very good to good condition; 308 in fair condition; 19 in poor condition; 2 in very poor condition and 227 with either a calculation error or no score (September 2022).

DCC are not following the CSS document strictly as concerns have been raised nationally leading to the recently completed consultation for a revised document. The Bridge Stock Condition Index (BSCI) is the numerical value of a bridge stock condition evaluated as an average of the BCI values weighted by the deck area (m²) of each bridge. The score is a measure of durability and structural safety (capacity).

As it's not possible to easily differentiate between these two factors (durability and structural safety), the Councils bridge engineers have undertaken a review (which is ongoing) of the 329 bridges with a fair to very poor score and no issues relating to safety have been discovered thus far which aren't already being dealt with. For example, 3 bridges supporting the MRN have low scores, two of these have been subsequently strengthened and one is being strengthened. The improvement actions in Performance Section 11 have been included to address this issue: Documented management plan to be put in place for all bridges with a poor and very poor score. Any national changes to the BCI scoring regime will be considered for implementation and updated as necessary to reflect any future amendments to the CSS guidance documents.

Bridges are subject to a General Inspection every 2 years and the Councils bridge inspectors ensure any serious safety related issues are raised with the Bridges and Structures Asset Management Team and dealt with urgently.

BCI Range	Condition	No.
100 to 90	Very Good	1397
90 to 80	Good	1126
80 to 65	Fair	308
65 to 40	Poor	19
40 to 0	Very Poor	2
-999	calculation error	189
no score		38
TOTAL		3079

Fig. 11. 5: BCI scores for Council owned bridges (Sept 2022)

B3: Load Carrying Capacity

This percentage only relates to bridges that support vehicles i.e. footbridges are not included. The 77 signed weight restriction bridges (July 2022), where the required capacity has been reduced with agreement of the local community, are deemed to be meeting the required capacity.

When an assessment shows a bridge to be sub-standard or provisionally sub-standard then the risk management procedures contained in CS 470 - Management

of sub-standard highway structures³ are followed. This means that interim measures such as a weight restriction; traffic management restrictions or a regime of monitoring is imposed on the structure to minimise the risk of asset failure. Weight limits may be accepted by the Highway Authority as a permanent measure.

All restrictions affect the performance of the network and availability to all users.

A recent high level review (July 2022) of the signed weight restriction against the assessed load capacity for Council and non- Council owned bridges identified that there are 83 bridges, excluding clapper bridges, that have an assessed capacity less than 40T (3 – 38T) without any signage and 15 bridges that have signage different to the assessed capacity. There are also 145 Council owned and unknown ownership bridges, excluding clapper bridges, without assessed capacity information in SMS, 11 of which are on 'A' roads

A clapper bridge is a simple bridge consisting of slabs of stone or planks laid across a series of rocks or piles of stones. The Council owns 94 clapper bridges, the majority of which have an assessed capacity less than 40T (3 – 38T). The load carrying capacity of clapper bridges is difficult to assess reliably because of the dimensional and material property variability of the individual units. A conservative model is used for the assessment combined with conservative material properties resulting in very low load capacities that are far below the vehicle loadings that the bridges will have carried over many years of use without signs of failure. Some clapper bridges have been strengthened where they carry higher class roads that have greater traffic flows. The remainder carry lower class routes, and as they are small span structures with generally low headroom, they are considered at low risk of failing.

B4: Overdue Bridge General Inspections (GI's)

Attention has been focussed on reducing the number of overdue bridge GI's. In 2018 there were 1268 Bridge GI's overdue (in excess of the 2-year inspection interval), which has been reduced to 438 as of June 2022.

B5: Risk Management Approach for Bridge Principal Inspections (PI's)

As stated in Section 2, the Council has adopted a risk-based approach to PI's to increase the inspection interval on non-critical structures in accordance with the risk-based approach described in Chapter 8 of CS 450². Work is ongoing to risk assess all bridges requiring a PI as per the risk management approach.

B6: Post Tensioned Special Inspections (PTSI's)

As stated in Section 2, post-tensioned bridges are complex, high risk structures, where undetected defects could result in sudden collapse. Attention has been focussed on eliminating the backlog of overdue PTSI's and reviewing Stage 1 PTSI reports that have been carried out in accordance with the old code to bring them in line with CS 465⁴ to ensure that all are current and in date by 2024. A project is currently being undertaken to produce a longer term management strategy for all post-tensioned bridges.

B2 & B7: Retaining Walls

The condition of the retaining wall stock reflects the lack of inspection & maintenance this asset class has had. There is also a problem with carrying out an adequate inspection because of vegetation growth to a significant proportion of the stock, which consequently affects the Condition Indicator score. Performance indicator B7 has been introduced to resolve this issue on the MRN, Resilient Network and 'A' roads.

Work Bank

The structures work bank documents the maintenance needs and costs and should form the basis of the subsequent Value Management and Value Engineering processes. There is currently a high degree of under reporting as up until November 2021 the SMS workbank and repair history only contained data for works identified and undertaken from General Inspections of bridges. The aim is that all maintenance tasks required on highway structures (Revenue and Capital) and the associated cost estimates are documented in the structures workbank and the repair history is linked to the work bank so that completed works are recorded.

Actions to address the findings from the above reviews and improve condition and performance are described in Chapter 8 Improvement Actions.

4 Maintenance Strategy

Highway Authorities have a statutory duty to maintain assets. Maintenance of bridges and other highway structures is undertaken to ensure that they do not deteriorate to a standard that compromises the functionality of the highway network through closures and weight restrictions

Section C.6 of the Code of Practice¹ states: *“The purpose of maintenance is to repair damage caused by deterioration, vehicle impact or vandalism, slow down or prevent the deterioration process and, where appropriate, meet the changing demands of users.”*

Different bridge types require different maintenance and inspection regimes. Some are very robust and require minimal maintenance, whilst others such as post tensioned bridges and moveable bridges require significant ongoing costs.

Masonry arch bridges are very robust and deteriorate very slowly provided they are protected from scour of their foundations. The main cause of masonry arch bridge failure is from scour often caused by debris build-up against the bridge during a flood event. Inspections are required to keep a check on any structural issues and scour inspections following flood events. Hence there is a continual risk which will need to be managed.

Higher risk structures, such as post tensioned bridges are maintained and inspected more frequently, to prevent unpredicted collapse. The potential for loss of life, disruption and financial consequences could be significant if these bridges are not maintained in a good condition.

Steel bridges and reinforced concrete bridges have a range of maintenance issues depending upon the quality of materials used, workmanship and types of exposure. They are generally designed for 120-year lifespan, but some show significant issues within half of their operational lifespan.

Timber bridges have a lesser lifespan (typically 15 – 30 years) than masonry and concrete and tend to be on cycleways and PROW's. Regular maintenance of these structures is required to prevent closures of cycleways and footpaths.

The Council is responsible for 335 listed bridges, 147m of listed retaining walls and 14 scheduled ancient monuments, 6 of which are also listed.

Movable Bridges such as the Exeter Canal Swing and Bascule bridges on Bridge Road Exeter, Shaldon Bridge Lifting Span and River Yeo Cycle & Footbridge in Barnstaple cross a navigable waterway. These need to be maintained to ensure they remain operable.

Maintenance is considered at all stages of the project workflow through integration of design and construction knowledge with operations and maintenance experience to ensure the ease, accuracy, safety, and economy of future maintenance tasks.

The majority of activities associated with the management of highway structures are carried out in accordance with the standards and advice contained within the National Highways Design Manual for Roads and Bridges (DMRB)⁸. However, there are circumstances where lesser standards are acceptable such as undertaking

repair to part of an element or repair of accident damage. Further details are provided in Section C.4. of the Code of Practice¹.

Contract documents and procedures for all tendered contracts associated with the management of highway structures are generally prepared in accordance with the National Highways Manual of Contract Documents for Highway Works (MCHW)⁹, which includes the Specification for Highway Works. Departures from the advice contained in the standard documents are recorded in Feasibility Reports, Approval in Principle (AIP) documentation or Tender Appraisal Reports as appropriate.

EDG Bridges and Structures Group also produce Policy, Procedure and Good Practice Guides where appropriate. A good example of this is the good practice guide 'Dealing with graffiti on Highway Structures' which can be found in [Appendix 11-1](#).

4.1 Creation of a new asset

New highway structures assets are created from new highway and cycleway schemes, highway stabilisation schemes or adoption of structures from developer schemes.

The Council Policy and Procedure documents for the maintenance audit of bridges and structures schemes^{10,11} define a process to ensure that as far as reasonably practicable future maintenance requirements and costs of new and improved bridges and highway structures schemes are carefully considered at the earliest stage to minimise future network disruption and lifecycle costs without compromising other important aspects such as access arrangements, environmental and sustainability issues, etc.

The Policy requires that information for future maintenance is recorded and passed to the maintainer in the form of as built drawings and maintenance manuals and stored in the structures asset management system SMS.

Technical approval is required for all new and existing structures with potential highway implications whether or not they are eventually intended to be adopted by the County Council. The process relates to design, construction, assessment, alteration, strengthening and repair to ensure that all structures are safe, durable, and in the case of structures proposed for adoption, are designed to require minimal maintenance. EDG Bridges and Structures acts as the Technical Approval Authority (TAA) on behalf of the County Council.

4.2 Routine and Reactive Maintenance

Regular and/or cyclical routine maintenance of bridges and other highway structures is undertaken to maintain their condition and functionality by protecting them from deterioration or slowing down the rate of deterioration, and thus reducing the need for reactive maintenance.

Regular maintenance undertaken by EDG Bridges and Structures includes routine electrical, hydraulic and mechanical maintenance of moving bridges, such as the Bridge Road Canal Swing and Bascule bridges, Shaldon Bridge Lifting Span and River Yeo Cycle & Footbridge.

In addition, minor maintenance, such as vegetation clearance and cleaning out of expansion joints is overseen by the Bridge Inspectors using the Revenue Budget.

Reactive maintenance includes emergency work that must be dealt with immediately on safety grounds such as parapet repairs following a bridge strike or removal of debris build up following a flood event, and essential maintenance work. Defects are identified through inspections (refer to Section 2.0 above) or reports of a defect by a third party. Work includes major concrete, masonry and steelwork repairs and scour repairs that must be carried out to prevent the structure becoming unsafe. If works cannot be carried out immediately, temporary or permanent restrictions such as weight or traffic management restrictions are applied.

The Bridges and Structures (BAS) Revenue Budget is used for emergency repairs, whilst the BAS Capital Budget is used to invest in Devon County Council's assets either by creating new assets or improving existing assets.

4.3 Renewal or replacement

Refurbishment and/or strengthening of structures are determined from inspections and assessments.

Structures are replaced when they reach the end of their serviceable life; when refurbishment and/or strengthening of a structure is more costly than replacement; or when structural failure occurs.

4.4 Decommissioning of the asset

Highway structures are decommissioned when they become redundant either due to the creation of an alternative structure or due to the extinguishment of a highway or PROW.

5 Levels of Service and Investment Strategy

5.1 Levels of Service

Figure 11.6 below documents the Levels of Service that demonstrate the relationship between the Council's corporate objectives, including the Strategic Plan for 2021 - 2025, and the performance of highway structures assets in terms of stakeholder requirements. The Levels of Service represent the fundamental service aimed at helping to deliver a road network which is as safe, reliable and as fit for purpose as possible within the current funding and resource constraints.

Measure	Responding to the climate emergency	Be ambitious for children and young people	Support Sustainable economic recovery	Tackle poverty and inequality	Improve health and wellbeing	Help communities to be safe, connected, and resilient
Carry out structures inspections in accordance with the National Code of Practice ¹ .			✓			✓
Monitor those structures considered to be below standard.			✓			✓
Using condition data develop and deliver an annual programme of bridge and retaining wall maintenance and structural repairs to maintain structures within available budgets.	✓		✓		✓	✓
Target structures which are in the Poor/Very Poor condition band where this has a potential impact on safety.			✓			✓

Fig. 11.6: Levels of Service.

Construction activity results in production of CO₂. Future management processes of the highway network are vital to the Council's contribution to a Net-Zero Devon, and

exploiting the economic opportunities presented by green technology will be central to bringing more higher value and sustainable employment to the County.

Highway structures contribute to the achievement of responding to the climate emergency, improving health and wellbeing by maintaining and improving walking and cycling infrastructure such as cycle/footbridges and boardwalks. Over the next few years budget has been allocated to replacing the Gem Aerial Walkway on the Drakes trail and improving Courtlands Boardwalk, which is part of the Exe Estuary trail. This is in addition to the budget allocated yearly to the refurbishment or replacement of footbridges.

The environmental review process is undertaken for all highway structures schemes.

As discussed in the HIAMP, Devon has developed a carbon calculator in conjunction with Exeter University. This tool will be used by designers on larger highway structures schemes as part of the design process to estimate both carbon emissions and carbon cost against various treatment solutions. Carbon data from Contractor's working on highway structures schemes will come through the carbon web form.

Carbon reductions using alternative design solutions, materials and working practices have already been used in Devon to reduce our carbon footprint, including the use of fibre reinforced plastics for new bridges rather than high carbon options such as steel and concrete. The use of recycled tyre bales for constructing retaining structures provides a significant reduction in the use of concrete and aggregate as well as less transportation of materials. Advances in concrete technologies and the use of admixes reduces the cement content and less quarrying activity. Other innovations, which have been used many times in Devon over the past 10 years, including soil nailing and anchored piled walls to stabilise highway embankments and reinforced earth, also reduce the reliance on traditional concrete retaining walls, which have a higher carbon footprint.

Work is currently being undertaken on a research project with Brunel University to consider the use of masonry arch bridges rather than modern concrete and steel bridges, to replace weak bridges in Devon, as they perform well and have a much longer lifespan and lower carbon footprint than concrete and steel bridges.

Sustainable economic recovery is supported by ensuring network availability and condition supports freight distribution and commuter travel to work, whilst maintaining access arrangements for all communities helps communities to be safe, connected, and resilient. These objectives are achieved by carrying out structures inspections in accordance with the Code of Practice¹; monitoring those structures considered to be below standard; using condition data to develop and deliver an annual programme of bridge and retaining wall maintenance and structural repairs to maintain structures within available budgets; and by targeting structures which are in the Poor/Very Poor condition band where this has a potential impact on safety. Focus is on maintaining those structures on the Resilient Network.

5.2 Investment Strategy

Any reduction in the current BAS Revenue and Capital budgets will result in difficult decisions regarding the continual usage of bridges in Devon with some bridges requiring closure as their condition deteriorates.

Different bridge types require different maintenance and inspection regimes. Some are very robust and require minimal maintenance, such as masonry arch bridges, whilst others such as post tensioned bridges and moveable bridges require significant ongoing costs.

Masonry arch bridges deteriorate very slowly and could accommodate a reduced maintenance regime for a considerable time period without becoming unsafe. Inspections would be required to keep a check on any structural issues and scour inspections following flood events.

Higher risk structures, such as post tensioned bridges need to be maintained and inspected, as unpredicted collapse could otherwise occur. The potential for loss of life, disruption and financial consequences could be significant if these bridges are not maintained in a good condition.

Steel bridges and reinforced concrete bridges have a range of maintenance issues depending upon the quality of materials used, workmanship and types of exposure. They are generally designed for 120-year lifespan, but some are showing significant issues within half of their operational lifespan.

Timber bridges have a lesser lifespan (newer bridges found to be less than 30 years) than masonry and concrete and tend to be on cycleways and public rights of way (PROW's). If these are not maintained closures of cycleways and footpaths will occur over time.

Council owned bridges of historical importance (listed and scheduled monuments) could be lost for ever if they are not maintained. The Council has a moral obligation, if not a statutory duty, to maintain the County's heritage

Movable Bridges such as the Exeter Canal Swing and Bascule bridges on Bridge Road Exeter cross a navigable waterway. These need to be maintained to ensure they remain operable. Major investment in upgrading these bridges is required within 5 years, without which the bridges will become more unreliable for canal openings and, it is likely a weight restriction on the Bascule bridge would be required within 10 to 20 years. A bid to the Department for Transport (DfT) has been made to upgrade the bridges and to undertake further improvements to Bridge Road. If this bid is unsuccessful the implications are additional funding will be needed within 5 years to refurbish or replace the existing bridges. This is not currently included in the future BAS budget.

It is envisaged the do minimum position would be undertaking safety inspections and monitoring of bridges that fall below the 'good' condition and into the 'fair' to 'poor' condition. Reactive rather than preventative maintenance would only be possible.

The longer term aspiration should be to increase the level of funding to allow the bridges in the fair to poor condition to be improved, thus reducing the safety risk to the public.

6 Programme Development

Part B of the UKRLG Highway Infrastructure Asset Management Guidance Document (HIAMG)¹² states that the objectives of works programmes are:

- *“Develop effective and efficient works programmes to meet the approach to asset management and deliver the service,*
- *Identify potential maintenance works – candidate schemes,*
- *Develop works programme of candidate schemes,*
- *Prioritise and optimise schemes in the works programme to meet the available budgets, and*
- *Monitoring of works to ensure it meets the approach to asset management”*

6.1 Identifying Schemes for an Initial Works Programme

Schemes are identified for an initial works programme through the following means:

- Asset data from Inspections,
- Assessments,
- Component life expectancy,
- Evaluation of sub-standard structures,
- Reports of a defect from an NHO or Third party, and
- Unplanned works.

As stated in Section 3 Performance, the structures work bank should document the maintenance needs and costs and form the basis of the subsequent Value Management and Value Engineering processes. At present the workbank in SMS lists all identified work by the inspectors, which they either undertake using the bridges and retaining walls revenue budgets or their Minor Refurbishments Capital budget, or is put into current or future works programmes depending on criticality.

Some components with a finite life are replaced purely according to their age, whilst other components are replaced when significant planned highway works are carried out.

Whilst every effort is made to plan works in advance, unplanned works are always likely to occur due to flooding, vehicle strike and sudden component failure.

The schemes are collated into the appropriate programme of work for the highway structures assets such as bridge strengthening; retaining wall strengthening; sub-standard parapets; joints, bearings and waterproofing; and major refurbishments etc.

6.2 Prioritising the Works Programme

The schemes in the initial works programme are reviewed and prioritised using a systematic, risk-based approach taking into consideration the following:

- Safety critical schemes;
- Structures with a low condition score;
- Locality i.e. road over rail, Resilient Network; route maintenance category;
- Structures hierarchy and critical infrastructure assets;
- Defined levels of service for the asset; and
- Local needs and priorities.

Safety critical schemes include those that are required to safeguard the highway user or where the function of the structure may be compromised if repairs are not carried out such as re-pointing work to an arch barrel or providing anti scour measures.

Strengthening works are prioritised in accordance with the factors listed in Annex E/1. of CS 470 - Management of sub-standard highway structures³.

As stated in Section 2 Inventory a priority framework has been developed for the Principal Inspection programme. These inspections are identifying short term, medium term and long term works and assessments.

Focus is also given to those structures where either the average condition of the bridge or the condition of a critical element in the bridge drops below a certain BCI score.

In addition to complex and high risk structures, where the consequence of failure is severe, such as post-tensioned bridges and road over rail bridges, reference is made to the highway network layers national defined routes¹³ to identify those structures that are on specific routes such as the Major Road Network (MRN), Resilient Network, primary and secondary salted networks, heavy load and high load routes. Figure 11.7 below shows the number of Council owned bridges and length of retaining walls for the route type supported. Figure 11.8 below shows the number of Council bridges and length of retaining walls per route classification supported.

Route Type Supported	Number of Council owned & unknown ownership Bridges	Length of Council owned & unknown ownership Retaining Walls (m)
MRN Supported	118	3,617
MRN Spanned	40	N/A
Primary Salted Supported	916	Data unavailable
Secondary Salted Supported	134	Data unavailable

Fig. 11.7: Number of Council bridges and length of retaining walls per route type supported. Note does not include retaining walls above the highway and retaining wall lengths for primary and secondary salted routes.

Route Classification Supported	Number of Council owned & unknown ownership Bridges	Length of Council owned & unknown ownership Retaining Walls (m)
'A' Class	426	41,458
'B' Class	250	21,972
'C' Class	1069	28,901
Unclassified	994	17,438
Footpath, Cycleway, Bridleway	330	3,385
Aqueduct	2	N/A
Arch in wall	1	N/A
Closed	3	N/A
Dismantled Railway	2	N/A
Unknown	2	N/A
Grand Total	3079	113,154

Fig. 11.8: Number of Council bridges length of retaining walls per route classification supported. Note not all retaining wall lengths are currently recorded.

All bridges that are on the Resilient Network have been identified as critical infrastructure assets as failure would result in a significant impact to the local, and potentially the national, economy. Priority is given to those structures on the MRN, then the Council's Resilient Network and salted routes (Primary then Secondary). Maintenance categories within those routes may be used to further prioritise schemes.

Selecting and Optimising Schemes for the Forward Programme

The prioritised programme of works is further optimised for the forward programme to ensure that the value of works is within the available budget for the current year and future years.

Where feasible, forward design is undertaken a year ahead of the works, allowing flexibility of scheme delivery and works to take place earlier in the next financial year during better weather. A three-year forward programme is currently being developed to provide flexibility for coordination of works and to allow for unforeseen schemes. As stated above, identified safety critical works are undertaken in year as soon as possible either using the Revenue or Capital budgets depending on the type of work or temporary restrictions are put in place until the works can be carried out. If budget is unavailable, other schemes are deferred to allow the safety critical works to be undertaken.

Where possible schemes are grouped and/or coordinated with other highway infrastructure asset schemes to provide cost savings in delivery. Work is ongoing to coordinate maintenance schemes on the highway network at an early stage to minimise disruption to travel and the economy and to reduce costs to the authority from multiple road closures. Schemes in the same area may be deferred or brought forward to ensure that they are delivered at the same time. Where surfacing

schemes traverse a bridge, waterproofing and joint replacement schemes may be brought into the programme to ensure that they are undertaken simultaneously.

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6.3 Structures Asset Valuation and Investment Tool (SAVI)

The Structures Asset Valuation and Investment Tool (SAVI) supports asset owners, operators and managers with the management of their structure stock. SAVI is a multi-functional, condition-based decision support tool. It can be used to: carry out valuation of structures stock; develop prioritised short-term programmes of work; and develop long-term asset management plans. EDG Bridges and Structures Asset Management Team intend to incorporate SAVI into the SMS database to assist with developing short-term programmes and lifecycle plans.

The Toolkit will ultimately be used to provide a longer term works programme and lifecycle plans which are derived from inspections, using deterioration profiles and intervention trigger levels.

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7 Risks

The HIAMP lists key risks pertinent to the highway network, which may prevent asset management objectives being achieved. Those risks pertinent to the highway structures assets are discussed in more detail below.

7.1 Climate change

Climate change is a major factor influencing the future of Devon's structures. Greater occurrence of flooding is increasing the risk of bridges being washed away and damage due to scour of bridge foundations. As experience shows from the 2009 flooding events in Cumbria, loss of bridges causes major disruption to communities and businesses. In Devon several bridges have collapsed due to damage following flooding, such as Waterstave and Collard Bridges in 2012. The Council's bridges identified at potential risk of scour following a flood event are surveyed and assessed to ensure that foundations are investigated and protected or the risks managed.

EDG Bridges and Structures Asset Management Team has undertaken a programme of Stage 1 assessments in accordance with BD 97/12 - The Assessment of Scour and Other Hydraulic Actions at Highway Structures¹⁴. This work has now progressed to carrying out Stage 2 assessments where specific works are proposed. The impact of debris accumulation on bridges during flood events, which is known to cause scour, is also being investigated.

During major flooding incidents when a number of bridges may be seriously damaged, the Bridges and Structures Emergency Plan, which is under development, will come into effect.

Investment in highway surface water drainage systems is required to minimise damage to highway embankments and retaining walls. Extreme rainfall events cause surface water to wash away embankments, which support the highway, requiring significant repairs including new retaining walls and other structural solutions to shore up the highway. This is an expensive and disruptive process and can be avoided if preventative actions such as maintaining and improving highway drainage systems are implemented. Future policies and preventative actions are required to ensure the highway network can cope with more frequent extreme weather events due to climate change.

7.2 Defects in Hidden Bridge Components

Two high profile cases in recent years have emphasised the importance of defects in hidden bridge components. In 2009, the Stewarton rail bridge, Ayrshire collapsed during passage of a freight train. Corrosion to half-through girder webs was so severe that complete loss of section had occurred in areas of high shear load. The corroded areas were hidden under ballast and had not been inspected. The A4 Hammersmith Flyover on one of London's busiest roads, had been subject to limited inspections of its post-tensioning tendons since the mid-1990s. During investigation works in 2011, two of the eight tendons over one particular pier were found to be badly corroded and the flyover was closed while further investigation of the remaining six tendons and assessment was undertaken. The flyover was reopened with restricted traffic loading while emergency strengthening works were undertaken before the implementation of a full strengthening scheme. The full strengthening

works, plus bearing and joint replacement, were completed in 2015 at a cost in the order of £120m.

CIRIA has recently published C764 - Hidden defects in bridges: Guidance for detection and maintenance¹⁵. EDG engineers will use the document to review and update current inspection practices, and to start a hidden defects programme to identify hidden components in bridges.

7.3 Funding

The Council is facing unprecedented financial pressures and with current high inflation this is impacting available funding and increasing the construction cost of schemes. Any further reduction in the BAS budget will mean the bridge condition is unlikely to be improved and it is more likely they will continue to deteriorate with potential for weight restrictions or closures at some point in the future.

Failure to maintain the Council's highway structures will result in the structures residual life reducing with potential need to replace sooner. Depending on the period of time and severity of the reductions, it could eventually result in closure of some bridges as it would not be possible to maintain them in a safe state and an escalation of costs to claw back the condition of other structures in future years.

Major investment in upgrading the Exeter Bridge Road Canal Bascule and Swing bridges is required within 5 years. Without this investment the bridges will become more unreliable for canal openings and, it is likely a weight restriction on the Bascule bridge will be required within 10 to 20 years. A bid to the Department for Transport (DfT) has been made for to upgrade the bridges and to undertake further improvements to Bridge Road. If this bid is unsuccessful the implications are additional funding will be needed within 5 years to refurbish or replace the existing bridges.

7.4 Bridge Safeguarding

It is a sad reality that bridges in Devon have been used to end life by suicide. Two major bridges in North Devon crossing the Rivers Taw and Torridge have had their parapets replaced with higher ones and to date the evidence is they have had a significant impact in reducing the number of incidences at these locations. Several other bridges have been identified and work continues to incorporate higher parapets as a means of preventing suicide. Nationally more work needs to be done to tackle the root cause to prevent vulnerable people from taking this course of action.

8 Improvement Actions

The EDG Bridges and Structures Group are continually seeking to improve the efficiency and effectiveness of its maintenance planning and asset management process with particular focus on developing a long-term Maintenance Strategy.

The need to analyse cost-effective maintenance strategies for Devon’s highway bridges is becoming increasingly important as the age of the bridge stock continues to increase whilst the availability of maintenance funding reduces.

Figure 11.9 below documents the improvement actions identified to meet the high-level performance targets and other targets to help ensure that asset management objectives are achieved. The improvement actions will be subject to an annual review to ensure compliance with the target dates. The work required will be incorporated into forward works programmes and resources and budget allocated accordingly.

Ref	Target	PI Ref (if applicable)	Improvement Action	Date to be achieved
1	All bridges on the MRN, Resilient Network and ‘A’ roads shall be BCI good +90 condition	B1a	As a result of the findings of the BCI review undertake further work focussing on how the associated elements are reported to give a more accurate condition score. All BCI structures are to be looked at in more detail and works prioritised for the forward works programme in accordance with risk-based approach. Undertake all GI’s and PI’s. Ensure sufficient resources and Capital budget are allocated.	March 2028
2	All road over rail bridges shall be BCI good +90 condition	B1b	Undertake all GI’s and PI’s. Ensure sufficient resources and Capital budget are allocated.	March 2028
3	All bridges on the remaining network with a severe score shall be BCI fair +80 condition	B1c	Undertake all GI’s and PI’s. Ensure sufficient resources and Capital budget are allocated.	March 2028
4	All bridges on the remaining network with a poor and very poor score shall have a management plan in place by 2028	B1d	Undertake all GI’s and PI’s. Ensure sufficient resources and Capital budget are allocated. Documented management plan to be put in place for all bridges with a poor and very poor score.	March 2028

Annex 11 – Structures

Ref	Target	PI Ref (if applicable)	Improvement Action	Date to be achieved
5	All retaining walls on the MRN, Resilient Network and 'A' roads shall be BCI good +90 condition	B2	Complete retaining wall inventory survey. Reduce Retaining Wall Stock with an overdue General Inspection. Ensure sufficient resources and Revenue budget are allocated for inspections and sufficient resources and Capital budget are allocated to undertake the works. Consideration to be given to establishing an assessment programme using CS 459 - The assessment of bridge substructures, retaining structures and buried structures ¹⁶	March 2028
6	All bridges with a capacity less than 40T shall have a management plan in place and shall be weight restricted or strengthened	B3	Detailed review of capacity and weight restrictions to be undertaken including checking assessments are still current and valid. Where weight restrictions are in place, ensuring that they are as per assessed capacity and TRO and signage are correct. Where no weight restrictions are in place applying for TRO and installing signage or putting in place a documented management plan with monitoring regime. Use risk-based approach to prioritise those structures where assessment is not still current and valid or where there is no assessment.	Management Plan: March 2025 Weight restriction / strengthened: March 2028
7	Reduce the backlog of GI's to all in date and maintain all GI's in date	B4	Ensure sufficient resources and Revenue budget are allocated for inspections.	March 2025
8	All bridges identified as requiring a PI in accordance with the risk management approach shall have an in date PI in place by 2028;	B5	Risk assess all bridges requiring a PI as per the risk management approach. Ensure sufficient resources and Capital budget are allocated to undertake PI's.	March 2024

Annex 11 – Structures

Ref	Target	PI Ref (if applicable)	Improvement Action	Date to be achieved
9	All Post Tensioned bridges shall have in date PTSI's and a longer term management strategy in place	B6	Undertake PTSI's in accordance with CS 465 ⁴ . Produce Risk Review Report; Risk Assessment & Management Report; and Special Inspection Report. Review any existing Stage 1 PTSI reports which have been carried out in accordance with the old code and produce a separate report to bring them in line with CS 465 ⁴ . Develop a longer term management strategy.	March 2024
10	95% of vegetation shall be removed from retaining walls on the MRN, Resilient Network and 'A' roads to allow thorough inspection to be carried out	B7	Allocate funding to vegetation clearance from annual Revenue budget.	March 2028
11	Develop reporting through the Work Bank	N/A	Collect missing data i.e. component material types. Develop Work Bank performance measure to report on the condition of the bridge stock. Document in the structures work bank all maintenance tasks required on highway structures (Revenue and Capital) and the associated cost estimates. Link repair history to the work bank so that completed works are recorded. Prioritise works as per risk-based approach.	March 2028
12	Capture carbon data for all highway structures schemes	N/A	Use carbon calculator on all highway structures schemes as part of the design process to estimate both carbon emissions and carbon cost against various treatment solutions. Use carbon web form to capture carbon data from Contractor's working on highway structures schemes	October 2023
13	Develop Lifecycle Plans	N/A	SAVI toolkit to be incorporated within the Structures Management System Database	March 2028

Ref	Target	PI Ref (if applicable)	Improvement Action	Date to be achieved
			and used to develop Lifecycle Plans.	
14	Develop a long-term Maintenance Strategy	N/A	Review current procedures in place for determining when maintenance work on different structures within the stock should take place. Develop a long term plan. Give consideration to prioritising works in alignment with Highway goals. Schedule of elements with finite life, with dates for replacement and programme in conjunction with highway maintenance works	March 2028
15	Reduce scour susceptibility of those bridges identified through assessment programme.	N/A	Use the results of the risk assessments to investigate bridge foundations to determine if further interventions are required.	March 2028
16	Develop Bridges Emergency Plan.	N/A	Update historical emergency plan to take into consideration current practices and to align with the highways Winter Service and Emergency Plan.	March 2023
17	Identify hidden components in bridges		Use CIRIA document C764 - Hidden defects in bridges: Guidance for detection and maintenance ¹⁷ . to review and update current inspection practices and to start a hidden defects programme to identify hidden components in bridges.	March 2028
18	Improve coordination of highway structures schemes with other highway infrastructure schemes.		Develop and adopt the Good Practice Guide - Coordination of BAS and Highways Schemes. Asset teams to meet to discuss forward works programmes and possibilities for coordination.	Ongoing

Fig. 11.9: Improvement actions identified to achieve asset management objectives

9 References

- 1 UK Roads Liaison Group. National Code of Practice 'Well-Managed Highway Infrastructure, DfT, 2016
- 2 National Highways. CS 450 – Inspection of highway structures
- 3 National Highways. CS 470 - The Management of sub-standard highway structures
- 4 National Highways. CS 465 - Management of post-tensioned concrete bridges
- 5 National Highways. CS 451 - Structural review and assessment of highway structures
- 6 CSS (County Surveyors Society) Bridge Condition Index (BCI) procedures, 2002
- 7 CSS. Guidance Documents for Performance Measurement of Highway Structures, Atkins, 2007
- 8 National Highways. Design Manual for Roads and Bridges (DMRB)
- 9 National Highways. Manual of Contract Documents for Highway Works (MCHW)
- 10 Devon County Council. Maintenance Audit of Bridges and Structures Schemes Policy, 2020
- 11 Devon County Council. Maintenance Audit of Bridges and Structures Schemes Procedure, 2020
- 12 UK Roads Liaison Group Highway Infrastructure Asset Management Guidance Document (HIAMG), DfT, 2013
- 13 Highway network layers national defined routes
- 14 National Highways. BD 97 - The Assessment of Scour and Other Hydraulic Actions at Highway Structures
- 15 National Highways. C764 - Hidden defects in bridges: Guidance for detection and maintenance
- 16 National Highways. CS 459 - The assessment of bridge substructures, retaining structures and buried structures
- 17 National Highways. C764 - Hidden defects in bridges: Guidance for detection and maintenance

Appendix 11 – 1 Good Practice Guide BM3 Dealing with Graffiti

DRAFT

Good Practice Guide No. BM3
Dealing With Graffiti on Highway Structures

Issue/ Revision	Prepared by	Date:	Reviewed by	Reviewed Date	Remarks
DRAFT	K Dentith	25/8/2010			
FINAL Rev0	N Jennings	20/1/2023	K Dentith	23/1/2023	Approved for use.

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Contents

1. Scope.....3
2. The Problem3

Dealing with Graffiti on Highway Structures

3. Removal of offensive material.....	3
4. Anti graffiti coatings	3
5. Use of street art and murals.....	4
6. Consultees Prior to new street art/murals.....	4
7. Examples of Street Art.....	5

Dealing with Graffiti on Highway Structures

1. Scope

This guide is intended to be used by anyone working on Devon County Council Bridges and Structures and its prime purpose is ensure a consistent approach to dealing with assets that have been subjected to graffiti. This is not a specification or safe working guide; the responsibility for safety planning will rest with the project manager. The Guide will cover the various aspects of dealing with graffiti including:

- Removal of offensive material
- Protection of new and existing structures with anti graffiti coatings
- Use of street art and murals for reducing the occurrence or impact of graffiti

2. The Problem

The majority of graffiti on Devon's bridges is considered unwanted and anti-social. Members of the public complain of unsightly appearance, offensive material and of feeling intimidated when walking through badly affected subways or retaining walls in urban areas. One option for dealing with graffiti is regular removal or overpainting in the hope that those responsible will lose interest and either desist or move elsewhere. This however can be a costly approach with weekly visits by cleaning teams needed in heavily used areas such as the subways at Exe Bridges in Exeter

3. Removal of offensive material

There is a need to quickly remove offensive material such as swear words, racist remarks and obscene drawings. This is usually best achieved by painting over the offending material as soon as it is reported and then programming a graffiti removal task. Structures that are frequently targeted will usually have an anti graffiti coating applied; it is important to check the structure records to identify the product so that the correct removal process can be used.

The two main methods of removal are high pressure water jetting and the use of chemicals. Care must be taken not to pollute the environment with chemicals or effluent from the water jetting operation which may contain paint or other contaminants. Removal operations can usually be carried out without restricting public access totally but a safety zone must be used to minimise public risk.

After the removal operation it will usually be necessary to reapply an anti graffiti barrier.

4. Anti graffiti coatings

If existing structures are being affected by graffiti the area Bridge Inspector will recommend a treatment process to the Principal Engineer Bridge Maintenance (PE (BM)) who will assess the cost implications and if necessary, add to the revenue programme.

Dealing with Graffiti on Highway Structures

New structures that will become the responsibility of the Council will receive a maintenance audit by the PE (BM) when graffiti protection using a surface finish such as 'knocked off rib' on walls to create an uneven surface or proprietary coatings to make it easier to remove graffiti will be considered.

5. Use of street art and murals

The application of murals and street art is growing in popularity in Devon and can be considered for reducing the occurrence or impact of graffiti. The benefits are many including reduced cost to the Council for cleaning operations, involvement of local community groups particularly schools and art colleges and the creation of a more pleasant environment

The materials used for murals and street art should be carefully considered and agreed with the PE (BM). Whilst damage to a structure from the application of paint is unlikely, it is often sensible to use water based or low volatile content paints to ensure the existing structure is not damaged or the anti carbonation treatment on surfaces is not compromised.

The content of the art work should also be carefully considered to ensure it cannot easily be defaced; the adding of appendages or speech balloons are two common ways to ruin a piece of street art.

It is quite common for local organisations or individuals to volunteer to paint subways and other structures as a school/college art project. This can work but the scale of the task involved can be under-estimated. The Tarka Trail scheme shown at the end of this paper was one such project. A local 6th form college had a competition amongst the students to create suitable designs for two newly opened subways that were being targeted. The Council provided the materials and pedestrian management for what was expected to be a two week project. It soon became apparent that the students would not complete the task and the Council had to take over. The cost of using contracted services for this type of operation is not insignificant.

The second example of Renslade Subway was carried out by a street artist at no cost to The Council and was completed in just over a week so volunteers should be encouraged provided they fully understand the task involved.

6. Consultees Prior to new street art/murals

Street art on Council owned structures does not require planning permission, however it is advisable to liaise with various parties to ensure stakeholders are aware of the project. The following list assumes a project may not necessarily be led by the Bridge Maintenance team; the project manager will need to consider if there are other stakeholders relevant to the particular project:

Consultees

- Principal Engineer Bridge Maintenance
- Bridges and Structures Asset Manager
- County Councillors

Dealing with Graffiti on Highway Structures

- District / Parish / Town Councils
- The Council's Neighbourhood Highway Teams
- Planning & Transportation Teams
- Publicity – including Press Office, social media and the Council's bulletins

7. Examples of Street Art

a) Tarka Trail Subways, Barnstaple

Template Method

Before



During



After



Freehand Method

Dealing with Graffiti on Highway Structures

During – note public protection works



Nearing completion



b) Renslade Subway, Exe Bridges



Annex 12 – Traffic Signals and Street Lighting

1	Introduction	1
2	Inventory	1
2.1	Street Lighting Inventory.....	2
2.2	Traffic Management Systems Inventory	2
	Asset Information Strategy	3
3	Performance	6
3.1	Data Collection and Fault Management	6
	Annual inspections	7
	Structural (Ultrasonic) Testing	7
	Electrical testing	8
3.2	Asset Condition	8
4	Maintenance Strategy	10
4.1	Creation of a new asset.....	10
4.2	Routine and reactive maintenance	10
	Routine Maintenance.....	10
	Cyclical maintenance.....	10
	Reactive maintenance.....	11
4.3	Renewal or replacement.....	11
5	Levels of Service and Investment Strategy.....	11
5.1	Levels of Service	11
5.2	Investment Strategy.....	11
	Capital spending strategy	12
	Traffic Service Options	12
	At present it remains an aspiration to carry out the following:	13
6	Programme Development	13
6.1	Identifying Schemes for an Initial Works Programme	13
6.2	Prioritising the Works Programme	13
7	Risks	14
7.1	Resource Availability	14
7.2	Asset Deterioration	14
7.3	Revenue budget	14
7.4	Other	14
8	Improvement Actions	14

Version Control		
Version	Date	Summary of Changes
0.1	10.03.2023	For consideration by Cabinet

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1 Introduction

Stated priorities of the Council's latest Strategic Plan include responding to climate change and helping communities to be safe, connected and resilient. This is set against the backdrop of the Council declaring a Climate Emergency and the subsequent commitment to achieving net-zero carbon emissions by 2030. At a national level, the scrutiny around creating safer streets has also never been greater. Streetlighting and Traffic Signals are pivotal to the Council's contribution to all three of these agendas and are essential if we're to meet these stated aims.

In recent years, the Council's streetlighting team have focussed on reducing energy usage whilst continuing to deliver our day-to-day functions such as keeping the public safe. The LED roll-out programme, along with the introduction of part-night lighting and a stepped dimming regime have achieved substantial reductions in our carbon footprint and revenue costs. In 2015/16 our streetlighting asset used circa 31million kWh of electricity per annum, last year this figure had been reduced to just 14million kWh. Given the current energy price this equates to an annual revenue saving of nearly £3m.

In a similar vein, a well-maintained traffic signals asset is particularly important to managing congestion and sustaining economic vitality. Traffic management systems are also a vital part of the Council meeting its statutory requirements under the Highways Act and the Traffic Management Act to ensure the safe and expeditious movement of traffic.



Fig. 12.1: Teignmouth seafront lighting replacement, Spring 2022

2 Inventory

The Council has an inventory of street lighting and traffic management assets this includes:

- Street light lanterns,
- Street lighting columns,
- Lit signs and bollards,
- Traffic Signal Junctions,

Annex 12 – Traffic Signals and Street Lighting

- Signalised Traffic Pedestrian crossings,
- Variable Message Signs (VMS),
- Vehicle Activated Signs (VAS),
- Real time passenger information system,
- CCTV cameras and equipment,
- Ice detection equipment,
- Rising Bollards,
- Real time traffic counter equipment, and
- UTC/SCOOT computer systems.

To give an idea of scale, as of 2019 the Council are responsible for:

- Street lights – 80,336,
- Illuminated signs – 9,156,
- Illuminated bollards – 3,188,
- Beacons – 751,
- Feeder pillars – 391, and
- School patrol lights – 350.

The street lighting asset database includes a significant amount of detail on asset components including column and lantern types. The Street Lighting assets are managed within an asset management system.

2.1 Street Lighting Inventory

The Street lighting Database is managed in real time from activity relating to the day-to-day works carried out by our maintenance contractors. Updates to the database are also added by the Council's Streetlighting team members. This system tracks work instruction progress and enables staff to monitor performance and running costs. It also produces a monthly energy report to calculate our electric usage.

Of this inventory, the breakdown of column types is:

- Steel – circa 55,000,
- Wood – circa 11,000,
- Aluminium – circa 7,500,
- Wall-Mounted – Circa 1,700,
- Cast Iron – Circa 1,600,
- Concrete – circa 200, and
- Other infrequent types include plastic, composites, ground and flange.

2.2 Traffic Management Systems Inventory

All data for the Traffic Equipment asset is stored on Excel Spreadsheets with Traffic Signal equipment on an Access Database. They provide:

- Access to inventory,
- Contractor and customer records,
- Mapping to pinpoint fault locations,
- Fault management,
- Electrical testing,
- Inspections,

- Financial control, and
- Photographic record.

The traffic signal assets, VMS assets and Car park assets do not have an Asset Management system but are managed from spread sheets and an in-house database is updated by Devon team members.

The traffic signal equipment added to the inventory as a result of Section 38 and 278 works are recorded by Devon County Council staff who update the spreadsheets.

Routine inspections and faults will identify equipment / problems, and these will be reported to Devon County Council staff who updates the spreadsheets or database.

Asset Information Strategy

Details of new or modified sites will be added to the inventory as a result of Section 38 and 278 works. It is necessary to record these quantities to understand the annual growth of the asset and to determine if there are differences in deterioration rates. This will allow trend analysis of previous additions to the sign assembly stock and enable costs to be established for inclusion in service options.

Identify costs and locations of accident damaged and vandalised equipment. This data will allow accident and vandalism hot spots to be located to ascertain possible special treatments. Analysis of previous year's costs due to accidents and vandalism will assist in the formation of service options i.e. these costs can be separated from general maintenance.

A signal-controlled junction or signal controlled crossing usually consist of the following elements:

- Signal controller,
- Traffic Signal Heads,
- Ducted cables network,
- Signal posts,
- Ducting and access chambers,
- Detection equipment (sensors in road or top of pole),
- Electrical supply, and
- BT or other communications system.

A VMS or VAS message sign can consist of the following elements:

- Sign controller,
- LED sign Heads,
- Support poles,
- Electrical supply,
- Ducting and access chambers, and
- BT or other communications system.

A RTPI site can consist of the following elements:

- LED or TFT screens,
- Support posts or brackets,
- Electrical supply,
- Ducting and access chambers, and
- BT or other communications system.

Annex 12 – Traffic Signals and Street Lighting

A CCTV site can consist of the following elements:

- CCTV camera,
- Pan and tilt unit,
- Support posts or brackets,
- Electrical supply,
- Ducting and access chambers, and
- BT or other communications system.

An Ice Alert site can consist of the following elements:

- Temperature monitor (Ice detection) unit,
- Support posts or brackets,
- Electrical supply,
- Ducting and access chambers, and
- BT or other communications system.

A rising bollard site can consist of the following elements:

- Rising bollard unit,
- Bollard control box,
- Electrical supply,
- Ducting and access chambers, and
- BT or other communications system.

An ATC and Real time traffic count site can consist of the following elements:

- ATC control box,
- Detection equipment (sensors in road or top of pole),
- Electrical supply,
- Ducting and access chambers, and
- BT or other communications system.

Annex 12 – Traffic Signals and Street Lighting

Inventory Type	Current % of inventory held	Proposed Inventory storage method	Data capture strategy	Comments
Existing Stock	100%	Spreadsheets	Data gathered from works orders and confirmed by site survey using paper copies	A visual inspection of all the Authorities Traffic equipment under maintenance is continually updated. Database requires continuous updating.
New equipment added to stock as part of Council's Capital programme	Unknown	Spreadsheets	Data gathered from works orders and confirmed by site survey using paper copies	When notified a site inspection is carried out
New equipment added to stock through Section 38 and 278	Unknown	Spreadsheets	Data gathered from works orders and confirmed by site survey using paper copies	When notified a site inspection is carried out
New equipment added to stock through 3 rd party agreements	Unknown	Spreadsheets	Data gathered from works orders and confirmed by site survey using paper copies	Contract requirement to inspect and test each site and complete site acceptance sheet
Site Condition	100%	Spreadsheets	Ongoing programme of site and equipment inspections to ensure that	Contract requirement to inspect and test each site annually and complete PI sheet.

Inventory Type	Current % of inventory held	Proposed Inventory storage method	Data capture strategy	Comments
			equipment is checked and tested annually and recorded PI sheets.	
Electrical Testing	100%	Spreadsheets	Ongoing programme of electrical testing to ensure that equipment and poles are tested annually and recorded on ELI test sheets.	Contract requirement to test within a 2 year period
Structural testing	<5%	Spreadsheets	Specialist Testing House	Code of Practice recommended testing of all traffic signal steel Posts greater than 20 years of age.
Vandal damage	Unknown	Spreadsheets	Inspection regime using paper copies	Annual average cost to repair damaged sign installations
Accident damage	Unknown	Spreadsheets	Inspection regime using paper copies	Where a driver is identified costs are recharged

Fig. 12.2: Status of Inventory

3 Performance

3.1 Data Collection and Fault Management

The Council receive, log, manage and store all faults whilst also managing their repairs through term maintenance contracts.

With regards to streetlighting, this is achieved via:

Annex 12 – Traffic Signals and Street Lighting

- Visual inspection by contractor (currently Enerveo) during every site visit,
- Electrical test every 6 years,
- Structural testing (KIWA) to categorise/monitor column integrity,
- Scouting of all assets on a bi-monthly cycle,
- The Council operate a 'report a problem' to enable the public to report issues (see screenshot to the right), and
- Telensa cells identify lantern faults remotely.

With regards to traffic signals, this is achieved via:

- Annual inspection of all assets by contractor (currently Swarco),
- Remote fault monitoring in the Network Operations Control Centre (NOCC),
- The Council operate a 'report a problem' to enable the public to report issues (see screenshot below), and
- Communicating issues with the travelling public via the Council's @DevonAlert social media accounts (see screenshot to the right).

The NOCC also logs/manages/reports other faults with our contractors for VMS, CCTV, Car park signs, Bollards or computer equipment along with systems (UTC/SCOOT) RMS, and CMS.

Annual inspections

To ensure equipment is in working order each site with Traffic equipment is inspected annually. Any faults identified are manually recorded and reported to Devon County Council staff that inputs this information into spreadsheets and or generates a job ticket. Although inspections are currently undertaken in an effective manner a long-term improvement strategy is proposed to both increase efficiency and reduce duplication of manpower required to obtain and record the data by:

- The introduction of mobile computers for the recording of inspection information, removing the need for data input by Devon County Council staff,
- Introduction of remote transfer of information thus removing the need for maintenance engineers to provide paper copied to the office and the need for Devon County Council staff to input the information, and
- Electronic updates will reduce waste paper.

Structural (Ultrasonic) Testing

Ultrasonic testing is undertaken on the behalf of the Council by an approved "structural testing house" and the initial structural test of signal poles is undertaken when it reaches 10 years of age or identified as required with an annual site inspection to ensure the integrity of the pole stock is maintained. Follow up inspection frequency of testing is determined from the recommendations of the



Fig.12.3: Screenshots of the Council's 'Report a Problem' system (Top) and example tweet regarding traffic signals (bottom)

specialist testing engineer as identified in the column “test report” and the potential outcomes of these tests:

- Re-test in 5 years – 0-10 LSU Range - little relative loss of section,
- Re-test in 3 years – post is sound and has 11-16 LSU range deterioration in posts material thickness,
- Re-test in 2 years – post condition has LSU range 17-24 Re-test as soon as practicable year if posts condition has LSU range 25 to 49, and
- Remove immediately if material deterioration has LSU range of greater than 50.

Electrical testing

The Council is required by statute to test Traffic Equipment stock at least once within a 6-year period. Our maintenance contractors are required to carry out an electrical test on all site equipment upon attendance to an asset requiring an electrical test.

The equipment is tested for:

- System earthing,
- Circuit conductor size,
- Circuit protection,
- Insulator resistance,
- Polarity status, and
- Phase/earth fault loop impedance.

3.2 Asset Condition

The condition of the traffic signal asset is considered good, with all assets not over 15 years old. The general condition of the streetlighting asset is known but is considered to vary considerably due to the significant quantity of aged stock. Equipment deterioration is measured and recorded. Proactive inspections are undertaken annually and the condition of equipment is ascertained through a number of means:

- Annual PI of traffic signal sites, and
- Maintenance operatives will identify defective equipment during fault attendance and reported back to the office. Members of the public reporting poor performance or equipment failure.

Inspection type	Frequency
Electrical Inspection & testing to comply with BS7671 – IEE Wiring Regulations 17 th edition.	100% of stock annually
Ultrasonic structural testing	Inspection is dependent on condition but to commence on columns >20 yrs old
Annual Inspection	100% of stock annually

Fig 12.4: Inspection Frequencies

Inspection type	Current method of data capture	Current data storage method	Proposed method of data capture	Proposed data storage method
Annual Inspection	Paper PI form	Spreadsheets	Directly into IMTRAC Database electronically	IMTRAC Computer Database
Structural testing	Paper based system	Spreadsheets	Directly into IMTRAC Database electronically	IMTRAC Computer Database
Electrical testing	Paper based system	Spreadsheets	Directly into IMTRAC Database electronically	IMTRAC Computer Database

Fig.12.5: Inspection Methods and Data Storage

Inventory component	Current method of inspection	Condition assessed Yes or No	Current data storage method	Proposed data storage method	Risk if not inspected
Traffic controller	During fault call and PI	Yes	Spreadsheets	Directly into IMTRAC Database electronically	High
Signal heads	During fault call and PI	Yes	Spreadsheets	Directly into IMTRAC Database electronically	High
Poles	During fault call and PI	Yes	Spreadsheets	Directly into IMTRAC Database electronically	High
Site Wiring	Electrically tested	Yes	Spreadsheets	Directly into IMTRAC Database electronically	High
Site performance	Devon staff check with TMA	Yes	Spreadsheets	Directly into IMTRAC	Med

Inventory component	Current method of inspection	Condition assessed Yes or No	Current data storage method	Proposed data storage method	Risk if not inspected
				Database electronically	

Fig 12.6: Condition Assessment

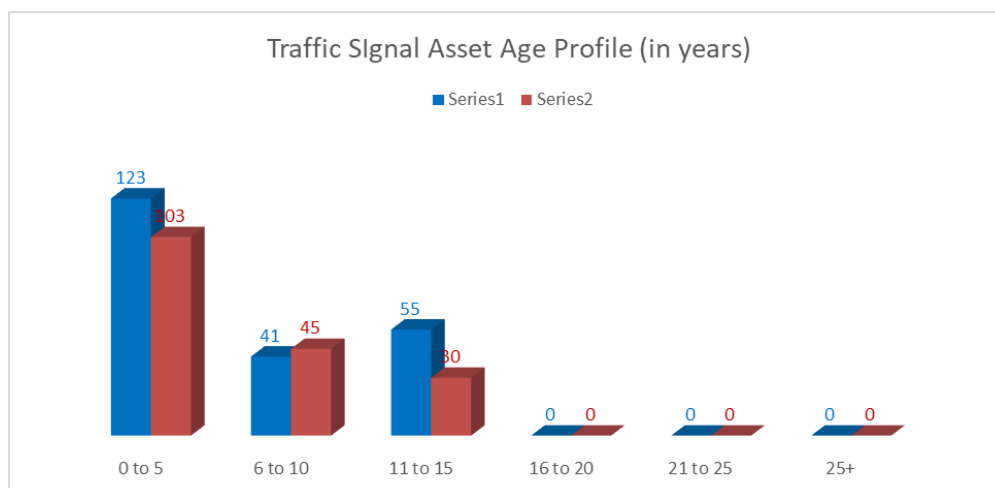


Fig. 12.7: Traffic Signal Asset Age Profile

blue = pedestrian crossings and red = signal-controlled junctions

4 Maintenance Strategy

Devon County Council has appointed specialist contractors to maintain the different types of Traffic Equipment

4.1 Creation of a new asset

The Council’s current Street Lighting Policy states:

‘requests for additional lighting will only be considered where there is a justified and pressing need and a funding stream is identified.’

With regards to wider traffic assets, new sites frequently come online as a result of significant development around the County and the asset is therefore growing.

4.2 Routine and reactive maintenance

Routine Maintenance

Reports of faults originate from three sources – the public, council night-time inspections or by the maintenance contractor as a result of routine inspections. Faults are recorded and works orders raised with the relevant contractor. Response times for such matters vary but contractual requirements exist for both Streetlighting and Traffic Signals. For example, an urgent traffic signal fault must be made safe within 4 hours.

Cyclical maintenance

Activities such as cleaning of lanterns, regular bulk replacement of lamps, condition inspections of columns, brackets and lanterns, painting of steel columns and

electrical testing is carried out by Term Maintenance Contractors with works order being generated at the start of each financial year. The Council aim to provide works programmes as early as practicable to enable efficient programming and arrangement of works

Reactive maintenance

Lighting columns and traffic signals damaged by routine traffic accidents are replaced as soon as possible. Wherever possible, costs are recouped through insurance companies from those found responsible for the accident.

4.3 Renewal or replacement

Long term planned maintenance such as the planned replacement of street lighting columns, the upgrading of lanterns to LED, the replacement of traffic signals or traffic control systems is programmed in advance of the start of the financial year where possible. The programme was developed to focus on the highest power lanterns initially as this enabled greater savings. The team are currently bidding for additional funds to expand the Telensa/LED roll-out in Devon.

5 Levels of Service and Investment Strategy

5.1 Levels of Service

The following levels of service for highway lighting and traffic management systems has been developed to reflect the fundamental service aimed at helping to deliver a road network which is as safe, reliable and as fit for purpose as possible within the current funding and resource constraints.

Level of service		Safe	Connected	Healthy	Prosperous	Resilient	Sustainable
Highways Lighting	Respond within 2 hours to reported traffic accidents involving lighting columns or other lighting emergencies.	✓	✓	✓	✓		✓
	Develop and deliver a programme of column repair and replacement in order to maintain the street lighting asset and reduce the risk of column failure.	✓	✓	✓	✓		✓
Traffic management systems	Respond within 4 hours to signal failures.	✓	✓		✓		✓
	Operate an annual inspection, electrical testing and repair regime for all traffic signals and pedestrian crossings .	✓	✓		✓		✓

Fig. 12.8: Levels of Service

5.2 Investment Strategy

Given the current revenue funding pressures facing the Council, the rising cost of electricity and the aims of the County to reduce its carbon footprint, the Street Lighting and Traffic Signals Team have been developing a strategy focused on the use of new technologies including the use of LED lanterns, part-night lighting and dimming projects and upgrading of traffic control systems. The key objective being to reduce energy costs over the long term.

Annex 12 – Traffic Signals and Street Lighting

Currently the Council spends over £3m per annum on energy costs to power its street lights and traffic signals as well as lit signs and bollards. This cost is rising and is unsustainable given the budget pressures on the service.

Capital spending strategy

In the past capital spending had been targeted specifically at replacing the oldest street lighting columns in order to reduce the backlog of high-risk columns and at replacing failed traffic signal sites on a reactive basis. The strategy moving forward is to focus on:

- Increase Telensa role-out to enable flexibility in dimming/part-night lighting and thus savings in energy consumption,
- Use of “light emitting diodes” (LED) sources of light to minimise the energy consumption where practicable,
- The use of more efficient equipment to reduce energy consumption,
- Keep traffic signal assets under 15 years old to support the Council’s Statutory Network Management Duty and avoid expensive reactive repairs (and the subsequent reputational damage),
- Replacement of lease lines with IP compatible lines to reduce line rental costs, and
- More efficient and reliable site equipment will reduce the number of reported faults and reduce the number of fault attendances (reducing the carbon footprint along with energy consumption).

A key element of the Council’s traffic equipment is the Variable Message Signs (VMS). VMS is key to our ability to proactively fulfil our Network Management duties but our current VMS stock is unfortunately ageing and unreliable. Technology in this area is advancing rapidly and will change again as traffic changes (looking ahead to autonomous vehicles.). As a team, we therefore commissioned an independent external study to understand the options available to Devon County Council going forwards. Moving forwards, capital investment will be made to update and renew this asset.

Traffic Service Options

Do Nothing

The existing budget and level of service is maintained with a inflation index increase per annum, this strategy would result in the steady and rapid decline of service as the cost to maintain the Traffic Equipment increases annually due to the uplift in rates combined with an increasing number of assets exceeding their recommended life expectancy coupled with addition of additional Traffic Equipment resulting from growth.

Steady State Service Level

The asset is maintained at its current level, where the Traffic Equipment assets are maintained at their present condition, this strategy would require an increase in budgets over and above inflation.

Goals, Objectives and Aims

- To continually improve the safe and efficient movement of traffic and people around the road network.
- To expand the LED and Telensa expansion further

- No Traffic Signal site to exceed its design life.
- All Traffic Equipment to comply with the Traffic Signs Regulations & General Directions 2002 (TSR&GD), and the Traffic Signs Manual.
- All Traffic Signal design and maintenance to comply with TR84/06 (2007 Revision) Code of Practice for Traffic Control and Information Systems for All – Purpose Roads.
- Replacement programmes will enhance the Authority's image.
- To replace the existing BT Private Wire system with a modern Communications system that meet current and future needs.

Systems that use communication links are:

- Traffic equipment,
- CCTV,
- ANPR,
- VMS,
- Count equipment,
- Telephone networks,
- Carpark equipment, and
- Authority corporate software.

At present it remains an aspiration to carry out the following:

- Provide an asset management system for all Traffic equipment assets.
- Accelerated programmes to upgrade Communications system that meet current and future needs.

6 Programme Development

6.1 Identifying Schemes for an Initial Works Programme

The street lighting programme is developed based on the following principle(s):

- Aim to proactively replace 1400 columns per year,
- Complete the LED roll-out, and
- Expand the Telensa CMS.

The traffic equipment programme is developed based on the following principle(s):

- Maintain all assets at under 15 years old,
- Renew VMS as funding opportunities become available

6.2 Prioritising the Works Programme

The street lighting programme is prioritised based on the following principle(s):

- A combination of column age and Kiwa testing to understand the asset's remaining life span
- The LED roll-out programme prioritised the highest energy locations (e.g. main roads) initially and is now being extended across the remainder of the County
- The CMS roll-out (Telensa) has focussed on the highest density lighting areas as the cost per unit is minimised here. In future, it's hoped that funding can be obtained to expand this further

The traffic equipment programme is prioritised based on the following principle(s):

- Equipment age and fault reporting
- With regards to VMS, the Council's Transport and Engineering Professional Services provider (currently WSP) have prepared a forward strategy report identifying priorities if funding becomes available

7 Risks

There are a number of key challenges facing the Street Lighting and Traffic Signals Teams to maintain the asset.

7.1 Resource Availability

In recent years there has been immense pressure on resources. From a labour perspective, contractors have struggled to secure skilled operatives to deliver the works programme. From a materials perspective, prices have risen (e.g. steel, concrete etc.) and the demand for energy saving products (e.g. LED's, Telensa cells etc.) has also increased. The Council regularly review and manage these risks with our Term Maintenance Contractors.

7.2 Asset Deterioration

The condition of both the Street Lighting and Traffic Signals equipment will deteriorate over time without intervention. The Council aim to profile this to compare site performance, manufacturers guaranteed life against actual life; the prediction of equipment failure and allow timely intervention and efficient budget allocation.

7.3 Revenue budget

- Increasing energy prices,
- Growth in number of traffic equipment assets places additional pressure on budgets, and
- No growth in budget to meet new specifications for equipment.

7.4 Other

The Council's Street Lighting contractor are currently implementing new asset management software. Whilst improving slowly, the initial setup phase has been challenging and the desired long-term efficiencies have not yet been realised.

8 Improvement Actions

Alongside the Highway Infrastructure Asset Management Plan, this Annex is a live document. It will be subject to continuous improvement and ongoing development with input from Council Officers and Stakeholder feedback. Areas for improvement are identified within the Annex which are summarised as Improvement Actions in this section. These Actions are aligned with Strategic Goals and are assessed as part of a wider cross-asset prioritisation process that prioritises their implementation taking account of the framework of funding and resource availability.

The actions that have been identified as being required to ensure the Traffic Signals and Street Lighting asset management objectives are achieved are:

- Explore options to expand the Telensa CMS to rural areas,
- Review the Council's Street lighting policy including a trial of further dimming/part-night lighting,

- Increase efficiency and reduce duplication of manpower required to obtain and record traffic equipment data by:
 - The introduction of mobile computers for the recording of inspection information, removing the need for data input by Devon County Council staff
 - Introduction of remote transfer of information thus removing the need for maintenance engineers to provide paper copies to the office and the need for Devon County Council staff to input the information, and
 - Electronic updates will reduce waste paper,
- Move traffic signals data to IMTRAC Computer Database (or similar specific software),
- Identify and prioritise a programme to replace the Council's outdated VMS stock,
- Contribute to the delivery of the Council's wider aims through the Bus Service Improvement Plan, and
- Maintain and advance the knowledge and skills of the Council's in-house teams.

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