

Essex County Council

**Highways and Transportation Asset Management Strategy
2023-24**



Foreword - Supporting Everyone's Essex / Helping achieve Net Zero by 2050

Essex County Council maintains a vast network of highway assets: over 5,000 miles of roads, together with a footway network of 4,000 miles (including where footways are shared use with cycle routes), and 4,000 miles of public rights of way. In addition, there are over 1,600 bridges and other highway structures, over 130,000 street lights, 11,700 illuminated signs, 1,900 beacons and wall lights, and over 2,700 lit bollards, and over 500 Traffic Signals and Crossings owned by the Council. There are also other asset groups such as cycle tracks, highway gullies and drains, vehicle restraint systems and traffic signs.

We recognise the vital role that the highways network plays in the lives of the residents as well as the travelling public and local businesses, especially as the county strives to recover from the recent economic and social impacts due to global issues. We are committed to long term efficient and cost-effective management of our highway assets to maximise the benefits of investment for all users. At the same time, we are also dedicated to ensuring that everything we do supports the Council's strategic priorities documented in Everyone's Essex, such as promoting a Greener Essex and contributing towards achieving the County's target of net zero by 2050.

The *Asset Management Strategy* is at the heart of the Council's investment planning, outlining how decisions are made relating to setting of Highways standards of service and how these are delivered. It also outlines how competing demands for investment across the asset groups are balanced in order to achieve the Council's strategic priorities. It serves as the basis for the development and implementation of detailed asset management planning which embeds an approach of continuous improvement. This enables the organisation, through its technology and processes, to be flexible so that it can adapt readily to change.

The *Asset Management Strategy* includes how national developments and best practice guidance are taken into consideration, such as the *Highways Maintenance Efficiency Programme (HMEP)*, the *Department for Transport Incentive Fund self-assessment criteria*, and the *Well-Managed Highway Infrastructure: A Code of Practice (UK Roads Liaison Group October 2016)*. It also includes how we are adapting to the evolving Coronavirus pandemic in the interests of safety for our operatives and customers. Through our commitment to robust asset management, we will continue to deliver our vision for Essex for Safer, Greener and Healthier Travel for current and future transport users; indeed, to deliver a transport system that supports sustainable economic growth and helps deliver the best quality of life for the residents of Essex.



Cllr. Lee Scott: Portfolio Holder for Highways Maintenance and Sustainable Transport

Delivery of this Asset Management Strategy

Essex County Council recognises the vital role that its highway network plays in the lives of residents as well as the travelling public and local businesses. This is especially relevant as the County responds to the recent economic and social impacts on society, and the urgent need to address climate change.

Effective asset management of the highway network, including its infrastructure, is fundamental in supporting the Council's strategic priorities. In so doing it contributes to the Local Transport Plan and the Council's vision of attracting sustainable economic growth within a sustainable environment, that helps deliver the best quality of life for the residents of Essex.



Paul Crick
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1. Context

1.1 Supporting 'Everyone's Essex – our plan for levelling up the county: 2021-2025'

The Council's Highways and Transportation Asset Management Policy recognises the vital role that its highway network plays in the lives of residents as well as the travelling public and local businesses, especially as the County strives to recover from the economic and social impacts of recent global events. It sets out the importance of effective asset management of the highway network and its infrastructure, which is fundamental in supporting the Local Transport Plan, the Council's strategic priorities set out in Everyone's Essex, and helping deliver the County's target of net zero by 2050. In short, it supports the Council's Vision of attracting sustainable economic growth that helps deliver the best quality of life for the residents of Essex.

The Highways network also plays an important role in the wider landscape Green Infrastructure network, not only through its Public Rights of Way network (PRoW) but through its verges and other soft estate that offer habitat and biodiversity value that serve as essential wildlife corridors. The Highways network can assist nature's recovery which is viewed as our best ally in reversing climate change as it is key to absorbing and storing carbon.

The Highways and Transportation Asset Management Strategy (which will hereafter be referred to as the Asset Management Strategy or the Strategy) sets out how the Highways and Transportation Asset Management Policy is to be delivered and its desired outcomes realised. The Highways Asset Management Policy sets out four key outcomes for the Asset Management Strategy to ensure effective management of the Council's highways infrastructure assets. These asset management outcome objectives mirror the commitments in the 'Everyone's Essex – our plan for levelling up the county: 2021-2025'.

- **Economy** – strong, inclusive & sustainable economy
- **Environment** – high quality environment
- **Health** – health, wellbeing & independence for all ages
- **Family** – a good place for children and families to grow

Table 1 below shows how effective asset management helps support 'Everyone's Essex – our plan for levelling up the county: 2021-2025'

Table 1. ‘Everyone’s Essex – our plan for levelling up the county: 2021-2025’

Everyone’s Essex Outcomes	Outcome Commitments	How the Asset Management Strategy helps achieve the Outcomes
<p>Everyone’s Economy – Strong Inclusive & Sustainable Economy</p>	<p>GOOD JOBS: we will work hard to address the impacts of the Coronavirus pandemic on unemployment by supporting business recovery and building a stronger economy for the future, enabling people to build the skills they need to be part of it, and working alongside Essex businesses to help reduce barriers to employment for disadvantaged groups.</p>	<p>Essex County Council supports the commercial needs and economic growth desired in the County through ensuring its Highways assets are safe, accessible, serviceable and sustainable. This provides access to key national and international destinations, supported by reliable journey times, which creates the right environment to attract investment and employers to the area. These benefits address the impact of the global pandemic on unemployment by supporting business recovery, creating employment opportunities for all skills levels, and creating the right environment for building a stronger economy for the future. The highway network also provides access to colleges, universities and other training establishments, enabling people to pursue the training they need to enter job markets and develop careers.</p>
	<p>INFRASTRUCTURE: we will deliver and maintain high quality infrastructure to improve opportunities for people living in Essex as well as supporting a growing economy and the delivery of new homes and communities by investing in the region of £1 billion by the end of this council.</p>	<p>The highway network and related infrastructure assets provides access for heavy good vehicles, machinery, materials and services to deliver new homes to communities.</p>
	<p>FUTURE GROWTH AND INVESTMENT: we will help grow existing businesses and the economic sectors of the future in Essex, including the arts, and secure high levels of new investment by working with partners to promote the county, by creating the conditions for growth and by maximising the</p>	<p>We will maximise the use of available budgets by co-ordinating with major projects to ensure that asset management needs are considered and addressed in any funding bids, and that maintenance programmes where possible, complement works targeted at growth and investment.</p>

	<p>impact of public sector spend within the county.</p>	
	<p>GREEN GROWTH: we will develop Essex as a centre for innovation, supporting new technologies and business models to enable our economy to transition to net zero and secure green jobs for the future by ensuring we have the right local skills and drawing in investment opportunities.</p>	<p>Linking business corridors and enterprise zones through reliable roads, footways and cycleways, increases the accessibility of these innovation centres. This enables job mobility, allowing the appropriate skills to move into the County bringing the benefits of innovation and investment.</p>
	<p>LEVELLING UP THE ECONOMY: we will work to level up the economy by addressing the drivers of socio-economic inequality (including income, education, employment, health and housing), based on the foundation of good jobs and a higher skilled and healthier workforce.</p>	<p>Providing access for education and training, and creating an environment that encourages economic recovery, creates employment opportunities for everyone. This promotes growth which will bring the prosperity needed to address socio-economic inequality.</p>
<p>Everyone's Environment – High Quality Environment</p>	<p>NET ZERO: we will work across the council and the county to hit our net zero targets, by ensuring that the council significantly reduces its carbon footprint, whilst also supporting an acceleration in the progress towards sustainable housing and energy, and active and alternative forms of travel across the county.</p>	<p>The use of materials with reduced carbon emissions are already embedded into the highway maintenance processes, and further opportunities to reduce carbon emissions as well as promote biodiversity gain are being explored. It also provides ever developing opportunities for active travel such as walking and cycling, thereby reducing traffic congestion and improving air quality.</p> <p>This approach will continue to address the recommendations of the Essex Climate Action Commission by contributing to the County's target of net zero by 2050.</p>
	<p>TRANSPORT AND BUILT ENVIRONMENT: we will deliver a step change in sustainable travel across the county, by growing passenger transport and</p>	<p>New walking and cycling schemes have been announced as part of our ambition for Essex to become Safer, Greener and Healthier. This will reduce traffic congestion, cut air pollution and improve</p>

	<p>active travel, and will ensure we support the move towards net zero, climate resilient developments, including our new garden communities, by delivering sustainable, healthy neighbourhoods for the future.</p>	<p>residents' physical and mental wellbeing. This will help deliver a step-change in sustainable travel, confirming Essex's place at the forefront of sustainable transport.</p> <p>Essex Highways is a contributor to the Bus Service Improvement Plan. It is also working closely with developers to embrace new garden community developments, to create opportunities for sustainable and active travel as well as enhance the use of the Public Rights of Way network, wherever possible.</p> <p>We will also endeavour to green and improve the amenity of public realm spaces, creating safe and comfortable places that encourage a feeling of community.</p>
	<p>MINIMISE WASTE: we will minimise the impact on the environment by supporting residents and businesses to reduce waste and increase the amounts recycled, and by working with others to deliver a more circular economy whereby we better protect our natural resources through the efficient and ongoing reuse of materials.</p>	<p>Essex Highways will continue to develop recycling treatments as part of its routine maintenance programme and will also continue to develop re-use of maintenance waste materials. The highway network also provides access to waste collection services and recycling centres.</p>
	<p>GREEN COMMUNITIES: we will work with communities and businesses, providing advice and support to enable and empower local action to reduce greenhouse gas emissions and build climate resilience.</p>	<p>The Essex Highways vision and aim for Safer, Greener and Healthier Travel for current and future users of the transport network, ensures everything we do supports the drive towards active travel and sustainable transport, biodiversity net gain, an increase in green infrastructure, the promotion of local nature recovery and improved water management. In particular, we will achieve this through our work with the Local Highway Panels where the focus is on localism and communities.</p>
	<p>LEVELLING UP THE ENVIRONMENT: we will help all our communities to enjoy a high-quality environment, by making them more resilient against flooding, heat stress and water shortages, by enhancing our</p>	<p>Reducing incidents of flooding remains a high priority for Essex Highways. Effective road drainage is vital to reducing the risk of property flooding and for preventing road user safety risk from excess water on the road surface. Its drainage asset cleansing, inspection and repair programmes remain vital services</p>

	<p>county's green infrastructure and by reducing air pollution.</p>	<p>which make the network more resilient to climate change.</p> <p>Improving our management of water, so we collect it and hold it back where appropriate, will enable it to be reused or released back into the environment, contributing to mitigating water shortages.</p> <p>The Essex Highways vision and aim for Safer, Greener and Healthier Travel promotes opportunities for sustainable travel, including active travel such as walking and cycling, all of which reduce traffic congestion and improve air quality.</p> <p>Greening and improving the amenity of public realm spaces will assist with reducing heat stress, support increase in green infrastructure and aid local nature's recovery. It will also help foster a spirit of community through people feeling safe, comfortable and included.</p>
<p>Everyone's Health – Health, Wellbeing & Independence for All Ages</p>	<p>HEALTHY LIFESTYLES: we will aim to increase the proportion of people able to live healthy lifestyles by embedding a community-first approach, by helping people to overcome social isolation, mental ill health and substance misuse, and by helping people to live fit and active lifestyles.</p>	<p>The highway network affords opportunities for active travel, exercise, sport, leisure, entertainment, and access to green spaces, all of which promote physical and mental wellbeing. The highway network also provides access to social services and other health care and provides vital communication links between communities which ensures social inclusiveness.</p> <p>We also provide opportunities for organised volunteer groups to undertake works on the Public Rights of Way network which support a community first approach and can also assist in overcoming social isolation and other wellbeing matters.</p> <p>Greening and improving the amenity of public realm spaces creates safe and comfortable places which encourage people to live active lives, which brings improvements to health and well-being for communities.</p>
	<p>PROMOTING INDEPENDENCE: we will work with key partners and the adult safeguarding board to help individuals to live free from abuse and neglect and will enable residents to live independently by assisting them to access suitable</p>	<p>The highway network promotes independent living through access to social services as well as to other health and domiciliary support. A safe, accessible, serviceable and sustainable highway network also creates the right environment for economic growth, which creates opportunities for employment and</p>

	<p>accommodation, supporting access to employment and meaningful activities, and enabling independence at home through reablement, care technology, and market shaping to ensure strong domiciliary support, and investment in housing.</p>	<p>training inclusive of those with low skills. It also enables access to the developing range of services that can be requested through digital communications.</p>
	<p>PLACE-BASED WORKING: we will deliver better care that meets the needs of residents by joining up care and support with local partners in a place, including with district councils, health partners and the local voluntary and community sector.</p>	<p>The highway network provides access to local and partner organisations as well as voluntary and community organisations which deliver health care and social services to residents.</p>
	<p>CARERS: we will help those carers of all ages whose caring duties are impacting most on their wellbeing by achieving a step change in the advice, guidance and support we provide to support wellbeing and independence, and by targeting it at those who need it most.</p>	<p>The highway network will provide the communication links needed to deliver the required support to carers.</p>
	<p>LEVELLING UP HEALTH: we will seek to reduce health inequalities by bringing together partners and communities to address the socio-economic drivers that underpin poor health outcomes, such as poor housing, poverty, economic insecurity and low skills.</p>	<p>A safe, accessible, serviceable and sustainable highway network creates the right environment for economic growth, which creates opportunities for employment and training inclusive of those with low skills. The highway network provides access to local and partner organisations to deliver social services as well as other health care and support services. It also provides access for heavy goods vehicles, machinery, materials and services to improve existing homes and deliver new homes to communities.</p>
<p>Everyone's Family – A Good Place for Children & Families to Grow</p>	<p>EDUCATION OUTCOMES: we will achieve educational excellence and high standards for all children and young people as we recover from the pandemic, by working in partnership with early years providers, schools, colleges and universities, by building greater coherence across the system and by engaging businesses,</p>	<p>The highway network gives people the opportunity to travel to schools, colleges and libraries of their choice. It also creates the right environment for investment and economic growth, which creates opportunities for employment and training at all skills levels.</p>

	<p>communities and the arts sector in supporting education outcomes.</p>	
	<p>FAMILY RESILIENCE AND STABILITY: we will work to strengthen family resilience and stability, as part of thriving communities, by embedding an approach that tackles the drivers of family instability and provide support to low income, vulnerable and working families.</p>	<p>A safe, accessible, serviceable and sustainable highway network creates the right environment for economic growth, which creates opportunities for employment and training, which promotes family stability. The highway network also provides access to health care and support services which address vulnerability and family resilience.</p> <p>We will continue to acknowledge the importance of the family unit through our work with our Local Highway Panels where there is a focus of localism and the development of community.</p>
	<p>SAFETY: we will continue to improve the safety of Essex residents, including children and young people, by sustaining our nationally recognised approach to early intervention, safeguarding and neglect, addressing domestic abuse, child criminal and sexual exploitation, and peer on peer violence and abuse. We will continue close working with our partners to help make our communities safer and address key issues such as violence and vulnerability, and safety for women and girls.</p>	<p>Essex Highways prioritises a safe environment for everyone travelling or working on its network, including safe design, delivery and use. It also promotes a safe environment through access to emergency services such as the fire, police and ambulance services, as well as access to vital support services such as safeguarding. It also maintains essential links to communities with limited access.</p>
	<p>OUTCOMES FOR VULNERABLE CHILDREN: we will work to improve outcomes for the most vulnerable and disadvantaged groups including Children in Care, Care Leavers, Children with SEND and children from BAME communities, by working with children, young people and partners across the system.</p>	<p>The highway network provides access to local and partner organisations as well as voluntary and community organisations which deliver health care and social services to children and other residents.</p>
	<p>LEVELLING UP OUTCOMES FOR FAMILIES: we will work to address inequalities affecting children and families by focusing on recovery from the pandemic, tackling family poverty, mental health support, emotional</p>	<p>The highway network provides access to key national and international destinations, supported by reliable journey times, thereby creating the right environment to attract investment and employers to the area. These benefits address the impact of the global pandemic</p>

	<p>wellbeing and healthy, active and productive lifestyles, and making sure that we engage hard to reach groups.</p>	<p>on unemployment by supporting business recovery, creating employment and training opportunities for all skills levels. The highway network affords opportunities for active travel, exercise, sport, leisure, entertainment, and access to green spaces, all of which promote physical and mental wellbeing. The highway network provides access to social services as well as to other health care and domiciliary services. It also maintains essential links to communities with limited access which promotes social inclusiveness and independent living.</p>
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The Asset Management Strategy acknowledges the importance of working within the legal, financial and environmental constraints currently faced by the Council which impact available budgets for the maintenance of highway infrastructure assets. This includes the adaption of working practices to comply with any restrictions relating to the evolving situation with the Coronavirus pandemic, which may need to be implemented in order to safeguard the health and welfare of operatives as well as the travelling public as far as practicable.

The Asset Management Strategy complements and supports other County Council highway maintenance and transportation related policies and strategies including: The Local Transport Plan; the Essex Highways Maintenance Policy & General Principles; the Highway Maintenance and Inspection Strategy for Carriageways, Footways and Cycleways; the Maintenance and Inspections Strategy for Structures; the Maintenance and Inspections Strategy for Street Lighting; the Maintenance and Inspections Strategy for Intelligent Transport Systems (ITS); the Maintenance Strategy for Winter; the Essex Speed Management Strategy; the Traffic Management Strategy, and Essex Design Guide.

1.2 Supporting the Essex Highways Vision and Aims:

Safer, Greener and Healthier Travel for current and future users of the transport network in Essex.

The Asset Management Strategy will help:

- Deliver a common vision, working collaboratively, seamlessly and with integrity and transparency
- Engage with our transport network users and provide them with the right information to help shape Essex priorities
- Ensure everything we do supports the drive towards a greener Essex, promoting options that have a positive impact on everyone's health
- Prioritise a safe environment for everyone travelling or working on our network, including safe design, delivery and use
- Optimise our resources through efficiency and innovation to deliver the best possible outcomes while continuing to build future service resilience
- Support the economic and social prosperity of Essex through joined up, accessible services

The vision and aims are embedded in all our process and practices and will promote active travel and sustainable transport. For example, it will encourage more people to walk and cycle, which is viewed as important for recovery from the coronavirus pandemic.

In Phase One of our 'Safer, Greener, Healthier' programme, we worked with other district councils in Essex to implement on-street measures designed to make city/town centre public spaces safer for people during the Coronavirus crisis. The schemes provided bigger, safer spaces in key locations for city centre shoppers, residents, workers and visitors to social distance. These safety improvements were funded by national government from the Emergency Active Travel Fund Phase One as part of the national response to the Coronavirus situation.

Essex County Council also received £7,358,700 in an ambitious Phase Two bid to the Emergency Active Travel Fund which was in line with the latest thinking from Government which asked Local Authorities to:

- Create a road environment that is safer and provides greater capacity for both cyclists and pedestrians
- Help to relieve short-term overcrowding and reduced capacity on public transport
- Deliver long-term benefits for public health and environmental benefits

Plans for these new Phase 2 schemes, in Braintree, Brentwood, Chelmsford, Colchester and Wickford were announced in October 2021. These plans follow recent consultations in these localities, which revealed that Essex residents were concerned about traffic congestion, air pollution and road safety. Action to tackle speeding was the highest priority followed by a desire for less traffic overall and for children to be able to play, walk and cycle in their neighbourhood.

These plans are part of our ambition for a step change in sustainable travel across the county by growing active travel and passenger transport. It will ensure Essex becomes safer, greener and healthier by making it easier and safer for residents to walk or cycle, reducing traffic congestion, cutting air pollution and improving residents' physical and mental wellbeing.

To find out more about what has been introduced already in different parts of the county, please have a look at the local sections accessible from the Essex Highways Service Information Centre: www.essexhighways.org/safer-greener-healthier

1.3 Promoting Biodiversity – The Environment Act 2021

The natural world is our best ally in reversing climate change

The publication 'Net Zero: making Essex Carbon Neutral by 2050', by the Essex Climate Action Commission, recommends actions to address the climate and biodiversity challenges. "The natural world is our best ally in reversing climate change – it is key to absorbing and storing carbon."

Biodiversity provides a variety of species, habitats, and ecosystems. It is essential for human existence and our environment by delivering key services including clean air and water. The planting of trees, for instance, is an important means of offsetting carbon pollution.

The negative impact of humans on the environment is well documented, as are the concerns regarding sustainability. Without significant changes, many species will be eradicated from the planet. The loss of species and habitats poses as much a danger to life on Earth as climate change.

Our duty to biodiversity is now law under The Environment Act 2021. For example, *section 102 General duty to conserve and enhance biodiversity*, states that a public authority must from time to time consider what action it can properly take to further the conservation and enhancement of biodiversity.

There is much that Essex Highways is currently doing to promote biodiversity, but it is not resting here – it acknowledges how critical biodiversity is to sustaining life and addressing climate change, and it will continue to explore new opportunities for achieving biodiversity net gain and contributing to local nature recovery.

For example, all Essex Highways maintenance activities comply with the requirement not to kill or harm protected species and habitats; i.e. hedge cutting is not undertaken during bird nesting season. Biodiversity is already considered for Structures schemes as well as for larger schemes for other asset groups, especially where environmental impact assessment is part of the planning consent. What is more, Biodiversity has historically been considered on the majority of improvement schemes and new road projects undertaken, even small schemes such as cycle lanes. Indeed, improvements to biodiversity have readily been encouraged and included in designs - and we will be building on this approach going forward.

Promotion of Biodiversity Net Gain is just part of how Essex Highways will support the Council's priority to increase the Green Infrastructure in Essex from the current 14% to 30% by 2040. Promotion of Biodiversity Net Gain will also encourage the use of the emerging Local Nature Recovery Strategy for Essex in 2023, further supporting Nation-wide goals to create a Nature Recovery Network (as mentioned in the GOV25YEP and the Environment Act 2021). Note that Green infrastructure can be defined as a carefully planned network of high quality natural and semi-natural assets and habitat types, of green and blue spaces, and other strategical planned environmental features that maintain and delivers our ecosystem services.

The Green infrastructure Strategy states Natural Green Infrastructure covers 518 km² or 14% of Greater Essex. Natural Green Infrastructure (NGI) includes:

- Natural and semi-natural open space (grasslands, heathland, scrub and woodland)
- Country parks
- Ancient Woodland
- Reservoirs, lakes, and ponds
- Coastal features (beaches, sand dunes, rocks, foreshore, tidal water, saline water)

Natural Green Infrastructure also exists in and around other land use area such as:

- Urban areas
- Non-farmed land such as horse pasture, golf courses, former landfill or extraction land, operational land managed by large statutory undertakers or corporates etc.
- Residential housing and light industrial areas
- Roads and the Public Realm

In this regard, the Essex Highway network, including its Public Rights of Way network, is in a unique position for its soft estate to play an important role in the health and well-being of our communities. Appropriate management of highway verges and other soft estate, as well as the implementation of natural flood water management techniques, provides continuity of habitat and attracts essential pollinators. Planting, however, need not be restricted to rural localities, as 'greening' can occur in urban open spaces in the public realm, through

implementing planters such as 'tree pits', 'green roofs' and 'green walls'. Greening and improving the amenity of public realm spaces also creates areas where people feel safe and comfortable, fostering the feeling of community and contributing to peoples' health and well-being. These features can create shading that reduces 'heat stress', and they effectively link areas of nature through 'green corridors' that result in an increase in green infrastructure that also provide habitat corridors which contribute to local nature recovery. For example, 'green corridors' link previously isolated areas of nature into a nature network, in which wildlife can travel and move across the landscape, accessing a variety of habitats. This movement is vital for increasing biodiversity in Essex. The creation of habitat corridors further supports the development of the Essex Local Nature recovery strategy, emerging in 2023.

We will endeavour to support the Council's objective for increasing Green Infrastructure, achieving biodiversity net gain and aiding nature's recovery, and continue to provide people access to high-quality green and natural places that facilitate inclusiveness and integration. This creates great places to be and provides multiple benefits for people and biodiversity.

For more information refer to the Essex Green Infrastructure Strategy published on the Essex County Council website:

https://downloads.ctfassets.net/knkzaf64jx5x/35jihEoQZAc4f7bwGyLa38/fc90fbc5519874490047930aae371036/Essex_Green_Infrastructure_strategy.pdf

1.4 Reducing Carbon - Helping the County achieve net zero by 2050.

The active travel schemes referenced in 1.2 above, will transform key routes across Essex and represent the start of a long-term County plan to provide high quality walking and cycling environments, where people feel safe and relaxed. The schemes will provide more space for people to get their minimum daily exercise, as they are going about their business, whilst enjoying every-day walking and cycling. These schemes will also reduce traffic congestion, reduce carbon emissions and improve air quality.

Essex Highways, through its technical working group, is also developing its approach to reducing carbon emissions in its use of materials and processes for asset maintenance and renewals. For example, in 2021/22, around 23% of all asphalt specified was a warm mix lower carbon option. Processing of 'warm mix asphalt' is around fifty degrees cooler than for conventional asphalt, thereby reducing greenhouse gas emissions by up to 40% as well as improving the durability and long-term performance of the treatment. Note that warm mix is used mostly for 'binder layers', but a trial use for surface course layers has recently commenced with a view to significantly extending use of this material. In addition, our asset management system software supplier is developing whole life carbon functionality, so that not only will we be able to select the best long-term treatment options to minimise cost but also the best long-term treatment options for reducing carbon emissions.

We also have a Key Performance Indicator (KPI SE10) relating to the use of recycled and secondary aggregate in construction. The purpose of this KPI is to promote the use of recycled products within the Essex highways contract to reduce waste and reduce the use of virgin materials, thereby contributing to reducing our carbon footprint.

In the case of Traffic Signals, schemes are identified to promote use of extra low voltage components, in order to reduce energy consumption and carbon. Efficient signalisation of specific traffic corridors also reduces the likelihood of traffic congestion, which reduces carbon and improves air quality. Similarly, the conversion to L.E.D lamps for Traffic Signals and L.E.D lanterns for Street Lights also reduces energy consumption and carbon. In the case of illuminated bollards, it is now permissible to replace assets in certain locations with non- illuminated bollards, which also contributes to reduced energy consumption and reduced carbon.

All these factors continue to promote a Greener Essex and contribute significantly towards achieving the County's target of net zero carbon emissions by 2050.

2. The Asset Management Framework

Asset management is widely accepted as a means of delivering the performance requirements of the Council in the most effective, efficient and sustainable manner.

All assets decline in condition as they age, and therefore require maintenance if they are to remain fit for purpose. Assets also require a regime of inspection for their condition to be monitored so that defects requiring repair can be identified. A system is needed in which to record the asset inventory as well as the outcomes of the inspections, and to schedule repairs.

These activities reflect a few of the key principles that comprise an Asset Management Framework. Effective Asset Management comprises long term planning over the whole lifecycle of an asset from construction, through maintenance, to replacement. This process is called Lifecycle Planning, and it is used to demonstrate how standards are achieved through appropriate maintenance strategies and corresponding investment.

The Asset Management Framework is embedded and delivered in the activities and processes undertaken by the Essex Highways Partnership; processes which remain agile, flexible and adaptive in order to respond to changes in demand and changes in Council priorities.

Whilst the approach outlined in this document largely refers to the maintenance and replacement of existing highways infrastructure, its principles of asset management are also applied to schemes which create new highway infrastructure.

3. Communication Strategy: People are at the Heart of what we do

Engaging with our customer is viewed as a vital decision-making tool.

The Highway Network, which includes all Highway assets, can affect every one of us, therefore we are all customers, and all have an interest in the Policies and Strategies which affect its management. The standards set for aspects of the Highways service are aligned to meet customer needs as far as practicable, therefore customer feed-back is an essential part of the decision-making process.

Our communications strategy sets out how we engage with our customers and other partners as we develop, improve and maintain the Highway network. This includes how we engage with County Members, residents, supply chain partners and employees, Parish Councils, City and District Councils, Utility companies, Emergency Services and other bodies with an interest in the Highway network.

This level of engagement places the organisation in a good position to foster the potential benefits from devolution promised by central government, such as strengthening collaboration and improving customer satisfaction by empowering Town and Parish Councils to address local priorities. This will also reduce costs by removing some of the complexity around governance and will allow the Council to focus on more complex projects that have a wider impact, therefore enabling the Council to do more with less. It will also encourage a community approach to addressing climate change which will enable us to explore different ways of doing things that ultimately will benefit us all. For example, turning unused land into nature reserves will contribute to the Nature recovery network across the Southeast of England and support the emerging Local Nature Recovery strategy 2023. This is regarded

as critical for addressing climate change. It may be possible for the creation, inspection and maintenance of these sites to be shared with other organisations or community groups, to alleviate stretched highways resources.

It is important that customers understand the Council's Asset Management Strategy, priorities and actions, as well as the important part played in the development of these documents through customer communication and consultation.

We provide communications in a range of accessible ways, across a variety of media but with a bias towards attractive, user-friendly digital channels, supporting the Council's desire to develop digital communications. For example, the Council makes full use of its web-based Highways Service Information Centre and 'twitter' to provide information and advice on a wide range of highway related activities. Customer feedback is also encouraged through the Council's Contact Centre.

Our strategic approach to communications is detailed in the annual Essex Highways Communications Service Plan whose effectiveness is assessed through an annual review process which sustains a culture of continuous improvement.

Whether through using technology to engage proactively with customers through social media or the Council's Contact Centre or working with Members to help identify improvement schemes in local areas, Essex Highways is committed to effective customer service in all situations.

4. Road Safety – Keeping Highway Users Safe

Protecting the public from harm when using the highway network is an absolute priority.

Under the Highways Act 1980, Authorities have a general duty of care to users and the community to maintain the highway in a condition fit for its purpose. Road Safety engineering is a vital component of asset management. These activities include carrying out auditing of scheme designs where works will fundamentally alter the existing highway, to ensure all safety measures have been included.

Road safety activities also include analysis of road traffic collision information, and where identifiable patterns or clusters are evident these are investigated thoroughly. Where measures to improve the safety of the road user are identified then these are programmed and implemented.

Other, routine Asset Management activities, such as safety inspections and corresponding defect identification and repair priorities, as well as works prioritisation processes that consider safety risk, contribute to road safety by keeping assets in a serviceable condition that minimises safety risk.

4.1. The Safer Essex Roads Partnership

Essex County Council is a formal member of the Safer Essex Roads Partnership (SERP) comprising Essex County Council, Essex Police, the 'Police Fire and Crime Commissioner for Essex', Essex Fire & Rescue Service, Southend Borough Council, Thurrock Council, the Safer Roads Foundation, Highways England (Guildford & Bedford offices), Essex & Herts Air Ambulance Trust and the East of England Ambulance Service NHS Trust.

All partner organisations signed-up to a new 5-year (extendable to 10 years) Memorandum of Understanding on 10/04/2021 that included the SERP's *Vision Zero aspiration by 2040. This Vision Zero is to be achieved by adopting the Safe System approach to road safety,

and an interim target has been set of a 50% reduction in deaths and serious injuries by 2030.

All SERP partner organisations have continued to endorse the primary focus of the SERP: to deliver Road Safety Services across the area of Essex, Southend and Thurrock.

*At the heart of Vision Zero is the belief that no one should be killed or seriously injured whilst using the road network within the SERP's area.

5. Network Hierarchies

Categorising assets based on their level of importance enables investment to be prioritised where outcomes will benefit the maximum number of users, thereby achieving value for money.

5.1. Road Hierarchy

A new road hierarchy was identified and introduced in 2013. This means that roads were divided into routes relative to their importance in terms of enabling economic activity and access to key services and destinations. This process created a strategic County Routes network comprising Priority 1 (PR1) and Priority 2 (PR2) roads, with the remaining network categorised as Local Roads. It is the County Routes network which provides the main arteries for the flow of commerce, goods and people, and therefore carries high volumes of traffic through and around the County.

This hierarchy achieves value for money by enabling inspection and maintenance resources to be prioritised to the most important roads, thereby delivering benefits to the greatest number of users within existing resource levels.

The development of this new hierarchy is in keeping with the recommendations within the 'UKRLG Well Managed Highway Infrastructure – A Code of Practice' published in October 2016.

5.2. The Resilient Network

The establishment of road network hierarchies is also in keeping with the recommendations within the Department for Transport (DfT) 'Transport Resilience Review' published July 2014. The Transport Resilience review recognised that with continued public expenditure reductions some local authorities would be unable to maintain the condition of all their roads, which inevitably would impact on the resilience of some of the less important roads. In view of this, it promoted the establishment of a 'resilient' network to which priority is given through maintenance and other measures.

The PR1 routes network is the Council's 'Resilient' network.

Regular reviews of the County Routes network are conducted to ensure that the route hierarchy continues to meet the changing needs of Essex and incorporates additional routes created through the opening of new road schemes, improvement schemes and adoption of third-party developments.

Based on the success of this hierarchy, and in view of continued downward pressure on funding availability, we have explored the benefits of further sub dividing this hierarchy with a view to safeguarding the Council's strategic priorities (refer to Section 9.1.1 Desired Outcomes for more information on hierarchy sub divisions).

5.3. Footway Hierarchy

Essex defines its footway hierarchy into three categories: PF1, PF2 and PF3.

PF1 footways are the most important footways as these are categorised as high footfall (high use), typically located in town centres.

PF2 footways typically are those that provide linkage between PF1 routes and local residential areas

PF3 footways are generally residential and low footfall (low use) footways.

Not all asset groups follow the same hierarchy designation as the roads to which they are associated, even though their level of importance follows broadly similar criteria. For example, it is possible for a PF3 footway (low importance) to be adjacent to a PR1 or PR2 road.

5.4. Bridges Hierarchy

A hierarchy has also been identified for Bridges and other Structures. It recognises that communications to some communities is limited, and therefore where structures carry roads to these communities, they are included with those of high strategic importance. This is in keeping with Essex's Vision which emphasises the development of communities, recognising that Essex is not one community but many small, strong communities. The Structures hierarchy is:

STR1 - Structures that are the highest priority of the network. The majority of these structures endure a higher amount of usage through frequency of traffic and loads or provide essential links. They are vital to ensure the continued unhindered flow for commerce, goods and people.

STR2 - Structures that are of a high importance to ensure the continued unhindered flow for commerce, goods and people.

STR3 - Structures located mainly on the local road network.

STR4 - The lowest priority structures assets on the network.

A hierarchy for cycle routes is currently being finalised to support active travel, and a hierarchy for public rights of way is also currently being developed.

5.5. Critical Assets

Some highway assets are regarded as critical infrastructure; i.e. assets whose failure would have a significant impact locally and possibly even nationally. For example, bridges which provide essential links to relatively remote communities. Accordingly, asset management planning identifies the levels of investment required to sustain appropriate levels of resilience for these assets.

6. Achieving Value for Money – Lifecycle Planning

Value for money flows from rigorous life cycle planning to identify interventions that minimise maintenance costs over the life of the asset

A key outcome objective of Asset Management is to provide the information required for investment decision making. Whilst the Council's budget setting is undertaken on an annual basis, investment planning information not only provides options for the short term (annual basis) but also the medium term (five years) and longer term (ten years).

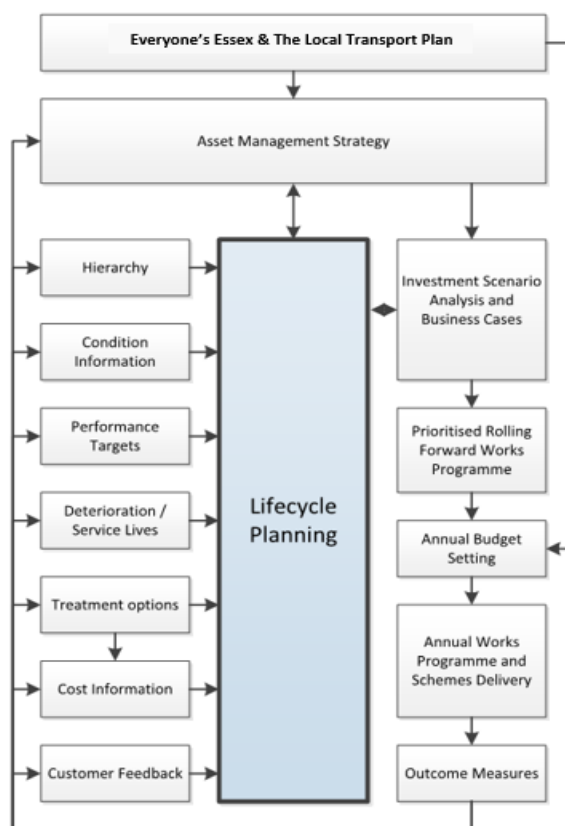
Life cycle planning is undertaken for each major asset group to identify all the activities and associated costs over the life of the asset which are required to sustain accessibility,

serviceability, sustainability and safety. This considers all maintenance and renewals activities, including minor repairs such as addressing potholes, repointing masonry, or fixing electrical faults. It also includes environmental maintenance such as cleansing of gullies and drains, and cyclical maintenance such as grass cutting and weed spraying and other vegetation clearance. These activities combine into an overall strategic approach to maintaining the Highway infrastructure.

A variety of strategy scenarios are linked to separate Investment levels and corresponding standards of service. Recommendations are made to the Council regarding how to achieve the best balance of competing demands across all asset groups by suggesting investment levels that reflect best the Council's strategic priorities. The Council is then able to assess the benefits and risks of each investment scenario and make an informed decision.

Lifecycle planning sits at the heart of the Asset Management Framework as shown in Fig 1 below which shows a clear link between the Asset Management Strategy and the Council's strategic priorities which are set out in Everyone's Essex and the Local Transport Plan.

Fig 1 Lifecycle Planning



7. Promoting Improvement through Innovation

Efficiency savings will be achieved through exploring new treatments, materials and practices that reduce costs, as well as reduce waste, energy consumption and our carbon footprint

It is important that our asset management strategy and delivery processes remain up to date and reflect best practice, and that they have the flexibility to respond rapidly to change. We must meet the future challenges of economic growth, population growth, traffic growth and an ageing population demographic, and the impact all this will have on highway network demand.

We must also be prepared for climate change, especially more extremes of weather such as heatwaves, intense downpours and high winds. We have seen some evidence of such

extreme events in recent years. We must also respond appropriately to address climate change. For example, promoting biodiversity net gain provides green corridors that achieve continuity for habitat and attract essential pollinators. This supports the local nature recovery strategy and the nature recovery network across Essex and the southeast, which is viewed as key to offsetting carbon. We must also manage water resources better, for Essex has a serious water shortage. We can achieve this through implementing natural flood water management techniques where appropriate, through collecting water for reuse or holding water back so it can be released slowly back into the environment.

Our Asset Management Framework remains agile through the adoption and implementation of best practice guidance, such as HMEP guidance, the 2014 Transport Resilience Review, and National Codes of Practice such as Well-Managed Highway Infrastructure – A code of Practice, and Management of Electronic Traffic Equipment – a code of Practice.

Ringway Jacobs attained British Standard BS ISO 55001 in Asset Management for Essex Highways in 2017/18; this standard was reviewed and sustained in 2018/19, 2019/20 and again in 2020/21 and 2021/22. This helps the Council to demonstrate its competence when bidding for third party funding for asset investment schemes.

Essex Highways actively participates with other national and local groups and organisations, and attends regional forums and national conferences, to improve knowledge, share good practice and experience, and to benchmark our performance with other Authorities (refer also to Section 14.2 Sharing and Learning through Benchmarking).

7.1. New materials, treatments and technology

We have a long-established Technical Working Group within the Highways service to review and update current specifications and treatment options. This approach includes the exploration of the latest materials and technologies to achieve efficiency savings. It also includes reviewing and improving materials and processes which we have been using for many years, including a developing approach to reducing carbon emissions to help the County achieve its target of net zero by 2050 (refer to section 1.4 Reducing Carbon - *Helping the County achieve net zero by 2050*, for more information).

The Highways service also continues to work closely with Ringway Jacobs shareholders, in particular with Eurovia's specialist pavement management consultancy John Lefebvre UK, to benefit from their extensive knowledge and expertise in this area across the UK and overseas. This provides insight into new products emerging from Eurovia's extensive pavement research and development facilities which may benefit the Essex Highways contract.

With Ringway Jacobs other shareholder, Jacobs, Essex Highways is also continuing to explore new structural analysis techniques to better understand the load capacity of our bridges and other structures assets. In this way weak structures will be more readily identified and assessed, and accordingly programmed for necessary remedial works.

8. The Performance Management Framework - turning the Council's strategic priorities into Outcomes

Aligning investment levels with required standards of service, and validating delivery of service outputs through measurement of performance, realises priority outcomes

Essex Highways activities are aligned to investment levels which reflect the standards of service desired by the Council. Standards are interpreted as 'performance standards' for which performance targets are set and duly monitored to ensure that planned outcomes are realised. Monitoring of performance includes the measurement and reporting of

performance on a frequency that is relevant for the service in question. Measurement of performance requires a regime of data collection and analysis which requires investment; the regime, therefore needs to be practicable and provide value for money.

Having the appropriate information when it is needed is essential to any decision-making process, and the data collection regime is part of the Essex Highways Information Strategy. This supports the service through improving the way in which the need for data is identified, and by improving the way data it is collected, used, stored and shared.

An overall strategic approach to Highway service provision comprises a range of services, and therefore performance management can be expected to include a suite of performance targets. Accordingly, the Council has established a framework of performance indicators for measuring the delivery of the Asset Management Strategy, and this is monitored regularly by senior officers and Cabinet Members. Any over or under performance is investigated and, if necessary, improvement plans put in place to ensure delivery of the required performance. Figure 2 below shows the links between the Asset Management Strategy performance indicators and the Council's strategic priorities. All performance measures contribute to keeping the highway network assets accessible, serviceable, sustainable and safe using an approach that results in value for money. Note that the information shown is for performance year 2022/23 (Year 11 of the Partnership contract).

Figure 2: Performance Management Framework (Year 11)

Key Performance Indicator Framework Year 11 2022/23 Part 1 of 2				Everyone's Essex - our plan for levelling up the County: 2021-2025'			
KPI reference	Measure Description	Definition	Target	Economy - strong, inclusive & sustainable economy	Environment - high quality environment	Health - health, wellbeing & independence for all ages	Family - a good place for children & families to grow
AC1	Condition of PR1 Network	This indicator tracks the improvement to the PR1 network and identifies the areas that need improving. The indicator uses a SCANNER survey to survey the road and produce a UKPMS score.	4%	x	x	x	x
AC2	Condition of PR2 Network	This indicator tracks the improvement to the PR2 network and identifies the areas that need improving. The indicator uses a SCANNER survey to survey the road and produce a UKPMS score.	4%	x	x	x	x
AC3	Condition of Local Roads	This indicator tracks the improvement to the Local road network and identifies the areas that need improving. The indicator uses a SCANNER survey to survey the road and produce a UKPMS score.	Baseline	x	x	x	x
AC4	SCANNER RCI. PR1 Mid Bands	This indicator tracks the improvement to the PR1 network and identifies the areas that need improving. The indicator uses a SCANNER survey to survey the road and produce a UKPMS score.	2%	x	x	x	x
AC5	SCANNER RCI. PR2 Mid Bands	This indicator tracks the improvement of the PR2 Mid Band network and identifies the areas that need improving. The indicator uses a SCANNER survey to survey the road and produce a UKPMS score.	2%	x	x	x	x
AC6	Condition of heavily used Footways	This indicator tracks the condition of the footway network and identifies the areas that need improving. The indicator uses an in house survey to assess the condition of the network.	To be set in July	x	x	x	x
AC7	Condition of lightly used footways	This indicator tracks the condition of the footway network and identifies the areas that need improving. The indicator uses an in house method to assess the network condition.	29%	x	x	x	x
AC8	Street lighting defects	The indicator is to measure the efficiency of the street lighting maintenance team ensure that the expected number of defects are being attended to.	21645	x	x	x	x
AC9	% of Structural Reviews completed to programme	The purpose of this indicator is to monitor the completion of Structural Reviews that are commissioned as part of the Capital Programme.	80%	x	x	x	x
AC10	Repudiation rate of Highway Insurance Claims	The purpose of this indicator is to reduce liability and costs to Essex County Council (ECC).	90%	x	x	x	x
AC11	Timeliness of asset adoptions	The indicator measures the timeliness of adding new streets on to asset systems, with inspection routes and gritting routes assigned as appropriate in accordance with the Maintenance and Winter Gritting strategies, and the updating of the S36 List of Streets	80%	x	x	x	x
AC12	% S2 defects repaired / made safe within timescales	Successful management of incidents or dangerous defects through effective planned rapid repair of the network.	99.00%	x	x	x	x
AC14	Routine cleansing of drainage assets	The indicator is to measure the efficiency of the routine cleansing of the drainage/gully asset and to ensure that condition data is collected during the cleansing operation to support a future targeted programming approach.	108000	x	x	x	x
BM01	Scheme satisfaction surveys	The purpose of this indicator is to measure public perception of schemes delivered by Ringway Jacobs Essex Highways and to record satisfaction with the level of service received.	70%	x	x	x	x
BM08	Supply Chain 360 Reviews	Using annual 360 degree supply chain assessments to measure our relationship with our supply chain. This includes their view of Ringway Jacobs Essex Highways as well as our view of their performance	80%	x	x	x	x
BM12	% defects repaired right first time	This measure is used to drive a right first time culture. It also shows we actively re-inspect our own work and look for continual improvement in the repairs that are completed on the network.	95%	x	x	x	x
BM14	Final Accounting in Time	This indicator measures the timeliness of agreeing the final accounts of Supply Chain Partners. It measures the average number of days from the end of the month of actual completion of the works, to the agreement of the Final Account.	90 days	x	x	x	x
BM17	Quality of Transportation Studies	To measure client satisfaction with transport planning deliverables.	80%	x	x	x	x
BM19	Task Order satisfaction survey	The Survey measures client views on how well changes have been communicated and managed throughout the year for each individual task order and summarised as a single result	80%	x	x	x	x
BM20	Accuracy of application	This purpose of this measure is to drive confidence in the accuracy of the application through measuring the number of errors that are identified in the monthly application as a percentage of total transactions.	98%	x	x	x	x
BM21	Contract Process Compliance	The purpose of this indicator is to measure the number of business improvement actions that are closed within time.	85%	x	x	x	x
BM22	Quality of Data in Confirm - Compliance	The purpose of this indicator is to measure the quality and timeliness of the data committed to Confirm.	80%	x	x	x	x
BM23	Delivery of annual efficiency targets	Straight forward pass/fail on whether RJ achieve 100% of their efficiency target.	100%	x	x	x	x
BM25	Provision of Transport Data (specified and agreed data sets)	This indicator is an ECC measure of service performance, and is used to measure the provision of data across selected data sets for monitoring traffic, and cyclists.	83%	x	x	x	x
CP02	Development Management satisfaction survey	This indicator is used to measure how Essex Highways is perceived by local developers and other customers wishing to improve the highway network.	75%	x	x	x	x
CP08	Surface of roads in good condition	This indicator is used to measure the levels of satisfaction with the surface of roads by way of a survey to Members, Councillors, Parishes and 3rd Party Organisations	41%	x	x	x	x
CP09	Surface of footways in good condition	This indicator is used to measure the levels of satisfaction with the surface of footways by way of a survey to Members, Councillors, Parishes and 3rd Party Organisations	42%	x	x	x	x
CP10	Development and delivery of road safety works and education	This indicator is used to measure the levels of satisfaction with the development and delivery of road safety works and education by way of a survey to Members, Councillors, Parishes and 3rd Party Organisations	55%	x	x	x	x

Key Performance Indicator Framework Year 11 2022/23 Part 2 of 2				Everyone's Essex - our plan for levelling up the County: 2021-2025'			
KPI reference	Measure Description	Definition	Target	Economy - strong, inclusive & sustainable economy	Environment - high quality environment	Health - health, wellbeing & independence for all ages	Family - a good place for children & families to grow
JTR1	Timely completion of winter gritting routes	This indicator is used to monitor and measure the timeliness of the completion to the winter gritting network. This drives a reliable winter service and ensures that the network remains open.	98%	x	x	x	x
JTR2	Average time to make network available following a P1 defect	This indicator is used to drive an efficient re-opening of the network after a P1 defect has been identified and the gang have attended and then left site. The indicator measures the average time that gangs are on site resolving an emergency response.	1.5 hours	x	x	x	x
JTR3	Journey Time Reliability	Currently under review	Under Review	x	x	x	x
JTR4	Compliance to permitting requirements	Every authority wishing to implement a permit scheme must indicate how it intends to demonstrate parity of treatment for promoters in its application. This is an annual measure and is reported at the end of the financial year to the DfT as part of the permit scheme KPI's.	80%	x	x	x	x
JTR5	Fault rate of ITS equipment	This indicator is used to measure the fault rate of each individual type of ITS asset on a month by month basis.	0.35	x	x	x	x
PD1	Delivery of the annual capital carriageways renewal programme	This indicator ensures that the capital roads budgeted programme is delivered producing the appropriate productivity levels demonstrating a best value Service.	97%	x	x	x	x
PD2	Delivery of the annual ITS programme	This indicator ensures the capital ITS renewal budget is delivered in its entirety, producing the appropriate productivity levels demonstrating a best value Service.	90%	x	x	x	x
PD3	Delivery of the annual major projects programme	This indicator ensures the major projects budget is delivered in its entirety, delivering the agreed programme and demonstrating a best value service.	85%	x	x	x	x
PD4	Timely delivery of the structures programme	This indicator ensures the Structures budget is delivered in its entirety, producing the appropriate productivity levels demonstrating a best value Service.	85%	x	x	x	x
PD5	Delivery of the annual Local Highways Panel (LHP) programme	This indicator ensures that the LHP programme is delivered, producing the appropriate productivity levels, demonstrating a best value service.	90%	x	x	x	x
PD6	Delivery of the annual S106 Programme	This indicator ensures the Section 106 Programme budget is delivered in its entirety, producing the appropriate productivity levels demonstrating a best value service.	90%	x	x	x	x
PD7	Delivery of the annual Capital Footways Renewal Programme	This indicator ensures the budgeted Capital Footways programme is delivered in its entirety, producing the appropriate productivity levels demonstrating a best value Service.	95%	x	x	x	x
PD8	Delivery of the annual SWAS programme	This indicator ensures the Surface Water Alleviation (SWAS) budgeted programme is delivered producing the appropriate productivity levels demonstrating a best value Service.	95%	x	x	x	x
SE1	Scheduled bridge inspections completed in time	This indicator measures the timeliness of completing monthly bridge inspections. The inspection reports generated are used to calculate the condition of the total asset and prioritise any required maintenance of structures.	98%	x	x	x	x
SE2	% S1 defects attended within 2 hours	This indicator measures the successful management of incidents or dangerous defects through effective emergency response.	98%	x	x	x	x
SE5	Effectiveness of casualty reduction schemes	This indicator is used to measure the cost effectiveness of a casualty reduction scheme	FYRR >100%	x	x	x	x
SE6	Timeliness of highway safety inspections	The purpose of this indicator is to ensure the successful management and inspection of the highway network in line with the maintenance strategy and to identify defects on the network for repair.	98%	x	x	x	x
SE8	Quality of Safety Inspections	The purpose of this indicator is to quality check the inspections that the safety inspectors conduct on the Essex highways network.	97%	x	x	x	x
SE10	Use of recycled and secondary aggregate in construction	The purpose of this indicator is to promote the use of recycled products within the Essex highways contract and reduce the use of virgin materials and carbon footprint	15%	x	x	x	x
SE11	Deliver National Driver Offender Retraining Scheme (NDORS) courses to meet the requirements of Essex Police	Deliver National Driver Offender Retraining Scheme (NDORS) courses to meet the requirements of Essex Police	45000	x	x	x	x
MI1	Number of outstanding defects on PR1 and PR2 network	Management Indicator	<1000	x	x	x	x
MI2	Number of outstanding defects on Local Road Network	Management Indicator	<5000	x	x	x	x
MI3	% of lighting columns working as planned	Management Indicator	95%	x	x	x	x
MI4	Keeping traffic signals maintained	Management Indicator	60%	x	x	x	x
MI5	Responding to, and clearing road hazards (for example, fallen trees, accidents)	Management Indicator	60%	x	x	x	x
MI6	General perception of the state of the roads in Essex	Management Indicator	55%	x	x	x	x
MI7	Number of KSI on Essex roads	This indicator is designed to record the number of people Killed or seriously injured on the Essex road network in order to provide an indication as to the effectiveness of road safety delivery by the Safer Essex Roads Partnership	674	x	x	x	x
MI8	Number of Slight Injuries on Essex roads	This indicator is designed to record the number of Slight injuries on the Essex road network. When combined with KSIs, it allows engineers to locate sites for localised safety improvements.	2338	x	x	x	x

Performance Measures and Targets are reviewed annually to take into any account changes in Council priorities and subsequent changes in investment, and they are also reviewed as an integral part of our culture to drive continuous service improvement.

In addition to the above, the Council participates in the annual National Highways and Transport Network public satisfaction survey (NHT), which measures public views on a wide range of highways services. One hundred and eleven Local Authorities participated in the 2021 survey, and comparative results provide useful benchmarking information for the Council. Essex has taken part in the survey twelve times.

The Council also participates in the Customer, Quality, Cost (CQC) annual survey, which provides a measure of the efficiency of its highways services and compares it with other Authorities.

Results from these surveys, and other customer feedback referenced in Figure 3 below, is reviewed and analysed in detail in order to take them into account for process reviews, investment decisions and for influencing our communications strategy. The performance measures from the performance management framework which focus on customer perception, are shown in Figure 3 below.

Fig. 3 Key Performance Indicator Framework Year 11 2022/23 - Customer Perception				Everyone's Essex - our plan for levelling up the County: 2021-2025'			
KPI reference	Measure Description	Definition	Target	Economy - strong, inclusive & sustainable economy	Environment - high quality environment	Health - health, wellbeing & independence for all ages	Family - a good place for children & families to grow
BM01	Scheme satisfaction surveys	The purpose of this indicator is to measure public perception of schemes delivered by Ringway Jacobs Essex Highways and to record satisfaction with the level of service received.	70%	x	x	x	x
BM08	Supply Chain 360 Reviews	Using annual 360 degree supply chain assessments to measure our relationship with our supply chain. This includes their view of Ringway Jacobs Essex Highways as well as our view of their performance.	80%	x	x	x	x
BM19	Task Order satisfaction survey	The Survey measures client views on how well changes have been communicated and managed throughout the year for each individual task order and summarised as a single result	80%	x	x	x	x
CP02	Development Management satisfaction survey	This indicator is used to measure how Essex Highways is perceived by local developers and other customers wishing to improve the highway network.	75%	x	x	x	x
CP08	Surface of roads in good condition	This indicator is used to measure the levels of satisfaction with the surface of roads by way of a survey to Members, Councillors, Parishes and 3rd Party Organisations	41%	x	x	x	x
CP09	Surface of footways in good condition	This indicator is used to measure the levels of satisfaction with the surface of footways by way of a survey to Members, Councillors, Parishes and 3rd Party Organisations	42%	x	x	x	x
CP10	Development and delivery of road safety works and education	This indicator is used to measure the levels of satisfaction with the development and delivery of road safety works and education by way of a survey to Members, Councillors, Parishes and 3rd Party Organisations	55%	x	x	x	x

9. Priorities for Main Asset Groups

Performance of the main asset groups is key to delivering the Council's strategic priorities

The main assets groups are those elements of highway infrastructure which represent the highest value of assets owned and maintained by the Council and represent the assets which are salient to supporting the Council's strategic priorities:

- **Roads**
- **Footways (including where shared use with cycle routes)**
- **Highway Bridges and other Structures**
- **Highway Lighting**
- **Intelligent Transportation Systems (ITS)**

The Council owns and maintains other highway assets such as off-road cycle tracks, cycle monitoring sites, drainage infrastructure, passenger transport infrastructure, public rights of way infrastructure, non-illuminated traffic signs and bollards, vehicle activated signs, vehicle restraint systems, pedestrian guard railing, winter management infrastructure, highway trees and other vegetation (soft estate). These asset groups are also subject to this Asset Management Strategy and its outcome objectives. (Some of these assets are managed by Essex County Council rather than through the Essex Highways partnership, but cross-team collaboration ensures consistency and continuity in asset management planning).

9.1. Roads

It remains a high priority for the condition of roads to support the commercial needs and economic growth desired in the County, to sustain the prosperity that will provide the very best quality of life for residents.

9.1.1. Desired outcomes

While the current levels of investment for maintaining roads means that the current condition cannot be sustained for all hierarchies, our objective during these times of high inflation and material shortages is to maximise the benefits of investment for priority routes. This provides the greatest benefits for Cabinet Member strategic direction as well as for responding to user priorities. It also exploits the best opportunities to encourage business recovery from the evolving pandemic, to create employment for all skills levels, and create the right environment for building a stronger economy for the future.

Optimisation will be achieved through recently implemented new technology and systems which have opened new opportunities from improved functionality. We will also continue to strive to reduce treatment costs through: exploring improvements to lifecycle planning via developments in existing data systems (including developments in whole life carbon options); innovative use of existing treatments; exploring new materials and techniques (especially lower carbon options); efficiency gains from long term scheduling of resources; embracing emerging technologies, and investing in specialist engineering advice and consultation where this is needed.

As with the approach to asset management for all asset groups, efficiency gains will also be made by setting investment levels which best balance the different types of maintenance activities (refer also to Section 12 Making the Case for Investment).

9.1.2. Condition Information

The standards of service associated with our roads is termed 'condition performance'. Historically, targets for road condition performance have been set annually by road hierarchy to align investment levels and the associated standards of service with the Council's strategic priorities. These performance targets have been set with reference to a machine-based survey process called SCANNER (**S**urface **A**ssessment of the **N**ational **N**etwork of **R**oads), which is a long established, national standard process for measuring the condition of roads. This assessment process focuses on structural condition defects, rather than localised defects such as potholes which are recorded during routine highway safety inspections. However, localised defects do provide valuable condition information, and every road in Essex is subject to at least one safety inspection annually; the more important hierarchies are inspected at a far greater frequency. For more information about SCANNER based road condition targets please refer to Section '8. The Performance Management Framework - turning the Council's strategic priorities into Outcomes', specifically Figure 2: Performance Management Framework (Year 11).

The Council has been undertaking SCANNER road condition surveys for around sixteen years, and in accordance with the DfT reporting requirements we continue to publish national road condition performance indicators NI130_01 for A classified roads, and NI130_02 which combines 'B and C classified roads'. These measures are all outputs from SCANNER.

Rapid changes within the industry, however, have provided new technology, such as artificial intelligence (AI), that can undertake performance measurement at reduced cost compared to SCANNER. Use of Artificial Intelligence is also cheaper than other methods of condition assessment such as Course Visual Inspection surveys which have been undertaken by Essex in the past. The potential benefits of AI assessment were recognised by Essex around two years ago, and investigations have been ongoing following its initial implementation. AI provides automated recording, identifying, interpreting and reporting of road defects, as well as identification and collection of inventory and other information. Essex will continue to develop its use of this technology, especially as improvements to AI software and hardware continue to increase the potential for its use.

The use of artificial intelligence in this way is recognised by the DfT, which is currently working with Local Authorities to identify new options for the national data set which currently is the preserve of the SCANNER road condition assessment process. SCANNER data is still collected in Essex, however, although at the minimum specified coverage, not only to comply with national data reporting requirements but because it continues to augment engineering judgement and AI as a means of identifying prospective maintenance sites.

PR1 routes are also subject to an additional annual condition performance survey which measures the 'skid resistance' of the road surface. This survey also conforms to national standards and methodologies. The results of skid resistance surveys reveal where skid resistance is below the standard required for the road geometry and traffic use for the site in question. The result of this survey is included in the annual reporting requirements to the DfT under KPI NI130_03.

9.1.3. Scheme Identification and Investment Prioritisation

Local defects such as potholes requiring urgent attention on grounds of safety can be addressed relatively quickly. Broader scoped works, however, to address more structural problems, through capital funded extensive road resurfacing, require forward planning and in some cases detailed design as part of preparations. There are comparatively limited resources within the industry in terms of machinery, materials and specialist operatives needed for such works delivery, therefore works are programmed ahead in order to obtain appropriate timing and economies of scale at favourable rates.

In addition to the implementation of AI condition assessment, the Council has also implemented a new asset management system called 'Expert Assets' (XA) which provides new opportunities through improved data processing. Prospective sites for road resurfacing are largely generated through use of the XA system, using AI data as well as SCANNER data. However, sites are also identified through engineering knowledge and feed-back from customers and Members.

Considerable knowledge and expertise have already been developed in the interpretation and use of road condition assessment data through the functionality of XA. This has improved the automated, electronic data process for identifying sites requiring maintenance treatment, directing our pavement engineers far more reliably to appropriate locations.

The XA system not only processes data to generate prospective maintenance sites but enables prioritisation of sites through flexible Value Management processes. The Value Management process allows the inclusion of other data sets with the formal road condition data, such as localised defects recorded through the routine highway safety inspections, or a data set designed to promote a specific maintenance initiative. It can be tailored and weighted to identify the scenario which best reflects the Council's strategic priorities.

All prospective schemes are subject to a site inspection by an engineer to validate the treatment requirements. The outcome of this process is a 3-year forward capital works programme, updated annually.

9.1.4. The Preventative Approach

At the heart of the capital works prioritisation process is the 'Preventative Approach'. Capital investment will, wherever appropriate, be prioritised towards roads in the early stages of deterioration where a lower cost treatment can be applied to prolong service life.

Preventative maintenance typically comprises treatments such as thin applications that penetrate the texture of a road surface, or crack sealing, surface dressing, slurry or micro-surfacing and thin and hot-mix asphalt overlay.

The preventative approach seals the road surface, preventing the ingress of water which would otherwise lead to the breakdown of road construction layers and the creation of potholes, thereby making the network more resistant to the formation of localised defects. The preventative approach can therefore result in a reduction in investment required for reactive maintenance.

The Preventative Approach, which aligns with HMEP guidance as well as the Well-Managed Highway Infrastructure: a Code of Practice (UK Roads Liaison Group October 2016), has been fundamental to the Council's Asset Management Strategy for many years.

The XA system not only generates prospective maintenance sites but can also be used for whole life costing, to minimise treatment costs over the whole life of an asset. It can also project future road condition based on identified deterioration rates and proposed investment levels. This facilitates treatment strategies designed to intervene at the optimum time and assists with predicting the investment levels required for road maintenance in future years. This functionality is currently being developed for other asset groups whose data is also stored in XA. It is anticipated that the XA system will shortly enable whole life carbon together with whole life costing, so that maintenance costs and carbon emissions can be minimised over the life of the asset.

9.1.5. Addressing preventable flooding incidents

Reducing incidents of flooding remains a high priority for the Council. Effective road drainage is also critical to sustaining asset condition, as ingress of water leads to a fundamental break down in the construction of the road and other assets. It is also vital to reducing the risk of adjacent property flooding from carriageway run-off in extreme rainfall events, and for preventing road user safety risk associated with excess water on the road surface.

Our drainage infrastructure asset register will continue to be improved in accordance with HMEP guidance on the management relating to highway drainage. Drainage infrastructure records dating back many years have been collated from various sources and are being added to the digital register on a risk-based priority.

Drainage CCTV surveys are also undertaken where appropriate, and this survey information is added to the Council's comprehensive library of visual information available to Essex Highways staff. This data assists engineers in understanding the cause of accumulations of water on the highway, and thereby contributes to resolution of these issues.

There is a routine environmental maintenance programme for cleansing drainage assets, and reactive maintenance resolves drainage blockages and other minor repairs to restore systems to free flowing. During cleansing operations, gully inventory and silt levels are updated utilising mobile digital devices, and software systems are in place to exploit this information for reallocating resources to provide a more efficient value for money service. Gullies that are subject to higher silt level accumulations or are in known flooding sites can be cleansed more frequently through this process, and gullies cleansed less frequently in locations where silt levels or flood risk are low.

Maintenance for sites which regularly flood from surface water run-off and which require significant drainage improvement measures, are invariably the subject of detailed investigations and design which require forward works programming. These sites are identified and recorded within an on-line **Surface Water Alleviation Scheme** risk register and are known as SWAS schemes.

The SWAS risk register incorporates a scoring and prioritisation process which takes into account a range of criteria which largely assesses sites based on their impact to road safety. However, it is acknowledged that property flooding, and the anxiety of potential property

flooding, are the subjects of customer and Member feed-back and are the cause of much misery. The SWAS risk register therefore also takes into account property flooding, especially internal property flooding.

The SWAS programme is shared with the Council's Flood and Water Management Team which acts in accordance with the Authority's role as Lead Local Flood Authority. Where there are sites of mutual interest there are opportunities for partnership working which can also be extended to the Environment Agency, Anglian Water, Thames Water, as well as District, City and Borough Councils. This collaborative approach has successfully unlocked external funding historically, and new opportunities for additional investment will continue to be explored.

9.1.6. Addressing Water Stress

While we are all familiar with the concept of climate change and increasing extreme weather events, many of us may have the perception that we have too much water rather than too little. However, East England is the driest part of the UK and is seriously water stressed (having difficulty meeting current water demands).

East Anglia is a major producer of food which requires a high level of water. It is also the location for a significant amount of industry which also requires water, and it is also an area of significant housing growth which will increase water consumption. Essex is already severely water stressed; the health of the environment is suffering because too much water is being taken out of it.

Invariably our response to address flood risk is to channel water away as efficiently as possible – those of us who have experienced anxiety of flooding would wish for nothing less. However, in those circumstances where it is practicable so to do, we will need to determine ways to leave water for nature to restore its health. For example, we could collect water for reuse or 'hold water back' so that it can be returned slowly to the environment. As part of our challenge to address highway surface water runoff, we will explore opportunities to use swales and bunds as well as natural flood water management techniques where this is practicable, and to retro fit sustainable urban drainage systems (SuDS) if appropriate and achievable. This will not only control flood risk but retain water for use during periods of shortages.

9.2. Footways (including where shared use with cycle routes)

Investment will be prioritised in a manner which will bring value for money solutions whilst taking in to account the needs of the most vulnerable across high and low use footways. Investment is also viewed as a significant contributor to the step change in sustainable travel planned by the County.

9.2.1. Desired Outcomes

The PF1 High Footfall (high use) footways are subject to routine, safety inspection at a higher frequency than PF2 and PF3 footways, and therefore are likely to be the subject of more frequent routine maintenance - although safety related defects are addressed with equal urgency for all hierarchies. This approach results in investment benefitting the maximum number of users. (Refer to the Essex Highways Service Information Centre/Road Strategies for more information on inspection frequencies, defect identification and defect repair response times).

The Council's strategy, therefore, is to give priority of funding for broader scoped, capital works to improving the condition of its PF3 low footfall footways (low use) in residential areas, as well as allocating a proportion of the investment to PF2 footways. Performance

targets and associated investment levels are set annually to ensure delivery of the desired standards of service.

9.2.2. Condition Information - Structural Condition Assessment

There are currently no formal reporting measures required by central government relating to footway condition. Following a review of the current condition methodologies within the industry, and an investigation into the practice of other Authorities, the Council developed a value for money visual condition survey. This is carried out by Highway Inspectors during routine safety inspections and is therefore subsumed within existing resource levels.

This data provides a measure of the condition of the footway in terms of safety and serviceability which is more readily understood by customers than some more technical survey methodologies.

9.2.3. Scheme identification and investment prioritisation

Prospective sites for maintenance are identified through lifecycle planning (refer to Section 6. Achieving Value for Money – lifecycle planning) which focuses on the highway inspectors' condition assessment data. However, sites are also identified through engineering knowledge and feed-back from customers and Members.

The inclusion of prospective schemes into a forward works programme is dependent upon a site visit by an engineer to verify the condition characteristics and to determine the type of treatment required. Wherever practicable, areas that are not suitable for reactive repairs will be added to the forward programme for capital works and will follow the 'Preventative Approach'. This promotes the application of value for money low-cost treatments such as micro-surfacing (slurry sealing) before deterioration reaches the point where higher cost, strengthening treatments are required.

Priority for funding is based on a bespoke value management process that combines condition observation information with information on localised defects recorded through the highway inspectors' routine safety inspections. Every footway in Essex is subject to at least one safety inspection annually; higher use footways are inspected more frequently. In this way, the value management process prioritises capital treatment for every footway in the County over current and future years.

9.2.4. Alternative Modes of Transport – walking and cycling being developed strongly

Footways and cycle routes provide alternative modes of travel, contribute to well-being through exercise, improve air quality by alleviating traffic congestion and reduce carbon emissions.

The Essex Cycling Strategy (published November 2016) sets out the key elements of a long term plan that will lead to a significant and sustained increase in cycling in Essex, establishing it in the public's mind as a 'normal' mode of travel, especially for short a-to-b trips, and as a major participation activity and sport for all ages. The strategy has been produced in conjunction with Essex County Council, the 12 Essex Districts/City/Boroughs, and the two Unitary Authorities (Southend-on-Sea and Thurrock). It has taken account of UK policy and data on cycling levels within Essex and best practice from around the world. For more information refer to <https://www.essexhighways.org/uploads/docs/ecc-cycling-strategy-novemeber-2016.pdf>

Walking is a popular recreational pursuit and the greenest form of transport available. Regular walking can help improve one's health and we work in partnership with many other organisations to promote and encourage walking. ECC claims that walking should be the natural choice, whether for short trips or as part of longer journeys, but over the last 30 years

it has become less popular. Today, approximately 60% of trips between 1 and 2 miles are currently by motor vehicle and could therefore be walked. The Essex Walking Strategy 2021 aims to help re-establish walking as the first choice for everyday travel wherever appropriate, while accommodating and even enhancing local plans for growth. For more information refer to https://www.essexhighways.org/uploads/road-strategies/walkingstrategy_october2021_final-web.pdf

In support of these plans, investment for maintenance of Footways remains robust, and investment for cycleways has been increased significantly in recent years. A comprehensive asset register of cycle routes, a cycleway hierarchy and a bespoke cycleway condition assessment survey are all being developed and are approaching completion. Where cycleways share use with footways, these are taken into account in our asset management of footways as per 9.2 above.

These modes of travel have become ever more vital in our response to the evolving Coronavirus pandemic, as we implemented on-street measures designed to make city/town centre public spaces safer for people. For more information on Active Travel refer to Section 1.2 Supporting the Essex Highways Vision and Aims: Safer, Greener and Healthier, or refer to the Essex Highways Service Information Centre regarding 'Safer, Greener, Healthier': <https://www.essexhighways.org/safer-greener-healthier.aspx>

9.3. Highway Bridges and Other Structures

Maintaining bridges and other structures to appropriate condition standards supports the efficiency of priority routes, thereby contributing directly to attracting investment to Essex. Applying this approach to sustaining links to communities with limited access also contributes to the development and strengthening of Essex communities.

9.3.1. Desired Outcomes

Structures are varied and complex assets which include bridges, footbridges, subways and underpasses, culverts, retaining walls, sign and signal gantries. Structures also comprise many different elements (components), all of which are critical to accessibility, serviceability, sustainability and safety of the asset. Some structures are heritage listed assets whose protection requires special consideration and treatments.

Our objective is to maintain structures in a safe, serviceable and sustainable condition. It is also to address weak structures where strengthening or reconstruction is required, thereby avoiding long term traffic management restrictions which can be disruptive to the travelling public and businesses. This is especially relevant where heavy goods vehicles are required to deliver essential goods and services to communities with limited access.

The management of risk is an essential part of asset management for structures, as structures will likely deteriorate in condition over time even when elements are replaced promptly at the end of their service life. Unlike roads and footways, however, the condition of structures is often not easily visible to the public, and the need for maintenance works or other rehabilitation measures may not be apparent or well understood. To address this we undertake effective communication to explain the need for structures maintenance works, especially where long term disruption or closure of roads and footways may be required to implement necessary schemes.

9.3.2. Condition Information

There is a sustained programme of data collection to gather information on the current condition of the structures stock. This is in keeping with the recommendations of the UKRLG Well-Maintained Highway Infrastructure – a Code of Practice (October 2016), although local priorities may result in departure from the Code of Practice in some instances.

General Inspections are carried out on all structures once every two years. General Inspections comprise a visual inspection of all parts of the structure that can be inspected without the need for special access or traffic management arrangements. There is also a risk-based programme of more detailed, Principal Inspections. Bridge Condition Index (BCI) scores are determined from condition inspections and where appropriate these are monitored annually as an asset management performance measure.

All inspections, testing and monitoring information is vital to asset management, as they identify the extent and severity of defects requiring repair and help identify any issues which may become a problem in the future. This information is not only important for risk management and for sustaining safety for the user but is also required for lifecycle planning (Refer to 6. Achieving Value for Money – Lifecycle Planning).

Load bearing Assessments for structures are also carried out where deemed appropriate, in order to determine the ability or capacity of the structure to carry the loads which are or may reasonably be expected to be imposed upon it. The Assessment provides valuable information for managing the safety and serviceability of highway structures.

Structural reviews are also undertaken where deemed appropriate; these ascertain the adequacy of structures to carry the specified loads when there has been a significant change to the usage, loading, condition of the structure or the assessment standards relating to the structure in question. A structural review is also used to determine if a load bearing assessment is required.

This data informs minor works programmes as well as forward structures capital works programmes for broader scoped refurbishment works. It also assists with the routing of abnormal loads. An abnormal load is a vehicle that is outside the classification of normal permitted traffic by virtue of its gross weight, length, width or axle configuration according to current road vehicle regulations. The movement of abnormal loads on highways is carefully managed so that large and or heavy vehicles only use those parts of the network that can safely accommodate them.

There are now software tools within the industry which facilitate lifecycle planning, deterioration modelling, and asset valuation for structures, and these are being used fully. Whilst use of these tools can never be expected to negate the need for engineering judgement, they will provide useful comparative data on investment levels and specific maintenance approaches relating to future performance of assets or specific elements of an asset. This information assists with risk management. It also provides an indication of potential future maintenance cost liabilities for the Council, which will help with setting investment levels and associated standards of service going forward.

It is worth noting that a substantial number of structures that support the Council's Highway network are owned by other bodies such as Highways England and Network Rail and by private landowners. Liaison with these owners will continue to be undertaken to ensure that the availability, condition and safety of these structures is consistent with the Council's own structures assets.

9.3.3. Weak bridges and culverts

The Council maintains a list of weak bridges and culverts ascertained from load capacity Assessments. Weak bridges are those that fail to meet full load carrying capacity. This does not necessarily mean that their condition is poor; some assets which are assessed as weak can be in good condition. It should be noted, however, that much of the structures stock was built during times when current demands could not have been foreseen or considered.

While the risk of a structural failure is very low, its impact on road users and businesses can be very high and therefore a risk-based preventative approach is implemented. As a result, many weak bridges are subject to the development of long-term structural rehabilitation schemes, typically strengthening or reconstruction. A corresponding future works

programme is in place and is subject to regular review following new inspection and assessment information. In the meantime, measures to mitigate the risk of those structural elements receiving loads greater than their assessed capacity are implemented where necessary via vehicle weight limits, propping, edge protection, traffic management, or increased inspection and monitoring frequency, as determined appropriate.

The Council is responsible for a large number of ageing watercourse culverts under the highway network. These need to be maintained in a serviceable condition to meet the Council's responsibilities under the Flood & Water Management Act 2010, and a programme of culvert strengthening works is included within the forward Structures capital maintenance programme. Such schemes may also be included in the SWAS risk register (refer to Section 9.1.5 Addressing preventable flooding incidents).

9.3.4. Scheme identification and investment prioritisation

The identification of capital refurbishment or replacement works is based on a lifecycle planning process that is augmented by the results of General and Principal Inspections and load capacity Assessments. Where need for a strengthening or reconstruction scheme is apparent, option studies are conducted where appropriate to assess alternative design solutions in terms of cost, risk, deliverability, timescale, network disruption and other factors before a preferred option is selected to progress through to detailed design then implementation.

The software Structures asset management system Bridge Station was implemented around two years ago, and this has enhanced asset management functionality for Structures assets. While populating Bridge Station with important asset information is ongoing, the system is already being used for recording the results of General and Principal inspections which identify defects. It is also assisting with identifying a programme of Risk Based interval Principal Inspections and helping with asset valuation. Other functionality such as scheme prioritisation and lifecycle planning reflect an improvement on previous processes.

The rolling forward structures capital maintenance programme requires more advanced planning than other asset groups. This is because full implementation can take several years from identifying a need at Principal Inspection or Assessment stage through to implementation on site. Part of the reason for this is the inherent complexity of structures assets, but it is also due to the requirement for land acquisition or planning consents, or significant utility diversions. Joined programmes of work are therefore required and developed for Principal Inspections, Assessments, Option Studies, Detailed Design and Works, in order to have the correct information and resources at the appropriate time for implementing the scheme. Capital investment for Structures maintenance works is prioritised towards:

- Strengthening or reconstruction of weak bridges where risk mitigation measures would incur long term significant traffic delay and disruption
- Structures of strategic importance or providing singular access to communities as indicated by their position within the Structures hierarchy
- Bridges where the form of construction makes them vulnerable to sudden failure which is not easily detected through inspections
- Structures that are already assessed as poor condition and are deteriorating
- Damaged or blocked culverts at known flood risk sites
- Structures that support well used public rights of way routes where closure would significantly inconvenience users

However, investment will always be made to repair damage to structures from vehicle strikes and the like, where immediate attention is required in order to keep the asset safe for users.

Capital maintenance schemes on some large and or network critical structures, and on heritage structures, may be very expensive and beyond the normal levels of funding allocated to Local Authorities. In order to address asset condition deterioration on such

structures we will continue to develop communications with central government with a view to making these structures special cases for investment.

9.4. Highway Lighting

Highway lighting contributes to the avoidance of driver confusion and therefore has a positive impact on road safety.

9.4.1. Desired Outcomes

Highway lighting assets are a significant element of highways infrastructure. The desired outcome objective is to maintain these assets in a safe, serviceable and sustainable condition, to maximise their service life on a value for money basis, and to reduce ongoing energy usage and reactive maintenance costs. The reduction of energy usage contributes to carbon emissions reduction and therefore contributes to the County's target of net zero by 2050.

9.4.2. Condition Information - Inspections and Testing

All highway lighting assets are recorded in an asset register and are subject to an electrical test and inspection once every six years to ensure fitness of purpose. Lighting columns, illuminated signs and beacons are also subject to a structural test and inspection once every six years, with the exception of non-metallic lighting columns/posts which are subject to a structural test and inspection once every three years.

The structural inspection of a lighting column is a 'top to toe' assessment of a column above and below ground via a risk assessment procedure. Visual external inspection of the column's bracket, shaft and base section is augmented where appropriate by the use of a probe for the internal examination of the column's shaft, base section and underground root section. The condition of the root section of a metal street lighting column is assessed via the direct measurement of metal wall thickness within the underground section down to depths of 2.0 metres.

The overall, combined results of the structural assessment define the asset in question as either:

- Structural Red = high priority for asset replacement
- *Structural Amber = medium to high priority for asset replacement or re-test in three years
- Maintenance Red = high priority for asset repair (repairable)
- Maintenance Amber = medium to high priority for asset repair (repairable)
- Green = acceptable until next scheduled test

*Structural Amber assets are non-repairable and will become Structural Red over time.

9.4.3. Investment prioritisation

A weighted prioritisation process which combines visual assessment data with structural test data and takes into account the hierarchy of the road in question, produces an overall risk score for structural assessment which assists with prioritising asset replacement. However, funding allocations will always be made to repair damage to highway lighting from vehicle strikes and the like, where immediate attention is required in order to keep the asset safe.

There are various software tools now available within the industry which assist with lifecycle planning for ancillary assets of this type, and we will continue to explore these fully where this is cost effective. We will also continue to explore the potential of our significant volume of historic structural and visual inspection data to improve our understanding of how assets

deteriorate over time, in order to pursue alternative means of quantifying future potential maintenance liability for the Council.

9.4.4. Central Management System

Increases in electrical energy charges place additional burdens on Local Authority budgets. As a result, the Council has installed remotely controlled 'Telecells' in each lighting column which link each column to an on-line central management system. This system facilitates individual control of the time periods in which the lighting columns are switched on. The system also registers the presence of a fault when a street light ceases working, which enables the Council to plan repairs or replacement. The Central Management System facilitates efficient management of highway lighting with a view to reducing overall energy consumption, which in turn reduces costs and carbon emissions.

9.4.5. LED Lighting

The County Council has long been aware of the potential benefits of using LED lighting technology to reduce energy consumption, improve service reliability and service life, and reduce light pollution. Following the success of an initial trial of sites in Essex market towns carried out some years ago, a substantial capital asset replacement programme has been in progress to replace existing sodium/mercury lamp technology with LED technology.

Illuminated bollards and signs, as well as a significant number of lighting columns have already been converted to LED technology. Implementation of the final phase to convert remaining assets to LED is in progress. After this programme, any assets still using sodium/mercury lamp technology will be converted to LED technology during maintenance operations over time.

9.5. Intelligent Transport Systems (ITS)

Enabling the efficient movement of traffic supports journey time reliability and makes a significant contribution to creating the right environment to attract investment to Essex.

9.5.1. Desired outcomes

This asset group includes traffic signal equipment and controllers, traffic safety cameras, bus lane enforcement cameras, variable message signs, vehicle-activated signs, school crossing lights, traffic count sites, bus telematics, CCTV, and other system infrastructure. The outcome objectives are to maintain the assets in a safe, serviceable and sustainable condition, and to safeguard journey time reliability by reducing equipment failures and occurrence of out of service 'down time'. (Some of these assets are managed by Essex County Council rather than the Essex Highways partnership, but cross-team working ensures consistency and continuity in asset management planning).

9.5.2. Condition Information - Inspection and Monitoring

All ITS assets are recorded in asset registers which include date of installation and corresponding age of asset. Key ITS assets are linked electronically to sophisticated software systems which monitor operation in real time and register occurrence of faults. Equipment installations are inspected annually for electrical integrity and general condition, and traffic signals are also included within the routine, visual safety inspections undertaken by Highway Inspectors.

9.5.3. Scheme identification and investment prioritisation

Reactive maintenance addresses relatively minor operational faults as well as any minor component replacement such as renewal of damaged/corroded poles. More complex refurbishment requirements to replace components and assets reaching the end of their service life are included in a 3-year forward works programme for capital works.

Lifecycle planning to identify and prioritise schemes utilises a matrix of information about the asset in question; i.e. age of asset, anticipated service life, number of faults logged over time, time needed to effect repairs, and road hierarchy of site in question.

A new ITS Maintenance Equipment Contract was successfully negotiated at the commencement of the 2019/20 financial year, and this is realising improved value for money for the Council. Investment is also focussed on the developing deployment of LED technology in order to reduce energy consumption, improve electrical safety through extra low voltage operation, and to reduce costs associated with signal lamp replacement. Currently around 63% of traffic signal assets managed by Essex Highways have been converted to LED technology. The use of LED technology and extra low voltage operation not only reduces energy consumption and costs but also reduces carbon emissions. ECC is also exploring the potential to increase its use of solar, or wind powered technology where possible to further reduce energy consumption and carbon emissions.

In recent years, investments in new technology have brought benefits of improved energy efficiency, operational efficiency and reduced 'down time'. This has resulted in reduced congestion and improved journey time reliability. This not only contributes to the realisation of the Council's strategic priority to create the right environment to attract investment and employers to the area but has also enhanced public perception of the service.

9.5.4. Future Proofing and Emerging Technologies

Essex Highways will continue to recommend investment in new ITS technology to the Council where clear benefits can be evidenced with sound data. For example, in recent years safety camera systems have been converted from wet film to digital data, with the benefits of automated real time transfer to a central data system, improved data security, and the avoidance of costs associated with loading, retrieving, and processing wet film. It has also significantly reduced the risk associated with site visits and working on the highway. Digital conversion was also crucial to the sustainability of the Safer Essex Roads Partnership and its road safety goals (refer to Section 4.1 The Safer Essex Roads Partnership for more information).

The County's vision is to implement an ITS network connected fully via the internet. This will future proof the network by allowing new assets and any required upgrades to be installed with ease. Future proofing of assets is already under way through the conversion of traffic signals from hard-wired dial up and broad band fixed lines to remote monitoring and Urban Traffic Control (UTC) communications using 4G wireless / 5G technology. This enables assets to be linked electronically to sophisticated software systems which monitor and control the operation of the traffic signals in real time, register occurrence of faults, and enable remote interrogation of the equipment by engineers and operatives. Around 45% of the key traffic signals asset base is connected online using this newer, more cost-effective form of wireless communication. Traffic Signals, Variable Message Signs, Car Park Counts and Vehicle Activated Signs are already connected to interactive map based systems, which enables the location of faults to be highlighted in real time, increasing the efficiency with which they can be addressed and in turn reducing the impact any faults have on the travelling public.

Synchronising and balancing traffic flows by connecting signals along corridors helps reduce congestion, thereby improving air quality for pedestrians and cyclists, and reducing carbon emissions. Key traffic signals are already linked in main urban towns and cities, and it is

anticipated that eventually network-wide connections will facilitate future data sharing across the County – and possibly the entire country - in time.

ITS assets will assist in the future adoption of connected and autonomous vehicles. The Council is looking to support connected vehicles through the adoption of smart technology; i.e. via traffic signals fitted with innovative sensors. The implementation of intelligent video analytics sensors to gather data, based on artificial intelligence, will forecast traffic flows with unprecedented accuracy. It could also be used to collect a wide range of digital data, such as traffic flow and composition data, road and footway defect data, traffic speed data, air quality data, CO2 emissions, weather and air temperature data.

The Council will also seek to extend the number of sites / signals where we can provide overt priority for passenger transport services. The promotion of efficient journey times through use of public transport will encourage modal shift which will ease traffic congestion and have a positive impact on air quality, road safety and carbon emissions. Adoption of new technology to allow more sophisticated bus priority controls is being investigated with our suppliers. We already have adopted bus control technology, but new improvements will allow us to roll out other bus priority measures throughout the County.

This technology can also be used to detect and, where required, prioritise vulnerable road users, pedestrians and cyclists, thereby supporting the proposed step change in sustainable travel planned by the County. For example, traffic signals that enable prioritisation for active travel by allowing pre-starts at junctions with the adoption of specific cycling signal lamps, will enhance connectivity and increase opportunities for residents, visitors and businesses to adopt a modal shift to walking and cycling. Cycle detection can be used for early start cycle phases to improve cyclist safety and can also be coupled with count data retrieval to monitor usage.

The Council is also looking to include the adoption of contactless pedestrian push button units at traffic signal crossings to remove the need for any touching of the apparatus and to assist those with visual impairments or mobility issues. Some of these solutions include apps that allow smart phones to register a pedestrian/cyclist demand remotely. This will improve the active travel experience for pedestrians, cyclists and vulnerable users.

There are also plans to grow electric vehicle charging capacity in Essex. Our Park and Ride sites have provided electric vehicle charging facilities since they opened in 2006. Britain's first all-electric car charging forecourt opened in Braintree in Essex in December 2020. There are currently over 1,600 charging points in the East of England with over 800 points in Essex.

10. Risk Management

The management of risk is paramount to addressing highway user safety as well as to addressing the safety of operatives working on the highway. It also mitigates the possibility of asset failure, thereby reducing incidents of traffic disruption.

A risk is a potential event which may result in an undesired consequence or impact. The possibility of the event occurring is termed a likelihood. There are many kinds of risks, and every one of us encounters risks to various degrees in our daily lives. We learn to evaluate the importance of the risk, and based on levels of importance either to tolerate the risk, take steps to avoid the risk altogether, or find means to mitigate the risk so the impact or likelihood is reduced to a level that we find tolerable.

From the point of view of Asset Management there are many kinds of risk: there are high level risks that affect the whole organisation; there are operational risks relating to operational activities such as working on the highway. There are also asset management

strategic and tactical risks that affect the highways infrastructure and its users, such as risk of not collecting adequate asset condition data used to prioritise maintenance.

Risks to highway user safety are addressed through the Council's general duty of care to maintain the highway in a condition fit for its purpose (refer to Essex Highways Service Information Centre/Road Strategies for more information on inspection frequencies, defect identification and defect repair response times).

Risk Management is an important aspect of Asset Management. Salient risks are recorded in risk registers so that they can be reviewed, updated, analysed and reported in order to facilitate their management.

11. Data Management and Systems

Having the right information is critical to decision making. Data is also used to demonstrate that investment is being used in an efficient and effective way that delivers value for money, and to demonstrate how the anticipated outcomes of the investment are being realised.

The maintenance of robust asset registers for recording and updating asset inventory, asset condition information and treatment cost information is essential to the asset management lifecycle planning process. These systems and data are also fundamental to the formulation of strategy scenarios which link different standards of service with corresponding investment levels. The Council's investment decisions are based on the appraisal of how the outcome of each of these scenarios will deliver strategic priorities.

Data is also required for other asset management purposes such as Highways Network Asset Valuation which, whilst no longer a reporting requirement for Local Authorities under Whole of Government Accounts, is none the less a critical asset management activity that informs lifecycle planning and helps to make the case for investment.

The data held in our systems includes:

- Customer contact data and correspondence
- Street Gazetteer and Network information
- Asset Registers and Inventories
- Inspection Records
- Defects records
- Condition information
- Asset installation/implementation dates and service lives
- Asset location information
- Works ordering and completion dates
- Maintenance histories
- Technical drawings of completed schemes, and Health and Safety Files
- Technical approval documentation for structures

Use of all data complies strictly with data protections laws.

An Information Strategy has been developed and documented so that data collection informs the performance management framework which monitors delivery of the Asset Management Strategy which is linked to the Council's strategic priorities (refer to Section 8. Performance Management - turning the Council's Strategic Priorities into Outcomes).

The Council's asset data is currently stored in a number of electronic and manual systems, although the most salient data is in electronic format which is subject to rigid security measures.

The functionality and capability of data management systems is routinely reviewed, and recommendations are made to the Council where the benefits from investment can be made. The advantages of new software can include the unlocking of essential developments in service provision, as well as significant cost savings from reducing data processing times. Examples of this are the recent implementation of the new artificial intelligence road condition assessment process and the improved data processing functionality afforded by the new asset management system XA.

12. Making the Case for Investment

The case for investing in the maintenance of each asset group is made robustly, based on sound data and evidence that demonstrates value for money, and is linked directly to the achievement of the Council's strategic priorities.

12.1. Business Cases – the benefits of long-term planning

Like most Highway Authorities, the Highways service competes with other Council priorities for investment. It is therefore important that the case for investing in the maintenance of each asset group is made robustly. This is especially true when making the case for investment in the long term, as this represents a sustained commitment by the Council.

A long-term approach to budget setting gives more certainty to the delivery of forward programmes of works, allowing more efficient planning and procurement of resources. It also enables strategic programming with other works on the highway network, which delivers value for money through shared resources. This approach also results in improved customer information. However, the budget setting process for the Council occurs annually, therefore acquiring long term agreements to funding can be problematic in an environment where availability of funding can be subject to significant and rapid change.

The Strategy scenarios which link standards of service with specific capital investment levels to deliver forward programmes of works, include the corresponding impact on the reactive funding requirement for minor repairs as well as impact on risk. Generally, as capital investment increases then asset condition improves and the requirement for minor reactive investment decreases. Arguably the impact on risk follows the same pattern.

Reactive repair cost savings can contribute to the cost of repaying any capital borrowing for the investment in question but are unlikely ever to offset it completely, and there is no 'golden mean' to dictate the ideal balance between the levels of investment for these different types of activity. Balancing investment levels across maintenance activities requires careful consideration of customer needs, as well as an understanding of the root causes for reactive maintenance, knowledge of processes and associated productivity and costs, and risk management. We will continue to review these matters and make corresponding recommendations to the Council.

The information required for investment planning is derived from lifecycle planning and deterioration modelling. This reflects not only individual asset need, but it includes recommendations on the best balance of funding across all asset groups to achieve the desired outcomes.

Business cases also assess the potential consequences of under investing in asset maintenance, including the likely impact on customer satisfaction. Accordingly, business cases for asset investment receive considerable Cabinet Member engagement and scrutiny before being presented to the Council for consideration.

Essex Highways also identifies opportunities for other potential sources of asset investment funding and where appropriate collates and submits bids on behalf of the Council. This

includes investment initiatives from the DfT, such as the additional traffic signal maintenance funding in 2021, in which Essex Highways participated and was successful in being awarded £250k of additional funding. There are also investment opportunities through the South East Local Enterprise Partnership (SELEP) and other organisations. For example, the Essex Highways partnership recently contributed to a Council bid to central government relating to the 'Housing Infrastructure Fund' (HIF), and was subsequently awarded £317.9m. Essex Highways will continue to explore all potential opportunities for additional investment for the Council.

13. Scheme Delivery

Delivering works on the ground to agreed quality, timescales and to budget underpins the effective and efficient delivery of asset investment.

13.1. Rolling Forward Programme of works

A prioritised 3-year forward rolling programme of capital maintenance schemes for each major asset group is maintained annually. The benefits of a long-term forward programme are that it offers the opportunity to manage the programme strategically with a view to:

- Minimising disruption on the network
- Maximising the opportunity for collaborative working between works programmes for different asset groups
- Providing opportunities to integrate larger and smaller scale works, or to integrate with planned third party works on the network (e.g. works of other organisations such as utility companies)
- Providing opportunities for collaboration on smaller scale maintenance works, with the benefits of minimising the number of road closures and reducing traffic management costs
- Optimising delivery by coinciding the timing of schemes which are in the immediate locality of other works

13.2 Annual Delivery Planning

The forward programme is reviewed annually to take account of new data, changing priorities and changes in investment. This commences prior to the start of each financial year and forms the basis for the annual delivery planning process.

Annual delivery plans set out the schemes and activities to be undertaken for each asset group during the financial year, how they will be delivered, the resources required, and the outputs and performance targets to be achieved.

The annual delivery planning process identifies resource needs and ensures that any potential recruitment programme has the appropriate focus. It also ensures that adequate resources are allocated to asset management activities.

Collaborative working with Supply Chain Partners (SCP) provides early contractor involvement in the design, planning and procurement process. Tendering works across the supply chain to derive a favourable 'target delivery cost' drives efficiency and value for money while sustaining quality. This approach is incentivised through the sharing of financial benefits between the Council and its Delivery Partner Ringway Jacobs, which drives a culture of continuous improvement.

The delivery of these programmes is subject to rigorous monthly review meetings throughout the year to scrutinise performance and outputs to ensure the full programme will be delivered within the required timescales and to budget.

14. Competencies, Training, Sharing and Learning through Benchmarking

Defining asset management roles with competent, accountable and well-trained personnel, combined with a 'one team' culture, ensures effective delivery of the Asset Management Strategy

14.1. Competencies and Training

Successful delivery of the Asset Management Strategy relies on competent and suitably experienced personnel, therefore accountabilities for asset management have been clearly defined. Annual staff performance reviews identify potential development needs for each staff member, and details are retained on file in a confidential competency matrix accessible only to managers.

This process enables the formulation of a structured training programme that ensures asset management knowledge is continually enhanced, and that those with key roles in asset management are identified and supported to achieve recognised qualifications and skills levels. Sharing of knowledge and the encouragement of innovation, however, fosters a culture of 'one team', so that whilst individuals are empowered to make a difference, advancements are made collectively so the organisation benefits from every improvement.

14.2. Sharing and Learning through Benchmarking

Sharing and comparing knowledge, practice and performance outcomes with other authorities and organisations within the industry (Benchmarking) is a recognised way of learning as well as helping others whose asset management activities are not so well advanced. Public perception of performance, as expressed through the NHT surveys, as well as objective financial analysis associated with performance as calculated by CQC (refer to Section 8. The Performance Management Framework), also provide invaluable information to assist our drive for continuous improvement. Benchmarking through such organisations as the Eastern Highways Alliance, however, which brings together Local Authorities within the region, as well as cross contract Asset Management Forums, continues to make a significant contribution to ongoing asset management development.

15. Reviewing and updating this Strategy

Asset management is a developing process within a dynamic environment, and we continuously monitor changes and new guidance within the industry to ensure that our approach remains innovative.

In recent years the Essex Highways Partnership has proved its maturity as a best practice asset management led service through sustaining compliance with DfT guidelines relating to the highest level of competence in asset management. This level of competence is assessed by the DfT's Local Highways Maintenance Incentive Fund Self-Assessment process, and ensures the Council receives its full allocation from the DfT for this area of funding. Local Authorities who are unable to comply with the same level of competence receive reduced levels of funding from the DfT.

It is also worth noting that Ringway Jacobs attained British Standard BS ISO 55001 in Asset Management for Essex Highways in 2017/18; this standard was reviewed and sustained in 2018/19, 2019/20 and again in 2020/21 and 2021/22.

Delivery of this Strategy is the responsibility of the Asset and Records Manager supported by Senior Managers in the Essex Highways service and the Council's Essex Highways Commissioning team. A collaborative approach combined with effective communication, however, ensures the Asset Management Strategy is delivered by a broader 'one team' approach. For example, in 2015, the Ringway Jacobs strategic partnership with Essex County Council became one of the first relationships of its kind in the United Kingdom to achieve BS11000 – Collaborative Business Relationships. More recently this accreditation was subject to a successful audit which included transfer to ISO44001. Some of Ringway Jacob's supply chain partners are also named partners.

This Strategy will be reviewed regularly to ensure it continues to be aligned to the Council's strategic priorities as documented in Everyone's Essex, and that it continues to provide the right information for informed decision making. Whilst the core principles relating to effective asset management underpinning this Strategy are unlikely to change significantly, we will continue to refine our understanding through our commitment to anticipate and plan for current and future challenges. Among the current salient challenges is the need to address climate change: reduce carbon, help support biodiversity net gain, aid local nature recovery, better manage use of water, and increase green infrastructure.

Next review date January 2024