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Executive Summary

Salford City Council’s Highway Infrastructure Asset Management Plan (HIAMP) is a highway management document that lays out the Council’s approach to maintaining highway assets strategically and efficiently.

The HIAMP is integral to the delivery of Salford’s highway maintenance investment programme by supporting effective scheme prioritisation, efficient delivery and helping to ensure robust and long term solutions.

The document provides asset information and analysis of the maintenance of highway assets, identifies efficiencies and promotes and supports informed evidence-based decision making by making best use of available resources. Valuations show that Salford’s highway network to be worth an estimated £1,145,740,000 (£1.146 billion) therefore, it is important that this valuable asset is protected and maintained efficiently with available resources such that the level of service provided can be optimised for highway users.

The HIAMP has been approved as a document by:

The City Mayor..............................................................

The City Treasurer............................................................................

The Strategic Director for Environmental and Community Safety
Section 1 - Introduction

The requirements to carry out highway maintenance is defined within statutory powers and duties defined by legislation and precedents developed over a time as a result of claims and legal proceedings. It is important that all those involved in highway maintenance, including Council Members of Salford City Council, have a clear understanding of the Council’s power and duties, and the consequent implications.

The highway network is the most visible, well used and valuable physical asset both in financial and in community terms, for which Salford City Council is responsible. Effective stewardship and asset management therefore, is crucially important to the user, the community, businesses and the environment.

The Asset Management Plan relates to the highway network for which Salford City Council is responsible, as the Highway Authority.

Purpose

The purpose of the Highway Infrastructure Asset Management Plan (HIAMP) will therefore, set out a formal and strategic approach for the management of Salford City Council’s asset.

The HIAMP is a strategic approach designed to propagate a series of actions, which will enable the City Council to build on existing processes and procedures to form a continuous improvement framework, in order to meet the Council’s strategic goals in the most effective manner and within the constraints of statutory requirements, customer expectations and funding limitations.

The funding for the management of this asset is under continuous scrutiny, with increasing pressure from government and the public for transparency, accountability and more efficient use of the limited resources available.

Salford City Council are responsible for:

742 km of carriageways
1109 km of footways
216 bridges and structures
40,115 road gullies
311 Pedestrian crossings
218 km Safety Railing
5842 Road signs
27,500 Street lights and other illuminated street furniture.

The value of this asset’s Gross Replacement Cost (GRC) is estimated at £1,145,740,000 (£1.146 Billion).

Salford City Council recognises the importance of its highway infrastructure asset and how an effectively maintained and managed network contributes to the achievement of its corporate goals. It understands that effective Asset Management Planning provides the required approach and platform for efficient management of its network, to deliver clarity around standards and levels of service, including the best use of its available resources.
Section 2 - Organisation

The HIAMP’s initial use will be to provide Council Members and Management with information on the investment required to manage the highway asset as recommended in the new Code of Practice for Highway Maintenance Management.

The HIAMP will also align with and support Salford’s bid for capital and revenue funding, therefore, providing a tool to assist in the financial planning of highway infrastructure maintenance.

The Asset Management plan uses techniques such as optimisation and risk management, to improve decision making and provide detailed information to back up and support engineering judgment. Further benefits include:

- The same or better level of service at a reduced cost
- A better level of service at the same or marginally increased cost
- Reduced life-cycle costs
- Defined levels of service
- Ability to track performance
- Ability to predict the consequences of funding decisions
- Improve transparency in decision making

Section 3 - Assets Covered

The highway network comprises a number of diverse assets and the principles of asset management are to be applied to all these component work streams.

Controllable Assets – Highway Asset Groups

These are highway assets where sufficient data exists to allow effective asset management

- Carriageways: Includes- Islands, hard shoulders, cycle lanes, kerb
- Footways: Includes- Cycleways
- Highway Drainage: Includes- Gullies, pipelines, catchpits, access chambers.
- Structures: Includes- Bridges, retaining walls, culverts, subways, tunnels
- Street Lighting: Includes- Illuminated Signs

Related Assets

These are assets that are related to the main Highway Asset Groups within the highway infrastructure:

- Detector loops
- Embankments and Cuttings
- Grassed areas and verges
- Hedges, Trees and Shrubs
- Safety Fences, Barrier Rails and Pedestrian Guard Rails
- Fences, walls and Screens
- Road Markings
- Traffic Signs: Includes safety bollards, Signs,
- Traffic Calming: Includes- road humps, chicanes, speed cameras, end street closures
- Street Furniture: Includes- litter bins, seats, cycle stands, information boards
- Managed Estate: Includes- verges with additional responsibility, trees, planting areas
- Public Rights of Way: Includes Bridleways, gates, marker posts, signs, styles
- Winter Maintenance: Includes- salt storage, salt bins, gritters.
Section 4 - Information and Communication Technology (ICT) Systems in Support of the HIAMP

Effective ICT systems are an essential component required to effectively deliver an asset management approach to highway maintenance. In recent years Salford City council has made considerable investment in computerised data management systems. These systems hold extensive amounts of data on numerous asset types. The data is required to effectively manage the asset and plan future maintenance.

The data supports the City Council’s highway inspection procedures, scheme selection protocols and customer service information. The main specialist system used to support HIAMP is: Pitney Bowes ‘Confirm’, which collates the following:

- Stores detailed highway data
- Calculates the value of the assets
- Repository for highway and street lighting inventory
- Pavement Management System [UKPMS]
- Works Management System for inspection and repairs
- Customer Service and enquiry system

Salford City Council have undertaken a considerable amount of work to collect and maintain data about the highway asset, however, refinements and additions to highway data is still ongoing. A data collection and management plan is prepared each year for the Highway Network Team.

The comprehensive gathering of inventory and condition data means that Salford City Council acting as Highway Authority can calculate the overall value of the highway infrastructure assets with some degree of accuracy namely the Gross Replacement Cost [GRC] and the more useful Depreciated Replacement Cost [DRC]. The submission of this information for highways is a requirement of HM Treasury as part of the Whole of Government Accounts Procedure [WGA]. A summary statement is indicated in Appendix A.

The HIAMP will shift towards Whole Life Costing and a particular focus on preventative maintenance to the highway network. Life cycle works planning involves looking at an asset from its creation then deciding the most appropriate maintenance treatments at the right time. This maximises the life of the asset and achieves better value for money, with specific goals being set via Performance Indicator Targets. Appendix B.

By undertaking relatively inexpensive preventative maintenance treatments at the correct time will save money by avoiding the need for more costly structural repairs in the future.

The HIAMP is based on the CSS (ADEPT) framework. The key elements of this framework are shown below and diagrammatically to illustrate the basic relationship between each element. It is a requirement that local authorities address these basic issues in relation to the management of the City’s highway assets.
Section 5 - HIAMP Framework

The framework below illustrates the various activities within asset management:

A. **Objectives:** In conjunction with LTP3 for Greater Manchester, Salford City Council collaborate with all nine GM Councils to ensure that the Policies and Objectives are met within the overall Transport Strategy. It is therefore, important that a good inventory system is maintained for use within the CONFIRM [UKPMS] system and the HMEP Toolkit.

B. **Levels of Service:** The development of good levels of service are assessed within the inspection regime and maintained within the asset. The information will support the decision of what, where and when work is to be carried out, in order to meet and satisfy the aspirations of the customers and stakeholders indicated on the National Highway and Transport Survey [NHTS].

C. **Option Identification:** A performance Gap is the difference between current level of performance and desired performance. To fully establish and identify the gap between current and desired performance, Salford have developed associated performance targets to allow performance to be measured against these targets.

D. **Decision Making:** The management of highway maintenance, including the setting of standards for condition and determining priorities and programmes for effective asset management, is undertaken utilising inventory, survey data produced, which in turn determines the risks and consequences, involved in determining specific work streams.

E. **Implementation:** Salford City Council produces annual programmes of maintenance works aimed at addressing deterioration on the highway network. At present the programme is determined by a combination of UKPMS, condition surveys, HMEP Toolkit, claim history, engineering judgement, and shareholders input, which is balanced against budget availability.

The majority of the work associated with the management of the highway network is carried out by Salford City Council and its Urban Vision partners, Capita plc and Galliford Try plc.

F. **Reporting & Monitoring:** In order to create a holistic approach to work programming, an ‘Integrated Forward Works Programme’ is developed as part of a five year rolling programme. This approach to work determination enables greater coordination of highway works throughout the highway network.

The following diagram simplifies the HIAMP Framework for guidance.
Section 6 - Goals and Objectives

Core Objectives

The national policy context for LTP3 will remain under review to ensure that the plan is fully aligned with the priorities of the new Government. However, in developing the key aims and objectives for LTP3 within this strategic context, a number of key themes are consistent across national and local strategic priorities, namely: economic growth, environmental sustainability, health and wellbeing, and value for money. This has led to the formulation of objectives for LTP3 as follows:

- To ensure that the transport network supports the Greater Manchester economy to improve the life chances of residents and the success of business;
- To ensure that carbon emissions from transport are reduced in line with UK Government targets in order to minimise the impact of climate change;
- To ensure that the transport system facilitates active, healthy lifestyles and a reduction in the number of casualties; and that other adverse health impacts are minimised;
- To ensure that the design and maintenance of the transport network and provision of services supports sustainable neighbourhoods and public spaces and provides equality of transport opportunities; and to maximise value for money in the provision and maintenance of transport infrastructure and services.

All Local Transport Plans (LTP’s) are required to include a strategy for highway maintenance and bridge strengthening. The Greater Manchester Plan for transport (LTP 3) recognises these challenges by developing a strategic objective to ensure that the condition of the Highway Network is improved.

Local Objectives

Salford City Council recognises that the highway network is a major public asset highly valued by the community. The Council therefore, aims to manage and maintain its highway network to a level that will maximise its contribution to the vision and core objectives of Greater Manchester. In so doing contribute to the success of the Greater Manchester (LTP3) as set out below.

- Ensuring the sustainability of programmed improvements, by maintaining new infrastructure to higher standards.
- By directing maintenance operations on the network as a whole in such a way that it supports the LTP objectives, particularly with regard to the shared priorities for safety, value for money and sustainable neighbourhoods.
Key Objectives: The key objectives of the strategy are in line with the following:

- Code of Practice for Highway Maintenance Management ‘Well Maintained Highways’
- Prevention and a Better Cure, HMEP ‘Potholes Review’.
- Management of Highway Structures.
- Street Lighting ‘Well-Lit Highways’.
- Association of Directors of Environment, Economy, Planning & Transportation “ADEPT”, [formerly covered by the County Surveyors Society]

These objectives are:

- To prioritise expenditure based on local needs and achieving maximum value to the community but with reference to LTP objectives concerning economic and urban regeneration, social inclusion and environmentally sustainable transport.
- To ensure network availability and facilitate reliability for all users, particularly public transport, pedestrians and cyclists.
- To undertake regular reactive and cyclic maintenance to ensure and improve the integrity of the network and fabric of the highway.
- To ensure maximum accessibility for all users during maintenance work.
- To maximise value to the community by seeking to incorporate integrated facilities (eg. bus, cycle and pedestrian) as part of maintenance programmes.
- To assist maximum efficiency of the network by maintaining signage for all users.
- To minimise cost over time by using whole life costing projections of network condition and economic raking techniques.
- To obtain maximum benefit through specifications and methods of working.
- To provide safer streets by improving and maintaining lighting on the network.
- Gradually shifting from reactive works to planned and preventative maintenance.
- To reduce the liability on claims which will free resources for further enhancement of the network.

Salford City Council will meet these objectives by pursuing the following methods:

- Maintaining bridges, structures, carriageways, footways cycle routes, signage public rights of way, street lighting and bus stations and bus stops efficiently and with innovation to modern standards.
- Maintaining enhanced and improved traffic management and safety methods provided through the LTP process to agreed standards.
- Maintaining traffic flow efficiently and incorporating design features within maintenance works that achieve wider LTP objectives.
- Employing environmental best practice, in respect of site management, recycling, disposal of waste, hours of operation, use of local resourced materials, improving air quality where practicable and responsible fleet management practices
Section 7 - Aspirations of the Public – National Highway and Transport Survey

What the public nationally think is most important and what they also regard as most in need of improvement.

When asked 'What is most important to you personally' the public chose as their three most important service areas in the 2013 national survey:

- Condition of Roads
- Pavement & Footways
- Safety on Roads

The challenge facing Authorities is clear as when asked ‘what is most in need of improvement in your area’ the public chose ‘Condition of Roads’ and ‘Pavement & Footpaths’ as the two areas most in need of improvement. ‘Traffic & Congestion Levels’ was the third most popular ‘in need of improvement’.

Salford’s priority for obtaining investment is intended to address what stakeholders regard as the high priority by targeting roads and footways to improve the Network, so that it is safe and fit for purpose.

The above graph mirrors the opinion of the last survey carried out by Salford City Council that ‘Roads and Footways’ are the most important highway asset identified by the general public.

It is, therefore, the intention of this HIAMP to assist in targeting those priorities identified.
Section 8 - Local Policy Framework

When considering the maintenance and management functions of Council, it is important to recognize that whilst highway maintenance of the network is a key element of the Council’s duties and responsibilities, it is just one of many services that the Authority provides.

Historically certain highway related functions have tended to be delivered in isolation from many of the other services provided by the council. As a consequence, there has been little opportunity to integrate these and in some cases there has been conflict between policies, programmes and priorities of different service providers.

It is acknowledged that, if the authority is to provide first class services to the people of Salford, integration between the various arms that deliver them should be a priority. In particular, it is vital to ensure that the highway maintenance and management functions complement the other services and play a key role in meeting the aims and objectives of the Authority.

Hence, in terms of developing the Authority’s highway maintenance and management policies, it is imperative that:

- key areas of interaction between maintenance and management of the highway and the corporate objectives are identified in collaboration with AGMA.
- The contribution of highway maintenance and management to meeting these aims and objectives are maximised.
- Potential areas of conflict are resolved.

Operational Policies and Standards for Highways and Street Lighting Maintenance

One of the aims of this document is also to review and recommend actions for improving the Highway Maintenance ‘Operational Policies and Standards for Highway and Street lighting Maintenance, as and when external policies such as, Acts of Parliament, codes of practice and local policies change.

The intention of the above document seeks to outline the Operational Policies and Standards of Salford City Council for the management of its highway network and highway assets. It defines good practice within current budget levels, identifying frequencies for inspections as well as policy and strategy for the repair and maintenance of the adopted highway network. This document is included as: Appendix. C.
Section 9 - Service Delivery and Performance Management

An Intranet based Integrated Management System (IMS) is currently operative which is based on the Plan, Do, Check, Act model, and is certified to the following International Standards.

- ISO9001: 2008 (Quality)
- OHSAS18001: 2007 (Health & Safety)
- ISO14001: 2004 (Environmental)

The IMS, which is based on the Safety, Health, Environmental and Quality (SHEQ) Policy / Manual, sets the standards and procedures by which all operations are implemented, and documents operational procedures for each business unit.

On an annual basis, a Service Delivery Plan is devised which outlines the key performance indicators and targets that will be used to monitor progress throughout the year.

Salford City Council’s has set out Management Key Performance Indicators (KPI’s). This HIAMP covers KPI’s 1 to 10 for Highways and 11 to 16 for Infrastructure.

A quarterly Service Performance report is produced reporting performance against all indicators except those that are measured annually.

Throughout the year, reports are produced to a ‘traffic light’ system to indicate the present performance. All targets are SMART:

- Specific
- Measurable
- Achievable
- Realistic
- Timebound

Detail shown in Appendix. D.
Section 10 - Inventory and Condition Assessment

Highway inventory is the collection and recording of highway assets in terms of the numbers of sections, location and type of items to be maintained as indicated below:

- Carriageway: Classification, Number, Length, width, and area
- Footways: Hierarchy, Number, Length, width, area and surface type
- Signs: Type, mounting and location
- Bridges: Type and Span
- Gullies: Number
- Street Lights: Number

Inventory, Valuation and Investment Strategy

A detailed highway inventory is one of the foundations of a highway maintenance strategy and fundamental to the asset management approach, this is recognised in the Code of Practice for Highway Maintenance Management 'Well Maintained Highways'

It is only when appropriate inventory and condition data is available to all staff involved in the process that an overall view and consistent management approach can be achieved.

It is important that a detailed inventory management plan which includes asset data, both inventory and condition is required, to enable the following processes to take place:

- Valuation assessments for each of the various assets and the prediction of their depreciation over time, considering all maintenance work undertaken on them.
- The effective monitoring and reporting of the highway network and its individual assets, at any stage during the life of the asset.
- The identification of future investment strategies, modelling of the future maintenance options, and the development of long term forward programmes, that enable the assessment of future budget needs.
- The assessment and management of current and future targets, together with valuation and associated performance indicators.
- There are gaps in the inventory data, a gap analysis will detail what is required to complete these gaps, in order to obtain a complete and accurate inventory.
- Assessment for Life Cycle Planning utilising HMEP Toolkit.

Current software upgrades are imminent which will enhance mobile working functionality so that infrastructure assets can be amended in real time, thus ensuring maximum accuracy and completeness.
Key Route Network

The Greater Manchester Combined Authority (GMCA) has approved proposals for the establishment of a ‘Key Route Network’ (KRN), the most economically important roads in Greater Manchester, carrying the highest concentrations of commuter and logistics traffic.

Salford’s Key Route Network (KRN) comprises of approximately 94 kilometres of highway, 13% of the total network length.

Establishing a defined Key Route Network (KRN) will benefit Greater Manchester through improved traffic management across local authority borders, and will support GMCA in prioritising investment to meet the current and future needs of Greater Manchester to boost economic growth, better coordinate roadworks and improve travel information for road users.

The day-to-day maintenance of the Key Route Network (KRN) will stay with local authorities, with TfGM taking on the supervision of performance management information and working with councils on investment priorities. There will also be closer working arrangements with Highways England and the Northern Transport Strategy, which will provide a more joined-up approach to improving and managing the region’s motorways. Salford City Council will continue to work and coordinate with TfGM to deliver the Key Route Network strategy.

Salford City Council Key Route Network has been identified within: Appendix. E.
The following table indicates the most appropriate assets which are collated within the HIAMP, these assets are held through the City Councils ‘Confirm’, ESRI, UK Pavement Management System which is managed by Urban Vision.

The following figures are used as a basis for the asset valuation:

<table>
<thead>
<tr>
<th>Asset Item</th>
<th>Quantity</th>
<th>Asset Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carriageways (Km)</td>
<td>Length m</td>
<td>Pedestrian Crossings</td>
<td>Number</td>
</tr>
<tr>
<td>Key Route Network</td>
<td>93,838</td>
<td>Zebra Crossings</td>
<td>16</td>
</tr>
<tr>
<td>Principal Roads</td>
<td>25,800</td>
<td>PPT Crossings</td>
<td>295</td>
</tr>
<tr>
<td>B. Roads</td>
<td>33,282</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Roads</td>
<td>27,791</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unclassified Roads</td>
<td>561,283</td>
<td>Road Signs</td>
<td>Number</td>
</tr>
<tr>
<td><strong>Total Network</strong></td>
<td><strong>741,994</strong></td>
<td>A Roads</td>
<td>2,825</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Zone</td>
<td>3,017</td>
</tr>
<tr>
<td>Footways</td>
<td>Length m</td>
<td>Street Lighting</td>
<td>Number</td>
</tr>
<tr>
<td>Prestige Walking Zones (1a)</td>
<td>0.00</td>
<td>LED</td>
<td>20,500</td>
</tr>
<tr>
<td>Primary Walking Routes (1)</td>
<td>32,290</td>
<td>Discharge Lighting</td>
<td>7000</td>
</tr>
<tr>
<td>Secondary Walking Routes (2)</td>
<td>132,680</td>
<td>Illuminated signs</td>
<td>3500</td>
</tr>
<tr>
<td>Link Footways (3)</td>
<td>121,340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Access Footways (4)</td>
<td>822,950</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Network</strong></td>
<td><strong>1,109,260</strong></td>
<td>Safety Fencing</td>
<td>Length m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single Sided</td>
<td>14,061</td>
</tr>
<tr>
<td>Bridges</td>
<td>Number</td>
<td>Double Sided</td>
<td>7,734</td>
</tr>
<tr>
<td>Bridge Span less than 10m</td>
<td>46</td>
<td>Drainage</td>
<td>Number</td>
</tr>
<tr>
<td>Bridge Span 10m - 20m</td>
<td>12</td>
<td>Gullies</td>
<td>40,115</td>
</tr>
<tr>
<td>Bridge Span greater than 20m</td>
<td>19</td>
<td>Footbridge Span less than 15m</td>
<td>24</td>
</tr>
<tr>
<td>Railway bridges</td>
<td>14</td>
<td>Footbridge Span greater: 15m</td>
<td>16</td>
</tr>
<tr>
<td>Culvert</td>
<td>36</td>
<td>Retaining Walls</td>
<td>45</td>
</tr>
<tr>
<td>Sign Gantry</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inventory Summary Reports are regularly updated within ‘Confirm’ Pavement Manager, shown together with Network Depreciation Reports for the Whole Life Costing. Appendix. F.
**Section 11 - Asset Valuation.**

Asset valuation is the **current monetary value** of an organisation’s assets. The value is reported annually in the organisation’s balance sheets and is one of the key components supporting **Whole Government accounts (WGA) and public sector finance**

The relative importance of the highway assets, once translated into monetary terms will be enhanced. This will help focus attention on to the value of the **highway network** compared with other assets for which the council has responsibility.

The main purpose of asset valuation is to enable the Audit Commission to monitor the Council’s stewardship of the asset, year on year as the asset valuation is an ongoing process and as such is updated every year taking into account the depreciation of asset condition along with any in-year impairment and loss in value due to age, condition and performance.

The Asset valuation for WGA is indicated as **Appendix. G.**

**Section 12 - Condition Assessment**

Routine condition surveys are currently procured and managed on behalf of the City Council through Urban Vision Network Management Team. The Network Management team provides a specialist service on site investigation, geotechnical and pavement analysis.

The data collected from these surveys are processed by Urban Vision using ‘Confirm’ Pavement Management System [PMS] and Databases, to provide reports for the Best Value Performance Indicators [BVPI]. The survey data is also used to develop and prioritise annual programmes of work. Investigation of this survey data is also carried out by Salford’s maintenance teams, incorporating officers representing highway engineering disciplines, in order to identify and prioritise individual schemes for the works programme.

The surveys comprise of:

- **SCANNER:** Survey carried out by slow moving vehicle using computer imaging techniques to record road surface defects. The data is analysed to current UKPMS Rules and Parameters.

- **Course Visual Inspection (CVI):** Surveys carried out to national UKPMS standards undertaken by accredited surveyors from a slow moving vehicle, which records defects in the road surface.

- **SCRIM:** Survey carried out by a machine on a vehicle, is used to ascertain the underlying skid resistant of a road in wet conditions. The data on which triggers surface improvement, is recorded as part of the Council’s Skidding Policy. This is Indicated in **Appendix. H.**

- **Footway Network Survey (FNS):** Used to determine the condition of the current footway network that is not initially covered by the CVI survey.

- **Detailed Visual Inspection (DVI):** Surveys carried out to national UKPMS standards by accredited surveyors, normally on foot. This data is data is analysed to UKPMS Rules and Parameters to determine condition of high priority footways indicated category. 1a, 1 and 2.

- **Deflectograph:** Survey carried out by a machine on a slow moving vehicle to determine the residual life of the road pavement.
Section 13 - Value Management Engineering

Value Management Engineering of pavement projects is aimed at providing a structured, consistent and quality guidance to the selection of pavement maintenance works in Salford in the form of a 5 year programme.

The process for the selection of possible schemes on the network begins with the examination of the Condition Data entered through the Pavement Management System (PMS). Once this has been completed, examination of the data is carried out to determine the lengths of the network which require treatment within 5 years.

The use of the HMEP Toolkit aids this process and supports strategic level planning decisions, by assessing impacts of funding on asset performance and maintenance needs, together with identifying levels of long term funding and resources for whole life costs.

GAP Analysis

A Performance Gap is the measure of the failure of an asset to meet the demand of its construction in other words the gap between actual condition and the desired / target condition. Failure is measured against individual demand.

Individual performance GAPs that are known to cause risk to the system include the following:

- Where roads fails within their design life, due to unexpected passage of heavy vehicles and requires substantial reconstruction
- Where a number of roads and footways require maintenance work but adequate funding is not available.
- Targets set out to reduce deterioration of the Network have not been met due to weather or budget allocations.

To fully establish and identify the gap between current and desired performance, it is desirable for Salford to have developed end performance targets to allow progress to be monitored.

An initial evaluation of performance will involve identifying performance measures and highlighting where the desired target has not been achieved along with core reasons.
Section 14 - Co-operative Working and Benchmarking

Co-operative and collaborative working will continue through Salford’s membership of Greater Manchester Association of District Engineers (GMADE) and the Association of Greater Manchester Authorities (AGMA), with regular meetings taking place to discuss various engineering topics, which includes Highway Infrastructure Asset Management Plans.

Members can also access the AGMA web site, which is used as a forum for engineers to discuss and share information on the latest developments in highway engineering and management.

Benchmarking through collaboration with AGMA sub groups has been used to great effect within the HIAMP process, whereby asset valuation, item rates and suitable working models have been discussed and agreed on, so as to progress updates and changes under new Law, Central Government, Codes of Practice, LTP’s and any changes in priority by the public and stakeholders.

Section 15 - The Core Objectives for Highway Maintenance

- Network Safety
- Network Serviceability
- Network Sustainability
- Customer Service

The above objectives, together with risk management, needs based budgeting and the project evaluation process, provide the basis for the asset management strategy aimed at meeting levels of service. Salford have adopted the principle ‘Prevention and a Better Cure’ in determining the balance between structural, preventative and reactive maintenance activities in order to improve the resilience of the highway network and minimise the occurrence of potholes and defects.

Salford have produced their Highway Investment Programme [HIP] aimed at securing the right treatment for the right site through identifying preventive maintenance measures. The Highway and Drainage Investment Programme’s which are updated annually indicating a five year plan, are shown under Appendix 1.

The Investment Programmes have been produced in co-ordination and collaboration with the Council Committee, all the relevant AGMA sub-groups and with reference to HMEP, CIPFA, ADEPT and HAMFIG.
Section 16 - Highways and Highways Drainage Strategy

Salford City Council produces annual programmes of maintenance schemes aimed at addressing deterioration of the network.

With an accurate and well maintained inventory, detailed condition survey data and by using deterioration modelling, future maintenance schemes and programmes are produced. These will also enable the development of a long term financial profile based on asset management techniques and professional engineering judgement.

Deterioration modelling is embedded within Salford’s UKPMS and based on traffic volumes/characteristics, construction type and age across the Salford network. The model predicts where a particular road lies within its expected functional life and forecasts when major works will be likely; therefore, allowing for a financial forecast to be developed over the life of the asset.

A Guide to the Method of Assessment / Rationale behind Salford’s asset management approach is also indicated within the Highway Investment Programme (HIP) under Appendix I.

Highway Summary

As time goes on, roads that are currently in good condition will deteriorate, just like any physical asset such as a house or a vehicle. To keep on top of the deterioration of our asset we must invest continually in maintenance.

We are unlikely to ever be in the position where we have enough money to maintain every road that needs work in a single year, so we have to make the best use of the resources we have to get the best results for our customers (our road users).

A systematic process is therefore needed to manage the highway asset. Asset management principles deliver that systematic approach.

Salford used to adopt the “worst-first” approach to asset management, by identifying the worst condition roads and develop a programme of road resurfacing, reconstruction and refurbishment.

This was easily understood by the public and members who see a road in poor condition and will see it as the council’s duty to repair it. However, years of underinvestment and “worst first” strategies in the past have got us to the point where we have a calculated accumulated depreciation of approximately £67 Million backlog of maintenance.

With funding for highways maintenance being squeezed over many years, available resources have been insufficient to maintain the highway network to the level we would like.

The key question is how we will decide which roads should have preventative maintenance treatment and which roads we need to undertake resurfacing or major reconstruction works.

The current approach is intended to increase the life span of our roads and reduce the percentage of roads in need of repair by balancing the “worst first” approach with a parallel programme of preventative maintenance, as indicated within ‘Prevention and a Better Cure’, thereby moving towards ’Optimum Life Cycle Planning’ utilising UKPMS data and the HMEP Life Cycle Planning Toolkit. This forms the basis of our Highways Asset Management Plan.
Example of Life Cycle Planning for Carriageways

If you wait and replace in full the binder and surface course after 20 years it returns to its “new” condition and begins to deteriorate again over the next 20 years, this is the Red Line approach.

If you resurface the road at the point where it is starting to require major treatment, this is the Yellow Line approach and you would resurface and repair every 15 years.

The Green Line and Blue Line approach shows how a Partial and Optimum asset management strategy works. It involves a combination of different types of surfacing, repairs and preventative maintenance.

Costs for major resurfacing works range from £228,000 per km (£75.00 per m²) for replacement of the top 100mm of the road surface (binder and surface course), to £144,000 per km (£35.00 per m²) for replacement of the surface course up to 50mm. Costs for preventative maintenance range from £52,000 per km (£8.00 per m²) for thin surfacing to £35,000 per km (£5.50 per m²) for surface dressing, including minor foundation repairs.

An example of a typical Lifecycle Plan showing how maintenance of a 1km section of road can be planned in different ways is indicated as Appendix J.
Section 17: Structures

It is widely recognised that a well managed transport infrastructure is vital to the economic stability, growth, and social well being of a country. Bridges and other highway structures are fundamental to the transport infrastructure because they form essential links in the highway network. It is not therefore in the public interest to allow highway structures to deteriorate in a way that compromises the functionality of the highway network, be it through restrictions or closures caused by unsafe structures or the disruption of traffic through poor planning of maintenance work.

There is a statutory obligation on highway authorities to maintain the public highway [Highways Act 1980; 1]. The obligation embraces the two essential functions of Safe for Use and Fit for Purpose. The two functions are not the same:

1. **Safe for Use** requires a highway structure to be managed in such a way that it does not pose an unacceptable risk to public safety.

2. **Fit for Purpose** requires a highway structure to be managed in such a way that it remains available for use by traffic permitted for the route.

The Greater Manchester Maintenance Strategy together with Salford’s HIAMP identifies key objectives to be prioritised based on the needs within the local area. Particular objectives relating to highway structures are as follows:

- Maintain a safe network of highways
- Ensure network availability and reliability
- Improve accessibility and value to the community and network
- Maintain a safe and reliable network of bridges and structures
- Influence private sector to maintain a safe, efficient and reliable network

In a similar fashion as for carriageways and footways, Salford City Council uses the results of structures inspections to represent the state of the structure stock on the network when conducting business planning for capital investment. Based on the results of the inspections, structures are assigned two numerical Bridge Condition Index (BCI) ratings: an Average BCI score (BCIave) and a Critical BCI score (BCIcrit). These reflect, respectively, the overall condition of the structure based on all elements surveyed, and the condition of the most structurally critical (loadbearing) elements of the structure. These are rated separately, as a bridge with an acceptable overall condition could still require priority capital maintenance to address sub-standard critical elements. Unlike DVI/CVI and SCANNER ratings for carriageways and footways, for BCI, a higher index represents better condition of the asset. Condition index bands and rankings for risk assessment purposes are shown in the table below.

- 95-100 Very Good Condition;
- 90-94 Good Condition;
- 80-89 Fair Condition;
- 65-79 Poor Condition;
- 40-64 Very Poor Condition; and
- 0-39 Severe.

The details of Salford’s Structures Life cycle plan and Management details are indicated within Appendix K.
Section 18 - Street Lighting

Street Lighting and illuminated signs maintenance is a significant aspect of network management, both financially and in terms of its perceived importance to users, providing direction and advice for all types of traffic.

Street Lights when installed and maintained to appropriate standards contributes helps towards the reduction and fear of crime and helps to promote a feeling of safety and well being.

The principles of the street lighting maintenance strategy, such as delivering the statutory obligations of the Council and supporting LTP3 are included within this HIAMP.

Standards for delivering Salford’s street lighting service follow, in general terms, the recommendations of the technical reports and guidance of the Institution of Lighting Engineers, ‘Well-Lit’ Highways and the Code of Practice for Highway Lighting Management.

In accordance with the Code of Practice the principles are set within core objectives of customer service, safety, network serviceability and sustainability. These are indicated within the Operational Policies and Standards document.

Street Lighting Initiative

Salford City Council have recognised the potential savings that can be achieved through modernisation of its street lighting infrastructure following the production of a business case and feasibility report titled ‘LED Street Lighting Initiative’.

The initiative recommended an ‘Invest to Save’ programme for the replacement of 95% of all ‘discharge lanterns’ to Retrofit ‘Light Emitting Diode’ [LED] lanterns, together with ‘Solar’ and ‘Reflective’ replacements for existing illuminated signs, in order to reduce energy output and invest for future financial savings.

As well as pressure to reduce costs and make financial savings, the City Council has made a commitment to reduce carbon levels in keeping with Government targets of 34% by 2020 and 80% by 2050. Addressing street lighting energy consumption through the initiative will, therefore, assist in achieving this goal, together with a reduced annual maintenance cost.

It is anticipated that 90% of Salford’s City network will be operative and working on LED, Solar or Reflective power within 2015.

Salford City Council have produced detailed working procedures and stock management procedures, together with a ‘Standard Specification for Highway Power Supply and Street Furniture’. The purpose of this is to provide guidance to all employees and developers associated with the provision of street lighting services.

The system has been designed to obtain compliance within Urban Vision’s ‘Business Management System’ [BMS], within Salford’s Intranet, to ensure safety of staff and developers undertaking work, including the general public.

The Street Lighting Specification and working documents are indicated as Appendix L.
Section 19 - Risk Management

The management of highway maintenance, including the setting of standards for condition and determining priorities and programmes for effective asset management, should be undertaken against a clear and comprehensive understanding and assessment of the risks and consequences involved.

A growing interest in risk management is being fuelled against the backdrop of an increasingly litigious society, the significant sums of money paid out by some authorities for public liability claims and the spectre of corporate manslaughter charges that authorities could face by failure of their duties. All of these lead to a desire to improve upon risk management procedures.

The Application of Risk Management

The objective of applying risk management within the asset management plan is to identify the specific risks associated with the management and operation of the network and by doing so ensure that these are managed in a structured, appropriate and auditable manner.

Categorisation of Risks

A 3-tier model has been used to categorise risk, based on strategic, tactical and operational risks. The rationale behind this is that it is likely that different groups of people within the Council will manage risks at these 3 different levels.

Strategic Risk

Strategic risks are the overarching service wide risks. Some of these may be beyond the control of the asset management team and some of which may be entirely external such as national budgets and political changes.

Tactical Risk

Tactical risks can affect Salford City Council’s ability to deliver annual programmes to desired budgets; examples could include: weather; changes in customer influences; local political pressures; and the consequences of the choice of level of service.

Tactical risks are those most likely to be managed via the asset management planning process with actions to address them, such as varying levels of service.

Operational Risk

Operational risks are those encountered on a day-to-day basis as the City Council manages and runs the network. Examples could include service delivery, repair failure, lack of safety inspections etc.

These risks will be identified and managed by the appropriate service delivery teams as part of the day to day management of the network. The Overall Risk rating below does not include an additional safety risk factor which has been added to risk analysis site working sheets.
## Potential Impact Rating

<table>
<thead>
<tr>
<th>Risk</th>
<th>Risk Score</th>
<th>Service disruption</th>
<th>Financial Loss</th>
<th>Reputation</th>
<th>Failure to meet Legal/Service Requirements</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme [Virtual certain]</td>
<td>5</td>
<td>Total Failure of Service</td>
<td>£5 Million +</td>
<td>National Publicity - Resignation of Mayor - resignation Chief Officer</td>
<td>Multiple civil-criminal suits, litigation claims &amp; fines</td>
<td>Fatality of one or more people</td>
</tr>
<tr>
<td>Very high [Probable]</td>
<td>4</td>
<td>Serious disruption to service</td>
<td>£500k - £5 Million</td>
<td>National Public and press interest</td>
<td>Litigation Claims and Fines</td>
<td>Serious injury and or permanent disablement</td>
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<tr>
<td>Medium [Possible]</td>
<td>3</td>
<td>Disruption to Service</td>
<td>£50K - £50K</td>
<td>Local Public &amp; press interest</td>
<td>Litigation Claims and Fines</td>
<td>Major injury to individuals</td>
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<tr>
<td>Low</td>
<td>2</td>
<td>Minor Impact on Service</td>
<td>£5K - £50K</td>
<td>Contained within department</td>
<td>Litigation Claims and Fines</td>
<td>Minor injury to individuals</td>
</tr>
<tr>
<td>Negligible</td>
<td>1</td>
<td>Annoyance but no service disruption</td>
<td>less than £5K</td>
<td>contained within section</td>
<td>Litigation Claims and Fines</td>
<td>Minor injury to an individual</td>
</tr>
</tbody>
</table>

## Likelihood of Occurrence Rating

<table>
<thead>
<tr>
<th>Risk Rating</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Almost Certain – Expected to occur in most circumstances (&gt; 80%).</td>
</tr>
<tr>
<td>4</td>
<td>Likely - Will probably occur in most circumstances (51% - 80%).</td>
</tr>
<tr>
<td>3</td>
<td>Possible – Fairly likely to occur (21% - 50%).</td>
</tr>
<tr>
<td>2</td>
<td>Unlikely - Could occur at some time (6% - 20%).</td>
</tr>
<tr>
<td>1</td>
<td>Rare (0-5%)</td>
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</tbody>
</table>

## Overall Risk Rating

Potential Impact X Likelihood of Occurrence = Overall Risk Rating

- **20 to 25**: Those risks requiring immediate management and monitoring
- **9 to 19**: Those risks requiring management and monitoring but less than critical
- **1 to 8**: Those risks which require ongoing monitoring
Section 20 - Implementation

With an accurate and well maintained inventory, detailed condition survey data and by using deterioration modelling through UKPMS and HMEP Toolkit, it is now possible to predict future maintenance schemes not only on the general location but also the proposed treatment type. This enables the development of a long term financial profile based on robust asset management techniques and professional engineering judgment.

The highway maintenance programmes produced by Salford covering all aspects of Capital, Revenue and Highway Investment, are approved annually by committee.
Section 21 - Permitting

Salford City Council welcomes the introduction of permitting.

The benefits that permitting affords:

- Actively state when works should take place by directing the days and timings of works, thereby minimising disruption
- Permits ensure that the integrity of the highway is not compromised following or during utility works
- Permit scheme have ensured parity with regards to the timing of works by both Statutory Undertakers and Salford.
- Salford are able to reject permit requests if inadequate information is provided on the request. This will ensure that all those wishing to carry out works on City’s highway must provide accurate information as to the location and timing of their works.
- Salford are able to place conditions and restrictions on the way in which works are carried out.
- Permits will ensure that Salford are better able to coordinate works that take place on the City’s highway network.
- Permitting has allowed Salford to fully assess all proposed activities scheduled to take place and ensure that these are coordinated to minimise disruption to all users of the public highway.
Section 22 – Air Pollution and Noise Pollution

The reports on Air and Noise Pollution are ultimately reported to the Department for Environment, Food and Rural Affairs (DEFRA), through Greater Manchester.

Air Pollution

Even though air quality in the UK is generally good, more needs to be done, especially in cities such as Salford, to reduce the harmful effects of air pollution.

Air pollution in the UK has improved significantly over recent decades through measures to reduce pollution from transport, industrial and domestic sources. However, the rate of reduction is now leveling off for some key pollutants such as oxides of nitrogen.

Salford monitors air quality by the use of monitoring equipment installed in fixed monitoring stations. The monitors give hourly results of several pollutants and additional monitoring is done by the use of tubes that absorbed the pollution over a month and give a monthly average. The results of the monitoring are collated at the end of each year and reported to Highways Forecasting and Analytical Services (HFAS) for Greater Manchester.

Effective management and maintenance of the road infrastructure can have a positive effect on improving air quality. Easing congestion reduces traffic emissions as does smooth flowing of traffic all of which can be affected by smart traffic controls and planned maintenance of the road network.

Salford’s City Councils Salford City Council’s Atmosphere Emissions Inventory for the last three reports to HFAS are indicated within Appendix. M.

Noise Pollution

Noise from the road network is of concern as it has effects upon health and wellbeing of those exposed to it from heart disease to sleep disturbance. As part of the Environmental Noise Regulations 2006 noise action plans were required, produced by the Secretary of State.

The action plans identify Important Areas where the relevant highways or rail authorities must consider what further measures, if any, might be implemented in order to improve the management of noise in the context of Government policy on sustainable development.

Within Salford 59 areas were identified as first priority locations under the noise action plan and as part of this asset infrastructure management plan, noise mitigation techniques will be used whenever the opportunity arises through either planned or unplanned maintenance, such as the use low noise surfacing materials.
Section 23 – Summary of Appendices

Appendix - A  **Whole of Government Account Summary (WGA):**
Salford City Council will provide the WGA annually in accordance with the CIPFA and HMEP Toolkit. The figures indicated within the appendix summarise Salford’s current highway account/asset situation for both carriageways and footways. The figures are reviewed and costed annually and include: The Gross Replacement Cost (GRC), Accumulated Depreciation (AcD), Depreciated Replacement Cost (DRC) and the Annulised Depreciation (AnD).

Appendix - B  **Carriageway and Footway Performance Indicators**
Salford City Council shall continue to provide Performance Indicators so that defined outcomes can be measured and monitored. A summary of the carriageway and footway performance targets showing the percentage of network requiring treatment is indicated within this appendix.

Appendix - C  **Operational Policies and Standards:**
Salford City Council’s Operational Policies and Standards document produces performance guidelines to ensure that it meets its legal and statutory obligations. It is a working document for carrying out inspections, assessments, repairs and maintenance within current Policies, Codes of Practice's and Act's of Parliament. This document is subject to continued annual review.

Appendix - D  **Service Performance Details:**
Salford City Council will continue to monitor and provide data which forms the basis of their Key Performance Indicators (KPI's) within its current management system for: ‘Reaction and Dealing with Reports’, ‘Highway and Streetwork Inspections’, ‘Response to Defects and Repairs’, ‘Accident Trip Claims’, ‘Construction Waste’, ‘Schemes Delivered on Time and within Budget’ and ‘Roads where Maintenance Should Be Considered’. However, some of these reports are only produced annually, therefore data may only available for the previous financial year, within these appendices.

Appendix - E  **Key Route Network:**
The Greater Manchester Combined Authority established a 'Key Route Network' (KRN), which are the most economically important roads in Greater Manchester, carrying the highest concentrations of commuter and logistics traffic. Salford’ Key Route Network is shown within this Appendix.

Appendix – F  **Inventory and Depreciation Summary Reports:**
Salford City Council will continue to utilise an accredited UKPMS system to manage Asset Inventory from which Depreciation Models, Asset Valuation and Gross Replacement Costs can be accurately derived. This in turn provides the Council with information to target funding to ensure cost effective utilisation. The reports produced by Confirm [UKPMS] outline the current available levels of inventory and depreciation for both carriageways and footways, are indicted in this appendix.
Appendix - G  **Asset Valuation of Gross Replacement Costs:**
Salford City Council will continue to produce a breakdown of the Asset Valuation and Replacement Costs for Whole of Government Accounts for submission to Central Government / CIPFA, on an annual basis in order to determine the City’s expenditure levels and requirements. The details available for submission are outlined within this appendix.

Appendix - H  **Skid Resistance Policy:**
Salford City Council recognises that adequate highway skid resistance along its network provides a safe road surface for traffic. The approach to monitoring skid resistance of carriageways, including the interpretation of data arising from measurements made, to ensure that surfaces have appropriate characteristics for adequate levels of skid resistance, will continue. Salford’s Skid Policy is outlined within this appendix.

Appendix - I  **Highway and Drainage Investment Programmes:**
Salford City Council utilises information produced from the UKPMS system along with other survey data indicated within Section 12. From this data programmes of work have been produced for the City Council to commit funding as part of a five year rolling programme of works investment profiles and targets for highway and drainage.

Appendix - J  **Example Life Cycle Diagram:**
A simple diagram indicating the life cycle planning of a typical kilometre of carriageway from ‘Wait to Failure’ regime to ‘Optimum Life Cycle Planning’ is indicated within this appendix. It is Salford’s intention to move to ‘Optimum Life Cycle Planning’ by 2016/17.

Appendix - K  **Structures:**
Under the Highways Act 1980, bridge, parapet wall and retaining wall maintenance is not only required, but is essential to the effective operation of the highway network. Salford City Council will continue to maintain its network of structures, bridges and retaining walls as outlined within the Inventory, Levels of Service and Lifecycle Plans for Salford City Council's Structures, as detailed within the Appendix.

The Inventory, Levels of Service and Lifecycle Plans for Salford City Council's Structures, which includes all Bridges, Parapet Walls and Retaining walls.

Appendix - L  **Street Lighting:**
This document outlines the City Councils working procedures, stock management and specification for power supply to street lighting and street furniture. This is an operational document to ensure effective management of the ongoing LED replacement programme as part of the move towards more efficient energy saving lighting stock. This document will be reviewed annually.

Appendix - M  **Air Pollution and Performance Statistics**
Salford monitors air quality by the use of monitoring equipment installed in fixed monitoring stations. The results of the monitoring are collated at the end of each year and reported to Highways Forecasting and Analytical Services (HFAS) for Greater Manchester. The last three reports are indicated within this Appendix.
# Section 24 - Abbreviations

The following abbreviations are used within this document:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ADEPT</td>
<td>Association of Directors of Environment, Economy, Planning &amp; Transportation</td>
</tr>
<tr>
<td>AGMA</td>
<td>Association of Greater Manchester Authorities</td>
</tr>
<tr>
<td>BCI</td>
<td>Bridge Condition Index</td>
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<tr>
<td>BVPI</td>
<td>Best Value Performance Indicators</td>
</tr>
<tr>
<td>CBIP</td>
<td>Crash Barrier Investment Programme</td>
</tr>
<tr>
<td>CIPFA</td>
<td>Chartered Institute of Public Finance and Accountancy</td>
</tr>
<tr>
<td>CoP</td>
<td>Code of Practice</td>
</tr>
<tr>
<td>CPA</td>
<td>Corporate Performance Assessment</td>
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<tr>
<td>CSS</td>
<td>County Surveyor’s Society</td>
</tr>
<tr>
<td>CVI</td>
<td>Course Visual Inspection</td>
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<tr>
<td>DEFRA</td>
<td>Department for Environment, Food and Rural Affairs</td>
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<tr>
<td>DIP</td>
<td>Drainage Investment Programme</td>
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<tr>
<td>DfT</td>
<td>Department for Transport</td>
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<tr>
<td>DRC</td>
<td>Depreciated Replacement Cost</td>
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<td>DVI</td>
<td>Detailed Visual Inspection</td>
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<td>FNS</td>
<td>Footway Network Survey</td>
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<td>GAAP</td>
<td>Generally Accepted Accounting Principle</td>
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<td>GMADE</td>
<td>Greater Manchester Association of District Engineers</td>
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<td>GMCA</td>
<td>Greater Manchester Combined Authority</td>
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<td>GRC</td>
<td>Gross Replacement Cost</td>
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<td>Highway Asset Management Financial Information Group</td>
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<td>Highways Forecasting and Analytical Services</td>
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<td>Highway Infrastructure Asset Management Plan</td>
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<td>Highways Maintenance Efficiency Programme</td>
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<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>International Financial reporting Standards</td>
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<td>Integrated Management System</td>
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<td>KPI</td>
<td>Key Performance Indicator</td>
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<td>KRN</td>
<td>Key Route Network</td>
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<tr>
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<td>Local Area Agreement</td>
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<td>Local Authority Accounting Panel</td>
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<td>Light Emitting Diode</td>
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<td>LiP</td>
<td>Local Implementation Plan</td>
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<tr>
<td>LoTAG</td>
<td>Local Government Technical Advisors Group</td>
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<td>Local Transport Plan</td>
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<td>National Highway and Transport</td>
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<td>Roads Liaison Group</td>
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<td>RSG</td>
<td>Revenue Support Grant</td>
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<td>SCANNER</td>
<td>Surface Condition Assessment of the National Networks of Roads</td>
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<td>SCRIM</td>
<td>Sideway-force Coefficient Routine Investigation Machine</td>
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<td>SHEQ</td>
<td>Safety, Health, Environment and Quality</td>
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<tr>
<td>SLI</td>
<td>Street Lighting Initiative</td>
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<tr>
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<td>Strategic Road Network</td>
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<td>SuDS</td>
<td>Sustainable Drainage System's</td>
</tr>
<tr>
<td>UKPMS</td>
<td>United Kingdom Pavement Management System</td>
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