
Strategy for Well-Managed Highway Infrastructure

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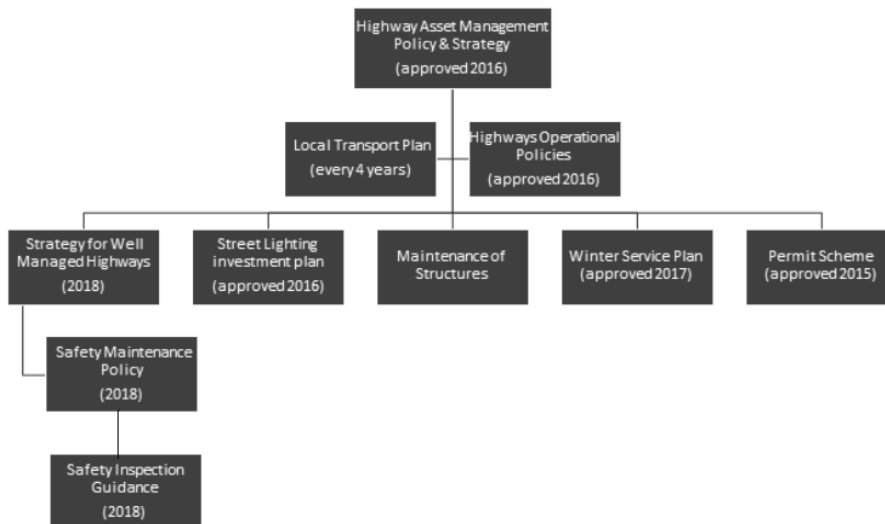
2. Introduction

Highway and Transport infrastructure is one of the UK's largest assets and is often the most complex to look after. For example, a road will contain different components such as sub-layers and surfacing, as well as utilising construction methods that differ from location to location.

There are various documents that set out how the highway network will be inspected, maintained and repaired, ranging from national legislation and national guidance to local policies, strategies and guidance. These documents relate to the public highway adopted by the local authority.

Brighton & Hove City Council have an approved suite of documents relating to the upkeep of its highway assets. This Strategy document is in response to the requirements in the UK Code of Practice 2016 for managing highway infrastructure. This Strategy sets out how Brighton & Hove City Council (BHCC) manages its risk-based approach to the highway network, with a principal focus on roads and pavements as the most heavily-used and highest-value assets.

BHCC's Strategy for Well Managed Highway Infrastructure links with other BHCC local documents as shown in the diagram below:



3. Code of Practice for Well Managed Highway Infrastructure 2016

In 2016, the UK government endorsed a new Code of Practice: 'Well Managed Highway Infrastructure' (WMHI), superseding the previous national standards laid out in the 2005 Code.

Highway authorities operate under primary legislation, contained in Acts such as the Highways Act 1980. The Codes of Practice relating to highway activities set out the guidelines and regulations for meeting these legislative requirements.



The Well Managed Highway Infrastructure Code of Practice is not a statutory requirement. However, any departure from the recommended guidance must be based on detailed analysis, judgement and evidence. The Code of Practice is a reference document for court or coroners' hearings in public liability claims.

The 2016 WMHI Code of Practice applies to all highway authorities. Brighton and Hove City Council as a highway authority is responsible for the highway network within its boundaries. The exception to this is where roads are managed by Highways England, such as the A23 and A27.

4. Principles of the Code

The fundamental principles of the Code of Practice are that highway authorities develop their own approach to maintenance of highway infrastructure, using risk evaluation to determine local needs, priorities and affordability. This approach includes all highway assets, taking a holistic view of network management:

“The Code is designed to promote the adoption of an integrated asset management approach to highway infrastructure based on the establishment of local levels of service through risk-based assessment.”

Brighton & Hove City Council as a highway authority has therefore responded to the principles set out in the Code and has conducted analysis and evaluation of the highway network to determine its approach based on level of risk.

“The intention of this Code is that Authorities will develop their own levels of service and the Code therefore provides guidance for authorities to consider when developing their approach in accordance with local needs, priorities and affordability.”

The Code also recommends working closely with neighbouring authorities in determining levels of service and for authorities to embrace new technology and innovation for managing the highway network.

5. Adoption of the Code of Practice

The Code of Practice for Well Managed Highway Infrastructure introduces a new approach to highway management. The notable difference is that national fixed standards, particularly for safety inspections of the public highway, are removed and replaced by a requirement for risk-based evaluation to set local levels of services for the maintenance and repair of the public highway.

By October 2018, all highway authorities must demonstrate that analysis has been undertaken to develop a risk-based approach and that the Strategy has been approved and adopted at an Executive level.

The Code of Practice contains 32 recommendations in total. Brighton & Hove City Council has been working towards achieving these recommendations since 2012.

6. Legislative requirements

The Council as a Highway Authority has a duty to maintain its highways under Section 41 of the Highways Act 1980. The same Act, in Section 58, grants a 'special defence against a highway authority for damages for non-repair of the highway' if it can demonstrate that it has taken reasonable care to ensure that the highway was not dangerous to traffic having regard to:

- The character of the highway and the traffic which was reasonably expected to use it;
- The standard of maintenance appropriate for a highway of that character and used by such traffic;
- The state of repair in which a reasonable person would have expected to find the highway;
- Whether the Authority knew or could reasonably have been expected to know that the condition of the highway was likely to cause danger to users;
- Whether warning notices were displayed when immediate repair could not reasonably be expected.

This duty has been further clarified by case law. The law does not require a highway authority to maintain the highway as new and free from any defects, because this is not possible both practically and in terms of affordability. However, case law has set out certain expectations about maintenance and repair, particularly for roads, pavements and cycleways.

7. Highway Maintenance

7.1. Maintenance regimes

The main types of maintenance undertaken by a highway authority are described in the table on the following page:

Type	Description	Funding
Reactive or safety	Immediate or short-term response to hazards that could compromise safety and require rapid intervention	Revenue
Routine or cyclical	Programmed works that maintain the asset in a steady state (e.g. gully cleansing) or provide for replacement, cleaning or refurbishment (e.g. street lighting lamps)	Revenue
Planned (preventative)	Planned works that enhance the life of the asset by preventing further deterioration – usually for surface issues (e.g. crack sealing, large-scale patching)	Revenue and capital
Planned (structural)	Planned works that re-construct or substantially repair the asset (e.g. resurfacing carriageways, replacing	Capital

	lighting columns)	
Winter service	Planned and reactive treatments to prevent or remove ice, frost or snow.	Revenue
Resilience and emergencies	Preparation, planning and response to emergency situations (e.g. flooding, sink holes)	Usually revenue

7.2 Planned Maintenance

Planned maintenance for roads, pavements and cycleways is carried out in accordance with the risk-based approach set out in Brighton & Hove City Council’s Asset Management Strategy. The medium-term strategy is to make effective use of available capital budgets to hold back decline in the condition of the major road network whilst investing in preventative treatments to secure longer term benefits for the unclassified roads.

Given the unprecedented financial challenges for local authorities, the available revenue budgets for highway maintenance, as for other council services, have substantially reduced over the last 10 years. A risk-based approach is therefore an essential method for prioritising maintenance schemes. Brighton & Hove City Council has reviewed and revised its Highway Maintenance guidance documents in accordance with the Code of Practice.

Revenue funding annually is directed towards:

- A repair regime for vehicle safety barriers
- Repairing loss of skid resistance levels at critical locations
- Repairing drainage infrastructure that is causing localised flooding incidents
- Joint and crack sealing of carriageways to prevent wholesale water ingress that will cause further damage such as potholes.

Capital funding is used for maintenance treatments to minimise the risk of sudden failure on roads and pavements that carry the greatest amount of vehicular and pedestrian traffic, including HGVs and buses. These treatments usually involve resurfacing of sections of the carriageway or footway. As with revenue funding, the capital maintenance programme is tailored annually according to funding assigned through the Local Transport Plan.

Integrated transport schemes funded through capital grants may also include renewal of pavements and carriageway surfacing – for example, the Edward Street Better Bus scheme.

7.3 Safety Maintenance

Safety repairs are an inevitable part of the lifecycle of carriageway, footways and cycleways. These repairs are typically restricted to defects such as potholes, uneven slabs and uneven tarmac. They do not include the areas surrounding the defect showing signs of general deterioration or risk factors that may give rise to safety defects in future.

Previous Codes of Practice set national standards for the inspection and repair of safety defects. However, the Code of Practice for Well Managed Highway Infrastructure requires local authorities to develop local guidance based on evaluation of local risk factors.

This includes:

- Setting the frequency of routine safety inspections for each street in the city
- Setting guidelines for the levels at which potential safety defects will be investigated
- Setting defect categories to determine type and timing of any repairs required
- Documenting any exceptions and reasons for this

Brighton & Hove City Council has therefore undertaken a thorough review of its Highway Safety Inspection regime. Based on evaluation of several factors that affect risk on the public highway network, inspection frequencies have been revised and local levels for investigation and repair of safety defects have been established

Due to the number of changes required by the Code of Practice 2016, Brighton & Hove City Council has produced a separate policy for Safety Maintenance, which will be a principal document in the defence of third party liability claims.

7.4 Winter Maintenance

Brighton & Hove City Council has an approved Winter Service Plan which documents its strategy and operational procedures for dealing with winter weather conditions. Gritting routes cover all main routes and all bus routes within the city. A priority network for operating under extreme conditions has been identified, which concentrates resources on the most urgent thoroughfares in the city. The Winter Service Plan was reviewed following the severe winters of 2009/2010 in consultation with the public via a Scrutiny Panel and with emergency services and other organisations through the Sussex Resilience Forum and Transport Partnership and in partnership with neighbouring authorities.

7.5 Resilient network and emergency planning

The council's resilient network is part of the network hierarchy and identifies critical highway infrastructure where failure could cause severe disruption to the functioning of the city. The resilient network is based on the priority network for winter gritting and encompasses the major routes through the city.

In defining the resilient network, consideration was given to other elements of local transport policy and strategy wherever possible, including supporting economic growth, regeneration, emergency services, walking and cycling, bus routes, travel planning, routes to stations and other interchange facilities. Consultation was undertaken with transport operators and the Resilience Forum, and the resilient network is a key part of the asset management investment strategy.

The Highway Asset & Engineering Manager is part of the council's Emergency Planning group, where scenarios are regularly tested, and works closely with the Flood Prevention Officer. Emergency plans have been drawn up for flooding incidents in specific locations such as Patcham.

7 Risk management

Assessing and mitigating risk provides a proportional approach to managing potential issues that may have a negative impact.

Risk management involves identifying problems that might arise and ascertaining the impact of each of those potential problems. Actions are then undertaken to reduce the level of risk.

This assessment of risk focuses on how likely the problem is to arise and the most likely consequences if it does happen:

LIKELIHOOD OF EVENT OCCURRING	CONSEQUENCE OF EVENT OCCURRING				
	NEGLIGIBLE	LOW	MEDIUM	HIGH	SEVERE
NEGLIGIBLE	1	2	3	4	5
VERY LOW	2	4	6	8	10
LOW	3	6	9	12	15
MEDIUM	4	8	12	16	20
HIGH	5	10	15	20	25
KEY TO RISKS					
LOW		MEDIUM		HIGH	

8 Risk-based approach for the public highway

It is impracticable for any organisation to completely eradicate all risk. The Highways Act and subsequent case law accept that it is not possible for the highway network to be completely perfect and risk-free.

Therefore, a risk-based approach for highways provides a framework for making proportional decisions about maintenance and repair activities, based on key factors and available data.

There are two types of risk for the highway network, which may overlap:

1. The risk to an asset itself – failure through deterioration or a major one-off event. Not all risks to an asset present a risk to users e.g. a carriageway may have structural defects in the sub-layer, but this may not present immediate safety problems for users.
2. The risk to people using the asset – caused by defects in the surface or structure of the asset

The WMHI Code of Practice 2016 states that highway authorities must decide how to manage their highway network based on their own risk assessments, taking into account local priorities, objectives, needs and affordability.

Brighton & Hove City Council's Strategy for Well Managed Highway Infrastructure and its accompanying documents set out the council's analysis of risk for the highway network and the risk management regime that it has put in place.

Where appropriate, risks relating to the provision of highway services are identified in BHCC's corporate risk register. The corporate risk register includes: "Loss in resilience of the city's transport infrastructure" which currently has an amber risk rating.

9 Evaluation of risk

Highway Maintenance officers have been preparing for the introduction of the revised Code of Practice since 2012. A fundamental part of the work has been collating essential data and other information for risk-based analysis, as stated in the Code:

"Delivery of a safe and well-maintained highway network relies on good evidence and sound engineering judgement."

Activities to incorporate the Code of Practice recommendations include:

- Utilising the framework in the Code based on the considerations listed - establishing the factors that will determine the criteria for categorising each and every carriageway and footway in the city bearing in mind any locally unique conditions.
- Assessing each road (carriageway and footway) against the above criteria.
- Development of the Highway Asset Management Strategy for long-term condition modelling and investment planning
- Developing new areas of safety inspection frequency to match the criteria, using available staffing resource, and make any adjustments required depending on any increased workload.
- Route optimising the safety inspections and areas to reduce excessive travel and vehicle usage.
- Training the Highway Inspectors in risk assessment in order to make an informed decision on the likelihood of a repair being required and the appropriate response time.
- Undertaking revisions to the supporting systems such as the highway management database, schedules of inspection, defect and complaint forms.

10.1 Establishing factors to determine criteria

The Code of Practice contains guidance to assist in determining local criteria. This guidance includes:

- Recommendations for a network hierarchy (priority) based on traffic composition and volume, and social/economic importance
- Considerations regarding users, such as key infrastructure locations, pedestrian desire lines and important locations such as access to shops, hospitals, schools.

The probability of an incident occurring is quantified by assessing the likelihood of highway users encountering the defect or hazard. Brighton & Hove City Council has established criteria for likelihood or risk in line with the Code of Practice hierarchy recommendations.

High Traffic Volumes	Likely
Medium Traffic Volumes	Moderate
Low Traffic Volumes	Unlikely
Very Low Traffic Volumes	Rare

The next step required an assessment of each carriageway and footway to determine its position in the hierarchy.

10.2 Assessment of each carriageway, footway and cycleway on the public highway

The following data was considered:

- Annual condition surveys of the carriageway and footway network
- Pedestrian and traffic counts
- Asset management strategy (data includes maintenance history, repairs, claims, complaints, accidents)
- Bus routes: frequencies and numbers of buses
- Designated traffic sensitive streets
- Prestige areas of the city
- Resilient network (key highway infrastructure supporting the city's economy)

NHT satisfaction survey and corporate customer feedback reports were also considered.

The data was analysed to provide a comprehensive understanding and evaluation of risk on Brighton & Hove's highway network, based on likelihood of risk.

For example, the number of buses per hour on every bus route in the city: this gives (a) an indication of the volume and weight of traffic which place more demands on the fabric and structure of the carriageway, and (b) an indication of primary routes across the city which will include pedestrian users of the bus services.

There are separate strategies that fully document the process and decisions for asset management plans and for safety maintenance.

10.3 Staff resources and competency

To accommodate the requirements of the Code of Practice, staffing resources are being reviewed as part of a wider Transport service redesign. Highway safety inspection areas will be part of the review and identification of the necessary resource.

All staff involved in highway asset management and/or highway safety maintenance have received training appropriate to grade and responsibility. Highway Inspectors hold LANTRA certification which satisfy the requirements of the Institute of Highway Engineers' certification scheme.

11 Customer feedback

Brighton & Hove City Council captures and analyses customer feedback via an internal quarterly report that is discussed with service managers and incorporates any lessons learnt or service improvements arising from interaction with customers. BHCC also participate in the annual National Highways & Transportation (NHT) survey which assesses public satisfaction with highway services.

This information is used to inform Highway officers about public perception, what the public value and how the services are performing from a customer viewpoint. This has formed part of the evaluation for risk-based levels of service. Arising from customer feedback, Highways are now have a more efficient response to public reports about potential highway defects, by using GPS-enabled handheld devices for Highway Inspectors to use on site.

12 Cross-council working

On a strategic and operational level, Highway Maintenance officers work with:

- Other Transport sections on integrated schemes, asset management and network management
- Cityparks regarding street trees

- Civil Contingencies on emergency planning and business continuity issues that may affect the highway network
- Cityclean on winter service planning and operations
- Insurance regarding third party liability claims
- Communications team on information about highway maintenance via the website and other media
- Procurement, performance and customer service teams for provision of highway services

The insurance team has been consulted on the revisions to the safety maintenance regime.

13 Other authorities

The council is a member of the SE7, a group of South East authorities that benchmarks and collaborates on highway maintenance service provision and requirements. Brighton & Hove is a predominately urban unitary authority whereas other members of the SE7 are large urban counties. Therefore, although some principles such as network hierarchy categories may be similar, BHCC's maintenance strategies and guidance may differ from neighbouring authorities due to the diverse needs, levels of risk and types of maintenance appropriate to a geographically constrained urban environment with high concentrations of residents, businesses and visitors.

The council also participates in the South East Service Improvement Group (SEASIG) for Customer Services, which benchmarks and collaborates on customer service provision and methods.

14 Performance and financial management

Brighton & Hove City Council has a performance management regime that is monitored at a corporate level. Highway Maintenance annual performance indicators set by national government, include condition of classified roads (A, B and C roads). Brighton & Hove City Council also undertake condition assessments for unclassified (residential) roads and of pavements, covering one-third of the entire network per year.

These condition indicators provide an assessment of the overall state of the city's street and assist with maintenance planning within available funding. Brighton & Hove City Council is in the higher echelons for proportion of classified roads requiring maintenance.

Local corporate performance indicators are set by the council and include:

- Overall user satisfaction score with highways & transport (against local importance)
- Progress the Local Transport Plan (LTP) & delivery programme to effectively manage, maintain and improve the council's transport infrastructure and highway assets



Performance and financial monitoring within Highway Maintenance includes:

- Percentage of safety inspections completed on schedule
- Percentage of quality checks on contractor works
- Reports on completion of works
- Financial reporting through the highway maintenance database and the authority's financial management system

Medium-term financial plans for highway maintenance are set out in BHCC's Highway Asset Management Strategy but are dependent on annual decisions for revenue and capital funding.

15 Data management and claims systems

Brighton & Hove City Council use a GIS asset management system for collating and analysing information on highway assets. An asset inventory survey of the entire highway network has been undertaken to provide up-to-date information on items such as street furniture.

Highway safety inspections and repairs are managed through a highway database which provides an auditable record of actions taken.

Systems are web-based and are hosted securely, meeting BHCC's IT requirements.

Highways work closely with BHCC's insurance team through the insurance claims system as well as via meetings for specific cases.

16 Sustainability

Brighton & Hove City Council has a Sustainability Action Plan that aims for zero carbon and zero waste, including the use of new technology to maximise reduction of carbon emissions and the promotion of sustainable materials.

Within Highway Maintenance, the following initiatives promote sustainability:

- Use of in-situ infrared pothole repairs which re-use existing road surface materials
- Permanent first-time repairs for safety defects wherever possible to reduce repeat visits to the same location to fix a temporary repair
- Use of sustainable timber resources
- Recycling of planed-off surface materials as carriageway sub-base
- 40% of recycled material in joint and crack sealing treatments
- Reducing flood risk through a risk-based gully cleansing programme, green infrastructure schemes and capital-funded renewal of soakaway infrastructure
- Protection of street trees within the urban street environment wherever possible, and particularly through expanding porous bark-filled tree pits and taking a pragmatic approach to pavement levels around tree root networks

17 Procurement

Brighton & Hove City Council Highways work closely with the corporate Procurement team for the procuring of highway maintenance contracts in accordance with BHCC standing orders. Contracts include the provision of planned highway maintenance schemes and provision of highway safety maintenance, based on New Engineering Contract (NEC) specifications and the provision of winter service weather forecasting, weather stations and gulley cleansing, based on BHCC contract specifications.

Highway maintenance contracts contain a provision for other authorities within the SE7 to utilise BHCC contracts, as do other SE7 local authority highway maintenance contracts.

18 Technology and innovation

As part of the Code of Practice review and arising from customer feedback, Highways delivered handheld devices for Highway Inspectors. Reports of highway safety defects will be digitally referred to inspectors; the devices will be GPS linked so an exact location can be sent to contractors when a repair is identified. The devices also link to a database system that holds information about each highway location in the city. Options for repair and inspection schedules will be location-specific and this IT system and mobile working is being adopted by the safety maintenance contractor in partnership.

Brighton & Hove City Council Highways has also recently undertaken condition surveys of the resilient carriageway network using high-definition imagery and assessment supplied by an award-winning company of highway data and technology provision. This survey provides an overview of network condition graded 1-5 alongside visual imagery that enables more efficient desktop identification of carriageway damage and associated maintenance scheme planning.

Over the longer term, repeating the survey on an annual basis will provide invaluable data for deterioration modelling and investment planning.

19 Heritage and conservation

Wherever possible, highway repairs will be like-for-like and will consider the character of an area.

However, there are exceptions to this. These include:

- Around tree roots where a more flexible material is required if the paving slabs have become trip hazards
- Where there is persistent vehicle overrun causing damage to pavements and a more resistant material is required
- Where the volume and type of traffic may require more durable materials

- Where insufficient budget results in safety requirements taking precedence over choice of materials
- Damage to verges caused by parking or vehicle overrun unless this presents significant safety issues on the carriageway or footway. Verges are not required to be maintained to walking/driving safety standards. The function of a verge in urban areas is to assist with surface water drainage, to provide segregation between vehicular and pedestrian traffic, and to enhance the visual amenity of an area.

20 Highway assets

The council deal with the fabric of the highway, specifically carriageways, footways and cycleways. The Highway Strategy documents refer principally to these assets, as the most heavily-used and critical to the city's social and economic functioning.

The Code of Practice encompasses the entire highway network and therefore teams within the Transport Section of Brighton & Hove City Council work closely together to deliver network management and maintenance. The Transport section has commissioned an inventory survey of all visible highway assets to update the asset register.

Street Lighting: Street Lighting has an ongoing investment to save programme of energy-efficient LED lamps, using a mix of Local Transport Plan funding and capital borrowing to replace end-of-life lighting columns.

Structures: The majority of highway structures are retaining walls and seafront arches. Highway structures receive Local Transport funding, particularly for the reconstruction of the highway arches of Shelter Hall which support the A259 coast road and the rebuilt Shelter Hall above ground which contributes towards economic regeneration of the seafront.

Road markings and signs: Signs, street name plates, road markings and road studs are maintained by the Parking Infrastructure team. There is a programme of annual planned maintenance across the parking schemes within the city. Other maintenance issues are dealt with on ad-hoc basis in response to public reports or as required.

Traffic systems: Investment into traffic systems is being undertaken through the Local Transport Plan funding. This investment seeks to replace end-of-life and outdated traffic controls with new, more responsive equipment, as well as increasing the use of technology to manage traffic flows, such as via bus lane enforcement cameras and variable messaging signs.

Network management: Network management is promoted through Brighton & Hove City Council's permit scheme, which has set fees according to the level of disruption that may be caused by third party roadworks such as those by utility companies. The fees pay for an inspection and enforcement regime which monitors roadworks and penalises poor traffic management and works overruns. The permit team also report utility safety defects to the relevant company for repair.

21 Pathways, rights of way and other non-public highway accessways



Predominately, these assets are funded and maintained by Cityparks (green spaces, bridleways, footways and parks) and Housing (pathways and roads in estates). There are some additional accessways maintained by Estates or by leaseholders of council land.

The Highway Maintenance team assists other council services as requested by providing expertise on maintenance treatments and schemes and qualified contractors to undertake works.

Local Transport Plan funding has been designated in previous years for tracks to and within the South Downs, such as the creation of a new track along The Drove from Woodingdean to Falmer Stadium.