Appendix 2

Brighton & Hove City Council Highway Asset Management Strategy

1. Introduction

1.1 What is the purpose of this document?

1.1.1 Brighton & Hove's Highway Asset Management Strategy sets out how the Council will maintain the City's highway network to ensure that it is safe and reliable now and in the future.

1.1.2 It also sets out how the Council's approach to maintenance will, as far as possible, underpin the Council's wider aspirations for economic growth, social equality, independent living and environmental sustainability.

1.1.3 Crucially, recognising the unprecedented financial challenges faced by all Council services, it considers how the Council can balance these needs within limited budgets.

1.1.4 However, planning for maintenance of highway infrastructure requires a long term view. Decisions made by the Council now will affect the ability of future generations to afford the levels of service that we are able to deliver at the present time. The HAMS therefore clarifies the long term implications of funding strategies for future levels of service.

1.1.5 Overall the purpose of the strategy is also to ensure that the Council can adhere to the principles within the Highway Asset Management Policy.

1.2 What is in this document?

1.2.1 The document acts as a record of the best evidence available at the time to support the Council's decisions.

1.2.2 It clarifies how the Council's maintenance services support wider objectives and draws on evidence of public opinion to inform priorities for expenditure. It also provides technical information on performance trends and forecasts that have been produced to inform the strategy.

1.2.3 At the core of the HAMS is the idea of lifecycle planning. The purpose of lifecycle planning is to identify the mix of treatments that will deliver the Council's objectives for the highway network at the lowest cost over the long term. In turn, lifecycle plans inform the Council's objectives by presenting what can be achieved within the tough financial constraints faced by the Council.

1.2.4 The main body of this document is therefore devoted to lifecycle plans for specific infrastructure types recognising that specific technical considerations will differ between, for example, carriageway surfacing and bridge maintenance.

1.2.5 The Highways Asset Management Strategy is intended to be a 'living' document. The document, or sections within it, will be reviewed or updated at least on an annual basis to

ensure that the Council is able to make strategic responses to new opportunities or risks and that the strategy itself reflects the best evidence available.

1.3 Outline of the document

1.3.1 Sections 2 and 3 outline the high level issues affecting our whole highway infrastructure. Section 2 briefly identifies the links between highway maintenance and wider Council objectives and draws on evidence of the views of Brighton & Hove's residents to inform our priorities for highways maintenance. Section 3 describes the outlook for funding of maintenance. This will include a brief discussion of alternative sources of funding and the contexts in which the Council will consider their use.

1.3.2 Sections 4-10 set out the investment strategies for each key asset group in turn. These are:

Section 4	Carriageway surfaces
Section 5	Footway surfaces
Section 6	Bridges, coastal defences and other structures
Section 7	Highway drainage
Section 8	Street lighting
Section 9	Traffic control systems
Section 10	Street furniture (including safety barriers, signs and bollards)

1.3.3 Section 11 summarises the medium term allocations for each asset type as described in the strategy.

1.3.4 In the current edition only Section 4 on Carriageway surfaces is covered in detail. Further work is required to develop plans for the other asset groups and the timescales for review are set out in each section.

1.3.5 Each investment strategy will cover the following themes:

1. How much asset have we got?
2. What are we trying to achieve and what are the long term demands for the assets?
3. What is our current level of service and is it getting better or worse?
4. How are we managing our assets currently?
5. What do we need to do to maintain the current level of service at the lowest cost?
6. How will the level of service of the asset change in future with currently available funding?
7. What is the best approach to deliver our objectives with available funding options?

1.3.6 Throughout the document colour coding of tables is used to assist with locating key pieces of information:

- Conclusions and summaries are provided in buff coloured boxes.
- Financial information is provided in blue coloured tables
- Red coloured boxes provide action plans and timescales for review and update of information in the corresponding section
- All other types of information are contained in green tables

2 What are we trying to achieve from our highway network?

2.1 Council objectives for the City's transport system

2.1.1 Highway maintenance underpins the Council's objectives for a sustainable transport system in the City. Table 2.1 below shows the links between highway maintenance and the objectives in the Brighton & Hove Local Transport Plan. These links provide a guide to enable the Council to prioritise maintenance expenditure within limited budgets.

Table 2.1 The contribution of highway maintenance to wider Council transport objectives

Objective	How does maintenance contribute?
Road safety	The core aim of the HAMS is to ensure the safety of road users and people who live and work adjacent to the highway. This drives the prioritisation of maintenance operations within limited budgets.
Resilience	Preventative and routine maintenance are fundamental to the resilience of the City's economy and communities particularly in the face of the growing risk of extreme weather events with climate change. The costs of routine maintenance of highway drainage are far outweighed by the social, economic and environmental costs of traffic disruption and flooding to properties if they are not maintained.
Sustainable economic growth	Market forecasts indicate that the highway network will continue to be the predominant means by which people travel even as we move towards a carbon free economy beyond 2050. Therefore long term decisions on maintenance investment are vital for the sustainability of the economy of the city and the region.
Equality of opportunity	Well-maintained pavements are vital for enabling people with mobility impairments to continue to live independently and poor condition of pavements can be a material issue for many people when considering how or if they can access a shop or service.
Promoting sustainable transport modes	Highway maintenance directly affects levels of cycling and walking. Evidence from surveys suggest that poor condition of roads is one of the primary factors that can deter people from actually choosing to cycle and that this factor is at least as significant as the positive effect of new cycling infrastructure.

2.1.2 Individual asset investment strategies in sections 4-10 will identify specific prioritisation objectives for different asset types and demonstrate how they will contribute to the Council's wider objectives above.

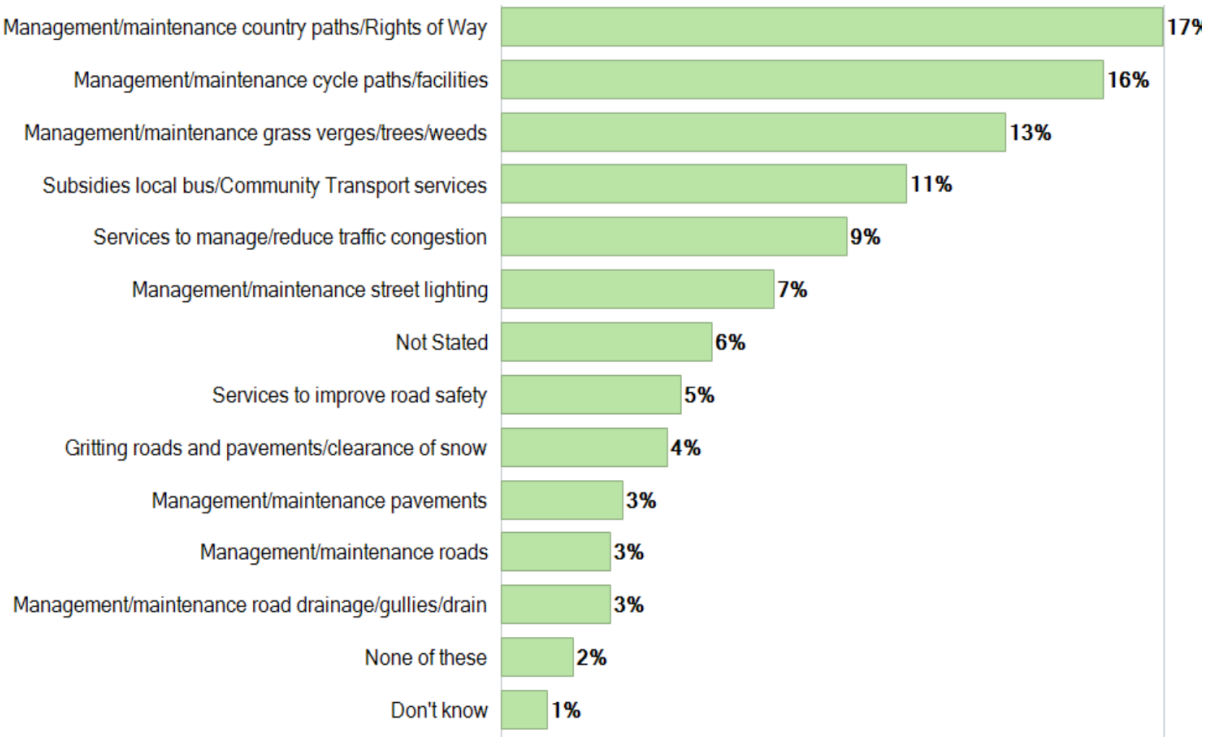
2.2 What do Brighton & Hove's residents say?

2.2.1 Since 2011 the Council has participated annually in the National Highways and Transport Survey (NHT) which is a public survey of satisfaction with highways and transport services specific to the Council's highway network. The latest available data comes from the 2015 survey.

2.2.2 Compared to the national picture, Brighton & Hove's residents express higher than average satisfaction with the condition of highways. However, there were many more respondents that believe that the condition of highways has got worse between 2014 and 2015 (35%) than those that believe that it has improved (9%).

2.2.3 It is clear from the NHT surveys that people in Brighton & Hove regard highways maintenance as one of the most important transport issues in the City alongside road safety and local bus services. In particular, the survey revealed that residents in Brighton & Hove believe that maintenance of highways should be the highest priority when protecting Council budgets within transport and highways services. Figure 2.2 compares the percentage of respondents that believe it is acceptable to reduce budgets for each aspect of the Council's highway and transport service.

Figure 2.2 Percentage of NHT survey respondents in Brighton & Hove that believe it is acceptable to reduce budgets for each aspect of the Council's highway and transport service



1.2.4 Only 3% of respondents believed that it is acceptable to reduce funding for roads, drainage and pavement maintenance which was the lowest level across all Council transport and highways services. This compared to 9% for services to reduce congestion and 11% for local bus subsidies.

Conclusions

With future updates to the HAMS the Council will draw on available evidence to quantify wider economic and social impacts of highway maintenance in order to identify where improvements in levels of service may be desirable or conversely if lower levels of service are acceptable in some cases.

In view of the evidence of the views of Brighton & Hove's residents in the NHT survey the Council will aim to prioritise transport budgets to minimise any decline in the condition of the highway network as a whole recognising the overall pressure on Council's budgets.

3. Funding of maintenance

3.1 Capital funding

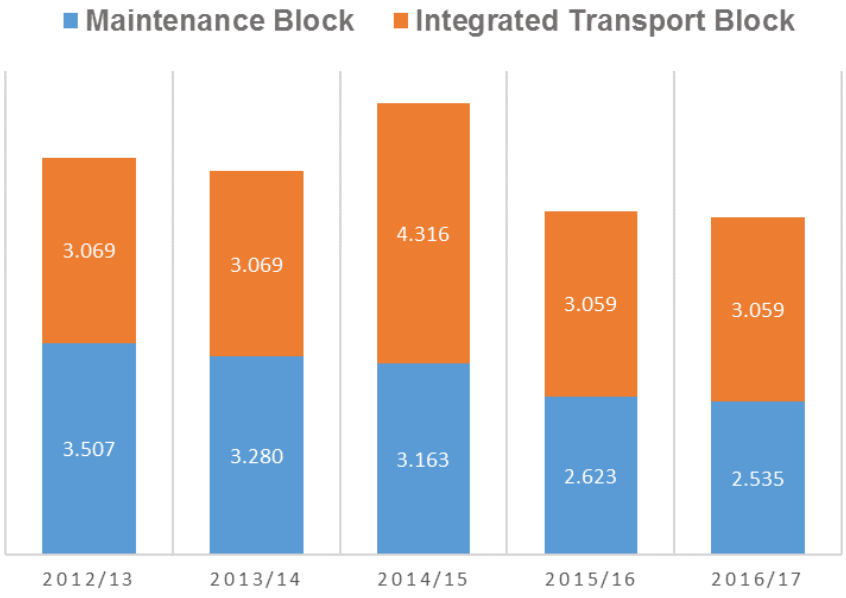
3.1.1 Capital funding can be used for maintenance operations that either restore the functioning of an asset – for example road resurfacing – or prolong the life of an asset in its current state – for example renewal of bridge deck waterproofing. Further details on how these are defined for individual asset types are provided in Sections 4-10.

3.1.2 Funding for the Council's capital expenditure for Local Transport Plan initiatives comes primarily from central Government grants. This funding comes in two blocks, one for maintenance of all highway assets and one for transport improvements (referred to as Integrated Transport Block). Funding is quoted separately in these two blocks because the Department for Transport uses separate formulae to calculate these amounts. However, there is no requirement for the Council to allocate funding according to these definitions and it is for the Council to decide how this should be spent according to its priorities.

3.1.3 In recent years the Council has used only the maintenance block and other supplementary grants for maintenance, although occasional schemes within the Integrated Transport Block have also included resurfacing of an existing carriageway or footway. For 2016/17, the Council allocated a slightly greater proportion of the overall fund to maintenance compared to transport improvements.

3.1.4 Since 2012/13 the amount of maintenance capital funding that the Council has received from DfT has reduced by nearly £1M as Figure 3.1 below shows.

Figure 3.1: Capital allocations under maintenance (blue) and Integrated Transport (orange) since 2012/13



3.1.5 Table 2.1 on the following page shows the central Government funding that the Council will receive for the next 5 years.

3.1.6 The Department of Transport has also introduced an incentive mechanism to encourage sustainable asset management and efficiency in highways services. The Council undertakes an

annual self-assessment of its performance through which it is allocated to an incentive band. Band 3 Councils will continue to receive the highest level of grant funding available whilst grants to Band 1 and Band 2 Councils will gradually reduce over the next 5 years. The bottom three rows of Table 2.1 show these three scenarios. It is anticipated that the Council will achieve Band 2 status in 2017/18.

3.1.7 For 2016/17 and 2017/18 the Council will receive a grant specifically for the Shelter Hall reconstruction scheme following a successful bid for the Department for Transport's Challenge Fund.

Table 2.1 Capital funding for Local Transport Plan initiatives (£M)

	2016/17	2017/18	2018/19	2019/20	2020/21
Integrated Transport Block	£ 3.059	£ 3.059	£ 3.059	£ 3.059	£ 3.059
Maintenance Block	£ 2.404	£ 2.332	£ 2.110	£ 2.110	£ 2.110
Challenge Fund (Shelter Hall scheme)	£ 3.817	£ 3.425			
Total	**£ 9.280**	**£ 8.816**	**£ 5.169**	**£ 5.169**	**£ 5.169**
Plus one of the incentive payments below dependent on Council performance					
Band 1 incentive	£ 0.131	£ 0.131	£ 0.132	£ 0.044	£ -
Band 2 incentive	£ 0.146	£ 0.196	£ 0.308	£ 0.220	£ 0.132
Band 3 incentive	£ 0.146	£ 0.218	£ 0.440	£ 0.440	£ 0.440

3.2 Revenue funding

3.2.1 Council revenue is funded through Council tax, business rates and central Government grants. Revenue spending for highways services covers reactive and emergency repairs to highway infrastructure as well as street lighting energy costs, premises and depot costs, staff and salaries, repayments on borrowing and also payments against third party claims.

More specifically, revenue budgets also cover safety inspections which are vital to the Council's management of risk and defence against third party claims.

3.2.2 As with all local authorities, due to reductions in Government grants, the Council's budgets are under pressure. Brighton & Hove City Council has committed to reduced revenue expenditure within the highway preventative and safety maintenance budgets. These two budgets fund repair or renewal of essential highway infrastructure including roads, pavements, safety barriers, drainage, skid resistance, guard rails, bollards, ironwork and other types of essential street furniture.

3.3 Other funding sources

3.3.1 Developer contributions

3.3.1.1 The Council is able to fund infrastructure improvements associated with developments using Section 106 agreements with developers.

3.3.1.2 There is very limited scope to use Section 106 agreements for capital maintenance projects unless the infrastructure requires redesign to support increased traffic or traffic loading to a new development site. An example would be strengthening of a bridge to allow HGV traffic to enter a site. For this reason Section 106 agreements are not considered further at a strategic level for long term maintenance funding.

3.3.2 Local Growth Funding

3.3.2.1 The Coast 2 Capital Local Transport Body has devolved powers to manage major investments in transport infrastructure in the region through the Local Growth Fund. There are opportunities for the Council to develop business cases for funding of major maintenance on corridors identified by the LTB as critical to the economic prospects for the region. These include routes such as the A23, A270, A259 and other routes connecting to major development areas such as the Seafront, Valley Gardens and the New England Quarter.

3.3.2.2 However, such investments are 'one-off' and can only deliver value for money if they are underpinned by an on-going commitment to funding that will sustain the infrastructure in its improved state. If this commitment cannot be made then large scale investments may increase the risk of a future 'shock wave' of maintenance liability for future generations.

3.3.3 Prudential Borrowing

3.3.3.1 Councils are able to access financing of investments in infrastructure from the Public Works Loan Board (PWLB) where it is demonstrated that the investments provide greater benefits to the economy than the cost of repayments. It also must be demonstrated that the Council can afford the repayments. A business case is currently being considered by the Council for investment in replacement of street lighting lanterns with LED which will provide substantial savings in energy costs and wider environmental benefits.

3.3.3.2 Given the unprecedented financial challenges faced by the Council, further consideration of this option requires us to identify where investments could quickly release pressure on revenue budgets for a sustained period. Financing options are discussed further in relation to individual asset types in sections 3-8.

Conclusions

Funding for planned highway maintenance has reduced significantly since 2011/12. Individual lifecycle plans in Sections 4-10 will identify the extent to which these reductions present threats to the sustainability of the City infrastructure.

There are alternative sources of funding that are appropriate for large scale infrastructure renewals where they will achieve specific economic objectives. However, these cannot replace the need for continued annual maintenance programmes to sustain the condition of the network as a whole.

4. Carriageway Surfacing Investment Strategy

4.1 How much carriageway asset do we have?

4.1.1 Brighton & Hove City Council is responsible for managing 624km of roads. Table 4.1 below summarises the length of roads in each road class:

Table 4.1 Road lengths in Brighton & Hove

Road class	Length
A Class Roads	59.6 km
B Class Roads	22.9 km
C Class Roads (Minor Roads)	46 km
Unclassified (Local) Roads	495.9 km
Total	**624.4 km**

4.1.2 Brighton & Hove is a busy, compact city with extensive bus routes. This means that some B and C roads are as heavily trafficked as our A roads. It also means that many of our local roads carry heavier bus traffic than equivalent roads in other Local Authority areas.

4.1.3 In terms of quantity, carriageway surfaces are the largest physical asset managed by the Council, and therefore have the highest value of all the assets. For this reason changes in the condition of carriageway surfaces across the network can lead to significant and long term financial consequences for the Council.

4.2 What do we need to achieve from our carriageway surfaces?

4.2.1 Road safety

4.2.1.1 There is no legal standard for the physical condition of carriageways with which Local Authorities in England must comply. The Council, as with all English Highway Authorities, must balance expenditure on carriageway maintenance with other vital Council services. This involves understanding the risks that deterioration in carriageway condition poses to road users and residents in different circumstances.

4.2.1.2 A new national Code of Practice emphasises that Highway Authorities should adopt a formal process for assessing and responding to risk through planned and reactive maintenance. The Council has updated its policies for highway inspection and repair and management of skidding risk which provide the technical detail of the Council's risk assessment and response policies.

4.2.1.3 Brighton & Hove has amongst the lowest road accident rates per capita in England and annual accident rates have continued to decline over recent years.

4.2.1.4 In order to sustain this low level with limited budgets we will use a comprehensive asset risk register that will enable us to prioritise reactive and planned maintenance where road users are likely to be more vulnerable to safety defects, such as at busy junctions with high levels of HGV traffic.

4.2.2 Resilience

4.2.2.1 The Council has undertaken a detailed study of the entire road network to identify routes that are most critical to the well-being and economic resilience of the City. This is referred to as the Resilient Network and includes important routes for emergency services, routes that carry high volumes of traffic and buses and also those where the condition of the road and associated infrastructure can have a major impact on residents and business in the vicinity.

4.2.2.2 Of the routes identified within the Resilient Network the condition of carriageway surfaces is most likely to affect the reliability of those that carry the highest levels of traffic and in particular HGVs and buses on the A, B and C roads.

Carriageway surfaces: Resilience objective

Our objective is to minimise the risk of sudden failures that lead to disruption to traffic on the A, B and C roads identified within the Resilient Network. In order to achieve this the Council will prioritise the use of budgets for planned maintenance on these roads with a focus on resurfacing of whole sections to reduce variability in condition and improve long term reliability for road users.

4.2.3 Sustainable economic growth

4.2.3.1 The Coast 2 Capital Local Enterprise Partnership, which has been established to promote economic growth in the wider region, has identified key development areas within Brighton & Hove that are vital to growth across the region, namely:

4.2.3.2 In support of these proposals the Council's Local Transport Plan emphasises the importance of promoting sustainable transport options along routes to these areas including cycling.

4.2.3.3 Major routes linking these areas include the A23, A259 and A270 as well as other roads that currently carry less traffic but that will experience greater levels of construction traffic in particular as a result of development proposals in these areas.

Carriageway surfaces: Sustainable economic growth objective

The objective for routes supporting the strategic development areas is to ensure a high standard of ride quality for road users. On routes with high numbers of HGVs and buses the use of localised patch repairs results in poor ride quality and rapid deterioration of the surface of the road and so a greater emphasis on resurfacing of complete sections of road on these routes is needed in order to achieve this.

4.2.4 Promoting sustainable transport modes

4.2.4.1 Two key objectives of the Local Transport Plan are to reduce carbon emissions from transport and also to promote healthier lifestyles by increasing levels of active travel. Promotion of cycling is a key element in achieving both of these objectives.

4.2.4.2 Recent studies of travel choice highlight the quality of road surfaces as one of the most significant factors in deterring or encouraging people to cycle particularly where off road routes are not available.

Carriageway surfaces: Sustainable transport objective

To seek to maintain and improve ride quality on roads that have high levels of cycling and

those identified as gaps within the cycle network (such as Old Shoreham Road and Marine Parade). On routes with high traffic volumes the focus will be on treatment of whole sections to obtain an even ride quality.

On local routes with high cycle flows this can be achieved by the use of larger scale patching in preference to localised pothole repairs where large numbers of defects or utility reinstatements affect the line of travel of cyclists.

4.3 What is the long term demand for our carriageways?

4.3.1 Decisions that the Council takes now will affect the performance of our carriageway surfaces for 30 or 40 years into the future.

4.3.2 In that time vehicle technology and travel behaviour will certainly change, although it is difficult to predict exactly how.

4.3.3 A major focus of research and development and Government transport strategy is on the use of intelligent transport systems and artificial intelligence to make more efficient use of road space than humans are currently able to do, through driverless car technology and vehicle platoons. Platooning technology in particular will enable an increase in the density of traffic on key routes with implications for increasing the rate of deterioration of the carriageway surface and structure.

4.3.4 Given this focus it is highly likely that carriageways will continue to be the primary means for getting around in Brighton & Hove for at least the life span of most resurfacing schemes carried out in the next 5-10 years. It is therefore crucial to continue to evaluate the long term sustainability of investment options for carriageways although this also means adopting a proactive approach to the uptake of innovative new methods and materials that will enable us to meet long term demands at lower cost and lower environmental impact.

4.4 What is the current level of service and is it getting better or worse?

4.4.1 How do we measure the level of service for carriageways?

4.4.1.1 The Council measures the level of service of our roads differently for different classes.

4.4.1.2 For A, B and C Roads (collectively referred to as the major roads) the Council uses a machine survey called Scanner to measure surface condition. Table 4.4.1 below summarises the aspects of the road surface condition that the Scanner survey measures.

4.4.1.3 These four measures are combined to provide an overall score of road condition. Any sections of road with a score greater than 100 are defined as being in poor condition. The level of service is then measured as the percentage of the length of roads in poor condition. The Council reports these separately for A roads and then for B and C roads together.

Table 4.4.1 Measures of road condition for the major roads

Condition measure	Why do we measure it?
Ride quality	Ride quality is a key aspect affecting the road user perception of the quality of the road.
Surface	This provides us with an indirect measure of the level of friction on the

texture depth	surface to prevent the risk of skidding
Cracking	The amount of cracking on the road tells us how likely the road is to deteriorate in condition in the short and medium term. The presence of cracking may indicate structural failures.
Rutting	Rutting is deformation or subsidence of the road surface in the wheel track. In extreme cases rutting can present a hazard to traffic and cyclists particularly when making turning movements at junctions

4.4.1.4 For unclassified (local) roads the Council uses a visual assessment method referred to as Coarse Visual Inspection (CVI) which is carried out from a moving vehicle. This provides information on different types of defect present and their extent. The Council surveys one quarter of the unclassified roads each year.

4.4.1.5 These defects are then weighted according to their importance and combined to provide overall scores for the condition of the surface and the structure of the road. Sections of road with a surface condition score of greater than 60 or a structural condition score of greater than 85 are defined as being in poor condition. As with the major roads, the Council reports the level of service as the percentage of the length of roads in poor condition.

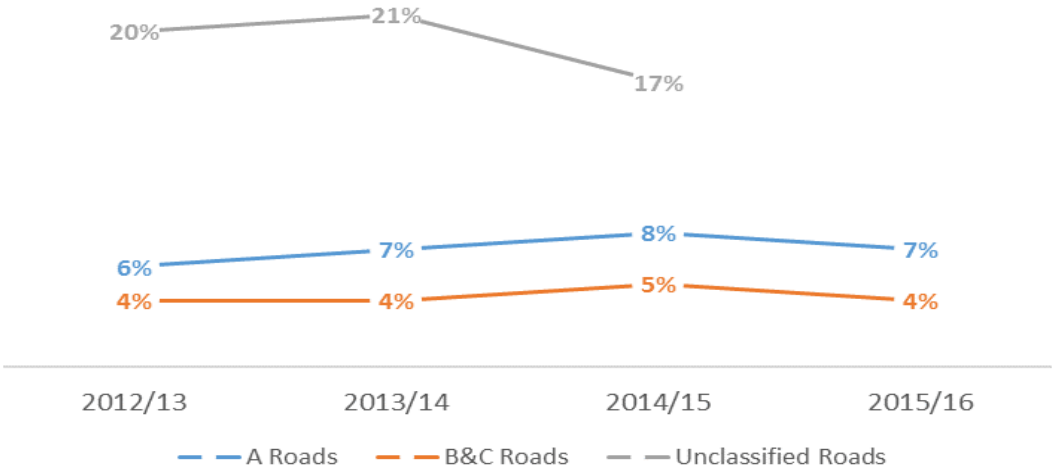
4.4.2 Condition trends

4.4.2.1 Figure 4.4.2 shows the recent trends in the level of service for A roads, B and C roads and unclassified roads.

4.4.2.2 Due to the nature of the surveys, within a relatively short period of assessment it is difficult to draw definite conclusions about the changes in the condition of A, B and C roads as many of the in-year changes are within typical margins of error for Scanner surveys (1.5%) although there appears to be worsening trend in the condition of A Roads since 2012.

4.4.2.3 Likewise, for the Unclassified road condition it is not possible to draw a firm conclusion about the trend from the available data in spite of the apparent 4% reduction from 2013/14 to 2014/15. Any actual improvements in condition must happen as a result of works undertaken by the Council either through resurfacing or, less so, by smaller pothole repairs. Within the period from 2012-2014 the Council resurfaced 0.6% of unclassified roads and therefore most of the 4% reduction in the indicator will have occurred as a result of the 4 year cycle over which surveys are carried out and other variations in assessment that are unavoidable within the survey methodology.

Figure 4.4.2 Trend in condition of roads in Brighton & Hove since 2012: percentage of roads requiring structural maintenance



4.5 What maintenance operations do we carry out and what do they achieve?

4.5.1 How much do we spend on carriageways maintenance?

4.5.1.1 Table 4.5.1.1 below shows the allocations of capital funding for carriageway surface maintenance since 2014/15 including other supplementary grants.

Table 4.5.1 Capital budgets for carriageway maintenance since 2014/15

Financial Year	2014/15	2015/16	2016/17
LTP Capital Allocation	£1.176M	£0.800M	£1.000M
Additional Highways Grant	£0.325M		
Pothole Repair Fund	£0.231M	£0.093M	
Severe weather recovery	£0.108M		
Total	**£1.840M**	**£0.893**	**£1.000**

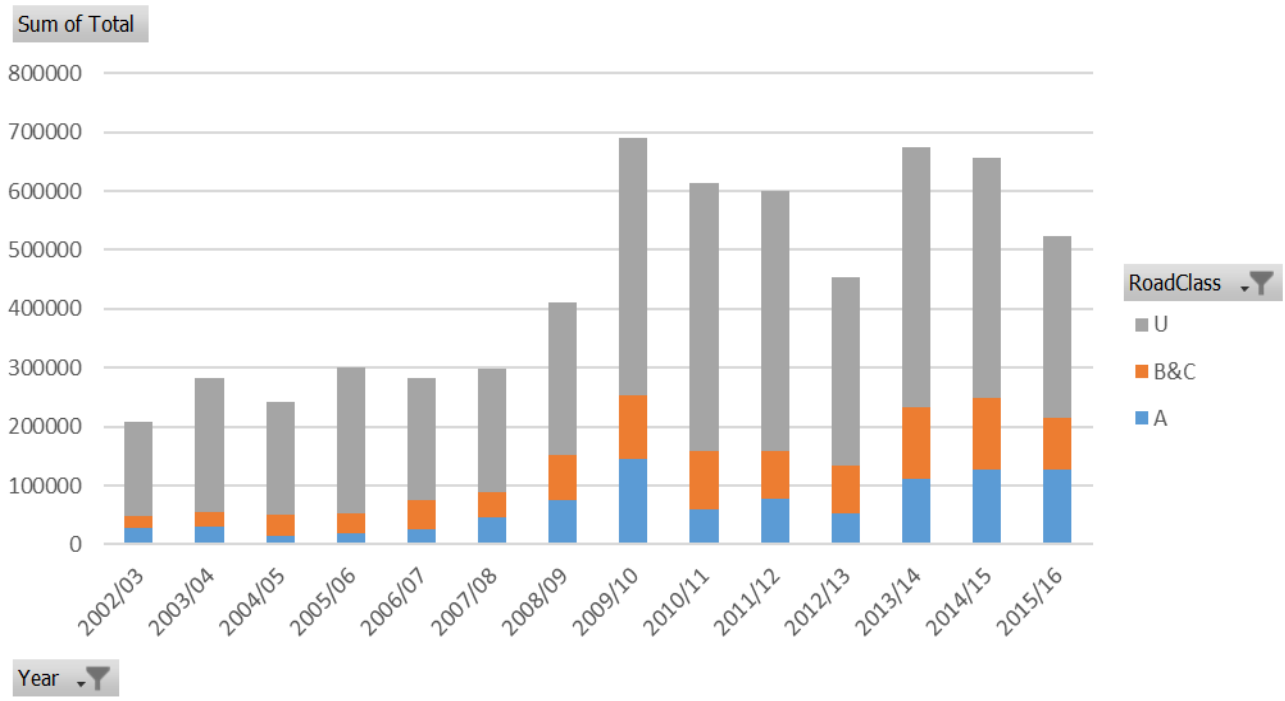
4.5.1.2 Since 2010/11 the Council has received a number of supplementary capital grants from Government to repair damage caused by extreme weather including the episodes of prolonged snow and ice cover in the winters of 2009/10 and 2010/11. However, during the same period the maintenance block capital allocation from central Government has reduced significantly (see Section 3.1 above).

4.5.1.3 In addition to capital spend the Council also uses £0.250 M of revenue for planned patching and crack sealing (see Section 4.5.4 and 4.5.5 below) and £0.050 M for planned treatments to improve surface friction at high risk sites.

4.5.1.4 Until 2011/12 the Council used an additional revenue fund for preventative microasphalt treatments (see below). However, this ceased in 2012/13 with the reduction in revenue funds and staffing resource.

4.5.1.5 The Council also uses revenue funds for unplanned reactive repairs, for example, repairs to potholes and damage around manhole covers. Figure 4.5.1 below shows the annual expenditure on carriageway repairs since 2002/03. This shows a significant increase in the annual expenditure on safety repairs over this period. This increase has in part resulted from the damage caused by extreme winter weather episodes, notably over the period 2009/10-2011/12 with prolonged snow and ice cover and frost damage and again in 2013/14 with the worst winter storms on record. These explain some of the peaks in expenditure over the period. However, setting those peak episodes aside it is clear that there is an underlying and more systematic increase in expenditure which is far over the typical rate of inflation for that period and points to a continued deterioration in the condition of the road network.

Figure 4.5.1 Expenditure on reactive repairs to carriageway surfaces by road class



4.5.2 Plane and resurface

4.5.2.1 This involves replacement of the road surface to varying depths dependent on the extent of deep structural failure in the road. As such this is regarded as a 'Renewal' operation which restores both safety and ride quality of the road and marks the start of the road lifecycle for our purposes.

4.5.2.2 In Brighton & Hove as in most local authorities it is rare to ever fully reconstruct whole sections of road and more often deeper structural failures are dealt with through patching of the lower layers. The relative amounts of deep structural repair required as part of resurfacing has a significant impact on the cost of a scheme.

4.5.2.3 Since 2012, Brighton & Hove Council has used capital funding exclusively for resurfacing. This has been focused towards major routes such as the A259 where there have been significant structural failures.

4.5.2.4 Typical costs of resurfacing range between £25-£45 per square metre. Additional costs within Brighton & Hove City Council include extensive traffic management and costs to meet Permit Scheme requirements. With capital spend on carriageways limited to £1M in 2014/15 and £0.8M in 2015/16 the Council has been able to undertake an average of 35,000 square metres of resurfacing each year which is equivalent to 0.76% of the road network in Brighton & Hove.

4.5.2.5 In order to clarify the implications of continuing this level of output Table 4.5.2 below shows the average percentage of Brighton & Hove's network that is resurfaced annually on each road class since 2014/15 and from infers how long it would take to resurface the whole network at current rates.

Table 4.5.2 Amount of resurfacing carried out each year (2 year average) and length of time that it will take to resurface the full network at current rates.

Road class	Average amount of resurfacing annually (square metres)	Percentage of the network resurfaced annually	The length of time it will take to resurface the whole network
A Roads	10,899	1.90%	53 years
B Roads	6,931	3.28%	31 years
C Roads	5,658	1.54%	65 years
Unclassified Roads	11,939	0.35%	285 years

4.5.2.6 The figures in Table 4.5.2 are cause for concern, in particular for the unclassified roads where the length of time between consecutive resurfacing at current rates would be 285 years. It is therefore imperative that the Council considers alternative options for the lifecycle management of our carriageway surfaces.

4.5.3 Preventative surface treatments

4.5.3.1 Surface treatments are designed to seal the surface of the road and prevent rapid deterioration from water and frost damage.

4.5.3.2 Typically surface treatments on their own do not restore the strength of the road structure but rather they preserve it. However, in practice surface treatments are combined with preparatory patching works that restore strength in localised areas and in some cases the addition of reinforcing membranes do greatly improve the resistance of the road surface to damage from traffic.

4.5.3.3 One particular type of surface treatment is Microasphalt which is which is usually laid on top of the existing surface to approximately 15mm depth. The Council had undertaken programmes of Microasphalt treatments every year using revenue funding until 2011/12. Thereafter, no further treatments have been applied in the period between 2012 and 2016 due to reduction in resources.

4.5.3.4 From the lifecycle planning perspective Microasphalt has a number of additional benefits to the above:

1. Microasphalt typically costs between £6-£12 per square metre (plus traffic management costs) which is significantly cheaper than resurfacing which is typically between £25-£45 per square metre.

2. Microasphalt can be used to improve the ride quality of a road in some cases by filling small dips and ruts in the road
3. Microasphalt schemes cause far less disruption to traffic than resurfacing schemes and the road can be open to traffic within an hour of completion.
4. Microasphalt is a cold mix and so consumes less energy than conventional resurfacing methods using hot mix materials. This makes Microasphalt an important option for reducing the lifecycle carbon emissions from road maintenance.

4.5.3.5 Therefore Microasphalt is now considered as an important option for use on Brighton & Hove's residential roads and B roads (away from junctions) where the level of deterioration is moderate. It is not considered as an option for A Roads or busy junctions as it is not able to withstand heavy traffic.

4.5.3.6 As a whole surface treatments can be used to improve the condition of the road from a user perspective. This fact combined with the significant life of the treatment (which may achieve the same life as a fully resurfaced road on residential roads) means that they are eligible as capital funded schemes.

4.5.4 Planned patching

4.5.4.1 This category covers any repairs to localised areas where the road has significant deterioration and poor ride quality.

4.5.4.2 These are different from normal reactive pothole repairs because they are not focused on just treating potholes that are reported as safety defects but also deal with surrounding defects that are not yet at the safety defect threshold. They also differ from typical reactive repairs in that the edges of patches are usually saw-cut and sealed and the patches are fully compacted. This enables the repair to last for many years. As such they are eligible as capital funded schemes.

4.5.4.3 Although planned patching can, in many cases, be a cost effective approach to addressing surface damage, continued patching to the same stretch of road over a number of years can result in poor ride quality, particularly on A and B roads where the impact of heavy traffic on uneven surfaces can lead to more rapid deterioration over time. For this reason planned patching can only have limited use within the lifecycle on these roads. Ultimately the full functionality of a major road can only be restored through resurfacing of whole sections.

4.5.5 Joint and crack sealing and mastic asphalt repairs

4.5.5.1 The Council allocates £0.250M annually to undertake joint sealing and mastic asphalt repairs using revenue funds.

4.5.5.3 The Council carries out an annual planned programme of sealing of joints and cracks in concrete bays which is a highly cost effective way to prolong the life of concrete roads in the Borough.

4.5.5.4 Alongside the crack repair programme the Council also carries out repairs to damaged surfaces, in particular, around manhole covers and gullies using a material known as Mastic Asphalt. Mastic asphalt is primarily made of bitumen mixed with sand and crushed limestone. Chippings are applied to the surface to ensure that the road has enough friction for vehicles passing over it.

4.5.5.5 A particular benefit of mastic asphalt is that it is a quick repair so there is minimal disruption to traffic. It is also does not require compaction and bonds well with the surrounding surface. For this reason mastic asphalt repairs can last for many years.

4.5.5.6 The mastic asphalt programme is used to tackle roads where large numbers of defects have been identified in a localised area and enable the Council to undertake permanent repairs to the whole area through a planned approach.

4.5.6 Reactive repairs

4.5.6.1 Reactive repairs are an inevitable part of the road lifecycle. These repairs are typically restricted to defects such as potholes, dips and sunken ironwork that are raised by safety inspectors. They do not treat the area surrounding the defect where there may be general deterioration or risk factors that may give rise to safety defects in future (for example utility reinstatements).

4.5.6.2 Across the network, analysis of reactive repairs shows that the Council makes very effective use of limited revenue funds and there are very few roads where the Council is consistently needing to make repeat visits to the same site. This is achieved primarily by carrying out permanent repairs where ever possible, for example by using in-situ infra-red pothole repair methods. As a result, on average the Council spends approximately 11p per square metre of carriageway per year on reactive repairs and less than 0.3% of the network (by area) incurs costs of greater than £1 per square metre per year.

4.5.6.3 Therefore, permanent reactive repairs will still continue to provide a cost effective means of addressing immediate safety risks on the network. However, continued use of safety repairs will cause significant problems for ride quality and eventually the carriageway surface will be weakened by frequent joints between patches. For this reason, resurfacing or surface treatments such as Microasphalt are eventually required.

4.5.6.4 In order to understand at what point larger scale treatments are required the Council has used a lifecycle model to test alternative long term scenarios as described below.

4.5.7 How do we estimate long term maintenance needs?

4.5.7.1 The Council has used a lifecycle model that predicts the change in condition of different types of carriageway surfaces following specific treatments such as resurfacing, microasphalt or patching. Within the model the pattern and rate of change in condition depends on the type of treatment used and the type of road.

4.5.7.2 Rates of change in condition can vary considerably even with similar types of road, and sometimes deterioration can happen very suddenly (for example as a result of prolonged frost or snow cover). The model therefore describes patterns of deterioration in terms of the likelihood that a road will change to a particular condition.

4.5.7.3 The Council will undertake further analysis of its historical condition data to ensure that the model closely reflects local patterns of deterioration and maintenance policies. However, for this edition the Council has applied deterioration rates derived from a study for Southend-on-Sea (with kind permission of Southend-on-Sea Borough Council). Owing to the similarity in a number of aspects, such as the climate and also the large proportion of concrete or composite roads found in Southend, these deterioration rates provide a useful basis to provide high level forecasts of future maintenance requirements for Brighton & Hove's road network.

4.5.7.4 The model uses a set of rules to determine when a treatment can be applied and in what order of priority. It then applies treatments in priority order until either the annual budget

is used up or until a specified service level is achieved. Therefore options can be defined in terms of specific service level targets, budget availability over a 40 year period and how much of each treatment can be applied on which types of road, when they can be applied and in what order of priority.

4.5.7.5 In order to help with identification of different options tested they are grouped as follows:

Option set	Option abbreviation
Maintain current level of service	S
Continue with current funding (Business as Usual)	BAU
Increase funding to carriageways	IF

4.6 What do we need to do to maintain the current level of service at the lowest cost?

4.6.1 How do we predict what is required to maintain the current level of service?

4.6.1.1 In order to estimate the amount of funding required to sustain the current level of service the model is used to produce a 40 year forecast of funding requirements assuming that there are no limits to the budget available to achieve this.

4.6.1.2 However, there are a number of different options for the use of treatments (described in section 3.6) that will enable the current service level to be sustained and so alternative scenarios are tested with different treatment mixes to identify the lowest cost method.

4.6.2 What are the options for maintaining the current level of service?

4.6.2.1 The options tested are:

Option	Strategy
Option S1	Use resurfacing only (with reconstruction of lower layers as required)
Option S2	Use resurfacing and planned patching
Option S3	Use resurfacing with planned patching and Microasphalt on B&C Roads (away from busy junctions) and Unclassified Roads
Option S4	As with Option S3 except on Unclassified roads where Microasphalt and planned patching are used on roads with more than 20% in poor condition and resurfacing of whole sections is only undertaken when the road has reached substantial structural failure to over 40% of its extent

4.6.2.2 Table 4.6.2 provides a comparison of the average annual costs of these options over a 40 year period.

Table 4.6.2 Comparison of lifecycle options to maintain the current level of service over 40 years (£M)

Lifecycle option	Option S1	Option S2	Option S3	Option S4
Average annual expenditure	£ 3.766	£ 3.509	£ 3.251	£ 2.739
Present Value of Costs	£ 79.340	£ 74.875	£ 70.181	£ 62.219

4.6.2.3 Table 4.6.2 shows that Option S4 is the lowest cost option to maintain the carriageway network at the current level of service with an average annual spend of £2.7M. This would include an average annual spend on Microasphalt of £0.638M.

4.6.2.4 By comparison, if the Council were to attempt to maintain the current level of service using only resurfacing as in Option S1, this would require an annual expenditure of £3.8M.

4.6.2.5 As shown in Section 4.5.1 the Council currently allocates £1.0M of capital each year for carriageways which is used solely for resurfacing. If the Council were to attempt to maintain the current level of service using only resurfacing then it would require £3.8M per annum with an annual shortfall of £2.8M.

4.6.2.6 By comparison, in Option S4, if the Council included an annual average of £0.6M for Microasphalt treatments the overall requirement for capital maintenance to maintain the current level of service would reduce to an average of £2.7M per annum with an annual shortfall of £1.7M. This reduction is achieved in part by using microasphalt to reduce the overall rate of deterioration although on other local roads the extent of repairs would be limited to localised patching rather than full resurfacing.

4.6.3 What is the value of investment in microasphalt?

4.6.3.1 Table 4.6.2 also provides a measure using an economic concept referred to as Present Value of Costs. The Present Value is a measure of the value now of a cost incurred by the Council at some point in the future. In practical terms it is calculated by applying a discount rate which is compounded year on year, effectively acting in the opposite way to an interest rate.

4.6.3.2 The calculation of the total Present Value of Costs over the 40 year period is intended to ensure that changes in cost a long way into the future do not unduly influence the decision to invest now.

4.6.3.3 As Table 4.6.2 shows the use of Microasphalt and planned patching in Option S4 reduces the total Present Value of Costs of managing the current level of service by £17M compared with Option S1.

4.6.3.4 Comparison of Option S4 and Option S2 demonstrates that every £1 spent on microasphalt will yield a saving to the Council of £2 in resurfacing and patching costs (again in Present Value terms).

4.7 How will the level of service of the asset change in future with currently available funding?

4.7.1 In this section and Section 4.8 there will be a number of charts showing long term projections of changes in the percentage of roads in poor condition, which are outputs from the lifecycle model. Small fluctuations in the projections may be as a result of inaccuracies in the estimation of the age of roads where this information is not available and so for the purposes of the strategy these charts are interpreted at a high level.

4.7.2 This section presents the findings of scenarios tested with the assumption that capital funding continues at the current level of £1M each year. In addition the £0.250M of revenue funding for planned highway maintenance is also included in the assessment. This allocation is assumed to be fixed until 2020/21 and thereafter it is linked to a 2.5% inflation rate.

4.7.3 Given the high value for money of introducing microasphalt it is assumed that this will be included in the capital programme from 2017/18 onwards in order to minimise any loss of service level.

4.7.4 Two alternative approaches are considered for managing the network with current budgets:

Option ref	Strategy
Option BAU1	Prioritise routes by levels of traffic such that requirements on A roads are met first, then B & C roads and unclassified roads receive the lowest priority
Option BAU2	Set aside a proportion of available capital for the unclassified roads to treat up to 5% of the outstanding backlog and allocate the rest to A, B and C roads.

4.7.5 Figure 4.7.1 below shows the change in the percentage of each road class in poor condition under Option BAU1.

4.7.6 Figure 4.7.1 shows that the Council may be able to limit severe decline in the condition of on the major road network for a further 15 years if all of the available capital is spent on these roads. However, in achieving that there would be no further funds available for capital maintenance on the unclassified roads and as a result the percentage of unclassified roads in poor condition would double by 2030/31.

4.7.7 Figure 4.7.2 presents the change in condition with Option BAU2. Option BAU2 would involve an average spend of £0.550M on the major roads and £0.700M on the unclassified roads. As Figure 4.7.2 shows, the diversion of capital money to the unclassified roads would significantly reduce the rate of decline on the unclassified roads but with a severe long term decline in the condition of the major roads (A, B and C roads).

4.7.8 However, the decline in condition of major roads would be gradual over the next 5-8 years and would be contained at or below 10% until 2024/25.

Figure 4.7.1 Option BAU1 change in condition with current budgets with all funding focused to classified roads (unplanned patching on unclassified roads)

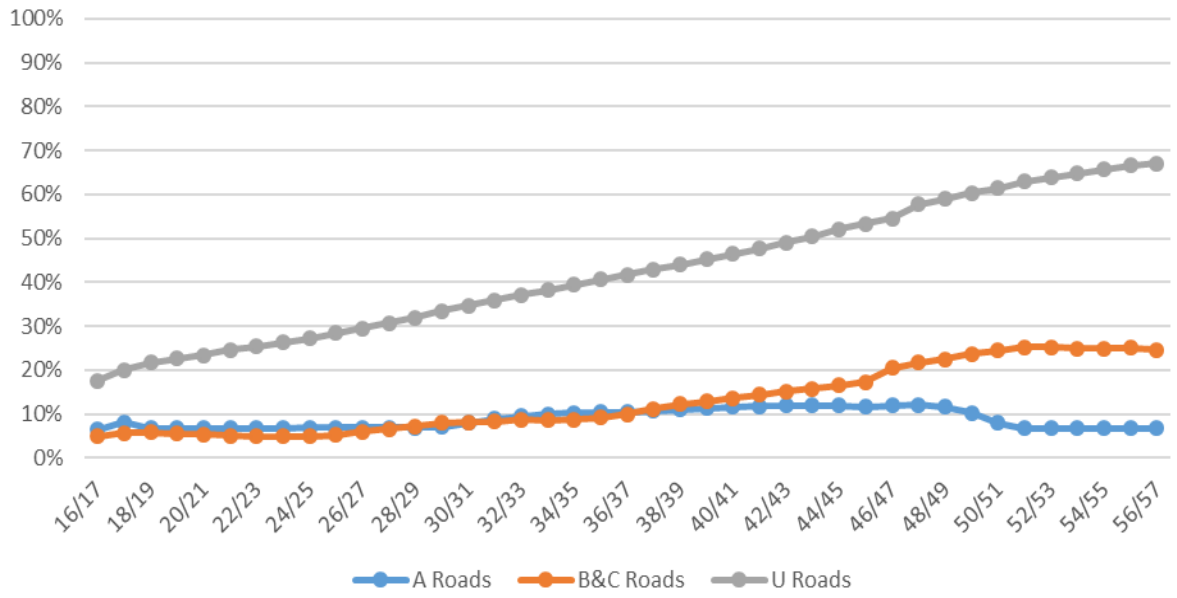
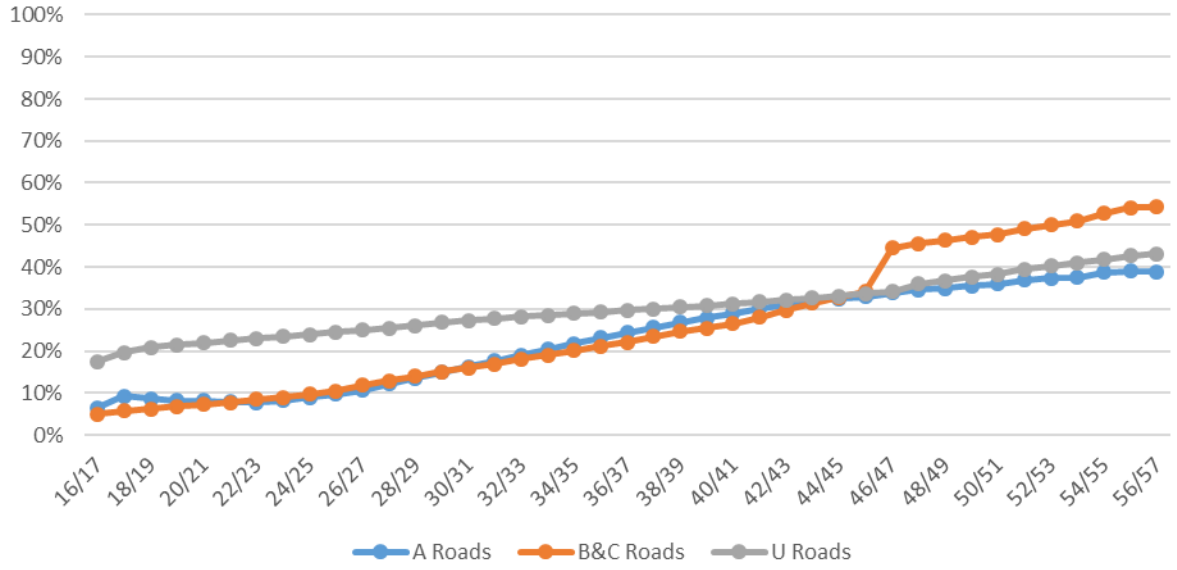


Figure 4.7.2 Option BAU2 change in condition with current budgets with budget set aside to treat 5% of the backlog on Unclassified Roads



4.8 What is the best approach to deliver our objectives with available funding options?

4.8.1 In view of existing funding constraints the Council must seek to minimise decline in the level of service of the road network over the medium term which will allow further time to build a longer term sustainable strategy for the road network.

4.8.2 Medium term strategy

4.8.2.1 The evidence from section 4.8 strongly indicates that the introduction of a microasphalt programme is critical to mitigating future decline in the condition of the network with limited budgets and can provide the Council with a substantial return on investment. However, allocation of funds entirely to the classified road network at the expense of the unclassified road network (Option BAU1) yields limited opportunity for the Council to benefit from the use of Microasphalt which would be mostly applied to the unclassified roads.

4.8.2.2 In the next 5 years Option BAU2 enables the Council to cost effectively manage the decline in unclassified roads. This would include an average annual investment of £0.185M in Microasphalt treatments.

4.8.2.3 However, in the long term Option BAU2 would be less favourable in terms of the objectives in 4.2. Poor condition and resilience on the A roads would deter investment and compromise the achievement of economic growth objectives. Such a decline would also reverse gains in cycling levels.

4.8.2.4 Further options to mitigate decline are therefore considered as follows:

Option ref	Strategy
Option IF1	Increase capital funding for carriageway maintenance by £0.5M per annum (£1.750M per annum) from 2018/19 onwards
Option IF2	Increase capital funding for carriageway maintenance by £1M per annum (£2.250M per annum) from 2018/19 onwards

4.8.2.5 Figures 4.8.2.1 and 4.8.2.2 show the condition forecasts for Option IF1 and Option IF2 respectively.

4.8.2.6 With Option IF1 the additional £0.5M is sufficient to retain the level of service on the major roads for the next 10 years although thereafter the decline on B&C roads will be severe (because the A roads will be prioritised for maintenance).

4.8.2.7 With Option IF2 the additional £1.0M would enable the Council to hold back significant decline in the A Roads and B&C Roads in the long term.

Figure 4.8.2.1 Option IF1 change in percentage of roads in poor condition with additional £0.5M per annum from 2018/19 onwards

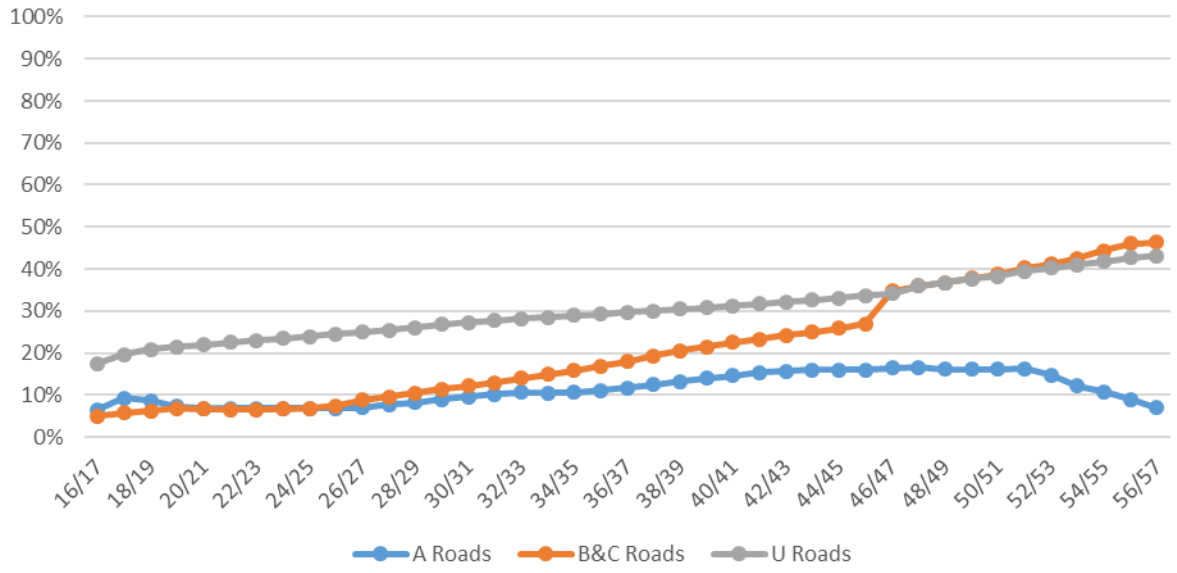
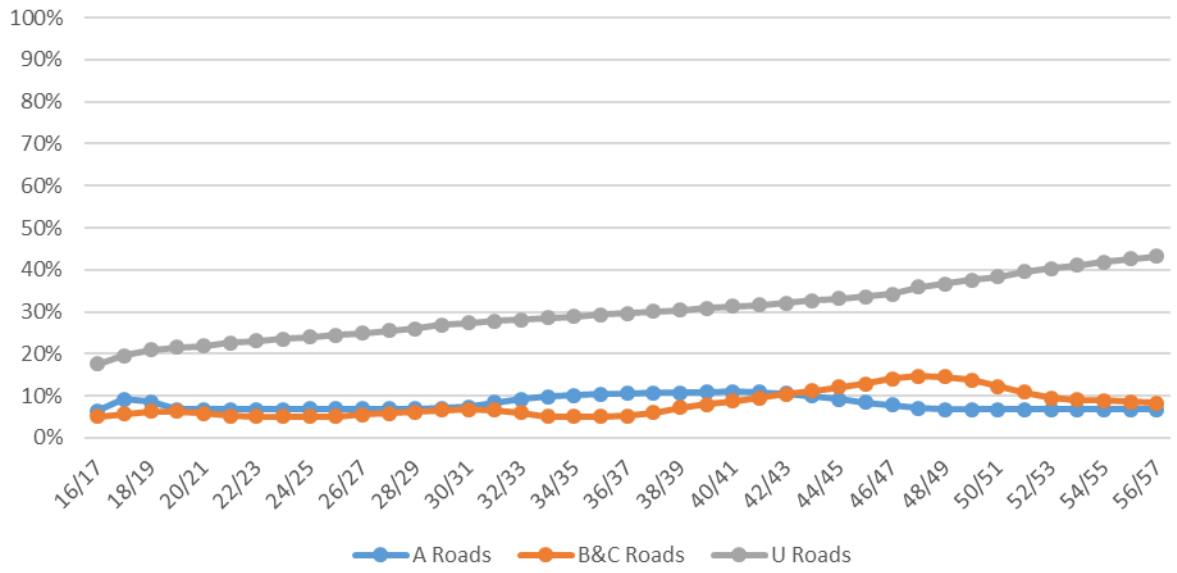


Figure 4.8.2.2 Option IF2 change in percentage of roads in poor condition with additional £1.0M per annum from 2018/19 onwards



4.8.3 Long term strategy

4.8.3.1 The longer term strategy will be likely to require securing further resources to close the gap in funding required to sustain the network at the same level of service.

4.8.3.2 However, it is equally important to work closely with our contractors and partners to identify innovative technologies that can drive down costs over the whole life of the carriageway.

4.8.3.3 Brighton & Hove Council is a member of the South-East 7 Highways Alliance (SE7) which can provide a strong forum for influencing the market and driving Research and Development to identify more cost effective and environmentally sustainable methods.

4.8.4 What are the risks to our strategy?

4.8.4.1 All of the above scenarios have assumed low growth in highway maintenance prices at or slightly above the typical rate of Consumer Price Inflation.

4.8.4.2 Price growth in highway maintenance has been relatively low since 2010 initially due to the down turn in the construction market until 2013 and more recently due to the unprecedented fall in oil prices since 2014.

4.8.4.3 World Bank forecasts indicate that oil prices will not reach pre-2014 levels before 2025 and this may have a continued effect in constraining highway maintenance prices due to the predominant influence of primary bitumen products. However, this close link to oil prices also means that highway maintenance prices are more vulnerable to geopolitical events than is the case with other construction sectors and this presents a significant strategic risk to the Council.

4.8.4.4 The SE7 alliance mentioned above is implementing a project aimed at maximising the recycling potential in highway maintenance (MORPH project). This and other similar initiatives may yield opportunities for the Council to reduce dependence on primary raw materials and in doing so build resilience to macro-economic trends and shocks.

4.8.5 What are the opportunities for our strategy?

4.8.5.1 As identified in section 3.3.2 it is important to identify where resurfacing or reconstruction of roads can support economic growth objectives for development sites in the LEP Strategic Economic Plan as well as increasing the resilience of the network and ensuring that the carriageways are able to support any increase in HGV traffic as a result of the developments. These proposals may be eligible for Local Growth Funding through the Coast 2 Capital LTB.

4.8.5.2 There will also be an opportunity to bid for funding from the next round of the Challenge Fund in 2018/19.

4.8.5.3 However, any funding from these sources should be considered for improvements to the level of service on particular corridors such as A23, A270 and A259, and would not be able to substitute for a sustainable funding strategy to arrest deterioration on the network as a whole.

4.9 Summary

4.9 Carriageway Surfacing Investment Strategy: Conclusions

4.9.1 Underlying trends in reactive repair costs on carriageways strongly indicate that the condition of the network as a whole has been declining since 2002/03 and at a faster rate since 2008/09 (Section 4.5.1, p9). Evidence from condition surveys are less conclusive although they indicate an overall worsening trend in the condition of A Roads (Section 4.4, p8).

4.9.2 With current levels of capital expenditure the Council is only able to resurface 0.35% of the unclassified road network each year. This means that if the Council continues with this level of expenditure it would take 285 years to complete a full cycle of resurfacing of unclassified roads (Section 4.5.2, p10).

4.9.3 There is strong evidence that the use of preventative maintenance is vital to enabling the Council to sustain or minimise decline in the condition of the network with limited budgets. Preventative maintenance treatments are most effective on unclassified (local) roads and are not usually suitable for urban A roads and other heavily-trafficked roads. With the inclusion of preventative maintenance in the mix of capital works the Council would need to spend an average of £2.7M each year to maintain the current condition of the network. However, if the Council continued to undertake only resurfacing without preventative maintenance the average cost to sustain the current condition of the network would increase to £3.8M (Table 4.6.2, p14).

4.9.5 With anticipated spend on planned maintenance of £1.250M per year the Council cannot sustain the level of service on the network. In the medium term an average split of £0.55M to major roads and £0.7M to unclassified roads would hold back significant decline in condition of the major roads for the next 5-8 years whilst enabling some investment (£0.184M per year) in preventative treatments on the unclassified roads that would yield longer term benefits (Section 4.7, p15). However, this option is unsustainable in the long term with all road classes showing major decline in condition (Figure 4.7.2, p15).

4.9.6 If the Council were to invest an additional £0.5M per year (total £1.750M per year) from 2018/19 onwards it would be possible to hold back deterioration on the major roads for 10 years before the rate of deterioration would exceed investment rates (Figure 4.8.2.1, p17). With an additional £1M per year (total £2.250M per year) from 2018/19 onwards it would be possible to sustain the condition of the major roads for the long term (Figure 4.8.2.2, p17). However, in each case the condition of the unclassified road network would decline steadily over the 40 year period.

4.9.7 The medium term (5 year) strategy is to make effective use of available capital budgets to hold back decline in the condition of the major road network whilst investing an average of £0.18M-£0.24M in preventative treatments to secure longer term benefits for the unclassified roads.

4.9 Carriageway Surfacing Investment Strategy: Conclusions

4.9.8 During this 5 year period the Council will seek to develop a longer term resourcing strategy for implementation from 2022/23 onwards that will analyse the gap in funding needed to sustain the condition of the network.

4.9.9 At the same time the Council will work closely with contractors and partners (particularly within the SE7 Alliance) to identify innovative solutions that may contribute to reducing the unit costs of major maintenance treatments and build resilience to future price instability.

Review of the Carriageway Surfacing Investment Strategy

Further work to develop lifecycle modelling based on data from Brighton and Hove's road network will be carried out, in particular, to support potential business cases for the Challenge Fund and Local Growth Fund.

This may require further surveys of structural condition (Ground Probing Radar and Falling Weight Deflectograph) at critical locations on key corridors.

5. Footway surfaces

5.1 Table 5.1 below summarises total capital spend on planned footway repairs since 2011/12.

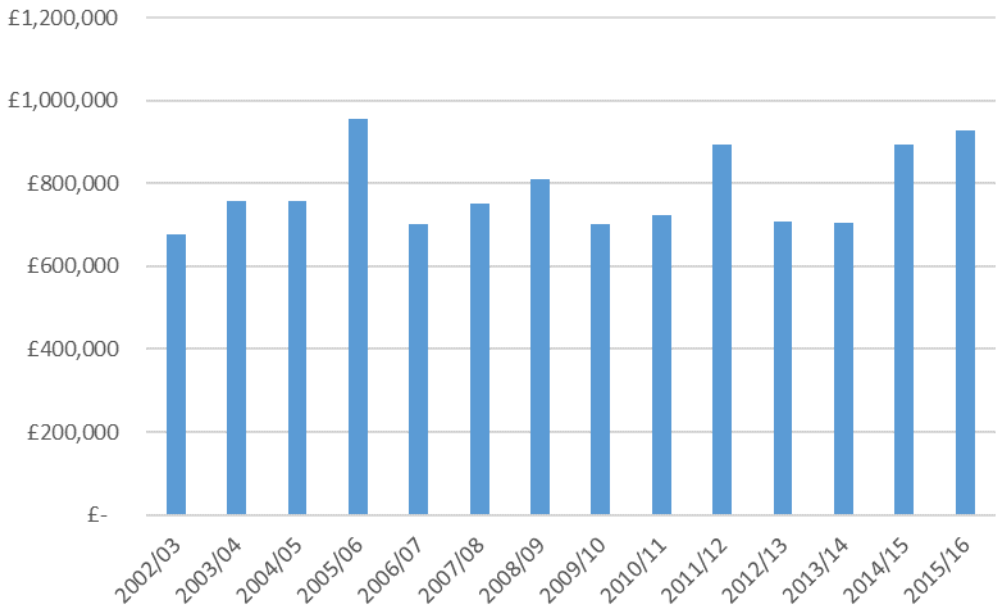
Table 5.1 Capital spend on footway maintenance since 2011/12

2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
£0.115M	£0.200M	£0.100M	£0.200M	£0.100M	£0.145M

5.2 This spend has been supplemented by between £0.050-£0.100M per year of revenue funding for planned footway repairs.

5.3 Figure 5.1 below shows the trend in expenditure on reactive repairs to footways since 2002/03. By comparison with the trend for carriageways (see Figure 4.5.1, Section p10) the long term trend in reactive repairs on footways has remained relatively stable although consecutive peaks over 2014/15 and 2015/16 may be cause for concern.

Figure 5.1 Trend in expenditure on reactive repairs to footways



5.4 In view of the key role that footways play in supporting independent living, particularly for people with visual and mobility impairments, as well as the significant financial risk that they may pose to the Council from third party claims if allowed to deteriorate the medium term strategy will be to ensure that the current level of service is maintained for footways.

5.5 Further work is required to forecast the long term investment requirements for footways. For the interim plan the Council will retain the current capital spending levels.

Review of the Footway Surfacing Investment Strategy
Work to develop lifecycle plans for footway surfaces will be completed by Q3 2017/18

6. Highway Structures Investment Strategy

6.1 There are 149 highway structures in the Council's ownership. These include road bridges, seafront arches and a large number of highway retaining walls, particularly on the seafront.

6.2 The Council's overall approach to management of highway structures is set out in the Highway Inspection Procedure (2013). This details the types and frequencies of inspection and monitoring that the Council carries out on different types of structure.

6.3 The Council is delivering a major package of renewal works to the Seafront Arches. This includes work currently being funded through a successful bid to the Department for Transport for £7.2M to reconstruct the Shelter Hall.

6.4 This work will secure the long term integrity of these structures which is vital to the economy of the town, both through the businesses that use the premises as well as supporting the A259 as one of the City's most critical routes.

6.5 Work on highway structures requires extensive planning in the medium and long term to minimise disruption to traffic, residents and businesses. For this reason the Council will develop full lifecycle plans for individual structures in order to ensure that appropriate preventative measures can be implemented and enable the Council to plan for the long term funding of major works on structures.

6.6 The City's coast protection structures defend the highway network from erosion and encroachment by the sea. Two approved life cycle plans are in place for their long term management. These are periodically updated in line with Environment Agency guidance.

Review of the investment strategy for bridges, coastal defences and other structures
Work to develop lifecycle planning for individual bridges and structures will be carried out in 2019/20

7. Highway Drainage Investment Strategy

7.1 With the growing risk of extreme rainfall events as a result of climate change the Council faces growing challenges to mitigate the risk of flooding from surface water run-off from highways.

7.2 The Council will address this challenge through two key approaches.

- Firstly the Council is directly addressing present risks of flooding through prioritisation of existing budgets. In particular the Council has partially reallocated revenue budgets to increase the frequency of cyclical maintenance of highway gullies in high risk locations.
- The second approach is to develop a longer term lifecycle based planning for the management of the City's highway drainage.

7.3 Currently the Council has included £0.15M of capital funding for renewal of soakaways in high risk sites in 2016/17 and a further £0.2M of revenue funding for investigation, renewal and improvements to the capacity of drainage at known flood sites.

7.4 However, the Council is developing a full risk profile of the City (including areas that may not have already experienced flooding) to prioritise data collection on drainage infrastructure and establish a targeted condition survey regime. This will enable the Council to plan in advance for preventative measures (such as tree root cutting and pipe lining) and avoid future flooding incidents and consequently the need for expensive excavations in future.

Review of Highway Drainage Investment Strategy
Work to develop lifecycle planning and refinement of the risk profile for highway drainage will take place in 2018/19

8. Street lighting Investment Strategy

8.1 The Council is considering a proposal to borrow £6.8M from the Public Works Loan Board to replace older-style lamps with LED lanterns as well as a Central Management System that will enabling dimming and part night switch off. These investments will substantially reduce the Council's energy costs.

8.2 £1 million of the funding will also be used to replace columns or to provide additional columns to meet current lighting standards.

8.3 However, the financial business case that Street Lighting is dependent on continued allocation of £300,000 per annum from the Local Transport Plan capital funding.

Review of street lighting investment strategy
The business case for street lighting Prudential Borrowing will go to the Policy, Growth & Resources Committee in December for Member consideration. Section 7 of the HAMS will be updated to reflect the resolution of the Committee.

9. Traffic Control Systems Investment Strategy

9.1 The Council is responsible for managing the City's traffic control system, including traffic signals, associated ducting and detection loops, communication equipment, variable messaging signs and a central control hub.

9.2 In addition to the above the Brighton & Hove Local Transport Plan outlines substantial investments in Intelligent Transport Systems to improve the management of the City transport network. Wireless sensor technology will form a significant part of the new infrastructure through this investment, including Bluetooth and Wifi detection devices that will enable better understanding and prediction of congestion and travel demand patterns, particularly on key corridors and locations where new developments are planned.

9.3 The Council will develop long term investment plans to maintain existing traffic control infrastructure as well as forecasting maintenance and replacement regimes for new infrastructure anticipated as part of the LTP.

Review of Traffic Control Systems investment strategy
Lifecycle plans for City's Traffic Control Systems will take place in 2019/20

10. Street furniture Investment Strategy

Review of Street Furniture investment strategy
Lifecycle plans for street furniture will be take place in 2018/19.

11 Medium term financial projection for planned maintenance

Entries in italics indicate that totals are subject to further work on lifecycle plan development and finalisation of the distribution of LTP Capital allocations during the period to 2019/20

Infrastructure	Programme	Funding source	2017/18	2018/19	2019/20
Carriageways	Resurfacing and planned patching	LTP Capital	£0.820M	*£0.820M*	*£1.260M*
	Preventative maintenance	LTP Capital	£0.180M	*£0.180M*	*£0.240M*
	Mastic asphalt and crack sealing	Revenue	£0.250M	£0.250M	£0.250M
	Skid resistance treatments	Revenue	£0.050M	£0.050M	£0.050M
Footways	Footway repairs and resurfacing	LTP Capital	£0.156M	*£0.168M*	*£0.170M*
	Footway repairs	Revenue	£0.050M	£0.050M	£0.050M
Highway structures	Shelter Hall scheme	Challenge fund	£3.425M		
	Shelter Hall scheme	LTP Capital	£0.922M		
	Other Highway Structures schemes	LTP Capital		*£0.800M*	*£0.800M*
Highway Drainage	Renewals to critical drainage infrastructure	LTP Capital	£0.150	*£0.150*	*£0.150*
	Repairs to drainage infrastructure (dig outs) and additional gully cleansing	Revenue	£0.200	£0.200	£0.200
Street lighting	Lighting Column Replacements (Contribution to Invest to Save)	LTP Capital	£0.300	*£0.300*	*£0.300*
Street furniture	Repairs to high risk safety barriers	Revenue	£0.050M	£0.050M	£0.050M
Total			**£3.128M**	**£3.018M**	**£3.520M**
Funding sources	LTP Capital Maintenance Block		£2.528M	£2.418M	£2.330M
	Revenue		£0.600M	£0.600M	£0.600M
	Shortfall				*£0.590M*