Code of Practice on Transport Infrastructure Assets

Consultation Draft as at July 2013

Foreword

This Code was first published in 2010 and it provides guidance on the development and use of financial information to support asset management, financial management and reporting of local transport infrastructure assets. This ~~first~~ version deals with local highway assets, but the ultimate intention ~~is that it will~~ is to ~~be~~ extend ~~ed~~ to cover light rail, tram and underground systems. The Code ~~h~~was ~~been~~ prepared at the request of the UK Government and implements a key recommendation from the CIPFA review of local authority transport assets which reported in 2008.

Since its introduction, the Code has been used to provide data to Her Majesty's Treasury (HMT) as part of the Whole of Government Accounts (WGA) data collection exercise. There remain inconsistencies between central and local government accounting and a common approach is important for government to understand its assets.

The Code ~~h~~was ~~been~~ developed and updated in collaboration with the Highways Asset Management Financial Information Group (HAMFIG), whose work is supported by a number of government funded research projects. Implementation ~~of the review~~wa ~~i~~s ~~being~~ overseen by a project implementation steering group (PISG) which includes representatives from national and local government and audit bodies in England, Scotland and Wales. Please see the acknowledgements for current membership and other information about HAMFIG and PISG.

CIPFA would like to thank all those who have contributed to the ~~development~~ update of the Code.

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Acknowledgements

This Code has been developed in collaboration with the Highways Asset Management Financial Information Group (HAMFIG). Its members are:

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To support implementation of the Code, a new Structures Asset Management Planning Toolkit is being developed, building on work undertaken by the London Bridges Engineering Group (LoBEG). The project is being undertaken by Atkins and overseen by a steering group:

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~~UK Pavement Management System (UKPMS) development work to support implementation of the Code has been undertaken for HAMFIG by:~~

~~Dr Ro Cartwright~~ ~~*Linhay Consultancy Ltd*~~

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The CIPFA Project Implementation Steering Group (PISG) is responsible for overseeing and advising on the implementation of the recommendations in the CIPFA review of transport infrastructure assets. It has exercised high-level oversight of the ~~development~~ update of the Code, leaving detailed development to HAMFIG, and provides a forum for taking decisions on associated policy issues. It has oversight of plans for communications and training to support awareness raising and implementation of the Code. It will monitor progress and identify future needs.

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Abbreviations and acronyms

ADEPT	Association of Directors of Environment, Economy, Planning and Transport
AMP	Asset management plan
BMS	Bridge management system
CIPFA	Chartered Institute of Public Finance and Accountancy

CSS	County Surveyors Society (now ~~the Association of Directors of Environment, Economy, Planning and Transport –~~ ADEPT)
CIPFA	Chartered Institute of Public Finance and Accountancy
LASAAC	Local Authority (Scotland) Accounts Advisory Committee
CVI	Coarse visual inspection survey
DRC	Depreciated replacement cost
DVI	~~Driven~~ Detailed visual inspection survey
FNS	Footway Network Survey
FReM	Financial Reporting Manual
GRC	Gross replacement cost
HAMFIG	Highways Asset Management Financial Information Group
HMT	Her Majesty's Treasury
IAS	International Accounting Standard
IFRS	International Financial Reporting Standard
ITS	Information technology systems
MEA	Modern equivalent asset
PFI	Private finance initiative

PISG	Project Implementation Steering Group
PPP	Public private partnership
RICS	Royal Institution of Chartered Surveyors
SCANNER	Surface Condition Assessment of the National Network of Roads
SCOTS	Society of Chief Officers of Transportation in Scotland
SCRIM	Sideways-force Coefficient Routine Investigation Machine
TAG	Local Government Technical Advisors Group
TUL	Total useful life
UKPMS	United Kingdom Pavement Management System
VAT	Value added tax
WGA	Whole of Government Accounts

CHAPTER ONE

Overview: the purpose and use of the Code

1.1 PURPOSE OF THE CODE

1.1.1 The purpose of this Code is to support an asset management plan (AMP) based approach to the provision of financial information about local authority transport infrastructure assets. The intention is that each authority should develop a single set of financial management information about these assets that is robust and consistent between transport authorities and supports:

- good, evidence-based asset management, including the development of more cost-effective maintenance and replacement programmes
- delivery of efficiency savings and service improvements
- long-term financial planning and budgeting
- corporate capital planning and the operation of the Prudential Code
- performance assessment and benchmarking

- resource allocation, locally, at regional level and nationally
- production of transparent information for stakeholders on the authority's management of its highway assets
- production of financial information that is compliant with International Financial Reporting Standards (IFRS) and meets the needs of Whole of Government Accounts (WGA) and National Accounts
- any future move to current value financial reporting of the assets in local authorities' own accounts.

1.2 THE IMPORTANCE OF TRANSPORT ASSET MANAGEMENT

1.2.1 The local highway network and other local transport infrastructure assets together represent by far the biggest capital asset that the UK public sector holds. Transport networks are vital to national economic prosperity. The comfort and safety in which people can move from place to place and the appearance of local streets are important contributors to quality of life. But few authorities know what their infrastructure is worth, and detailed information on what it comprises, and the condition it is in, is patchy and often out of date. Nationally there is a perception that spending is insufficient to maintain our transport infrastructure to satisfactory standards. However, the Government does not have robust, consistent information about the true cost of holding and maintaining the assets, or the size of maintenance and investment backlogs. And most authorities do not have the detailed information they need to drive down the cost base and improve service delivery.

1.2.2 Asset management could and should play a key role in tackling these problems. In other countries and other UK sectors where infrastructure asset management is well established, it has delivered significant value for money savings and service benefits. In Great Britain, those authorities that have made good progress in implementing transport asset management have demonstrated both the potential to achieve equivalent benefits and that it is possible to prioritise implementation so as to gain early benefits from focused initial investment.

1.3 POTENTIAL BENEFITS

1.3.1 Chapter 2 describes the Code's approach to generating financial information and provides some advice on how this can be used to support better decision making and the delivery of efficiency savings. Potential uses include:

- whole life cost-based modelling, to understand and minimise costs, maximising value over the long term
- scenario planning and option appraisal to model and understand the cost consequences of different maintenance strategies
- prioritising work programmes to maximise the return on a given level of investment
- reducing the amount of unplanned, reactive maintenance
- reducing the number and value of successful third-party claims
- understanding and adjusting trade-offs between capital and revenue spend to achieve the best balance
- using the detailed information that the system will provide about the cost of individual maintenance activities to drive down the cost base, and to monitor whether treatments deliver the expected performance
- informing better procurement
- monitoring performance trends over time
- benchmarking.

1.4 SCOPE

1.4.1 This version of the Code deals with highway infrastructure assets, but the intention is that it will be extended to cover other local transport network assets, ie tram, light rail and underground systems. For the purpose of the Code, highway infrastructure is taken to mean the network of highways, footways and cycleways and the structures, lighting and other assets that are directly associated with them. Assets such as car parks, maintenance depots and bus stations that are owned and/or operated by authorities should be regarded as property assets and valued in accordance with the RICS Valuation Guidance.

1.5 USERS

1.5.1 Primary users, ie those with the chief responsibility for implementing and applying the Code, will be highway engineers responsible for managing and operating the assets and finance staff responsible for highway financial management, corporate budgeting and financial planning.

1.5.2 The Code is intended to serve as best practice guidance for those who are responsible for the management of the assets and as a tool for those who audit their performance. As explained in chapter 2, the Code uses accounting principles and other financial disciplines and techniques to ensure that the financial information generated for asset management is robust, consistent and fit for purpose. It also generates asset management data in a form that can be readily used to report the assets on a current value basis in WGA. HM Treasury has set a timetable for the~~a gradual~~ transition to reporting on this basis, starting~~ed~~ with limited, unaudited data submissions for 2009/10, building up to capturing a complete set of data in 2012/13.~~a full audited dry run in 2011/12 and the withdrawal of historic cost-based reporting from 2012/13.~~

1.5.3. This Code is intended to cover all forms of local highway authority having responsibility for highway maintenance as defined in Section 1 of the Highways Act 1980 as amended. For other authorities the transactions are not likely to be material, and therefore the measurement requirements do not apply to non-highways authorities-~~Street furniture includes items such as litter bins, seats, bus shelters, flower planters, which a non-highways authority may have, but they are unlikely to be material. Where they are material, they should be valued in accordance with this Code.~~ As a matter of good practice an inventory should be maintained.

1.5.4. Non-highway footpaths (as opposed to footways) and non-highway cycle tracks are not included within the code, so even a highway authority does not need to include public rights of way or private permissive paths.

1.6 IMPLEMENTING THE CODE

1.6.1 Effective implementation will require highway engineers and finance staff to work closely together to ensure that financial information is timely, consistent and of high quality to meet the needs of both. They will jointly need to make sure that the information produced also meets the needs of other internal stakeholders – in particular members, to support decisions on policy and funding – and that there is clear, transparent information for taxpayers and other external stakeholders on the authority's management of its assets.

1.6.2 Internal audit can also play a valuable role in supporting implementation and reducing the risk of any external audit issues further down the line, by providing interim assurance from testing inventory, cost data and systems as they are developed.

1.6.3 The Code sets out a long-term approach so that authorities can see where they should be aiming. However some things will not be capable of being fully implemented initially. It takes time to develop good asset management, building up and refining inventory and condition data and support systems. Progress so far has varied considerably between authorities. ~~In recognition of this, t~~The ~~Code also sets out interim approaches where necessary, including ways of dealing with issues such as the lack of data. It~~ is designed to allow authorities to start at the level that their own data and systems will support and then to develop and move forward over time.

CHAPTER TWO

The approach to developing and using financial information

2.1 USING ACCOUNTING PRINCIPLES TO SUPPORT ASSET MANAGEMENT AND FINANCIAL MANAGEMENT

2.1.1 A key principle that underpins the Code is that the same data should be capable of serving the needs of asset management, financial management, budgeting and financial reporting. Data used for financial reporting is of high quality and consistency because it is collected according to professional accounting rules and is subjected to strong internal controls and a formal audit regime. Applying those principles to the production of information about highway assets not only ensures that the data is fit for use for WGA, but also provides high-quality information to support the management of the assets and maximise the value delivered from both past investment and future expenditure.

2.1.2 It also supports the production of information on a consistent basis between authorities, which facilitates benchmarking and means that information can be aggregated to provide data at regional and national level on spending patterns and needs. This can be used to inform national decision making on both policy and resource allocation.

2.1.3 Within accounting, depreciation is used to provide a measure of the cost of the economic benefits embodied in an asset that have been consumed during the accounting period. Depreciation can be measured in various ways. For commercial undertakings, a key aim should be to reflect changes in market value or income generating potential, but for long-life public sector infrastructure a more appropriate measure is what needs to be spent to maintain the asset in a stable condition. The present, historical cost-based approach to valuing local authority infrastructure is not a good basis for dealing with assets that have very long lives. It provides some information about what is being spent on the assets, though even this is not necessarily consistent between authorities, but it says nothing about the effect the expenditure has on the condition of the assets or how far it matches spending need.

2.1.4 This Code therefore uses a different accounting approach. **Depreciated replacement cost** (DRC) is a method of valuation defined in the Code of Practice on Local Authority Accounting as ~~that provides~~ the current cost of replacing an asset with its modern equivalent asset, less deductions for all physical deterioration and all relevant forms ~~impairment~~of obsolescence and optimistion. It is generally used where there is no active market for the asset being valued – that is, where there is no useful or relevant evidence of recent sales transactions due to the specialised nature of the asset. Gross replacement cost (GRC) is based on the cost of constructing a modern ~~n~~ equivalent new asset. ~~, and~~ T~~t~~he difference between the gross and depreciated cost is the ~~the cost of restoring the asset from its present condition to 'as new'~~amount of the value of the asset that has been consumed ~~so far during~~by the authority during its useful life~~-~~. ~~Annual~~ D~~d~~epreciation is ~~calculated~~ estimated by spreading the GRC over the age of the asset. Where this is not possible, ~~by~~ the ~~identifying all~~cost of ~~the~~ capital treatments needed to maintain assets or key components over their life cycles is ~~and then~~ spread~~ing the total cost~~ evenly over the number of years in the life cycle in order to estimate the value of the asset consumed. ~~Calculated in this way, annual depreciation not only represents the annual consumption of service benefits but also provides a measure of what on average needs to be spent year on year to maintain the assets in a steady state.~~

2.2 DEVELOPING AND USING FINANCIAL INFORMATION

2.2.1 Financial modelling

2.2.1.1 Good asset management needs appropriate inventory plus up to date local cost data and condition information. It also needs an understanding of how assets or components deteriorate and, in particular, when they will have to be replaced or treated. Management and maintenance strategies should be life cycle plan based and designed to optimise value over the life cycle. The Code sets out a financial modelling approach which, together with the application of professional accounting practice in the way it is implemented, is designed to bring all these things together in a consistent, systematic way. Figure 2.1 below summarises the key inputs, processes and outputs used by the Code in modelling financial information.

2.2.2 Life cycle plans and whole life costs

2.2.2.1 The life cycle plan identifies and costs all the capital works and their projected timing, and so provides the information needed to undertake long-term expenditure forecasting and to undertake a variety of financial modelling.

2.2.2.2 Because the financial information is produced and aggregated across the life cycle, it supports – and the Code requires – a whole life cost approach, rather than simply looking at the cost of the next treatment. The base position should be to produce plans that reflect local standards of service, which may reflect affordability considerations, but otherwise to plan on the basis that the assets are fully funded.

This provides a starting position from which to assess the cost consequences of alternative scenarios, for example the trade-offs between cheaper, more frequent maintenance treatments or allowing the asset to deteriorate until it requires a single, more fundamental treatment.

2.2.2.3 Developing life cycle plans and exploring options for street lighting, traffic management systems and street furniture is relatively straightforward. Carriageways, footways and structures are more complex and also account for the great majority of asset value and maintenance expenditure.

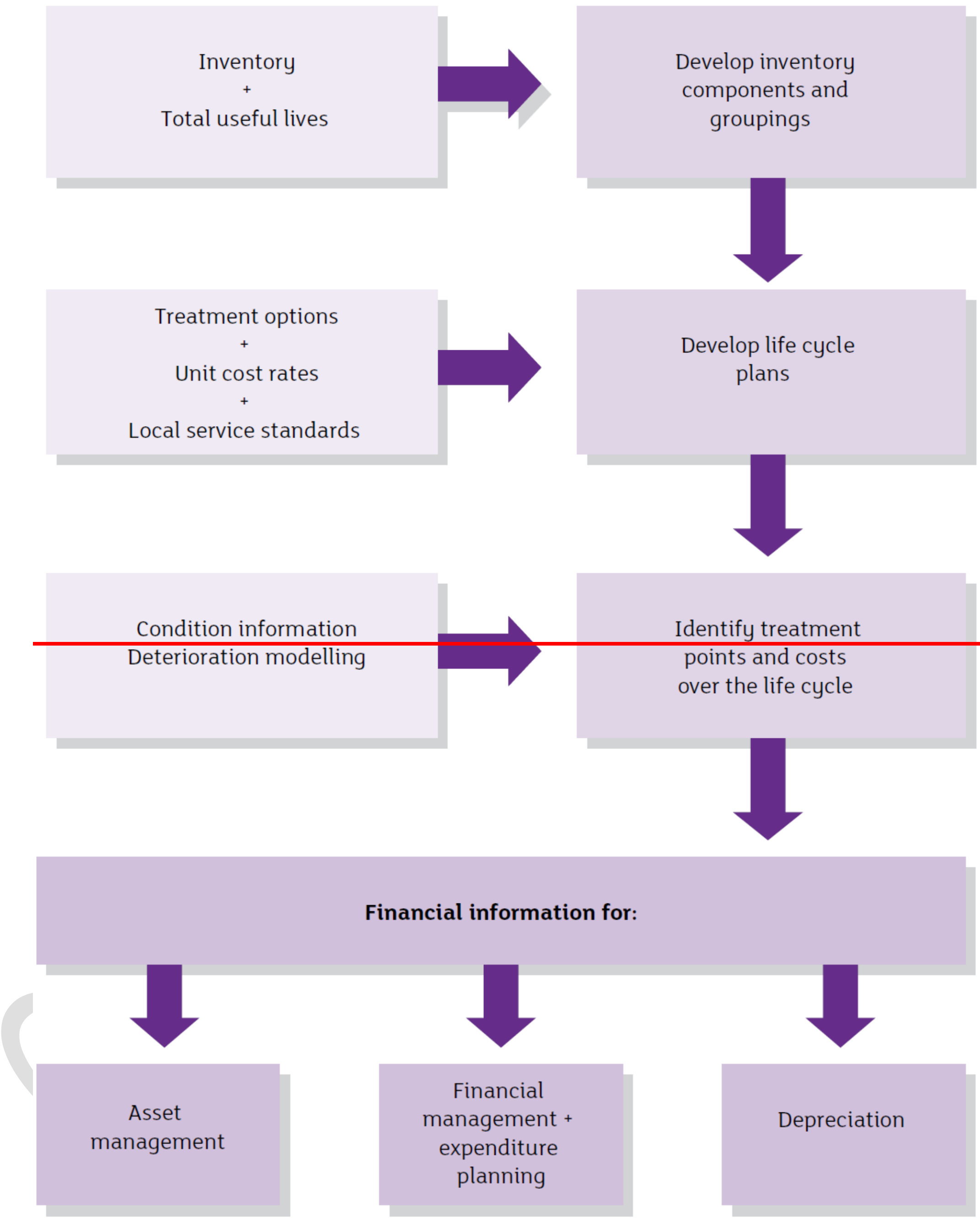
2.2.3 Using condition information

2.2.3.1 All authorities hold data about the condition of their carriageways and footways in pavement management systems that conform to the UK Pavement Management System (UKPMS) specification. Although UKPMS was developed to support the management of maintenance strategies and programmes of carriageways, in recent years its prime use ~~h~~was ~~been~~ to generate national performance indicators. The intention is that UKPMS will be used to support the implementation of the Code in respect of carriageway and footway data. Some initial modifications have already been made and its asset management capabilities will be enhanced over the next few years, in particular to provide for more detailed deterioration modelling. Authorities will be able to use UKPMS as a tool to explore and cost alternative maintenance strategies and their effects on the condition of the network, and to prioritise work so as to maximise value for a given budget.

2.2.3.2 There wa~~i~~s no existing equivalent national system for structures, so a new model ~~new model is being provided, which is~~ consistent with the principles in the Code has been developed. This also ~~and~~ supports asset management planning and financial modelling, including valuation and it is anticipated that the functionality will be built into ~~structures~~bridge management systems. Temporary spreadsheets have been developed to prove the concept.

2.2.3.3 Good practice in asset management requires that the strategy for maintaining an asset should be based on appropriate life cycle planning that endeavours to anticipate the future performance of the asset under various scenarios. Where possible, this analysis should take into account operational costs as well as maintenance and renewal costs and any other significant factors or constraints, and the end product will be a series of ‘options and consequences’ – different possible costed outcomes. This scenario planning needs to include risk assessments as well as financial analysis.

Figure 2.1 Modelling financial information



2.2.3.4 This kind of modelling exercise allows the authority to make an informed decision, selecting either the scenario that delivers the desired level of performance for the least money or (in a budget-constrained situation) the scenario that delivers the level of service closest to the desired level within the available resources.

2.2.4 Cost, inventory and treatment lives

2.2.4.1 By their nature, life cycle plans attempt to predict the future performance of the asset. As with any modelling, the nature and quality of the outputs will depend on the quality of the input data. Cost information will generally be readily available and, so long as it is input consistently, it should be robust. Inventory will need to be developed and the Code gives advice on prioritisation. Essentially the priorities are the obvious ones – to concentrate on the high-value, high-spend items first and then tackle the lower-value, lower-spend items and extend the detail of the inventory.

2.2.4.2 The most complex part of the analysis is predicting how the asset will perform and therefore when it will reach a treatment point. Asset managers will be able to take a reasonable view, across a group of assets, of the average useful life of an asset or treatment, but the performance of individual assets within the group will vary considerably. Also for many assets, especially the big spend items like carriageway surfaces, authorities may well not have information about the timing and nature of past treatments. In these cases, condition will need to be used to estimate the remaining useful life.

2.2.5 Monitoring and using information

2.2.5.1 Monitoring future changes in condition is an important part of checking whether the life cycle plan assumptions about treatment lives are realistic. Assumptions need to be reviewed and, if necessary, revised at least annually. Comparisons between annual expenditure and condition can also provide a good indication of the realism of useful life assumptions. Monitoring changes to the value of the asset following capital expenditure can give evidence of its impact. ~~If, say, an authority's spending broadly matches its annual depreciation, then if the useful life assumptions are right, the condition of the asset should broadly remain at steady state over time, with only minor annual fluctuations. If the condition of the asset shows a deteriorating trend, then the assumed useful life is probably optimistic. Conversely, if the asset's condition shows a steady improvement, the life assumptions are probably too pessimistic.~~

2.2.5.2 Initially, life cycle plans will probably be at a relatively high level and, since it will take time to explore alternatives, they may reflect past practice which may not be optimal. However, the resulting financial information should provide a reasonable estimate of the expenditure needed to implement those strategies at the network level. The currentinterim approaches described in the Code will allow authorities even with limited data to deliver network-level approximations of the work required to maintain the assets. They will also support the exploration of alternative strategies and thus can start to deliver efficiency gains. However, particularly for the more complex assets such as carriageways, to maximise efficiency the interim approaches will need to be refined. For carriageways, this will mean a gradual shift from a network or road hierarchy based approach to one that works at the level of individual road sections. Further systems developments, particularly in UKPMS, are planned to support this.

2.2.5.3 The model uses authorities' own maintenance and replacement cost rates. As discussed above, the amount of annual depreciation/annual spending requirement depends on the whole life cost effectiveness of the maintenance strategy adopted, but it is also affected by the efficiency with which it is procured. The detailed cost data in the model can be used to drive down the cost base. Initially the focus is likely to be on identifying and targeting those activities that generate significant regular expenditure so that these can be examined to see if alternative, more cost-effective approaches are possible. In time the approach can be extended until it covers all regular activities. Because cost data is being compiled on a consistent basis, it can also be used to track performance over time and for benchmarking between authorities.

2.2.5.4 Depreciation only applies to capital expenditure. However, it is important that life cycle plans and asset management financial systems also reflect revenue expenditure. This is needed anyway for expenditure planning, but it is also an important element of life cycle planning and whole life cost optimisation so that trade-offs between capital costs and routine (revenue) maintenance can be explored.

2.2.6 Interpreting DRC data

2.2.6.1 There are limits to the extent that depreciated replacement cost (DRC) can be used as an indicator of the state of the asset base. DRC will be adjusted annually to deduct annual depreciation and any impairment charges and to add the value of capital works undertaken in the year. Thus if annual expenditure matches depreciation, the DRC should remain stable. However, it is important to note that because all information is produced on a current value basis, the asset values are indexed and uprated annually in line with inflation. It is therefore possible, for example, that an authority was spending less than the annual spending requirement but the effect of this was masked by indexation so that a comparison of the DRC for successive years still showed the DRC as increasing. It is therefore important to look at the underlying changes that influence movements in DRC rather than simply comparing the absolute figures.

2.2.6.2 Asset managers also need to be careful about drawing conclusions from the relationship between GRC and DRC below the network level. In particular, DRC:GRC ratios may not be a good basis for making comparisons between different assets or components. There are important differences in the costs incurred in building major new schemes (used for GRC) and the costs of maintaining them (when used to estimate ~~the consumption of the asset or in~~ depreciation ie the economic consumption of the asset), reflecting the different nature and scale of the activities involved. For example, a new build scheme may include significant costs for activities such as site preparation and earthworks that are unlikely to be replicated in subsequent maintenance; on the other hand, while there may be some traffic management costs with new build schemes, they are unlikely to be as significant a cost contributor as for major maintenance and replacement works.

~~For some assets, replacement costs may be greater than the contribution that the asset makes to GRC. For example, the unit cost of replacing street lighting columns may well be higher than the GRC unit rate, because the replacement rate needs to allow for the cost of removing the old column and making good the footway, costs which do not arise when lighting is installed as part of a new build scheme.~~

2.2.6.3 For asset management purposes, a comparison between total replacement cost and accumulated depreciation may be a more useful and reliable measure. However, in using this, it is important to remember that some asset types, such as traffic management systems, have finite lives and will be depreciated down to zero by the end of their useful lives. Other assets, notably carriageways, have a substantial part of the total value in underlying layers and earthworks which may not require treatment and therefore not require depreciation. Even for assets which have the same depreciation regime, the accumulated depreciation will vary depending on the age profile of the group. For finite life assets that have a fairly even spread, for example a 20 year life with approximately 5% being replaced each year, accumulated depreciation will remain stable at around 50% of replacement cost. However, if the age profile is skewed, then accumulated depreciation could be much higher or lower, even if in each case spending matches need.

2.3 TOOLS TO SUPPORT IMPLEMENTATION OF THE CODE

2.3.1 As mentioned above, the UKPMS specification is being modified to support the implementation of the Code in respect of carriageways and footways. For structures thea proof of conceptnew financial planning model hwas been developed as an interim approach and it is anticipated that this will be incorporated into bridge management systems. To facilitate the calculation of GRC a number of simple spreadsheets are provided, together with composite rates for carriageways, footways, structures and land. Table 2.1 below shows that even for authorities with limited asset management systems, GRC and depreciation can be calculated using a combination of UKPMS, the structures planning proof of concept tool and simple spreadsheets linked to the inventory data. Authorities that have asset management systems, or that develop them, can of course use these instead of the spreadsheets provided, so long as the resulting calculations are consistent with the principles set out in the Code.

2.3.2 Additional material to help authorities to understand and implement the Code will be provided from time to time in the form of advice notes and answers to frequently asked questions.

2.3.3 Materials to support implementation of the Code can be found on the CIPFA website at www.cipfa.org.uk/pt/infrastructure

2.3.4 In implementing the Code, authorities need to decide for themselves how to structure systems to store and manipulate asset management and financial data, and to make interfaces between asset management and financial systems. In the longer term there are advantages in having a high degree of systems integration, but in the short to medium term most authorities are likely to need to store data and generate financial information, including valuation data as well as management information, within asset management systems. Where financial information is required, for example for WGA reporting, then aggregated data can be transferred into the relevant finance systems, either electronically or manually.

Table 2.1 Sources of financial information

Asset type	GRC (simple spreadsheet approach)	Depreciation
Carriageways	Composite rate per square metre +	Surface layers through UKPMS

	rate by length for linear add-ons	Other items in composite rate, eg drainage, retaining walls, boundary fencing – based on average annual replacement spending requirements
Footways and cycletracks	Composite rate per square metre	Done through UKPMS
Structures	Structures proof of conceptlanning tool	Structures proof of concept toolmodel (works as spreadsheet, London Bridge Management System (BMS), spec for other BMS modules)
Lighting	Spreadsheet Based on inventory/new build unit rates	Spreadsheet Based on inventory/age/life/replacement unit rates
Traffic management	Spreadsheet Based on inventory/new build unit rates	Spreadsheet Based on inventory/age/life/replacement unit rates
Street furniture	Spreadsheet Based on inventory/new build unit rates	Spreadsheet Based on inventory/age/life/replacement unit rates

CHAPTER THREE

How the Code fits with other guidance

3.1 RELATIONSHIP WITH OTHER ASSET MANAGEMENT GUIDANCE

3.1.1 This Code replacesd the CSS/TAG *Guidance Document for Highway Infrastructure Asset Valuation* published in July 2005, which should no longer be used. It needs to be read in conjunction with the Highways Maintenance Efficiency ProgrammeCSS/TAG *Framework for* Highway*s Infrastructure Asset Management Guidance* which provides overall guidance on the implementation of highway asset management. Other key reference documents are the UK Roads Liaison Group's Codes of Practice;;Board's *Highway Asset Management Quick Start Guidance* series, which are particularly useful to authorities still in the early stages of developing asset management, and the Department for Transport publication *Maintaining a Vital Asset*. Well-Maintained Highways, Well-lit Highways, Management of Highway structures and Management of Electronic Traffic Equipment. These documents are all available on the UK Roads Liaison Group website (www.ukroadsliaisongroup.org).

3.1.2 Other guidance that is relevant to consideration of particular asset groups or issues is referred to as appropriate in the asset-specific chapters of this Code. A full bibliography is given at the end of this publication.

3.1.3 These guidance documents are subject to revision from time to time and, where appropriate, future updates will include changes to make text consistent with this Code. For the avoidance of doubt, if there are inconsistencies between this and any other guidance in respect of matters that are the subject of this Code, then this Code should be regarded as the authoritative source on those matters.

3.2 RELATIONSHIP TO OTHER ACCOUNTING GUIDANCE AND REQUIREMENTS

3.2.1 In~~From~~ 2010/11 local authority accounting ~~is~~ moved~~ing~~ to the new *Code of Practice on Local Authority Accounting in the United Kingdom 2010/11* which ~~was~~is ~~:~~b~~B~~ased on International Financial Reporting Standards. This w~~, which h~~as ~~been~~ prepared with the oversight of the Financial Reporting Advisory Board.~~, rather than the Accounting Standards Board.~~ For the time being the IFRS-based Code will continue to require that infrastructure assets are reported on a historical cost basis. However, to provide the necessary consistency of accounting policies for WGA purposes, and to support the production of information for the National Accounts, HM Treasury has set a timetable that will require authorities to move to reporting their infrastructure assets for WGA purposes on a depreciated replacement cost basis, in accordance with the approaches set out in this *Code of Practice on Transport Infrastructure Assets*.

3.2.2 The *Code of Practice on Transport Infrastructure Assets* has been prepared in accordance with the relevant International Accounting Standards, and with regard to the guidance in the Financial Reporting Manual (FReM). It is designed to work with the *Code of Practice on Local Authority Accounting* and to support a future change to the basis on which asset values are reported in local authority accounts.

3.2.3 Asset managers should use the *Code of Practice on Transport Infrastructure Assets* as the guidance document on financial aspects of asset management. While they do not need a detailed knowledge of the *Code of Practice on Local Authority Accounting* or other accounting guidance, they do need a general awareness of broader linkages.   When either the application of finance aspects of this Code or its relationship to other accounting guidance is unclear, asset managers should refer to their finance colleagues in the first instance.

3.2.4 For accountants, the *Code of Practice on Transport Infrastructure Assets* includes guidance on the DRC-based measurement (carrying value) of infrastructure assets that are in use for operational purposes. following initial recognition. This section links to the *Code of Practice on Local Authority Accounting* requirements for the recognition and measurement of property, plant and equipment for transport infrastructure assets, such as initial recognition, measurement principles, as the identification of additions, disposals, depreciation and impairments. The actualdetailed accounting transactionsrequirements for these transactions must also meet the requirements of the provisions of the.All other aspects of accounting for infrastructure assets – initial recognition, assets under construction, derecognition of assets at the end of their useful life, disposal of obsolete or surplus assets, adjustments following revaluation or impairment, and other reporting requirements – should be dealt with in accordance with the guidance in the *Code of Practice on Local Authority Accounting* *in the United Kingdom (the Accounting Code)*and will be the same as any other follow the same accounting treatments of any other item of property, plant and equipmentasset. Accountants will need to satisfy themselves that asset management systems and the arrangements for updating inventory and other information are appropriate for WGA financial reporting purposes.

3.2.5 In implementing the Code, accountants should also have regard to the CIPFA Financial Management Model. As noted in chapter 1, highway and other transport infrastructure represents by far the biggest value asset that the authority holds. Successfully implementing the approaches to developing and handling financial data described in the Code should help authorities significantly in managing their transport infrastructure assets. If used effectively and further refined and developed over time, the resulting financial information should also increasingly support performance and enable service transformation. The model should therefore be used as a tool to measure progress. The good practice statements on measurement and management of assets and liabilities will be particularly relevant here. Other aspects of the model will also be relevant, including those relating to responsibilities for delivering cost-effective services, providing challenge and support on value for money and performance, evidence-based decision making, operating financial information systems that meet users’ needs, and delivering value for money through procurement.

3.2.6 The Code also supports corporate capital planning and the operation of the Prudential Code.

CHAPTER FOUR

The Code's approach to producing financial information: the essential building blocks

4.1 WHAT HAS CHANGED IN THIS CODE

4.1.1 The approach taken in the Code has some important differences from the way in which infrastructure assets are currently valued and depreciated in local authority accounts. In particular, it is based on current values rather than historical costs, and the information used for financial reporting is derived from the authority's asset management plans.

4.1.2 ~~There are also some changes from the approach set out in the CSS/TAG *Guidance Document for Highway Infrastructure Asset Valuation*. This used an AMP-based current value approach, but it was based on renewals accounting which, with the move to IFRS-based financial reporting across the public sector, is no longer allowed. The approaches set out in the present Code also make much greater use of componentisation (discussed below), and there are some important differences in the way assets are valued and depreciated.~~

4.2 ASSET CLASSIFICATION

4.2.1 Assets need to be grouped in a consistent manner so that data can be aggregated for regional or national purposes, for example to determine actual expenditure or estimated spending need for a particular asset class, to allow authorities to benchmark performance with others, and to allow individual authorities to track performance over time.

4.2.2 The classification used in this Code is shown in Table 4.1. ~~It is based on the classification in the CSS/TAG guidance but with some adjustments. The most significant change is that attached and segregated footways and cycletracks have been brought together as a single asset type. The separate category for off-highway drainage has been removed since most sustainable drainage systems are not dedicated highway assets; all highway drainage other than large structures is now included with carriageways.~~ The table is not exhaustive. If the listed asset types and groups do not provide adequate coverage then an authority will need to extend this scheme (or delete items not held) to fit its own network. Authorities may make minor adjustments to the level 1 groupings, but if so the contribution that affected assets make to GRC, expenditure, etc should be identified so that numbers can be readily reported on a nationally consistent basis, or used for benchmarking or other purposes if required.

4.2.3 The classification has three levels. These are defined as:

Level 1: Asset types – broad categories based on the general function of the assets. They divide the asset base into categories that may be suitable for reporting in the financial statement and provide an appropriate basis for high-level management information.

Level 2: Asset groups – used to distinguish between assets that have a similar function and form.

Level 3: Components – distinguishes between components that, at least when systems become well developed, may require individual depreciation and impairment models, such as different service lives and/or rates of deterioration.

Table 4.1 Classification of highway assets

Level 1 Asset type	Level 2 Asset group	Level 3 Components that level 2 implicitly covers
Carriageway	Area (square metre) based elements Flexible pavements Flexible composite pavements Rigid concrete pavements Rigid composite pavements	Pavement layers Other surface types, eg paved Central reservation, roundabout, lay-by, traffic island, etc Earthworks (embankments and cuttings, retaining walls height <1.35m) Traffic calming Fords and causeways
	Linear elements (see section 6.7.2.2)	Kerbs Line markings Road studs Road drainage elements (gullies, drains, etc, but not large structures) Boundary fences and hedges Hard strip/shoulder verges/vegetation
Footways and cycletracks (attached to the road or segregated)	Footways Pedestrian areas Footpaths Cycletracks	Pavement layers Other surface types, eg block paving, unbound materials
Structures	Bridges (span >1.5m)	~~All~~ Certain elements identified on the CSS

Level 1 Asset type	Level 2 Asset group	Level 3 Components that level 2 implicitly covers
	Cantilever road sign Chamber/cellar/vault Culverts (span >0.9m) High mast lighting columns (height >20m) Retaining walls (height >1.35m) Sign/signal gantries and cantilever road signs Structural earthworks, eg strengthened/reinforced soils (all structures with an effective retained height of 1.5m or more) Subway: pipe Tunnel (enclosed length of 150m or more) Underpass/subway: pedestrian (span of 1.5m or more) Underpass: vehicular Special structure	inspection pro forma Smaller water-carrying structures are considered as road drainage
Highway lighting	Lighting columns Lighting unit attached to wall/wooden pole Heritage columns Illuminated bollards Illuminated traffic signs	Column and foundations Bracket Luminaires Control equipment, cables Control gear, switching, internal wiring cabling (within ownership)
Street furniture	Transport Highway Streetscene/amenity	Traffic signs (non-illuminated) Safety fences Pedestrian barriers Street name plates Bins Bollards Bus shelters Grit bins Cattle grids Gates Trees/tree protection, etc

Level 1 Asset type	Level 2 Asset group	Level 3 Components that level 2 implicitly covers
		Seating Verge marker posts Weather stations
Traffic management systems	Traffic signals Pedestrian signals Zebra crossings	Different types
	In-station	Complete installation
	Information systems Safety cameras	Variable message signs Vehicle activated signs Real time passenger information
Land	Freehold land Rights land	Features on the land are not taken into account in the valuation

4.3 INVENTORY

4.3.1 Inventory items need to be appropriately divided into types and groups using the classification framework.

4.3.2 It is essential that inventory is updated regularly to take account of all items added to or removed from the asset base. This will include updating at the component level where component breakdowns apply (see section 4.4 below).

4.3.3 Guidance on developing an inventory for asset management is given in the ~~CSS/TAG *Framework for Highway Asset Management*.~~UK Roads Liaison Group's Highways Maintenance Efficiency Programme Highway Infrastructure Asset Management Guidance document. –The development of a robust, detailed inventory requires both expenditure and manpower. It needs to be undertaken within the context of an overall information strategy. For authorities that do not already have such an inventory the first priority should be to establish good information about carriageway widths (to set alongside the very good information all authorities hold on lengths), and about footway lengths and widths.

4.3.4 For most authorities, carriageways and footways typically represent 70–80% of gross asset value excluding land, and account for the majority of capital maintenance expenditure. Having good information about these is essential for both asset management and valuation. Structures typically represent between 10% and 20% of the gross asset value excluding land. The majority of authorities have good information on bridges, which normally constitute the major part of highway structures. Information on other structure types (such as retaining walls or structural earthworks) is typically not as good, although most authorities have good information on the quantity of these assets, and condition information is improving. Most authorities have good information about street lighting and traffic management systems. Authorities may not have good information about street furniture, but since this typically accounts for a very small proportion of gross value it should not be a first priority.

4.3.5 To avoid double counting, authorities will need to make sure that they do not include in their highway inventory assets that sit on highway land but are held and accounted for by another part of the authority (for example as amenity or housing assets), or owned by another authority or body (such as street lighting provided by parish councils or bus shelters managed and maintained by a passenger transport executive).

4.3.6 **PFI/PPP assets:** assets that are the subject of private finance initiative (PFI) and public private partnership (PPP) arrangements need to be separately identified, even where the arrangement is on the authority's own balance sheet. This is because PFI and PPP assets are maintained and funded differently. For WGA purposes, PFI/PPP assets should be valued in accordance with the guidance in this Code, with the transition from historical cost reporting being made to the timetable set by HM Treasury. Other financial disclosures that are required for PFI/PPP arrangements should be made in accordance with the *Code of Practice on Local Authority Accounting*.

4.4 COMPONENTISATION

4.4.1 The International Accounting Standard (IAS) that deals with accounting for property, plant and equipment, including infrastructure, is IAS 16 *Property, Plant and Equipment* for local authorities this Standard is adopted in the *Code of Practice on Local Authority Accounting*~~6.~~ This requires that where an asset can be broken down into identifiable components with a cost that is significant to the total cost of the asset (and where these components with differenthave different useful lives), those components should beare required to be accounted fodepreciated r separately, in order that they can be depreciated over their useful livesfe (see *Code of Practice on Local Authority Accounting*Accounting Code paragraph 4.1.2.40). Componentisation needs to be applied at an appropriate level of materiality and components with similar lives can be grouped together. The accounting requirements for recognition and derecognition of components Componentisation is also discussed inare provided in paragraphs 4.1.2.19 and 4.1.2.47 of the *Code of Practice on Local Authority Accounting*.

4.4.2 Systematic componentisation is fundamental to the way in which the *Code of Practice on Transport Infrastructure Assets* generates financial information. Under this approach, componentisation is driven by the level of detail that is needed to identify those replacement and capital maintenance activities that are significant enough to need to be taken into account to support the development of detailed work programmes and forward budgets. This may lead to a more detailed level of componentisation than would be required under IAS16. Groupings will therefore also reflect works practice, with components that are renewed or maintained on the same cycle being grouped together. This may lead to a more detailed level of componentisation than would be required under IAS16.

4.4.3 The Code also applies componentisation in a way that fits with and supports the use of other management tools. For instance, for major structures it is designed to follow and reinforce the inspection regime set out in *Management of Highway Structures: A Code of Practice*. For carriageways and footways the approach uses and further develops the asset management capability of the UK Pavement Management System specification (UKPMS). Detailed guidance on the application of componentisation to different types of infrastructure assets is given in the chapters that deal with each asset type.

4.4.4 In summary, the Code will require a more detailed approach to componentisation than has been the case with other methodologies, or than would be needed simply to satisfy IFRS accounting requirements. Instead the level of detail and the grouping of infrastructure components should be determined by what is necessary to support detailed maintenance planning and associated budgeting over the life cycle of the assets.

4.5 ASSET AND TREATMENT LIVES

4.5.1 Having broken down assets into appropriate components, it is necessary to determine the life of each component~~ or treatment.~~. As indicated above, useful lives also determine whether or not it is appropriate to group components.

4.5.2 Assets and components fall into one of two categories:

- those with a **finite life**, at the end of which they will need to be replaced – typically 20–40 years although some assets will have considerably shorter or longer lives
- those which, given any necessary capital expenditure, will have an **indefinite life**.

Indefinite life components can be further subdivided into those that require capital maintenance to allow them to achieve their expected life and those that do not.

4.5.3 For a finite life asset or component, the life cycle period will be the whole of the anticipated life. For an indefinite life component the period will be based on the life of any capital treatments necessary to keep it in use. Judgement needs to be applied here. If, for example, over time an asset would receive a number of cheaper, shorter-lasting treatments, plus a single major long-lasting one, then the life cycle should be based on the latter, to ensure that the activities and costs captured are fully representative over the longer term.

4.5.4 If, exceptionally, a component that had been categorised as not requiring any treatments to maintain its life indefinitely does experience deterioration (for example due to inadequate maintenance of surface layers), then it will need to be re-categorised and an appropriate life cycle plan developed.

4.5.5 It is essential that assumptions about the remaining life of an asset, component or treatment are reviewed annually and revised where necessary.

4.6 COST INFORMATION

4.6.1 Rates used for the calculation of gross replacement cost (GRC) should be new build rates. Chapter 6, which explains what GRC is and how it should be calculated and used, includes detailed guidance on GRC rates.

4.6.2 Where it is not possible to identify the GRC for a specific component, in order to estimate the amount of the asset consumed or depreciated, ~~For all other financial management and reporting purposes,~~ the current unit cost rates should be used as an estimate. The rates ~~used~~ need to~~should~~ be up to date ~~maintenance and~~ replacement cost rates, ie rates for the latest reporting period (financial year). Wherever possible they should be the authority's own rates. In order to comply with the Code of Practice on Local Authority Accounting, the rates ~~They should~~need to reflect actual rates at the time; proposed improvements in procurement or other factors that might lower rates in future years should not be anticipated.

4.6.3 There may be cases where authorities do not have sufficiently recent rates of their own. This may ~~is most likely to~~ arise with certain infrequent ~~maintenance or~~ replacement activities on structures; for these separate guidance ~~is being~~has been provided. For anything else authorities should take appropriate steps to obtain a realistic estimate, for example by seeking rates from neighbouring authorities.

4.6.4 Replacement costs ~~should~~ need to be net of any residual (disposal) value of the asset or component. In most cases disposal will be part of the replacement works contract and will therefore already be reflected in the unit cost rates. For example, in a street lighting replacement contract, the contractor will normally be responsible for removing and disposing of the old assets as well as installing the replacements, and the rates will take account of any scrap value. However, where that is not the case, any residual value will need to be netted off from the replacement costs.

4.6.5 All costs rates used in the AMP should be revised annually to bring them up to current values. In using financial information to support longer-term asset management and financial planning, authorities will need to take a view on whether or not costs for future years should be further uprated in some way to allow for future inflation. This is a matter for local discretion, but it is generally preferable to use a constant price basis for long-term financial planning. As well as avoiding the difficulties involved in making long-term inflation projections, it is much easier to identify other trends or peaks and troughs in expenditure requirements if the effects are not masked by inflation assumptions. For budgeting purposes, however, authorities are likely to want the ability to uprate forecast expenditure over the short to medium term.

4.6.6 With respect to VAT, local authorities' business activities will generally be treated in the same way as those of ordinary traders. However, their statutory and other non-business activities will be outside the scope of the tax, and VAT falling on any purchases by them of goods and services for these activities will not be deductible under the normal credit mechanism. In order to avoid the tax on these purchases burdening the rates or the rate support grant, special arrangements exist under Section 33 of the Value Added Tax Act 1994. As such, VAT should generally be excluded from all such calculations including those relating to PFI schemes.

4.7 COSTS THAT MAY BE CAPITALISED

4.7.1 This section is intended to provide some basic guidance on capitalisation in relation to highway infrastructure. It is not intended to be comprehensive. ~~The Code of Practice on Local Authority Accounting dictates that tangible fixed assets should be accounted for in accordance with IAS16 Property, Plant and Equipment except where interpretations and adaptations to fit the public sector are detailed in the Code.~~ As noted earlier the *Code of Practice on Local Authority Accounting* adopts IAS 16 for the accounting treatment of property, plant and equipment this includes transport infrastructure assets. Direct reference should be made to that Code for its accounting and reporting requirements. More detailed application guidance on what constitutes capital expenditure is also given in CIPFA's *Practitioners' Guide to Capital Finance in Local Government*.

4.7.2 Under IAS 16, the cost of an item of infrastructure shall be recognised as an asset if, and only if, it is probable that future economic benefits associated with the item will flow to the entity, and the cost of the item can be measured reliably. Items that qualify for recognition under IAS 16 should be capitalised.

4.7.3 Most of the provisions under IAS 16 relating to capitalisation are the same as under the previous UK standard, FRS 15, with the important difference that subsequent expenditure on an asset is capitalised using the same criteria as the initial spend. It is not necessary for expenditure to improve the condition of the asset beyond its previously assessed standard of performance – the measurement is against the actual standard of performance at the date of the expenditure.

4.7.4 Costs that meet the recognition principle described in section 4.7.2 include initial costs of acquisition and construction, and costs incurred subsequently to add to~~enhance~~, replace part of, or service the asset. ~~In this context, enhancement means the carrying out of works that materially lengthen the useful life of the asset or materially increase the standard of performance or service potential of the asset.~~

4.7.5 Only costs that are directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management may be capitalised.

4.7.6 Directly attributable costs for highway infrastructure assets include all costs incurred by the authority when constructing the asset, such as labour, plant, material, site preparation, traffic management and professional fees. However, certain costs, such as pre-feasibility costs, the authority's overall programme management, monitoring and overhead costs not directly attributable to ~~a~~bringing a specific asset or scheme into the~~scheme~~, condition and location necessary for it to be capable of operating as intended by the authority ~~are not admissible~~ are not capital expenditure.

4.7.7 Any abortive costs, including those related to design errors, industrial disputes, idle capacity, wasted resources and production delays, are also not ~~admissible~~ capital expenditure. The actual outturn costs incurred in constructing a highway asset can be broadly grouped under the following cost elements:

direct cost of material, labour, plant and equipment including site clearance and preparation costs, including contractor's profit margin and finance costs

project management and supervision costs including scheme design, from the preferred scheme stage

costs of authority's own staff time from preferred route stage

costs of site clearance (net of any scrap value)

costs of landscaping and environmental works, including items such as noise insulation

cost of temporary works, such as diversions and temporary bridging

temporary traffic management costs, such as coning, traffic lights and signage

diversion of non-highway utility (such as gas, water, telephones and cables)

diversion of water courses

possession costs for assets over, or that impact on, railway lines, canals, etc

purchase and compensation costs associated with land acquisition.

4.7.8 Expenditure on existing assets should be capitalised where they result in items with physical substance and also

- it is probable that future economic benefits or service potential associated with the item will flow from the entity and
- ~~and~~ the cost of an item can be measured reliably (*Code of Practice on Local Authority Accounting* paragraph 4.1.2.16)

- ~~in the following circumstances:~~
- ~~where it provides enhancement as described above~~
- ~~where a component that has been treated separately for depreciation purposes is replaced or restored at the end of its useful life, or~~
- ~~where the expenditure relates to a major inspection or overhaul consistent with IAS 16.~~

4.7.9 Put simply, the intention is to capture anything that adds~~enhances~~ to or restores the service potential of the asset compared to its condition at the time the expenditure is made. Therefore activities that do not improve the inherent strength or performance of the structure cannot be capitalised. For example, filling potholes in a carriageway would not normally be regarded as capital works because while they improve safety, they are in effect temporary repairs that do not directly affect the structure of the asset or prolong its life.

4.7.10 Preventative treatments may be categorised as either capital or revenue depending on the nature of the treatments. Gully cleaning, for example, is current expenditure even though a failure to clean sufficiently often eventually leads to damage to the structure of the carriageway. This is because the cleaning is not actually adding to~~enhancing~~ or restoring the service potential of a physical asset or component. On the other hand, surface treatments that prevent water penetration are capital works because they are providing a new or replacement component.

4.7.11 Works carried out for purely aesthetic reasons should not be capitalised. Thus while, for example, preventative painting of a structure should be capitalised, repainting simply to improve its appearance should not. In practice of course if an authority does, say, preventative painting early for aesthetic reasons, then that would still be treated as capital. But it is providing a new physical component and would attract depreciation over the actual rather than the theoretical life of the treatment, and impairment would need to be applied to the remaining value of the previous treatment. Another example of aesthetic works that should not be capitalised would be if a bituminous footway had been dug up for statutory undertaker works and satisfactorily reinstated, but the authority chose to resurface it simply to produce a consistent appearance.

4.7.12 Engineers should take advice from their accountants about any areas of uncertainty as to whether a particular treatment or activity can be capitalised. In cases of difficulty, accountants will wish to consult their auditors at an early stage.

4.8 CONDITION INFORMATION AND DETERIORATION MODELLING

4.8.1 Condition information needs to be collected with sufficient frequency and consistency to provide a representative view of the condition of the asset and to track how this changes over time on a consistent basis. It can then be used to support deterioration modelling.

4.8.2 In many cases authorities may not know the age of an asset or component or how long ago a particular capital treatment was carried out. In these cases it is necessary to use condition as a basis for estimating age. Deterioration modelling is important in estimating and then monitoring the future performance of an asset or treatment, in particular when the asset will need to be replaced or treatments carried out.

4.8.3 Further advice on the collection and use of condition data is given in some of the chapters on individual assets.

CHAPTER FIVE

Developing financial information to support asset management and financial reporting

5.1 INTRODUCTION

5.1.1 As explained in chapter 1, a key principle of this Code is that the same data should serve the needs of asset management, financial management, budgeting and financial reporting. This chapter describes a basic standard model for developing financial information which will serve all of these purposes. It draws on the 'building blocks' described in chapter 4.

5.1.2 Good asset management needs:

up-to-date cost information (as defined in section 4.6)

good inventory data, with an appropriate degree of componentisation

good current condition data and deterioration modelling

to be life cycle plan based

to be whole life cost based.

The model described below seeks to bring all these things together in a consistent, systematic way. It should be used for all types of infrastructure asset, although application will vary depending on the complexity of particular asset types.

5.2 THE BASIC MODEL

5.2.1 **Step 1**: determine component breakdowns and groupings as in section 4.4.

5.2.2 In the rest of this chapter the term 'component' is used. However, it should be understood as applying also to groups where grouping of components is appropriate and to whole assets where there is no componentisation.

5.2.3 **Step 2**: determine whether individual components have finite or indefinite lives and for the latter whether any treatments are required to allow the component to remain in use indefinitely.

5.2.4 **Step 3**: for each component type identified, develop a life cycle plan which includes:

the expected life of the component, or for indefinite life components the life of the treatment cycle

the timing, nature and cost of all the capital treatments (in-life maintenance and end-life replacement) needed to maintain the service potential of the component over its useful life (This will also assist when estimating the value of the asset consumed).

The plan should be designed to optimise value on a whole life cost basis over the cycle. Whole life cost optimisation is not simply about achieving the lowest economic cost over the cycle. The assumptions built into the life cycle plan need to reflect non-economic benefits as well. This should be done through setting local service standards. Whole life cost optimisation can then focus on delivering the required service specification at the lowest economic cost.

5.2.5 Authorities need to use condition data, supported as appropriate by deterioration modelling, to develop the initial assumptions, particularly about component lives, and then to monitor and, where necessary, adjust those assumptions.

5.2.6 **Step 4**: for each component the assumptions and outputs from the life cycle plan should be modelled. The key elements here are estimated asset life, treatment type and treatment costs, including replacements. The latter should be assigned to the year in which they are expected to arise.

5.2.7 Life cycle planning should always be whole life cost based and reflect good engineering practice. Except insofar as affordability has been taken into account in setting local standards of service, the life cycle plan should not initially take account of future funding constraints, though it will reflect the consequences of past funding constraints. In this way the model can provide a clear and consistent measure of the true cost of holding the assets. This also provides a fixed starting point from which to model the consequences of alternative funding scenarios.

5.3 KEY IMPLEMENTATION POINTS

5.3.1 Most authorities will not initially have all the information needed to produce detailed life cycle plans and models. The approach should therefore be to start with whatever data is available and to refine assumptions and increase the level of detail over time as systems and data improve. For example, an authority might initially have only two life cycle plans for its lighting stock, recognising the different life cycles of column and luminaire, and with broad brush assumptions about age and average life across the stock as a whole. But in time, as data allows, separate life cycle plans might be produced to reflect factors such as different types of column or local circumstances where these materially affect performance, for example to recognise that lighting in exposed rural areas will have a significantly shorter life than in more sheltered areas.

5.3.2 The degree of detail and complexity required for modelling will vary between different types of asset. For example, street furniture, even in a developed form, will be relatively simple, with a limited number of components and treatments. Further guidance on componentisation and distinguishing finite and indefinite life components is given in the later chapters that deal with individual asset types. For the most complex assets, carriageways, footways and major structures, specific modelling approaches are being developed. Again these are described in greater detail in the asset-specific chapters of the Code.

5.3.3 Regular monitoring and updating are essential. The model needs to be updated:

when a component is added to or removed from the inventory

whenever a capital treatment is carried out; and

annually to update cost rates and to review assumed asset lives and life cycle plans.

If something happens in-year that indicates that the assumptions made about the life of a particular component are wrong, then the issue should be investigated and the model revised as appropriate without waiting till the annual review.

5.3.4 The estimated life should not be extended if the component is no longer in a serviceable condition but affordability or other constraints prevent its timely replacement. The model should however be revised to pick up the cost consequences of the failure to carry out works at the optimal time. An example of this would be where failure to renew a surface treatment in time resulted in damage to underlying layers.

5.3.5 Authorities may also wish to identify and build the costs of revenue treatments into their life cycle plans and financial models as this is necessary for whole life cost purposes. However, revenue costs must be clearly and separately identified so that the two types of expenditure can be aggregated separately. This is important not only for financial planning but also because only the capital expenditure will be ~~able to be~~ included in the estimation of DRC ~~taken into account when the model is~~ and in the estimate of ~~used to calculate~~ depreciation.

5.3.6 Advice on how to undertake life cycle planning is given in the UK Roads Liaison Group's Highways Maintenance Efficiency Programme Highways Infrastructure Asset Management Guidance document.

~~Board's *Highway Asset Management Quick Start Guidance Note – Life Cycle Planning*.~~

5.3.7 In developing, implementing and maintaining the model it is important that asset managers and finance staff work closely together to ensure that it delivers outputs that are robust, consistent and up to date, and serve the needs of both.

CHAPTER SIX

Gross replacement cost

6.1 INTRODUCTION

6.1.1 When infrastructure assets are constructed or purchased or a component is added or replaced, the new works will initially be recognised in the accounts at cost. They should then be valued on a fair value basis. –Infrastructure assets typically cannot be sold and hence do not have a market value which can be applied. They are therefore ~~valued,~~ measured using a depreciated replacement cost approach. Accounting adjustments are made to reflect any differences between cost and initial carrying value. This chapter of the Code deals with the calculation of gross replacement cost (GRC) which is the starting point for calculating depreciated replacement cost.

6.1.2 GRC is the total ~~admissible~~ cost of replacing either the whole of an existing highway network or some part of it with a modern~~n~~ equivalent ~~new~~ asset. It is the starting point for calculating the net current value of highway assets – that is, their value after taking account of ~~depreciation and impairment~~physical deterioration and all forms of obsolescence and optimisation. Putting a current monetary value on the assets is important because it emphasises the substantial value that is tied up in them and hence the need to invest in maintaining their value. It puts the asset valuation on a comparable basis with all other major ~~categories~~ classes of public sector ~~fixed~~ property, plant and equipment~~assets~~. This is particularly important for WGA and National Accounts purposes because local highway networks are the single largest public sector asset and therefore account for a significant share of national investment.

6.1.3 ~~The CSS/TAG valuation guidance required authorities to develop their own unit cost rates for GRC. However, in recent years there has been little local highway authority new build work and authorities have had difficulties in establishing sufficient data across the various different road categories to develop robust unit cost rates. Action was needed to address the data problem and to produce an approach that would deliver a robust GRC that is consistent between authorities and, given appropriate inventory, can be easily calculated. Therefore, c~~Composite rates for carriageways, footways and structures are now provided centrally for the purpose of calculating GRC. Rates are provided at regional and, where necessary, sub-regional level to reflect geographical cost variations. Authorities will continue to use their own data for lighting, traffic management and street furniture.

6.1.4 The Code also provides new guidance on valuing land. Again this adopts a simplified approach, using rates to be provided centrally.

6.1.5 Central rates should be used only for the ~~GRC~~ purposes provided, typically the calculation of GRC. Where rates are necessary to estimate the proportion of a component consumed (~~D~~depreciation) ~~and other financial information should continue to be calculated using~~ an authority's own maintenance and replacement rates need to be used, for which good up to date information is generally available at the individual authority level.

6.2 BASIS OF VALUATION

6.2.1 Highway assets should be valued at fair value on a depreciated replacement cost (DRC) basis. DRC represents the net current value of the asset, ie GRC less depreciation (~~-~~physical deterioration) and impairment. A DRC approach is used because of the specialist nature of the assets, which are non-cash generating and rarely if ever sold. GRC is measured as the current cost of replacing the network or part of it as if it were a newly constructed asset. An authority's network needs to~~should~~ cover all the roads, and the assets associated with them, that are included in the register kept in accordance with Section 36 of the Highways Act 1980 (England and Wales) or the list in accordance with Section 1 of the Roads (Scotland) Act 1984.

6.2.2 Where an authority provides and maintains capital assets (such as bridges or stiles) on a public right of way that is not on the register/list, these may be treated as highway assets. However, in deciding whether to include such assets, regard should be had to materiality. ~~It will not normally be appropriate to value the associated land if it is not in the authority's ownership.~~

6.2.3 Authorities are reminded that assets held as part of a PFI or PPP arrangement need to be valued separately. (Section 4.3.6 refers.)

6.3 MODERN EQUIVALENT ASSET

6.3.1 Apart from heritage assets, the concept of the modern equivalent asset (MEA) normally applies. The MEA is defined as an asset which provides the same potential performance as the existing asset but takes account of up to date technology. A key purpose of the MEA approach is to ensure that an asset is not over-valued as it might be if the construction cost assumed that the methods and materials used in the original construction would be replicated instead of reflecting the use of modern methods and materials. An MEA also needs to recognise costs such as enhanced safety requirements which may not have existed when the asset was constructed. However, an MEA does not mean redesigning a road. If, for example, a particular road was being constructed today, it might well be built with wider carriageways and new features to cope with current traffic. That would represent an increase in service potential and would therefore be treated as an enhancement, rather than part of the MEA.

6.3.2 The methodology for calculating carriageways and footways that is set out below should largely remove the need to consider MEA issues for those asset types. It is important however that the new asset should be valued on the basis of the same or an equivalent footprint to the old one. This could be either a green field or a brown field location; a new rural road would predominantly be built on green field land, and an urban one on brown field land, and costs will reflect typical land clearance costs for each type.

6.4 HERITAGE ASSETS AND OTHER ASSETS IMPORTANT TO THE CHARACTER OF AN AREA

6.4.1 Many authorities have a significant number of heritage and/or listed highway assets, principally bridges, for example Tower Bridge, but they may also have other assets that are deemed to be important to the character of the area, such as ornate lighting columns and cobbled streets. If the asset would be replaced on a like for like or 'nearly as like as feasible' basis, it would not be appropriate to value it using the MEA approach because this would not reflect the true costs incurred by the authority in maintaining and/or replacing the existing asset, compared to replacing it with an MEA. Therefore, the standardised unit rates derived for MEA groups, or subgroups, should not be used to calculate the asset value for heritage assets or other assets that are important to the character of an area.

6.4.2 Unit rates and GRC models may be determined for individual heritage type assets or groups/subgroups of them. The approach adopted depends on the type and number of such assets in the authority and their value.

6.4.3 Unit rates and GRC models should be based on an optimised replacement cost that provides the required appearance and function but seeks to make cost savings and efficiencies where appropriate. Examples include:

Lighting column – an existing cast iron lighting column with decorative features that reflects the character of the area has been classified as a heritage asset. The column should be valued by assuming it will be replaced by a lighting column that looks the same and provides the same service, although a modern material (steel) may be used to optimise the cost.

Pavement – a cobbled street is deemed to reflect the character of the area and is an important aspect of tourism. The pavement should be valued by assuming it will be replaced by structural layers of appropriate modern materials and standards but the surface layer will be cobbled stone.

If sufficient construction cost data is not available from within the authority or other similar authorities, then engineering judgement and experience should be used in valuing special structures and heritage assets. Authorities may wish to consult other authorities that hold similar assets and, if necessary, advice may also be sought from a quantity surveyor.

6.5 ADMISSIBLE COSTS MEETING THE DEFINITION PROPERTY, PLANT AND EQUIPMENT (CAPITAL EXPENDITURE)

6.5.1 Guidance on the items of costs to be taken into account in valuing and revaluing the assets is given in sections 4.6 and 4.7.

6.6 KEY COST DRIVERS AND DATA ISSUES

6.6.1 The key cost drivers for GRC are inventory and unit rates. So far as is possible and appropriate these need to reflect asset type, construction form and location, ie urban or rural, and regional or sub-regional price differences.

6.6.2 It is recognised that both the coverage and quality of inventory varies widely between authorities. The methodology set out below recognises this and provides some short-term solutions that authorities can use to produce initial valuations.

6.7 METHODOLOGY FOR CALCULATING GRC FOR THE BUILT NETWORK (NETWORK ASSETS EXCLUDING LAND)

6.7.1 Classification framework

6.7.1.1 The starting point is the asset types as defined in the classification framework shown in chapter 4. To provide the necessary degree of consistency, assets must be grouped and valued in accordance with those asset types, which are:

carriageways

footways

structures

lighting

traffic management systems

street furniture.

6.7.2 Carriageways

6.7.2.1 The carriageway length is from the authority's own inventory taken as the road length agreed annually by each authority with the relevant national administration and used for the compilation of national transport statistics (in England known as the R199B road length). This may need to be adjusted if any de-trunked roads are excluded.

The ‘model’ utilises the following carriageway groups:

Urban (roads with a speed limit up to and including 40mph)

‘A’ roads

‘B’ roads

‘C’ roads

Unclassified roads

Rural (roads with a speed limit of more than 40mph)

‘A’ roads

‘B’ roads

‘C’ roads

Unclassified roads

6.7.2.2 This is the breakdown used for centrally provided rates. Two types of rate are provided for each road type: a composite carriageway rate per square metre, and a linear rate for items that relate to road length rather than area. The asset classification shown in Table 4.1 shows the split between area and linear items.

6.7.2.3 The area rates take account of all the relevant admissible costs identified above. They include allowances as appropriate for all the components described in level 3.

6.7.2.4 The composite rates do not necessarily reflect the actual incidence of the various components in existing networks. Instead they are intended to provide a good proxy for what would typically be provided across a network on a modern equivalent asset basis.

6.7.2.5 Using the appropriate central rates, carriageway GRC can be calculated simply as:

carriageway area (or road length x width) x appropriate composite cost rate plus road length x appropriate linear rate (see 6.7.2.2).

The carriageway GRC for each road type can then be aggregated to give a total carriageway GRC.

6.7.2.6 The width of the carriageway is a~~the most~~ significant factor in the calculation of GRC and should be based on actual inventory. ~~’; it is also one where there may be limited information currently available. For authorities that do not have width data initially, the spreadsheet includes default values for each road type that can be used until local data is available. The area of the carriageway is calculated within the GRC model using length and width data. If but if area data is available and not width data for verges this can be inserted.~~

6.7.2.7 Examples of completed spreadsheets showing the calculation of both carriageways and footways are included in the supporting materials to the Code, together with versions that authorities can use to calculate their own carriageway and footway GRC~~, using either their own or default data~~.

6.7.3 Footways

6.7.3.1 Central rates are also provided for footways. These are composite rates per square metre.

6.7.3.2 ~~For authorities that do not have their own footway data, the spreadsheet 'model' includes an assumed configuration of footway for each road hierarchy, as a basis for estimating length, for example urban 'A' roads are assumed to have a footway to each side of the carriageway. A default width has also been included within the 'model'.~~

6.7.4 Structures

6.7.4.1 The gross replacement cost of a transport structure is calculated as:

GRC = dimensions x unit rate x adjustment factor(s)

Where:

dimensions – those relevant to the structure type, such as square metres, metres and number

unit rate – the cost per dimension relevant to the structure type, such as pounds per square metre

adjustment factor(s) – these reflect criteria that have a significant impact on GRC.

6.7.4.2 The following structure types should be used when calculating GRC and, where appropriate, subdivisions (such as those shown) should be adopted where there are significant differences in unit rates. Unit rates are derived using the concept of modern equivalent asset (MEA) as described in section 6.3, although heritage and special structures may require an alternative approach (as discussed in section 6.7.4.6).

Table 6.1 Structure types

Structure types	Description	Dimensions	Possible subdivision
Bridge: vehicular	A structure with a span of 1.5m	Deck area (m^2) =	Single span

Structure types	Description	Dimensions	Possible subdivision
	or more spanning and providing passage for vehicular traffic over an obstacle, eg watercourse, railway, road	length × average width	2 and 3 span 4 and more span
Bridge: pedestrian/cycle	As for vehicular bridge, but provides passage for pedestrians and cyclists	Deck area (m^2) = length × average width	Single span Multi span
Cantilever road sign	A structure with a single support that projects over the network in order to carry a traffic sign	Number	–
Chamber/cellar/vault	An underground room or chamber with an average length of 1.5m or more	Plan area (m^2) = average length × average width	–
Culvert	A drainage structure with a span of 0.9m or more passing beneath a network embankment that has a proportion of the embankment, rather than a bridge deck, between its uppermost point and the road running courses	Plan area (m^2) = length × average width	Single cell Multi cell Depth of fill >1m Depth of fill ≤1m
High mast lighting	Lighting columns over 20m in height	Number	–
Retaining wall	A wall associated with the network where the dominant function is to act as a retaining structure (>1.35m)	Length (m)	Height ≤3m Height >3m
Sign/signal gantry	A structure spanning the network, the primary function of which is to support traffic signs and signalling equipment	Length	Cantilever Spanning
Structural earthworks – reinforced/strengthened soil/fill structure	A structure associated with the network where the dominant function is to stabilise the slope and/or retain earth. All	Plan area (m^2)	Height ≤3m Height >3m

Structure types	Description	Dimensions	Possible subdivision
	structures with an effective retained height of 1.5m or greater		
Subway: pipe	Subways that provide passage for utility service pipes and cabling	Plan area (m^2) = length × average width	–
Tunnel	An enclosed length of 150m or more through which vehicles pass	Plan area (m^2) = length × average width	Bored
			Cut and cover
			Submersed tube
Underpass (or subway): pedestrian	A structure with a span of 1.5m or more that provides passage for pedestrians	Plan area (m^2) = length × average width	–
Underpass: vehicular	The underpass includes approach slab, retaining walls, bridge, drainage, etc	Plan area (m^2) = average length × average width	–
Special structure	For example, moveable bridges, Tower Bridge	As appropriate	Dealt with individually

Table notes:

Bridge deck area = deck width x length

Bridge deck length = centreline to centreline of end supports; or = distance between end support faces + 0.6m

Bridge deck width = measured from outside edge to outside edge

Retained height = as recorded or (actual height + 0.6m)

Culvert length = headwall to headwall

*Culvert width = as per bridge deck **length***

6.7.4.3 National unit rates are provided for each of the above structure types as part of the ~~s~~Structures Asset Management Planning toolkit. For more information~~support documentation and are available~~ see the CIPFA website ~~at~~ www.cipfa.org~~.uk/pt/infrastructure~~

6.7.4.4 The unit rate must be adjusted, where appropriate, to take account of criteria that have a significant impact on replacement cost. Factors that may have a significant impact are listed in Table 6.2 below.

Table 6.2 Adjustment criteria

<table>
<tr><th>ID</th><th>Criteria</th><th colspan="2">Description</th></tr>
<tr><td>1</td><td>Heritage</td><td colspan="2">Exact replacement (materials and look and feel) of existing structure.</td></tr>
<tr><td rowspan="2">2</td><td>Replica heritage</td><td>Same finish as existing structure – impacts on aesthetics, type of material and quality of finish.</td><td rowspan="2">These two criteria are considered to have similar effects, therefore a structure can only have one of these assigned against it in order to avoid double counting.</td></tr>
<tr><td>Conservation area</td><td>Impacts on aesthetics, type of material and quality of finish.</td></tr>
<tr><td>3</td><td>Environmentally sensitive</td><td colspan="2">To take account of protected flora and fauna.</td></tr>
<tr><td>4</td><td>Route supported – A, B or C</td><td colspan="2" rowspan="2">To take account of the route type supported by the structure.</td></tr>
<tr><td>5</td><td>Route supported – unclassified</td></tr>
<tr><td>6</td><td>Obstacle (highway)</td><td colspan="2" rowspan="7">To take account of the different activities and costs incurred when constructing a bridge over different obstacles. This should take account of costs such as possessions (for railways), traffic management, access, etc.</td></tr>
<tr><td>7</td><td>Obstacle (railway)</td></tr>
<tr><td>8</td><td>Obstacle (watercourse – navigable)</td></tr>
<tr><td>9</td><td>Obstacle (watercourse – non-navigable)</td></tr>
<tr><td>10</td><td>Obstacle (footway/cycleway)</td></tr>
<tr><td>11</td><td>Obstacle (tenanted/business)</td></tr>
<tr><td>12</td><td>Obstacle (land/disused)</td></tr>
<tr><td>13</td><td>Substandard structure</td><td colspan="2">To take account of the lower cost of constructing a bridge with a substandard capacity.</td></tr>
<tr><td>14</td><td>Location – urban</td><td colspan="2">To take account of the difference in cost between rural</td></tr>
</table>

15	Location – rural	and urban locations.
16	River, coastal, etc walls	To take account of the specific activities involved in the construction of river walls.
17	Tunnel (150 to 400m)	To take account of the different safety, drainage and M&E required for tunnels >400m.
18	Tunnel (>400m)	

6.7.4.5 Values are provided in the supporting documentation for each of the above factors.

6.7.4.6 **Heritage and special structures:** special structures are those that due to a combination of their size, construction and/or character are not suitable to be valued using standardised unit rates, for example, the Jubilee Bridge.

6.7.4.7 Special structures should be valued individually using the principles given in this Code, including the concept of the modern equivalent asset.

6.7.4.8 In many cases this information is unlikely to be available, therefore heritage/special structure unit rates can be either:

MEA unit rates adjusted by an appropriate factor, either the default factor provided in the supporting documentation or a locally derived/agreed factor, or

unit rates derived using engineering judgement and experience (and advice sought from a quantity surveyor if appropriate).

6.7.5 Other asset types

6.7.5.1 For lighting, traffic management systems and street furniture, the GRC should be based on the current cost of the assets, using authorities' own local rates. The cost rates used in the various spreadsheets are therefore for illustrative purposes only. The degree of detail used in the calculations will depend on the quality of inventory and cost information available. Most authorities seem to have reasonably good inventory for lighting and traffic management systems but many do not have good data on street furniture.

6.7.5.2 Any costs likely to be included in other highway or local authority assets should be excluded. So, for example, while the cost of ducting for cables would be included with lighting, the cost of carriageway and footway surfacing would be excluded for GRC purposes since these would be picked up as part of the construction cost for those asset types. More generally, since GRC rates are those for providing an equivalent new asset (ie as if part of a new build scheme), they should not include any costs for removal of existing assets.

6.7.5.3 Over time, as authorities refine their asset base and break items down into greater detail, they may wish to use these breakdowns for GRC purposes. More detailed breakdowns are desirable where they support better management of the asset and better financial planning. However, given that total GRC of a highway network will be a very large value to which each of these three asset groups will make only a modest contribution, it will only be worth using the more detailed data for GRC if it is likely to make a material difference to the value of the asset or the information will be used for other asset management or financial management purposes.

6.7.6 Lighting

6.7.6.1 The simplified GRC methodology provides for the valuation of street lighting assets at the unit level – lighting columns, illuminated bollards, illuminated signs, etc. The physical costs for an urban network may differ from a rural network.

6.7.6.2 The supporting materials include a spreadsheet giving an example of how this simplified asset valuation would be recorded. This involves multiplying the number of units by the relevant unit cost rate and aggregating the totals. In time authorities might wish to refine the valuation and increase the level of detail provided, but subject to the caveat in section 6.7.5.3 above. An example of a more detailed spreadsheet of this kind has also been provided.

6.7.7 Traffic management systems

6.7.7.1 Initially a simple procedure based on the known number of asset groups (traffic signal junctions, crossings, etc) is proposed to provide the GRC.

6.7.7.2 This procedure estimates the GRC for the traffic systems asset, assuming it was being installed in its entirety as part of a new build scheme, but excluding those costs likely to be included in other highway or local authority assets.

6.7.7.3 Specific information technology system (ITS) in-station equipment like urban traffic control and real time passenger information systems will be valued as an asset (excluding cost of buildings).

6.7.7.4 The aim is to achieve a consistent record of the ITS asset. The supporting materials include an example of how this simplified asset valuation might be produced, together with a version of the spreadsheet which authorities can use to calculate the GRC for their own traffic management systems.

6.7.8 Street furniture

6.7.8.1 The approach adopted for street furniture will depend on the level of inventory information available. Where there is no data or there are gaps in coverage, this will need to be addressed in due course. However, street furniture inventory is not a first priority since for most authorities it represents only a small part of total asset value, depreciation and expenditure. (It may be more significant in some areas, such as in highly urbanised authorities, in which case that needs to be reflected in the priority attached to it.)

6.7.8.2 **Asset composition:** the street furniture items listed in level 3 of the asset classification should be included if they are owned as part of the highway network. The list is not comprehensive and authorities should add additional items relevant to their network. In doing so, regard should be had to the classification framework to make sure that there are no conflicts with this.

6.7.8.3 It should be noted that safety fences and pedestrian guardrails have been classified with street furniture rather than carriageway because they do not form part of the composite carriageway or linear rates.

6.7.8.4 For authorities that already have adequate inventory data, GRC can be calculated simply by multiplying the number of units of a particular item by the appropriate cost rate, then aggregating the totals.

6.7.8.5 For authorities that do not yet have sufficient street furniture inventory to do this, ~~as a temporary measure,~~ a default value will be provided based on a percentage of combined carriageway and footway GRC. Given that street furniture represents only a very small proportion of GRC, the use of a default value for this asset type should not have a significant impact on total GRC. However, authorities ~~will need to collect such inventory in due course.~~ should consider the value of having such an inventory.

6.7.8.6 **Trees:** trees should only be treated as highway assets where they serve a specific highway function, such as where they have been provided to act as a sound barrier or provide screening. Other trees, for example those on estate roads that have been provided to improve the appearance of the street scene, should be classed as community rather than highway assets. For the purpose of calculating GRC it is suggested that highway trees should normally be valued at a nominal cost of £100 per tree. For special categories of trees, for example those subject to a tree preservation order where there is a duty to replace like with like, a higher GRC rate might be applicable. However, such refinements will not normally be material to the calculation of GRC.

6.8 HIGHWAY LAND

6.8.1 Highway land must be valued as part of GRC but should be treated as a ~~distinct~~separate class of asset – the value should be identified separately from that of the other highway assets that comprise the 'built GRC'. It will need to be reported separately.

6.8.2 ~~Since~~ All highway land for which ~~t~~the authority is the beneficial occupier, i.e. that it controls the economic benefits and service potential that inherent within it ~~, all land designated as highway land~~ should be included in the valuation, regardless of whether it is actually owned by the authority, and valued in accordance with the approach described below. The only exception to this would be any land which is occupied on a short time based lease, such as land acquired to provide temporary access or diversion while works are carried out. Such lease arrangements should be treated in accordance with the guidance in section 4.2 of the *Code of Practice on Local Authority Accounting*.

6.8.3 The following detailed points should be noted:

(i) land used for depots and compounds should be valued separately in accordance with the RICS valuation standards

(ii) land owned by the authority that is surplus to requirements and suitable for disposal should be reported separately at its market value

(iii) after initial recognition land under new works that has been brought into use should be valued on the same basis as the existing network.

6.8.4 Authorities that have good information about the extent of their highway land should use it for valuation. For authorities that do not have ~~sufficiently~~ good information in relation to the area of verges, the model provides an automated process~~, guideline average widths are provided, extending the approach proposed for dealing with inadequate information about carriageway and footway widths to provide boundary to boundary notional widths. Authorities should multiply the relevant average width by the road length to produce estimates of highway land area.~~

6.8.5 Land should be valued in accordance with the following procedure, using land values provided centrally. Two values, one urban and one rural, expressed as rates per ~~hectare~~square metre, will be provided for each local authority area. The urban or rural rate should be used depending on the urban or rural classification (based on road speeds) of the highway running through the land. The total area of urban and rural highway land for each should then be calculated using known or, if necessary, estimated boundaries and the relevant rate applied.

6.8.6 ~~Authorities that have to rely initially on default values in calculating areas of highway land will be expected firstly to develop good information about carriageway and footway widths, which will better inform estimated total land widths, and then in due course to identify and base valuations on the actual area of highway land held.~~

~~6.9 WITHDRAWAL OF DEFAULT VALUES~~

~~6.9.1 Section 4.3.4 of this Code stresses the importance of good inventory data on carriageway widths and footway widths and lengths, and the need for authorities to prioritise collection of this data where they do not yet hold it. The use of default values for these attributes will not be allowed for WGA reporting from 2011/12. Other default values may be withdrawn at a later date, but only following consultation. The use of default values should be disclosed in financial and other management reporting.~~

6.10 REVALUATION AND INDEXATION

6.10.1 Centrally provided rates for the built network will be revised every five years to support a full revaluation. Between revaluations, rates used for GRC should be ~~uprated~~ updated annually using an appropriate index. For lighting, traffic management systems and street furniture, for which local authorities are using their own rates for GRC, the rates should be updated annually using actual rates where available. If up to date rates are not available between revaluations, rates may be indexed using an appropriate index.

6.10.2 Centrally provided rates for land valuation are updated annually. Land valuations should be revised annually using the latest provided rates.

6.11 DEPARTING FROM THE APPROACHES IN THIS GUIDANCE

6.11.1 An authority may if it wishes depart from the methodology described above or substitute its own rates for centrally provided ones. However, it will need to demonstrate to the auditors ~~of its WGA return~~ that the approaches applied follow both this Code and the *Code of Practice on Local Authority Accounting* requirements~~the same principles~~, produce comparable valuations and can be repeated consistently from year to year. It will also wish to have regard to the costs and benefits involved.

CHAPTER SEVEN

Depreciation and impairment

7.1 ACCOUNTING DEFINITIONS AND REQUIREMENTS FOR DEPRECIATION

7.1.1 Definitions:

Depreciation is the systematic allocation of the depreciable amount of an asset over its useful life. (Each part of an item of infrastructure with a different asset life and with a cost that is significant in relation to the total cost of the item shall be depreciated separately).

Depreciable amount is the cost of an~~the~~ asset or other amounts substituted for cost, ~~or component~~ less residual value (as described in section 4.6.4).

Depreciated replacement cost (DRC) is a method of valuation which provides the current cost of replacing an asset with its modern equivalent asset less deductions for all physical deterioration and all relevant forms of obsolescence and optimisation.

Useful life is the period ~~for~~ which an asset is expected to be available for use by an authority~~entity~~.

7.1.2 **Requirements:** as explained in chapter 4, IAS 16 requires that where an asset can be broken down into identifiable components with different useful lives, those components should be accounted for separately. For practical purposes, this means breaking assets down into their key parts at a sensible level of materiality, not trying to separately identify and account for every individual element. Components need to be distinguished in terms of those that have a finite life, at the end of which they will be replaced, and those that, given appropriate capital maintenance (replacement of subcomponents), will last indefinitely.

7.2 BASIS FOR CALCULATING DEPRECIATION

7.2.1 For some infrastructure assets, such as carriageways and structures, the GRC rate is calculated as a single composite rate and is not broken down into the different components. This means that it cannot be used to calculate the value of the asset consumed or depreciation for each component. It is therefore necessary f~~F~~or finite life components for~~,~~ depreciation to be~~is~~ based on the cost of replacing the component plus any other capital treatments needed to allow it to achieve its anticipated life and performance. Some indefinite life components, such as most underlying road layers, would normally be non-depreciable. However, because of the need to identify components/assets at a sensible level of materiality, some indefinite life components may include elements that do require capital maintenance/replacement in order that the component as a whole can continue to operate indefinitely. In these cases, the costs of the maintenance/replacement activity would be treated as depreciation but the total value of that component would not be depreciated. For highway assets the main indefinite life components are underlying layers of carriageways and footways, although some of these will attract depreciation. There may also be some indefinite life components to structures. Other asset types – lighting, traffic management systems and street furniture – consist entirely of finite life components.

7.2.2 Where the GRC rate is not broken down into the required level of detail f~~F~~or each component (or group or asset, depending on the level of componentisation), ~~annual~~ depreciation should be ~~calculated~~ estimated usingas~~as~~ the replacement cost of the

~~assets~~component as a proxy for the value of the asset ~~which has been~~ consumed by the authority as follows:

the aggregated cost of all the capital replacements/treatments needed to maintain/restore its service potential over the life cycle, spread over the estimated number of years in the cycle.

7.2.3 The information needed to ~~calculate~~ estimate depreciation – capital costs and estimated useful lives – should be available in and taken from the financial model described in chapter 5. (NB the rates in the model are specified as net of any residual value and therefore should not require further adjustment to provide the depreciable amount.)

7.2.4 The only additional requirement for the model to calculate depreciation is to allocate the depreciable amount over the total useful life. This should be done on a straight line basis. This also has the advantage of providing an even charge for budgeting purposes and spreading the consumption of the economic benefits evenly across generations.

7.2.5 Where the GRC rate is broken down by components, depreciation will be the GRC rate divided by the component's (or group's or asset's, depending upon the level of componentisation) useful life.

7.2.6. The requirements specified for reviewing and keeping the data and assumptions in the financial model up to date, if properly met, should provide the necessary assurance for valuation and financial reporting.

7.2.7~~6~~ Changes in estimated asset life will of course need to be reflected in the way annual depreciation is charged. If the estimated life is extended or reduced~~,~~ ~~then the remaining depreciable amount should be spread over the longer period. If the life is reduced, then either the remaining depreciable amount must be spread over the shorter period or a one off impairment charge made to cover the difference~~then depreciation will need to be re-estimated.

7.3 APPLYING THE APPROACH: PRACTICAL ISSUES

7.3.1 The principles described above are relatively straightforward. However, there are significant practical difficulties in applying them initially to highway network assets. The first issue is the scope and quality of inventory data. The second is that even authorities that have good inventory data may well not know the age of a particular component or where it stands in its life cycle. This is not a major problem for annual depreciation so long as the costs and estimated life over a typical cycle are robust.

However, it is a significant problem in measuring the initial DRC. Various approaches are possible for this. In some cases, an authority may be able to do no better than to assume an even age spread across a particular asset type, or apply such evidence as is available to modify that. A preferable approach, where it is possible, is to use condition information to provide reasonable estimates of initial DRC.

7.3.2 For long life assets, it will take considerable time for authorities to gather age data, and at least in the early years while inventory, groupings and asset life data are still developing, authorities are recommended to re-run the initial DRC calculation annually rather than simply calculating subsequent DRC by the value of annual movements. For any asset types where good age data is not available, authorities may find it useful to calculate the asset's contribution to DRC both ways and compare the two.

7.3.3 Further guidance on calculating depreciation for individual asset types is given in chapters 8 to 11.

7.4 IMPAIRMENT

7.4.1 Impairment is a reduction in the net value of an asset due to a sudden or unforeseen decrease in its previously measured condition and/or performance that has not already been accounted for through depreciation. One example would be an asset or component that failed or otherwise needed replacement before the end of its estimated useful life. Another might be damage due to an accident or natural phenomenon such as flooding, landslide or severe adverse weather conditions.

7.4.2 An **impairment loss** is defined in the *Code of Practice on Local Authority Accounting* as the amount by which the carrying amount of an asset exceeds its recoverable amount. The **carrying amount** is the amount at which an asset is recognised after deducting any accumulated depreciation and accumulated impairment losses and the recoverable amount is the higher of fair value less costs to sell (i.e. net selling price) and its value in use.

7.4.3 As the Code promotes the use of the same information for expenditure planning and ~~accounting,~~reporting its approach is where possible to predict and allow for things that would otherwise have to be treated as impairment. For example, on the basis of experience it is possible – and prudent – to make allowances for replacement of a certain number of lighting columns, traffic signs and barriers each year as a result of accident damage and build those into the relevant life cycle plans. Similarly, life cycle plans for carriageways might assume one severe winter weather event every ten years and allow for the impact of that in determining maintenance treatments and useful lives. Such effects would therefore already be reflected in the calculation of annual depreciation and an impairment loss would only arise if there were material additional events or costs.

7.4.4 At the end of each reporting period an assessment shall take place as to whether there is any indication that an asset may be impaired. If an indication exists, the recoverable amount shall be estimated having regard to the application of the concept of materiality in identifying whether the recoverable amount of an asset needs to be estimated. If no indication of an impairment loss is present the Code does not require a formal estimate of the recoverable amount.

7.4.5 The objective is to ensure that the assets are carried at no more than their recoverable amount. An asset is carried at more than its recoverable amount if its carrying amount exceeds the amount to be recovered through use or sale. Provided highway assets are adequately maintained and depreciated in an appropriate manner, they are unlikely to become materially impaired unless events or changes in circumstances cause a sudden and unforeseen reduction in the performance. A reduction in the remaining service life of an asset/component could be treated using accelerated depreciation, or alternatively impairment is calculated.

7.5 MEASURING IMPAIRMENT

7.5.1 The approach used for impairment should be established and consistently applied. After an approach is established, if it is identified that a change in the approach would provide a fairer valuation, then this should be applied at the next benchmark valuation and described in the valuation report. Damage to highway assets resulting in an impairment charge is calculated as the cost of restoring/replacing the asset (or component) to a fully serviceable condition, minus depreciation already charged. It must be charged within the year that the impairment occurs.

7.5.2 Impairment needs to be considered over the total value of the asset, including components such as earthworks or underlying carriageway layers that would not normally be depreciable. As with depreciation any residual value, including scrap value, would be netted off.

7.5.3 Valuation reflects availability of an asset as well as its condition. If an asset is unavailable for more than 12 months then impairment has to be charged on the whole asset, for example if a bridge closed for more than 12 months for major repairs then the full value not yet depreciated would be charged to impairment, rather than just the cost of the work required to restore its condition.

7.5.4 Further advice on impairment in relation to individual asset types is provided in the later chapters of the Code.

7.6 REPLACEMENTS FUNDED BY INSURANCE

7.6.1 Where an asset is damaged as a result of an accident, the authority will where possible seek to recover the costs of replacing the asset or component(s) through a claim on the party's insurance. Although there is no net cost to the authority, the replacement should be treated for asset management and valuation and budgeting in the same way as any other component replacement. The insurance payment must be accounted for separately and cannot ~~then~~ be used as a contribution to set off against the cost.

CHAPTER EIGHT

Carriageways: detailed guidance

8.1 INTRODUCTION

8.1.1 This chapter provides more specific guidance on the valuation, depreciation and impairment of carriageways. It is proposed that the UK Pavement Management System (UKPMS) should be used as a tool to support both management (including the associated financial planning) and valuation of pavement assets.

8.1.2 This chapter deals only with carriageway surface and underlying layers. Other assets that have been included with carriageways in the composite rates for GRC, such as drainage, kerbs and fencing, are dealt with in chapter 11.

8.2 UKPMS

8.2.1 The UK Pavement Management System (UKPMS) specification provides the national standard for management systems for the assessment of local road network condition and for the planning of investment and maintenance on paved areas of roads, kerbs, footways and cycletracks on local roads within the UK.

8.2.2 The primary use of UKPMS is to assist local authorities in the planning of maintenance on the local road and footway network through the systematic collection and analysis of condition data. This is recommended as good practice and is a vital element of an effective highway asset management regime. Because the UKPMS approach ensures consistency between the different pavement management systems operated by different local authorities, it is also used across the UK to report performance information to national administrations.

8.2.3 In general, all pavement management systems consist of a representation of a road network divided into uniquely referenced road lengths. Against this network, it is possible to locate other data including condition data collected by visual or machine surveys and inventory such as construction details and width information. By applying rules to the condition data held against each section a depreciated value can be calculated, as described below. Further information about UKPMS is available on the system website (www.pcis.org.uk).

8.2.4 Rule sets are released by the UKPMS Support Contractor in an annual cycle to meet the needs and timescales for both national reporting and the Annual Health Check, which ~~. From 2009 the Health Check~~ includes guidance on the provision of

~~new~~ financial information to support asset management, and is the basis for some of the interim approaches described below. The relevant note is Technical Note 46. Further developments to support the process will be made to UKPMS as necessary in future years.

8.3 ASSET COMPOSITION, COMPONENTISATION AND LIFE CYCLE PLANNING

8.3.1 For simplicity most carriageways can be divided into ‘surface’ and ‘underlying’ layers.

Surface: the top 100mm or the total thickness of the bound layers, whichever is least. The primary purpose is to seal the road and to provide grip and a reasonable ride quality and shape.

Underlying: the layers below the surface that give the road strength. In the case of a major road this might include further bound layers as well as unbound layers and could be of substantial thickness. In the case of a minor road the underlying layer(s) might all be unbound and could be quite thin, or even non-existent in some cases.

8.3.2 Surface layers will need maintenance treatments from time to time and are therefore finite life, depreciable components. Under normal circumstances wholesale replacement or major repair of underlying layers will not be part of the life cycle plan of most roads. In such cases underlying layers should be treated as non-depreciable, subject to the requirements in section 4.5.4 to change the categorisation if circumstances change.

8.3.3 There are some circumstances in which underlying layers may need capital treatments and therefore attract depreciation. Problems in the underlying layers of the road are usually attributable to one or a combination of:

utility company openings

poor underlying ground conditions

heavy goods vehicle traffic.

8.3.4 There are two possible approaches to dealing with these problems. For utility openings and relatively localised subsidence, an appropriate allowance should be made in the life cycle plan for a small amount of work to underlying layers to be undertaken as part of the programme of works to surface layers. This might be as simple as an additional percentage, based on historic trends, that needs to be spent over and above the cost of the treatments to surface layers to rectify underlying defects.

8.3.5 More widespread poor underlying ground conditions or roads which carry a high number of heavy goods vehicles may require periodic repair or replacement of some or all of the underlying layers. These roads need to be identified and life cycle plans produced which provide for the works to the underlying layers as well as the more frequent works to the surface layers. Life cycle plans need to be based on the longer timescale of the major works, rather than just the surface treatment cycle.

8.3.6 Rigid concrete pavements and rigid composite pavements

8.3.6.1 Although in a minority in terms of carriageway construction types, there are still a considerable number of roads that are either of a rigid concrete construction or have been modified over their working lives to become rigid composite pavements. This section deals with these roads and offers information to enable local highway authorities to extend the classification advice to cover these types of highways.

8.3.6.2 Any concrete road which has effectively been broken up in situ and the broken material used to form a foundation layer to the reconstructed road with flexible material above should be considered as a flexible road and the advice given elsewhere applied.

8.3.6.3 Guidance on failures in and deterioration of concrete pavements is given in the *UKPMS User Manual*, Volume 2 *Visual Data Collection for UKPMS*, Chapter 6. Reference should also be made to Section 3, DVI Defect Definitions, which contains a section on concrete pavements.

8.3.6.4 It is acknowledged that the condition and planned maintenance of concrete pavements can be a very complex operation and in many cases each length of concrete pavement will have to be considered separately. The authority will have to decide the scale of the investigations and the associated costs.

8.3.6.5 ~~As a~~Currently~~n interim approach~~, if the concrete pavement is in good condition and shows no signs of distress it may be treated as an indefinite life asset and depreciation would only apply to any capital treatments required to keep it in that condition. If however a pavement, either now or in future, shows any signs of deterioration, it should be assumed that it has a finite life and a life cycle plan should be developed that provides for either replacement of components or replacement in due course of the whole pavement with a flexible construction.

8.4 DATA ISSUES

8.4.1 As discussed in section 7.3.1, there are some practical issues in applying the principles for calculating depreciation to particular asset types because of deficiencies in data. For carriageways, UKPMS ~~will as an interim measure allow authorities to use default width data where they do not have their own data. It will also~~ provides a consistent methodology, described below, for using the condition data in UKPMS as a means of estimating the age of the carriageway surface where this is not known.

8.5 DEPRECIATED REPLACEMENT COST: ~~INTERIM~~ CURRENT SOLUTION

8.5.1 The following methodology has been devised to calculate the contribution that carriageway surface assets make to depreciated replacement cost (DRC). The method uses condition survey data, including CVI, DVI and SCANNER, in UKPMS. It applies to bituminous surfaces which account for around 99% of the local network. Because the approach only works for surface layers, since that is what the UKPMS condition data covers, authorities will need to exclude the costs of any major reconstruction works to underlying layers from the surface depreciation calculation and add these in separately as appropriate afterwards. Where there is only a small amount of work to underlying layers, this can be included in the cost of surface works.

8.5.2 Road grouping/section data definition

8.5.2.1 The depreciation methodology is designed to operate in association with groupings of ~~pavement~~ carriageway sections. For GRC, the methodology is based on road classification and urban/rural splits, since those are readily available to all authorities. However, given the different nature of GRC and DRC rates and the activities that they represent (see sections 2.2.6.1 and 2.2.6.2), it is not necessary to use this grouping for calculating depreciation. Groupings are however limited to section data contained within UKPMS and will be based around standard attribute data such as:

road hierarchy

urban or rural

speed limit

road type

the classification in the *Well-maintained Highways: Code of Practice for Highway Maintenance Management* (UK Roads Board, 2005, updated in 2012).

So far as data and systems allow, authorities should use whichever groupings are most suitable as component groupings for life cycle planning purposes, ie which bring together road lengths that would receive comparable treatments and have broadly similar lives. Groupings must cover all road lengths with bituminous surfaces.

8.5.3 Other required inputs

8.5.3.1 Having specified road groupings, each authority is required to develop a simple life cycle plan and input for each grouping:

Total useful life: the average time (in years) after which the carriageway~~pavement~~ surface has been fully consumed and needs replacement. This is usually the time when it makes economic sense to renew the surface because unplanned reactive maintenance has accumulated to a point where surfacing renewal is economically viable. In assessing average total useful lives authorities should in appropriate cases make allowances for occasional factors such as severe weather events as well as ongoing ones such as traffic growth.

Renewal unit rate: the average cost for the relevant component grouping of replacing the surface at the end of its useful life, expressed in £/m^2 at current prices. This should be based on the authority's own current rates and should include any allowance made for small amounts of work to underlying layers.

Deterioration initiation: the point (measured in years from the start of the life cycle) at which surface deterioration first becomes measurable. This is explained in greater detail in section 8.5.3.2.

The methodology is sensitive to each input and therefore it is important that a robust approach is devised for determining inputs, making the best use of available data. HAMFIG have produced guidance on suitable ranges for the total useful life and the deterioration initiation which can be found on the CIPFA website at www.cipfa.org.

8.5.3.2 New ~~pavement~~ carriageway surfaces can appear in 'as new' condition for a period of time before they show any deterioration in UKPMS. Since depreciation needs to be allocated over the total useful life of the asset, an adjustment has to be made to allow for this, otherwise the condition data would treat as new not only surfaces that have just been constructed or renewed but also somewhat older surfaces that have not yet started to show deterioration. Without the adjustment, the methodology would under-represent the true level of depreciation. For high-volume roads the 'deterioration initiation' point could be as soon as one year. For very low-volume roads it could be considerably longer. Engineers will need to apply judgement and experience in estimating the deterioration initiation point, and then monitor and adjust the inputs for individual groupings as appropriate in the light of experience.

8.5.3.3 Table 8.1 below shows an example of groupings and data inputs. In this case road lengths are grouped using the *Well-maintained Highways* classification and an urban/rural split. The data in the table is provided for illustration only and is not intended to be used as default values.

Table 8.1 Example of groupings and data input

Well-maintained Highways classification	Urban or rural	Deterioration initiation – T_{INI}	Total useful life – T_{TUL}	Default width (m)	Renewal rate £/m²
3	U	2	15	6.5	£30
3	R	2	15	5.0	£25
4	U	3	17	5.5	£25
4	R	3	17	4.5	£20

8.5.4 The calculation of DRC

8.5.4.1 Once an authority has determined its groupings and input values for deterioration initiation, total useful life and cost rates, plus appropriate width data, UKPMS can calculate depreciated replacement costthe accumulated depreciation and annual depreciation which are used to calculateestimate DRC. It does this by using UKPMS condition data for each length to calculate an overall condition for each section. The condition value is used to estimate the age which in turn provides an estimate for the accumulated depreciation percentage.then converted to a depreciated value, via a deterioration curve and depreciation line. The accumulated depreciation percentage is then multiplied by the network length, average width and renewal rate to provide an estimate of the accumulated depreciation.ed value is then used to obtain the DRC. The process is illustrated in the graph at Figure 8.1 below.

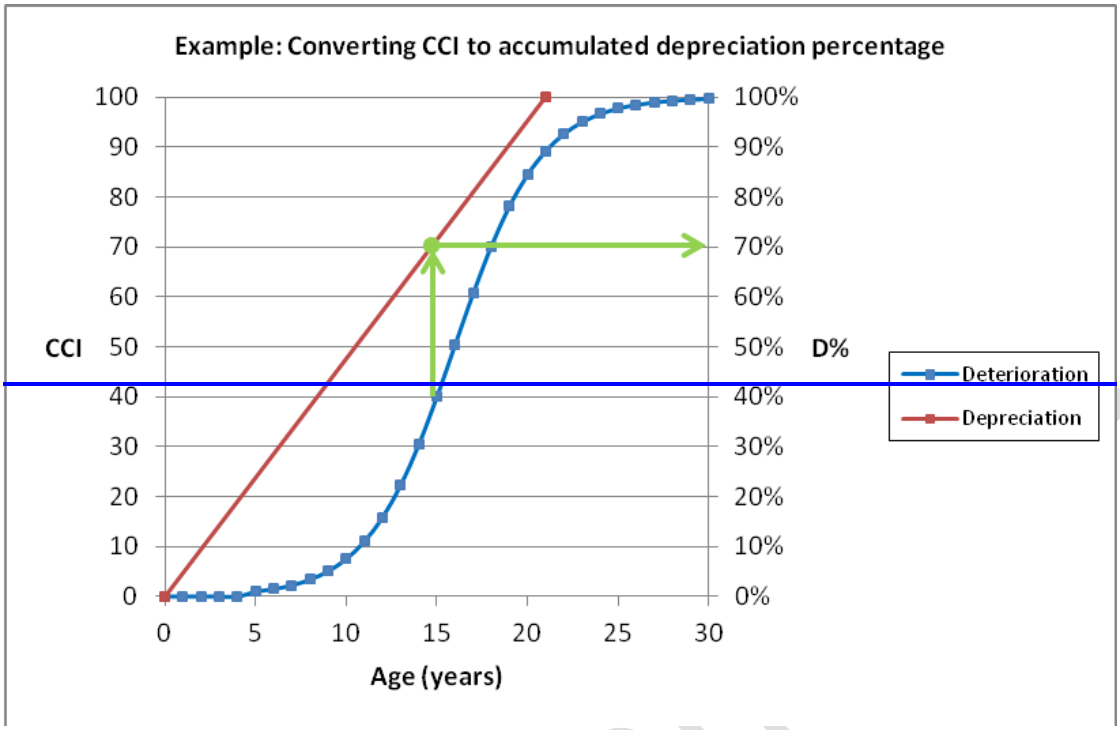


Figure 8.1 Converting condition to a depreciated value

8.5.4.2 The formula for the deterioration curve includes both the total useful life and the deterioration initiation time and so it is automatically adjusted to fit these two parameters. The accumulated depreciation line (the straight line in the diagram) depends only on the total useful life. The diagram also illustrates that surfaces which have not yet started to show deterioration are assumed to have incurred depreciation corresponding to half way between newly constructed (ie with no depreciation) and the point at which deterioration begins. The straight line is used for accumulated depreciation in order to better reflect the consumption of the asset.

8.5.4.3 The details of the calculation, including the formulae used, are provided in UKPMS Technical Note 46.

8.5.4.4 New condition indexes have been derived for CVI (bituminous only), DVI (bituminous only) and SCANNER condition data. Condition data needs to reflect the present condition of pavements. For unclassified roads where there are no nationally set requirements as to survey frequency, authorities will need to take a view in the light of traffic and other factors as to what is an appropriate frequency and coverage to achieve this. Additional surveys may be required to measure the effects of significant weather events, for example following a period of severe winter weather.

8.5.4.5 UKPMS will provide ~~a~~ standard reports for Accumulated Depreciation and Annual Depreciation.~~containing the depreciated value (%) and survey coverage (%)~~.

8.5.4.6 A detailed explanation of the methodology, including the definition of the depreciation curve and the way it is used to convert condition data to DRC, and of the reporting formats that it can provide, is given in UKPMS Technical Note 46, which provides guidance to UKPMS developers to allow them to produce financial information to support asset management (this note is available at www.pcis.org.uk).

8.5.4.7 Where there is larger scale reconstruction to underlying layers, the contribution that those layers make to DRC will need to be calculated separately outside UKPMS. Where authorities have age data for such works, the DRC contribution can be calculated by multiplying the annual depreciation (see section 8.6.2 below) by the number of years' life consumed. Where there is no age data, authorities will need to estimate age, relying on professional judgement supported where available by information from any deflectograph surveys, statutory undertaker openings, etc.

8.5.4.8 UKPMS is likely to be subject to further modifications in future years either to refine the initial approach in the light of experience or to otherwise enhance its capability to generate financial information to support asset management. These will be defined in later (annual) versions of Technical Note 46. In applying this chapter of the *Code of Practice on Transport Infrastructure Assets*, authorities should use the most up to date version of Technical Note 46. Further guidance or examples may also be provided as part of the supporting materials.

8.5.5 Moving forward on DRC

8.5.5.1 ~~Eventually~~ In due course all authorities should have actual age data as a basis for calculating
DRC – and all authorities need to start recording this whenever they carry out capital work – but, given the very long lives of surface treatments for many unclassified roads, authorities will need to use condition as a proxy for age for some considerable time to come.

8.6 ANNUAL DEPRECIATION

8.6.1 There will be two levels for this:

an interim version which uses the data inputs (other than deterioration initiation) required for interim DRC as described above

an aspirational version which adopts the same life cycle-based approach but will use deterioration modelling and UKPMS data to refine the inputs.

8.6.2 The ~~interim~~ current version

8.6.2.1 Using the data from the ~~interim~~ DRC calculation, annual depreciation should be calculated for each of the groupings in section 8.5.2 as:

$$\frac{\text{total area (sq m) x renewal unit rate}}{\text{total useful life}}$$

Authorities will again need to calculate any depreciation for underlying layers separately from that for surface layers, and then add the results together.

8.7 A MORE DEVELOPED LIFE CYCLE APPROACH FOR THE FUTURE

8.7.1 Introduction

8.7.1.1 The interim network-level approach described above looks at a discrete subset of the network (unclassified urban roads for instance) and estimates, based on engineering judgement, how long a road of this type will typically last and what the most efficient generic life cycle treatment for this type of road would be.

8.7.1.2 However, even within a general category, there will be a wide variety in the performance of roads based on differences in traffic, construction and a host of other factors. This means that while the interim approach provides a good starting point for general planning and forecasting of need, it is not sufficiently refined to work as a decision-making tool to support detailed work planning – authorities should not plan to resurface a road every 20 years (for example) simply because the grouped life cycle plan for that part of the asset is based on that frequency and treatment.

8.7.1.3 Consequently, and because the carriageways are by far the most valuable part of the highway asset for most authorities, it makes good sense to aim to move to a more advanced level of life cycle planning for them in the future, one that directly supports the production of maintenance works programmes as well as underpinning the financial information.

8.7.1.4 Such an approach would need to work at a road section level, rather than a network level, and should effectively produce a mini life cycle plan for each road section within the network, predicting future condition and optimal treatment strategy. These could then be aggregated to a network level to give an overall level of demand, identifying both the annual depreciation charge and the (ideal) long-term works programme through the same process.

8.7.1.5 The following section sets out the blueprint for how this could work and could be delivered but it is stressed that this is a longer-term solution towards which authorities should be working, not one that most will be able to deliver in the short or medium term.

8.7.2 Optimised road section level approach

8.7.2.1 Componentisation is assumed for all examples. The model applies to all the layers that need capital treatments. Depending on how assets are grouped for life cycle planning, different models may be needed for different components/layers.

8.7.2.2 To achieve this each section of carriageway would need a mini life cycle plan which includes:

- the expected life of the maintenance cycle
- the timing, nature and cost of all the treatments needed to maintain the (current specified) service potential of the asset over its life cycle on a whole life cost basis
- condition data and deterioration modelling to monitor performance of the carriageway against the assumptions, particularly the assumed treatment lives, in the life cycle plan, and to amend the plan, and its funding requirement, as necessary on a regular (probably annual) basis
- cost information, updated annually, based as far as possible on the authority's own costs, for each treatment in the life cycle plan.

8.7.2.3 The annual expenditure requirement for each section of road would be calculated as the cost of all the treatments in the life cycle plan divided by the number of years in the expected life cycle. These figures would then be aggregated to produce the total annual expenditure requirement for the carriageway network.

8.7.2.4 To support the move to an approach of this kind:

- a deterioration model to predict the future performance of the individual road will need to be developed, tested and implemented in a way that is available to all authorities to allow future performance to be predicted with a reasonable degree of accuracy and consistency
- an optimisation process needs to be linked to the deterioration model to allow authorities to select the most cost-effective treatments (this is especially critical where the budget is insufficient to fully fund the ideal programme).

8.7.2.5 These requirements have been identified in a recent review of UKPMS core functionality so it is envisaged that UKPMS systems should be able to undertake these tasks in the future. However the development and implementation of these functions will not be quick or simple and they may not be available until 2013 or beyond.

8.7.3 Local implications of the approach

8.7.3.1 In order to adopt this approach and make use of the proposed new UKPMS functionality, authorities will need to ensure they have a substantial amount of data on the asset since any model of this type is only as reliable as the data on which it is based. In working towards this, authorities should first develop a data strategy to identify what they will need to collect and which gaps in their current data are most critical.

8.7.3.2 The data needed falls into three general categories~~,~~ described ~~below in outline. T~~in the tables below. ~~list the general categories, the ease with which the data can be collected and the general likelihood of an authority having such data at the moment.~~

Table 8.2 Static data (mostly updated only when the asset changes)

	~~Ease~~	~~Likelihood~~
Length	~~Easy~~	~~Yes~~
Classification and/or hierarchy	~~Easy~~	~~Yes~~
Width and area	~~Moderate~~	~~Maybe~~
Age of surface	~~Hard~~	~~Some~~
Age of structure	~~Very hard~~	~~A few~~
Surface type	~~Moderate~~	~~Maybe~~
Type and thickness of structure	~~Hard~~	~~A few~~
Traffic flows	~~Moderate*~~	~~Some~~
HGV flows and/or land use	~~Moderate~~	~~A few~~
Changes in use patterns	~~Hard~~	~~Some~~

Difficult ground conditions	~~Moderate~~	~~Some~~
Bus routes	~~Moderate~~	~~Some~~

~~**Easy for an individual road, difficult for the whole network but some kind of approximation should be possible.*~~

Table 8.3 Condition related data

	~~Ease~~	~~Likelihood~~
SCANNER surveys (ABC roads)	~~Easy~~	~~Yes~~
Up to date CVI surveys (U roads)	~~Easy~~	~~Some~~
Safety inspection data	~~Moderate*~~	~~Yes~~
SCRIM/GripTester data *(As and Bs only?)*	~~Moderate*~~	~~Some~~
Public reports	~~Moderate*~~	~~Yes~~
Other expenditure (eg Cat 2)	~~Moderate*~~	~~Some~~
Deflectograph *(As and Bs only?)*	~~Moderate*~~	~~Some (old?)~~
Streetworks openings	~~Easy~~	~~Some~~
Structural info from s/w inspection	~~Moderate~~	~~Some~~

~~**Ease depends on the system used to capture and store this data.*~~

Table 8.4 Treatment details

Range of treatments
Costs
Durability/life
Treatment patterns
Restrictions based on:
Urban/rural

Classification
Traffic load
Area, etc

8.7.4 Deterioration and optimisation model

8.7.4.1 While the details need to be developed, the performance model, whether in UKPMS or elsewhere, would need to use the above data to:

examine each road section

establish current condition

evaluate likely future deterioration

evaluate various treatment options (treatment + year, includes ‘do nothing’)

select optimal treatment for that road (could be ‘do nothing’)

rate the relative efficiency of that treatment (cost/benefit)

identify typical future treatment pattern based on initial ideal treatment

this creates a mini life cycle plan for that road.

Then at a network level:

evaluate the annual depreciation charge for the network based on the aggregated analysis of the individual road sections

select the most efficient treatments up to the available budget level for each year to give an optimised programme for five to ten years

this gives a forward works programme optimised for value for money that can be used to coordinate with other works.

Beyond the five to ten year programme, use the idealised notional forward projection to create a longer term ‘need’:

a 40–50 year life cycle plan and financial projections for the asset.

8.7.4.2 In addition to the data requirements, it should also be understood that, to get the full benefits of a strategy of this type, it needs to be put into practice on the ground – that is to say that works programmes and operational procedures need to follow and support the strategy. This may require cultural changes within the organisation and consideration by national administrations of whether changes are required to performance measurement, including national performance indicators, to reflect the availability of better information and support good asset management practice.

8.8 CARRIAGEWAY LIFE CYCLE PLANNING: PUTTING THE GUIDANCE INTO PRACTICE

8.8.1 Introduction

8.8.1.1 The purpose of life cycle planning is to examine and evaluate different options for the maintenance and operation of an asset in order to determine the most effective strategy for the asset. Consequently different plans can be drawn up for different strategies on the same asset, allowing a comparison of the costs and benefits of each to be made and helping decision makers optimise the results. This example deals with roads with a bituminous surface since these tend to make up the vast majority of local authority networks.

8.8.2 Defining the asset

8.8.2.1 As described in section 8.3, the surface layers of the carriageway asset will normally have a finite life while the lower layers of the road will generally have an indefinite life. Therefore, while the structural layers of a road will require localised treatment from time to time, in most cases an authority will not normally plan their complete replacement within a typical life cycle.

8.8.2.2 This example concentrates on building a life cycle plan for the surface layer(s) of carriageways, which can be defined for this purpose as the top 100mm of the road or the total thickness of the bound surface, whichever is less. The same principles would however apply to roads that required a combination of surface treatments and, less frequently, major reconstruction, although the plan would be a bit more complex.

8.8.3 Identifying suitable groupings

8.8.3.1 The carriageway should be divided into suitable subgroups based on factors that influence the life cycle. The key thing is to ensure that the life cycle is reasonable for the assets on which it is being used. For example, it would not be reasonable to apply the same life cycle information to a country lane and a motorway.

8.8.3.2 In the case of carriageway surfaces, key factors to consider include:

usage (in terms of number and weight of vehicles)

construction (since this will affect life and inform maintenance options) maintenance techniques (plans should not be based around techniques that the authority would not consider appropriate on that type of road).

8.8.3.3 Most authorities will not have sufficient data to differentiate between similar roads and it is important that the amount of effort and detail used in the life cycle planning exercise is proportionate and appropriate to the available data. It is therefore suggested for this intermediate level of plan, that carriageway surfaces be broadly grouped into a small number of groups that have generally similar properties and performance. Factors to consider might include:

condition data – this is often collected differently for unclassified and classified roads

A roads – these frequently carry more and heavier traffic and may be more robustly constructed

treatments – some treatments are more suitable for rural roads and others for urban; this should be based on local custom and practice so that the plan is deliverable.

Box 8.1 Identifying suitable groupings

Barsetshire Council has a mixed urban and rural network with towns and villages of various sizes linked by rural roads of various sizes and a number of busy strategic roads, all of which are managed by the council.

Barsetshire collects SCANNER data on its A, B and C roads and CVI on its unclassified roads at various frequencies. It also reports condition performance based on these measures. The council therefore decides it makes sense to divide the network based on this classification rather than its own maintenance hierarchy (which could be another obvious choice). It decides that its B and C roads are similar enough within the limits of the data available to be one group while the A roads are another and the unclassified network a third.

Barsetshire regularly surface dresses rural roads but council policy precludes surface dressing in urban areas. Instead Barsetshire uses micro asphalts on minor urban roads although not usually on the classified network. This means that it needs to distinguish between urban and rural for each of the three groups based on classification – a total of six groups so far.

Barsetshire has a small number of high-status roads (mainly in enhanced town centres) and a limited number of concrete estate roads. It sets these special cases aside for now since they are only a small part of the network.

Barsetshire does not have good enough information on the construction or history of individual roads to divide these groups down further but it has sufficient knowledge and experience to establish typical treatments for these groups.

For the purposes of this life cycle planning exercise Barsetshire therefore settles on the following six groups:

A roads, urban	200km	A roads, rural	300km
B & C roads, urban	150km	B & C roads, rural	500km
Unclassified roads, urban	2,500km	Unclassified roads, rural	2,000km

8.8.4 Identifying treatment options

8.8.4.1 This stage of the process aims to identify the treatments available to local engineers in managing the network.

8.8.4.2 A life cycle plan should consider all significant treatments needed over the life cycle. The key ones will be those that maintain the road surface, allow it to reach its service potential or replace it when it has reached the end of its useful life. This does not have to be a treatment that adds ‘strength’ to the road, but it has to extend its life rather ~~that~~ than just keeping it in a safe condition. Treatments such as surface dressing and resurfacing have a place in the life cycle plan.

8.8.4.3 Authorities may also wish to build in allowances for reactive treatments such as pothole filling and routine maintenance, both for expenditure planning purposes and so that decisions on which option is optimal can be based on consideration of all costs. However, capital and revenue costs need to be separately identified.

8.8.4.4 The treatments selected should be based on the treatments available to the authority and, similarly, the costs applied should be based on the actual cost to the authority of delivering the treatment in question.

8.8.4.5 When identifying the range of available treatments it is also necessary to identify:

any restrictions on use

the typical benefits expected

the typical life of the treatment.

Box 8.2 Identifying treatment options

The Barsetshire engineers consider the various treatments they usually employ to maintain the network and group them into three main headings. It is important that they understand which treatment options meet the criteria of capital expenditure and which are revenue. Both need to be included for life cycle planning, but only the capital expenditure will impact directly on the value of the asset.:

Surface treatments

Intended to seal and protect the existing surface and extend its life; may include limited patching works to the existing surface.

Resurfacing

Intended to replace the existing running surface with either an inlay or an overlay; may include limited patching works to the lower layers.

Rehabilitations

Intended to return strength to a road that has structural problems through heavy traffic, ground conditions etc. May be full or partial reconstruction or substantial localised structural patching.

They then look at the breakdown of their network (given in Box 8.1 above) and consider what treatments they would use, where, and what life they would expect:

Surface treatments:

- surface dressing (any rural road); typical life ten years
- slurry seal and micro asphalt (unclassified urban roads); typical life 12 years
- classified urban roads – no suitable surface treatment.

The design treatments would be appropriate to the road in question but a 'typical' treatment is acceptable for life cycle planning purposes as long as it is representative. Barsetshire also uses various specialist treatments such as fibre-reinforced surface dressing but decides that these could be covered within the generic treatments.

Resurfacing:

- surface course overlay (some rural roads); typical life 20 years
- surface course inlay (any road); typical life 20 years.

Barsetshire uses a range of products and, again, the design would be appropriate to the site in question. For this purpose a typical average treatment can be used.

Rehabilitations:

- full or partial depth reconstruction of the road (usually limited to heavily trafficked roads like A roads); typical life 20 years for the new surface, 50 years for the repaired structure
- localised structural repair or renewal on an ad hoc basis as sections fail (rest of the road network); typical life 20 years for the new surface, 50 years for the repaired structure.

Again Barsetshire would consider a range of appropriate treatments where suitable to the road in question (such as in-situ recycling, 'crack and seat' for failing concrete road slabs etc) but for this purpose these can be rolled up into generic 'typical' treatments.

An authority's own life cycle plan might go into more detail and include more options where the information is available to support this.

8.8.5 Costing the options

8.8.5.1 When creating a typical cost for the job, relevant factors that should be considered include:

- the works cost (eg the resurfacing/surface dressing, etc)
- preparation works needed for the main works (eg pre-patching for surface treatments or limited areas of patching/deeper works on a resurfacing scheme. By making allowance for this type of works, based on what the authority normally needs to allow for, this covers the small element of deterioration in the ‘indefinite life’ layers of the road)
- temporary traffic management and communications including signals, signs, the cost of temporary traffic orders, etc
- costs associated with restricted hours working, etc
- accommodation works (eg adjusting the height of dropped kerbs to allow an overlay)
- design and supervision costs associated with the scheme or programme of works
- other works necessary as part of the scheme (eg replacing road markings after resurfacing).

Box 8.3 Costing the options

Barsetshire needs to arrive at a typical rate for each treatment. This should be an average cost for that type of treatment on that group of roads. This is not intended to generate schemes or engineering estimates – only to quantify the overall need and scale of future maintenance – so using an average cost is acceptable. It is important to understand which costs meet the definition of capital expenditure and which are revenue.

Barsetshire looks at its surface dressing programmes first. The council tends to use high-end dressings using modified binders and multiple layers of chippings on its busier roads and cheaper variants on the other parts of the network. Factoring in some use of fibre-reinforced dressings on heavily cracked sites its typical costs are as follows, based on the current rates in its term maintenance contract and converting these into the cost per linear kilometre using the typical widths for its network (it could alternatively rate all costs per m^2):

A roads:	£2.45 per m^2 (£19,600 per km [8m average width])
B & C roads:	£1.90 per m^2 (£11,400 per km [6m average width])
Unclassified roads:	£1.55 per m^2 (£6,975 per km [4.5m average width])

Next it adds the pre-patching and ancillary works based on the typical amount of work that, experience suggests, it needs to do on each kilometre it surface dresses. Barsetshire includes within this pre-patching replacement of road markings, limited accommodation works, etc:

A roads:	£21,000 per km

B & C roads:	£10,500 per km
Unclassified roads:	£7,750 per km

Barsetshire now needs to look at on-costs. Because of its contract, basic traffic management is included in the above costs but it needs to add on the cost of road closures and diversions (used on some sites only), restricted hours (again some sites only) and design/supervision costs. Looking back at these additional costs as a proportion of its basic works costs in recent years, it arrives at the following numbers:

A roads:	+21% (substantial need for restricted hours and extra traffic management)
B & C roads:	+18%
Unclassified roads:	+11%

It can now arrive at a 'per km' rate for this treatment on each of its three rural road groups (it does not evaluate this for urban roads as Barsetshire does not use this treatment in urban areas):

A roads:	£19,600 + £21,000 + 21% = **£49,126 per km**
B & C roads:	£11,400 + £10,500 + 18% = **£25,842 per km**
Unclassified roads:	£6,975 + £7,750 + 11% = **£16,345 per km**

Barsetshire then repeats this process for all of the treatment types it has identified and for all groups to which they apply. This gives it a matrix of treatments and costs, all of which are the costs to treat a kilometre of the network, based on the estimated average costs it has derived and the average width of the appropriate part of its network.

This example has not worked through the thought process in detail for each one but some points are worth considering:

Surface treatment (urban) – Barsetshire has arrived at an average cost for using slurry seals and micro asphalts on unclassified roads but decided that too few classified roads are suitable for this treatment for it to be included in its general life cycle plan.

Resurfacing – Barsetshire has taken typical assumptions for the usual treatments and materials appropriate to each group of assets. For instance, it has assumed that on urban unclassified roads, its resurfacing will typically be a mix of inlays and channel plane overlays and that the typical thickness of new material will be at the thinner end of the scale. On A roads it has assumed the average treatment thickness will be greater, hence a disproportionate increase in costs and on rural roads an overlay without extensive planing will be possible some of the time, decreasing costs on these roads.

Rehabilitation – for its busiest A roads, Barsetshire has assumed that this rare treatment will be a full reconstruction to a reasonable depth; on other classes of road it decides that it will be a localised deep patch to restore a localised failure, backed up by a normal resurfacing. Consequently the rate per kilometre does not greatly exceed the resurfacing rate on these roads. That does not necessarily represent the actual treatment – some of these local roads may need a more extensive treatment – but others will not need even that. This is its estimate of what, on average, will be required in the life cycle of the road, based on its experience and knowledge of its network.

8.8.6 Examining life cycles

8.8.6.1 The life cycle plan should consider at least one full life cycle though it is probably not normally realistic to look beyond about 60 years. For many asphalt carriageway surfaces a shorter cycle will be appropriate.

8.8.6.2 Having assembled the treatment options and costs, these can now be put together into life cycle packages, taking account of any restrictions on how these treatments are used, in order to find the most effective life cycle package for a given type of road.

8.8.6.3 Some treatments can be repeated indefinitely, and some are only suitable as intermediate treatments between other, usually more expensive, options. The choices should be suited to an authority's own network, based on experience of what works in local circumstances. That is not to say that authorities should not consider or experiment with other options, only that life cycle planning should be realistic.

8.9 IMPAIRMENT

8.9.1 If there is an unforeseen decrease in either performance or previously measured condition compared to the previously assessed level then an impairment change may be applied. These notes supplement the main guidance on impairment in sections 7.4 and 7.5.

8.9.2 With the use of UKPMS, the data is collected at the section length level and then grossed up to give the total net performance for the network. It would be technically very difficult to distinguish impairment from depreciation. Therefore all changes to surface will be picked up as depreciation.

8.9.3 However, there could still be impairment to underlying layers. Examples of this would be if the allowance made in calculating depreciation for small scale replacements arising from things like utilities' works proved to be insufficient, or if a section of road was severely damaged by catastrophic flooding. If the impairment to a surface layer occurred after the condition survey was undertaken it would not be included in UKPMS and should therefore be considered at the end of the financial year and the DRC value adjusted accordingly.

CHAPTER NINE

Footways and cycletracks: detailed guidance

9.1 INTRODUCTION

9.1.1 This chapter provides more detailed guidance on the depreciation and impairment of footways and cycletracks. As with carriageways, it is proposed that UKPMS should be used as a tool to support both management and valuation of footway assets. A new method of collecting condition data for footways (Footway Network Survey – FNS) is currently being introduced to UKPMS. This will be suitable for use over the whole footway network and in due course, once there is sufficient data, this could be used to provide appropriate financial information for footway assets. However, the methodology described below is intended to be flexible enough to allow its use with other common survey types as well.

9.2 ASSETS COVERED

9.2.1 This chapter covers surfaced footways, cycletracks and footpaths that are part of the highway network. This would also include paved highway verges where authorities differentiate these from footways. In this context 'paved' includes any hardened/sealed surface including bituminous surfaces, mass concrete and slabs, flags and blocks of various sizes and materials.

9.2.2 On-carriageway cycle lanes should be dealt with as part of the carriageway asset.

9.2.3 Shared surfaces and pedestrianised areas are not specifically dealt with here since the details are likely to vary from case to case and authorities should adopt a suitable approach to their individual assets based on their local situation. By way of guidance, it is likely to be most appropriate to include shared surfaces as carriageways, and pedestrianised areas as footways for valuation purposes, based on the likely use and typical construction although this should be flexible to suit the individual circumstances.

9.2.4 Similarly the use of specific enhanced or unusual materials (including unsurfaced highway paths) is not covered in detail but authorities should adapt the general guidance set out here to suit local practice.

9.2.5 This guidance considers footways in three broad categories, grouped by predominant surface type:

Bituminous – footways with bituminous surface layers typically 70–100mm thick laid on an unbound base layer.

Concrete modular – footways with a modular surface of concrete paving slabs or blocks; typically laid on a sand or mortar bed on top of an unbound base layer.

Other finishes – includes mass-concrete footways and those with surfaces such as enhanced and natural stone finishes or mastic asphalt on concrete which are different enough in terms of cost and/or life cycle to need separate consideration. These footways are diverse and are not dealt with in detail here but it is anticipated that authorities will adapt the methods given here to any local unusual finishes.

9.3 ASSET COMPOSITION AND COMPONENTISATION

9.3.1 For bituminous assets, the surface (bound) layers (typically 70–100mm) will be depreciable. In addition, some allowance for making good small areas in underlying layers should be included, based on the authority's experience.

9.3.2 For modular assets, normally only the slabs and the bed (typically sharp sand) on which they sit will need capital treatments and therefore attract depreciation – typically this will be a total thickness of around 100mm depending on the slabs and bed in question. Again some allowance should be made for making good small areas below those levels.

9.3.3 For both types, beyond what is stated above, the underlying layers will not normally require treatment and will therefore not normally be depreciated. The allowance to be included with the 'surface' costs is intended to cover the cost of making good previous reinstatements where necessary or dealing with damage from tree roots or over-running vehicles. The amount of allowance made should reflect the *average* need based on the authority's experience and practice.

9.3.4 However if exceptionally, treatment is required to lower layers, those will attract depreciation too. This might apply if a particular group of assets were known to have problems and to need deeper treatment on a regular basis due to unusual local conditions.

9.4 DATA ASSUMPTIONS AND APPROACHES TO VALUATION

9.4.1 Two key elements of data are required for valuation purposes: inventory and condition. Different authorities will have different levels of data available to them and therefore a flexible approach is required to make the guidance usable by all while giving scope for improvements as data and techniques advance.

9.4.2 **Inventory** – not all authorities have detailed inventories for their footways. They are likely to have a reasonable inventory for the more important categories (1a, 1 and 2) but may not have an inventory for category 3 and 4 footways. For cycletracks the position is likely to be even worse, and some authorities may have little or no inventory.

9.4.3 **Condition** – most authorities should have reasonably current condition data for category 1a, 1 and 2 footways. Many will not have condition information for other footways or for any cycletracks.

9.4.4 Authorities will need to bring their footway and cycletrack inventory and condition data up to a serviceable level on all hierarchies. Where good data on footway lengths and widths is not available, this needs to be collected as a first priority because of its fundamental importance for both maintenance planning and valuation. Surface type should also be collected, as part of either inventory or inspection. Authorities should adopt the Roads Board Footway and Cycletrack Management Group's Footway Network Survey (FNS) or other suitable approach as a practical solution to the issue of obtaining and maintaining condition data on all hierarchies.

9.4.5 Two levels of approach have been identified for inventory and condition: an entry-level approach to be used as a stopgap by authorities with limited data; and a more advanced level that may be attainable by some authorities now and should be achieved by all in time (see sections 9.6 and 9.7 below). It is not considered appropriate to apply deterioration modelling to footways and cycletracks in the same way as is being suggested for carriageways, hence there is no equivalent to the longer term 'aspirational' approach described in chapter 8.

9.4.6 Given the nature of the assets and the simpler relationship between condition and depreciation described below, authorities do not need to calculate the depreciation of underlying layers separately from that for surface layers as is necessary for some carriageways.

9.5 USING FNS OR OTHER CONDITION DATA TO CALCULATE ACCUMULATED DEPRECIATION FOR INITIAL DRC

9.5.1 The accumulated depreciation present in the footway and cycletrack network is calculated using the following process.

Step 1: Divide the network into suitable groupings. This will typically be based on the *Well-maintained Highways* hierarchy and subdivided by construction type so that broad treatment types and assumptions are similar for all footways in the network group. Further guidance on this is given later in this chapter, and Box 9.1 below gives an example of how it might be applied.

Evaluate the amount of the network (in square metres) in each of these categories.

Step 2: For each network group, evaluate the percentage of the group that is in each of the following condition bands:

Red – requires a structural treatment

Amber – requires a resurfacing treatment

Yellow – requires a surface treatment or localised treatment

Green – currently requires no treatment.

The red/amber/yellow/green bands are deliberately tied to general treatment types to allow for other survey types, processed through UKPMS, to produce similar results based on suggested treatments.

For those authorities that do not have sufficient current condition data to carry out a full assessment of their whole network, it would be preferable to use a robust sample survey of a representative portion of the network and to base the DRC on that pro rata. However, such an approach would require a reasonable knowledge of inventory in order to ensure that the sample is representative and to allow it to be scaled across the network pro rata.

Step 3: Evaluate the typical treatment type and cost for each condition band, for each of the network groups identified in Step 1.

For each asset group, evaluate a typical treatment for the appropriate asset in the red, amber and yellow bands and calculate the average cost of this treatment using the authority's normal maintenance rates.

In each case, take a typical treatment for sites of that type and condition, not an extreme case. Assume that the site is of average size and in average condition for its condition band so that it represents an average cost for treating sites in that band.

For bituminous surfaces only, for sites in the green band, take the assumption that footways/cycletracks in that band are, on average, halfway between 'perfect' and the yellow band. On that basis, halve the cost of the yellow treatment and use this as the green treatment cost. This is designed to represent the fact that there will be depreciation present in these green footways/cycletracks, even though this has not yet manifested as deterioration. It is not intended to be a genuine treatment, just a way of identifying the depreciation accumulated to date.

9.5.2 Box 9.2 below provides an example network evaluation of typical treatments and costs.

9.5.3 For guidance on what to include in cost rates, authorities may find it helpful to refer to section 8.8.5.1.

9.6 ENTRY LEVEL APPROACH TO DATA

~~9.6.1 For authorities that do not have sufficient inventory, either overall or for particular categories of footway, default values will be provided on an interim basis, based on data from authorities that do have good inventory, of typical lengths and widths of footway associated with a particular type of road. For instance, if analysis showed that 1km of typical urban unclassified road had 2km of footways associated with it at 1.8m wide then an authority would allow 3,600m2 of footways per km of urban unclassified road. (This will also be used to calculate footway GRC where actual inventory is not available.)~~

9.6.~~2~~1 Where available (eg categories 1a, 1 and 2) and sufficiently recent, authorities should use their own condition information. Where condition information is not available, authorities should initially use an estimated condition rating based on information drawn from FNS or safety inspections (such as defects per 100m). This might need to be at a network level if the inventory information is poor.

9.7 ADVANCED APPROACH TO DATA

9.7.1 This uses actual inventory, including lengths, widths and surface material. It uses FNS type condition information. For areas identified as requiring treatment, authorities may need to carry our more detailed condition surveys to design and rank treatment schemes or to help calibrate data.

9.7.2 Authorities may need to combine elements of the two approaches. If, for example, an authority has reasonable inventory data but poor condition data, it should use its own inventory but use the level 1 approach for dealing with condition.

9.8 APPLYING THE GUIDANCE TO INDIVIDUAL ASSET GROUPINGS

9.8.1 Because of the different nature of the assets, bituminous and slab footways will require different approaches as follows. In particular, it is suggested that life cycle planning is probably not appropriate for modular footways since maintenance needs for these are generally driven by external factors rather than normal usage.

9.9 BITUMINOUS FOOTWAYS AND CYCLETRACKS

9.9.1 This is primarily intended to deal with a conventional footway or cycletrack construction of (say) 70mm of bituminous surface on (say) 150mm of unbound sub-base. Other bituminous finishes (such as mastic asphalt on concrete) may need separate treatment and should probably be treated separately with their own life cycle plan(s).

9.9.2 The surface (bound bituminous layers) will have a finite life and so the life cycle plan needs to allow for wholesale maintenance and renewal or replacement on a periodic basis.

9.9.3 The underlying layers will not always need wholesale replacement and may continue indefinitely if the surface above them is maintained and external factors do not otherwise interfere. However, it is likely that localised structural repairs will be required on a proportion of ‘surfacing’ jobs each year and some sites may require complete replacement of the underlying layers. Factors that may contribute to this include:

tree roots

vehicle over-running

utility openings

renewal of footways constructed to a lower specification

poor underlying ground conditions.

The authority will need to take a view on how much work of this nature is required each year based on historic records and the condition of the network and allow for this in the life cycle plan.

9.9.4 **Initial DRC:** to ~~determine~~ estimate accumulated depreciation, take the quantities of each bituminous network group in each condition band from step 2 above and multiply them by the appropriate rate identified in step 3. Add all the results together to provide total accumulated depreciation across the whole network and subtract from footway GRC.

9.9.5 **Annual depreciation** should be ~~based~~ estimated on a life cycle plan that identifies the most cost-effective way for the authority to maintain its bituminous footway assets over a suitable life cycle (typically at least 40 years). The plan might be based on simple replacement of the surface to estimate the amount by which the asset has deteriorated or might include a more complex life cycle including one or more preventative treatments such as slurry sealing.

9.9.6 Annual depreciation can then be calculated as the unit (per square metre) rate for all the treatments in the life cycle plan multiplied by the area (square metres) of bituminous footway divided by the number of years in the life cycle.

9.9.7 The assumptions in the plan need to be reviewed regularly. If they are realistic, then the annual depreciation figure also represents what an authority needs to spend each year to maintain the asset in its present condition. Authorities need to monitor the change in measured condition from year to year to make sure that expenditure is delivering the expected effect on performance.

9.9.8 Section 8.8 provides some further guidance and worked examples on life cycle planning for bituminous carriageway surfaces. Since the principles will be similar, those asset managers dealing with bituminous footways might find it helpful to refer to this too.

9.10 MODULAR FOOTWAYS

9.10.1 This approach is primarily intended to deal with a conventional footway with a precast concrete modular surface of conventional slabs, small-element slabs or block paving. Typically this will rest on a bed of sharp sand which will, in turn, be supported by an unbound sub-base layer.

9.10.2 Specialist or enhanced finishes such as slabs bedded on concrete for increased bearing capacity or natural Yorkstone paving may need separate treatment and should probably be considered as a separate asset group.

9.10.3 Modular surface materials do not generally wear out through normal usage – the passage of pedestrians back and forth. Instead the need for capital maintenance is usually the result of external factors such as tree roots, vehicle over-running and utility openings. For these, instead of developing life cycle plans, an approach based on data about the incidence and effect of such factors is likely to be more useful for asset management and expenditure planning. The depreciation calculation is also somewhat different.

9.10.4 **Initial DRC:** Given that the GRC is not broken down into these components, in order to ~~determine~~ estimate the depreciation or value of the asset consumed to date, take the quantities of each network group in each condition band (from step 2) and multiply them by the appropriate rate identified in step 3. It should be noted that no allowance should be made for treatment of 'green' condition assets since for slab and modular footways normal wear is not an issue. Add all the results together to provide total accumulated depreciation across the whole network and subtract from footway GRC.

9.10.5 **Annual depreciation:** this is ~~calculated~~ estimated by measuring the change in the area of footway needing treatment at the previous reporting date (end of the previous financial year) with the area of footway needing treatment at the end of the current reporting date (latest financial year end) and multiplying the difference by the current cost rate (as an estimate of deterioration during the reporting period). If the amount of footway needing treatment has increased, the cost of the difference will be the measure of depreciation.

9.10.6 If the amount of footway needing treatment has decreased over the year, no depreciation is incurred.

9.11 FUTURE DEVELOPMENTS

9.11.1 Guidance in this chapter will be subject to further development, including in relation to the development and application of FNS. UKPMS Technical Note 47 deals with FNS and further guidance will also be provided in the UKPMS User Manual. As with

Technical Note 46, authorities will need to make sure that they are using the most up to date version.

9.11.2 Further guidance or examples may also be provided as part of the supporting materials.

Box 9.1 Identifying suitable network groups

Barsetshire Council has a mixed urban and rural network with towns and villages of various sizes linked by rural roads of various types. Most urban roads and some rural ones include footways and the network contains a small number of dedicated cycletracks, most of which are concentrated in a 1960s new town, as well as some shared use cycletrack/footways.

The Barsetshire footway network is divided into five hierarchies in line with *Well-maintained Highways: Code of Practice for Highway Maintenance Management*.

1a Prestige Walking Zones
1 Primary Walking Routes
2 Secondary Walking Routes
3 Link Footways
4 Local Access Footways

The cycletracks are not divided by hierarchy so constitute a single group on their own.

In addition, Barsetshire applies a different level of service to a group of low-use purely rural footways that it calls 'rural pathways'. These are generally category 4 footways with no fronting properties, where the expected use is more likely to be people out taking exercise or walking dogs. For this reason the level of service and treatment types are more similar to those for its public rights of way network than the other footways and this needs to be reflected in its planning.

This means that it needs to distinguish between the five footway groups based on hierarchy and add the cycletracks and 'rural pathways' – a total of seven types so far.

These seven types then need to be split between bituminous and modular surfaces, excepting the cycletracks and rural paths which all have bituminous surfaces.

Barsetshire has a small number of special footway surfaces, but these are mainly in enhanced town centres and so are mostly covered by the 1a category.

Barsetshire does not have good enough information on the construction or history of individual footways to divide these groups down further, but it has sufficient knowledge and experience to establish typical treatments for these groups.

For the purposes of this life cycle planning exercise it therefore settles on the following 12 groups:

1a Footways – bituminous	1a Footways – modular
1 Footways – bituminous	1 Footways – modular
2 Footways – bituminous	2 Footways – modular
3 Footways – bituminous	3 Footways – modular
4 Footways – bituminous	4 Footways – modular
Rural pathways – bituminous	Cycletracks – all bituminous

Box 9.2 Evaluating typical treatments and costs

Barsetshire starts by considering the amber ‘resurfacing’ treatment for its category 4 bituminous footways. It considers this would involve removing and replacing the bound layers; typically this is a 20mm surface layer on top of a 60mm thick binder layer.

Looking back at the jobs it has completed over the last few years Barsetshire finds that the average area of such jobs is 600m^2 and that 10% of them were carried out under restricted working hours (which carries a 15% uplift in the contract). It also notes that it typically had to do deeper work on around 10% of the area of footway surfacing jobs of this type.

From its term contract it prices up a 600m^2 footway resurfacing job, allowing for 60m^2 of deeper work. It adds on a 1.5% uplift for restricted working (based on a 15% uplift on

10% of jobs) and makes allowance on a similar basis for other occasional factors such as any special traffic management or unusual materials that need to be used from time to time. Having arrived at the cost of the work itself, it then considers if there are other factors such as design costs and contract overheads that need to be factored in and increases the cost appropriately. Once that is done, it divides the total cost by 600 to give the all-in rate per square metre.

It then looks across the other hierarchies and considers the cycletracks. In each case the amber (resurfacing) treatment for a bituminous surface will be the same but a few factors will vary, such as the frequency with which it needs to use restricted hours working. It makes some minor adjustments to the same basic calculation to allow for this and arrives at a set of rates that covers all the amber treatments for bituminous surfaces.

It considers the red treatment for the same types of surfaces and decides that they are very similar to the amber treatments; it just needs to allow for replacement of the entire underlying layer, not just 10%. By making adjustments to the amber rates at the appropriate stage it is able to derive the red treatment rates for the same classes of surface.

To complete the suite of ‘bituminous’ rates, Barsetshire considers the ‘yellow’ rate for a surface treatment or localised repair.

Here there are different options that need to be considered since Barsetshire routinely carries out slurry sealing and micro asphalt treatments on its bituminous surfaces as well as doing localised patch repairs to keep them serviceable. To decide on the split, it looks at the annual budget and decides that it spends about twice as much on localised planned patching as it spends on slurry sealing, etc.

It therefore evaluates a rate for a typical slurry-type job (including preparation works such as cleaning, patching and adjusting ironwork) and any appropriate add-ons, using the same principles outlined above. For illustration this comes to £12/m^2.

Next it evaluates a typical rate for a patching job. Looking at a range of examples, it discovers that, in a typical 100m stretch of footway in yellow condition that it decided to patch, it would typically patch 20% of the total area. It therefore comes up with a price for footway patching, based on the term contract and the normal size of such orders and using the same principles and additions mentioned above. For illustration this comes to £45/m^2; however, it is only patching 20% of the total area of a given section, so the rate pro rata is £9/m^2 (although this will vary with hierarchy since some of the on-costs increase on busier footways).

Since it spends twice as much on patching as on surface treatments, to get the typical rate for a yellow treatment it takes 2/3 of the patching rate and 1/3 of the surface treatment rate for an average cost of £10/m^2. The green rate will be half this cost or £5/m^2, representing the fact that the green footways are, on average, half way to needing a yellow-type treatment.

This gives Barsetshire a complete set of rates for all main types of bituminous footways and cycletracks in all conditions.

The only significant exception to this is the 'rural pathways', where different levels of service and treatments apply. It would not usually reconstruct these paths; instead it would usually overlay them since it is practical for these assets and more cost effective. It generates additional red and amber rates for these paths based on an overlay with more preparatory work such as patching of the existing surface included in the red rate than in the amber. Again these are based on its contract prices and its experience about typical treatments it uses. It would not normally slurry seal these rural pathways since it considers it more cost effective to let them deteriorate further and then overlay them. Consequently the yellow treatment is based purely on the patching cost; however it patches fewer defects on these paths since it accepts a lower level of service, so it allows for patching 10% of the area rather than 20%. This gives a yellow rate of £4.50/m^2 and a green rate of £2.25/m^2 for the rural pathways.

Finally Barsetshire needs to consider its modular footways.

Its cycletracks and rural paths are almost entirely bituminous, so, for modular surfaces, it only needs to consider the five groups by hierarchy. The limited number ~~of~~ of category 1a footways it has almost all have enhanced surfaces, so it considers those separately. It has a few category 1s and 2s with enhanced surfaces, but these are counterbalanced by the non-enhanced category 1a footways, so Barsetshire takes the view that proceeding as if all 1a footways are enhanced and the remaining footways are all standard surfaces will, on average, balance out.

Enhanced footways – using prices from its term contract, with appropriate additions as discussed above, Barsetshire derives costs for full reconstruction (including underlying layers), resurfacing (including limited works to underlying layers) and localised repairs (relaying and replacing slabs or blocks) for its enhanced category 1a footways. There is no suitable surface treatment so the yellow treatment is based entirely on localised repairs. It has a number of different modular surface types and finishes in different areas and takes an average price across all types.

Next Barsetshire looks at the standard modular footways. These include standard concrete paving slabs in various sizes and several different types of concrete block paving, although the 'traditional' 50mm thick, 600mm wide slabs make up more than two thirds of its modular footways. Looking at its contract prices it determines that the difference in prices between these different finishes is not significant; therefore it prices these rates based on the traditional paving slabs as they form the majority and represent a reasonably typical rate for the whole range of (non-enhanced) concrete modular paving.

Looking at typical treatments from recent years, Barsetshire arrives at the following treatments:

For red footways it allows for replacing all the slabs with new slabs on a new sand bed and new unbound sub-base.

For amber footways it allows for relaying 50% of the existing slabs and replacing the other 50% with new slabs, all on a new sand bed. It also allows for limited (10%) replacement on the unbound sub-base layer.

For yellow footways it estimates it needs to 'fix' 20% of the area of the footway in question, reusing half of the existing slabs and replacing the rest. There is no surface treatment option so the yellow rate is based purely on this localised repair.

~~The green rate will, as before, be half of the yellow rate.~~

This gives Barsetshire a full range of treatments and costs for all hierarchies, surface finishes and condition bands.

9.12 IMPAIRMENT OF FOOTWAYS AND CYCLETRACKS

9.12.1 These notes supplement the main guidance on impairment in sections 7.4 and 7.5.

9.12.2 For bituminous footways, assuming the calculations are carried out in UKPMS, using standard condition data, the model will not distinguish impairment of surface layers from depreciation, but will produce a combined result, unless the impairment occurs after the condition surveys. Any impairment of underlying layers will need to be calculated separately based on the relevant treatment costs.

9.12.3 For modular footways where annual depreciation is based on estimates of past effects, if the provision made for a particular year turned out to be insufficient, any material shortfall should be accounted for as impairment. The same would apply to any material shortfall in the estimated allowance for treatment to underlying layers of bituminous footways or cycletracks. Impairment could also arise in the case of a significant one-off event such as a section of footway being washed away by severe flooding.

CHAPTER TEN

Structures: detailed guidance

10.1 INTRODUCTION

10.1.1 This chapter provides specific guidance on the approach to be adopted for calculating depreciation and impairment, for transport structures (as defined in section 6.7.4). An overview of the approach is provided, setting out the key principles and assumptions to be followed. The technical and engineering detail of the approach will be contained in the *Highway Structures Asset Management Planning Toolkit* which comprises three parts:

Part A: Methodology

Part B: Function Specification

Part C: Supporting Information.

10.1.2 Commercial software/system providers must comply with this Code and the above guidance to ensure consistency in valuation and financial reporting for transport structures. The system/software must be verified by the ~~Decision Support Tool subgroup of~~ the UK Bridges Board.

10.2 OVERVIEW OF STRUCTURES LIFE CYCLE PLANNING

10.2.1 A life cycle planning approach is used to determine current and future maintenance needs and evaluate the DRC. The approach utilises standard inventory and inspection data, alongside data on deterioration rates, service lives and treatment types/effects.

10.2.2 Figure 10.1 provides a high-level overview of the life cycle planning approach to be used for highway structures; the main steps are:

- Identify **inventory data and groups** – eg structure type, dimensions, materials elements and the criteria used to group similar structures
- Gather **condition data** – element level condition and defect data, eg a standardised severity and extent condition rating approach is used for highway structures
- Identify **programmes of work** – defined programmes of work that typically address specific needs or issues, eg strengthening, parapet upgrade, scour susceptible bridges
- **I~~i~~dentification of needs** – identify maintenance needs based on defined

intervention levels, triggers and programmes of work

Decide on~~select~~ treatments and/or strategies – select the appropriate treatment, and/or long-term strategy, to address the need

C~~c~~alculate costs and penalties – evaluate the costs (eg labour, plant, material, access, etc) and penalties (eg traffic disruption) of doing or not doing work

~~p~~Prioritise identified needs – prioritise competing maintenance needs using an appropriate set of weighted criteria

Action treatment strategy~~maintain and deteriorate~~ – improve/restore the condition of those structures or elements that have been treated and deteriorate others

Review expenditure and condition – evaluate the total annual expenditure and the condition of the structure stock after maintenance

outputs – the key outputs from the life cycle planning process, across the full analysis period (ie time horizon) and for each scenario analysed (eg ‘do minimum’, defined budget and target condition), include:

expenditure, condition and backlog profiles

the expected life of each finite life component

the treatment cycle/life of each indefinite life component

the timing, cost and effect of each intervention (be it a replacement of a finite life component or capital maintenance of an indefinite life component).

10.2.3 The DRC and annual depreciation for the stock of structures is ~~evaluated~~ estimated from the outputs. The life cycle planning process is described in detail in Part A of the supporting documentation.

Figure 10.1Overview of structures life cycle planning process

10.3 COMPONENT BREAKDOWN

10.3.1 The structure types are described in section 6.7.4. It is recognised that some structures are suitable for subdividing to component level, such as bridges, while others can be adequately dealt with at a structure level, such as retaining walls, culverts and sign/signal gantries. Table 10.1 below shows the minimum and refined breakdown for highway structures; the approach is primarily based on the CSS Condition Indicator Elements (or equivalent) as described in the *Inspection Manual for Highway Structures* (Highways Agency, 2007). It is likely that the level of componentisation required for asset management purposes will be more detailed than that required for financial reporting purposes.

Table 10.1 Structure breakdown for life cycle planning

Structure types	Minimum breakdown	Refined breakdown
Bridge: vehicular	CSS bridge inspection elements	Subdivision of major inspection elements, eg abutments divided into east and west
Bridge: pedestrian/cycle		
Cantilever road sign	Structure	CSS sign/signal gantry inspection elements
Chamber/cellar/vault	Structure	CSS bridge inspection elements
Culvert	Structure	CSS bridge inspection elements
High mast lighting	Structure	CSS sign/signal gantry inspection elements
Retaining wall	Structure	CSS retaining wall inspection elements
Sign/signal gantry	Structure	CSS sign/signal gantry inspection elements
Structural earthworks – reinforced/strengthened soil/fill structure	Structure	–
Subway: pipe	Structure	CSS bridge inspection elements
Tunnel	CSS bridge inspection elements	Subdivision of major inspection elements, eg abutments divided into east and west
Underpass (or subway): pedestrian		
Underpass: vehicular		
Special structure		

10.3.2 A detailed description of the breakdown that can be used for each structure type will be provided in Part A of the supporting documentation.

10.4 FINITE AND INDEFINITE LIFE COMPONENTS

10.4.1 Structure components can in general be classified as follows:

finite life – bearings, bearing plinth/shelf, superstructure drainage (external), substructure drainage (external), waterproofing, movement/expansion joints, finishes, handrail/parapets/safety fences, surfacing, machinery, signs and lighting

indefinite life – primary deck element, transverse beams, secondary deck element, half joints/hinge joints, tie beam/rod, parapet beam or cantilever, deck bracing, foundations, abutments, spandrel wall/head wall, pier/column, cross-head/capping beam, superstructure drainage (integral), substructure drainage (integral), access/walkways/gantries, handrail/parapets/safety fences, invert/river bed, aprons, fenders/cutwaters/collision protection, river training works, revetment/batter paving, wing walls, retaining walls, embankments.

10.4.2 The above relationships are not absolute; some components appear in both categories while others may change from finite to indefinite life due to structural form, material and maintenance needs/strategy. Further details on component classifications are provided in Part A of the supporting documentation.

10.5 INVENTORY DATA ~~(IDENTIFY MINIMIM DATA SET?)~~

10.5.1 The inventory data required for the life cycle planning approach are:

structure type as described in section 6.7.4

structure dimensions as described in section 6.7.4

structure grouping – taking account of key maintenance drivers such as material type and structure form, for example, the Bridge Type Code (or equivalent) as described in the *Inspection Manual for Highway Structures*, can be used to define structure groups

structure usage (eg route supported) and obstacle crossed (eg navigable watercourse)

inspection elements as described in section 10.3.

10.5.2 The above represents the minimum data set required to support life cycle planning and estimating depreciation; this does not preclude authorities from improving and refining the data used for life cycle planning as described in Part A of the supporting documentation.

10.6 CONDITION AND PERFORMANCE DATA

10.6.1 The condition and performance data required for the life cycle planning approach are:

- condition of each element described in section 10.3; for highway structures this is the severity and extent codes described in the *Inspection Manual for Highway Structures*
- defect codes, where applicable; for highway structures as described in the *Inspection Manual for Highway Structures*.

10.6.2 Condition data is provided by general and principal inspections, which, for highway structures, are undertaken at two and six year intervals in accordance with *Management of Highway Structures: A Code of Practice*.

10.7 LIFE CYCLE PLANNING ASSUMPTIONS AND DATA

10.7.1 The assumptions and data that support life cycle planning (as set out in Figure 10.1 above) include:

- intervention triggers – the conditions (or other performance criteria) that trigger the need for work
- treatment options/strategies – the specific treatment options that are suitable for an identified/triggered item of work and, where available, specific life cycle strategies that have been developed for individual structures or groups of similar structures
- treatment costs and add-ons – the unit rates/fixed costs for specific treatments, the algorithms/assumptions used to adjust the unit rates/fixed costs to take account of quantities, and the cost add-ons/uplifts, such as access, traffic management, etc
- penalties – the penalties (such as traffic delay, load restrictions, failures) that are likely to be incurred if action is not taken (this is used to support prioritisation of needs) These costs will be revenue.
- prioritisation criteria and weightings – the criteria and respective weightings that are used to prioritise needs

- service lives and deterioration rates – the average service lives and deterioration rates for structure components, including upper and lower bounds that reflect the expected range of service lives/deterioration rates
- treatment effect – the impact that a treatment has on the condition/performance of a structure/component
- defined budget/target condition – the life cycle analysis can be run by either defining the budget available or the target condition. Under the former approach, the life cycle analysis evaluates the condition that is achieved for the available budget; under the latter the life cycle analysis defines the budget required to achieve the desired condition.

10.7.2 The life cycle planning assumptions and data are discussed in detail in Part A of the supporting documentation, and default assumptions/data are provided in Part C of the supporting documentation. The default data provide a practical starting position. However, authorities are recommended to define area/structure-specific data where appropriate.

10.8 CALCULATING DEPRECIATION

As with carriageways, the GRC for structures is not broken down into components and hence cannot be used to calculate the depreciation for each component. It is therefore necessary to use the future costs of replacing components and the capital treatments needed to maintain the components in order to calculate the amount of the asset which has been consumed, i.e. the depreciation.

10.8.1 Depreciation for structures is calculated as follows:

- **finite life structures/components** – depreciation is based on the cost of replacing the component plus any interim capital expenditure needed to allow it to achieve its life
- **indefinite life structures/components** – depreciation is based on the cost of any capital treatments needed to maintain the component to the required standard over the life of the treatment, systematically spread across the defined life cycle. If a component does not normally require treatment to maintain its life indefinitely, no depreciation applies. However, should it begin to show signs of measurable deterioration that will require capital treatment to restore service potential then it needs to be re-categorised and treated from that point as a finite life asset.

10.8.2 **~~Annual d~~Depreciation** is therefore estimated ~~calculated~~ for each component/asset/group as:

cost of all capital treatments and/or replacements in the life cycle
number of years in the life cycle

10.8.3 Where sufficient age data is available **initial depreciated replacement cost (DRC)** is calculated as:

GRC minus (annual depreciation x number of years of life cycle consumed so far)

10.8.4 Figure 10.2 illustrates how depreciation is calculated and systematically spread across the total useful life (or intervention cycle).

Figure 10.2Depreciation over the life cycle

10.9 APPROACH TO CALCULATING DRC

10.9.1 In the majority of cases, the current condition and performance of a structure or component is somewhere between 'as new' (ie construct or install) and 'end of life' (ie replace or maintain), with limited, if any, information on the timing and cost of past activities. In the absence of age data and the breakdown of GRC by component, the initial DRC calculation is therefore based on predictions of future treatment needs over the life cycle, and their timing and cost, while the current condition is used to estimate the current age of the structure/component. This is shown by the following component level example.

10.9.2 **Example**: consider a single bridge component with the following details:

component type = bearing (roller bearing)

predicted useful service life = 40 years

current condition = 2B

replacement cost = £50,000 (including traffic management, access, etc).

10.9.3 The current condition information is used to identify an assumed age for the component, as shown below in Figure 10.3. The assumed age is then used as the basis for the straight line accumulated depreciation calculation, ie 25 years of an expected 40 year life have been used and therefore the current DRC is £18,750.

Figure 10.3Schematic of condition/DRC relationship

10.9.4 The life cycle approach provides this information for all defined structures/components, thereby enabling the DRC to be calculated for the stock of structures.

10.10 IMPAIRMENT

10.10.1 Impairment of structures should be calculated in accordance with the guidance in sections 7.4 to 7.6.

CHAPTER ELEVEN

Other highway assets: detailed guidance

11.1 SCOPE

11.1.1 This chapter provides further guidance on the application of the Code to street lighting, traffic management systems and street furniture. It also covers the various elements that have been grouped with carriageways for the purpose of producing composite rates, but are not part of the surface or underlying layers and therefore are not covered in chapter 8.

11.2 LIGHTING, TRAFFIC MANAGEMENT SYSTEMS AND STREET FURNITURE

11.2.1 Introduction

11.2.1.1 These assets are considered together because they share the characteristics of being less complex (at least in terms of providing financial information) than carriageways, footways and structures. Componentisation should be more straightforward and all assets/components have finite lives. Also, at least for lighting and traffic management, authorities generally have good inventory and age data. As a result, authorities should generally be able to produce appropriate financial information simply by following the guidance in chapters 4 to 7 of the Code.

11.2.1.2 For lighting assets (street lighting, illuminated traffic signs, bollards, etc), *Well-lit Highways: Code of Practice for Highway Lighting Management* includes guidance on asset management, including advice on inventory, componentisation and condition assessment.

11.2.2 Annual depreciation and depreciated replacement cost

11.2.2.1 **Annual depreciation** for lighting, traffic management systems and street furniture should be calculated on a straight line basis, in accordance with the methodology in chapter 7. The local authority's life cycle plans will indicate the average life of each asset and become more refined over time. Life assumptions must be reviewed annually and adjusted as necessary.

11.2.2.2 The process used for calculating **initial DRC** will depend on whether the authority has data on the age of the assets/components. If it does, DRC should be calculated for each asset/component as GRC minus (annual depreciation multiplied by the number of years of total useful life consumed so far).

11.2.2.3 If an authority does not have age data, then an estimate should be made, based on a judgement of the remaining life of the asset. A useful rule of thumb in checking out the realism of estimates is that if assets/components in a group are being replaced as they reach the end of their useful life and there is a fairly even spread of replacement activity from year to year, then the depreciated replacement cost across the group should be roughly 50% of GRC. If the average age of the group is older, and/or capital expenditure is not sufficient to allow for timely replacement, then the DRC could be much lower. Conversely, if a high proportion of the asset group has been replaced relatively recently (as has been the case for many authorities with street lighting) then the initial DRC would be much higher than 50%.

11.2.2.4a For many authorities street lighting was installed after the main network equivalent to a brown field site. Where this is the case, replacement rates should be used to calculate GRC and the accumulated depreciation, in order to better reflect the cost of a modern equivalent asset not constructed at the time of the complete network.

11.2.2.4 If an authority does not have inventory for street furniture and is initially relying for GRC on the default percentage described in section 6.7.8.5, then as an interim measure that figure may be used to calculate depreciation, in which case the authority will need to estimate an average total useful life for the whole asset type and take a view on the typical average current asset age or residual life.

11.2.2.5 The one exception to the guidance above is highway trees, which are classified as part of street furniture. Highway trees (as defined in section 6.7.8.6) will normally have an expected useful life greater than 40 years. Given that the value of the tree will not be material, ~~T~~these should not be depreciated, though they may need to be impaired, for example if a tree has to be removed as a result of accident damage. If a tree has an expected useful life less than 40 years then its value is not deemed to be material and expenditure should be written off when incurred.

11.2.3 Impairment

11.2.3.1 Impairment should be assessed in accordance with sections 7.4 to 7.6.

11.3 ASSETS INCLUDED IN COMPOSITE RATES

11.3.1 The guidance on depreciation of carriageways and footways deals with the surface and underlying layers, but that will not pick up all the components that are grouped with these assets in the GRC composite rates. Some replacements/treatments will be picked up and depreciated as part of carriageway works, for example works to reservations, kerbs (which might also be picked up with works to footways), traffic calming, replacement of road markings and road studs. Smaller scale works to individual elements will not normally be material for valuation and do not need to be treated separately, though authorities will need to make appropriate allowances for them in expenditure planning. Other components should be treated as follows.

11.3.2 **Drainage:** while authorities will need to obtain appropriate inventory and performance information about drainage assets to support asset management and address issues such as the impact of climate change, it is not recommended that they should seek to develop detailed information on existing drainage assets for valuation purposes. The costs would be very high and would not represent good value for money. Also, much of existing highway drainage is not the same as would be provided in a modern equivalent asset. For GRC purposes the difficulty has been resolved by including drainage, on an MEA basis, within the composite carriageway rate. For depreciation purposes, drainage assets should be treated as indefinite life assets and annual depreciation should be based on the average annual capital expenditure required to maintain them indefinitely. If, in any year, the expenditure required was materially greater than allowed for in depreciation, the excess should be treated as impairment. This approach also provides an appropriate capital expenditure figure for forward budgeting. Authorities should also separately identify the expenditure required for non-capital works.

11.3.3 **Earthworks:** excavated or raised ground (such as embankments and cuttings), low height retaining walls (<1.35m) and other relevant earthwork assets that are outside the scope of the structures listed in section 6.7. These should also be treated as indefinite life assets and annual depreciation should be based on the average annual capital expenditure (if any) required to maintain them indefinitely. If, in any year, the expenditure required was materially greater than allowed for in depreciation, the excess should be treated as impairment.

11.3.4 **Boundary fencing** is normally provided as accommodation works and passed on to the adjacent land owner. Unless the authority owns material amounts of such fencing, it should be treated on the same basis as assets in section 11.3.1. If the holding is material, then either it should be depreciated on a straight line basis in accordance with section 11.2 or annual depreciation should be estimated based on the annual value of capital works. Safety fencing and pedestrian barriers are classed as street furniture.

11.3.5 **Land, verges, hedges and other vegetation** should not be depreciated.

Glossary

~~Admissible costs~~	~~Costs that are directly attributable to bringing the asset into a working condition for its intended use.~~
Annual depreciation	The depreciation amount allocated each year, which in certain cases may be estimated by ~~T~~the aggregate cost of all the capital replacements/treatments needed to maintain/restore its service potential over the life cycle, spread over the estimated number of years in the cycle.
Asset	In the context of this guidance an asset is an integral feature of the highway infrastructure, such as roads, structures, lighting and traffic management systems.
Asset classification	Assets grouped in a consistent manner so that data can be aggregated for regional or national purposes.
Asset consumption	Measured in terms of depreciation and impairment of assets.
Asset management	A strategic approach that identifies the optimal allocation of resources for the management,

operation, preservation and enhancement of the highway infrastructure in order to meet the needs of current and future customers.

Asset management plan (AMP)

A plan for managing the asset base over a period of time in order to deliver the agreed levels of service and performance targets in the most cost effective way. This may be referred to as a highway asset management plan (HAMP) or transport asset management plan (TAMP) in other guidance documents and codes of practice.

Asset management system

The hardware and software that supports asset management practices and processes and stores the asset data and information.

Asset valuation

The (valuation) procedure used to ~~calculate~~ measure the asset value.

Asset value

The ~~calculated~~ measurement in current monetary value of an asset or group of assets. It should be correctly referred to as the '~~net asset value~~carrying value', but it is normally shortened to 'asset value'. Where the term 'asset value' is used in the Code it should be interpreted as the carrying~~net asset value~~. 'Asset value' in this document is synonymous with depreciated replacement cost.

Authority

Used in this version of the Code to mean a local highway authority, this covers all forms of local highway authority having responsibility for highway maintenance as defined in Section 1 of the Highways Act 1980 as amended.

Balance sheet

A financial statement showing the assets and liabilities of an authority.

Benchmark valuation

A full valuation that includes a review of the valuation basis and calculation of unit rates, gross replacement cost and depreciated replacement cost, typically undertaken once every five years.

Carriageway

This term has a meaning in law under Section 329 of the Highways Act 1980. It is a way consisting or comprised in a highway, being a way (other than a cycletrack) over which the public have a right of way for the passage of vehicles. It was originally defined as a road on which a carriage could be driven, and now means public vehicle highway – more commonly a road.

Carrying Amount

The amount at which an asset is recognised in financial statements after deducting any accumulated depreciation and accumulated impairment losses.

Componentisation

Where an asset can be broken down into identifiable components with different useful lives those components should be accounted for separately. This should be applied at an ~~sensible~~ appropriate materiality ~~level of materiality~~ level for financial reporting purposes. However, asset management purposes are likely to require a lower level of componentisation.

Composite rates

New build rates provided centrally for carriageways, footways and structures for the purpose of calculating gross replacement cost.

Costs that meet the definition of property, plant and equipment assets

Costs that are directly attributable to bringing the asset to the location and condition necessary for

(capital expenditure)	it to be capable of operating in the manner intended by the authority. These costs must be recognised in accordance with the requirements of the *Code of Practice on Local Authority Accounting*.
Cycletrack	Defined in the Highways Act 1980. A track on which the public have a right of way on pedal cycles. It can be within the highway boundary (but outside the carriageway) or a separate highway in its own right.
Depreciated replacement cost (DRC)	A method of valuation which provides the current cost of replacing an asset with its modern equivalent asset less deductions for all physical deterioration and all relevant forms of obsolescence and optimisation.
Depreciation	The systematic allocation of the depreciable amount of an asset over its useful life arising from use, ageing, deterioration or obsolescence.
Deterioration	The physical wear and tear on the asset; damage due to time, weather, etc that can be observed and measured through condition surveys.
Financial Reporting Manual (FReM)	The document issued by HM Treasury which sets out the accounting policies and practices that UK government bodies must follow when preparing their final statements. It provides guidance on the application of IFRS, adapted and interpreted for the public sector context.
Finite life	Length of life at the end of which the assets will need to be replaced.

Footpath	A highway over which the public have a right of way on foot only, not being a footway [Section 329(1) Highways Act 1980/Roads (Scotland) Act 1984].
Footway	A way comprised in a highway, which also comprises a carriageway, being a way over which the public has a right of way on foot only [Section 329(1) Highways Act 1980/Roads (Scotland) Act 1984]. Footways are the pedestrian paths alongside a carriageway.
Gross replacement cost/gross asset value	The total admissible cost of replacing either the whole of an existing highway network or some part of it with a~~n~~ modern equivalent ~~new~~ asset.
Heritage asset	~~A listed asset or an asset that, due to its construction form or character, is considered to be important to the heritage and/or character of an area.~~ An asset with historical, artistic scientific technological, geophysical or environmental qualities that is held and maintained principally for its contribution to knowledge and culture. In highways terms it may be a listed asset or an asset that, due to its construction form or character, is considered to be important to the heritage and/or character of an area.
Highway	Collective term for publicly maintained facilities laid out for all types of user, and for the purpose of this guidance includes, but is not restricted to, roads, streets, footways, footpaths and cycle routes. (In Scotland, the term ‘highway’ should be interpreted as ‘road’ as defined by the Roads (Scotland) Act 1984.)

Highway infrastructure/highway infrastructure assets	The network of highways, footways and cycleways and the structures, lighting and other assets that are directly associated with them. They do not include assets such as car parks, maintenance depots and bus stations which should be regarded as property assets.
IFRS – International Financial Reporting Standards	International accounting standards and other requirements of the International Accounting Standards Board.
Impairment	An impairment loss is the amount by which the carrying amount of an asset exceeds its recoverable amount. A reduction in net asset value due to a sudden or unforeseen decrease in condition and/or performance of an asset compared to the previously assessed level which has not been recognised through depreciation. ~~An impairment loss is the amount by which the carrying amount of an asset exceeds its recoverable amount.~~
Indefinite life	Those assets that~~, given the necessary maintenance,~~ will last indefinitely.
Initial measurement	Determining a monetary value of a newly constructed, reconstructed or improved asset.
Levels of service	A statement of the performance of the asset in terms that the customers can understand. Levels of service typically cover condition, availability, accessibility, capacity, amenity, safety, environmental impact and social equity. They cover the condition of the asset and non-condition related demand aspirations, ie a representation of

	how the asset is performing in terms of both delivering the service to customers and maintaining its physical integrity at an appropriate level.
Life cycle plan	A plan to cover the expected life of the component from new to replacement or, for indefinite life components, the life of the treatment cycle from 'as new' condition back to 'as new' condition. The plan should includes the timing, nature and cost of all treatments needed to maintain the service potential of the asset, component or group over its useful life.
Modern equivalent asset (MEA)	An asset that provides the same potential performance as the existing asset, but takes account of up to date technology.
Network	The highway network inclusive of all its elements, such as roads, segregated footpaths and cycle routes, structures and lighting.
Recoverable amount	The higher of an asset's fair value less costs to sell and its value in use.
Revaluation Reserve	A Balance Sheet reserve which records the gains arising from the revaluation of non-current assets until they are consumed by the authority or realised in a sale
Rural pathway	Low use rural footway.
Special structures	Structures that due to a combination of their size, construction and character are not suitable to be valued using standardised unit rates and gross replacement cost models.

Statement of accounts	A set of financial statements which present the financial performance and position of an authority during the accounting period covering its assets, liabilities, income and expenditure, the cash flow, and any provisions for the future.
Unit rates	The cost per unit measure (number/length/area/volume) to replace an asset or part of an asset.
Useful life	The period for which an asset is expected to be available for use by ~~an entity~~an authority.
Valuation basis	Assets within this Code should be ~~valued~~ measured at fair value ie on a depreciated replacement cost (DRC) basis.
Whole life cost	Systematic consideration of all costs and revenues associated with the acquisition and ownership of an asset, component or group over its complete life cycle.
Whole of Government Accounts	Full accruals based accounts covering the whole of the public sector. They consolidate the accounts of around 1~~3~~500 bodies from within the central government, local government, health service and public corporation sectors.

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Most of the documents listed here are subject to revision and updating from time to time. Users are therefore advised to check that they are using the latest version.

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