Milton Keynes City Council

Code of Practice

Carriageway, Footway and Redway Maintenance

Document Control

Title	Code of Practice for Carriageway, Footway and Redway Maintenance
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Status	Final Version 1.1.1
Issue Date	March 2023

Issue Record

Version	Approval Date	Details	Status	Action By
1.0.0	January 2023	Created CoP Carriageway, Footway and Redway Maintenance	Draft	MM/GT
1.1.0	March 2023	Incorporating Lifecycle planning and complete document for new contract	Draft	MM/GT
1.1.1	April 2023	Issued Code of Practice Carriageway, Footway and Redway Maintenance	Final	AD

Introduction

Milton Keynes City Council Highways Carriageway, Footway and Redway Maintenance Code of Practice has been fundamentally reviewed with maintenance engineers, inspectors, and other practitioners to take account of the recommendations and best practice set out in the October 2016 "Well-managed Highway Infrastructure: A Code of Practice" and any other relevant guidance documents. The Code of Practice is designed to promote the adoption of an integrated asset management approach to highway infrastructure based on the establishment of local levels of service through risk-based assessment.

This document supports the overarching Milton Keynes City Council Highways Infrastructure Asset Management Policy, Strategy and Plan which sets out and describes the service levels relating to our risk-based approach to managing how it organises and maintains the carriageways, footways and Redway assets on our network it is responsible for.

This code is part of a suite of documents for each of our key asset groups and where necessary cross references to these other documents will be made that sets down the process & procedures to be operated.

This code covers the overall plans for the capital maintenance / upgrades of the carriageway, footway and Redway assets. There is a separate code (Code of Practice for Highway Inspections) that deals with service inspections covering emergency, reactive and routine maintenance activities. These two documents jointly ensure that the assets are both safe, well maintained and where necessary upgraded to prolong lifecycles and minimise whole life costs.

This specific code covers the following key areas of

1. Network Hierarchies
2. Lifecycle Planning,
3. Scheme Selection
4. Condition Surveys
5. Network Performance
6. Environmental Considerations

1.1 Carriageways

1.1.1 Context

In maintaining the Milton Keynes carriageway network, we aim to keep them at a condition that ensures reasonable facility, safe and accessible for all users and provides a high degree of street-

scene quality for local residents. In order to ensure cost-effectiveness and value over the whole lifecycle of the carriageways, and to ensure sustainable asset management practices we aim to maintain the overall carriageway network in a "steady state" as measured by the condition indicators, where each year the amount of network that requires maintenance is matched by annual funding.

There are two distinct categories of carriageway in Milton Keynes; the new town network that is predominantly urban and has generally been well constructed, with an emphasis on good quality materials and design, that tends to have very little in the way of structural issues, where the predominant need is for surface maintenance. In contrast to this the older network of un-designed generally rural carriageways tends to have more issues especially on unclassified roads, with deterioration resulting from a lack of designed drainage and a broader range of maintenance needs.

Asset Stock and Usage

Table 1 and 2, below, summarises the lengths of carriageway network and the split by type of surface that exist within each of the categories that are used for reporting.

	Construction			
Road Type	**Flexible**	**Flexible Composite**	**Rigid Concrete**	**Rigid Composite**
A Roads Urban	18.68 km			
A Roads Rural	122.32 km			
B Roads Urban	22.52 km			
B Roads Rural	40.48 km			
C Roads Urban	97.53 km			
C Roads Rural	323.47 km			
Unclassified	901.00 km			
TOTAL	**1526.00 km**			

Table 1. Carriageway Inventory

Surface Area	M^2	% Split
Bitumen	6,109,379	85.69%
Block	841,413	11.80%
Concrete	74,464	1.04%
Flag	24	0.00%
Other	81,964	1.15%
Surface Dressing	22,467	0.32%
Grand Total	**7,129,711**	

Table 2. Carriageway Surfacing split

Asset Groupings and Hierarchy

For asset management purposes, we have adopted standard “Network Hierarchy” designations as follows:

- Principal
- Non-principal
- Unclassified

The hierarchies apply to both Grid Roads and non-Grid Roads.
Due to the importance of the ‘Grid Road’ network these roads have their own hierarchy designation and for capital maintenance purposes they are given their own set aside budget. The rest of the budget is split between Principal, Non-Principal and Unclassified roads.

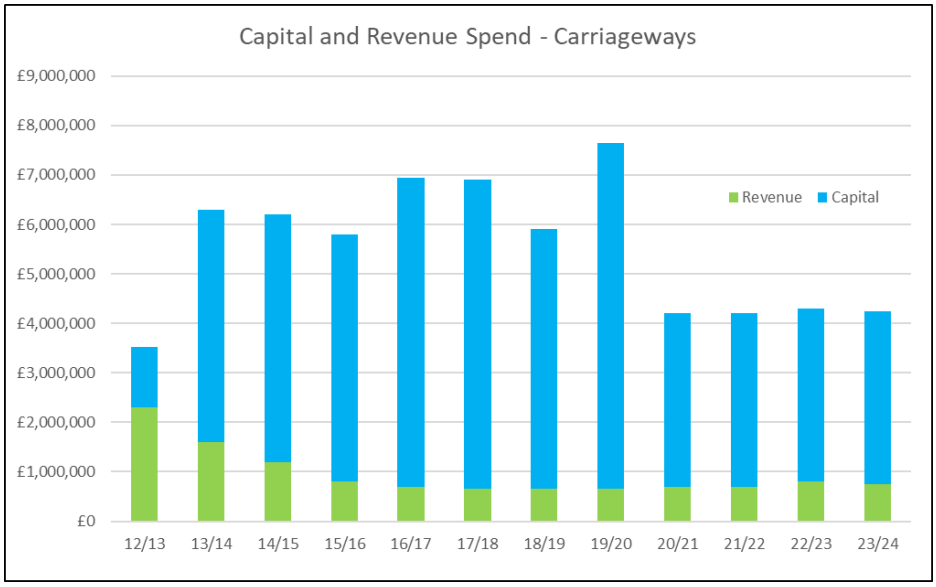
Asset History

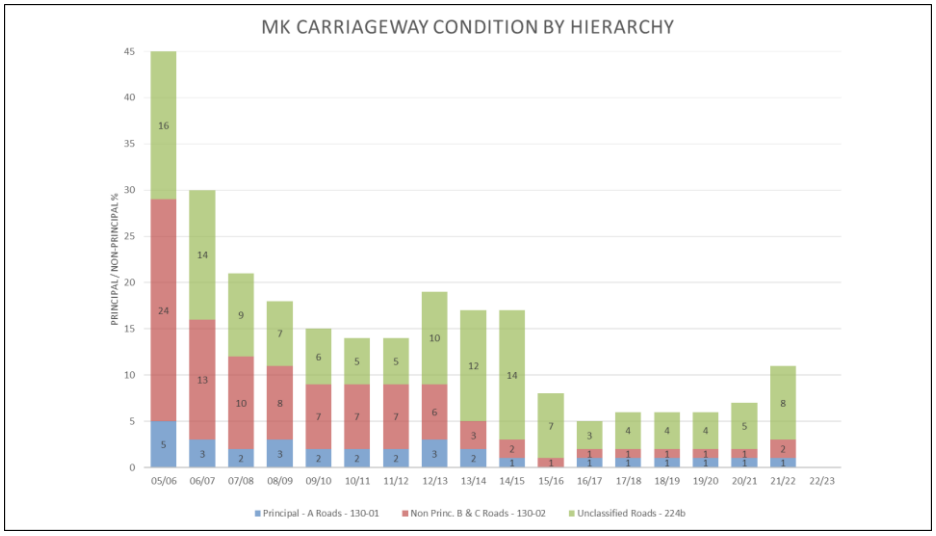
Historic Funding and Maintenance Strategies

Historically capital budgets have been insufficient to maintain the existing network to a steady state condition and the strategy has been to prioritise the ‘worst first’ roads, this has led to an increasing backlog of repairs and a steady decline and did not allow preventative treatments to be carried out that would extend life and minimise cost over the life of a carriageway asset.

In order to move provide sufficient funding to adopt a preventative approach that represents better value for money in the longer term in 2014 Milton Keynes secured £50m through the prudential borrowing mechanism in order to arrest the decline of the assets and implement targeted longer term works programme. As part of the prudential borrowing business plan in order to maximise the available spend against the depreciation cost of the treatment, the prudential borrowing was separated from the normal capital allocation, the prudential borrowing was used to fund inlay and structural surfacing works and the standard capital allocation was used for surface treatments with shorter lifecycles. In addition, the capital funding for surface treatments was financially profiled so that there would be 3 years of investment (circa £2 million per annum) then a gap of 5 years and another 3-year investment block. This continuously cycles ensuring that there is a significant capital investment in surface treatment preventative works allowing for targeted interventions and creating an environment whereby a ‘steady state’ asset is maintained (see condition scores)

In recent years carriageway revenue budgets used for small scale cyclical and reactive carriageway have noticeably reduced and been absorbed into the overall reactive and emergency repairs budget to address all highway defects, both in absolute terms and as a proportion of total expenditure on carriageways. This has proven difficult to address certain works that have been re-assigned as more major surfacing schemes or larger pre-patching prior to surface treatment. This is shown in the graph below.





Asset Value and Risk Profile

Our most recent highways infrastructure valuation exercise in 2020/21 assessed the "Gross Replacement Cost" of our carriageway network at some £1.894 billion; excluding the value of the land (i.e., this would be what it would cost to build a new carriageway network). If one takes into account the degradation in value that occurs through deterioration and use, the "Depreciated Replacement Cost" figure is £1.681 billion for carriageways.

1.1.2 Asset performance

Levels of Service

In maintaining our carriageway network, we aim to manage safety risk to within acceptable limits through a regime of inspections and reactive and planned maintenance, and to ensure that we are fulfilling our statutory duty to maintain the network. We report a number of performance indicators on the condition of our carriageway network as shown below.

Network	***Reference***	***Description***
Principal (A) Roads	130-01	% of Network Where Maintenance Should Be Considered
Non-Principal. (B & C) Roads	130-02	% of Network Where Maintenance Should Be Considered
Unclassified Roads	Former BV 224b	% of Network Where Maintenance Should Be Considered
Principal (A) Roads	NI130-03	Skidding Resistance: Percent of Survey Length Requirement Further Investigation

We generally perform well in comparison with our regional and national averages; we aim to maintain the condition of the network "steady state", where the annual need for maintenance is matched by our funding and capacity to carry out maintenance. The authority's aspiration is to attain a position in the top quartile of authorities in the country (out of 153) and maintain this position.

We assess public satisfaction with the road network through our participation in the NHT (National Highways and Transport) public satisfaction survey; satisfaction levels related to carriageway conditions and maintenance in Milton Keynes in are above the national, regional (southeast) unitary local authority averages.

Risk management and mitigation

Major risk relating to carriageways is normally associated with catastrophic failure of the construction, defects such as potholes or severe loss of skid resistance which could result in loss of life or serious injury.

The risks can be mitigated by the inspection regime (see Code of Practice for Highway Inspections) and structural condition assessments that are carried out which highlight serious defects in accordance with the intervention levels stated and the repair times given. In addition, the authority has invested in and helped to develop Road AI surveys (Viasala) that is fitted to a number of highways vehicles and records current condition on every journey, this is monitored to establish deterioration and intervention actions.

Surveys and Inspections

Condition surveys

The condition of the principal and non-principal classified network is assessed through annual SCANNER (Surface Condition Assessment of the National Network of Roads) surveys. This is a (traffic speed) machine-based survey that measures a range of road condition parameters. These measurements are processed in the pavement management system (PMS) to create a road condition indicator (RCI) score for every 10 metre sub-section of this network.

The condition of the unclassified network is currently assessed through the UKPMS coarse visual inspection (CVI) survey.

Principal roads are subject to SCRIM surveys to determine skidding resistance, following which a risk assessment is carried out to determine if action is required to mitigate the risk of wet skidding accidents.

As previously mentioned, MK Highways also undertakes Road AI surveys every time a general inspection of the highway is carried out, these surveys record road condition defects in line with UKPMS criteria to allow for condition scoring and RAG rated mapping of the network all of this is integrated into our Highways and Asset Management System (AMX) for scheme selection/network management.

Safety Inspections (see Code of Practice for Highway Inspections for detail)

In addition to these surveys, as part of Milton Keynes risk management regime we carry out routine "safety" inspections of roads to identify and respond to defects that represent a risk to the safety of users. We also inspect and assess risks where defects are brought to our attention from other sources, such as reports from residents.

1.1.3 Scenario evaluation

Lifecycle Options

In developing our asset maintenance approach for carriageways, we carry out an options appraisal exercise;

1. At the strategic level to determine the investment and maintenance strategy that represents best value in terms of minimising lifecycle costs, managing and mitigating risk and delivering our desired level of service for carriageways. This looks at the treatment selection strategy, i.e., compares the whole life cost for each different family of carriageway construction and use to determine which sequence of treatments offer the optimal treatment scenario for each carriageway construction and use option – Note: we currently have 9 options for consideration (see example table below for first 3 options)

Life Cycle Analysis - Bituminous Carriageways					
Locations		**Carriageway Surfacing**	**Area**		**Entire Highway Network**
Material Type		**Bituminous**	**Existing Area of Bituminous (m2)**		**1561 km x avg. width 6.3 metres**
Alternatives		**Year 1**	**Year 15 — 20**	**Year 25 - 30**	**Year 40**
Whole life cost £56 to £66 per m2	**Option 1** Overlay existing carriageway. Rural roads between villages (consider some minor roads in villages)	Overlay existing surface if levels, drainage and kerbface allows, this will add strength to older rural roads where constructional 'make up' is unknown or 'tarbound' material is present and to remove the full thickness would be cost prohibitive in disposal tonnage. Road profile restored,texture, drainage improved, road strengthened £ 20.00 per m2	Intervene with a surface treatment at year 15 to 20 based on condition data. Visual appearance showing loss of texture, oxidisation and minor surface defects surface needs to be structurally sound. Consider surface dressing/ high performance microasphalt (Gripfibre) £3 to £8 per m2	Intervene with a second surface treatment at year 25 to 30 based on condition data. Visual appearance showing loss of texture, minor stripping of 1st surface treatment and minor surface defects surface needs to be structurally sound. Consider surface dressing/ high performance microasphalt (Gripfibre) £3 to £8 per m2	Resurfacing option only due to original levels now not able to accommodate another overlay. If original tarbound may increase cost. Consider thin surfacing course and remove dressing/microasphalt only £30.00 per m2
Whole life cost £66 to £76 per m2	**Option 2** Inlay Resurfacing existing carriageway. All Rural roads	Resurface existing surface if condition determines, up to 20% of binder can be replaced before deep inlay considered. Road profile restored,texture, drainage improved, road strengthened. Resurface up to high amber RAG based on SCANNER/CVI £ 30.00 per m2	Intervene with a surface treatment at year 15 to 20 based on condition data. Visual appearance showing loss of texture, oxidisation and minor surface defects surface needs to be structurally sound. Consider surface dressing/ high performance microasphalt (Gripfibre) £3 to £8 per m2	Same as year 15-20.Some minor repairs may be required due to general wear and tear (minimal). £3 to £8 per m2	Resurface existing surface if condition determines, up to 20% of binder can be replaced before deep inlay considered. Road profile restored, drainage improved, road strengthened. Resurface up to high amber RAG based on SCANNER/CVI £30.00 per m2
Whole life cost £136 to £146 per m2	**Option 3** Deep Inlay Resurfacing of existing carriageway.	Deep resurface/ reconstruct existing surface if condition determines, up to 20% of binder can be replaced before deep inlay considered. Road profile and structure restored,texture, drainage improved, road strengthened. Resurface up to high amber RAG based on SCANNER/CVI	As Option 2 year 15-20	As Option 2 year 25-30	Resurface as per Option 2 year 1, this is possible as structural issues addressed in Year 1 of this

This table will look at where a carriageway is in its lifecycle and the engineer will select the appropriate option for the Year 1 treatment to continue the overall lifecycle until it reaches the next stage which is identified through condition surveys.

To assist with identifying suitable selections each road hierarchy, together with an indicative cost per metre squared for estimating purposes will only be suitable for certain treatments / materials taking into account MK specific requirements, we use the following table as a guide in conjunction with the Highways Service Contract Specification – Table 7

Treatment	Bituminous Inlay Resurfacing	Bituminous Inlay Deep Resurfacing	Bituminous Reconstruction	Modular Inlay Resurfacing	Modular Reconstruction	Bituminous Overlay	Surface Dressing	High Performance MicroAsphalt - Grigfibre	MicroAsphalt	Asphalt Preservative
Life Expectancy	Up to 20 years	Up to 30 years	Up to 40 years	Up to 40 years	Up to 40 years	Up to 20 years	Up to 15 years	10 to 15 years	10 to 15 years	5 to 7 years
Average Cost per m2	£30	£60	£100	£60	£100	£20	£5	£10	£6	£3
Road Classification										
Grid Road Roundabouts	✓	✓	✓							
Grid Roads	✓	✓	✓					✓		✓
Principle Roads - Urban	✓	✓	✓					✓		✓
Principle Roads - Rural	✓	✓	✓				✓	✓		✓
Non-Principle Roads - Urban	✓	✓	✓					✓	✓	✓
Non-Principle Roads - Rural	✓	✓	✓			✓	✓	✓		✓
Unclassified - Urban	✓	✓	✓	✓	✓			✓	✓	✓
Unclassified - Rural	✓	✓	✓			✓	✓	✓	✓	✓

Note: Bituminous Reconstruction can be conventional reconstruction or a recycling process or combination of recycling and bituminous layers.

2. At the street level the highways engineer carries out a site validation exercise to determine the most appropriate lifecycle option that best balances risk, performance and cost, and to prioritise forward programmes of maintenance works. e.g., the above may because of local issues mean that the above cycle is amended such that the year Option utilising a micro surfacing treatment is removed and local repairs followed by resurfacing is utilised.

Maintenance and Funding Strategies

At the strategic level, we evaluate a number of investment strategies, for example:

1. Zero funding
2. Minimum funding to manage risk
3. Fixed, historic based funding
4. Eliminate backlog and achieve a ‘steady state’ over 10 years
5. Eliminate backlog and achieve a ‘steady state’ over 15 years

Cyclic Maintenance

Cyclic maintenance is the regular day-to-day work that services rather than repairs the asset and is necessary to keep the asset in working order. Scheduled cyclical maintenance activities such as gully emptying, street cleaning and grip cutting are planned programmed work designed to have a preventative effect on the carriageways. Another Council Department carries out grass cutting and weed spraying. Although these activities are not explicitly designed to improve carriageway condition, they help prevent damage to the carriageway from water or vegetation and they have a significant effect on customer opinion about the level of service the council is providing.

Reactive Maintenance

Reactive maintenance covers ad hoc (unplanned/unscheduled) repairs to assets due to damage or the renewal of small elements or components which have become unserviceable due to general wear and tear or have deteriorated for other reasons. Reactive maintenance covers works necessary to maintain the highway assets in a safe condition to the standards set out in the Code of Practice for Highway Inspections or in response to bad weather or other emergencies (see also Highway Emergency Plan) where a rapid response is required. Reactive maintenance includes highway defect repairs, placement of warning signs, emergency tree works, response to highway flooding and other highway emergency work.

Planned Maintenance (renewals or replacements)

Even when the structure of the highway is in very good condition, the surface deteriorates due to age, trafficking, and weather. Much planned capital maintenance is concerned with protecting or restoring the carriageway surface. This comprises the planned (programmed) work that does not increase the asset's designed capacity, but restores, rehabilitates, replaces, or renews an existing asset to its original capacity and includes resurfacing and surface treatments.
Planned maintenance describes activities that are programmed in advance that are aimed at improving local road condition. Routine planned maintenance includes localised patching, edge strengthening (haunching or kerbing) and re-profiling to improve drainage. The scale of these works tends to be smaller and more localised as opposed to more strategic and larger scale structural maintenance schemes that include reconstruction and overlays.

As such, these works can be either revenue or capital funded depending on the scope and projected longevity of the treatment. This type of work is often done in order to complete a better repair of a section of carriageway that gets repeated customer complaints, or which is regularly highlighted for reactive pothole repairs through the highway inspection process.

Asset Upgrading / Structural Maintenance

Upgrading consists of major works that upgrade or improve an asset beyond its existing design capacity. Planned lifecycle or structural maintenance is the long-term strategic renewal or replacement of highway assets. Structural maintenance generally comprises more extensive and therefore expensive treatments to restore the condition and value of the asset compared to more reactive treatment activities such as patching or pothole repairs. Structural maintenance tends to predominately be funded through capital budgets. A balance needs to be struck between the scale of planned maintenance and when a decision to replace or renew needs to be made. Renewal or replacement of an asset is the key part of lifecycle planning, minimising the whole life cost of the asset.

Option Appraisal

In determining our strategy and in developing our lifecycle plans we draw upon a range of asset data:

1. Financial data, including cost and budget information;
2. Asset network data, particularly the hierarchy which for many asset types determines the maintenance priority at a particular location;
3. Asset inventory data on the location, specification, quantity and age of the road network, both as a whole and in candidate locations for maintenance works;
4. Asset condition data from our cycle of surveys (SCANNER, CVI and SCRIM and Road AI);
5. Treatment life and whole life cost assessments
6. Information on historic performance and maintenance activity on the network (e.g., history of defects);
7. Risk and claims information; and
8. Assessments by local engineers.

We are moving to a new Highways Maintenance and Asset Management system (AMX) in 2023 that will enable processing of the road condition surveys (Viasala Road AI will be built into this system) and scheme selection in addition to recording all highway inspections, this will act as our principal tool for evaluating investment options and for determining forward works programmes. It will also be used to process our condition survey data and produce our DfT returns.

Scheme Prioritisation and Forward Works Programming

Following the annual condition surveys a report on network condition and treatment sites is produced into a mapped form using the UKPMS rules and parameters. This provides a range of broad, generic treatment outputs. This element is used by MK highways engineers to support the process of selecting the most appropriate remedial treatments to meet local requirements and financial constraints. Note that UKPMS rules and parameters are a “one-size-fits-all” approach and have not been subject to review for a number of years. UKPMS maintenance recommendation is primarily a “worst-first” treatment prioritisation which identifies remedial works based primarily on analysis of condition data. The reports and maps provide highway engineers with locations at which further investigation will be undertaken to confirm the type and extent of works required.

Following this map-based network report, schemes identified for further investigation are driven using the Viasala Road AI survey in order to assist the engineer to evaluate the road section, this gives an up to date recorded condition score and a video record of the road section so that reviews can be easily carried out in the event there is any ambiguities that need further review by other officers without the need to revisit the site.

In assessing whether a carriageway section should be included in a future works programme, and to determine the timing of works we carry out a priority assessment drawing upon a combination of further factors that include:

- Condition data
- Hierarchy
- Risk assessment
- Claims history
- Scheme Cost
- Engineering and inspector assessment / validation
- Treatment options
- Value for money assessment
- Routine maintenance data
- Environmental assessment

In determining whether a road section should be included in a future programme we undertake a priority assessment utilising a number of factors if the section scores highly enough it will be added to the respective capital programme. Once added to the programme the section will be assessed to determine what stage in its life cycle it is and therefore what treatment can be considered.

It must also be noted that there will be occasions that a section of carriageway will suffer rapid deterioration and will require a suitable response as that means the scheme will replace a project scheme purely on the grounds of safety. An example being 'old' surface dressings failing during extreme summer heat or older SMA surfacing at key junctions/roundabouts materially affected by extreme cold/wet causing rapid failure.

It is our intention to produce rolling 3 to 5-year forward works programmes for all parts of the network with a detailed 2-year programme for approval to enable advanced design and programming to take place.

Environmental Considerations

When considering all aspects of carriageway management, it is imperative that the key environmental drivers are given appropriate weight, namely;

- Sustainability
- Carbon Accounting
- Biodiversity

These key factors will be assessed when any programme of works/treatment selection/innovation consideration takes place using the service 'Environmental Assessment Checklist'. When this is undertaken in an evaluation of a scheme priority should be given to the above factors.

Road construction is a heavy carbon user from the processes to extract raw materials to the processes to convert these into functional road surfaces for highway users

1.1.4 Improvement actions

The following improvement actions have been identified for carriageways:

- Implement an automated Asset Options Model as part of the new Highways Maintenance and Asset Management system (AMX), and use this to identify the preferred investment strategy for carriageways;
- Continue to identify innovative treatment options to extend life of carriageways, drive sustainability and to maximise performance and minimise lifecycle cost;
- Develop a 3-to-5-year programme of carriageway works to be updated on an annual basis; and
- Report carriageway condition, performance, and maintenance need on an annual basis as part of an annual asset performance report.
- Review lifecycle options when presented with new materials / treatments i.e., recycling
- Introduce Rejuvenator products as part of the preventative treatment programme.
- Ensure improved Communications to inform Councillors and the public of what they are likely to see as part of an Asset Management approach

Sustainability

Milton Keynes has demanding carbon targets for 2030 and 2050 in addition to targets to meet budget challenges and increased impact from network occupancy by utilities.

This has resulted in exploring different methods to achieve the best engineered solution and minimising waste and creating a longevity in surfacing materials which in turn minimises the 'whole life cost'.

Milton Keynes will be looking to expand and move its programmed scheme activities for carriageway improvements to sustainable methods and is looking to the new term contract to provide these solutions.

1.2 Footways and Redways

1.2.1 Context

In maintaining the footway and Redway network we aim to keep them in a condition that enables them to function effectively and provides a safe surface for users and to eliminate the backlog of repairs to ensure that the asset is managed in the most cost-effective way. Works are identified and prioritised to carry out both preventative works to maximise the life of assets, needs based schemes in order to achieve a cost-effective balance of preserving footways/cycleways that have not yet fully deteriorated and fixing those that have.

Asset Stock and Usage

Milton Keynes has a network of some 1480km of footways and cycle tracks, including some 346km of "Redways" (cycle track). This equates to some 2.5 million square metres of footway surface and just over 1.0 million square metres of Redway surface. The 'new town' footway and Redway network was constructed within a relatively short period of time (1967 to 1994), which means that much of the network is of like condition and reaches the point where maintenance intervention is required to maintain serviceability at the same time. Funding was increased in 2013 and with the award of the new highways term contract incorporating the following of sound principles for scheme selection and also increase the percentage of preventative treatments in both the 'new town' and traditional older areas this will result in an improvement in overall condition scoring and a more sustainable investment strategy.

The footway network comprises predominantly concrete flags (18%) and bituminous footways (82%), and Redways of bituminous construction with red coloured surfaces. Central Milton Keynes is quite unique in that all footway surfaces are constructed from a silver-grey granite faced paving flags.

Asset Groupings and Hierarchy

Tables below show the hierarchies that are used to categorise all of our Footways and Redways; we use these categories for determining priorities for maintenance and for specifying the standard of service that we aim for on particular parts of the network.

Hierarchy of Footways
Category 1 – Primary Walking Route – High use in CMK and town centres
Category 2 – Secondary Walking Route - Medium use route through local areas feeding primaries, local shopping areas incl. CMK not included in Cat 1
Category 3 - Link Footways - Link local footways through urban areas & busy rural footways
Category 4 - Local Access Footways - Low use, short estate roads & cul de sacs
Category 5 - Public Rights of Way – responsibility of MKC Environment

Hierarchy of Cycleways and Redways

Category a – Cycleway that forms part of the carriageway Category b1 – Primary Redways, identified in salting routes (H6 and V6) Category b2 – All other Redways Category c – Leisure routes – not normally MKC responsibility

Footways/Redways				
Hierarchy	**Flexible**	**Paving Flags**	**Modular**	**Rigid Concrete**
Category 1	98.47 km			
Category 2	0 km			
Category 3	13.67 km			
Category 4	24.4 km			
Redways	346 km			
TOTAL	**1481 km (1135km footways)**			

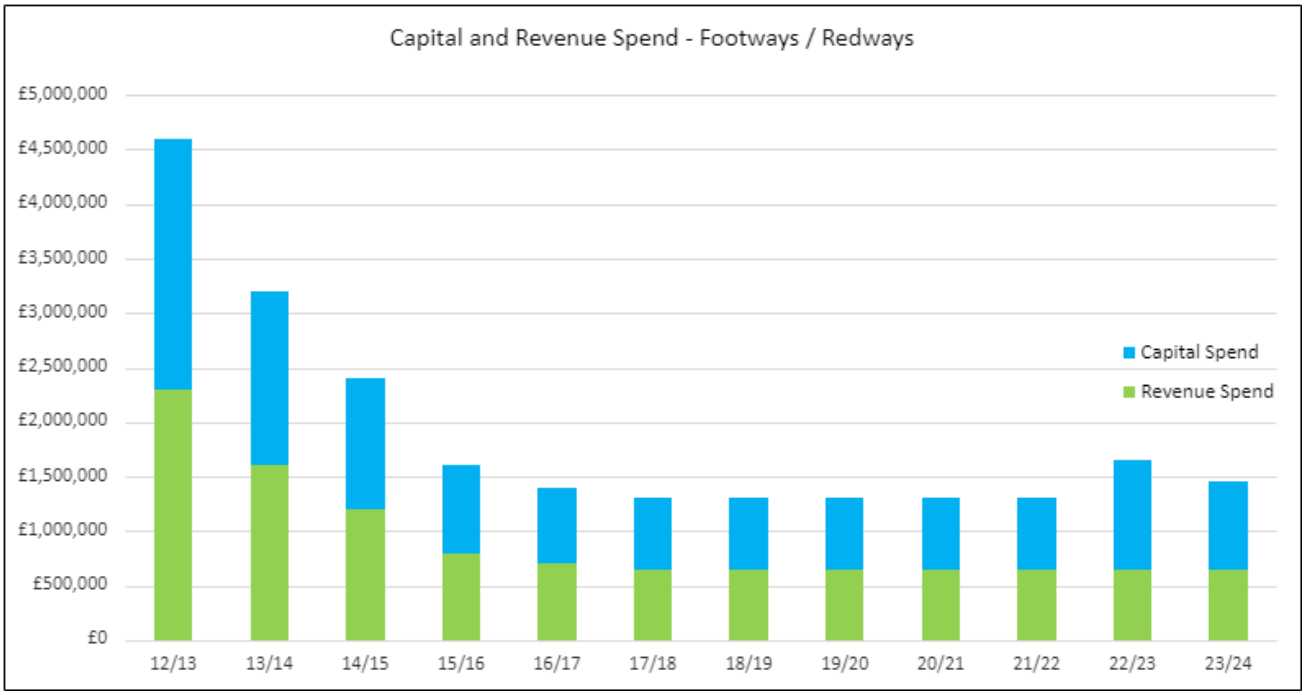
Asset History

Funding and Budgets

Historically capital budgets have been insufficient to maintain the existing network at a sustainable "steady state" condition that provides an acceptable level of service. This means that we have had to prioritise the worst condition footways, in order to manage risks to users rather than adopting a planned, preventative approach to treatments where we intervene to prevent deterioration to the point where more costly treatments are required. This has led to an increasing backlog of repairs and a steady decline and ultimately will be more costly, as increasing numbers of footways are reaching the ends of their useful lives.

In order to address this, Milton Keynes has borrowed some £50m part of which has, in conjunction with government "incentive" funding allowed us to tackle this backlog and to improve the condition of the footway network somewhere towards our desired condition and Level of Service.
The budget assigned to footways is broken down to the following categories for practical management purposes. Programmes of work are developed for each of these:

- Central MK Footways
- General Footways
- Cycleways / Redways



Footway and Redway Performance and Condition

In order to monitor the condition and level of service provided by our footway and Redway network report we report our KPI 54 "Condition of Footways". This KPI shows that in recent years the condition of the footway network has generally been worsening, resulting in degradation in the standard of service provided to users. The investment in the network through prudential borrowing from 2012 shows that, conditions are starting to improve. The national indicator for footways has remained fairly static for a number of years (circa. 64%) this is despite investment seen extensive utility programmes installing fibre optic cabling to all properties in Milton Keynes leaving the footways (particularly in bituminous surfaces) in a functional state but in a visually poor condition leading to a down scoring on the surveys.

Asset Value and Risk Profile

Our most recent highways infrastructure valuation exercise in 2019/20 assessed the "Gross Replacement Cost" of our footway and cycleway (Redway) network at circa £133 million, excluding the value of the land. (i.e., this would be what it would cost to build a new footway network). If one takes into account the degradation in value that occurs through deterioration and use, the "Depreciated Replacement Cost" figures is circa £73 million for footways and Redways.
For footways and Redways the principal risk that we are concerned with is safety risk for users which is mitigated through our proactive regime of inspections.

1.2.2 Asset performance

Levels of Service

In maintaining our footway network, we aim to manage safety risk to within acceptable limits through a regime of inspections and reactive and planned maintenance, and to ensure that we are fulfilling our statutory duty to maintain the network.
We assess public satisfaction with the footway and Redway network through our participation in the NHT (National Highways and Transport) public satisfaction survey; satisfaction levels related to walking and cycling in Milton Keynes in recent amongst the highest in nationally and amongst unitary local authorities.

Surveys and Inspections

The general condition of the footway/Redway network is assessed through annual eFNS (enhanced Footway Network Surveys) surveys; this is carried out on 25% of the network each year so that the whole network is covered every four years. This is a national standard walked survey; the information collected as part of this survey allows to report on the condition of every part of the network and is used for determining where treatment is required, what that treatment should be and also for assessing the amount of useful life that remains. Since it is a standard survey, it can also be used to compare the condition of Milton Keynes' footway and Redway network to those of other local authorities and for compiling information for reporting on performance and asset value to central government and to support bids for funding.

In addition to these surveys, as part of Milton Keynes risk management regime we carry out routine "safety" inspections of footways and cycleways to identify and respond to defects that represent a risk to the safety of users. We also inspect and assess risks where defects are brought to our attention from other sources, such as reports from residents.

1.2.3 Scenario evaluation

In developing our asset maintenance strategy for footways and Redways, we carry out option appraisal exercise at two levels;

- At the strategic level to determine the investment and maintenance strategy that represents best value in terms of minimising lifecycle costs, managing and mitigating risk and delivering our desired level of service for footways; This looks at the treatment selection strategy, i.e. compares the whole life cost for each different family of footway and redway construction and use to determine which sequence of treatments offer the optimal treatment scenario for each Footway and Redway construction and use family e.g. the wholly bituminous estate footways may have the most appropriate combination of treatments as

    - Yr 0 Resurface – Plane off and inlay 25mm
    - Yr 15 Micro asphalt Surface treatment
    - Yr 30 Micro asphalt Surface treatment
    - Yr 45 Resurface – Plane off 45mm and inlay 25mm back to original level and repeat

  The Redway network demands a different approach due to the nature of the failure modes that are present in Milton Keynes and the age of the asset. In order to maximise the life of the Redway it requires an intervention that involves a full reconstruction. Typically

    - Yr 0 Reconstruct – Plane off, excavate and reconstruct 450mm
    - Yr 20 Plane off and inlay 25mm
    - Yr 40 Plane off and inlay 25mm
    - Yr 60 Plane off an inlay 25mm

- At the street level to determine the most appropriate lifecycle option that best balances risk, performance and cost, and to prioritise forward programmes of maintenance works.

Maintenance and Funding Strategies

At the strategic level, we evaluate a number of investment strategies, including, for example:

- Zero funding
- Minimum funding to manage risk
- Fixed, historic based funding
- Eliminate backlog and achieve desired level of service over 5 years
- Eliminate backlog and achieve desired level of service over 10 years

Lifecycle Options

The specification for all footways/Redways is outlined in the specification within the term contract for Highways, Street Lighting and Network Infrastructure taking into account new materials, tried and tested materials and materials that have been proven to work effectively on the MK network.
At the maintenance option level, a range of maintenance options and lifecycle plans that have been developed. A typical lifecycle for footways might comprise 4 interventions over a 40-year period, ranging from full reconstruction, to resurfacing and surface treatments.

Sustainability Analysis – Footway Micro Asphalt					
Locations / Area		Footways Standing Way to Whaddon Way / Bletchley		Programme Date	2016/2017
Existing Material Type		Tarmac		Area of Treatment (Condition Amber)	28000 m2
Preferred Option / Initial Scheme Cost		Option 3 / £280,000		Projected Available Budget / Source	£300,000 / Dft Incentive Fund Grant
Alternatives		Year 1	Year 10	Year 20	Whole Life Cost
Initial Scheme Cost Year 1 28,000 m2 X £100.00 = £2,800,000 Total Lifecycle Scheme Cost 28,000 m2 X £108.00 = £ 3,024,000	Option 1 Reconstruct Tarmac Footways to full depth (215mm)	Tripping hazards removed.. Visual improvement, improvement in texture. Surface sealed from water ingress. Structural issues addressed **£ 100.00 per m2** initial cost (this cost is for labour and materials)	Minimal repairs required due to general wear and tear. Utility works will produce some deterioration minor maintenance will have to be carried out. **No additional cost**	Surface deterioration caused by oxidisation Tripping hazards increase which could potentially lead to pothole formation and claims. Apply micro asphalt surface treatment **£8.00 per m2**	Whole life cost **£108.00 per m2** (this excludes the cost of an decrease in insurance claims)
Initial Scheme Cost Year 1 28,000 m2 X £65.00 = £1,820,000 Total Lifecycle Scheme Cost 28,000 m2 X £73.00 = £ 2,044,000	Option 2 Resurface surface and binder course only (75mm)	Improvement in texture. Visual improvement. Tripping hazards removed. Design faults solved. Surface sealed from water ingress. **£ 65.00 per m2** initial cost (this cost is for labour and materials)	Minimal repairs required due to general wear and tear. Utility works will produce some deterioration minor maintenance will have to be carried out. **No additional cost**	Surface deterioration caused by oxidisation Tripping hazards increase which could potentially lead to pothole formation and claims. Apply micro asphalt surface treatment **£ 8.00 per m2**	Whole life cost **£73.00 per m2** (this excludes the cost of an decrease in insurance claims)
Initial Scheme Cost Year 1 28,000 m2 X £10.00 = £280,000 Total Lifecycle Scheme Cost 28,000 m2 X £16.00 = £ 560,000	Option 3 Localised structural repair plus Micro Asphalt surface treatment (10-15mm)	Improvement in texture.Visual improvement.Tripping hazards removed. Design faults solved.. Surface sealed from water ingress. Localised structural repairs only **£ 10.00 per m2** initial cost (this cost is for labour and materials, including localised structural repairs)	Minimal repairs required due to general wear and tear. Utility works will produce some deterioration minor maintenance will have to be carried out across whole area. **£ 2.00 per m2**	Surface deterioration caused by oxidisation Tripping hazards increase which could potentially lead to pothole formation and claims. Apply 2nd micro asphalt surface treatment **£ 8.00 per m2**	Whole life cost **£20.00 per m2** (this excludes the cost of an decrease in insurance claims)

Option Appraisal

In determining lifecycle plans we draw upon a range of asset data:

- Financial data, including cost and budget information
- Treatment regime's derived in Scenario evaluation (above)
- Asset network data, particularly the hierarchy which determines the maintenance priority at a particular location
- Asset inventory data on the location, specification, quantity, and age of the footway and Redway network, both as a whole and in candidate locations for maintenance works
- Asset condition data from our cycle of enhanced FNS surveys
- Information on historic performance and maintenance activity on the network (e.g., history of defects)
- Risk and claims information
- Assessments by local engineers

Sustainability

Milton Keynes has demanding carbon targets for 2030 and 2050 in addition to targets to meet budget challenges and increased impact from network occupancy by utilities.

This has resulted in exploring different methods to achieve the best engineered solution and minimising waste and creating a longevity in surfacing materials which in turn minimises the 'whole life cost'.

Milton Keynes will be looking to expand and move its programmed scheme activities for footway and Redway improvements to sustainable methods and is looking to the new term contract to provide these solutions.

Scheme Prioritisation and Forward Works Programming

In assessing whether and a footway section should be included in a future works programme, and to determine the timing of works we carry out a priority assessment drawing upon a combination of factors that include:

- Hierarchy
- Risk assessment
- Claims history
- Cost
- Engineering and inspector assessment
- Value for money assessment
- Condition data
- Routine maintenance data

1.2.4 Improvement actions

The following improvement actions have been identified for footways and Redways:

- Implement a scheme selection model into AMX and use this to identify the preferred investment strategy for footways and Redways
- Explore innovative treatment options to extend life of footways and Redways and to maximise performance and minimise lifecycle cost
- Develop a 5-year programme of footway and Redway works to be updated on an annual basis
- Report footway and Redway condition, performance, and maintenance need on an annual basis as part of an annual asset performance report
- To train MKCC inspectors to undertake condition assessments during safety inspections, to replace the cycle of enhanced FNS surveys