



# Drainage Lifecycle Plan

The following document outlines Milton Keynes approach to Lifecycle planning for its Drainage Assets.

**MK Highways – Asset Management Plan Document**

**Date October 2016 Version 1.0**

## **Drainage Life Cycle Plan**

### ***Goals & Objectives***

The key objective of this lifecycle plan is to drive the efficient maintenance and long-term management of drainage systems by the adoption of an asset management approach. This will be achieved by identifying gaps, adopting best practice from HMEP 'Guidance on the management of Highways Drainage Assets', the setting of appropriate targets, monitoring and measuring performance against these, reporting outcomes, and reviewing service delivery, which will in turn support both the Highways Asset Management Policy and Strategy.

### ***Drainage Asset Statement***

The main Milton Keynes highway drainage network was constructed within a relatively short period of time (1969 to 1994), following the creation of the unitary authority in 1997 Milton Keynes expanded to include a number of rural towns with their associated drainage infrastructure, most of which is considerably older.

The nature of the construction of Milton Keynes was to construct a new town that incorporated existing natural watercourses and drainage features into a developed environment, this was often modular which has caused continuity issues for these existing features. Some of this has been accommodated with the construction of a number of significant 'balancing lakes', this principle has continued to form the design of new estates creating new assets that require careful integration and management of the existing system.

MK Highways has recognised the importance of drainage assets in its Asset Management Strategy document.

The specification for drainage assets is outlined within the new 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 on the MK network.

Historically capital budgets have been insufficient to maintain the existing drainage network, in addition the responsibility as Lead Local Flood Authority (LLFA) following the Flood and Water Management Act 2010 has transferred to

Milton Keynes which bestows additional liability for assets and the creation and maintenance of these assets.

This has placed a demand on the authority to move to a preventative approach MK has prudentially borrowed £50m in conjunction with procuring a new term service contract in order to arrest the decline of the assets and through to a targeted longer term (5 years) planned works programme enabling a move to minimising 'whole life costs' whilst addressing immediate pressures.

Drainage priorities can and are determined by weather events highlighting weaknesses/problem on the network, with this in mind in order to enable the service to respond to these pressures a funding profile has been established for the next 10 years that allows a routine and planned programme to be delivered each financial year that is reviewed annually and modified accordingly.

### *Drainage Inventory*

The drainage asset is an integral part of the overall highway. It contributes to the elements that make up the "fabric" and takes many forms and orientations, more recently under the responsibility of Lead Local Flood Authority (LLFA) Milton Keynes has also constructed a number of assets 'off highway' that contribute to the management of both watercourses and surface water.

Milton Keynes undertook a driven Asset Inventory Survey (completed by Yotta) in 2014, whereby all gully information was extracted. In addition a number of walked surveys of key assets (e.g. Pumping stations, grids and grilles) were undertaken also in 2014. In parallel with this Milton Keynes has also digitised in excess of 7,000 'as built' plans of the highway drainage systems both on the main primary network and the secondary estate networks, this has all been catalogued and is available for reference.

A key step towards ensuring that a number of recommendations in the HMEP guidance on drainage related to inventory data management is achieved is the investment by Milton Keynes in a system that performs multiple functions of supervision of the operational works (Kaarbontech Gully Smart) and logging and updating the drainage asset in both the field and in the office from historical investigatory records (Kaarbontech Pipe Smart), this system has the ability to record and capture assets in the field previously not held or recorded.

Data from these systems is synchronised with Milton Keynes Asset management system CONFIRM to update the master asset database with more relevant additional metadata. NOTE : this is an ongoing activity and will continue especially following investigations using CCTV and tracing mapping to further refine and detail this asset group.

Due to the extensive development works being carried out in Milton Keynes MK Highways has worked with both the adoptions team and key developers to establish drainage asset data 'as built' information as part of the handover again this data is imported into CONFIRM to ensure records are accurate. This process is also use when creating or upgrading drainage assets by MK Highways.

The following tables summarises the known highways drainage asset data ;

Drainage Asset Description	Quantity / No.	Asset % Capture (est.)
Carriageway Gully	61000	100
Footway/Redway Gully	7000	
Drainage Pipes	7000+ plans	90
Manholes		
Catchpits		
Headwalls		
Culverts > 900mm	103	100
Culverts < 900mm		
Trash Screens	42	100
Electric Pumps	21	100
Soakaways		
Ditches		
Grips	350	75
Linear Kerb Drainage		
Linear Drainage e.g. ACO		
Channelised Concrete Ditches	1	100
Swales		
Wet/Dry Balancing Ponds	9	100

## *Condition*

Maintaining the condition of the drainage asset is a continuous activity, the asset constantly deteriorates and is subject to many factors such as root ingress, flooding, silting, utility damage etc.

Measuring the condition of an asset that is in effect mostly buried underground is difficult to routinely measure in a cost effective manner, certain assets are accessible and undergo annual inspections i.e. culverts over 900mm, electrical pumps, trash screens and during the operational cleansing of gullies the condition of the visible asset is recorded by exception on the Gully Smart system.

The condition of underground drainage systems are subject to Closed Circuit Television Surveys (CCTV) when identified as being defective or as part of a larger transport scheme.

MK Highways has purchased a CCTV camera system for such inspections and records the condition of this asset electronically for scheme use and future maintenance.

Drainage systems also undergo both routine and scheme based 'jetting' and 'root cutting' to improve the condition of the system affected.

Where capital improvement / upgrades have been performed the asset condition is recorded as new.

Maintaining the condition of the carriageway network is a continuous activity – the asset never remains “new” for long once the road becomes subject to traffic, weather and other factors. A clear understanding of the condition of the carriageway network (and the amount of residual life it has) can help to direct maintenance programmes so as to ensure that best use is made of resources.

The accuracy and completeness of condition records is considered variable (i.e. some assets are very accurate – Electrical Pumps, others are poor and we are still building condition data – drainage pipes).

## Performance Gaps

The following performance gaps have been identified during development of the drainage lifecycle plan. Further performance gaps are likely to be identified and addressed during implementation of this plan.

Identification / Description	Current Action	Future Action
Incorporate the risk based approach to management of drainage assets into the Code of Practice for Highways Safety Inspections	Review the existing Code of Practice for Highways Safety Inspections and develop a risk matrix for responsive and routine actions.	Adopt the Code of Practice and implement
There are gaps in the current drainage inventory	A review of inventory information is being undertaken. Invest in Pipe Smart software	Undertake additional inventory data capture. Formulate a data management procedure to capture future changes to the asset.
Development areas in Milton Keynes creating new drainage assets that need capturing	Discussions with developers and adoptions team to ensure a process to capture all assets and update asset management system	Formalise process and agree format 'as built' electronic data to update the asset inventory records accordingly
The full exercise required for whole life costing has not yet been undertaken.	Additional information is being collected for use in the whole life costing process	Procedures and processes need to be developed for undertaking a whole life financial costing exercise on the drainage asset using HMEP tool.
A fully detailed risk management assessment (GRACE) has not been undertaken for the asset.	A review of existing risk documents is underway. Both in Strategic and Operational level.	Following publication of UKRLG code of practice Nov 16, a review of the risk management strategy is required, with a focus on decision-making based on acceptable risk.
A fully integrated long-term forward works programme is yet to be fully developed.	A number of initiatives are underway to collate the existing short-term works programmes.	A focus on the information required to develop a long term works programme is required
Drainage asset currently not published publicly	Develop a dedicated layer with significant asset	Publish all drainage asset on the web for public

Identification / Description	Current Action	Future Action
There is a lack of performance indicators associated with this asset.	Contract KPI from data in NHT surveys on drainage performance	A review of the highway maintenance strategy and the Code of Practice is required to assess which of the suggested local performance indicators are
Collate strategic surface water flooding hotspots and use to target improvements	Produce Strategic Surface Water Flood Plan	Implement recommendations and align surface water flooding hotspots with cyclic and planned works.

## Drainage Management Practices:

### *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, clearance of grids/trash screens, grip cutting and clearance of ditches to maintain watercourses are planned programmed work designed to have a preventative affect on the function of surface water. Although many of these activities are not explicitly designed to improve drainage asset condition, they help prevent damage to the fabric of the highway 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 i.e. root ingress. Reactive maintenance covers works necessary to maintain the drainage assets in a safe condition to the standards set out in the Code of Practice for Highway Safety Inspections or in response to bad weather

or other emergencies where a rapid response is required. Reactive maintenance includes localised jetting to clear blockages, placement of warning signs in response to highway flooding and other highway emergency work.

### ***Planned Maintenance (renewals or replacements)***

This comprises the major 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.

Planned maintenance describes activities that are programmed in advance that are aimed at improving local drainage condition. Routine planned maintenance includes localised patching, edge strengthening 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. 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 the drainage system that gets repeated customer complaints or which is regularly highlighted for reactive drainage repairs through the highway safety 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 drainage assets. Structural maintenance generally comprises more extensive and therefore expensive treatments to improve the condition and value of the asset compared to more reactive treatment activities such as localised repairs to drainage pipework. 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. An example would be when a drainage culvert needs enlarging for safety purposes i.e. reduce flooding on a carriageway; there is a point when a replacement of the culvert would be a better long term option, even though it is more expensive. Renewal or replacement of an asset is the key part of lifecycle planning, minimising the whole life cost of the asset.

### ***Asset Creation/Acquisition***

These have been adopted for consistency and long term sustainability. Acquisition of drainage assets is normally associated with those adopted through the planning development process using Section 38 or 106 legal agreements. The construction of Flood Defences also may fall into this category.

### ***Disposal***

Disposal is any activity that removes a decommissioned asset, including sale, demolition or re-location.

### **Budget Optimisation**

#### ***Cyclic/Reactive (Ad-Hoc) Maintenance (Revenue)***

An overall budget based on historic practice (increased approximately by the rate of inflation each year) and raised from various grants and the council tax is available for maintenance each year. Over the last five years drainage costs have reduced year on year with current budgets at £300,000.

Emergency costs vary from year to year and are weather related, last financial year the amount spent of reactive drainage emergencies was circa £35,000.

#### ***Capital Maintenance***

Funding is secured from the central government grant maintenance settlement via the DfT and supplemented by loans from Prudential Borrowing secured in 2014.

In 2012 Milton Keynes committed to prudentially borrowing an additional £50 million to invest in all its highways asset, in effect this realised an additional £250,000 per annum for drainage improvements (available from 2014). From 2012 DEFRA has made available funds (circa £150,000 per annum) to undertake drainage/flood related schemes and also to develop longer term strategic plans. In addition there are two additional sources of funding these are ;

- DfT Challenge Fund – A fund that is available via a bidding process for major highway improvement schemes in excess of £5 million.
- DfT Asset Incentive Fund – An assessment fund that is allocated to authorities in accordance with their approach to managing of their asset.

Milton Keynes is committed to both bid for additional funding and to evidence their pledge to Asset Management principles in line with the guidance documents produced by HMEP.

## **Risk Management – Drainage Assets**

Risk is the chance of something happening that will have an impact on objectives.

### **Physical Risk**

Major risk relating to drainage assets is normally associated with severe flooding causing risk of fatalities and or serious injury.

In recent times, significant flooding has occurred both fluvial and pluvial causing major impact on properties and the highway network. Another cause during severe weather is inadequate construction on older areas of the drainage network that are subject to deterioration caused by various factors.

Secondary risk also applies to all of the above. Indeed most of the flooding experienced start as minor problems which upon further investigation develop as failures associated with secondary risk causing severe disruption as opposed to serious injury.

### **Business Risk**

Major risk and secondary risk resulting in death, serious or minor injury can mean claims for compensation, involvement with other emergency services, damage to property, disruption to people and disruption to traffic. All of which can have a lasting effect on the image of the Council and a detrimental effect on the environment. Therefore financial costs could be significant and its importance not underestimated. There is a high level of insurance claims relating to the drainage asset which need to be addressed.

### **Process/network**

The risks can be mitigated by the targeted cyclic maintenance, inspection regime and structural condition assessments on drainage assets that are carried out which highlight issues that when assigned priorities need to be addressed to prevent further problems.

## **Forward Works Programme:**

Historically, planned capital maintenance programmes have only been submitted for the year ahead. In 2012, the opportunity was taken to obtain funding using the Prudential Borrowing Code and £50 million was secured over a seven year period starting in 2014.

Drainage asset scheme selection is outlined in the MK Highways Asset Management Strategy (HAMS). This has allowed for a priority assessment to be carried out to identify schemes. This will be a rolling programme updated each year in accordance with updated surveys/priorities.

One area of responsibility is Flood Water Management Act 2010 that has imparted the responsibility on the local highways authority to investigate and action flood events. This has led to a number of projects being undertaken linked to flood defence.

Although there is a level of confidence about the future DfT funding, in reality the level of funding is insufficient to support a programme of maintenance of this valuable asset.

It is our intention to produce rolling 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.

## **Performance Management:**

Performance management is measured by annual reporting of Contract KPI's

Those reported on are:-

- KPI 1a – Emergency Response
- KPI 1d – 28 day Repairs
- HMBI 12 – Keeping Drains Clear and Working

## **Drainage Lifecycle Plan Scheme Selection**

See Asset Management Strategy Document for Scheme Selection