

Code of Practice

Drainage maintenance



Document Control

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0.1.1	April 2022	Added Gully Asset management principles	Draft	BV
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Introduction

Milton Keynes City Council Highways Drainage 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”. 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.

The ‘Well Managed Highway Infrastructure Code of Practice’ defers to the HMEP Guidance on the Management of Highway Drainage Assets which states that the objective of this document is to provide guidance to local highway authorities on the most cost-effective approach to managing and maintaining drainage assets, based on having better drainage inventory data and the application of asset management principles.

This code is part of a suite of documents for each of our key asset groups, that in turn supports the overarching Milton Keynes City Council Highway 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 drainage assets on our network. Where necessary cross references to these other documents will be made that sets out the process and procedures to be operated.

This code covers the following key areas of

- Network Hierarchies
- Lifecycle Planning,
- Risk Management
- Scheme Selection
- Condition Surveys
- Network Performance
- Inventories
- Operational Activities
- Gully Cleansing Methodology

Background

Both guidance documents identify good practice in the management of drainage assets associated with water management on the public highway and evidence a move toward a risk-based approach to enable this.

The Councils 'Highways Asset Management Policy (updated 2023)' recognises the need for a 'systematic risk-based approach' that enables the Council to deliver services within its financial resources, based upon a clear understanding of the likelihood of asset failure and any subsequent consequences.

The Councils Highways Asset Management Strategy defines that 'we will continue to work to ensure that a risk-based approach is embedded in our culture and our approach to asset management'.

The Councils Highways Asset Management Plan identifies that '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. This code outlines how this will be achieved.

This code of practice also provides a controlled framework for section 3.16 of the Councils Policy statement on Flood defence that states 'Routine maintenance of the Council's flood defences will concentrate on removal of silt from highway culverts, the removal of debris from trash grids and the cutting back of vegetation where it is deemed to impede the flow of water' by focusing of drainage systems that are prone to blockage or failure.

The identification of risks, based upon historic events and good data analysis, also supports the Councils emergency planning flood response procedure and strategic flood management plan. During a flooding incident, the Council shall execute its duties under Section 19 of the 'Flood Management Act'. Triggers for Section 19 action includes: -

- Prolonged periods of rainfall, causing rivers and local flood management assets such as balancing lakes, brooks, and streams, to breach or overflow onto surrounding land.
- Heavy or prolonged rainfall 'upstream' of Milton Keynes that causes rivers in Milton Keynes to reach capacity and threaten localised risk of flood.
- Rapid melt of heavy snowfall, causing saturation of the ground in areas of limited drainage control
- Meteorological office severe weather forecast, predicting prolonged or heavy rainfall in the vicinity, or upstream of rivers flowing through the city of Milton Keynes.

1.1 Drainage

1.1.1 Context

The drainage asset is an integral part of the functioning of Milton Keynes' highway network. Much of the Milton Keynes highway drainage network was constructed within a relatively short period of time (1967 to 1994) as part of the construction of the infrastructure network. but it also includes a number of rural towns with their associated drainage infrastructure, most of which are considerably older.

Milton Keynes new town incorporated existing natural watercourses and drainage features into a developed environment causing some continuity issues for these existing features requiring accommodation through the construction of a number of significant ‘balancing lakes’. As Lead Local Flood Authority (LLFA) Milton Keynes has also constructed assets ‘off highway’ that contribute to the management of both watercourses and surface water.

Asset Inventory

Milton Keynes undertook a driven Asset Inventory Survey (completed by Yotta) in 2014, whereby all gully information was extracted. In addition, several 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 more than 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.

Assets are updated on the system as and when works are carried out in addition to an ongoing recording (digitising) of existing known assets. CCTV investigative surveys are also stored as records of both condition and repairs.

Formal adoption records of growth areas are also mapped and recorded at point of adoption as part of the section 38 process. Our intention is to also record non highway assets within our new asset management system (AMX) to start to build a comprehensive picture of the drainage network ‘end to end’, to this end we are engaging with local water authorities, drainage boards, agencies and landowners who all have assets that play a role in effective drainage in Milton Keynes.

We are conscious of the gaps in some of our drainage assets and continue to collect asset information to record as an ongoing priority.

The table below (Table 1 – Drainage Asset Inventory) summarises the extent of the highway drainage assets. For full details of each asset and maintenance requirements see Appendix A.

Drainage Asset Description	Total Asset No.	Cleaned per Annum (Lump Sum)	Lump Sum or Extra via CE
Carriageway Gully	72210 no.	25764 no.	Lump Sum
Ad hoc Gully Attendance	200 no. per /annum	200 no.	Lump Sum
Carriageway Kerb Weirs	2246 no.*	2246 no.	Lump Sum
Footway/Redway Gully	660 no.*	60 no.	CE/Lump Sum split
CMK Underpass Footway Gully	400 no.	400 no.	Lump Sum
Drainage Pipes	100661 l/m *	400 l/m	CE/Lump Sum split

Manholes	2176 no.*	8 no.	CE/Lump Sum split
Catch pits	223 no.*	5 no.	CE/Lump Sum split
Headwalls	572 no.*	4 no.	CE/Lump Sum split
Culverts < 900mm	32 no.*	2 no.	CE/Lump Sum split
Trash Screens	48 no.	48 no.	Lump Sum
Electric Subway Pumps	21 no.	21 no.	Lump Sum
Soakaways	5 no. *	CE	CE
Ditches	34354 l/m *	560 l/m	CE/Lump Sum split
Filter Drains	16833 l/m *	CE	CE
Grips	340 l/m (86 sites rural) *	340 l/m	Lump Sum
Linear Kerb Drainage	3069 l/m *	3069 l/m	CE
Linear Drainage e.g., ACO	1734 l/m *	718 l/m	CE/Lump Sum split
Channelised Concrete Ditches	1 (50 l/m)	50 l/m	Lump Sum
Swales	None to date	n/a	n/a
Wet/Dry Balancing Ponds	9	See Code of Practice Drainage Maintenance	Lump Sum Plus CE split
Non-Highways Drainage Asset	n/k	n/a	CE

Table 1 – Drainage Asset Inventory

Note 1: Numbers subject to increase as a result of adoptions from expansion areas– these will be subject to the CE process for Lump Sum items when increase is above 5% of figure stated in table above.

Note 2: Items marked with * the figures are those recorded as of March 2023 – further surveys may increase these numbers, which will contribute to the CE adjustment in Note 1.

Asset Groupings and Hierarchy

For the purposes of prioritising maintenance and assessing risk, we make of the use of the appropriate well established network hierarchy for the carriageway, footway or redway that a particular drainage asset supports, rather than defining a separate network hierarchy for highway drainage.

Asset Funding

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 some of these assets.

This has placed a demand on the authority to move to a risk based approach; MK has used its Integrated Block funding 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 planned works programme based on a prioritisation of schemes using a risk matrix enabling a move to minimising 'whole life costs' whilst addressing critical immediate pressures. The investment has solved numerous drainage issues, but many remain. This is reflected in the current forecast backlog of £3 million.

Additional funding has been allocated to revenue to fund a move to an asset led gully cleansing regime whilst also enabling carrying out maintenance and localised minor repairs to the drainage system assets.

Funding has also been made available through the Flood Management Team as grants, revenue, and capital allocations to undertake to address targeted drainage problems to include drainage assets that are in the ownership of the local authority but are not highways in addition to supporting 3rd parties with solutions and access to drainage engineering resources (via Highways) to solve drainage issues.

Funding has also been made available via the Flood Management Team to enhance flood monitoring using innovation and to this end they have funded a gully monitoring system that enables the local authority to see flow rates in real time in flooding 'hot spots' and respond accordingly.

Cyclic/Reactive 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.

Planned / Capital Maintenance / Grants

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 the main categories of its highway 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, the DfT Challenge fund makes additional funds available, on a competitive basis. These capital sums have been subject to review and have been supplemented for specific schemes.

Asset Value and Risk Profile

Major risk relating to drainage assets is normally associated with severe flooding causing risk of fatalities and or serious injury as well as damage to buildings. In recent times, significant flooding has occurred both fluvial (river) and pluvial (surface) causing major impact on properties and the highway network. Another cause during severe weather are drainage designs that don't cater for the Higher rainfall experienced as a result of 'climate change' and deterioration on older areas of the drainage system due to a truncated build period of the new town.

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

Scenario evaluation

Investment Strategy

The budget assigned to Drainage is based on historic figures which is not yet 'needs based' by priority and risk. 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.

An automated priority risk based assessment is carried out to identify schemes and will be used to develop a forward programme updated each year in accordance with updated surveys/priorities. The financial profile of the prudential borrowing budget is reviewed with MKCC finance team annually and adjusted to account for pressures within the asset.

Maintenance and Funding Strategies

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 5 years that allows a routine and planned programme to be delivered each financial year that is reviewed annually and modified accordingly.

It is our intention to produce rolling 5-year forward works programmes for all parts of the network with a detailed 1-year programme for approval to enable advanced design and programming to take place.

Statutory requirement

As Lead Local Flood Authority (LLFA), Milton Keynes has a responsibility to investigate flooding events in accordance with Section 19 of the Flood and Water Management Act 2010. This duty also takes into account the Strategic Flood Risk Strategy and the Surface Water Management Strategy of Milton Keynes. This is in addition to the authority's duty to maintain the highway network as highway authority.

Levels of Service and performance

Performance management is measured by annual reporting of Contract KPI's
See Contract Scope documentation on 'Performance Management'

Surveys and Inspections

Condition surveys

Measuring the condition of an asset that is in effect mostly buried underground is difficult to routinely measure in a cost-effective manner, certain visible assets are accessible and undergo annual inspections i.e., culverts under 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 is 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. CCTV surveys are carried out in response to incidents rather than routinely.

Systems and Data

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 City Council 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 will be synchronised with Milton Keynes Asset management system (AMX) to update the master asset database with more relevant additional metadata. NOTE: this will be an ongoing activity and will continue especially following investigations using CCTV and tracing mapping to further refine and detail this asset group.

MKCC has taken a step change in its approach to asset management in the form of procuring, designing, and implementing a new system that has been bespoke to Milton Keynes, this system will

initially complement Kaarbontech but will ultimately be the primary repository for all drainage asset records and has the capability to also document all 3rd party records to show complete drainage systems 'end to end' irrespective of ownership. This new system will be activated in April 2023 and is known as AMX (Asset Management Expert).

Routine, Reactive and Planned Maintenance

Routine 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, clearance of grids/trash screens, grip cutting and clearance of ditches to maintain watercourses are planned programmed work designed to have a preventative effect 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. Drainage systems also undergo both routine and scheme based 'jetting' and 'root cutting' to improve the condition of the system affected.

A programme of 4-year cycle of gully cleaning has allowed recording of the % level of silt to be documented – this data has been modelled through the Kaarbontech gully asset management tool to create an annual asset lead programme (i.e., through a risk-based approach). [See Asset Modelling Tool – Gully Cleaning.](#)

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 work necessary to maintain the drainage assets in a safe condition to the standards set out in this code or in response to bad weather or other emergencies where a rapid response is required. Reactive maintenance includes localised jetting and root cutting (with externally hired gully cleansing tanker) 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 gully cleansing and carriageway 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 uphold improved performance of the drainage system that gets repeated customer complaints, or which is regularly highlighted for reactive drainage repairs through the highway safety inspection process.

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 need 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.

Works Prioritisation and Programming

Drainage Priority Score = DRD x (Hierarchy score + Frequency + Duration + NM) x 1,000 / Cost Estimate (£)

Location Enter details of Location

DRD is Drainage Risk Data Score (Enter a 'X' in the white boxes)

Impact	Flooding affecting high speed roads and roundabouts (10)	Where flood water has entered HOUSES excluding garages and outbuildings / gardens (8)	Flooding affecting Redway Underpasses (6)	Flooding affecting Emergency Services i.e. Fire Station forecourts (4)	Where flood waters have entered garages, outbuildings and gardens (3)	Other flood complaints sorted algeographically b/date order (2)	Blocked gully outlets identified by routine road gully cleaning operation (1)
Extreme (7)							
High (5)							
Intermediate (3)							
Low (2)							
Negligible (1)	X	X	X	X	X	X	X
	10	8	6	4	3	2	1
	10	8	6	4	3	2	1

Risk Factor	Priority Response Times	Action
Extreme	40-70	Immediate Make Safe or Repair
High	21-39	24 Hours - Make Safe or Repair
Intermediate	11-20	28 Days
Low	5-10	6 Months
Negligible	1-4	Resolved by Routine Contractual Maintenance

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Hierarchy Score **20** Category 4b - All other roads

Risk Score **60** **Frequency of Incident** Very Occasional occurrence (Only floods in exceptional rainfall) **Duration of Incident** Unknown

Network Management (NM) **20** Are there Multiple works already programmed on this section **No** **40**

0 This will be programmed for Capital works

Cost Estimate (£) **£10,000**

Overall Score Value **272.00**

Date **03/04/2023** **Created By** **C Devereux**

Key **Low Priority** **Plan Investigation** **Planned Maintenance**

Table 2 Scheme Prioritisation Matrix

The figure in *Table 2* shows the risk factors that are applied to determine the priority of drainage maintenance schemes. In addition to these risk factors, carriageway and/or redway hierarchy is used to weight and prioritise maintenance.

A spreadsheet compiling all outstanding schemes is kept for schemes that have gone through this prioritisation matrix, this is used to select schemes based on priority and determine the programme of works for the next 3 years.

Improvement actions

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 the HIAMP.

- Create a Code of Practice for Highways Drainage Maintenance.
- An ongoing review of inventory information is being undertaken.
- Undertake additional inventory data capture. Formulate a data management procedure to capture future changes to the asset.

- Utilise data already collected to commence moving towards a data led approach in 2024 for gully cleansing utilising the Kaarbontech modelling tool to create a yearly cleansing regime
- 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 into AMX.
- Additional information is being collected for use in the whole life costing process
- A number of initiatives are underway to collate the existing short-term works programmes linked to other services i.e., Golden Grid programme 2022/23.
- Undertake to score all outstanding schemes using priority matrix to create a list of schemes using factors to prioritise, this will also allow for an assessment of the current backlog of identified works and enable a long term works programme to develop.
- Environment Flood Team to develop a dedicated layer with significant drainage asset recorded.
- Develop new Contract KPI's on drainage performance
- Implement recommendations and align surface water flooding hotspots with cyclic and planned works.

Operational Delivery

Responsibilities and Definitions

Definitions

The Client	Milton Keynes City Council Highways Service Team
NRSWA Team	Staff from Milton Keynes City Council who are responsible for New Roads and Streetworks Act compliance across the Milton Keynes Network
The Contractor	The appointed service provider
Hazard	In the terminology of this document is defined as an issue with the network that has potential to cause harm to highways users
Defect	In the terminology of this document is defined as a logged defective element of a highways asset and has an associated defect code and priority ranging from below intervention to high priority
Job	In the terminology of this document is defined as the action raised from a defect or a hazard that will be completed by the contractor
KaarbonTech	The Drainage asset management system used to record inspections, maintenance, and asset status

AMX	Asset management system containing all drainage assets. Also, the highways asset management system that captures all details of hazards, defects, and jobs.
AMX mobile	Is the mobile version of AMX that allows inspections to be carried out electronically on the highways.

Responsibilities

The **Client** has a responsibility to provide clear guidance (i.e., this code of practice) to ensure the contractor(s) has clear instruction to deliver the drainage maintenance Service.

The **Contractor** has a responsibility to deliver the drainage maintenance service and accurate data updates in line with this Code of Practice and achieving the quality standards and objectives (Key Performance Indicators) outlined in the contract scope.

Operational Resources and Budgets

The Council provides financial resources to secure operations to be carried out in both a planned and reactive manner in maintaining its highway drainage assets in a serviceable condition.

The contract shall pay a lump sum for all the activities that are considered a Core activity and any work activity outside of this list shall be subject to a Compensation Event (CE) payment see Table 1 – Drainage Asset Inventory) and Appendix A for list of assets that are included in the lump sum and those that are additions and subject to a CE.

This manual therefore provides guidance on the appropriate identification, classification, and actions within planned programmes of inspection and work; with priority depending on Chronological condition history, the severity of condition at inspection, site characteristics and road classification.

Risk Priorities

Whilst all high-risk assets (assets prone to blockage or poor performance that do not control flooding) are identified and included in the asset risk evaluations, there will be assets that have not yet been included at the point of adoption of this code of practice. Where additional assets are identified, they will be assessed, and the asset data entered into the drainage maintenance system for inclusion in future calculations.

A data validation process is built into the day-to-day working practice of the drainage management programmes, to ensure the accuracy and validity of the data used to formulate asset inspections and maintenance priorities.

The application of weightings and the subsequent prioritisation of inspection and maintenance may change from time to time as strategies adapt to risk and demand.

Whilst this asset management process has been designed and thoroughly tested, to ensure the correct assessment of asset risk, it may be necessary to amend the processes, criteria and calculations as lessons are learnt, to ensure the implementation of continuous improvement. Where this is necessary, the processes, protocols and documentation shall be amended to record changes and ensure compliance.

Asset Management Modelling Tool – Gully Cleansing

In line with national guidance (Highway Maintenance Efficiency Programme – Guidance on the Management of Drainage Assets), a “one size fits all” cyclic cleansing approach is no longer appropriate.

Whilst it may be acceptable for some gullies to be cleaned every four years, it is not suitable for every gully on the network.

There will be some that will require more frequent cleansing which go unattended for long periods this could result in more localised flooding events or reports of standing water. Therefore, this approach carries some risk and in heavy rainfall it places a burden on the reactive gully maintenance services.

In order to remain compliant with best practice there is a need to revise the way in which the cleansing operation is assessed and how actual on-site works are planned and carried out. This revision will result in a new gully emptying frequency to a needs-based approach where some gullies will be cleaned less frequently and gullies that require more frequent cleaning will receive an enhanced service. In moving towards this approach consideration of factors such as flooding history and volumes of material removed during previous gully emptying works are considered.

We have invested in a dedicated Gully Asset Management system (Kaarbontech) that allows us to collect more detailed information (map based) on cleaning and then create bespoke cleansing programmes.

Eventually, the cyclical cleansing frequencies for all gullies will be optimised and individually determined based on asset management principles and key risk factors such as road hierarchy, historical levels of silt recorded during past cyclical cleaning cycles, speed limit, within a flood zone, outstanding repairs, location, and road geometry. This approach will minimise the unnecessary cleansing of gullies whilst ensuring gullies requiring higher cleaning frequencies are attended to.

Gully Cleansing Frequency Methodology

Officers in MKCC have reviewed and analysed the historical gully cleansing data captured over the last 8 years as part of the current term service contract together with emergency responses and identified known ‘hotspots’ that have been captured over the last 20 years of drainage maintenance.

We also have visibility of flood risk areas produced from strategic documentation of surface water/fluviat flood risk areas and outputs from Section 19 investigations by the 'Flood Management Team' in MKCC.

In addition, we use common risk factors across our other asset Codes of Practice as our primary key risk factors such as road hierarchy and road speed which are particularly relevant in relation to the unique high speed 'Grid Road' network and the associated risks.

To apply the risk factors to create a corresponding risk category for the modelling tool within kaarbontech, we input scores to each factor then apply these individual factors to produce a score for each individual gully these will then produce a matrix with ranges that drop gully sites into a risk category as follows.

- Critical – 6 months
- High – 2 years
- Moderate – 4 years
- Low – 6 years

(Ranges shown in Table 3 below)

This ensures that sites with drainage that have high key risk factors are attended to more frequently (6 months) and those that are not problematic and are consistently found to have low silt readings even on the current 4-year cycle are moved to a longer interval between cleans. Milton Keynes infrastructure has mainly been constructed within the last 50 years and has undergone a well-designed construction process including the main drainage systems incorporating a series of balancing lakes which attenuate floodwater and act as natural siltation aids during periods of flooding, this aids good drainage within these systems and in turn reduces siltation in the highway system, this is also assisted by the natural geology in the MK area which is predominantly clay and less of an issue with 'run off' and subsequently increased siltation.

Risk Category	Importance	Vulnerability	No. of Gullies in Risk Category	Cleansing Frequency	Gully Cleans per Year
Critical	29-30	145-213	2,027	Six monthly	4,054
High	19-28	52-144	20,946	2 Year Cycle	10,473
Moderate	15-18	37-51	36,364	4-year Cycle	9,091

Low	0-14	0-36	12,873	6 Year Cycle	2,146
Totals			72,210		25,764

The above reasoning and historical data have determined the cleansing frequencies in the table below, however MKCC will review this on an annual basis to ensure that the cleansing service is operating at an optimum for its assets.

Table 3 – Year 1 Cleansing Frequencies based on historical data

Annual Review of Gully Cleansing

Annually the existing modelling tool for gully cleansing risk categorisation will be reviewed and re-run with data from the previous 12 months, this may then change the risk scores to reset the list of cleansed gullies and the frequency. The data mostly influencing the recategorization will be the silt content as this is the measure of the impact of the cleansing regime and we will apply the rationale in Table 4 – Annual Review Criteria - to assessing whether the current cleanse is correct and whether a gully need moving into a different category.

Table 4 – Annual Review criteria

Gully Silt Level	Finding of silt content at last clean	Impact	Category Change
0 to 25%	Very low to low silt content	Current cleansing frequency too short	Yes / increased cycle length by one category
26% - 50%	Low to Medium silt content	Current cleansing frequency correct	No
51% - 75%	Medium to High silt content	Current cleansing frequency may be too long	Review / reduced cycle length by one category (see note 1)

>75%	Very High Silt content	Current cleansing frequency too long	Yes / reduced cycle length by one category (see note 2)
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Note 1: Gullies recording 51% to 75% of silt maybe moved into the next category of cleansing to reduce the time between cleans if two consecutive cleans fall into this range and no external factors have created a false reading i.e., significant flooding event causing excess 'run-off' or incident causing gullies to be filled. Additionally, if the gully in question is a single isolated gully in a street and the overall road drains adequately no change may be required.

Note 2: The only exception is if a false reading is given because of a significant weather or other event influencing the amount of silt in the gully.

Appendix A – Asset Inventory and Maintenance Details

Cyclical Maintenance – Lump Sum (unless detailed differently in description page)

Ref	Description
DC 1	Standard Carriageway Gully
DC 2	Carriageway Kerb Weir/Side Entry Gully
DC 3	Combined Kerb and Drainage System (CKD)
DC 4	Carriageway Drainage Chamber (Catchpits)
DC 5	Carriageway Verge Grips
DC 6	Carriageway Ditches
DC 7	Trash Screens / Grid / Grilles
DC 8	Underpass electrical pumps
DC 9	CMK Underpass Gully
DC 10	Channelised Concrete Ditches

Non-Cyclical Maintenance – mix of Lump Sum and CE (see data sheet for detail)

DN 1	Standard Footway/Redway Gully
DN 2	Slotted Footway/Redway Drainage channel
DN 3	Soakaway
DN 4	Filter Drains
DN 5	Wet/Dry Flood Attenuation bunds
DN 6	Culverts (less than 900mm diameter) and Outfalls
DN 7	Piped Highways Surface Water Drainage Systems
DN 8	Oil Interceptor
DN 9	Slip Formed Drainage Channel

DC 1 STANDARD ROAD GULLY

Description:

Standard road gully (nominally 450 x 450 x 100mm) cast iron construction, these gullies fit in a frame seated on a concrete cast gully pot and/or brick or prefabricated gully chamber. Sizes in older areas vary. Some are hinged on one side. They are primarily located in carriageways adjacent to the kerb in the channel line but are also found in adopted car parking areas.

They are found on all categories of carriageways.

Asset Number:

72,210

Maintenance:

D 1 Gullies are cleaned in guidance with the UKRLG and the DfT, D1 gullies are then jetted up to 3m along the lateral pipe to clean any build-up of silt or root migration. Where D1 gullies are in a rural setting they are jetted up to 3m or more to the out fall which may be in the ditch line which may require excavation around the outfall to remove the blockage

Issues:

Gully lids can be 'jammed' or cracked – See Core Activity

Frequency of Maintenance:

Frequency of cleansing in accordance with annual 'Asset Led' programme issued in March by Client., on a 6-month program issued to contractor to program in resources. Any gullies that are not cleaned within the target month will be allowed to move over to the following month but no further slippage in to the next.

Traffic Management:

Traffic management in accordance with class of road included in core activity lump sum

Core Activity / CE Addition:

Option – Lump Sum Activity – Option A – 25764 no. per annum

Cleaning, Flushing, Traffic Management, jetting up to 3 metres if slow running or blocked of programmed list.

Ad hoc attendance = dig out/jammed lid/one off clean with tanker

CE = Broken lids requiring replacement, Broken frame requiring replacement

Notes:

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E.g., Standard gully in channel line adjacent to a 125mm kerb face



Gully Tanker cleaning a gully on a roundabout

ASSET RECORDS:

Record location of gully, then record silt level, photo of gully cleaned before and after on, also photo to show jetting activity on PDA.

Notes if gully blocked and uncleaned, broken lid

DC 2 Carriageway Kerb Weir/ Side Entry Gully

Description:

Side entry Gullies (nominally 495 x 355 x 150mm) cast iron construction with hinged lid, these gullies fit in a frame seated on a concrete cast gully pot and/or brick or prefabricated gully chamber. Others are designed within the kerb line which can be both concrete and cast iron.

They are found on all categories of carriageways.

Asset Number:

Currently 2,246 no. assets maintained by MKCC

Maintenance:

DC 2 Gullies are cleaned in guidance with the UKRLG and the DfT. Side entry gullies with cast iron lids are cleaned like a DC1 gullies due to shallow pots within the kerb line, these are then jetted up to 3m. Kerb weirs are jetted up to 3m or more in rural areas to the out fall which may be in the ditch line which may require excavation around the outfall to remove the blockage

Issues:

Gully lids can be 'jammed' or cracked or broken/ displaced lateral pipes – See Core Activity

Frequency of Maintenance:

Frequency of cleansing in accordance with annual 'Asset Led' programme issued in March by Client, on a 6-month program issued to contractor to program in resources. Any gullies that are not cleaned within the target month will be allowed to move over to the following month but no further slippage in to the next.

Traffic Management:

Traffic management in accordance with class of road included in core activity lump sum

Core Activity / CE Addition:

Option – Lump Sum Activity – Option A – 2246 no. per annum

Including Cleaning, Flushing, and Traffic Management-jamming lids, jetting up to 3 metres if slow running or blocked

CE Addition = Broken lids requiring replacement, Broken frame requiring replacement.

Notes:

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E.g., Standard side entry gully in channel line adjacent to a 125mm kerb face



E.g., Offlet (weir Kerb) Standard Half Batt Kerb side entry - 125mm kerb face – with 100mm inlet



Typical cast iron Kerb Weir within kerb line

ASSET RECORDS:

Record location of gully, then record silt level, photo of gully cleaned before and after on, also photo to show jetting activity on PDA.

Notes if gully blocked and uncleaned, broken lid

DC 3 Combined Kerb and Drainage System (CKD)

Description:

Combined Kerb drainage and drainage systems (CKD) or commonly known as Beany Block kerbs or Max E Channel, these are constructed in concrete and vary in internal diameters from 150mm to 225mm. Cast iron access points are spaced along the sections to allow access to jet and clean but also points to discharge into main surface water carriers.

They are found on all categories of carriageways.

Asset Number:

Currently 3,069 metres are maintained by MKCC

Maintenance:

Combined Kerb drainage systems are cleaned in guidance with the UKRLG and the DfT. The system is jetted along the channel and drawn back to the access points to remove silt and debris by tanker. Boards may be needed to maintain jetting water within the asset while cleaning.

Issues:

Gully lids can be 'jammed' or cracked, or channel displaced— See Core Activity

Frequency of Maintenance:

Frequency of cleansing in accordance with annual 'Asset Led' programme to be issued by client to involve multiple activities.

Traffic Management:

Traffic management in accordance with class of road included in core activity lump sum

Core Activity / CE Addition:

Works to be issued by client as CE

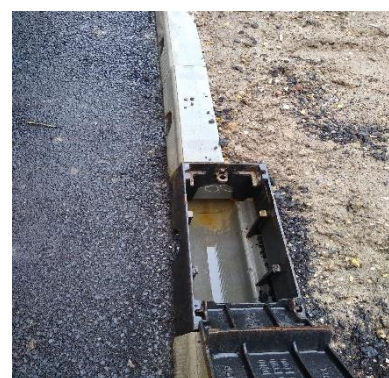
CE Addition = Broken lids requiring replacement, Broken frame requiring replacement, or displaced CKD channel kerb.

Notes:

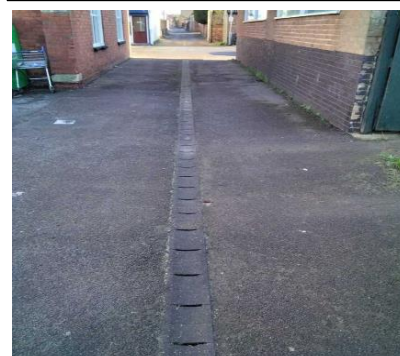
Licensed Dewatering facility at Bleak Hall



E.g., Standard CKD



E.g., Offlet (weir Kerb)
Standard Half Batt Kerb



Block Kerb or Max E channel

ASSET RECORDS:

Record location of CKD then record silt level, photo of CKD cleaned before and after on, also photo to show jetting activity on PDA.

Notes if CKD blocked and uncleaned, broken lid, need to add list here.

DC 4 Carriageway Drainage Chamber (Catchpits)

Description:

A catchpit is an empty chamber that is installed into a drainage system to prevent silt and debris from building up and causing blockages. Catchpits are essential in preventing pipe blockages, which would result in the backing up of water in the drainage system – therefore leading to flooding.

They are found on all categories of carriageways.

Asset Number:

Currently 223 assets maintained by MKCC

Maintenance:

Catch pits are cleaned by De-silting catch pit with a telescopic hose boom, as some catch pits are set back from verge so additional hose is required to clean catch pit out. High-pressure water is to break down silt to remove within the catchpit. Pipes leading into the catch pit to be jetted 10m into the pipes to remove any build-up of silt or lime scale.

Issues:

Manhole covers can be 'jammed' or cracked, or displaced— See Core Activity

Frequency of Maintenance:

Frequency of cleansing will be directed by client as a CE

Traffic Management:

Traffic management in accordance with class of road included in core activity lump sum

Core Activity / CE Addition:

Option A – Lump Sum - 5 no. per annum

Including Cleaning, Flushing, Traffic Management, Un-jamming lids, jetting up to 10 metres if slow running or blocked

CE Addition = Broken lids requiring replacement, Broken frame requiring replacement.

Notes:

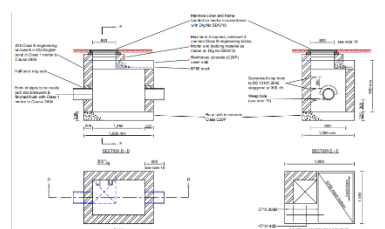
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e.g., access chamber to catchpit on grid road



e.g., Access point to



e.g., typical detail of a catch pit in MK

ASSET RECORDS:

Record of location of asset, silt level, photo of chamber before and after on PDA.

Notes if catch pit is blocked or uncleaned or displaced need to add list here

DC 5 Carriageway Verge Grips

Description:

Drainage grips are used to channel water away from the carriageway and into ditches, where there is an absence of or limited number of gullies or other positive systems that can drain the highway water away.

They are found on all categories of carriageways.

Asset Number

Currently 324 metres over 86 sites MKCC maintained

Maintenance:

Grips are cut in the verge by machine or by hand to remove any build-up of vegetation or driven over by vehicles, this will be directed by the councils G. A drawing to size and design in renewal of grips or new installations.

Issues:

Damaged if driven over at tight passing points on rural lanes, or by Improper grass cutting maintenance which will reduce their effectiveness as vegetation dies back, resulting in localised flooding in areas

Frequency of Maintenance:

Frequency of cleansing in accordance with annual 'Asset Led' programme issued by Client.

Traffic Management:

Traffic management in accordance with class of road must be included in core activity lump sum of activity

Core Activity / CE Addition:

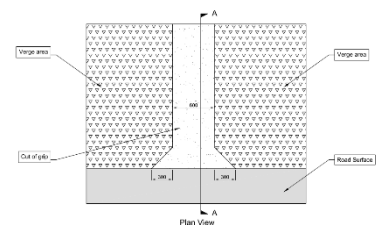
Option A – Lump Sum – 340 l/m per annum

Notes:

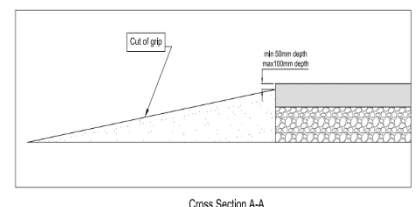
Spoil to be removed from site, no spoil to be left unless directed by client



E.g., Typical Grip verge



G.A drawing of width of Grip in verge



Cross section of Grip in verge detail as per G.A drawing

ASSET RECORDS:

Record photo of location of Grip channel, photo before cleaning and after on PDA.

Notes if channel is unable to be cut in site allocated to contractor, this must be reported to client

DC 6 Carriageway Ditches

Description:

Ditches are to remove water from surrounding areas and their effectiveness is fundamental in keeping roads in good condition. It is essential that the foundations of the carriageway are drained and not allowed to become water-logged. They are found on all categories of carriageways.

Asset Number:

353 assets – 34,354.34 metres of MKCC ditches currently

Routinely once a year Highways clean Council-maintained ditches on an annual basis these are: Deethe Close (Woburn Sands), 31 metres Lower Weald, 223 metres Orchard Way (Stoke Goldington) 83 metres and Tathall End 223 metres

Maintenance:

Removal of silt is suggested that you temporarily deposit silt on top of the banks of the watercourse, this allows for organisms to migrate back into the ditch. In other these instances, you should remove the silt and deposit elsewhere; ensuring permission is in place from the landowner. Ditches should be cleaned by either ditching bucket or by V bucket, removing all build-up of deposited silt.

Were routine ditches are cleaned this is done is to remove vegetation and any build-up of silt by hand or machine and removed from site on day.

Issues:

If drainage ditches become blocked with overgrowth or because of earth being moved into them by passing agricultural vehicles, this can reduce their effectiveness and in turn prevent highway gulley outfall pipes from working, which results in standing water on the road surface. This can give the appearance of a blocked gulley as the system is unable to drain water away through its outfall.

Frequency of Maintenance:

Frequency of cleansing in accordance with annual 'Asset Led' programme issued in Aug by Client to carry out routine maintenance on the four ditches as above. Other ditches will be raised by the client in CE Addition Activity

Traffic Management:

Traffic management in accordance with class of road included in core activity lump sum

Core Activity / CE Addition:

Lump Sum – Option A – 560 l/m per annum

CE on any ditches over 560 l/m per annum

Notes:

Licensed Dewatering facility at Bleak Hall



E.g., Ditch cleaned by Ditching bucket



E.g., Ditch being cut



New ditch or heavily silted ditch being recut by V bucket

ASSET RECORDS:

Record ditch should be photographed before cleaning and after on PDA.

Notes: if issue should arise this should be contacted direct to

DC 7 Trash Screens/ Grid / Grills / Catch Pits

Description:

Trash screens or grids and grills are inclined or vertical installations on inlets or outlets of pipes to prevent waterborne debris (sediment, weeds, timber, animal carcasses, litter and household and non-domestic waste) from entering culverts, to or rivers or lakes where, such debris could cause blockages, significant damage or localised flooding.

They are found on all categories of carriageways.

Asset Number:

Currently 48 are maintained by MKCC

Maintenance:

Removal of build-up of vegetation / litter from grills and dig out any build-up of spoil built up to 3 meters back from grill, this can be done by hand or strimmer.

Catch pits to be cleaned and dig out by machine, with the grills also to be cleaned to remove any build-up of vegetation within the grill and replace

Issues:

Grills can be displaced or damaged, but more likely to be blocked in winter months with leaf fall or other vegetation or due to specific local conditions. These factors all have a bearing on the amount and type of debris that is deposited in the watercourse which may affect the risk of blockage and subsequent of flooding.

Frequency of Maintenance:

Frequency of cleansing in accordance with annual 'Asset Led' programme to be carried out twice a year in March and September.

Traffic Management:

Traffic management in accordance with class of road included in core activity lump sum

Core Activity / CE Addition:

Option – Lump Sum Activity – Option A – 48 no. per annum

Notes:

no vegetation to be left on banks or surrounding areas

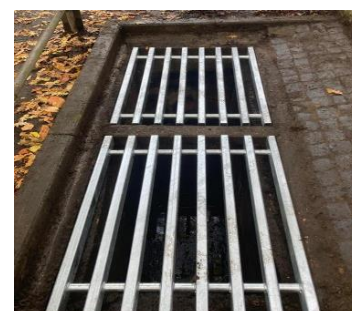
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E.g., Trash Grill – Before cleaning



E.g., Trash Grill cleaned



E.g., Catchpit – grill

ASSET RECORDS:

Record location and grill or catch pit before and after with photograph on PDA.

Notes: if issue should arise this should be contacted direct to client.

DC 8 Underpass Electrical Pumps

Description:

A pumping station is an electromechanical unit used to lift and distribute sewage or wastewater when gravity will not naturally transfer it away from a location. Surface water is collected and stored in a chamber, when this reaches a predetermined level, an integral pump uses pressure to lift the sewage through a discharge pipe system and pumps the liquid into a gravity fed pipe to rivers or SuD's ponds. Levels are closely monitored by a liquid level sensor or float switch, which turns the pumping station on and off. Pumping stations may use one pump or more pumps depending on the application.

They are found on all categories of carriageways and redways.

Asset Number:

Currently 21 Underpass Stations are maintained by MKCC

Maintenance:

Removal of pumps and fully inspection of each pump and rails with inspection report on the condition of cabinets to be carried out. Clean out each wet well to remove any silt or limescale build up and wash pumps down to remove any silt build up. Jet lateral pipes from catch pit / manhole to remove build-up of lime scale or silt. This will be recorded and photographed on each visit to the pump stations both for routine maintenance inspection and call outs. Records from yearly inspections to be sent to client within a week of inspection. Repairs to bring pumps back into service carried out within 3 months.

Issues:

Poor recording of defects will affect the risk of blockage or subsequent of flooding

Frequency of Maintenance:

Frequency of cleansing in accordance with annual 'Asset Led' programme issued in March by Client for reports to be submitted one month after to look at defects or other works to be raised.

Traffic Management:

Traffic management in accordance with class of road/ redway included in core activity lump sum

Core Activity / CE Addition:

Option – Lump Sum Activity – Option A – 21 no. per annum

Notes:

Any faults to pumps or electrical cabinets to be photographed to show defect of pump or pump taken away for repair to show defect that is to be replaced or repaired to verify defect. Warranty of all electrical repairs and tests to be provided electronically



E.g., Pump station Wet well with Two pumps stationed in bottom of chamber



E.g., Tanker cleaning and jetting chamber to remove silt build up

ASSET RECORDS:

Record each pump station before cleaning and after on PDA.

Notes: if issue should arise this should be contacted direct to client from subcontractor.

DC 9 CMK Underpass Footway Gullies

Description:

Two main types of drainage gullies are P trap and bottle gully – Both are used to collect water from variety of surfaces on footways, These are small hinged 9 Inch covers and frames or larger depending on the area.

They are found on all categories of carriageway footways.

Asset Number:

Currently 400 assets maintained by MKCC

Maintenance:

Cleansing is done by handheld silt grab scoops or round bowl gully grabs to clean footway gully pots. All operatives are to be trained in to dealing with shards/ needles, appropriate safety equipment to be issued to crews with shard boxes to dispose of needles. Footway gullies to be cleaned and rods or with handheld rotary cleaner up to 3m in to lateral to remove any blockage.

Allen Key is needed to unlock covers on some covers

Issues:

Poor recording of defects will affect the risk of blockage or subsequent localised flooding.

Frequency of Maintenance:

Frequency of cleansing in accordance with annual 'Asset Led' programme issued in March by Client, to be cleaned once a year.

Traffic Management:

Traffic management in accordance with class of footway included in activity lump sum

Core Activity / CE Addition:

Option – Lump Sum Activity – Option A – 400 no. per annum

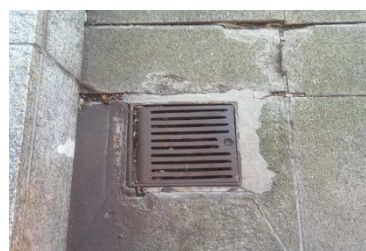
CE Addition = Broken lids requiring replacement, Broken frame requiring replacement

Notes:

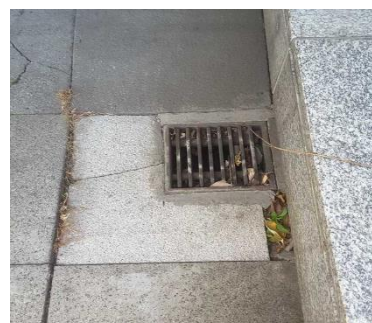
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E.g., Footway Gully in underpass



E.g., cover type requiring Allen key



E.g., typical hinged footway gully in underpass

ASSET RECORDS:

Record each footway gully before cleaning and after on PDA.

Notes: if issue should arise this should be contacted direct to client from subcontractor.

DC 10 Channelised Concrete Ditches

Description:

Channelised concrete ditches are to remove water from surrounding areas and their effectiveness is fundamental in keeping roads in good condition

They are found on all categories of carriageways.

Asset Number:

1 asset – 40 meters of channelised Concrete ditches maintained by MMKCC currently on the A4146

Maintenance:

Removal of silt is suggested that you temporarily deposit silt on top of the banks of the watercourse, this allows for organisms to migrate back into the ditch. In other these instances, you should remove the silt and deposit elsewhere; ensuring permission is in place from the landowner. Ditches should be cleaned by either ditching bucket, by removing all build-up of deposited silt.

Issues:

If drainage ditches become blocked with overgrowth this can reduce their effectiveness and in turn prevent channelised concrete ditches working, which results in standing water on the road surface.

Frequency of Maintenance:

Frequency of cleansing in accordance with annual 'Asset Led' programme issued by Client.

Traffic Management:

Traffic management in accordance with class of road included in core activity lump sum

Core Activity / CE Addition:

Option – Option A – Lump Sum – 50 l/m per annum

Notes:

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E.g., Ditch cleaned by Ditching bucket



Channelised Concrete Ditch on the A4146



Channelised Concrete Ditch on the A4146

ASSET RECORDS:

Record ditch should be photographed before cleaning and after on PDA.

Notes: if issue should arise this should be contacted direct to client.

DN 1 Standard Footway/ Redway Gully

Description:

Two main types of drainage gullies are P trap and bottle gully – Both are used to collect water from variety of surfaces within redways or footways, These are small hinged 9 inch cover and frames or larger depending on the area.

They are found on all categories of carriageways redways/ footways.

Asset Number:

6600 assets

Maintenance:

Cleansing is done by handheld silt grab scoops or round bowl gully grabs to clean footway gully pots. All operatives are to be trained in to dealing with shards/ needles, appropriate safety equipment to be issued to crews with shard boxes to dispose of needles. Footway gullies to be cleaned and rods or with handheld rotary cleaner up to 3m in to lateral to remove any blockage.

Issues:

Poor recording of defects will affect the risk of blockage or subsequent localised flooding.

Frequency of Maintenance:

Footway gullies are cleansed upon request or when a problem is noticed, Highway drainage repair and replacement works are programmed throughout the year, based on feedback from gully crews and reports from members of the public and highway inspectors.

Traffic Management:

Traffic management in accordance with class of footway/ redway included in activity lump sum

Core Activity / CE Addition:

Option – Option A - Lump Sum – 60 no. per annum

CE for any footway/redway gullies over and above 60no. per annum

Notes:

Licensed Dewatering facility at Bleak Hall



Example footway gully



E.g., footway gully in the process of handcleaning

ASSET RECORDS:

Record each footway gully before cleaning and after on PDA.

Notes: if issue should arise this should be contacted direct to client from subcontractor.

DN 2 ACO /Slotted / Drainage Channel

Description:

ACO Drainage, Channel Drainage or Linear Drainage is a method of draining surface water from hard surfaces such as tarmac or paving, using a long narrow drain covered by a grating which drains water along its entire length.

These come in various sizes of 100mm – 150mm – 200mm length.

A slot drain is a linear drain used to evacuate ground water, The difference between a slot drain to a traditional trench drain is that the slot drain does not have any kind of grating, Its entire length.

They are found on all categories of carriageways redways/ footways.

Asset Number:

Currently MKCC council maintain 1734 l/m

Maintenance:

ACO Cleansing is done by hand by unbolting the ACO metal channel with Allen keys or by bolts, these are to be regreased on replacement for ease to remove in future. ACO channels are to be cleaned by hand using trowels or Chad's.

Slot drainage is cleaned by jetting with boards over the top of the slot to stop any debris coming out or pressured water.

Issues:

Poor recording of defects will affect the risk of blockage or subsequent localised flooding.

Frequency of Maintenance:

ACO channels or Slot channels are cleansed upon request or when a problem is noticed, Highway drainage repair and replacement works are programmed throughout the year, based on feedback from gully crews and reports from members of the public and highway inspectors.

Traffic Management:

Traffic management in accordance with class of road/ redway included in core activity lump sum

Core Activity / CE Addition:

Option – Option A – Lump Sum – 718 l/m per annum

CE for any slotted / ACO over and above 718 l/m per annum

Notes:

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E.g., ACO channel in block paving.



E.g., Concrete slot drainage with redway



E.g., Concrete slot drainage with redway

ASSET RECORDS:

Record each Slotted/ ACO before cleaning and after on PDA.

Notes: if issue should arise this should be contacted direct to client from subcontractor.

DN 4 Filter Drains

Description:

Filter drains are gravel filled trenches that collect and move water. They also treat pollution. The trench is filled with free draining gravel and often has a perforated pipe in the bottom to collect the water. They are widely used to drain roads and are often seen along the edge of main roads. There is frequently a geotextile just below the surface that is used to trap silt and stop it clogging the gravel deeper in the trench. A small filter strip before the trench is also a good way of stopping silt clogging the trench, they are found areas in verges with areas of permeable ground conditions

Asset Number:

Currently 21 locations are maintained by MKCC

16,833.00 metres of filter drainage recorded by MKCC

Maintenance:

Maintenance of filter drains is relatively straight forward if they are constructed in accordance with The SUDS Manual (CIRIA C697) and incorporate a sacrificial geotextile layer close to the surface. Routine maintenance involves removing debris and litter from the surface and cutting back vegetation. More intensive maintenance work such as removing and cleaning or replacing the surface layer of gravel is only required intermittently. Cleaning and replacing gravel is the preferred option as it is more sustainable than disposing of the gravel. There are specialist contractors that remove the gravel from filter drains, clean and replace it.

Issues:

Filter drains cause problems when mowing surrounding grass if they become overgrown (the stones are thrown up and can damage mowers if they go over them), or vegetation is allowed to self-seed within the filter drainage blocking the pipe.

Frequency of Maintenance:

Filter Drainage are cleaned upon request or when a problem is noticed, Highway drainage repair throughout the year is based on feedback from gully crews and reports from members of the public and highway inspectors.

Traffic Management:

Traffic management in accordance with class of road/ redway included in core activity lump sum

Core Activity / CE Addition:

CE = All works to be issued in works order packages from client

Notes:

Licensed Dewatering facility at Bleak Hall



E.g., Filter drainage by roadside



E.g., Filter drainage in verges

ASSET RECORDS:

Record each Filter drainage before cleaning and after on PDA.

Notes: if issue should arise this should be contacted direct to client from subcontractor.

DN 5 Wet/Dry Flood Attenuation Bunds

Description:

A soil or concrete bund is a structural measure with an embankment of soil or stones, or soil and stones, constructed along the contour and stabilized with vegetative measures, such as grass and fodder trees. The height of the bunds depends on the availability of stones. Bunds reduce the velocity of runoff and soil erosion, retain water behind the bund and support water infiltration, slowing the movement of water, protecting streams and rivers from pollutants, but also, slow flows during high rainfall and reduce downstream flooding.

Asset Number:

Currently 9 assets recorded by MKCC. Location of Bunds maintained by MKCC are in Stoke Goldington – Tathall End

Maintenance:

Require regular inspection and maintenance, including grass cutting, control of unwanted vegetation, repair of damage by cattle and dealing with infestation by burrowing animals. This to be done by client before and after heavy rain falls on the sump area of the pipe inlet and outfall of the pipe.

Issues:

Vehicle activity over the bunds eroding the bunds or activity from animal activity in burrowing into the bunds

Frequency of Maintenance:

Inspection after heavy rain fall on entire network by client

Inspection of entire network every 12 months - By - contractor

Strimming of Bunds to prevent scrub becoming established every 3 years

Traffic Management:

Contact landowners is required if any work is to be carried out – this to be done by letter drop under the instruction of client or by phone call from client to customer.

Access to be Core Activity / CE Addition:

Option – Option A – Lump Sum – 9 no. grass bunds – 3 per annum (3-year cycle)

Notes:

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E.g., pond and Bund- top meadow Stoke Goldington



E.g., Soil Bund – Ram Alley – Stoke Goldington



E.g., Concrete Bunds/ Soil Bunds Old farm Park Track – Stoke Goldington

ASSET RECORDS:

Record each Bund before cleaning and after on PDA, but also on inspection to show condition by inspectors and by client after event.

Notes: if issue should arise this should be contacted direct to client from subcontractor.

DN 6 Head Walls /Culverts (Less Than 900 Diameter) & out falls

Description:

A Culvert is a tunnel carrying a stream under a road or railway. A culvert may act as a bridge for traffic to pass over it. They are typically found in a natural flow of water and serves the purpose of a bridge or a current flow controller.

Culvert is provided under roads and highways for a crossing of water, as road embankment cannot be allowed to obstruct the water flow. The culvert is ideally suited for a road to limit water flow in a controlled way.

There are some common types of culverts such as pipe, box, and Brick arch culvert. The culvert type is based on hydraulic, water surface elevation, and roadway height and other conditions.

Culvert headwalls are attached to the ends of a culvert to reduce erosion, inhibit seepage, retain the fill, improve the aesthetic and hydraulic characteristics, and make the ends structurally stable

Asset Number:

Currently 572 Head wall / Culverts on MKCC records

Maintenance:

Require regular inspection and maintenance, including grass cutting, control of unwanted vegetation

Issues:

Head walls and culverts must be designed so they do not cause a restriction to flow. They must not increase the risk of flooding or prevent maintenance of the adjacent open watercourse. Where possible designs incorporate a specified amount of freeboard to allow for floating debris, minor blockage, and variations on the 'design' water surface. Consideration must also be given to overland flow paths in the event of a culvert becoming obstructed. It should be ensured that flows will not affect property or cause unreasonable nuisance or harm.

Frequency of Maintenance:

Head walls and culverts are cleaned upon request or when a problem is noticed, Highway drainage repair throughout the year is based on feedback from gully crews and reports from members of the public and highway inspectors.

Traffic Management:

Contact landowners is required if any work is to be carried out – this to be done by letter drop under the instruction of client or by phone call from client to customer. Where culverts are near water, this will be done by the contract on individual site base risk assessment.

Access to be Core Activity / CE Addition:

Option – Option A – Lump Sum – 4 no. per annum

CE for any headwalls over and above 4no. per annum

Notes:

Licensed Dewatering facility at Bleak Hall



E.g., Brick Arch Culvert
Cranfield Road -North Crawley



E.g., Brick Head wall -Simpson



E.g., Concrete Head wall -

ASSET RECORDS:

Record each Head wall and culvert before cleaning and after on PDA.

Notes: if issue should arise this should be contacted direct to client from subcontractor.

DN 7 Piped Highways Surface water Drainage Systems

Description:

Surface water drainage systems transport rainwater away from gutters, driveways, roads, and fields to prevent flooding. These durable pipes are made from weatherproof and lightweight HDPE to clay, giving them a high tensile strength.

Asset Number:

Currently 100661.50 metres of surface water carrier pipes are maintained by MKCC.

Maintenance:

A planned and preventative maintenance (PPM) programme backed by clear asset condition data is essential to ensure large area drainage systems remain in good working order. Monitoring the condition of pipes over time is a key step, commonly done by commissioning CCTV drainage surveys. This will be carried out by high pressure jetting to clear silt build up or to root cutting to remove followed by CCTV camera work to look at the condition of the system, allowing maintenance to be carried out by lining the pipe to extend the life or full replacement is needed. Inclusive of Jetting/Root Cutting and CCTV activity.

Issues:

Surface water carries can be restricted due to objects entering, unrestricted into the system, this can be cans, bottles bricks and roots. This can restrict the flow of water over time by not allowing the free flow of surface water resulting in localized flooding. Flooding can be also contributed by pipes being displaced or damaged by utilities installing new assets within the highway.

Frequency of Maintenance:

Surface water drainage main carriers' pipes are cleaned upon request or when a problem is noticed, Highway drainage is repaired throughout the year which can be based on feedback from gully crews and reports from members of the public and highway inspectors.

Surface water drainage main carriers' pipes are prioritized into reports built around the MKCC assets matrix enabling the highways department to prioritize works

Traffic Management:

Traffic management in accordance with class of road will be included in core activity lump sum

Access to be split Lump sum Core Activity / CE Addition:

Option – Option A – Lump Sum – 400 l/m

CE for any pipework over and above 400 l/m per annum

Notes:

Licensed Dewatering facility at Bleak Hall



E.g., Water Eaton Road
150mm clay pipe



E.g., Blockage in pipe due to
Brick in pipe and pipe cracking



E.g., Root cutting In Progress
to remove roots from pipe

ASSET RECORDS:

Record each section of
drainage before cleaning
and after on PDA with
CCTV.

Notes: if issue should
arise this should be
contacted direct to client
from subcontractor.

DN 9 Oil Interceptors

Description:

Oil interceptors are to capture rainwater run-off from car parks, petrol stations, car washes, roads and vehicle storage units which may be contaminated by oil or petrol. This oil must be prevented from entering the water system to stop environmental pollution. An oil interceptor (or oil separator) is a trap designed to catch and hold any oil residue before it reaches the storm drainage system.

Asset Number:

Currently 9 Oil Interceptors recorded by MKCC – These are NON-HIGHWAY – owned by MKCC housing department

Maintenance:

Require regular inspection and maintenance to remove build-up of oils and silt washed into the interceptor, this work to be done by a specialist contractor to wash and clean interceptor and dispose of waste material to a designated waste transfer site.

Issues:

Interceptors (also known as oil, grease and water traps or separators) are fitted to your drainage system. They separate wastewater from oil, silt, dirt, and any other harmful contaminants to prevent pollution to the local watercourse. Which create a build-up over time, and if it is not cleaned and maintained regularly it may lead to flooding which could pollute the environment.

Frequency of Maintenance:

Oil interceptors are within car parks of MKCC, these are maintained by Housing or by MKCC parking or other departments within the council.

Traffic Management:

Chapter 8 signing and guarding

Access to be Core Activity / CE Addition:

CE = Works to be issued in works order packages from client

Notes:

All silt to be disposed of at Designated Waste Transfer sites



E.g., Oil Interceptor



E.g., Cleaning Oil Interceptor

ASSET RECORDS:

Record each oil Interceptors before cleaning and after on PDA.

Notes: if issue should arise this should be contacted direct to client from subcontractor.

DN 10 Manholes

Description:

A manhole or inspection chamber is an access point to a underground utility network, such as a drainage system, this allows the underground pipes to be inspected surveyed, unblocked, cleaned or repaired. Manholes are typically located at one of three points in a drainage system.

- Where a branch drain joins a main drainage pipe in the system
- When there is a straight run of pipe for more than 22 meters
- Where a drain pipe changes direction by more than 30 degrees

They are found on all categories of carriageways.

Asset Number:

Currently 2176 no. assets maintained by MKCC

Maintenance:

Manholes are cleaned by de-silting by high-pressure to remove any build-up of silt to break down any silt, then remove with a Vac's to remove the silt so not to wash further downstream to create other problems. Pipes leading into the Manhole to be jetted to the next manhole in the system to remove any build-up of silt or lime scale, Including Cleaning, Flushing, Traffic Management, Un-jamming lids, jetting

Issues:

Manhole covers can be 'jammed' or cracked, or displaced, which will allow hazard to allow debris and excess water to enter the chamber. Chambers can be damaged by root ingress, where tree roots looking for water enter the system making the chamber unstable and becoming blocked. Other issues that the chamber can be abused by dumping unsuitable rubbish within the chamber blocking the system in a localised area resulting in flooding to the area and closing roads or properties.

Frequency of Maintenance:

Frequency of cleansing will be directed by client as a CE

Traffic Management:

Traffic management in accordance with class of road included in core activity lump sum

Core Activity / CE Addition:

Option – Option A – Lump Sum – 8no. per annum

CE for any manholes over and above 8no. per annum

Notes:

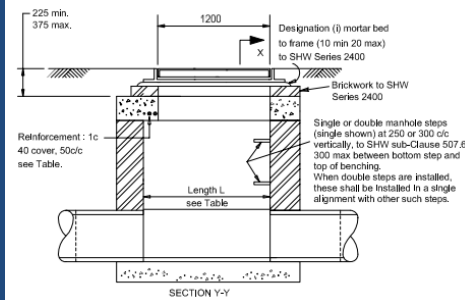
De-watering facility at Bleak Hall



E.g., Manhole cover in typical situation in road



E.g., Access point showing the pipe within chamber



E.g., G.A of a typical manhole design

ASSET RECORDS:

Record of location of asset, silt level, photo of chamber before and after on PDA.

Notes if Manhole is blocked or uncleaned or displaced need to inform client of issue.

Probability	Blocked highway drainage identified by Inspections or from general enquiries (See note 1)	Other flooding complaints (see note 2)	Floodwater entered garages, outbuildings or gardens (see note 3)	Flooding affecting Emergency Services (See note 4)	Flooded Underpass (see note 5)	Water entering habitable premises (see note 6)	Flooding on High-Speed Roads (See note 7)
Impact							
Negligible	Planned	See note 2 Visual Risk Assessment	See note 3 Visual Risk Assessment	See note 4 Visual Risk Assessment	See note 5 Visual Risk Assessment	See note 6 Visual Risk Assessment	See note 7 Visual Risk Assessment
Low	Planned	See note 2 Visual Risk Assessment	See note 3 Visual Risk Assessment	See note 4 Visual Risk Assessment	See note 5 Visual Risk Assessment	See note 6 Visual Risk Assessment	See note 7 Visual Risk Assessment
Intermediate	Planned	See note 2 Visual Risk Assessment	See note 3 Visual Risk Assessment	CAT 1	CAT 1	CAT 1	CAT 1

Probability	Blocked highway drainage identified by Inspections or from general enquiries (See note 1)	Other flooding complaints (see note 2)	Floodwater entered garages, outbuildings or gardens (see note 3)	Flooding affecting Emergency Services (See note 4)	Flooded Underpass (see note 5)	Water entering habitable premises (see note 6)	Flooding on High-Speed Roads (See note 7)
Impact							
High	See note 1	See note 2 Visual Risk Assessment	CAT 1	CAT 1	CAT 1A	CAT 1A	CAT 1A
Extreme	See note 1	See note 2 Visual Risk Assessment	CAT 1	CAT 1	CAT 1A	CAT 1A	CAT 1A

Responsive Drainage & Flooding Matrix

Impact Categories	
Negligible	Localised contained low impact standing water
Low	Low risk of flooding to non-habitable land
Intermediate	Medium Risk of impact to property
High	High Risk of Serious Injury
Extreme	Risk of Fatalities (including drowning) / Extreme Weather event

NOTE : All flooding is subject to changes in situation/seriousness and risk at very short notice due to the variable nature of causes i.e. weather, behavioural nature of river levels that may cause delays in the full impact of an event, therefore any event shall be referred to either the Highway Service Manager and /or Highways Duty Officer to ensure a strategic overview and regular review of priorities takes place to ensure resources are directed to areas of most need.

Priorities in the above matrix can be changed based on the visual assessment at short notice, any change **MUST** be notified to either the Highway Service Manager or the Highways Duty Officer.

It is also critical that crews are prepared, and any pre-warning of storm events shall prompt preparation of emergency crews to carry additional sandbags and road closed signs etc.

SANDBAGS: Milton Keynes Council will issue sandbags upon request by calling (01908) 226699 but only if at imminent threat of being flooded. The delivery time will depend on the scale of the flooding, the number and location of the callers and how many staff and vehicles are in use. We will not deliver sandbags in anticipation of rain/storm.

Note 1: Blocked gullies, kerb weirs, trash screens, ditches, or drainage 'grips' are either reported via the helpdesk as an enquiry or identified by the routine gully cleanse or a highway inspection. Where the impact is negligible, low, or intermediate the response shall be to raise a CE for either a 28/84 Day and added to list for a separate attendance to carry out jetting/ clearance work with the gully/ drainage crew.

It is expected that if an event occurs that falls into the High or Extreme Risk category the impact shall fall into another category i.e., a blocked gully outside a property that causes flooding and risk of water entering the property it shall be dealt with under "water entering habitable property" and treated as a CAT 1A.

Note 2: This category has been added to cover off any flooding that does not fit into the other categories such as flooding on a minor estate road that does not affect property or premises. The severity can be identified by the duration of a flood i.e., if the flood has receded within 2 hours it is considered Intermediate or less. If the road stays flooded greater than 2 hours, it can be considered

High, and action will take the form of erecting Road Closure signs pending secondary action once the resolution is established at which point action will be taken as soon as resources allow. It is important that a visual risk assessment is carried out in these types of events to establish if further additional immediate action may be necessary.

The enquiry may require more investigation for further action and assessment of whether the issue will attract funding for inclusion on a future works programme. A separate CE instruction will be issued if required.

Flooding/drainage issues again may fall into an associated category in the event of a High or Extreme event. Refer to that category for action.

Note 3: Floodwater entering a garden or outbuilding may be distressing and be visually concerning, it is in itself often not of immediate priority during a high risk or extreme event and can be assigned a lower 24-hour priority, however it is important to visually assess these types of floods especially if the area is a known 'hotspot'. Priorities can change in short timescales.

Again, it also depends on whether the flooding source is associated with surface water, river, highway, flash flood, continuous rain event etc.

Note 4: Flooding affecting emergency services is a high priority as this may affect response to incidents especially during extreme weather events, this also supports the network resiliency. Low and negligible drainage issues may not impair the operation of an emergency services facility, again a visual assessment may be appropriate to determine if the situation may deteriorate with further rain etc.

Note 5: A flooded underpass is a high-risk category as underpasses are used by pedestrians to safely transit across roads and Milton Keynes has a high number of underpasses under high-speed dual carriageways.

Any underpass that is covered by water and unpassable for pedestrians is considered either High or Extreme and will be subject to a 2 Hour Cat 1A attendance to either close the underpass off and re-route pedestrians with diversion signs. Or use of a pump/gully vehicle to clear the water.

If the underpass contains an electronic pumping station it shall be closed off and pedestrians re-routed, and the retained supply chain shall be engaged to repair/replace the pump.

If a small amount of water is in the underpass but it is safe for the public to pass it shall be considered Low or Negligible, flood boards shall be erected. Again, with any flooded underpass a subsequent visual inspection is essential to ensure that the correct action has been taken. This is especially critical during unsettled weather periods.

Note 6: Water entering premises is usually considered as either a high or extreme event and is most widespread during fluvial (river) flooding. Surface water flooding usually affects smaller numbers of

properties and is more localised. It is possible to have a combination of both. It is not expected to experience flooding to premises during negligible to intermediate events.

In such an event it is **CRITICAL** that the Highway service manager/MKC duty officer is notified at the earliest opportunity.

The authority's response to flooded properties is varied from road closures to delivery of sandbags, re-directing water flows, clearance of obstructions in watercourses (where safe to do so) and even assistance to the public/ emergency services.

Note 7: Flooding on high-speed roads can range from negligible to extreme, it is particularly difficult to deal with on MK grid network where there is a high density of high-speed dual carriageways intersected by roundabouts.

The action required will be determined by an inspection (priority will be given to these inspections), responses range from lane closures to complete road closures, with flood boards and if necessary and resource allows a diversion route. More immediate responses may be actioned if the request is from a reliable source such as TVP.

In such an event it is **CRITICAL** that the Highway service manager/MKC duty officer is notified at the earliest opportunity.

Action is not normally required on sites that are prioritized as negligible or low, again a visual assessment may be appropriate to determine if the situation may deteriorate with further rain etc

