

Technology Management & Maintenance Manual

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Part 0 - Introduction

Part 0 - Introduction

0.1 Background

The Highways Agency (HA) has key objectives to provide safe roads, reliable journeys and to keep travellers informed.

Effective maintenance of the Traffic Technology Systems which support the network plays an important role in achieving those objectives.

Under the Highways (Miscellaneous Provisions) Act 1961, highway authorities have an obligation to maintain public highways to reasonable standards. The current provisions are incorporated in the Highways Act 1980, Section 41 (duty to maintain) and Section 58 (special defence in actions for damages for non-repair). The importance of Section 58 is that it provides the defence "*that the Authority had taken such care as in all the circumstances was reasonably required to secure that the part of the highway to which that action related was not dangerous for traffic*".

0.2 Purpose

This document sets out the Highways Agency's Performance Requirements in relation to the carrying out of maintenance services on Traffic Technology Systems.

0.3 Structure

These Performance Requirements are structured to deliver outcomes for the various categories of work described. The technology maintainer is generally free to choose the method by which these outcomes are delivered, but the method must include for the Highways Agency's requirements where stated as a deliverable, process or procedure. The technology maintainer is encouraged to be innovative in the manner in which the outcomes are delivered which should not necessarily follow previous Highways Agency requirements and operational practices.

In addition to any performance metrics that the technology maintainer wishes to utilise, the technology maintainer must, as a minimum, measure performance using the metrics described in each asset type section.

The format of each Performance Requirement is as overleaf:

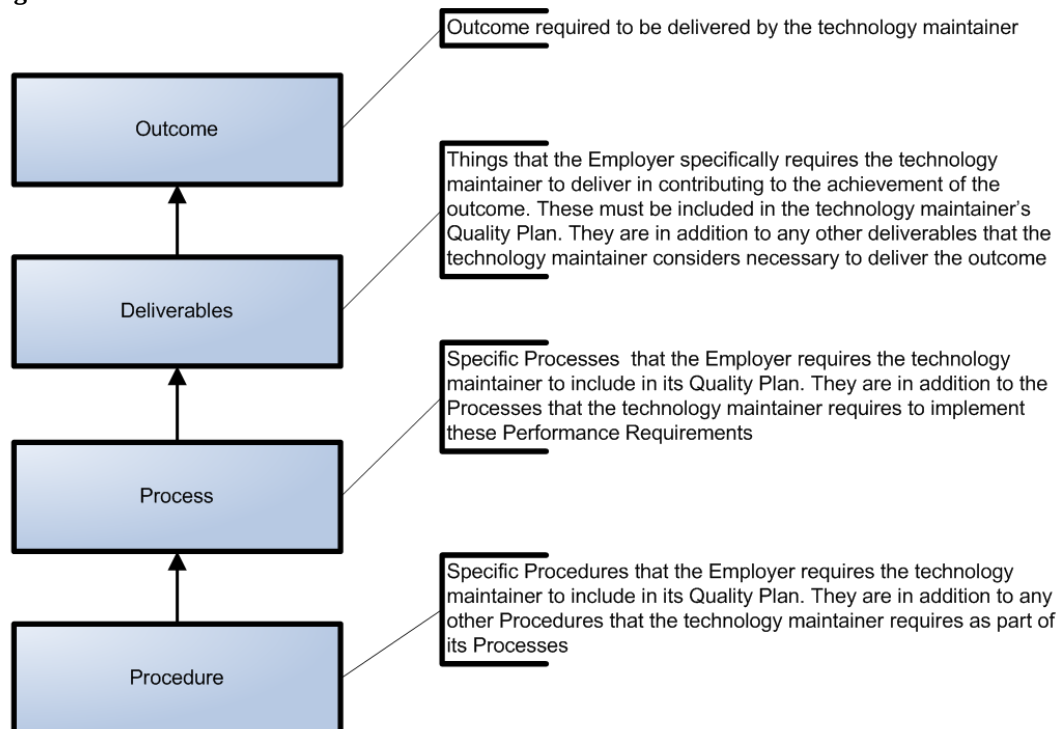
The scope of work covered by this manual covers the following Traffic Technology Systems:

- Close Circuit Television
- Close Circuit Television Mast Ancillary Equipment
- Emergency Roadside Telephones
- Highways Agency Digital Enforcement Cameras
- Highways Agency Weather Information Service
- Instation Equipment (including Traffic Learning Centre)
- Matrix Signs
- Message Signs
- Motorway Incident Detection and Automatic Signalling
- NTIS Automatic Number Plate Recognition cameras

- NTIS Traffic Appraisal Monitoring and Economics sites
- NTIS Traffic Monitoring Unit sites
- Overheight Detectors
- Tidal Flow Equipment
- Road Traffic Signals

The scope for each asset type is contained within individual sections within Part 2 – Asset Specific Requirements. Within Part 2 the maintenance requirements for each asset type are subsequently described in greater detail in the following format:

Figure 1



The deliverables, processes and procedures are not exhaustive. They represent what the Highways Agency requires the technology maintainer to carry out in addition to that which the technology maintainer deems is required to deliver the stated outcomes.

Any failure by the technology maintainer to deliver an Outcome, Deliverable, Process or Procedure is deemed to be a Nonconformity and will require root cause analysis and corrective action in accordance with the contract.

Notwithstanding the preceding paragraph, a failure by the technology maintainer to deliver an Outcome will not be a Nonconformity if, and only if, the technology maintainer has carried out and complied with the relevant Deliverables, Procedures and Processes and the root cause of the failure is due to circumstances that are wholly outside the control of the technology maintainer and could not reasonably have been foreseen by a technology maintainer experienced in traffic technology maintenance and operation.

0.4 Philosophy / Rationale

The technology maintainer is expected to take a risk based approach to the execution of the asset maintenance.

In the context of these requirements a risk based approach means that the technology maintainer develops its operational maintenance regime using data and information about the network. This should underpin intelligent decisions about where and when to undertake maintenance work.

The primary risks that the technology maintainer must mitigate are:

- Safety – avoid the network becoming hazardous to highway users and risk to road-worker safety
- Availability – avoid risk to maintaining free flow of traffic

This involves the technology maintainer establishing a thorough understanding the character of the network and the traffic which is expected to use it.

Based on that information the technology maintainer must prioritise its work in order to optimise the use of, and achieve best value from the available resources. It is expected that the technology maintainer develops as part of its Quality Plan, clear processes and procedures to effectively undertake this prioritisation

The output from the asset maintenance processes becomes the input to the processes for the development of Renewal Schemes. The technology maintainer has an obligation to support the HA in helping to Reduce congestion and improve reliability by informing the Service Manager of any improvements or enhancements that could be made to the Traffic Technology Systems. The technology maintainer must ensure that the interaction of these processes is effectively managed and coordinated. Potential Renewal Schemes identified by the technology maintainer must be based on the needs of the network as described in the NDD programme Development Manual. The needs of the network must be properly supported by the technology maintainers' asset maintenance activities.

As mentioned above, the Performance Requirements described in this manual are outcome focussed leaving the technology maintainer to choose its asset maintenance methodology, subject to incorporating the Highways Agency particular specified requirements. As a result it is expected that the technology maintainer develops and implements innovative methods for delivering the Services that will reduce cost to the Highways Agency

In order to optimise the technology maintainer's performance, the use of fixed performance targets has been avoided wherever practicable. The approach expected is that the technology maintainer measures and understands its performance, and more importantly uses measurement data to improve its performance and also reduce cost. The technology maintainer's overall performance in relation to these maintenance requirements will be measured and recorded, together with cost savings generated by 'efficiency improvements'.

0.5 Key Operational Processes for the technology maintainer

The following are key operational processes that the technology maintainer is required to perform:

- The technology maintainer carries out its work in a manner that will provide the Employer with a “special defence” under Section 58 of the Highways Act 1980.
- The technology maintainer adopts/develops the key procedures and processes indicated within the asset specific requirements shown in Part 2.
- The requirements of this document are minimum requirements and the technology maintainer must supplement them with any activity required to meet its contractual obligations.
- The technology maintainer must include detailed procedures in its Quality Plan in relation to the inspection, making safe and repair of the asset.

0.6 Specific Obligations

The technology maintainer must deliver these Performance Requirements in accordance with the following specific obligations:

- The Quality Plan must support the delivery of the stated outcomes notwithstanding that the technology maintainer will be held responsible for the stated outcomes regardless of the Highways Agency’s acceptance of the Quality Plan.
- The stated Highways Agency objectives are delivered in addition to those which the technology maintainer undertakes as being necessary to deliver the outcomes.
- Processes are included in the Quality Plan and must include those stated here as being required. The processes must be designed in a manner that successfully achieves the deliverables.
- The Key Operational Processes described above must be adopted by the technology maintainer and included in the Quality Plan.
- The Quality Plan must include for the provision of strategies and plans that describe in detail exactly what work the technology maintainer is going to undertake in order to deliver the outcomes. These must include resource levels, frequency of operations, and work outputs. They must include work undertaken by the technology maintainer’s supply chain.
- Relevant procedures are included in the Quality Plan and must include those stated here as being required.
- Performance must be measured and reported using the stated metrics and in accordance with the requirements of the contract documents.

0.7 General Obligations

The technology maintainer must deliver these Performance Requirements in accordance with the following general obligations:

- In compliance with all laws, statutes, regulations, by-laws, directives, rules and government orders applicable to the Employer, technology maintainer or the Services to the extent that they are applicable to any part of the Services.
- In accordance with all Health and Safety requirements stated in the Service Information.

- The technology maintainer ensures that the routine maintenance is carried out in a manner that supports the Highways Agency in delivering their obligations under all relevant legislation.
- The technology maintainer ensures that the routine maintenance is carried out in a manner that supports delivery of the Highways Agency's Strategic Plan.
- The technology maintainer adopts the asset management principles described in the contract documents.
- The technology maintainer ensures that the routine maintenance is carried out in a manner that supports delivery of the current Highways Agency Sustainability Development Action Plan.
- Using processes and procedures that are cost efficient, ensuring non-value adding work is minimised, and waste is eliminated. Continual Improvement opportunities must be sought utilising the mechanisms covered in the contract documents to generate efficiency savings and innovations required by the Conditions of Contract.
- Where any document or procedure is stated in these Performance Requirements, these are deemed to be the latest versions.
- All Hold Points are observed and the technology maintainer has a documented release mechanism in place.
- In line with the general requirement to continually improve the delivery of the Services, the technology maintainer must understand its performance at all levels i.e. outcome, deliverable, process and procedure. The technology maintainer must develop the performance metrics by agreement with the Highways Agency, and use the measurement information to improve the delivery of these Performance Requirements.
- In developing its Quality Plan in respect of these Performance Requirements the technology maintainer must closely observe the Quality Policy themes covered by the contract documents e.g. where cycle time is an important part of delivering the outcome the technology maintainer must take account of the 'Fast' theme when designing its processes. This must be considered in conjunction with the obligations described elsewhere in the contract documents where the technology maintainer is required to optimise the execution of value adding activities, minimise non-value adding activity and eliminate waste.

Part 1 – General Requirements

Part 1 – General Requirements

1.1 General Requirements

The following paragraphs contain aspects of technology asset maintenance that have general requirements that are common to the Traffic Technology Systems contained within this manual.

1.2 Maintenance Levels

The maintenance levels for Traffic Technology Systems are split into 3 types – ‘first’, ‘second’ and ‘third’ line maintenance. Each level is described below and has been translated into the associated requirements within each of the asset sections in Part 2.

- ‘First line’ maintenance is mainly on-site repair of a system, by replacing hardware or software.
- ‘Second line’ maintenance involves the swapping of modules or repairs of equipment at the technology maintainer’s depot.
- ‘Third line’ maintenance is triggered when ‘first’ and ‘second’ line maintenance actions have not resolved the problem. The faulty equipment will be sent to the HA National Distribution Centre and will subsequently be sent to a third line repair facility or returned to the manufacturer for repair.

Each asset type section in Part 2 will contain a table similar to Table 1 Maintenance Levels shown below which will provide details of the maintenance level requirements for the asset.

Maintenance Level	Requirement
‘First line’	On site repair/reset
‘Second line’	Swap modules or return to technology maintainer’s depot for repair
‘Third line’	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

Table 1 – Maintenance Levels

1.3 Fault Categories and Response Times

Set out in Table 2 overleaf are the fault response categories and the response times that are required by the Highways Agency in relation to faults occurring with its Traffic Technology Systems.

A fault is a system and/or equipment failure that continually exists for a period of 15 minutes or more (typically known as ‘Hard Fault’) and is registered on TPMS after that period. The ‘Response Time’ and ‘Restore Service’ times indicated in the table

are maximum times which start from the time that these faults are registered on TPMS.

Within each asset type category in Part 2 a similar table is provided which identifies faults and the fault category to which the fault is attributed.

Fault Category	Response Time	
XUT (Extra Urgent Technology)	Service is to be restored within 2 hours	
UT (Urgent Technology)	Service is to be restored within 4 hours	
Fault Category	Restore Service	Permanent Repair
T1	24 hours	6 months
T2	56 Days	12 months

Table 2 - Fault Categories and Response Times

1.4 Incident Management

The definition of an Incident is included within the Conditions of Contract.

The following types of Incident require an XUT (extra urgent technology) response as indicated in Table 2 - Fault Categories and Response Times:

- an unforeseen event which directly or indirectly affects the Traffic Technology assets and causes or has the potential to cause disruption to the free flow of traffic or threatens the safety of the public or is an immediate or imminent threat to the integrity of any part of the network or Traffic Technology assets or to land adjacent to the network or likely to be affected by events on the network;
- faults or defects involving Traffic Technology assets causing an immediate or imminent risk to the safety of the public, the technology maintainer's workforce or Others.

The types of Incidents indicated above and requests to 'make safe' Traffic Technology assets from the Regional Control Centre, the police, other emergency organisations, the Employer's Asset Support Contractor, Traffic Officers and Others who are responding to or notifying the technology maintainer of an Incident affecting the network require the technology maintainer's **immediate response**. Requests for assistance are usually relayed to the technology maintainer via the Regional Control Centre.

If for whatever reason corrective action or repair is not reasonably practical within the specified period, the technology maintainer affects temporary measures to make safe or mitigate the effect of the Incident, defect or fault and immediately instigate procedures to affect the full repair in the most effective and efficient manner.

The technology maintainer ensures that all relevant parties are fully informed and updated before the end of the next working day on the status of any Incident, defect or fault repair or other actions taken.

1.5 Technology Performance Management Service (TPMS)

The TPMS was designed to provide the Highways Agency with a number of key indicators relating to the condition and performance of technology assets. It provides real time information relating to the maintenance requirements of the Highways Agency Technology Management System (HATMS).

The Highways Agency and its technology maintainers are able to view the current status of the network, including defects, colour coded to identify the impact of each fault. They can also view the assets on the network based on their overall condition indicator; this facility allows managers to identify which assets are likely to need additional maintenance or replacement in the short and medium terms.

The main features of TPMS are:

- Dashboard of Health
- Availability figures
- Contractor Service Performance
- Fault and repair time data

The following list of documents provides further details in respect of TPMS.

- a) MCH 1852 TPMS Definitions of Asset Category, Types and Variants.
- b) MCH 1854 TPMS Overview of System.
- c) MCH 1864 TPMS Registering an Asset.
- d) MCH 1865 TPMS Asset Inspections and Maintenance Activities.
- e) MCH 1952 NMCS Maintenance Documentation Strategy.
- f) MCH 1953 TPMS Bar Code Procedures.
- g) MCH 2485 TPMS Web Client User Guide.
- h) MCH 2486 TPMS Reporting Services User Guide.
- i) MCH 2550 TPMS Handheld Device User Guide.

1.6 National Roads Telecommunications Service (NRTS)

The NRTS contractor (NRTS Co.) provides the Highways Agency's telecommunications services on the network under a Public Private Partnership. These telecommunications services comprise:

- The Transmission Service including longitudinal cabling, transmission station buildings, transmission equipment and local cabling to defined interfaces
- The Aerial Site Service

The NRTS Co is responsible for the assets of the national transmission network, including the longitudinal cabling, transmission station buildings, transmission equipment and local cabling to pre-defined interfaces.

Where defined under the contract, the technology maintainer is responsible for all Traffic Technology Systems in control centres and roadside devices. NRTS Co. is responsible for providing resilient and reliable transmission services to these control centres and roadside devices. In support of these transmission services, NRTS Co. is responsible for the design standards, records and maintenance of buried

transmission cables, ducts, transmission cables within ducts, associated equipment, cabinets and transmission station buildings.

The technology maintainer retains responsibility for the maintenance of the end devices beyond the NRTS Co. interface / Service Delivery Point and generally for power supplies and power cables supporting these devices.

Whenever faults occur in the vicinity of the NRTS/ technology maintainer Interface (i.e. near the Service Delivery Points) the technology maintainer is responsible for determining whether the fault is the responsibility of the technology maintainer or of the NRTS Co. In the case of technology maintainer maintained equipment using legacy protocols (RS485 and HDLC) the technology maintainer will use a NRTS End Customer Tester (NECT) to accurately allocate the faults to the correct party. The use of the NECT to support fault allocation by the technology maintainer is further defined in MCH2551. The NECT testers will be issued free to the technology maintainer to allow the implementation of the fault allocation process.

Training in the use of the NECT will be provided free of charge for up to 8 personnel, at the start of the contract or when the use of the NECT is introduced. The technology maintainer will subsequently be required to train any additional staff involved in fault finding activities. The technology maintainer will be required to nominate a "NECT champion" through which any issues relating to the use of the NECT and faults identified by the NECT can be shared with the HA and its contractors (in particular the NRTS Co.) through a process of regular liaison.

The NECT operates in conjunction with a laptop, to be provided by the technology maintainer, with a USB2 port that runs Windows XP, Windows Vista or Windows 7. The technology maintainer shall provide the necessary laptops to connect to the NECT and undertake any actions required within the technology maintainer's organisation to gain permission to install the NECT software on the technology maintainer laptops.

Specific information relating to NRTS and the location of NRTS Service Delivery Points are defined in:

- a) MCH 1146 NRTS Guide for RMC
- b) MCH 1148 NRTS Guides Supporting Information Services and Interfaces
- c) MCH 1149 NRTS Guides Supporting Information Assets and Responsibilities
- d) MCH 2551 NRTS / RTMC Handover Process: (Legacy Services)

1.7 Interface Arrangements

Where the technology maintainer's work needs to be co-ordinated with Others (e.g. Employers contractors) or different parts of the Employers organisation (e.g. Traffic Officers) the technology maintainer ensures that the work interfaces are effectively and efficiently managed such that any adverse impact of the technology maintainer's ability to deliver the outcomes is minimised.

The technology maintainer is highly dependent on the availability of NRTS transmission services and the services of Others that interface with it because they are integral to the performance of the Traffic Technology Systems that the technology maintainer is responsible for maintaining. Therefore a good and efficient working relationship between the technology maintainer and Other organisations it interfaces with (including NRTS Co.) is essential.

NRTS Co. in particular is required to enter into Interface Agreements with all organisations with whom it interacts. Those 'Interface Agreements' are NRTS Registered Documents.

Interface Agreements are intended to address the physical, institutional, and operational details of the interface between each party at all working levels. The objective is to produce a partnering agreement where the obligations and responsibilities of each party are consistent, clearly understood, respected and implemented efficiently and fairly.

The technology maintainer consults liaises and co-operates with Other organisations it interfaces with (including NRTS Co.) in producing an 'Interfacing Agreement' that meets these objectives and in ensuring that all the procedures between Other organisations and the technology maintainer are efficient and compatible and in the wider interests of the Employer.

As part of this liaison, the technology maintainer will hold regular meetings with NRTS Co. At these meetings, NRTS Co. will discuss any operational and performance issues within the technology maintainer's area and issue updates on any faults that have been passed between the two parties. The technology maintainer will attend the meeting with an understanding of any concerns on the reliability and performance of NRTS infrastructure within the technology maintainer's area. The technology maintainer will cooperate with NRTS Co. by providing information on performance issues and data relating to equipment maintained by the technology maintainer that exhibits communication faults.

The Interface Agreements include (but are not limited to) procedures for:

- Fault notification and clearance
- Routine maintenance
- Repair and reinstatement of damage and recovery of costs
- Location of Cables and Buried Infrastructure
- Co-ordination of planned works
- The interfaces and management process between all parties (including interface diagrams)
- Access arrangements
- Electrical testing of shared supplies
- Disconnection & reconnection of road side systems
- Road space booking procedures
- Use of traffic management provided by Others

1.8 Winter Resilience

The technology maintainer considers changes that are required to its procedures to ensure that service is maintained through periods of inclement weather usually in the winter. The operational procedures to be adopted for the winter period (usually between 1st October in any year and ends on 30th April in the following year) are to be developed following a risk assessment undertaken by the technology maintainer which includes but is not limited to:

- Identifying the risks (e.g. communications, electricity supply, logistics staff, travel etc.)

- Mitigating against the risks
- What circumstances will trigger the operational changes
- Activating the plan
- Roles and responsibilities

The technology maintainers operational procedures are required to be developed giving due regard to the procedures adopted by Other technology maintainers and work in conjunction with those procedures.

1.9 Stores Operating Procedures

MCH 2538A (Technology Managing Agent Contractors Stock Management Operating Procedures) (September 2010) was published to give technology maintainers traffic technology stock operating procedures (including Warehouse Management System (WMS) procedures) for the roll out of a centralised national Stock Management System (SMS).

The document explains how to utilise the system based and non-system based processes, and how these processes interface with the Highways Agency's financial system.

The technology maintainer is required to operate in accordance with these procedures or any subsequent amendments.

These operating procedures are for all stock that is held at a technology maintainer's network, store, satellite compounds and engineers' vehicles irrespective of the status of stock. It should be noted that these procedures do not cover stock management processes and accounting within the National Distribution Centre.

1.10 Asbestos Management

The management of asbestos associated with Highways Agency assets has been defined in the General Asbestos Management Plan and associated documents prepared by Highways Agency to fulfil its obligations under Regulation 4 of Control of Asbestos Regulations (CAR) for all HA assets. Specific guidance on the management of asbestos in Traffic Technology Systems is given in the Technology National Asbestos Management Plan (TNAMP) which conforms to the overarching principles defined within those documents.

The duties required for compliance with CAR are therefore the responsibility of the technology maintainer to implement in accordance with procedures defined by Highway Agency.

Notwithstanding that the Highways Agency assumes the ultimate 'Duty to Manage' these assets through procedural requirements outlined in the general documentation (e.g. by authorisation of Asbestos Management Plans which are required to be produced annually by the technology maintainers).

The technology maintainer also has duties under CAR, notably Regulation 11 and those associated with implementation of works to and in the presence of asbestos products. These duties relate to their employees and other persons who may be affected by the works.

The Highways Agency has assigned the day to day management of its technology assets to the regional technology service technology maintainers and has required each incumbent to produce a Technology Regional Asbestos Management Plan (TRAMP) and associated Asbestos Action Plans (AAP).

Guidance on the production of a TRAMP is available within the TNAMP.

1.11 Maintenance at or near Tunnels

The Highways Agency through its service providers manages a series of tunnels.

It is essential that equipment and procedures are in place to manage the tunnel operation 24 hours a day and to satisfy European Union Tunnel Safety Directives. The tunnel bores are constantly monitored to confirm the safe transit of vehicle through the tunnel. There are also a series of stringent safety procedures and equipment in place which become active should an Incident occur within the tunnel.

The equipment that is in place to manage the tunnel safety is varied and is managed and maintained through a series of operational contracts. This document specifically addresses the Highways Agency requirements for those parts of the system that are overseen and monitored by the Regional Control Centres (RCCs).

Listed below are the Traffic Technology System assets which are referred to in Part 2 of this document and which convey data to the HATMS located within the RCC:

- Tunnel Signals
- Tunnel Emergency Roadside Telephones
- Tunnel CCTV

Faults that occur in any of the above assets which are located within a tunnel have a fault category of UT and consequently the 'time to restore service' is 4 hours.

It should be noted that tunnel equipment maintenance arrangements vary depending upon any local agreements which are in place for each tunnel. Those agreements should be read in conjunction with this document. The tunnel agreements will indicate which of the above assets are monitored by the tunnel control room and consequently which assets are outside the scope of this document.

Part 2 – Asset Specific Requirements

Part 2 – Asset Specific Requirements

The pages immediately following each contain specific asset type information in terms of the scope and metrics as well as outcomes, deliverables, processes and procedures (detailed in Fig.1 within Part 0 – Introduction).

The asset types for which individual sections exist are:

- Close Circuit Television
- Close Circuit Television Mast Ancillary Equipment
- Emergency Roadside Telephones
- Highways Agency Digital Enforcement Cameras
- Highways Agency Weather Information Service
- Instation Equipment (including Traffic Learning Centre)
- Matrix Signs
- Message Signs
- Motorway Incident Detection and Automatic Signalling
- NTIS Automatic Number Plate Recognition cameras
- NTIS Traffic Appraisal Monitoring and Economics sites
- NTIS Traffic Monitoring Unit sites
- Overheight Detectors
- Tidal Flow Equipment
- Road Traffic Signals

Controlled Motorway, Managed Motorway and Ramp Metering systems are made up of a combination of the above asset types and intermediate controlling devices at the roadside. The asset types have been considered individually and refer to any specific requirements for Controlled Motorway, Managed Motorway and Ramp Metering systems.

This document includes all roadside technology associated with the above assets that is not the responsibility of the NRTS Co. (see section 1.6) i.e. the technology maintainer retains responsibility for the maintenance of equipment beyond the NRTS Co interface / Service Delivery Point.

2.1 Closed Circuit Television (CCTV) Requirements

2.1.1 Scope

CCTV (PTZ and Fixed) (including AID) Cameras, CCTV roadside equipment and Wireless CCTV.

This requirement does not include CCTV instation systems at the Regional Control Centre, ANPR and Highways Agency Digital Enforcement (HADECS) cameras.

2.1.2 Outcomes

CCTV equipment is located on the network to capture and transmit real time images of the network. The cameras are intended to give a clear real time view of what is happening on the network which assists operators in deciding on any support that is needed.

The CCTV system as a whole allows operators to monitor the operation of the network, traffic conditions and manage incidents which enable a faster response and clearance of incidents to be achieved.

The required outcomes are that:

1. The CCTV equipment continues to fulfil its intended purpose.
2. The CCTV equipment operates efficiently and without premature loss of equipment life.
3. The CCTV equipment does not present a hazard to road users or technology maintainers.

2.1.3 Deliverables

1. To ensure that the CCTV equipment is fully operational.
2. To ensure that the CCTV equipment components are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.1.4 Process Requirements

1. Assess and record the condition of all CCTV equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all CCTV equipment components and installations and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the CCTV equipment or other equipment.
4. Any faults which occur in the CCTV equipment shall be rectified within timescales indicted below:

Fault Description	Fault Category (see Part 1 for details)
CCTV Equipment Failure	UT
CCTV Failure within Tunnel or within 1km of a tunnel portal (both directions)	UT
All Other faults	T1

2.1.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset
'Second line'	Swap modules or return to technology maintainer's depot for repair (excluding AID cameras)
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair (excluding AID cameras)

2. Ensure that all CCTV equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all components of CCTV equipment in accordance with the approved AMP.
5. Record all CCTV equipment maintenance activities within the Highways Agency asset management database TPMS.
6. Ensure that all CCTV equipment maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that CCTV equipment is maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.1.6 Metrics

The Key Performance Indicators associated with CCTV equipment are measured through the use of data contained within the TPMS.

2.2 Closed Circuit Television (CCTV) Mast Ancillary Equipment Requirements

2.2.1 Scope

Mast ancillary equipment (including winch systems, pan/tilt/zoom mechanisms and mountings) associated with ANPR Cameras and CCTV (PTZ and Fixed) (including AID) Cameras.

The requirement does not include CCTV Mast structure or ANPR or CCTV (including AID) Cameras.

2.2.2 Outcomes

CCTV equipment is located on the network to capture and transmit real time images of the network. The effectiveness of the CCTV equipment to fulfil its designed role is to a large extent reliant upon its location. CCTV Camera masts, poles and mountings give the cameras an optimal position from which to monitor the network and are located at strategic positions in order to secure the effectiveness of the CCTV Cameras. They may also enable CCTV cameras to be lowered and raised for maintenance purposes.

The required outcomes are that:

1. The CCTV mast ancillary equipment continues to fulfil its intended purpose.
2. The CCTV mast ancillary equipment operates efficiently and without premature loss of equipment life.
3. The CCTV mast ancillary equipment does not present a hazard to road users or technology maintainers.

2.2.3 Deliverables

1. To ensure that the CCTV mast ancillary equipment are fully operational.
2. To ensure that the CCTV mast ancillary equipment are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.2.4 Process Requirements

1. Assess and record the condition of all CCTV masts ancillary equipment.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all CCTV masts ancillary equipment and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the CCTV mast ancillary equipment or other equipment.
4. Any faults which occur in the CCTV masts ancillary equipment shall be rectified within timescales indicted below:

Fault Description	Fault Category (see Part 1 for details)
CCTV Mast Ancillary Equipment Failure	UT

2.2.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
3. Assess the condition of and maintain all components of the CCTV mast ancillary equipment in accordance with the approved AMP.
4. Record all CCTV mast ancillary equipment maintenance activities within the Highways Agency asset management database TPMS.
5. Ensure that all CCTV mast ancillary equipment maintenance and repairs comply with the relevant standards and regulations.
6. Ensure that CCTV masts ancillary equipment is maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.2.6 Metrics

There are no Key Performance Indicators associated with CCTV masts ancillary equipment.

2.3 Emergency Roadside Telephone Requirements

2.3.1 Scope

Emergency Roadside Telephones (ERT).

This requirement does not include ERT Installation equipment

2.3.2 Outcomes

Emergency Roadside Telephones are provided on motorways and some All-Purpose Trunk Roads as a service to road users to call for assistance in case of emergency, breakdown or incident. ERTs provide road users with a direct speech connection to the Regional Control Centre and constitute an emergency “999” telephone service.

The Road Users Charter sets the requirement for the ERT system with published standards of service. Testing and cleaning of ERTs is undertaken to ensure a satisfactory service to road users in line with these standards.

The required outcomes are that:

1. ERT continues to fulfil its intended purpose.
2. ERT operates efficiently and without premature loss of equipment life.
3. ERT does not present a hazard to road users or technology maintainers.

2.3.3 Deliverables

1. To ensure that the ERT is fully operational and safe.
2. To ensure that ERT unit is free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.3.4 Process Requirements

1. Assess and record the condition of all ERT equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all ERT equipment components and installations and to rectify any defects which will prevent achievement of the outcomes or increase the rate of deterioration of the ERT or other equipment.
4. Any faults which occur in the ERT system shall be rectified within timescales indicated below:

Fault Description	Fault Category (see Part 1 for details)
ERT Failure within Tunnel or within 1km of a tunnel portal (both directions)	UT
Other ERT not Functioning as required	T1

2.3.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. If any ERT is faulty or non-operative the technology maintainer shall cover the ERT with a '**NOT IN USE**' bag.
3. Ensure that all ERT equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
4. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
5. Assess the condition of and maintain all ERTs in accordance with the approved AMP.
6. Record all ERT 'maintenance activities' within the Highways Agency asset management database TPMS.
7. Ensure that all ERT maintenance and repairs comply with the relevant standards and regulations.
8. Ensure that ERT systems are maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.3.6 Metrics

The Key Performance Indicators associated with ERT equipment are measured through the use of data contained within the TPMS.

2.4 Highways Agency Digital Enforcement Camera System Requirements

2.4.1 Scope

Highways Agency Digital Enforcement Camera System (HADECS)

This requirement does not include Advanced Motorway Indicator (AMI), Controlled Motorway Indicator (CMI), CCTV (including AID) and ANPR Cameras or HADECS Installation equipment.

2.4.2 Outcomes

Parts of the network employ HADECS enforcement equipment as a mechanism to improve compliance with variable mandatory speed limits (VMSL) displayed on AMI.

For each aspect displayed by the AMI there is a corresponding threshold which, when exceeded, will cause the enforcement equipment to capture evidential data for the generation of a 'Notice of Intended Prosecution' (NIP). Evidence provided by the enforcement equipment and forming part of the NIP must be admissible in a court of law. As a consequence the maintenance responsibilities for certain aspects of the HADECS system are retained by Others.

The required outcomes are that:

1. The HADECS enforcement equipment continues to fulfil its intended purpose.
2. The HADECS enforcement equipment operates efficiently and without premature loss of equipment life.
3. The HADECS enforcement equipment does not present a hazard to road users or technology maintainers.

2.4.3 Deliverables

1. To ensure that the HADECS enforcement equipment is fully operational.
2. To ensure that the HADECS enforcement equipment components are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.4.4 Process Requirements

Details of the process requirements for HADECS are contained within MCH1788.

Support to the HADECS Maintainer is required and shall be agreed and included within the SLA between the technology maintainer and the HADECS Maintainer.

2.4.5 Procedures

1. The technology maintainer provides support to the HADECS Maintainer in accordance with the SLA between the technology maintainer and the HADECS Maintainer.
2. The technology maintainer provides appropriate assistance to check interfaces to AMI/CMI and if special setting of AMI is required for commissioning or Site Acceptance Testing.
3. The technology maintainer is responsible for fault management and fault reporting.

4. The technology maintainer is responsible for the day to day management and coordination of HADECS Maintainer including booking of road space.
5. The technology maintainer provides equipment and plant necessary to install gantry mounted HADECS units (e.g. Gantry access vehicles cranes etc.).
6. Ensure that all HADECS enforcement equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
7. Record all HADECS enforcement equipment maintenance activities within the Highways Agency asset management database TPMS.

2.4.6 Metrics

There are no Key Performance Indicators associated with HADECS enforcement systems.

2.5 Highways Agency Weather Information Service (HAWIS) Systems Requirements

2.5.1 Scope

Environmental Sensor Stations (ESS) (collecting weather information) and Met Sub-system ESS (which include anemometers and fog detectors) equipment installed in the carriageway or at the roadside.

2.5.2 Outcomes

ESS equipment is used to provide accurate and timely weather information to the Highways Agency and its partners. The information gathered by these systems is used to assist the Highways Agency in fulfilling its role as a network operator, particularly in times when adverse weather conditions prevail. The data gathered by the ESS transmits weather information to the Highways Agency Weather Central Service whereas the Met Sub systems provide real time information for HATMS.

The required outcomes are that:

1. The ESS equipment continues to fulfil its intended operational purpose.
2. The ESS equipment operates efficiently and without premature loss of equipment life.
3. The ESS equipment does not present a hazard to road users or technology maintainers.

2.5.3 Deliverables

1. To ensure that the ESS equipment is fully operational.
2. To ensure that ESS system components are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.5.4 Process Requirements

1. Assess and record the physical, electrical and operational condition of all ESS equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all ESS equipment components and installations and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the ESS or other equipment.
4. Any faults which occur in the ESS equipment shall be rectified within timescales indicted below:

Fault Description	Fault Category (see Part 1 for details)
The only forecasting site within a domain is affected. Primary forecasting site is affected within the same domain as a failed secondary forecasting site. Secondary forecasting site is affected within the same domain as a failed primary forecasting site.	UT
All Other Faults (Permanent Repair to be undertaken at pre-season service)	T1

2.5.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Ensure that all ESS equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all components of ESS equipment in accordance with the approved AMP.
5. Record all ESS equipment 'maintenance activities' within the Highways Agency asset management database TPMS.
6. Ensure that all ESS equipment maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that ESS equipment is maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.5.6 Metrics

The Key Performance Indicators associated with HAWIS are measured through the use of data contained within the TPMS.

2.6 Installation Technology Equipment at the Regional Control Centres and Traffic Learning Centre Requirements

2.6.1 Scope

CCTV Installation equipment, Dynamic Display System (DDS), ERT Installation equipment, Highways Agency Traffic Management System (HATMS), Road Traffic Signal Installation equipment and Tidal Flow Traffic System Installation equipment and Telephone Text Controller.

This requirement does not include Command & Control, Integrated Communications Command System (ICCS), Airwave, Mobile Tetra Radio Terminals, Hand Held TETRA radio terminals, Vehicle Mobile Data Loggers, Operational Telephony, Transmission, HABIT, Fax & MFDs, BT Services, LAN & Structured Cabling, Video Conferencing, Building Multimedia Information & Public Address Systems, SKRIBE and HADECS.

Note: these assets are subject to Service Level Agreements which are undertaken by Others and do not form part of this document.

This requirement does not include roadside technology.

2.6.2 Outcomes

The RCC provide a 24 hour traffic management and information service every day of the year.

The RCC is primarily responsible for the management and operations of the Traffic Officer Service and will be focused on responding to traffic incidents which includes ensuring that the media are broadcasting accurate, up to date and factually correct information to road users.

Other RCC responsibilities include:

- planning for roadworks
- monitoring road conditions (through CCTV and loops)
- allocating resources
- establishing diversion alternatives
- setting regional electronic road signs.

and as a result they are reliant on robust and efficient technology.

The required outcomes are that:

1. The Installation technology systems continue to fulfil their intended purpose.
2. The Installation technology systems operate efficiently and without premature loss of equipment life.
3. The Installation technology systems do not present a hazard to users or technology maintainers.

2.6.3 Deliverables

1. To ensure that the Installation technology systems is fully operational.
2. To ensure that Installation technology systems are free from physical and electrical defects which present a hazard to users or technology maintainers.

2.6.4 Process Requirements

1. Assess and record the condition of all Instation technology equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all Instation technology systems equipment components and installations and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the Instation technology or other equipment.
4. Any faults which occur in the Instation technology equipment shall be rectified within timescales indicted below:

Fault Description	Fault Category (see Part 1 for details)
All Highways Agency Traffic Management System (HATMS) failures or subsystem failures	XUT
All Other Systems Faults including Control Office Base Station (COBS) at Traffic Learning Centre Failure	T1

2.6.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	HATMS (including software), CCTV, DDS, Road Traffic Signal and Tidal Flow Traffic System Instation Equipment.
'Second line'	HATMS, CCTV, DDS and Road Traffic Signal and Tidal Flow Traffic System Instation Equipment
'Third line'	HATMS, CCTV, DDS and Road Traffic Signal and Tidal Flow Traffic System Instation Equipment

2. Ensure that all Instation technology equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all components of Instation technology equipment in accordance with the approved AMP.

5. Record all Instation technology equipment maintenance activities within the Highways Agency asset management database TPMS.
6. Ensure that all Instation technology equipment maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that Instation technology equipment is maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.6.6 Metrics

The Key Performance Indicators associated with Instation technology equipment are measured through the use of data contained within the TPMS.

2.7 Matrix Signals Requirements

2.7.1 Scope

Matrix Signals (LED and Optical Fibre), Signal Drivers, Signal Structures and Signal Transponders installed at the roadside.

This requirement does not include Signal Local Communications Controller and Signal Subsystem which are included within the Installation Technology Equipment requirements.

2.7.2 Outcomes

Matrix Signal equipment is used to display advisory and mandatory restrictions, instructions or warnings to drivers. They are an integral part of the National Motorway Communication System (NMCS) and may be fitted in various combinations to NMCS access and non access structures as follows:

- a) Matrix Indicator (MI) fitted to either portal gantry or post structures.
- b) Enhanced Matrix Indicator (EMI) forming the signal elements of a Motorway Signal Mark 2/3 fitted to a cantilever.
- c) Controlled Motorway Indicator (CMI) fitted to either portal gantry, or post structures.
- d) Advanced Motorway Indicators (AMI) fitted to either portal gantry, or post structures.

The required outcomes are that:

- 1. The Matrix Signal equipment continues to fulfil its intended operational purpose.
- 2. The Matrix Signal equipment operates efficiently and without premature loss of equipment life.
- 3. The Matrix Signal equipment does not present a hazard to road users or technology maintainers.

2.7.3 Deliverables

- 1. To ensure that the Matrix Signals and associated roadside equipment are fully operational.
- 2. To ensure that Matrix Signals unit and associated roadside equipment is free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.7.4 Process Requirements

- 1. Assess and record the physical, electrical and operational condition of all Matrix Signals and associated roadside equipment and installations.
- 2. Ensure that all current legislative requirements are met.
- 3. Maintain the performance of all Matrix Signals and associated roadside equipment components and installations and to rectify any defects which will prevent achievement of the outcomes or increase the rate of deterioration of the Matrix Signal equipment or other equipment.
- 4. Any faults which occur in the Matrix Signals and associated roadside equipment shall be rectified within timescales indicated below:

Fault Description	Fault Category (see Part 1 for details)
Matrix Signals Failure Associated roadside equipment Failure	UT
All Other Faults	T1

2.7.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	LED Matrix Signals AMI (version 1) AMI (version 2) CMI
'Second line'	AMI (version 2) CMI
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Ensure that all Matrix Signal equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all Matrix Signal equipment in accordance with the approved AMP.
5. Record all Matrix Signal maintenance activities within the Highways Agency asset management database TPMS.
6. Ensure that all Matrix Signal equipment maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that Matrix Signal equipment is maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.7.6 Metrics

The Key Performance Indicators associated with Matrix Signals are measured through the use of data contained within the TPMS.

2.8 Message Signs Requirements

2.8.1 Scope

Message Signs (LED, Flip-Dot, Optical Fibre and Fixed Text), Message Sign Drivers, Message Sign Structures and Message Sign Transponders at the roadside.

This requirement does not include Message Sign Local Communications Controller, Instation Message Sign Subsystem.

2.8.2 Outcomes

Message Sign equipment comprises of all types of Enhanced Message Signs (EMS) and Variable Message Signs (VMS). These signs are all used to convey driver information or instructions to motorists. They are an integral part of the National Motorway Communication System (NMCS) and may be fitted in various combinations to NMCS structures as follows:

- a) Type A – Motorway Signals (Mark 2/3/4) where the EMS is combined with an Enhanced Motorway Indicator on a Cantilever Structure.
- b) Type B – EMS / VMS fitted to a Cantilever Structure in the motorway verge.
- c) Type C – EMS / VMS fitted to a portal Gantry.
- d) Type D – Fixed Text Message Signs (“Rotating Plank Type”).

The required outcomes are that:

1. The Message Sign equipment continues to fulfil its intended purpose.
2. The Message Sign equipment operates efficiently and without premature loss of equipment life.
3. The Message Sign equipment does not present a hazard to road users or technology maintainers.

2.8.3 Deliverables

1. To ensure that the Message Signs and associated roadside equipment are fully operational.
2. To ensure that Message Sign units and associated roadside equipment are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.8.4 Process Requirements

1. Assess and record the condition of all Message Sign equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all Message Sign equipment components and installations and to rectify any defects which will prevent achievement of the outcomes or increase the rate of deterioration of the Message Sign equipment or other equipment.
4. Any faults which occur in the Message Sign equipment shall be rectified within timescales indicated below:

Fault Description	Fault Category (see Part 1 for details)
Message Sign Failure Associated roadside equipment Failure	UT
All Other Faults	T1

2.8.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	EMS VMS (MS2) VMS (MS3) VMS (MS4)
'Second line'	EMS VMS (MS2) VMS (MS3) VMS (MS4)
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Ensure that all Message Signs and associated roadside equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all Message Sign equipment in accordance with the approved AMP.
5. Record all Message Sign maintenance activities within the Highways Agency asset management database TPMS.
6. Ensure that all Message Sign equipment maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that Message Sign equipment is maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.8.6 Metrics

The Key Performance Indicators associated with Message Signs are measured through the use of data contained within the TPMS.

2.9 MIDAS Equipment Requirements

2.9.1 Scope

Motorway Incident Detection and Automatic Signalling (MIDAS) system, MIDAS Inductive Loops, Outstations, Cabinets, Cables, Transponder and equipment installed in the carriageway or at the roadside.

This requirement does not include Local Communications Controller (LCC), MIDAS Instation equipment, Traffic Appraisal Monitoring and Economics (TAME) sites and Traffic Monitoring Units (TMU) Site.

2.9.2 Outcomes

MIDAS equipment is safety related and used to provide automatic queue protection through automatic signal and message sign settings in dynamic response to traffic conditions such as congestion and incidents. It seeks to prevent incidents due to congestion and “secondary incidents” by providing advance warning of slow moving / stationary traffic, and to improve traffic flows on busy motorways by applying appropriate speed limits on Controlled Motorways and Managed Motorways. It is also used to provide traffic data to support the operation of Ramp Metering Systems.

MIDAS also collects real time traffic data used for performance analysis of the road network and for design purposes.

The required outcomes are that:

1. The MIDAS equipment continues to fulfil its intended operational purpose.
2. The MIDAS equipment operates efficiently and without premature loss of equipment life.
3. The MIDAS equipment does not present a hazard to road users or technology maintainers.

2.9.3 Deliverables

1. To ensure that the MIDAS and associated roadside equipment is fully operational and available.
2. To ensure that MIDAS and associated roadside equipment components are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.9.4 Process Requirements

1. Assess and record the condition of all MIDAS equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all MIDAS equipment components and installations and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the MIDAS or other equipment.
4. Any faults which occur in the MIDAS equipment shall be rectified within timescales indicated below:

Fault Description	Fault Category (see Part 1 for details)
MIDAS equipment Failure	UT
All Other faults (except loop failure)	T1
Loop failure	T2

2.9.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Ensure that all MIDAS and associated roadside equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all components of MIDAS equipment in accordance with the approved AMP.
5. Record all MIDAS equipment maintenance activities within the Highways Agency asset management database TPMS.
6. Ensure that all MIDAS equipment maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that MIDAS equipment is maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.9.6 Metrics

The Key Performance Indicators associated with MIDAS equipment are measured through the use of data contained within the TPMS.

2.10 NTIS Automatic Number Plate Recognition (ANPR) cameras Requirements

2.10.1 Scope

Automatic Number Plate Recognition Cameras and associated roadside equipment associated with NTIS operations.

This requirement does not include CCTV, AID or ANPR cameras / system operated by the Police or any Institution requirements.

2.10.2 Outcomes

The NTIS is the hub of the English motorway network and plays a key role in supporting the Highways Agency in delivering its strategic aims of "safe roads, reliable journeys and informed travellers".

NTIS uses ANPR cameras to:

- provide accurate real-time traffic information to the public
- minimise the congestion caused by incidents, roadworks and events taking place on or near the motorway and trunk road network
- providing information on diversions to help motorists avoid the queues

In order to achieve these objectives the NTIS collects the journey time information via ANPR cameras which is analysed and subsequently disseminated in the form of useful travel information.

The required outcomes are that:

1. The ANPR cameras continue to fulfil the intended operational purpose.
2. The ANPR cameras operate efficiently and without premature loss of equipment life.
3. The ANPR cameras do not present a hazard to road users or technology maintainers.

2.10.3 Deliverables

1. To ensure that the ANPR camera equipment is fully operational.
2. To ensure that ANPR camera equipment components are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.10.4 Process Requirements

1. Assess and record the condition of all ANPR equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all ANPR camera equipment components and installations and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the ANPR or other equipment.

- Any faults which occur in the ANPR camera equipment shall be rectified within timescales indicated below:

Fault Description	Fault Category (see Part 1 for details)
All Faults	T1

2.10.5 Procedures

- The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

- Ensure that all ANPR camera equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
- Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
- Assess the condition of and maintain all components of ANPR camera equipment in accordance with the approved AMP.
- Record all ANPR camera equipment maintenance activities within the Highways Agency asset management database TPMS.
- Ensure that all ANPR camera equipment maintenance and repairs comply with the relevant standards and regulations.
- Ensure that ANPR sites are maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.10.6 Metrics

The Key Performance Indicators associated with ANPR camera systems are measured through the use of data contained within the TPMS.

2.11 NTIS Traffic Appraisal Monitoring and Economics (TAME) Sites Requirements

2.11.1 Scope

Traffic Appraisal Monitoring and Economics (TAME) count sites installed in the carriageway or at the roadside.

This requirement does not include any Installation requirements.

2.11.2 Outcomes

The NTIS is the hub of the English motorway network and plays a key role in supporting the Highways Agency in delivering its strategic aims of "safe roads, reliable journeys and informed travellers".

NTIS uses TAME equipment to

- minimise the congestion caused by incidents, roadworks and events taking place on or near the motorway and trunk road network
- providing information on diversions to help motorists avoid the queues

In order to achieve these objectives the NTIS collects traffic monitoring data from TAME sites which is analysed and subsequently used for historical analysis of traffic flows.

The required outcomes are that:

1. The TAME sites continue to fulfil their intended operational purpose.
2. The TAME sites operate efficiently and without premature loss of equipment life.
3. The TAME sites do not present a hazard to road users or technology maintainers.

2.11.3 Deliverables

1. To ensure that the TAME sites are fully operational.
2. To ensure that TAME site components are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.11.4 Process Requirements

1. Assess and record the condition of all TAME site equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all TAME sites equipment components and installations and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the TAME sites or other equipment.
4. Any faults which occur in TAME sites shall be rectified within timescales indicated below:

Fault Description	Fault Category (see Part 1 for details)
All Faults (except loop failure)	T1
Loop Failure	T2

2.11.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset (including SIM card replacement)
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Ensure that all TAME site equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all components of TAME sites equipment in accordance with the approved AMP.
5. Record all TAME site maintenance activities within the Highways Agency asset management database TPMS.
6. Ensure that all TAME site maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that TAME sites are maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.11.6 Metrics

The Key Performance Indicators associated with TAME sites are measured through the use of data contained within the TPMS.

2.12 NTIS Traffic Monitoring Unit (TMU) Sites Requirements

2.12.1 Scope

Traffic Monitoring Unit sites installed in the carriageway or at the roadside.

This requirement does not include any Installation requirements.

2.12.2 Outcomes

The NTIS is the hub of the English motorway network and plays a key role in supporting the Highways Agency in delivering its strategic aims of "safe roads, reliable journeys and informed travellers".

NTIS uses TMU equipment to:

- provide accurate real-time traffic information to the public
- minimise the congestion caused by incidents, roadworks and events taking place on or near the motorway and trunk road network
- providing information on diversions to help motorists avoid the queues

In order to achieve these objectives the NTIS collects data from TMU sites which is analysed and subsequently disseminated in the form of useful travel information.

The required outcomes are that:

1. The TMU sites continue to fulfil their intended operational purpose.
2. The TMU sites operate efficiently and without premature loss of equipment life.
3. The TMU sites do not present a hazard to road users or technology maintainers.

2.12.3 Deliverables

1. To ensure that the TMU sites are fully operational.
2. To ensure that TMU site components are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.12.4 Process Requirements

1. Assess and record the condition of all TMU sites equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all TMU sites equipment components and installations and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the TMU site or other equipment.
4. Any faults which occur in the TMU sites shall be rectified within timescales indicated below:

Fault Description	Fault Category (see Part 1 for details)
All Faults (except loop failure)	T1
Loop Failure	T2

2.12.5 Procedures

1. The technology maintainers undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset (including SIM card replacement)
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Ensure that all TMU equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all components of TMU equipment in accordance with the approved AMP.
5. Record all TMU site maintenance activities within the Highways Agency asset management database TPMS.
6. Ensure that all TMU sites maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that TMU sites are maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.12.6 Metrics

The Key Performance Indicators associated with TMU sites are measured through the use of data contained within the TPMS.

2.13 Overheight and High Vehicle Detector Requirements

2.13.1 Scope

Overheight Vehicle Detectors, High Vehicle Detectors, Controller, Height detectors, Vehicle Presence Detectors and Structure Incident Detectors and associated equipment installed at the roadside.

2.13.2 Outcomes

Overheight Vehicle Detector (OVD) and High Vehicle Detectors (HVD) are located to protect low structures by detecting overheight vehicles on the approaches to such structures. The OVD and the HVD provide the functionality to detect overheight or high vehicles at a defined height above the road surface and in the specific direction approaching the restricted height structure. On detection of overheight or high vehicles they inform drivers through a message displayed on the associated VMS.

The required outcomes are that:

1. The OVD and HVD equipment continue to fulfil their intended purpose.
2. The OVD and HVD equipment operate efficiently and without premature loss of equipment life.
3. The OVD and HVD equipment do not present a hazard to road users or technology maintainers.

2.13.3 Deliverables

1. To ensure that the OVD and HVD equipment is fully operational.
2. To ensure that the OVD and HVD equipment components are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.13.4 Process Requirements

1. Assess and record the condition of all OVD and HVD equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all OVD and HVD equipment components and installations and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the OVD and HVD equipment or other equipment.
4. Any faults which occur in the OVD and HVD equipment shall be rectified within timescales indicated below:

Fault Description	Fault Category (see Part 1 for details)
All Faults	T1

2.13.5 Procedures

1. The technology maintainer undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Ensure that all OVD and HVD equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all components of OVD and HVD equipment in accordance with the approved AMP.
5. Record all OVD and HVD equipment maintenance activities within the Highways Agency asset management database TPMS.
6. Ensure that all OVD and HVD equipment maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that OVD and HVD equipment are maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.13.6 Metrics

There are no Key Performance Indicators associated with OVD or HVD systems.

2.14 Tidal Flow Traffic System Equipment Requirements

2.14.1 Scope

Tidal Flow Traffic System equipment, Message Signs including associated roadside equipment.

This requirement does not include Tidal Flow Traffic System subsystems equipment at the Regional Control Centre.

2.14.2 Outcomes

Tidal Flow Traffic System equipment is used to control the direction of traffic on multiple lane roads usually with no central reservation. The equipment can be set to control the number of running lanes in each direction to suit traffic volumes and reduce congestion.

The number of running lanes in each direction is controlled by the RCC and is usually set employed to assist traffic flows at peak times but can also be used outside of these times if required. The RCC operator uses the Tidal Flow subsystem to change the gantry mounted signals on the main carriageway and often on associated slip roads to set the required flow state.

The required outcomes are that:

1. The Tidal Flow Traffic System equipment continues to fulfil its intended purpose.
2. The Tidal Flow Traffic System operates efficiently and without premature loss of equipment life.
3. The Tidal Flow Traffic System equipment does not present a hazard to road users or technology maintainers.

2.14.3 Deliverables

1. To ensure that the Tidal Flow Traffic System equipment is fully operational.
2. To ensure that the Tidal Flow Traffic System equipment components are free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.14.4 Process Requirements

1. Assess and record the condition of all Tidal Flow Traffic System equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all Tidal Flow Traffic System equipment components and installations and to rectify any defects which will prevent achievement of the required outcomes or increase the rate of deterioration of the Tidal Flow Traffic System equipment or other equipment.
4. Any faults which occur in the Tidal Flow Traffic System equipment shall be rectified within timescales indicted below:

Fault Description	Fault Category (see Part 1 for details)
All Faults	XUT

2.14.5 Procedures

1. The technology maintainers undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Ensure that all Tidal Flow Traffic System equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all components of Tidal Flow Traffic System equipment in accordance with the approved AMP.
5. Record all Tidal Flow Traffic System equipment maintenance activities within the Highways Agency asset management database TPMS.
6. Ensure that all Tidal Flow Traffic System equipment maintenance and repairs comply with the relevant standards and regulations.
7. Ensure that Tidal Flow Traffic System equipment is maintained with parts obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.14.6 Metrics

The Key Performance Indicators associated with Tidal Traffic Flow System are measured through the use of data contained within the TPMS.

2.15 Road Traffic Signals Requirements

2.15.1 Scope

Road Traffic Signals, traffic signal controller (and any other equipment located inside the controller case) and any other case forming part of the site, detector cases, roadside transmission cabinets, miscellaneous equipment cabinets, optical equipment, detector loops, push button or tactile facilities.

The requirement does not include High mast columns (excluding doors, brackets and all attachments). Traffic Signal Posts and Traffic Signal installation equipment.

2.15.2 Outcomes

Traffic Signals and associated equipment are employed to prevent exit queuing on the motorway slips, entry control, traffic safety, congestion reduction and integration of traffic into the surrounding highway network. The control of the road traffic signals is subject to location and may comprise of Urban Traffic Control (UTC) / Split Cycle Offset Optimisation Technique (SCOOT), Vehicle Actuation (VA) or Microprocessor Optimised Vehicle Actuation (MOVA) systems.

The required outcomes are that:

1. The Traffic Signal equipment continues to fulfil its intended purpose.
2. The Traffic Signal equipment operates efficiently and without loss of economic life.
3. The Traffic Signal equipment does not present a hazard to road users or technology maintainers.

2.15.3 Deliverables

1. To ensure that the Traffic Signals are fully operational.
2. To ensure that Traffic Signals equipment is free from physical and electrical defects which present a hazard to road users or technology maintainers.

2.15.4 Process Requirements

1. Assess and record the condition of all Traffic Signal equipment and installations.
2. Ensure that all current legislative requirements are met.
3. Maintain the performance of all Traffic Signal equipment components and installations and to rectify any defects which will prevent achievement of the outcomes or increase the rate of deterioration of the Traffic Signal equipment or other systems.
4. Any faults which occur in the Traffic Signal equipment shall be rectified within timescales indicated below:

Fault Description	Fault Category (see Part 1 for details)
All Traffic Signal Failure (except Traffic Signals Failure at or within tunnels and loop failure)	XUT
Traffic Signals Failure at or within Tunnel	UT
Traffic Signal Loop Failure	T1

2.15.5 Procedures

1. The technology maintainers undertakes maintenance in accordance with the table below:

Maintenance Level	Requirement
'First line'	On site repair/reset
'Second line'	Swap modules or return to technology maintainer's depot for repair
'Third line'	Send to HA National Distribution Centre. The equipment will subsequently be sent to a third line repair facility or returned to the manufacturer for repair

2. Ensure that all Traffic Signal equipment has identification markers for TPMS logging that are correctly located and are clearly visible and legible. The identification details included within TPMS must also contain the correct asset information.
3. Prepare and maintain an Asset Management Plan (AMP) that includes time and/or risk based approaches for undertaking condition assessments, assessing and prioritising defects and undertaking maintenance. The AMP will also include the methodology for undertaking repairs in accordance with the current fault management requirements.
4. Assess the condition of and maintain all Traffic Signal equipment in accordance with the approved AMP.
5. Operational parameters of Road Traffic Signals are optimised, monitored and amended to ensure the desired outcomes are achieved.
6. Prepare and maintain a Traffic Signal Failure Contingency Plan.
7. Record all Traffic Signal maintenance activities within the Highways Agency asset management database TPMS.
8. Ensure that all Traffic Signal equipment maintenance and repairs comply with the relevant standards and regulations.
9. Ensure that Traffic Signal equipment is maintained with parts which obtained in accordance with stores operational procedures or via HA Service Level Agreements with manufacturers.

2.15.6 Metrics

The Key Performance Indicators associated with Road Traffic Signals are measured through the use of data contained within the TPMS.

Annex A – List of Principal Abbreviations

<u>Annex A - List of Principal Abbreviations</u>	
Abbreviation or Acronym	Expanded
AID	Automatic Incident Detection
AMI	Advanced Motorway Indicator
AMP	Asset Management Plan
ANPR	Automatic Number Plate Recognition
APTR	All purpose trunk road
CAR	Control of Asbestos Regulations
CCTV	Closed Circuit Television
CMI	Controlled Motorway Indicator
DDS	Dynamic Display System
EMI	Enhanced Matrix Indicator
EMS	Enhanced Message Sign
ERT	Emergency Roadside Telephone
ESS	Environmental Sensor Station
HA	Highways Agency
HADECS	Highways Agency Digital Enforcement Cameras
HATMS	Highways Agency Traffic Management System (England only)
HAWIS	Highways Agency Weather Information Service
HVD	High Vehicle Detector
LCC	Local Communications Controller
MI	Matrix Indicator
MIDAS	Motorway Incident Detection and Automatic Signalling
MS2	Motorway Signal Mark 2
MS3	Motorway Signal Mark 3
MS4	Motorway Signal Mark 4
NECT	NRTS End Customer Tester
NMCS	National Motorway Communications System
NMCS2	National Motorway Communications System Mark 2
NRTS	National Roads Telecommunications Services
NTIS	National Traffic Information Service
OVD	Overheight Vehicle Detector
PTZ	Pan, Tilt and Zoom (CCTV)
RCC	Regional Control Centre
SKRIBE	Screen & Keyboard Reduction Initiative for Better Ergonomics
TAME	Traffic Appraisal Monitoring and Economics
TMU	Traffic Monitoring Units
TNAMP	Technology National Asbestos Management Plan
TPMS	Technology Performance Management Service
TRAMP	Technology Regional Asbestos Management Plan
VMS	Variable Message Sign