PART 2 – ASSET MANAGEMENT RECORDS

CONTENTS

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2.1   Introduction to Network Management Information

The Highways Agency is responsible for the operation and maintenance of an Approved Network. The Approved Network includes the great majority of motorways and all-purpose trunk roads in England. The Approved Network is not static. Roads may be detrunked and passed to Local Authorities; they may occasionally be reclassified as trunk roads and added to the Highways Agency's portfolio; new roads may be built and added to the Network.

The Highways Agency maintains the Highways Agency Pavement Management System (HAPMS), a computer-based model of the Approved Network and its history. The model provides the sole definition of the Approved Network. The process of defining the Approved Network to a high quality has involved a considerable amount of effort on the part of the Highways Agency and its Service Providers. All parties must therefore regard the Approved Network as a valuable asset that must be maintained.

The Approved Network as defined in HAPMS must be used as the definitive location reference for:

any technical and condition surveys of the pavement asset, e.g. Routine Maintenance Management System (RMMS), visual surveys (of both flexible and concrete surfaced pavements), Deflectograph, Sideways Force Coefficient Routine Investigation machine (SCRIM) and TRAffic-speed Condition Surveys (TRACS).

In addition to the Network definition and condition data, HAPMS contains data that describes the physical characteristics of the Network and its makeup.

2.2   Highways Agency Pavement Management System

2.2.1   General

The management system for the carriageway pavements of the motorway and all-purpose trunk road network, Highways Agency Pavement Management System (HAPMS), was developed and continues to be enhanced to meet the ministerial targets identified in the Highways Agency's 10 Year Plan.

HAPMS consists of a set of computer applications that provide the following business capabilities:

- Improved data management by holding **network, construction**, definitive **inventory, traffic, accident** (described in Chapter 2.6.8) and **condition** data on a single database (the Network Data Repository)
- Enhanced analysis and reporting of the data both in map-based and textual formats
- Integrated tools for the optimisation, in terms of minimising whole life cost within the available budget, of pavement maintenance at both a scheme and network level
- Recording and management of lane closure information

The HAPMS applications that are currently available to Service Providers are:

- Confirm (proprietary MapInfo software)
- Machine Survey Pre-processor (MSP)
- Visual Surveys (described in Chapters 2.9 and 2.10)
- Scheduled Road works (SRW) (described in Part 6 Chapter 6.2)
- Forward Facing Video footage (Chapter 2.6.5)
- SWEEP.S (described in HAPMS documents 348, 460 & 461).

HAPMS is concerned only with operational data.

Figure 2.2.1 shows the relationship between the currently available HAPMS components, including applications and data.
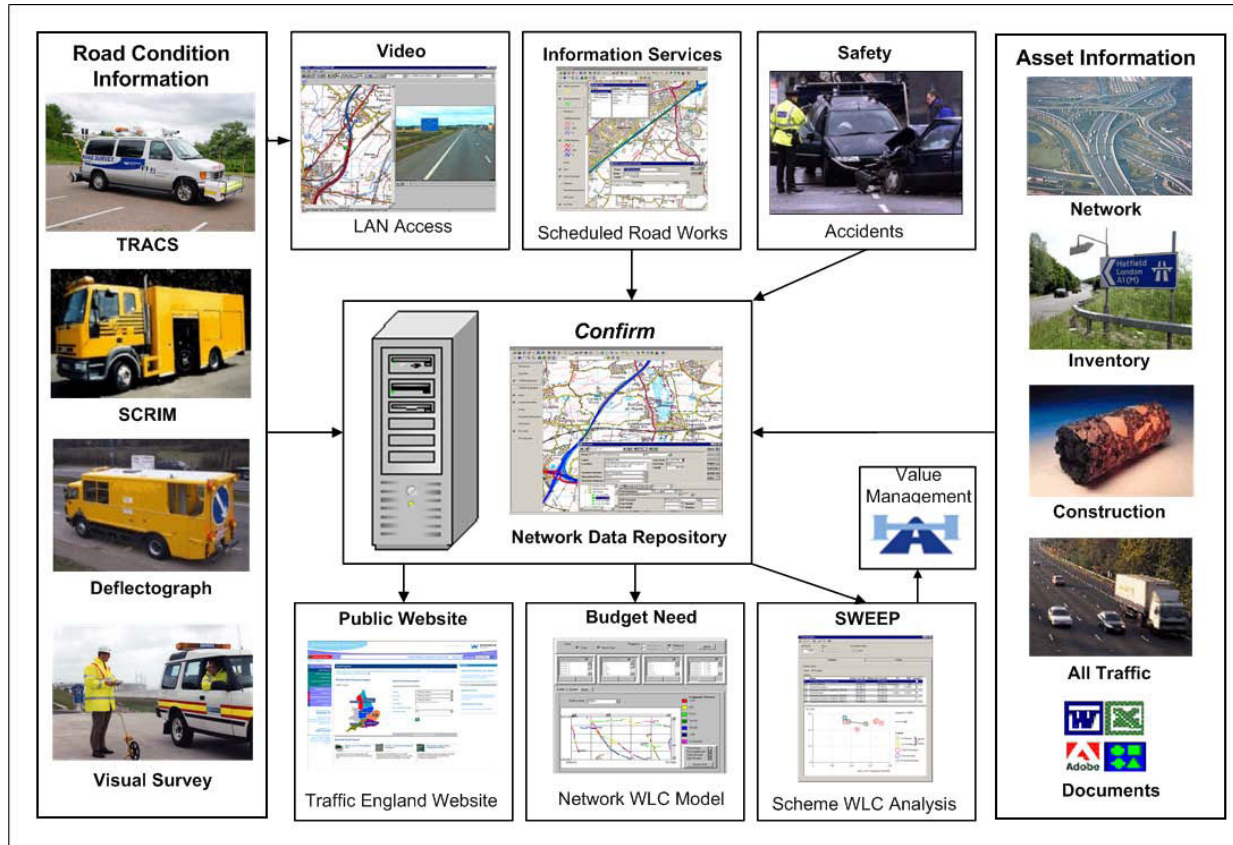
Figure 2.2.1 HAPMS Principal Components

2.2.2   Accessing HAPMS

The Service Provider must access HAPMS via their Highways Agency extranet or ISDN connections. For information about using the Highways Agency connection, the Service Provider must, in the first instance, contact their own internal IT departments. Any requests for help in using HAPMS, including requests for training of new users, must be directed to the HAPMS Support Team (HAST) via the Highways Agency ServiceDirect helpdesk in Leeds (Telephone: 0113-2541140; E-mail: ServiceDirect@highways.gsi.gov.uk).

The central component in the HAPMS suite of software is the Network Data Repository (NDR), this has been built around MapInfo's Confirm software. Confirm is a market based software suite for the management of pavements that has been modified and enhanced to meet the business needs of the Highways Agency. It is licensed to the Highways Agency for use on Highways Agency roads only and must not be used on any other road or for any purpose not described herein.

One of the guiding principles of the development of HAPMS is that there must be only one version of each item of these data, held centrally, and maintained by the Service Provider. The central database, or Network Data Repository (NDR), is shown in Figure 2.6.1. Confirm is the tool by which the data are managed, analysed and reported.

2.2.3   The Importance of Up-to-Date Data

HAPMS is an online system from which national, regional and area reports are extracted. It is essential therefore that all data are kept up to date, for example construction data relating to where and when quieter surfacings have been used, in order that the Highways Agency can report on its 10 Year Plan target.

The Service Provider is responsible for the accuracy of the content held within HAPMS for their Network.

2.2.4   DBFO SON-NET Submissions

Pre-2003 DBFOs must continue to use SON-NET and send amended SON-NETs to the HAST via e-mail (hapms@highways.gsi.gov.uk).

SON-NETs take the form of macro enabled Microsoft Excel spreadsheets. Those using SON-NETs must contact the HAPMS Team via ServiceDirect to obtain the latest version

2.3   Introduction to Section Referencing

Section Referencing provides a consistent and robust location referencing system, enabling the accurate and reliable allocation of data to the motorway and all-purpose trunk road network for which the Highways Agency is responsible. The use of section referencing has resulted in the derivation of a nationally consistent, high quality **Approved Network**, a process which has involved a considerable amount of effort on the part of the Highways Agency and Service Providers. Section referencing is maintained by the Service Provider using HAPMS.

The Service Provider must designate a member of his staff, the "Network Referencing Manager" (NRM). This individual will be responsible for the accuracy, completeness and timeliness of the Approved Network in their Area and for liaison with the Highways Agency on matters relating to section referencing, and must attend the NRM training course run by the HAPMS team. The Highways Agency Pavement Management System Support Team (HAST) maintains a schedule of nominated NRMs and of their deputies. The Service Provider must ensure that any change of NRM is notified to the Service Manager and to the HAST, and that the new NRM is fully appraised of the Approved Network maintenance procedures.

Pre-2003 DBFO Concessionaires who do not currently have access to HAPMS must use SON-NETs (Microsoft Excel workbooks) to advise the HAST of any changes to the Approved Network.

The HAST (in its role as Network Auditor) will undertake regular audits of the Approved Network to ensure adherence to the principles of section referencing. The Highways Agency reserves the right to instruct the Service Provider to make changes to the Approved Network.

The Highways Agency cannot undertake to meet any special requirements of external referencing systems. If Service Providers intend to incorporate details of the Approved Network into their own local systems, then their systems must be developed so that they support the Highways Agency's section referencing method

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2.3.1   Section Referencing Principles

Section referencing divides the Network into sections, each having fixed start and end positions and road alignment. Each section also has certain constant characteristics along its length, for example, the number of permanent lanes and environment (rural/urban).

Sections must be terminated at the following locations:
• Major road junction
• End of slip road taper (sections on both the slip road and main carriageway must terminate)
• Change from one-way to two-way traffic or vice versa
• Change in the number of permanent lanes (short lengths of additional or reduced lanes at or around junctions may be ignored)
• Rural/urban boundary
• Service provider boundary (including the boundaries of secondary Service Providers – see Chapter 2.4.8)
• Change of road number (including, for example, a change from A1 to A1M)
• End of trunk road, e.g. the road becomes a local road

In addition, care should be taken to select practical section lengths because accuracy is essential to all aspects of section referencing. When selecting sections, account should also be taken of the recommendations on network referencing contained in the RMMS Survey Procedures Manual.

Note that:

> • Each side of a dual carriageway must be referenced separately.
> • Lay-bys separated from the main carriageway (known as ox-bow lay-bys) are sections in their own right. It is not necessary to split sections on the main carriageway to form a junction between the main carriageway and the lay-by.
> • Roundabouts are referenced as separate sections.

2.3.2   Agent Authority Area Codes

> Agent Authority (AA) Area Codes are used for the referencing of sections. In most cases AA area codes correspond to Local Authority areas (Counties and Metropolitan Authorities) and must be used for the referencing of sections wholly or primarily within those areas. However each Service Provider is also assigned its own AA area code which may be used, but only with the approval of the Network Auditor. A list of the current Local Authority AA Area Codes is given in Annex 2.3.1of this document.

2.3.3   Section labels

Each section is assigned a section label formulated as follows:

> • A four-digit AA area code (see Annex 2.3.1), followed by
> • An "A" or "M" character depending on the section's road class, followed by
> • The road number of up to four digits, followed by
> • An optional "M" character (depending on the road class), followed by
> • A forward slash ("/"), followed by
> • A section number of up to three digits

The following are all examples of syntactically valid section labels:

> 1900M1/3
> 1900M62/105
> 1900A1M/25
> 1900A1001M/123
> 1900A10/15
> 4720A6120/103

Each section label is individual to that section, irrespective of surrounding sections. There is no requirement to maintain sequential labelling of sections along a road.

2.3.4   Section start and end dates

Each section has a start date, i.e. the date on which it is considered to have become part of the Approved Network.

Initially each section will not have an end date – it will be known as a "Live" section. An end-date will be defined when the section is no longer considered to be part of the Approved Network. This will be either because the length of road no longer exists, has been de-trunked or has been re-referenced.

2.3.5   Nodes and Location Reference Points (LRPs)

Within HAPMS Location Reference Points (LRPs) can be recorded against sections. Nodes are no longer used within the Approved Network..

2.3.5.1 Location Reference Points

A Location Reference Point (LRP) is a known point somewhere on a section. LRPs may be classified as either:

•   **An embedded LRP** where there is something physically marking the point, typically a pair of studs, or **Section Reference Marker** (see also section 2.3.7), in the centre of a lane.
•   **A geographic LRP** where there is nothing physically marking the point.

Each LRP is given a label, a chainage, a cross-section position (XSP), a position within the XSP, between 0.0 (left hand side) and 1.0 (right hand side), and, optionally, a pair of coordinates. Note that a geographic LRP must have a pair of coordinates.

As a minimum, a LRP must be defined by the Service Provider for the start and for the end of each section, each with a pair of coordinates to a resolution of 1m. The recorded coordinate for the LRP at the start or end of the section may be taken at any point on the cross-sectional line passing through the LRP within the extent of the carriageway, and be within 0.25m of that cross-sectional line. In all other cases the coordinate of an LRP must have a resolution and an accuracy of 1m.

2.3.5.2 Use of Nodes and LRPs within HAPMS

Currently the only direct use of nodes and LRPs within HAPMS are as sources of reference labels for the start and end of survey lanes within planned survey routes. When a planned survey route is created, for each survey lane HAPMS will search for a LRP or node in the following sequence:

•   A LRP at the start of the survey lane in the survey lane XSP,
•   A LRP at the start of the survey lane in another XSP,
•   A LRP at the end of the preceding survey lane in its XSP,
•   A LRP at the end of the preceding survey lane in another XSP,

2.3.6   Geographic Representation

Two geographic representations of each section are held within HAPMS. These are known as the 1:50,000 and 1:2,500 idealisations. The Service Provider must maintain the 1:50,000 Idealisation as a good representation of the Network.

The 1:2,500 idealisation is the responsibility of the HAST. It is sourced from the GPS stream of a TRACS survey. Any inaccuracies must be reported through ServiceDirect Team.

2.3.7   Section Reference Markers

Section start and end points are referenced on the ground by one or more pairs of cored thermoplastic markers positioned in the left-hand lane of dual carriageways or one-way single carriageways and on both sides of two-way single carriageways (see Annex 2.5.1). The markers are 100mm in diameter and placed 175mm apart. They have a depth of between 10mm and 20mm,

and the top surface is level with the road surface. The material is a plastic resin with white filler that contains reflective glass particles. It conforms to British Standard (BS) 3262 (1989).

The section reference markers referred to in this section are patented. The Highways Agency has authority to install them as section reference markers on its carriageways. They cannot be used for any other purpose (e.g. delineating zebra or pelican crossings) or on any other roads without the patent being infringed. The patent number is GB2179385B and is administered by East Midlands Diamond Drilling Ltd., a member of the Vickers Highbank Group Ltd., Churchfield House, 1 Lockwood Close, Top Valley, Nottingham (0115 967 9000).

The section reference markers form the first order of surveying reference for all maintenance assessment surveys. They must be positioned with a longitudinal tolerance of ±0.25m. The centres of the 100mm diameter holes used to form the section reference markers must be 175mm ±5mm apart

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2.4   Section Referencing Procedures

2.4.1   Introduction

Section referencing is primarily a desk exercise, but should be supported by site visits if necessary.

Changes to section referencing by the Service Provider is undertaken using HAPMS.

Pre-2003 DBFO Concessionaires who currently do not have access to HAPMS must use a revised version of SON-NETs (Microsoft Excel workbooks) to advise the Highways Agency of any changes to the Approved Network. Revised SON-NETs from DBFO Concessionaires must be submitted to the HAST via e-mail (hapms@highways.gsi.gov.uk).

2.4.2   Section Length Changes – Re-referencing / Re-calibrating a Section

Before changing a section's length, the Service Provider must measure the distance between the start and end section reference markers using a calibrated measuring device, capable of measuring to an accuracy of ±1m. If the section reference markers are not in place, these must be re-instated before the length is measured.

If a section length is found to be wrong, adjacent sections must be investigated to ensure that the overall Network length is consistent with identifiable physical features, for example, roundabouts.

Re-calibrating a section causes associated condition data to be stretched (or shrunk) in length. Sections should only be re-calibrated when correcting a section length that was found to be wrong.

If a section's measured length is more than 10% (for sections shorter than or equal to 500m in length) or 50m (for sections over 500m) of the current HAPMS length, and other data is located on that section (for example, condition data) the section must be re-referenced not re-calibrated.

Re-referencing means end-dating an old section and creating a new one – it should happen only when sections change or are outside the recalibration tolerance.   The new section created should be populated with any condition and wheeltrack information from the original section - copied and assigned to the relevant lanes - ensuring that survey data remains assigned to the correct real-world location.

A section must be re-referenced under the following circumstances:

• 	The start and/or end point of the section has moved (for example, the location of speed limits has moved). This may also result in a length change;
• 	A change in section function or direction, or;
• 	A change in the number of permanent lanes, environment or one-way or two-way status.
• 	Re-calibration is not possible because the recalibration tolerances are exceeded.

2.4.3   Changes associated with schemes

The Service Provider must carry out the section referencing resulting from improvement schemes.

It is the responsibility of the consultant/designer to provide a set of drawings to the relevant Service Provider that show the Network for the area affected by the scheme when opened. To carry out this operation, the designer will need to liaise, through the Highways Agency's Scheme Project Sponsor, with the Network Referencing Manager (NRM), who is responsible for the section referencing, including creating any new sections within HAPMS.

Once a line of communication has been established between the consultant/designer and the Service Provider, any revisions to the scheme layout should be communicated directly to the Service Provider (Figure 2.4.1). Liaison with the PS and the Service Manager will then be the responsibility of the Service Provider.

The Service Provider must consider the effect of the scheme on existing sections, i.e. consider which sections need to be modified, retired or replaced. Existing sections must be retained where the road alignment and other characteristics (as described in Chapter 2.3.1) remain intact, e.g. where the section is only reconstructed and its alignment remains unchanged. Otherwise sections must be retired or created as appropriate.

The Service Provider is responsible for maintaining the 1:50,000 Idealisation of sections within HAPMS.

Plans should be submitted to:

HAPMS Support Team
Highways Agency
29th Floor
Euston Tower
286 Euston Rd
LONDON NW1 3AT

The installation/reinstallation of section reference markers and the removal of any redundant markers must be undertaken as part of the improvement scheme contract to ensure the correct section reference markers are in place before the new or improved road opens.

The flow diagram shows the following steps listed to the right:

1. Consultant sends initial scheme drawings to Service Provider via Project Sponsor

2. Consultant sends plans plus scheme layout plan representing new road alignment to Service Provider

3. Service Provider updates textual Section details in HAPMS and forwards any maps or plans to HAST who digitise the Sections onto HAPMS

4. Referencing is checked by Network Auditor - any queries are discussed with the Service Provider

Figure 2.4.1 Network Reference Data Flow Diagram

2.4.4   Timescales for Scheme Related Changes

The Service Provider must ensure that the data described in Chapter 2.4.3 and Annex 2.4.1 are complete and accurate within the HAPMS database by the date the relevant section of carriageway is adopted/trunked by the Highways Agency.

2.4.5   Changes not associated with schemes

For changes that the Service Provider considers necessary and which are not associated with any scheme, the Service Provider must amend the Approved Network within HAPMS as appropriate. If these include changes to the extent of the section(s), the installation of new section reference markers and the removal of any redundant markers must be carried out to match the new section referencing.

Where there is a change of Service Provider, the original sections will be reassigned by the Network Auditor

2.4.6   Trunking of existing Local Authority roads

Where they do not already exist, section reference markers must be installed to match the section referencing. The Service Provider must ensure that the data described in Chapter 2.4.3 and Annex 2.4.1 are complete and accurate within the HAPMS database by the date the relevant section of carriageway is adopted/trunked by the Highways Agency.

2.4.7 Changes instigated by the Highways Agency

Exceptionally, the Highways Agency may deem it necessary to modify the section referencing. The Highways Agency will contact the relevant NRM to discuss the changes required.

The Highways Agency reserves the right to make changes to section referencing.

2.4.8 Sections Shared by Service Providers

Where shared maintenance sections exist, the Service Provider responsible for the maintenance of the pavement (the "primary" Service Provider) is responsible for specifying the section referencing. A single section definition will then be maintained and the "secondary" Service Provider must record any survey information using the primary Service Provider's section label.

Sections must terminate at the ends of the length of road for which a secondary Service Provider is responsible (see also Chapter 2.3.1). Thus a section must be wholly allocated to a single primary Service Provider or shared by a primary Service Provider and a secondary Service Provider in the same manner over its complete extent.

2.4.9 Changes to the Approved Network within HAPMS

If any of the characteristics of a section are altered, the section must be retired and one or more sections created. This is done by giving the original section an appropriate end date and creating the new section(s), with the updated characteristics, giving it/them a start date that is one day after the end date of the now retired section. (See also Chapter 2.3.4).

Where a section becomes no longer a part of the Approved Network, such as when it is detrunked or demolished, it must be retired by giving it an appropriate end date.

2.4.10 Accuracy and Completeness of the Network

The Service Provider is responsible for the accuracy and completeness of the Network Referencing, in fulfilling this requirement the Service Provider must address any deficiencies within their Network that are bought to their attention within 20 days of notification.

2.4.11 Re-use of Section labels

Section labels of retired sections may be re-used. However, on any given day, the section label must be unique within the Approved Network.

2.4.12 Creation and Retirement Data

When any section is created or retired, the reason (and certain other data) must be entered into HAPMS. Further information on the data required by the Highways Agency's asset accounting system is given in Annex 2.4.1.

2.4.13 Section Nodes at Service Provider Boundaries

As stated in Chapter 2.3.1, sections must terminate at a Service Provider boundary. A common section LRP will therefore be located at the boundary between Service Providers. Both Service Providers must use a common LRP number at this point. This number must therefore be unique within both Service Providers' Areas.

When changes are made to LRP located at boundaries, the Service Provider's must retain evidence of agreement between both parties as to the new position and number.

One Service Provider is responsible for the placement of the section Reference Marker(s) for this LRP, and this responsibility must be recorded by that Service Provider (see Chapter 2.4.15).

2.4.14 Installation of Section Node Reference Markers

Section reference markers, as described in Chapter 2.3.7, must be installed midway between the wheel tracks of the appropriate lane. If the wheel tracks are not clearly defined by wear or colour then the section reference markers should be installed following observation of passing traffic. The section reference markers must be installed in accordance with Annex 2.4.2.

Examples of typical layouts for section reference markers are shown in Annex 2.5.1.

Section reference markers must be installed clear of all carriageway markings, e.g. "Give Way" lines, lane arrows and junction markings.

Metal studs previously used as section reference markers must be replaced by cored thermoplastic section reference markers and the road surface made good, where necessary, when lane closures are in use for other reasons (e.g. maintenance works).

2.4.15 Recording of Section Reference Markers

In order to enable the accurate replacement of lost or damaged section reference markers, the Service Provider must keep records of their locations. Service Providers must record this information within HAPMS as LRP's.. The Service Provider are then responsible for the completeness, accuracy and timeliness of that LRP data.

2.4.16 Timescale to respond to Network Auditor

In all cases, the Service Provider must respond within 20 working days to requests from the Network Auditor for information to ensure that the section referencing is up to date and for data relating to the Network.

Where the referencing is deemed to be inaccurate by the Network Auditor the Service Provider is required to rectify any errors they have been notified of within 20 days.

2.5   Cross Section Positions

2.5.1   Definition of Cross Section Positions

Each reference section represents a strip of road including both the carriageway and off-carriageway features (e.g. footways and verges) up to the highway boundary. The section therefore may be considered to consist of a number of longitudinal strips that correspond to features such as lanes, and lines that indicate the edge of the carriageway etc. These longitudinal strips and lines are referred to as Cross Section Positions (XSPs). It should be noted that each strip does not have to have a constant width.

The XSPs that may be used within HAPMS are shown in Table 2.5.1 with the numbering and position of the XSPs across the highway:

Name of XSP	Abbreviation	Strip or Line	Numbering Convention
Left Boundary	LB	Line	
Left Boundary Area	LA	Strip	
Left Off Carriageway	L	Strip	1 to 9, right to left
Left Edge	LE	Line	
Left Hard Shoulder	LH	Strip	
Left Additional Nearside Lane	-L	Strip	1 to 9, right to left
Left Permanent Lane	CL	Strip	1 to 9, left to right
Left Additional Offside Lane	+L	Strip	1 to 9, left to right
Centre Line	CC	Line	
Right Additional Offside Lane	+R	Strip	1 to 9, right to left
Right Permanent Lane	CR	Strip	1 to 9, right to left
Right Additional Nearside Lane	-R	Strip	1 to 9, left to right
Right Hard Shoulder	RH	Strip	
Right Edge	RE	Line	
Right Off Carriageway	R	Strip	1 to 9, left to right
Right Boundary Area	RA	Strip	
Right Boundary	RB	Line	

Table 2.5.1 – Cross Section Positions that may be used within HAPMS

The implied direction of the section in Figure 2.5.1, is 'left to right across the page'. The shaded XSPs correspond to longitudinal lines, the unshaded XSPs to longitudinal strips.

Left Boundary	
Left Boundary Area	
	N
	↑
	2
Left Off Carriageway	1
Left Edge	
Left Hard Shoulder	
	N
	↑
	2
Left Additional Nearside Lane	1
Left Permanent Lane	1
	2
	↓
	N
Left Additional Offside Lane	1
	2
	↓
	N
Centre Line	
	N
	↑
	2
Right Additional Offside Lane	1
	N
	↑
	2
Right Permanent Lane	1
Right Additional Nearside Lane	1
	2
	↓
	N
Right Hard Shoulder	
Right Edge	
Right Off Carriageway	1
	2
	↓
	N
Right Boundary Area	
Right Boundary	

Figure 2.5.1 XSP Convention

It should be noted that the XSP conventions assume that the two sides of a dual carriageway are modelled independently. Thus, any details relating to the central reservation must be modelled by Right Off Carriageway XSPs. Also, as shown in the Table, some XSPs may have an 'index' in the range 1 to 9.

Examples of typical use of on-carriageway XSPs are shown in the diagrams in Annex 2.5.1.

2.6 HAPMS Data

2.6.1 Carriageway Construction

HAPMS contains the record of pavement construction for the Approved Network. The pavement record is stored against each XSP and is to be updated from as-built records following all new construction / maintenance actions.

2.6.2 SCRIM Investigation Levels (IL)

The SCRIM investigation levels are set in accordance with HA policy as defined in HD 28/04.

2.6.3 Speed Limits

The legal speed limit is stored against each section or parts therein, where speed limits differ over the length of the section.

2.6.4 Carriageway Inventory

The carriageway inventory provides the definitive record of non-pavement carriageway assets. The Routine Maintenance Management System (RMMS) Manual sets out the list of items that the Highways Agency requires to be stored in HAPMS.

The Highways Agency has discontinued the requirement for the carriageway surface and lane widths to be stored as inventory items, these are now held separately in the XSP and construction records.

2.6.5 Forward Facing Video

A forward facing video had been produced from the TRACS surveys. Images of the road network at 5m intervals are accessed through viewing software that links the images to their position on a map. The video is available to Highways Agency staff via their desktop pc's and Service Providers have been issued with the system on external data drives.

2.6.6 Machine Survey Pre-processor (MSP)

MSP is a stand-alone software application for the validation, route-fitting and pre-processing of data collected during machine pavement condition surveys. It is described in more detail in Chapter 2.11. Unlike Confirm, MSP is owned by the Highways Agency and the Service Provider does not need a license to use it on the trunk road network only.

2.6.7 Scheduled Road works

Scheduled Road works (SRW) is a HAPMS module for the recording of lane closures on the Network. It is described in more detail in Part 6 Chapter 6.2 of this document. As a module of HAPMS, SRW is subject to the same license obligations and is only available for use on the trunk road network.

2.6.8 Accident Data

The Highways Agency is committed to improving safety on its network and to contribute to achieving the Department for Transport's casualty reduction targets. Under the Highways Agency's Safety Strategy, the 'Operational Folder - Operational Guide to the Safety Strategic Plan' sets out guidance for managing safety, provides injury accident data at both national and local levels, and offers information and advice on data analysis. This advice includes suggestions for extending

traditional problem identification, analysis and prioritisation techniques and reflecting changes in accident patterns across the Network.

With the inclusion of accident data within the HAPMS database, those individuals working in the fields of road safety and maintenance on the trunk road network will have desktop access to data on injury and fatal accidents

2.6.8.1 Accident Data available within HAPMS

The accident data in HAPMS relates only to reported injury accidents (no damage-only data are included). The current policy is to accept only validated data into the HAPMS system. This validation exercise is undertaken annually and the data made available in June of the following calendar year. The earliest year that data is available for is 1994

2.6.8.2 Accessing Accident Data using HAPMS

To obtain access to this newly available data, users are directed in the first instance to ServiceDirect (0113-2541140) with details of your requirements. (Note that the data is automatically available to existing HAPMS users).

2.6.8.3 Source of the accident data

The data is from the national STATS19 injury accident database. This is a database held by the Department for Transport and contains all the objective information recorded by the police when a road traffic accident is reported. The STATS19 form consists of attendant circumstances, a vehicle record for each accident-involved vehicle and a casualty record for each casualty, and can be found on the DfT website.

2.6.8.4 Advice on data usage

This is contained in the operational folder which can be found on the DfT website.

2.6.8.5 Limitations on the Use of the Accident Data in HAPMS

The accident data has been assigned to the HAPMS sections using an algorithm which looks at the accident OSGR and the road name to locate the accidents on the Highways Agency network. The accident data has been allocated sections on the basis of Ordnance Survey Grid Reference (OSGR), provided the supplied OSGR information on the STATS19 form is within a defined tolerance of an appropriate section. If an OSGR is not accurate or other data used by the algorithm is ambiguous or incorrect, this can result in accident data being assigned to the wrong section or to no section at all. This is potentially a particular problem for dual-carriageway section assignments (care should be used if analysing dual-carriageway sections separately) and in the vicinity of junctions (where, for example, the accident data can be 'fitted' to the slip road in error).

2.6.8.6 Other Sources of Trunk Road Accident Information

For additional accident information please continue to use:

•   Summaries of the injury accident data relating to the motorway and trunk road network
    available in the operational folder (which can be found on the Highways Agency web site).

2.7   Data Management

2.7.1   General Principles

The data contained within the operational databases of the Highways Agency represents a substantial investment in both time and money on the part of the Highways Agency and its Service Providers. In order to realise the value of this investment it is important that both parties recognise the value of the operational data and take steps to ensure that decisions taken as part of the day-to-day management of the Network are supported by up to date and accurate information.

Management of the Highways Agency's operational data requires awareness of both the existing data held within the operational databases and new data sourced from surveys, as-built records, etc. This section provides guidance on the roles and responsibilities with regard to data management and sets out the general allocation of such roles and responsibilities between the Highways Agency and its Service Providers.

2.7.2   Highways Agency Role

The Highways Agency provided the initial population of the HAPMS database from data supplied by the incumbent Service Providers at the time of the system launch. Since that date the Highways Agency through the HAST has provided the Service Providers with a collection of tools to enable the Service Providers to fulfil their responsibility to maintain, complete and report on the data.

The Highways Agency centrally procures and manages the annual TRACS and SCRIM contracts provide condition and location referencing information (in the form of the 1:2,500 idealisation) through HAPMS.

The Highways Agency also makes available within HAPMS the STATS 19 accident record as provided by the DfT. This dataset is limited to Personal Injury Accidents (those classified as Fatal, Serious or Slight) identified as occurring on the trunk road network. Chapter 2.6.8 describes the business applications and background to this functionality.

2.7.3   Service Provider's Role

As with all of the Highways Agency operational databases, the full business value to the user community (the Service Providers) and the owner (the Highways Agency) can only be achieved if the underlying data are substantially correct and complete. The Service Provider as the delegated maintainer of the trunk road network has responsibilities to ensure that the Highways Agency's data are up to date and accurate (to the required quality as defined by their respective contract).

2.7.4   As-built Records

It is the responsibility of the Service Provider to ensure that the data within the Highways Agency's databases are up to date and accurate. This includes the incorporation of any changes to the Network information resulting from maintenance carried out on the Network as well as from the implementation of new construction as a result of TPI (Targeted Programme of Improvements) and related schemes.

In the case of changes instigated by third party consultants/designers it is the responsibility of the Service Provider to ensure that they are aware of changes to the physical make-up of their Network. All as-built records will be provided to the Service Provider who must update the information within HAPMS as required.

It is the responsibility of the Service Provider, in their role as Network Manager, to ensure that all the information required to maintain an accurate representation of the Highways Agency's assets are provided.

Facilities within the HAPMS software are provided to update and maintain the following information:

- Construction: HAPMS contains the definitive record of the physical construction of the carriageway asset. It is the responsibility of the Service Provider to ensure that layer and material information, including date of construction, are complete and are updated following completion of maintenance or improvement schemes.
- SCRIM IL: HAPMS contains the definitive record of SCRIM Investigatory Levels for the trunk road network. It is the responsibility of the Service Provider to ensure that all IL's reflect the correct application of the Highways Agency's current policy.
- Speed Limits: HAPMS contains the definitive record of speed limits on the trunk road network. It is the responsibility of the Service Provider to ensure that the speed limit data is updated following the completion of maintenance or improvement schemes.
- Inventory: HAPMS contains the definitive record of carriageway related inventory (as defined by the RMMS manual) for the trunk road network. It is the responsibility of the Service Provider to ensure that the records contained within this central repository are updated following the completion of maintenance or improvement schemes.
- Lane Geometry: HAPMS contains records of lane geometry and widths within the **XSP Detail** section attribute. Service Providers are required to maintain the carriageway width (and lane width) information within this attribute. The Service Provider must ensure that lane geometry information is maintained and updated following the completion of maintenance and improvement schemes.

2.7.5 Fitting data to the Network

This section deals with the business and technical processes for fitting a survey to the defined Network. Tools are provided within HAPMS for the definition of survey routes, which are then used by MSP to fit the measured condition to the Network. Chapter 2.11 of this document provides a description of the MSP software.

The MSP user manual describes the technical process of fitting a survey to the Network. This document describes the business processes for dealing with surveys which do not 'fit' and sets out the actions the Service Provider is required to undertake to resolve these issues.

It is important to note that the Network Referencing Data held within the HAPMS database is regarded by the Highways Agency as the definitive description of the trunk road network and this definition includes the recorded section lengths.

For each type of condition survey, fitting tolerances are defined for the purposes of loading condition information against sections stored within HAPMS. For example the current tolerances for the fitting of TRACS survey information is 10% for sections that are less than 500m in length or 50m for sections longer than 500m.

Surveys which fall within tolerances are then "rubber-banded" (see figure 2.7.5) to fit within the chainage limits of the section. Surveys (or data) with chainage measurements outside these tolerances are initially rejected and require further checking as described in the next two sections.

Figure 2.7.5 demonstrates the principles of rubber banding data to the Network.
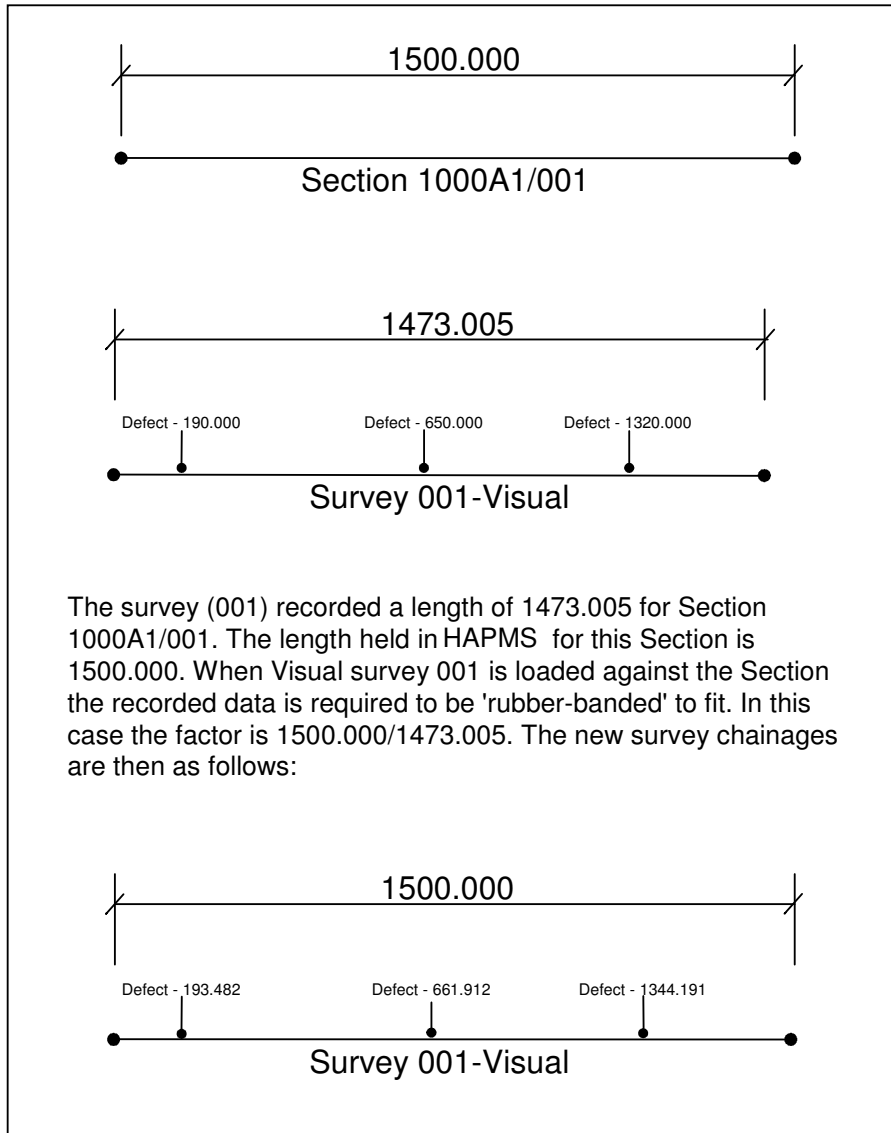
Figure 2.7.5: Principles of Rubber-banding

2.7.6   **Fitting Highways Agency procured data**

The TRACS and SCRIM survey contracts are managed centrally by the Highways Agency. The survey contractor fits the survey data to the Network, and the results are provided to the Service Provider. The HAST undertakes an audit on the fit and 'acceptability' of the TRACS data prior to accepting the data for use by the Service Provider.

Where the survey contractor identifies a section which is perceived to be incorrect within HAPMS, the HAST will liaise with the Service Provider's NRM to resolve this. Upon receiving a request for clarification from the HAST the Service Provider must reply within 20 days, providing the following information:

- • Section length
- • OSGR locating the Section Reference Marker at the section's start
- • OSGR locating the Section Reference Marker at the section's end

OSGR's must be measured with differential GPS. The OSGR recorded as the LRP at the start or end of the section may be taken at any point on the cross-sectional line passing through the Section Reference Marker within the extent of the carriageway, and be within 0.25m of that cross-sectional line.

2.7.7   Service Provider Procured Surveys

In the case of scheme specific surveys such as Deflectograph, and where the Service Provider user is attempting to bulk update the construction records as a result of a Ground Penetrating Radar (GPR) survey, it is the responsibility of the Service Provider's NRM to ensure that any new data is fitted to the Network.

It is not acceptable for a section to be temporarily recalibrated for the purposes of fitting data.

Users concerned about fitting either survey data or bulk updates to section attributes such as construction or inventory, should in the first instance contact ServiceDirect Team (0113-2541140); E-mail: ServiceDirect@highways.gsi.gov.uk

2.7.8   Timeliness

The Service Provider is responsible for the accuracy and completeness of the data held within the HAPMS databases and is contractually obliged to maintain this on behalf of the Highways Agency over the life of their contract.

The Service Provider is also required to ensure that any changes to Highways Agency owned data that occur during the contract period are reflected in the relevant asset database. In meeting this obligation the Service Provider must accurately and completely update the relevant asset record within 20 days of the completion of the works or condition survey.

2.8   Pavement Condition Surveys

2.8.1   Background

Following the introduction of the Road Users' Charter and the coincident move by the Highways Agency to be a service based organisation, there has been a change of emphasis on the determinants for maintenance intervention. This recognises that the road user is concerned only with the surface condition of the road.

This section describes the strategy for Pavement Condition Surveys, which is fully supported by the facilities provided in HAPMS.

For the purpose of clarity, a differentiation is made between surveys and inspections:

Surveys   Defined as the collection of data either by machine or visually. Machine surveys are the collection by machine of measurements. Visual surveys are a mixture of assessments and measurements, with data capture possibly by hand-held computer

Inspections   Defined as viewing of the relevant length of road, either on foot or from a slow moving vehicle, to apply and to record judgements but not to collect data

2.8.2   Pavement Condition Survey Strategy

There are two levels of pavement condition survey:

•   Network level
•   Scheme level

All network level pavement issues (for example, network level reporting, budget planning, targeting of priority lengths for treatment) will be based on the data collected by the Network level surveys See Figure 2.8.1.

Any additional data required to define/design individual maintenance scheme will be collected by the scheme level surveys. The actual scheme level condition surveys required to be undertaken for each individual scheme will vary from scheme to scheme.

Lengths of road that will be candidates for treatment will be defined by the relevant maintenance engineer, and will include those lengths identified by the Network surveys and any other lengths that the maintenance engineer wishes to consider for other reasons.

After the Network level surveys, and prior to the confirmation that any length of road is considered a candidate for treatment and subject to scheme level surveys, an inspection must be carried out by an engineer (or experienced Inspector). This inspection must formally confirm that the length identified from the Network surveys, or by other means, is a proper candidate for treatment and give the engineer or Inspector's considered views of other elements of the proposed work, which are currently considered as part of the Value Management exercise.

2.8.3   Network Level Surveys

The network level machine surveys are:

•   TRACS - undertaken on the entire network each year and for multiple lanes.
•   SCRIM - currently carried out notionally on one third of the Network each year in the most heavily trafficked lane, usually lane 1.

The Highways Agency centrally procures and manages the annual TRACS and SCRIM surveys.

2.8.4   Scheme Level Surveys

The range of scheme level surveys includes:

• Deflectograph	For all schemes other than existing rigid construction, providing data that is needed to assess the structural condition of the pavement and to determine whether the pavement is, or remains, long life
• Visual Condition Surveys	For flexible pavements requiring surface treatment, providing data to establish the preferred option for surface treatment for the scheme. The survey will vary in content depending on the existing pavement construction. If possible, the visual condition survey should be undertaken at the same time as other Scheme level surveys to limit the number of lane closures.

In addition, special surveys that are relevant to a particular scheme, or options for a scheme, may be undertaken including:

- Falling Weight Deflectometer (FWD)
- Ground Penetrating Radar (GPR)/Seismic
- Dynamic Cone Penetrometer (DCP)
- Coring or trial pits (including any subsequent laboratory testing of samples)
- CCTV surveys of drainage pipe runs
- Topographical surveys

Figure 2.8.1   Pavement Condition Survey Strategy
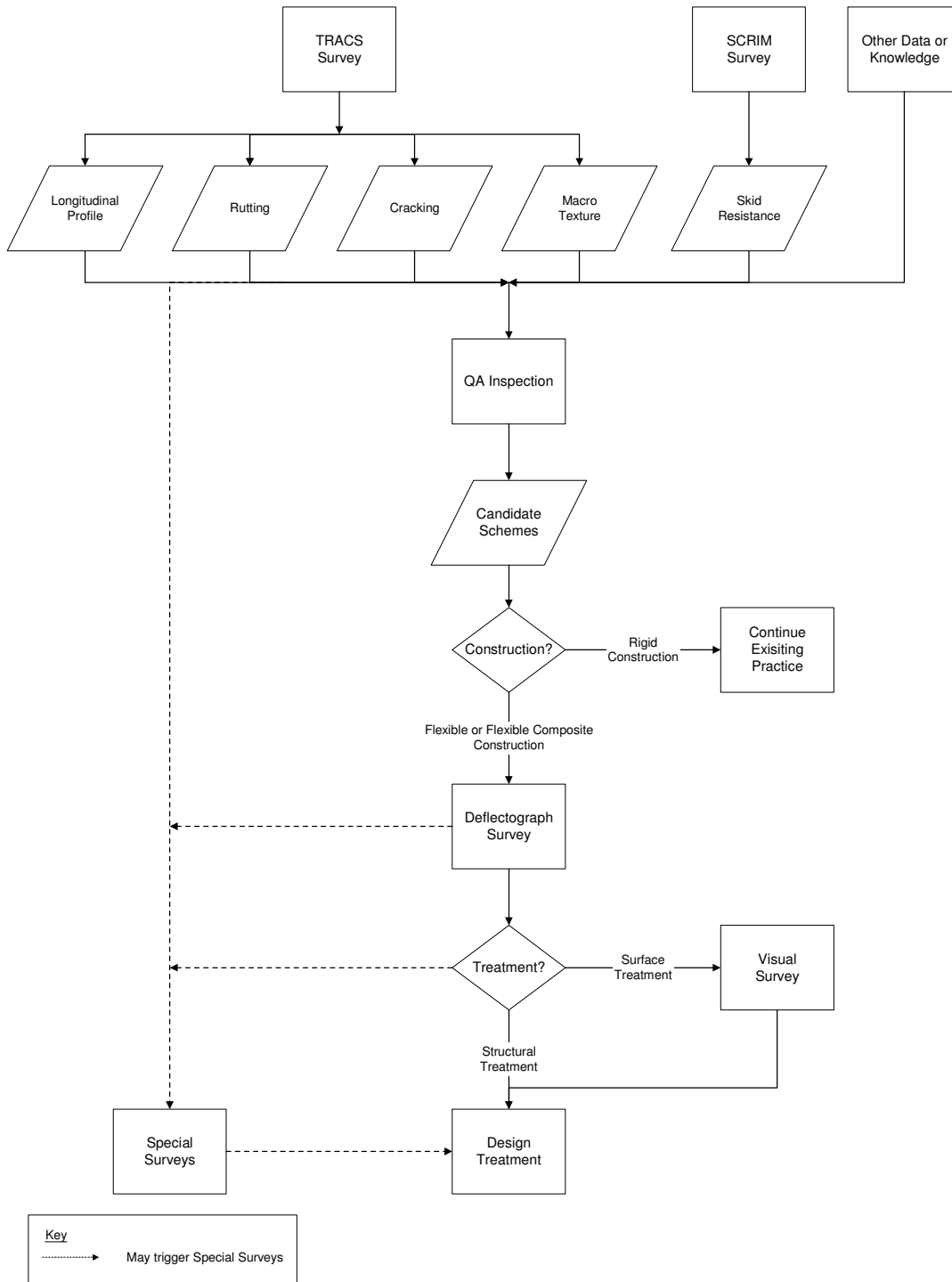
It is intended that data from scheme level surveys (including Special surveys) will supplement the data available from the Network level surveys, which will be available (other than crack intensity) at a disaggregated level for scheme consideration. It should be noted that the data from the Special surveys cannot be stored in HAPMS at present but the Service Provider must retain this data for possible future inclusion in HAPMS

2.8.5   Survey Procedures

All surveys must be carried out in accordance with Volume 7 of the Design Manual for Roads and Bridges.

2.8.6   Bar Code Plates

It should be noted that the five-digit bar code plates (that were used for section referencing for HRM surveys) are no longer used and should not be replaced if removed as a result of normal Service Provider activities.

2.8.7   Submission of Bids for Pavement Condition Surveys

All guidance on the preparation and submission of bids is provided in the documents referred to in Chapter 10.

2.9   Visual Surveys (Flexible)

2.9.1   Background – HAPMS Survey Strategy

The Highways Agency has adopted a survey strategy comprising annual, high-speed network level surveys (TRACS and SCRIM) and further investigations on areas of the Network identified as possible candidates for planned maintenance schemes.

Although the survey strategy gives prominence to the role of machine-based surveys, there is still a need for visual surveys to collect those data that cannot currently be collected by machine:

1.	Pavement Visual Surveys provide information, supplementary to that provided by network machine surveys, to support the design, evaluation and audit of potential maintenance schemes on flexible carriageway pavements (PVS-f). Please note that there is a proposal for an equivalent survey for concrete carriageway pavements to be defined but that, until this is available, the Service Provider must continue with existing arrangements using the Visual Condition Survey.
2.	Network Visual Surveys (NVS) of those parts of the Network that are not covered by machine surveys (kerbs, footways, cycletracks and hard-paved verges) for the Highways Agency's reporting on performance of that network.

Figure 2.9.1 describes the HAPMS survey strategy, and illustrates the role of the two visual surveys within this strategy.

2.9.2   Timing and Frequency of Surveys

a.   Pavement Scheme Visual Surveys of Flexible Carriageways (PVS-f)

Scheme visual surveys must be carried out at locations on flexible surfaced carriageways where maintenance schemes are being considered. These surveys may be limited to lengths and lanes rather than to whole carriageways or sections. Visual surveys used to support the evaluation of scheme bids must have been carried out and loaded into HAPMS no more than 12 months prior to the date of the first "snapshot" of the forward programme given in the Programme Objectives Guide.

b.   Network Visual Surveys

Network Visual Surveys must be programmed so that the whole of the network of off-carriageway items are covered over a two year period. 50% of those sections requiring survey must be inspected each year within those two years.

Footways,
Cycleways, Kerbs
and Paved Verges ← ¦ → Carriageways

Network Surveys

Scheme Surveys

SCRIM

TRACS

Network Visual
Survey

PVS-f
Pavement Visual
Survey (Flexible)

Deflectograph

Various
Design-Related
Investigations as
Necessary*

Key:

Machine Survey

Visual Survey

* FWD, Drainage Surveys etc.
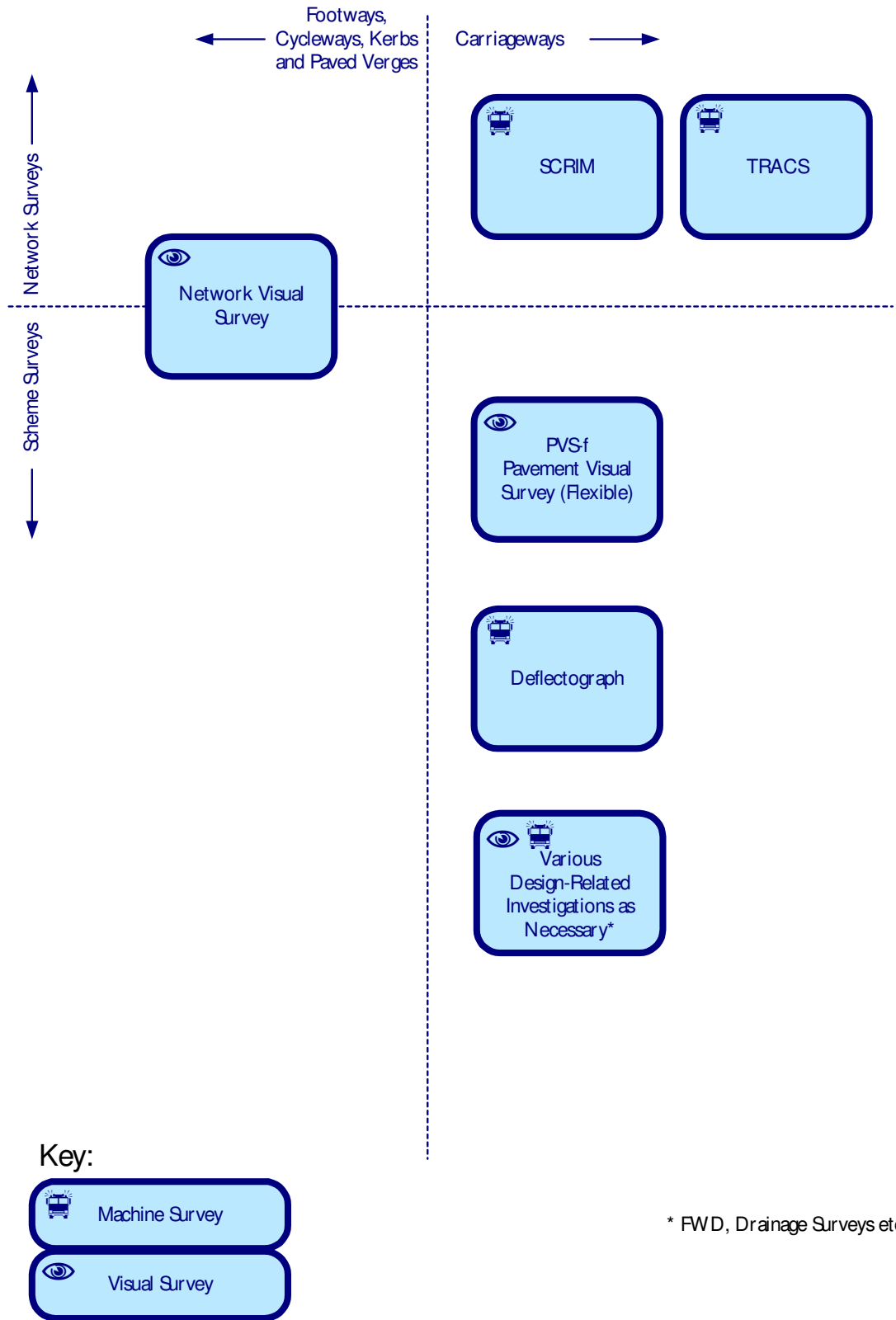
Figure 2.9.1 HAPMS survey strategy

2.9.3   Concrete Carriageways

The PVS-f survey is only applicable to flexible carriageway pavements. VCSs of concrete pavements as described in Chapter 2.10, must continue.

2.9.4   Visual Survey Software

The Highways Agency provides the following software for the purposes of undertaking HAPMS Visual Surveys.

DCD Software, Version 2.01a.HA

Functionality has been provided within the HAPMS system that must be used for the definition and outputting of survey routes to the handheld computer, and for loading of completed surveys, from the handheld computer.

2.9.5   Survey Procedures

NVS and PVS-f Visual Surveys must be carried out in accordance with the provisions of the HAPMS Visual Survey Manual.

2.9.6   National Road Maintenance Condition Survey (NRMCS)

The Highways Agency is still actively participating in the NRMCS. TRACS and SCRIM surveys will provide the data for the carriageway condition used in the NRMCS.

2.10   Visual Condition Surveys (VCS) on Concrete Surfaced Pavements

2.10.1 Roads to be Surveyed

All concrete surfaced carriageways of motorways and all purpose trunk roads must have a visual condition survey. On heavily trafficked motorways and dual carriageways where significant delays occur during daytime lane closures, VCS must be carried out at night.

2.10.2 Extent and Frequency of Surveys

In order to obtain sufficiently detailed condition data to support major maintenance schemes, surveys must be carried out over the length of the identified scheme, and must be no older than 1 calendar year at the time of Scheme appraisal.

2.10.3 Inspection Procedures

VCSs must form part of the inspection procedure to be adopted before the opening to traffic of newly laid concrete surfaced pavements and must also be carried out at the end of the Contract maintenance period.   The surveys must be carried out by the Service Provider and the consultant/designer (if one is appointed) following agreement with the Service Manager, and inspection records must be kept by the Service Provider.

2.10.4 Surveys

Procedures and methods for carrying out VCSs for concrete surfaced pavements (including CRCP) are fully described in the DMRB: Volume 7, section 3, and Part 2 HD29/94.

2.10.5 Recording the Survey Data

The Service Provider must retain a fair copy of the 1:100 scale field inspection sheet. Note: this data can be held electronically. Two copies of the pavement construction data and defect summaries must be submitted to the Service Manager within three months of the completion of the survey.

2.11   Machine Survey Pre-processor (MSP)

2.11.1 Introduction

The Highways Agency's MSP is a stand-alone software application that is to be used by the Service Provider or by the Service Provider's survey contractors, to process data from SCRIM and Deflectograph surveys prior to loading into Confirm.

The software is also being used by the Highways Agency's TRACS Contractor to process the TRACS data prior to loading into Confirm.

In summary, MSP:

- Reads in and validates the format and consistency of Raw Condition Data (RCD) collected by the relevant survey machines;
- Validates the measured values;
- Carries out corrections to, and/or some analysis of, the measured values ;
- Maps the survey to a Survey Route, defined within a file; and
- Outputs the corrected/analysed data and mapping information as Base Condition Data (BCD), for subsequent loading into Confirm.

2.11.2 Accessing MSP

MSP is a stand-alone application that can be installed on any PC whether connected to the Highways Agency Extranet or not. Service provider users were provided with a copy of the MSP application and a User Guide at the training courses that accompanied its rollout.

Any requests for help in using MSP, including requests for additional copies of the software, should be directed to the Highways Agency ServiceDirect helpdesk (Telephone 0113-2541140); E-mail ServiceDirect@highways.gsi.gov.uk

2.11.3 Corrections and Analysis

The corrections and/or analysis carried out by MSP are:

TRACS data

- Filtering of the GPS co-ordinate data
- Calculation of three longitudinal profile variances (normally 3m, 10m and 30m), averaged over fixed lengths (normally 10m)
- Calculation of rut depth in each wheel track, averaged over fixed lengths (normally 10m)
- Calculation of texture depth (either SMTD or MPD) and percentage fretting, averaged over fixed lengths (normally 10m)
- Calculation of cracking intensities for the whole carriageway, left wheeltrack and right wheeltrack, over fixed lengths (normally 10m)
- Calculation of predicted noise, averaged over fixed lengths (normally 10m) together with estimated surface type
- The geometric data (gradient, crossfall and radius of curvature) and individual cracks recorded by TRACS are also output (without correction/analysis)

SCRIM data   2.11 - 2

• Correction for static calibration • Correction for Distance Calibration Factor

Deflectograph data

• Correction for static calibration • Correction for wheel load • Linear interpolation of temperature • Correction for Distance Calibration Factor

2.12   Records and Inspections of Highway Structures

2.12.1 General

The overarching principles for the provision and maintenance of records and inspections for trunk road structures throughout the UK are set out in BD62 'As Built, Operational and Maintenance Records for Highway Structures', BD63 'Inspection of Highway Structures', and BD53 'Inspection and records for Road Tunnels'.

Records for new build, modifications and renewals works to trunk road highway structures in England are required by BD62 Annex A to be supplied and input into SMIS by the organisation responsible for the design of the works (the Designer), taking account of SMIS online User Guidance. For network improvement and maintenance works carried out under Service Provider contracts, the Service Provider will be responsible for ensuring that his Designer fulfils this duty.

Compliance with this Section 2.12 in relation to inputting of records into SMIS, and with the related SMIS User Guidance, is deemed to represent the minimum compliance with BD62. The requirements of this Section 2.12 and those of BD62, BD63 and BD53 supersede those in IAN38/01, IAN45/02, IAN 62/05 and IAN 67/05, which are hereby withdrawn.

> The acceptance into SMIS of records for new build, modifications and renewal works, together with the upkeep of operational records in SMIS, is the responsibility of the Service Provider, who must take reasonable steps to satisfy themselves that SMIS is populated correctly at all times.

SMIS is administered by SSR on behalf of Traffic Operations Directorate. The following table summarises the key contacts relating to SMIS queries.

Table A   SMIS Contacts

Subject Area	Contact
Engineering issues and Access	SMIS Administrator: smis@highways.gsi.gov.uk
Software or other usage issues	ServiceDirect: tel: 0113 254 1140

2.12.2   Scope of Highway Structures

> The scope of highway structures for which records must be held and maintained in SMIS, and inspections undertaken is given in BD62 Annex A Table 4. The normal maintenance inspection regime of General, Principal and Special Inspections in accordance with BD63 must apply to each Structure Type shown in the Table, except as indicated below:
>
> • Small Span Structures (formerly 'Small Culverts'). For Bridges and Buried structures between 0.9m and 1.8m span, Principal Inspections are not required, except for corrugated steel culverts, in which case the normal maintenance inspection regime must apply.
> • Masts. Posts for Highway Signs are not recorded on SMIS and are not covered by the SMIS inspection process.
> • Tunnels. General, Principal, Special, and M&E Inspections must be in accordance with BD53 'Inspection and Records for Road Tunnels'
> • Service Crossings and Other Structures. For other structures not defined in the Table but needing technical approval the Service Provider must contact the SMIS Administrator.

2.12.3   Type of Records required in SMIS

> The type of as built, operational and maintenance structure records to be held are described in Section 4 of BD62 and must be maintained by the Service Provider within the relevant branch of

the SMIS hierarchy, as explained in SMIS User Guidance Volume 1 under "BD 62 Requirements" and in the SMIS Designer Guide under "Introduction". The Service Provider must ensure that document records that they upload into the Structure File Branch are located in the correct subfolder.

Where bridge and culvert structures are modified to cater for road widening, the new construction must be input as part of the existing structure.

2.12.4   Data input to SMIS for new build, modifications and renewals

For structures new build, modifications and renewals, Designers are required in submit the necessary inventory details and Structure File records within the timescales stated below, as set out in BD62 Annex A :

• An Early Notification spreadsheet for each new structure, at the time of Approval In Principle submission for the structure, sent to relevant Highways Agency Technical Approval contact.
• The structure inventory data, at least one month before the planned Pre Opening Inspection, POI (refer to BD63), by direct input into SMIS.
• Structure File documents for the completed works, no later than three months from the opening of the structure to traffic, as electronic files either direct into SMIS or on CD to the SMIS Administrator.

With respect to item 2 above the Service Provider must confirm within SMIS, as part of his POI duties, the acceptance of the completed data input.

For new structures, the Service Provider must liaise with the Designer so that the Designer can establish an acceptable referencing system for the structure for SMIS inventory and inspection recording purposes.

For modifications and renewals to existing structures (including widenings) it is essential that the Service Provider "migrates" the component hierarchy (ie amend for condition reporting) of the structure before the Designer inputs the modification data. The Designer and Service Provider must therefore liaise at a sufficiently early date to enable this to be done. This requirement is also stated in the SMIS Designer Guide Section 6.

2.12.5   Supply of Structure Records in Connection with Changeover of Responsibility

Records at Transfer of HA Structures to the Ownership of Others

Where a new structure has been constructed under an HA contract, but ownership is to be transferred to a third party, full data and documentation is supplied by the Designer in accordance with BD62.

Where an existing structure is to be transferred to a third party, the Service provider must update the data and documentation in SMIS, prior to transfer (See 2.12.7).

Where necessary, the SMIS Administrator can supply a Structure Report to the responsible HA officer as a summary record of the SMIS inventory for the structure.

The HA officer must notify the SMIS Administrator of the date of the change of ownership of the structure not later than one week after the transfer.

Records at the Transfer of Existing Third Party Structures to the Ownership of the Highways Agency

When transfer of ownership from a third party to the HA is to take place, the Service Provider must apply to the SMIS Administrator for a new Structure Key and, at least one month prior to the planned handover inspection, create a suitable inventory in SMIS. Following the handover inspection (refer to Acceptance Inspections in BD63), the Service Provider must input the inspection records into SMIS in accordance with 2.12.8.

2.12.6   Supply of Records for Structures on the HA Network Owned by Others

For newly built structures over, under or adjacent to the highway but owned by others, on instruction from the Area Manager or other authorised person the Owner should supply to the Service Provider, and the Service Provider obtain from the Owner, within three months of substantial completion of the structure, summary information about the structure for inputting into SMIS, comprising:

a.   A completed Early Notification of Structure spreadsheet, which should be obtained from the SMIS Administrator.
b.   Minimum headroom information for each span over the road, rail or navigable waterway.
c.   Three electronic Report Images required for the 277(SMIS) Report. These are a 1:2500 scale map of the vicinity, a general elevation photograph and a general arrangement drawing. Agents should agree the format of these images with the Owner, giving due consideration to the guidelines in the SMIS User Guides.

Where the Service Provider is able to acquire this information it must be entered onto SMIS correctly and without delay. Where the Service Provider is unable to obtain this information from the owner, the Service Provider should on instruction from the Area Manager or other authorised person, create and input this information to SMIS.

2.12.7   Supply and Upkeep of Operational Records for Existing Structures

As part of the ongoing management cycle of a structure, SMIS contains various functions for use by the Service Provider. Requirements for these are summarised in sub-section 2.12.7.

Maintenance Inspections

The Service Provider must carry out Maintenance inspections in accordance with BD 63 and must input information from General, Principal and Special Inspections directly into SMIS in accordance with 2.12.8 below.

The Service Provider must complete and "authorise" Inspections in SMIS within three months of the inspection taking place.

The Service Provider must use the inspection scheduling facility in SMIS for inspections and monitoring.

Where a Service Provider is responsible for maintenance of a new structure, the initial Acceptance Inspection should be the Pre Opening Inspection (POI) (see BD63 Section 5). This inspection must constitute the commencement of the programmed General and Principal Inspection intervals. The POI may be either a General Inspection or a Principal Inspection although should normally be a Principal Inspection, but it must in all cases be sufficiently detailed to enable the Service Provider to fulfil its responsibilities of future maintenance and management of the structure.

Monitoring Inspections are separately identified in SMIS and are recurring Special Inspections for the management of substandard structures.

Maintenance Actions

Maintenance Actions are created in SMIS as recommended actions to deal with particular maintenance needs, for entry onto the Higways Agency's Structure Renewals Programme. The Service Provider must create these within SMIS, in accordance with the onscreen guidance, either:

- During the inspection inputting process.
- During the development of the planned forward programme.
- Independent from the inspection screens (e.g. following an assessment or incident).

The Service Provider must review and accept Maintenance Actions within three months of the action being identified. Where Maintenance Actions are identified at the time of a maintenance inspection, the Service Provider must undertake this review before the inspection input is "authorised". The Service Provider will need to allocate staff with the "engineer" user role to undertake these duties on their behalf.

Developing Maintenance projects

The Service Provider must use the Project Forming, Estimating, Scheduling and Bidding, and Continuous Value Management functions in SMIS as required by the Highways Agency as part of the effective management of the structures asset.

Ongoing Review of SMIS Inventory

The Service Provider must take the opportunity to check and update relevant parts of the SMIS inventory whenever current information can be checked or ascertained during normal operational activities. This should be at least on the following occasions:

a. Before "authorising" a Principal Inspection input into SMIS (eg physical details and images).
b. Within two months of completion of maintenance schemes (eg additional or amended physical details and images).
c. Within two months of input of inventory information into SMIS by Designers (ie acceptance of Designers data and records input).
d. Where existing structures have yet to be converted to component level inspection, at initiation of the component level inspection regime (ie instigate component hierarchy and ensure physical data is attributed correctly within the hierarchy).
e. Before data for a modified structure (eg widening) is input by the Designer. (ie "migrate" (for condition reporting purposes) the component hierarchy if not already done.
f. Where an existing structure is to be transferred to a third party, the Service Provider must update the data and documentation in SMIS prior to transfer.
g. Upon receipt or known creation of any more recent information or on recognition of any incorrect information.
h. Within one week of the physical addition or removal of any Interim Measure.

Structural Assessments and Load Management

The Service Provider must input Assessment records from the Steady State Assessment Programme into SMIS through the Load Management section and the Structure File section as appropriate. Submission of paper AHS/2 forms as a record of new assessment information is no longer required.

Advice in the SMIS User Guidance Volume 4 - Operational must be followed regarding the Load Management.Summary section

2.12.8   Maintenance Inspections

The Service Provider must use the inspection and monitoring scheduling facility in SMIS for planning and programming maintenance inspections.

The Service Provider must undertake all inspections as "component level" inspections and defect information (ratings, images etc.) recorded against the component referencing system for the structure within SMIS, as set out in the SMIS User Manual and on screen guidance. The Service Provider must "authorise" Inspection data within three months of the inspection taking place.

General, Principal and Special Inspection reports, can now be generated from SMIS. Bound paper reports for these inspections need not be submitted to the Highways Agency, unless specifically requested by the appropriate HA staff.

Where some inspections require additional information beyond that for which there is functionality in SMIS for keyed input, (e.g. Acceptance Inspections, enhanced maintenance inspections etc), a report prepared externally to SMIS may be created and submitted to the HA for acceptance and then uploaded into the relevant section of the Structure File in SMIS.

At handover of new structures to the Service Provider, the Service Provider must confirm in SMIS, as part of his POI Acceptance Inspection duties, their acceptance of the Designers completed data input for the structure.

2.12.9   Identification Markings

Service Providers must carry out the identification marking of highway structures in accordance with BD45. Identification of new structures must be carried out at the same time as the first Principal Inspection.

2.13   Drainage Records & Inspections

2.13.1   General

It is essential to have accurate data on the location and condition of highway drainage assets in order to plan ordered and cost effective maintenance. Data gathered must be stored in a manner that permits quick and easy access and in a format that is readily understandable to the Service Provider and Highways Agency irrespective of the data source.

HD 43 defines the data to be collected and the way in which it should be recorded. Data storage software is not specified, but a Geographical Information System (GIS) MUST BE USED. The Highways Agency will provide a GIS to ensure national uniformity within its network.

2.13.2   Data Collection & HADDMS

Information relating to highway drainage items can be obtained from a number of sources and in a variety of formats.

The Service Provider is responsible for collating drainage data from all available sources and also selecting which data is to be included with the Highways Agency Drainage Data Management System (HADDMS).

Data from existing RMMS systems may be transferred into HADDMS and CCTV surveys may also be used as a means of data collection.

2.13.3   Inventory

HD 43 identifies the types of drainage inventory items to be included and are classified as either 'point', 'continuous' or 'region' items.

Definitions are provided for point items e.g. manholes, continuous Sub-surface items e.g. culvert, continuous surface channels e.g. swales, continuous surface water & sub-surface channels & drain Items e.g. filter drains, and region Items e.g. sedimentation pond.

2.13.4   Record Types

HD 43 also identifies the attributes to be recorded for all inventory items be they 'point', 'continuous' or 'region' items.

2.13.5   Data Referencing

HD 43 lays down the requirements for the referencing of each item based on its position relative to the Ordnance Survey Grid.

2.14   Geotechnical Asset Information Management

2.14.1   General

The operational database for the management of geotechnical asset information is the Highways Agency Geotechnical Data Management System (HAGDMS). It is important that all parties recognise the importance of the data and take steps to ensure that decisions taken as part of the day-to-day management of the Network are supported by up to date and accurate information.

This section provides guidance on the general roles and responsibilities with regard to data management and sets out the general allocation of such roles and responsibilities between the Highways Agency and the Service Provider.

2.14.2   Overview of System

The primary purpose of the system is as an electronic data and risk management system to support the overall management of the geotechnical asset. For Service Providers, HAGDMS acts as the repository and means to manage the information required by HD41/03, 'Maintenance of the Highway Geotechnical Assets'.

It comprises a Geographical Information System (GIS) and the following component databases and datasets:

Geotechnical Asset Database (GAD): A national database functioning as an inventory of the geotechnical asset and its condition for the whole of the Network. It also contains functions to log geotechnical defects, manage their risk to the Network and provide records of remedial measures. Data dates from 2002 when the system became fully operational.

Reports Database: A national database of geotechnical reports and ground investigation data. Reports relate to the construction, improvement and maintenance of the entire Network. The Reports Database is also the repository for geotechnical reports and records that are stored in electronic (.pdf) format and are available to view on-line.

Boreholes Database: A national database of borehole locations abstracted from the archive of geotechnical reports. Electronic records are attached to a number of these in the form of borehole logs and AGS data (Association of Geotechnical and Geo-environmental Specialists).

Contacts Database: A database of registered HAGDMS users, British Geological Survey (BGS) Regional Geologists and key geotechnical contacts.

Third Party Datasets: The front-end user interface of the Geographical Information System (GIS) allows access to third-party datasets e.g. from the Ordnance Survey (OS), British Geological Survey (BGS), airborne laser scanning (LiDAR) surveys and high-resolution aerial ortho-photography. Compressed versions of digital aerial photo images of the whole network, extending approximately 1km either side of the highway, are a recent addition to the system.
Highways Agency GDMS has been set up as a web-based system to make it as fully accessible as possible. The address is http://www.hagdms.co.uk.

2.14.3   Role of the Highways Agency

The Highways Agency is responsible for administering and developing the system and supporting the Service Provider to enable them to fulfil their responsibility to input, maintain and report on the data.

2.14.4   Role of the Service Provider

The Service Provider, as the delegated maintainer of the Network are responsible for ensuring that the data is accurate, complete and up-to-date (to the required quality as defined by their respective contract).

2.14.5   Access Arrangements & Contact

Any Service Provider is permitted to access the system. Both view-only and editing access rights may be granted depending on the individual's roles and responsibilities.

New users can request access to the system from the following points of contact:

- Staff of the Highways Agency should contact their local Geotechnical Advisor (GA)

- Staff of the Service Provider should contact their Geotechnical Maintenance Liaison Engineer (GMLE)

For further information on any other aspect of HAGDMS, contact David Patterson (Project Manager and Sponsor) of Highways Agency SSR AAG (Geo) in the Bristol Office. [GTN: 1371 8399 or david.patterson@highways.gsi.gov.uk]

For further information on procuring either geodetic or spatial data via the LiDAR Framework and its subsequent storage and retrieval, contact Chris Duffell of Highways Agency SSR AAG (Geo) in the Manchester Office. [GTN: 4315 5660 or chris.duffel@highways.gsi.gov.uk]

2.14.6   Liaison between the Highways Agency and the Service Provider

Liaison between the two parties on issues regarding geotechnical data must take place between the Geotechnical Advisor for the Highways Agency and the Geotechnical Maintenance Liaison Engineer (GMLE) (as defined in HD41) for the Service Provider. The Service Provider may also be required to liaise with the Highways Agency's Geotechnical Database Administrator, who has day-to-day responsibility for managing geotechnical data.

The duties of the Service Provider's GMLE are as follows:

- Liaise with the Geotechnical Advisor for the Highways Agency as required

- Ensure compliance with all data management specifications relevant to managing the geotechnical asset

- Act as focal point to receive any communications regarding development changes to HAGDMS and redistribute to all relevant personnel within the Service Provider's organisation

- Act as a focal point to receive any communications regarding changes to the specifications for data management related to geotechnical asset management data and redistribute to all relevant personnel within the Service Provider's organisation

2.15   Environmental Information System

2.15.1   General

The operational database for the management of environmental asset information is the Highways Agency Environmental Information System (EnvIS). EnvIS consists of specific environmental data supplied by Service Providers, the Highways Agency and other bodies that is collated and displayed in the Highways Agency Geographical Information System (HAGIS). This data is used to assist in managing the environment, within and surrounding the trunk road network and in the review and reporting of the environmental performance of both the Service Provider and the Highways Agency.

This section provides guidance on the general roles and responsibilities with regard to data management and sets out the general allocation of such roles and responsibilities between the Highways Agency and the Service Provider.

2.15.2   Overview of System

EnvIS data is categorised as either environmental inventory or environmental management information, which together, provide important details on the characteristics and management of Environmental Elements located within and surrounding the trunk road network. Environmental Elements are defined in IAN 84/07 as part of EnvIS environmental inventory and are man-made or natural assets comprising the environment within and surrounding the trunk road network.

Environmental Inventory – contains data, provided by the Highways Agency (e.g. national designations), Service Providers and other bodies, relating to the characteristics of specific Environmental Elements within the following environmental topics:
  • Landscape;
  • Nature Conservation and Ecology;
  • Water;
  • Cultural Heritage;
  • Air Quality;
  • Noise, and;
  • Waste and Material Resources.

Environmental inventory specifically records the following information (where appropriate):
  • an Element's classification and the status of that Element (what it is);
  • an Element's specific location (where it is located), and;
  • an Element's intended Highways Agency objective(s) and environmental objective(s) (why it is there).

Environmental management information – is data attached to individual Environmental Elements and assists in informing both the Highways Agency and Service Provider of the broad environmental management requirements of the trunk road network, and corresponding environmental performance.

For each Environmental Element, environmental management information specifically records the following information (where appropriate):
  • details of any environmental commitments entered into;
  • type of management actions undertaken for each Environmental Element in line with its Highways Agency and environmental objective(s);
  • status of each management action;
  • planned / actual date for completion of each management action; and
  • condition and / or performance rating of each Environmental Element.

2.15.3 Roles and Responsibilities

General

The Highways Agency's Service Manager and the Service Provider's Environmental Coordinator and / or the Service Provider's Area Environmental Manager have duties to ensure compliance with EnvIS as explained below.

Highways Agency

For completeness and to aid the Service Provider's understanding of the workings of EnvIS, the duties of the Highways Agency's teams are explained below. Contribution to and management of EnvIS is split across three parts of the Highways Agency namely: Policy; EnvIS Management Team (EMT), and; Information Directorate.

a)   Highways Agency Policy
Policy will use EnvIS to actively monitor the performance of Environmental Elements, Service Providers and the Highways Agency to ensure compliance with stated aims and objectives. In coordination with the EnvIS Best Practice Group they will also make changes to EnvIS to reflect administration and Central Government environmental policy variations from time to time.

b)   EnvIS Management Team
The EMT acts as the focal point of contact for all Service Providers maintaining and supplying environmental data to EnvIS standards. This team will monitor submission of data, assess the quality of data, and offer guidance on data quality and quantity issues. They will also offer guidance on interpretation of EnvIS standards. All contact and requests for data will be managed by this team and should be routed via ServiceDirect (Highways Agency helpdesk – 0113 254 1140 or mailto:ServiceDirect@highways.gsi.gov.uk).

c)   Information Directorate
Highways Agency ID manages the processing of data submitted by Service Providers. It validates data on upload to the EnvIS databases and identifies errors and omissions. They will generate error reports for distribution to suppliers of data and will also generate and issue Highways Agency Unique ID numbers for all satisfactorily loaded environmental inventory data. Finally, they have responsibility for managing the national designation data in the EnvIS database.

Service Provider

The term Service Provider, is used to collectively describe both the Designer and Network Management Agent. Service Providers are required to collect, record, submit and utilise available EnvIS data in the course of network management.

The terms Designer and Network Management Agent relate directly to the type of work that is being undertaken. For example, a Service Provider working on a Design Build Finance and Operate (DBFO) project will undertake duties relating to both Design and Network Management during the life of a contract. Equally, if a Network Management Agent is undertaking renewals or improvement works, then the role of Designer will be assumed. This interpretation is important to remember when recording and submitting EnvIS data, as it means that a Service Provider is not exclusively a Designer or Network Management Agent, but can perform both roles during the course of a commission.

a)   Designer
The term Designer, refers to the contracting agent carrying out design and construction activities

for or on behalf of the Highways Agency.

> When undertaking the role of Designer, the Service Provider must collect, record, submit and utilise available EnvIS data in the course of project planning, design and construction.

b)   Network Management Agent
The term Network Management Agent, refers to the contracting agent responsible for managing and maintaining the Network.

> In his role as Network Management Agent, the Service Provider must collect, record, submit and utilise available EnvIS data in the course of Area maintenance and operation.

2.15.4   EnvIS Specialist Personnel Requirements

Environmental Specialists

Relevant environmental specialists, with the appropriate level of expertise, should be utilised in the application of the different environmental topics addressed by EnvIS. All environmental specialists must have relevant highway experience relating to detailed design, construction and maintenance. Annex E of HD 46 (DMRB 5.2.1) gives indicative levels of experience, professional status and competency that the Highways Agency considers necessary in fulfilling this role.

> **GIS specialists**
> The Service Provider must have access to a Geographical Information System (GIS) and specialist GIS trained personnel in order to record and assign correct geospatial attributes to Environmental Elements.

Database Administrators (DBA)
Service Providers may need access to DBA personnel in order to manage the standard set of look up tables and the necessary import and export routines for data transfer between the Highways Agency and Service Provider.

Analyst / Programmers
Service Providers may require analyst and programmer resources to develop local applications for assigning attribute data to Environmental Elements.

2.15.5   Access Arrangements & Contacts

> EnvIS data is collected by both the Highways Agency and Service Providers, and is transferred between each party, in a prescribed format. The Network Management Agent must transfer data to EnvIS, as a minimum, at intervals as defined in the IAN 84/07. The Designer must submit EnvIS data at key milestones as defined in the IAN 84/07. This data is displayed by the Highways Agency in layers in HAGIS. Service Providers with extranet access will be able to view this data in an EnvIS view of HAGIS. Similarly, reports, generated from EnvIS data, will be available through HAGIS or by using standard reporting tools in the Highways Agency Management Information System (HAMIS). Data downloads will be undertaken by the Highways Agency on request from the Service Provider and dispatched on mutually agreed media.

Any Service Provider with existing access to Highways Agency GIS is permitted to access the system. New users can request access to the system through their nominated Company Highways Agency Liaison Officer (CHALO) and the completion of Highways Agency security and NUNS forms. See Part 11.4.7 for information on new account management.

For further information on any aspect of EnvIS, contact ServiceDirect (0113 254 1140) or mail to: ServiceDirect@highways.gsi.gov.uk

2.15.6   Liaison between the Highways Agency and the Service Provider

Should the Service Provider have any issues regarding EnvIS data any liaison with the Highways Agency must take place through the EMT. The Service Provider may also be required to liaise with the Highways Agency's EnvIS Database Administrator, who has day-to-day responsibility for managing EnvIS data This will also initially be through the EMT But in all cases, the initial point of contact is through ServiceDirect (as above) to help ensure issues and queries are properly managed.

Annex 2.3.1   Local Authority Area Codes

Area Code	Local Authority Title
0011	HIGHWAYS AGENCY
0016	WELSH OFFICE
0017	BAA
0018	M6 TOLL MOTORWAY (MEL)
0020	TRANSPORT FOR LONDON
0114	BATH AND NORTH EAST SOMERSET
0116	BRISTOL
0119	SOUTH GLOUCESTERSHIRE
0121	NORTH WEST SOMERSET
0225	BEDFORDSHIRE
0230	LUTON
0335	BRACKNELL FOREST
0340	WEST BERKSHIRE
0345	READING
0350	SLOUGH
0355	WINDSOR AND MAIDENHEAD
0360	WOKINGHAM
0430	BUCKINGHAMSHIRE
0435	MILTON KEYNES
0535	CAMBRIDGESHIRE
0540	CITY OF PETERBOROUGH
0645	CHESHIRE
0650	HALTON
0655	WARRINGTON
0724	HARTLEPOOL
0728	REDCAR AND CLEVELAND
0734	MIDDLESBOROUGH
0738	STOCKTON-ON-TEES
0800	CORNWALL
0835	ISLES OF SCILLY
0900	CUMBRIA
1050	DERBYSHIRE
1055	CITY OF DERBY
1155	DEVON
1160	CITY OF PLYMOUTH
1165	TORBAY
1245	DORSET
1250	BOURNEMOUTH
1255	POOLE
1345	DURHAM
1350	DARLINGTON
1440	EAST SUSSEX
1445	BRIGHTON AND HOVE
1585	ESSEX
1590	SOUTHEND-ON-SEA

Area Code	Local Authority Title
1595	THURROCK
1600	GLOUCESTERSHIRE
1770	HAMPSHIRE
1775	CITY OF PORTSMOUTH
1780	CITY OF SOUTHAMPTON
1850	COUNTY OF HEREFORDSHIRE
1855	WORCESTERSHIRE
1900	HERTFORDSHIRE
2001	EAST RIDING OF YORKSHIRE
2002	NORTH EAST LINCOLNSHIRE
2003	NORTH LINCOLNSHIRE
2004	KINGSTON-UPON-HULL
2114	ISLE OF WIGHT
2275	KENT
2280	MEDWAY TOWNS
2371	LANCASHIRE
2372	BLACKBURN
2373	BLACKPOOL
2460	LEICESTERSHIRE
2465	CITY OF LEICESTER
2470	RUTLAND
2500	LINCOLNSHIRE
2600	NORFOLK
2741	YORK
2745	NORTH YORKSHIRE
2800	NORTHAMPTONSHIRE
2900	NORTHUMBERLAND
3055	NOTTINGHAMSHIRE
3060	CITY OF NOTTINGHAM
3100	OXFORDSHIRE
3235	SHROPSHIRE
3240	THE WREKIN
3300	SOMERSET
3450	STAFFORDSHIRE
3455	CITY OF STOKE-ON-TRENT
3500	SUFFOLK
3600	SURREY
3700	WARWICKSHIRE
3800	WEST SUSSEX
3930	WILTSHIRE
3935	SWINDON
4205	BOLTON
4210	BURY
4215	MANCHESTER
4220	OLDHAM
4225	ROCHDALE
4230	SALFORD

Area Code	Local Authority Title
4235	STOCKPORT
4240	TAMESIDE
4245	TRAFFORD
4250	WIGAN
4305	KNOWSLEY
4310	LIVERPOOL
4315	ST HELENS
4320	SEFTON
4325	WIRRAL
4405	BARNSLEY
4410	DONCASTER
4415	ROTHERHAM
4420	SHEFFIELD
4505	GATESHEAD
4510	NEWCASTLE UPON TYNE
4515	NORTH TYNESIDE
4520	SOUTH TYNESIDE
4525	SUNDERLAND
4605	BIRMINGHAM
4610	COVENTRY
4615	DUDLEY
4620	SANDWELL
4625	SOLIHULL
4630	WALSALL
4635	WOLVERHAMPTON
4705	BRADFORD
4710	CALDERDALE
4715	KIRKLEES
4720	LEEDS
4725	WAKEFIELD
4900	DEFENCE ESTATES
5030	CITY OF LONDON
5060	BARKING AND DAGENHAM
5090	BARNET
5120	BEXLEY
5150	BRENT
5180	BROMLEY
5210	CAMDEN
5240	CROYDON
5270	EALING
5300	ENFIELD
5330	GREENWICH
5360	HACKNEY
5390	HAMMERSMITH AND FULHAM
5420	HARINGEY
5450	HARROW
5480	HAVERING

Area Code	Local Authority Title
5510	HILLINGDON
5540	HOUNSLOW
5570	ISLINGTON
5600	KENSINGTON AND CHELSEA
5630	KINGSTON UPON THAMES
5660	LAMBETH
5690	LEWISHAM
5720	MERTON
5750	NEWHAM
5780	REDBRIDGE
5810	RICHMOND UPON THAMES
5840	SOUTHWARK
5870	SUTTON
5900	TOWER HAMLETS
5930	WALTHAM FOREST
5960	WANDSWORTH
5990	CITY OF WESTMINSTER
6805	ANGLESEY
6810	CAERNARFONSHIRE AND MERIONETHSHIRE
6815	CARDIFF
6820	CARDIGANSHIRE
6825	CARMARTHENSHIRE
6830	DENBIGHSHIRE
6835	FLINTSHIRE
6840	MONMOUTHSHIRE
6845	PEMBROKESHIRE
6850	POWYS
6855	SWANSEA
6905	ABERCONWY AND COLWYN
6910	BLAENAU GWENT
6915	BRIDGEND
6920	CAERPHILLY
6925	MERTHYR TYDFIL
6930	NEATH AND PORT TALBOT
6935	NEWPORT
6940	RHONDDA CYNON TAFF
6945	TORFAEN
6950	VALE OF GLAMORGAN
6955	WREXHAM
7188	DOT (POLICY DIVISION) C FOX
7207	GOVERNMENT OFFICE (LONDON)
7212	TRAFFIC DIRECTOR FOR LONDON

Annex 2.4.1   Section Creation and Retirement Data

Introduction

This annex describes the data requirements within HAPMS in order to support the Highways Agency's System for Management (SfM) Phase 2 Network Assets Solution.

Data Requirement

Within HAPMS the section data fields required for SfM are:
• Road, section label
• Start date
• End date
• Length
• Section Function
• Operational Area
• Permanent Lanes
• Single or Dual
• Environment
• Local Authority.

Sections Creation

For all sections created the following data are also required:

1. Creation Type

Creation Type is to be selected from the following:

• **New Build**. For all section creations resulting from a construction or improvement scheme. This includes modified sections – e.g. where they are widened or lengthened.

• **Trunking**. When the section addition results from a local authority road being brought into the Highways Agency's ownership.

• **Re-referencing**. The new section has been created solely due to re-referencing – this is most common following a road number change.

• **Data Cleansing.** When a section is 'found' i.e. the section has been in existence and under the control of Highways Agency but has not previously been recorded.

2. PIN (Project Number)
All "New Build" sections require the PIN field to be populated with the PIN of the project that created that section.

3. Traffic Accumulation Date

The Traffic Accumulation Date should be set to the date of last major strengthening or the date of original construction if no major strengthening has since been carried out.

Retired Sections

For all sections retired the following data are also required:

1   Retirement Type

Retirement Type is to be selected from the following:

• **Demolition**. For all section retirements resulting from a construction scheme, e.g. an existing pavement section is demolished as part of a bypass scheme.

• **Detrunking**. When the section retirement results from the section being transferred to local authority management.

• **Re-referencing**. The section has been retired solely due to re-referencing – this is most common following a road number change.

• **Data Cleansing**. This type should be selected when a section is retired due to the fact that it should not be recorded as a section e.g. a single physical section has been recorded twice.

2   PIN (Project Number)

All "Demolition" sections require the PIN field to be populated.

N.B. Within HAPMS, the above Creation and Retirement data can vary by chainage within a section.

Annex 2.4.2   Method of Installation of Section Reference Markers

Extract from patent number GB2179385B

A pocket is formed in the road surface by a drilling technique. A drill is used comprising a central pilot bit surrounded by an annular bit. The pilot bit permits drilling of an annulus by the annular bit in a precise location by guiding the annular bit.   The annulus has an outer diameter of approximately 100mm and a depth of between 5 and 15mm. An annular recess is formed in the road surface and a pocket is filled with a heated fluid thermoplastic material to the uppermost edge of the pocket and the material allowed to cool and set to form a stud. The jagged base of the pocket keys the stud in the pocket. The stud projects slightly above the top of the pocket, the amount of the projection being determined by the surface tension of the fluid material during the forming of the stud. See (a) to (d) below.
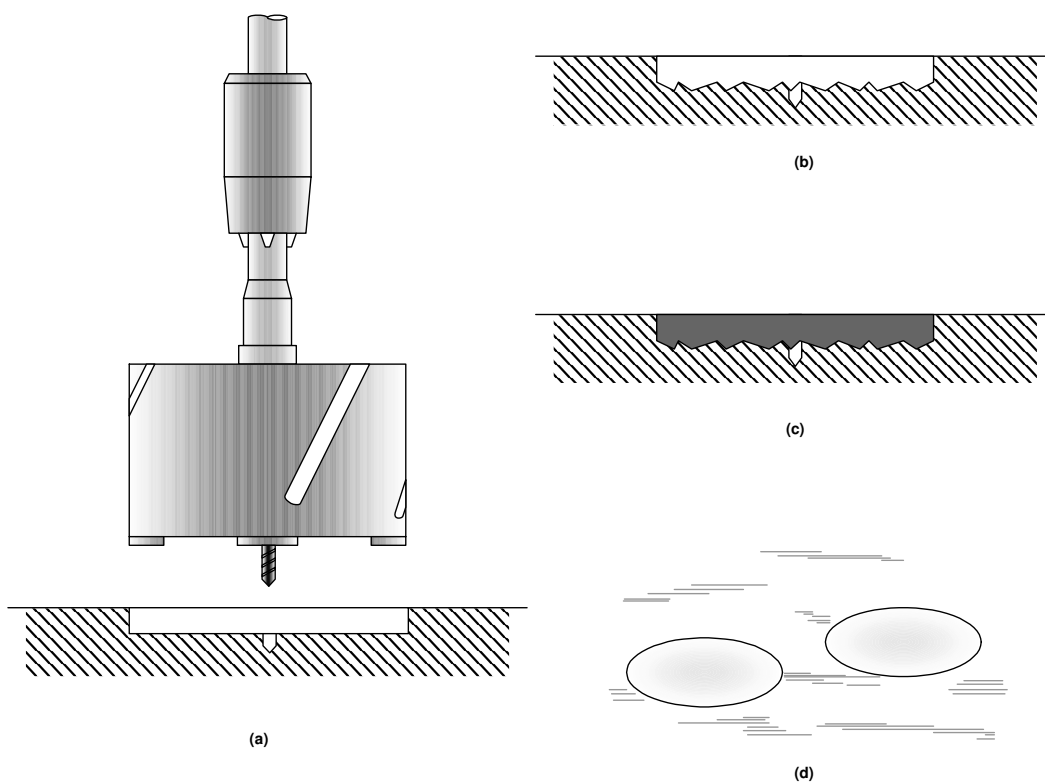
(a) Drilling of pocket
(b) Annular recess formed by drilling
(c) Filling of pocket with thermoplastic
(d) Finished Section Reference Markers (or Studs)

Figure 2.4.2: Method of Installation of Section Reference Markers

Part 2

**Annex 2.5.1
Typical use of on-carriageway XSP's and layouts
for Section node Reference Markers**

Annex 2.5.1   Typical use of on-carriageway XSPs and layouts for Section Node Reference Markers

> These notes apply to all Figures in this Annex
>
> 1.   On dual carriageways, section reference markers must be positioned in the centre of the wheeltracks of the left hand lane.
>
> 2.   On single carriageways section reference markers must be positioned in the centre of the wheeltracks in the left hand lane in both directions.
>
> 3.   Section reference markers must be installed at staggered crossroads as if it is two separate 'T' junctions.
>
> 4.   The cored thermoplastic markers must be installed on a line perpendicular to the nearside kerb, edge line or projected kerb line passing through the notional position of the end of the sections(s). Markers must be installed clear of all carriageway markings.
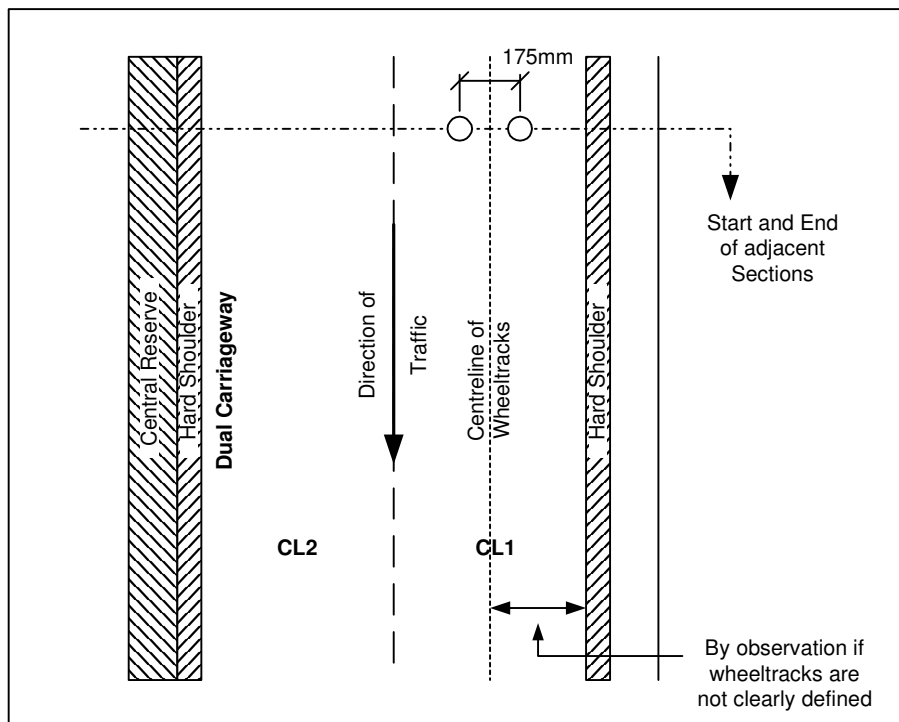

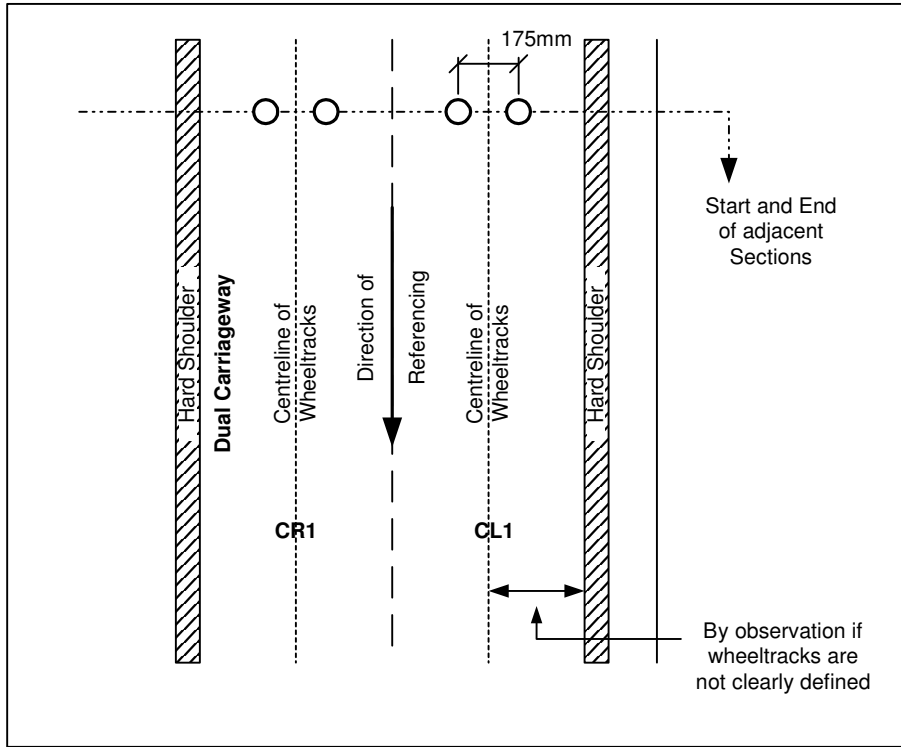*Figure A2.5.1 Position of Markers of Two Lane Dual Carriageway*

Part 2
Annex 2.5.1
Typical use of on-carriageway XSP's and layouts
for Section node Reference Markers

Figure A2.5.2 Position of Markers on Two Way Single Carriageway
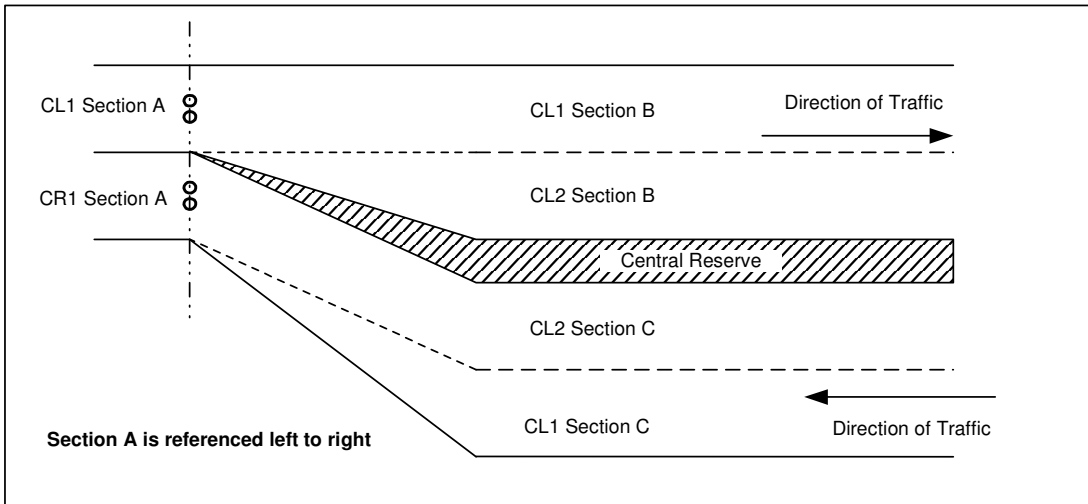
Figure A2.5.3 Start of Dual Carriageway

Part 2

**Annex 2.5.1
Typical use of on-carriageway XSP's and layouts
for Section node Reference Markers**

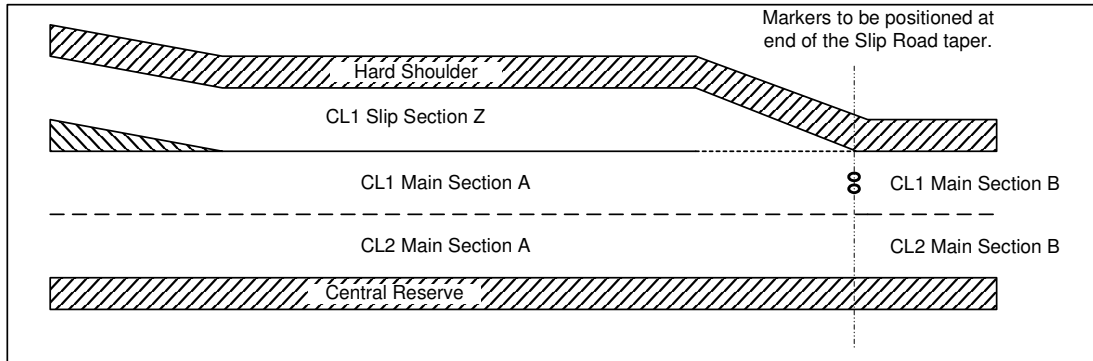*Figure A2.5.4 Slip Road entering Main Carriageway*
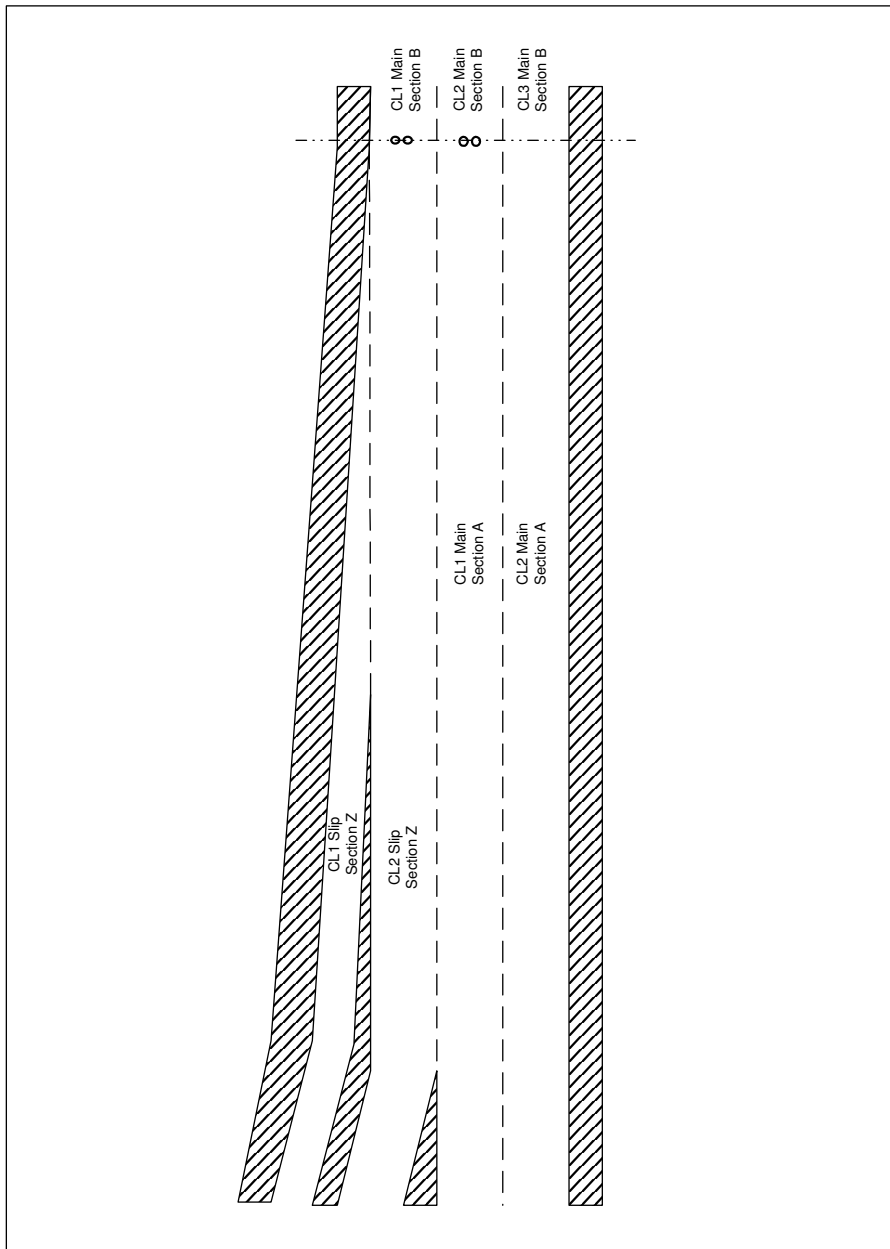
Figure A2.5.5 Main Line Addition at a Ghost Island Merge

Part 2

**Annex 2.5.1
Typical use of on-carriageway XSP's and layouts
for Section node Reference Markers**

a.   Lane gain and drop where only entering / leaving traffic is likely to use the additional left hand lane

b.   Lane gain and drop where through traffic is likely to use the additional left hand lane.

Note: All Section Referencing Markers for lane gain / drop are to be positioned according to the adjacent detail. In the case of the "lane drop" scenario the end of the physical 'nosing' is to be used to position the markers.

Ghost Island

End of physical taper.

Figure A2.5.6 Lane Gain and Drop

Part 2

Annex 2.5.1
Typical use of on-carriageway XSP's and layouts
for Section node Reference Markers
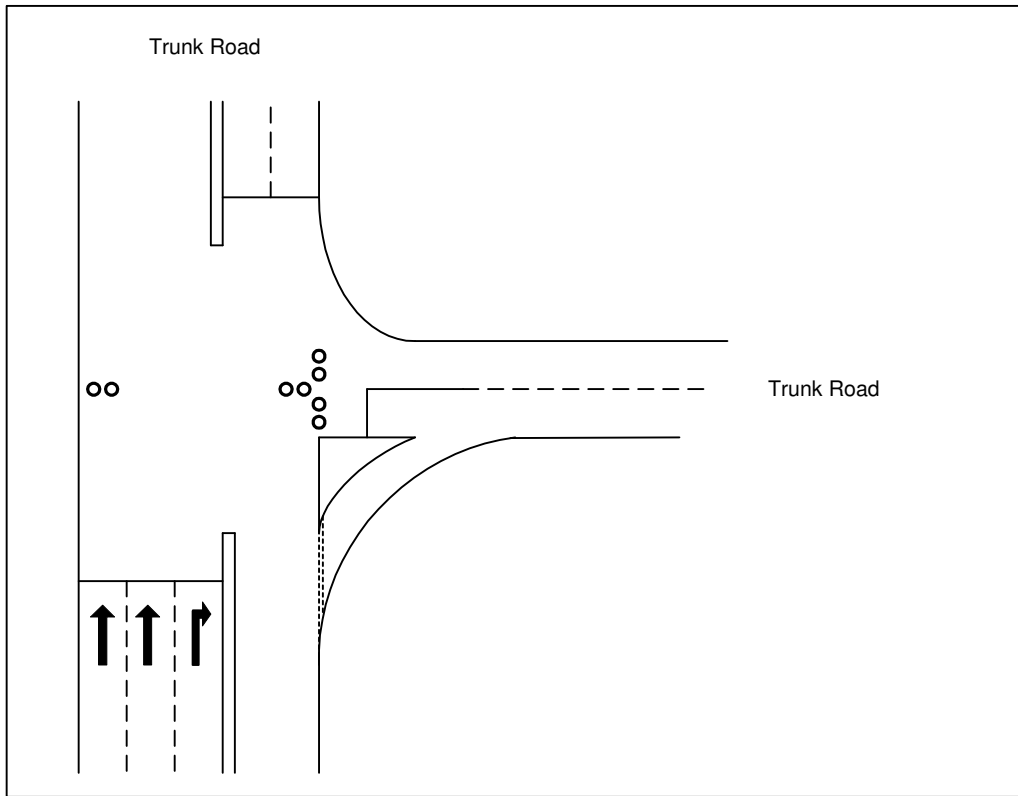
Figure A2.5.7 Trunk Roads meeting at a 'T' Junction

Note: Trunk Road A is considered to be the major of the two
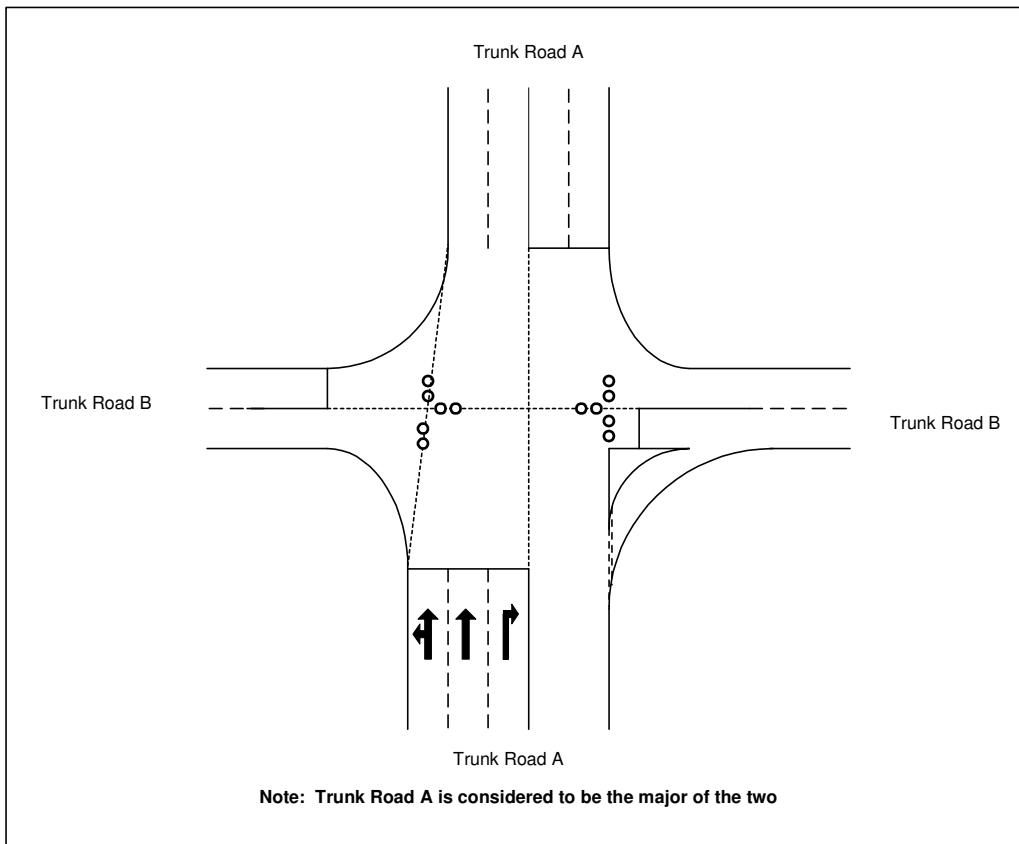
Figure A2.5.8 Trunk Roads meeting at a Cross Roads

Part 2

**Annex 2.5.1
Typical use of on-carriageway XSP's and layouts
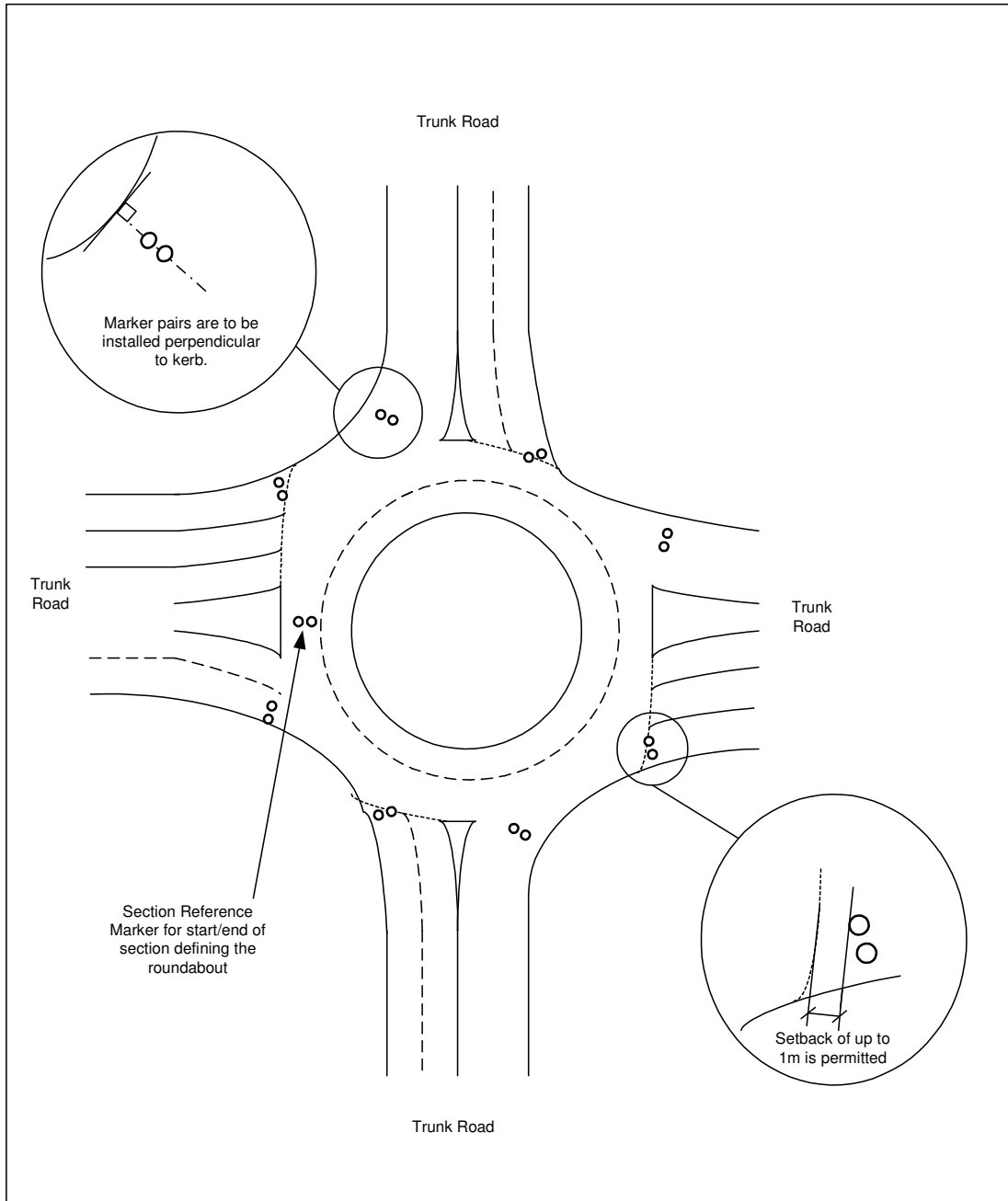for Section node Reference Markers**

Figure A2.5.9 Trunk Roads meeting at a Roundabout