VOLUME 10   ENVIRONMENTAL DESIGN AND MANAGEMENT

SECTION 0   ENVIRONMENTAL OBJECTIVES

PART 6

HA 91/01

ENVIRONMENTAL DATABASE SYSTEM

SUMMARY

This Advice Note describes the Highways Agency's environmental database system. It is not currently in use in Scotland, Wales and Northern Ireland.

INSTRUCTIONS FOR USE

This is a new document to be incorporated into the manual.

1.   Insert HA 91/01 into Volume 10, Section 0.

2.   Archive this sheet as appropriate.

Note: A quarterly index with a full set of Volume Contents Pages is available separately from The Stationery Office Ltd.

THE HIGHWAYS AGENCY

**THE SCOTTISH EXECUTIVE DEVELOPMENT
DEPARTMENT**

**THE NATIONAL ASSEMBLY FOR WALES
CYNULLIAD CENEDLAETHOL CYMRU**

THE DEPARTMENT FOR REGIONAL DEVELOPMENT*

Environmental Database System

* A Government Department in Northern Ireland

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Contents

Chapter

1.1 INTRODUCTION

1.1.1   This part of the Advice Note currently relates only to England as it has been developed specifically to cater for the Highways Agency's requirements. Other Agencies may choose to utilise the system in whole or part, but its use in Scotland, Wales and Northern Ireland is not part of their current policy.

1.1.2   Since 1996, Managing Agents (MA) have been required to inspect and manage the whole of the 'soft estate', as well as undertake environmental assessment, design and implementation of both highway and environmental improvements.

1.1.3   The Highways Agency has recognised the need to produce a consistent national inventory or database of its estate, which covers landscape, ecology and other environmental features. This will ensure an accurate, cost-effective and environmentally sound approach towards management and improvement of the highway network.

1.2 MANAGING AGENT AND HIGHWAYS AGENCY REQUIREMENTS

1.2.1   The key to the success of the database is simplicity and future flexibility. Not only does the database need to fulfil the operational and strategic requirements of both the Highways Agency and MAs, it also needs to be compatible with the wide variety of computer systems used by the MAs.

1.2.2   For operational purposes, data is required to programme and prioritise maintenance, to prepare budgets and assist in environmental assessments. Data for operational purposes would include OS digital mapping, the location and dimension of all on-site landscape and ecological features, the location of maintenance boundaries, and the location of conservation and landscape designations.

1.2.3   For strategic purposes, data is required for statistical analysis, for conducting audits and for determining compliance with relevant legislation. This data can also be used in the assessment of strategic options for highways network improvements and route management.

1.2.4   Third Party data is available from many national sources and in many formats. The data may include fields such as geology, agricultural land classifications, landscape character zones, population, water quality data and local planning information (including Regional and Policy Planning Guidance, and Local Transport Plan).

1.2.5   The overall aims of the database are:

- to store and retrieve comprehensive environmental data regarding the highways network;
- to enable MAs to develop Environmental Management/Action Plans and manage their soft estate in an environmentally-sound and cost-effective manner;
- to provide statistics and strategic data for analysis by the Highways Agency;
- to enable the Highways Agency to measure environmental performance;
- to be presented in a format that can be easily updated and will facilitate the transfer of data between the Highways Agency and their agents.

2.1   The Highways Agency's Environmental Database system essentially comprises two linked parts:

- A map-based inventory
- A text-based database

The two parts together provide the essential data required. They are linked electronically, and also, by a unique 'feature reference' which identifies each individual feature on both mapping (location and extent) and the database.

2.2   The Ordnance Survey base mapping is available to Designers and Managing Agents through the Highways Agency's service level agreement with Ordnance Survey. Generally, Landline Plus will provide the appropriate level of detail, utilised at 1: 2500 scale, or 1:1250 in urban areas.

MAs should be aware that OS issues updates from time to time and should check with HA before using an update. As if HA and MA are using different issues mapping problems will arise.

2.3   The Database containing the factual information must be linked to the mapped features, and utilise the prescribed, format and protocols for the Mandatory Datasets as detailed in the following chapters of this section.

MAs may extend the Database to incorporate additional fields, such as their own Work Programme/Management Plan, so long as the core data remains as prescribed, and can be output as a report to HA without the additional parts included for MA's own purposes.

2.4   The following chapters describe the methodology, and format to be followed when preparing, updating and transferring the Database contents.

3.1   The environmental data to be collected will require a combination of site surveys and desk-top research, coupled with obtaining data from third party bodies.

There are two types of data:

- **Core Data** – Those features that are considered an essential part of operating the network and therefore are an essential part of the Database inventory, and thus need to be collected, and the information updated, as an integral part of the MA's duties.
- **'As-and-when Data'** – Those features that are not essential, but which may be added to the database as-and-when required, for specific purposes. For instance, additional Planning/policy features may be collected for the assessment of an improvement scheme, or the MA may be requested to record all locations/types of noise barrier on a particular route.

The symbology of the data is set out in Chapter 4; and the protocol for capturing and format of the data is set out in Chapter 5.

3.2   There are three elements where data falls into both categories:

- **E2.2 Surface-Water Outfalls** – For the Environmental Database, these are considered 'Core data' when located close enough to potentially influence P.61/6.2 – Class 1 or 2 Watercourses or Groundwater – Sensitive zones. Otherwise, data collection will be determined by TRMM requirements or site-specific needs.
- **E4.1 Injurious Weeds** – 'Core data' when significant areas of infestations or persistant problem areas are present, otherwise the areas are identified as-and-when and remedial measures are undertaken as considered necessary.
- **P4.4 Public Rights of Way** – 'Core Data' when footpaths/bridleways are within or immediately adjacent the highway boundary, or cross the highway either at grade, above, or below.

3.3   MA's should seek advice and/or approval from the relevant HA Project Manager prior to collecting and/or incorporating "as-and-when" data into the Database.

4.1   The following table lists the Core Functions and Elements Codes, which are more fully described elsewhere within this Advice Note.

DATABASE CODES

Environmental Functions

Ref	Dataset	Core Data	As-and-when	Mapped as:
EFA	Visual Screening	●		N/A
EFB	Landscape Integration	●		N/A
EFC	Enhancing the Built Environment	●		N/A
EFD	Nature Conservation and Biodiversity	●		N/A
EFE	Visual Amenity	●		N/A
EFF	Heritage	●		N/A
EFG	Auditory Amenity	●		N/A
EFH	Water Quality	●		N/A

Landscape Elements

Grassland (LE1)

Ref	Dataset	Core Data	As-and-when	Mapped as:
LE1.1	Amenity grass areas	●		Polygon
LE1.2	Grassland with bulbs	●		Polygon
LE1.3	Species rich grassland	●		Polygon
LE1.4	Rock and scree	●		Polygon
LE1.5	Heath and moorland	●		Polygon
LE1.6	Open grassland		●	Polygon

Native Planting (LE2)

Ref	Dataset	Core Data	As-and-when	Mapped as:
LE2.1	Woodland	●		Polygon
LE2.2	Woodland edge	●		Polygon
LE2.3	High forest	●		Polygon
LE2.4	Linear belts of trees and shrubs	●		Polygon
LE2.5	Shrubs with intermittent trees	●		Polygon
LE2.6	Shrubs	●		Polygon
LE2.7	Scattered trees	●		Polygon
LE2.8	Scrub	●		Polygon

Ornamental Planting (LE3)

Ref	Dataset	Core Data	As-and-when	Mapped as:
LE3.1	Amenity tree and shrub planting	●		Polygon
LE3.2	Ornamental shrubs	●		Polygon
LE3.3	Groundcover	●		Polygon
LE3.4	Climbers and trailers	●		Polygon/ Polyline/Point

Hedges (LE4)

Ref	Dataset	Core Data	As-and-when	Mapped as:
LE4.1	Ornamental species hedges	●		Polyline
LE4.2	Native species hedges (trimmed)	●		Polyline
LE4.3	Native species hedgerows	●		Polyline
LE4.4	Native hedgerows with trees	●		Polyline

Trees (LE5)

Ref	Dataset	Core Data	As-and-when	Mapped as:
LE5.1	Individual trees	●		Point

Wetlands (LE6)

Ref	Dataset	Core Data	As-and-when	Mapped as:
LE6.1	Water bodies and associated plants	●		Polygon
LE6.2	Banks and ditches		●	Polyline
LE6.3	Reed beds	●		Polygon
LE6.4	Marsh and Wet Grassland	●		Polygon

Hard Landscape (LE7)

Ref	Dataset	Core Data	As-and-when	Mapped as:
LE7	Hard landscape features		●	Polygon/ Polyline/Point

Environmental Elements

Noise (E1)

Ref	Dataset	Core Data	As-and-when	Mapped as:
E1.1	Noise-reducing surface		●	Polyline
E1.2	Noise barrier-built elements		●	Polyline
E1.3	Noise-reducing earthworks		●	Polyline

Water (E2)

Ref	Dataset	Core Data	As-and-when	Mapped as:
E2.1	Water pollution control measures		●	Point
E2.2	Surface water outfalls	●	●	Point
E2.3	Soakaways		●	Point

Nature Conservation and Biodiversity (E3)

Ref	Dataset	Core Data	As-and-when	Mapped as:
E3.1	Protected species	●		Point
E3.2	Ecological protection measures	●		Point/Polyline

Pests and Injurious Weeds (E4)

Ref	Dataset	Core Data	As-and-when	Mapped as:
E4.1	Injurious weeds	●	●	Polygon
E4.2	Legislated pests		●	Point

Planning and Policy Elements

Nature Conservation Designations (P1)

Ref	Dataset	Core Data	As-and-when	Mapped as:
P1.1	Statutory Nature Conservation Designation	●		Polyline/Point
P1.2	Local Nature Conservation Designation	●		Polyline/Point

Landscape Designation (P2)

Ref	Dataset	Core Data	As-and-when	Mapped as:
P2.1	Statutory Landscape Designation	●		Polyline/Point
P2.2	Local Landscape Designation		●	Polyline/Point

Cultural Heritage (P3)

Ref	Dataset	Core Data	As-and-when	Mapped as:
P3.1	Cultural Heritage Feature	●		Point
P3.2	Conservation Area	●		Point

Land Use (P4)

Ref	Dataset	Core Data	As-and-when	Mapped as:
P4.1	Agricultural land (ALC 1 and 2)		●	Point
P4.2	Land Management Agreements (ESA)		●	Point
P4.3	Public open spaces		●	Point
P4.4	Public rights of way	●	●	Line if Core/ Point

Third Party (P5)

Ref	Dataset	Core Data	As-and-when	Mapped as:
P5.1	Sensitive location/complaint/third party claims		●	Point

Water Quality (P6)

Ref	Dataset	Core Data	As-and-when	Mapped as:
P6.1	Watercourse of Class 1/2 Quality	●		Point
P6.2	Areas of Groundwater Sensitivity	●		Point
P6.3	Other Watercourses		●	Point

Off-Site Planting (P7)

Ref	Dataset	Core Data	As-and-when	Mapped as:
P7.1	Off-Site Planting		●	Point

4.3.1   Additional Codes – may be added when required by the Managing Agent or Scheme Designer selecting the next sequential number within the Element group (or letter if any additional Function is added) eg:

- LE3.5   - Annual Bedding (by others)
- LE7.1   - Raised Planter
- LE7.2   - Wrought-Iron Tree Guard 1.8m high
- P5.2   - School
- P5.3   - Bus Shelter
- P7.1   - Off-Site Planting
- EFK   - Accessibility to Public Transport

These types of coding may only be used for 'as and when' Data, sets and if the Managing Agent elects to add them, the features must be omitted from the Output Report to the HA.

4.3.2   Codes Subdivision – existing codes for either Core or 'as-and-when' elements may be subdivided, to suit MA's Management Plan, or to describe the features in more detail. This is effected by adding a digit (but not a decimal point) to the Core code, in sequence; eg:

- LE1.1 Amenity Grass ———————▶ LE1.11   High 14 cuts
  LE1.12   Medium 7 cuts
  LE1.13   Low 4 cuts

- LE5.1 Individual Trees ———————▶ LE5.11   on-site
  LE5.12   off-site

- P3.1 Cultural Heritage ———————▶ P3.11   National Monument
  P3.12   Listed Building
  P3.13   SMR
  P3.14   Trad. Mileposts

The principle is that, for the Core Database and report output to HA, only the first two digits (ie 1.1, 5.1, 3.1 in examples above) are read. All data recorded in subdivisions is however considered 'Core Data' for the purposes of collection, updating, and being given a Unique Feature Reference.

4.4   The protocols for element codes, additional codes, and subdivision is particularly relevant when preparing design/contract requirements for improvements.

It may also be usefully used by the Agent/Designer along with Notes or linked files to describe in more detail the Elements or their requirements, within the Database, the various types of Nature Conservation elements, giving the ability to record different grassland habitats, or protected species by name. The extent of usage for this purpose will be guided by the Biodiversity Action Plan, and Scheme Requirements.

5.1   This chapter sets out the protocols for the format and input of the mandatory data into the Database.

5.2   The number, and order of the columns within the database are mandatory, in order to achieve national consistency, and to enable individual databases between areas to be linked in future.

MAs may add additional columns to suit their own purposes, and these should follow sequentially on beyond the 'Path' column, to enable the Mandatory Datasets to be kept and output as a discrete file.

The Network Reference column is included either for MAs to use if they wish for recording chainage, grid reference etc or for the Highways Agency's use in the future. It need not be populated and must be deleted from the Output Report to the HA if used.

5.3   The data should be entered using the protocols shown on the following tabular example. Commas are not favoured, to avoid complications in outputting the report to HA as a comma delineated text file. However, if they are used they must be enclosed in double quotes.

5.4   MAs need to identify the column for the Unique Feature Reference in their Output Report and keep it the same for each of the MID/MIF file pairs.

5.5   Blank characters may be used where populating a field that is not mandatory.

5.6   The comma separated text file must for the Output Report have a file name with a file extension of .txt or .csv.

HA ENVIRONMENTAL DATABASE - DATASET PROTOCOLS (EXAMPLE)
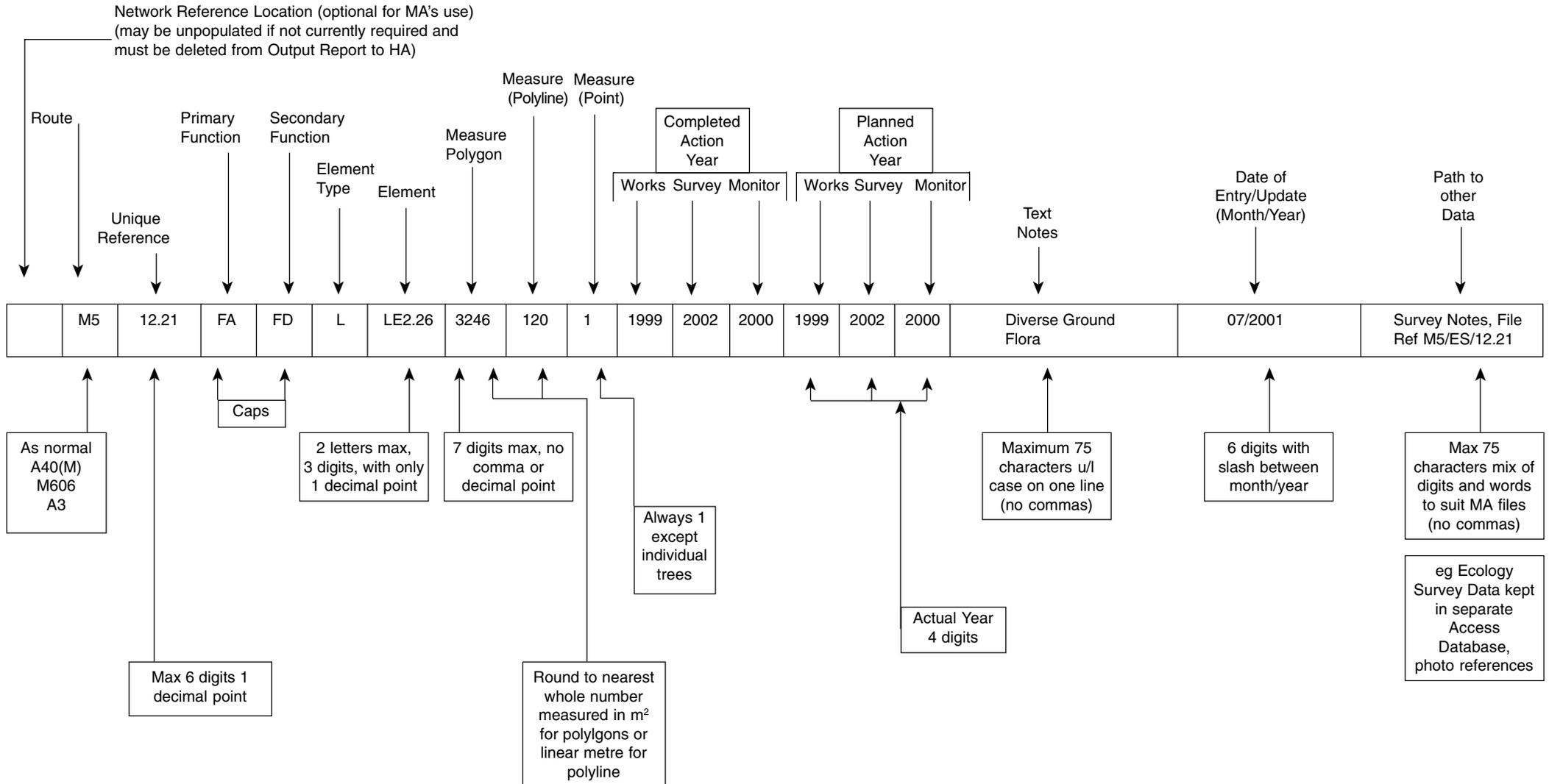
6.1   The Database system does not prescribe the software programme to be used to set up the mapping, or record the spatial information on the OS bases and plans.

It must however, be capable of linkages geographically to the National Grid, and be output to the Highways Agency in the format described in Chapter 7 following, retaining the linkage to the database files.

6.2   The choice of polygon, polyline, or point feature is predetermined for many Elements, as listed in the Table in Chapter 4.

For Planning/Policy Elements, the only core requirement is that, where Core Statutory Designations in P1.1 and P2.1 abut the highway boundary, these Elements are mapped and recorded as a Polyline and measured as such. This enables the Highways Agency to measure the lengths of route adjacent to such elements.

For all 'P' Series Elements area measurement is not required, other than to establish the total number per type/route. Therefore Points shall be used, or Polyline measures for those mentioned above. (This does not stop MAs representing the features as an area, should they so wish, so long as the polygons are not closed.)

For "as-and-when" data, the choice of graphical mapping is left to the Designer/MA, as measurement is not required. Points shall be used in the database. This enables the MA to show the geographical extent of the feature for his own purposes, without the requirement to show extent visually in the annual. Output Report to the HA.

6.3   It is for the MA to select a choice of colour/hatching/symbols etc to suit their own system and their proposed usage of the mapped data. The only mandatory requirements are that:

- Lines should be solid
- Unique Feature Reference Number shown
- Title Block shows Area No. and Route Name
- Poylgons should be closed
- Sample agreed with HA.

6.4   The choice of geometry type for any sub-division of codes must be the same as the parent.

6.5   Any graphics added to the mapped data such as labels, hatching not linked to a feature must be omitted from the Output Report sent to the HA.

6.6   MAs should be aware of the limitations of mapping scale when selecting geomtry type for features.

6.7   MAs should seek guidance from the HA before populating the completed Action Year fields.

6.8   For the Action Year Fields, the year that is entered is the **end** of that financial year, eg for Works Planned in FY 2002/2003 the year entered in the field is 2003.

7.1   The Database is prepared, updated, and managed by Managing Agents (MAs) on the Highways Agency's behalf, as part of their duties.

The Highways Agency will set up and operate a system enabling it to receive the data, and incorporate it into its central GIS. This requires that MAs set up their database in a format that can be transferred.

The following paragraphs set out the agreed data interchange format, which is a mandatory part of the Environmental Database system.

7.2   The Highways Agency will receive the Database from each MA annually, as a report in electronic format. This annual issue to the Highways Agency will incorporate the MA's update from the previous year and comprise a complete set of both spatial and text information.

The Highways Agency's system will check and validate the reports, and identify non-conformities and errors. Where this occurs, the report will be returned to the MA for correction.

MA should check with the HA the specific procedures for this validation prior to issuing reports.

7.3 SPATIAL INFORMATION

This data comprises the mapped environmental features on OS bases, each of which are uniquely referenced and linked to the database text files.

The spatial data will be supplied to the Highways Agency by MAs using the Map Info Interchange Format (MIF). The MIF file must be in the British National Grid (BNG) Co-ordinate System. For the BNG parameters MA should check with the HA.

MIF contains a pair of files with extensions **.mif** and **.mid**. Each **.mid** field will contain at least the unique identification reference field which will also be one of the fields in the comma-separated text file.

7.4 TEXTUAL INFORMATION

This comprises the information held within the core datasets of the Management Agent's Environmental Database, as described in Chapter 5.

This data will be output as a comma-separated text file following the protocols explained in Chapter 5, with the unique identification reference field providing the link with the spatial information. This linkage must be retained during the transfer process. Commas within the database are not favoured.

7.5   MAs shall provide one hard copy of the updated Environmental Database (mapping and text) to the Highways Agency annually as well as the electronic version.

8.1   The Database is intended to provide a tool for the MAs to prepare their Management Plan, maintain the network, and assess/design improvements. It also provides an inventory and valuable statistical data for HA.

The MAs are required to update the information held within the Database annually, with the annual cycle running from 1st April each year.

8.3   The annually-updated Database is output to the Highways Agency as a report.

MAs shall save and retain the Database files for the previous year(s) in electronic format prior to the update.

Once the previous year's data has been saved for record purposes, MAs may update the Database as-and-when appropriate during the year, to suit their operations. A column within the core database provides for dating the last update/input for each feature.

The completed update will only be transferred to the Highways Agency once per year, in March.

8.4   The unique identification reference for features within the Database may not be changed during the update process.

New features may be added using consecutive unique references. If a feature is deleted, then the unique reference code may be reused.

8.5   The updating does not imply a re-survey of the network. Its purpose is to enable input of any new features identified, works undertaken, or changes to the network. It will also incorporate the review of proposed Actions the data for which is derived from the MA's Management Plan, which is also updated annually.

9.1   The Database system provides for the ability for linkage and cross-reference to additional data sources and records, which by their nature cannot or need not be held within the core database.

9.2   The linkage/cross-reference is achieved via the "Path" column within the core dataset for each feature.

The reference may refer to a wide range of other data sources, such as plans, photographs, survey notes, factual reports, library references, publications, etc.

9.3   Where these additional data sources are compiled, held or updated by MAs they should be cross-referenced to the Database by utilising the Unique Feature Reference coding.

9.4   Data sources held by the MA shall be stored in a manner suitable for handover to the Highways Agency or succeeding MA at the end of the commission, or when requested by HA, with an indexed directory.

10.1   The handover requirements relate not only to the existing network, but also to completed improvement schemes, whether local network improvements, or major National Programme Schemes.

10.2   The format for transferring the Database information is the same as that described in Chapter 7 and 9 above ie electronic format plus one hard copy, plus any additional data records.

10.3   Individual contracts will specify the exact requirements, and any network referencing systems to be incorporated.

10.4   Upon receipt of the handover information, MAs shall incorporate it into their Environmental Database.

11.1   When included in their contract with the HA, MAs are required to undertake the necessary survey work and prepare 5-year Management Plans for the soft estate. These plans are updated annually to provide the basis for the Work Programme and budget forecasts.

11.2   MAs will develop methodologies for their Management Plans that suit their own operational systems and requirements, subject to complying with any specific HA briefs. They must also be available for technical audit and monitoring.

11.3   There is clearly a significant interface between the Database and Management Plan, both in terms of work required, data usage, and the updating process. MA may elect to combine the two documents into an integrated system. If so, MAs need to be able to separate the Management Plan information, in order to output the core datasets to the Highways Agency in the mandatory format.

11.4   As both the Database and Management Plan are required to be updated annually, the Management Plan should contain a facility for recording in an auditable manner, the Outturn Performance against the proposed Work/Survey/Monitor items identified, ie a system for recording which programmed items were completed in each financial year.

12. ENQUIRIES

All technical enquiries or comments on this Advice Note should be sent in writing as appropriate to:

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