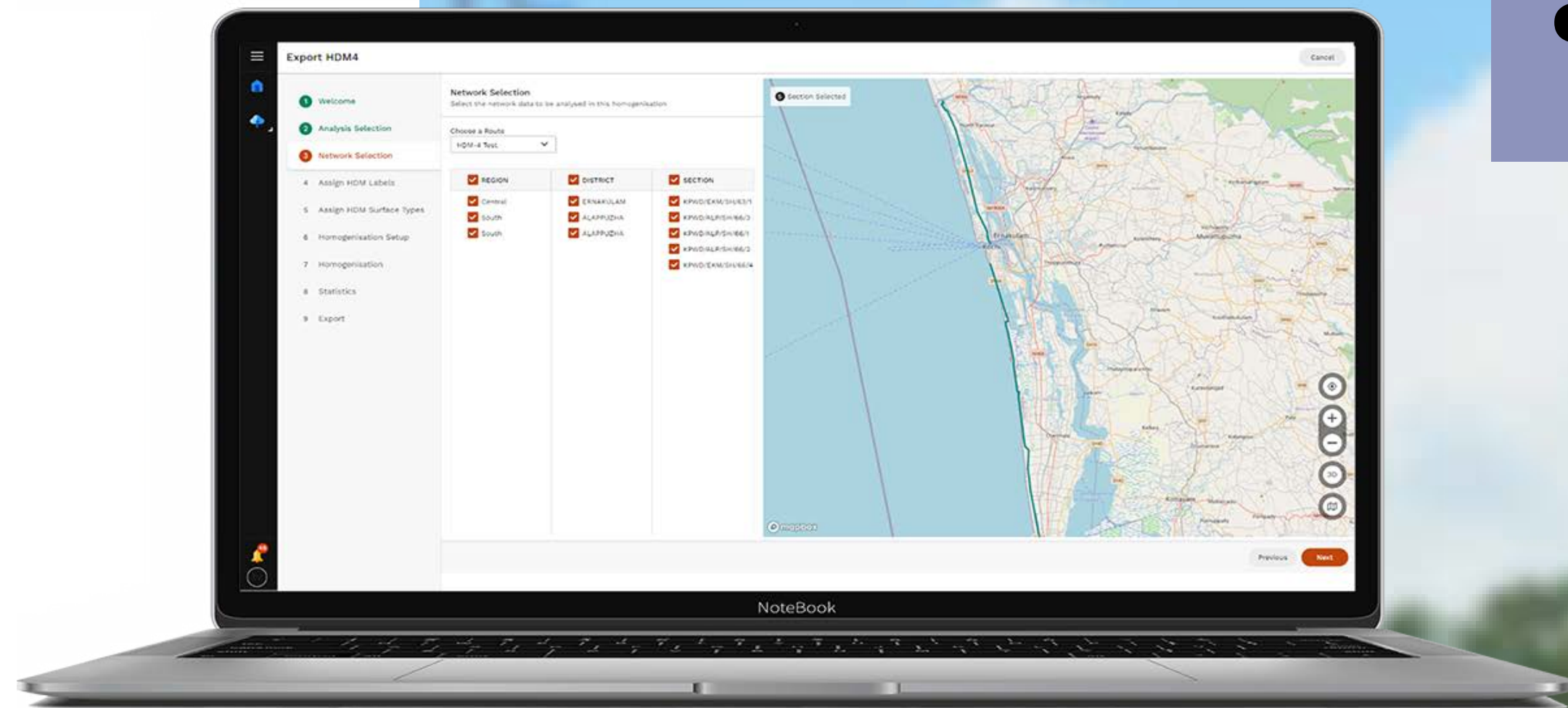




About HDM-4 V.2 and HDM-Sentry



HDM-4 Version 2 - New and Improved Features

Analysis modelling

Sensitivity analysis to support forecasting

Investigate the impact on analysis results from variations in 18 key parameters such as unit costs, vehicle use, traffic levels and growth, and net benefits.

Unlimited budget scenario comparison

Each budget scenario defines the financial resources available for a given analysis period. HDM-4 V2 now generates an optimised work programme for each budget scenario to support comparison of the effects of different funding levels on the network being analysed.

Estimation of social benefits

The simple framework for including social benefits is now more transparent, by incorporating them within the exogenous costs and benefits user interface.

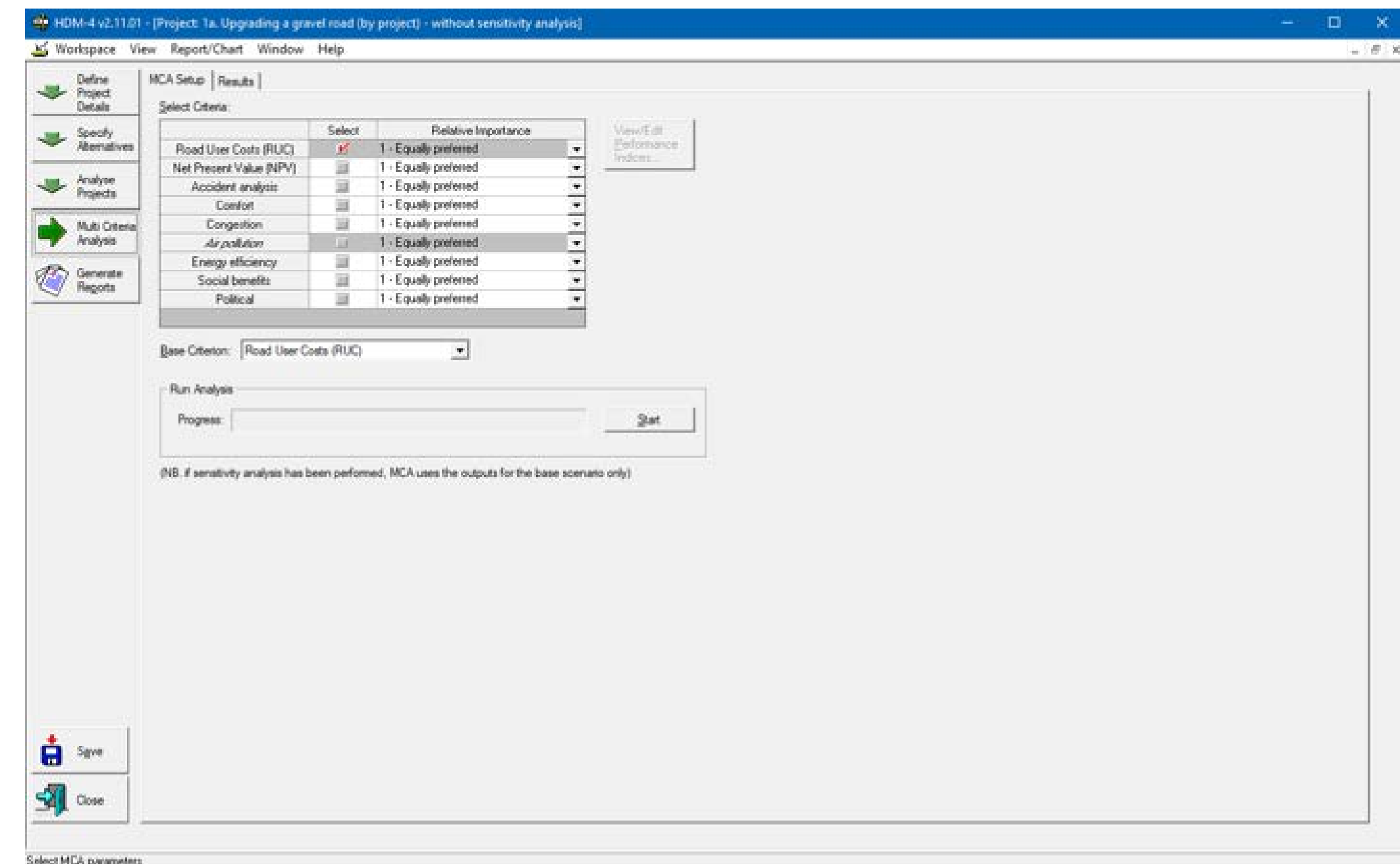
Asset valuation

A new (optional) component to estimate the financial and economic value of road assets as a function of the level of investment.

Multi-criteria analysis (MCA)

A new method of comparing projects using criteria that cannot easily be assigned an economic cost:

- Economic (RAC , RUC, and NPV)
- Safety (Accident analysis)
- Functional (Comfort and Delay)
- Environment (Air Pollution)
- Energy (Energy efficiency)
- Social (Social Benefits)
- Political



HDM-4 Version 2 - New and Improved Features

Data handling and organisation

Updated database technology

HDM-4 uses an object-orientated database to store its local data. HDM-4 version 2.0 has been updated to use the latest version of this database to ensure the latest developments and enhancements are available, as well as continued support and backup from the suppliers is accessible.

Redesign of new section facilities

The definition of new sections has been moved to the work standards folder in the workspace. These new sections are now assigned to alternatives using the new alternatives user-interface. This approach allows new sections to be reused across studies and alternatives.

Report template storage management

New features within the reports tree-view:

- add report categories, or sub-categories
- rename or move reports between categories
- store reports in multiple directories, e.g. separate folders for HDM-4 default reports and 3rd party report templates

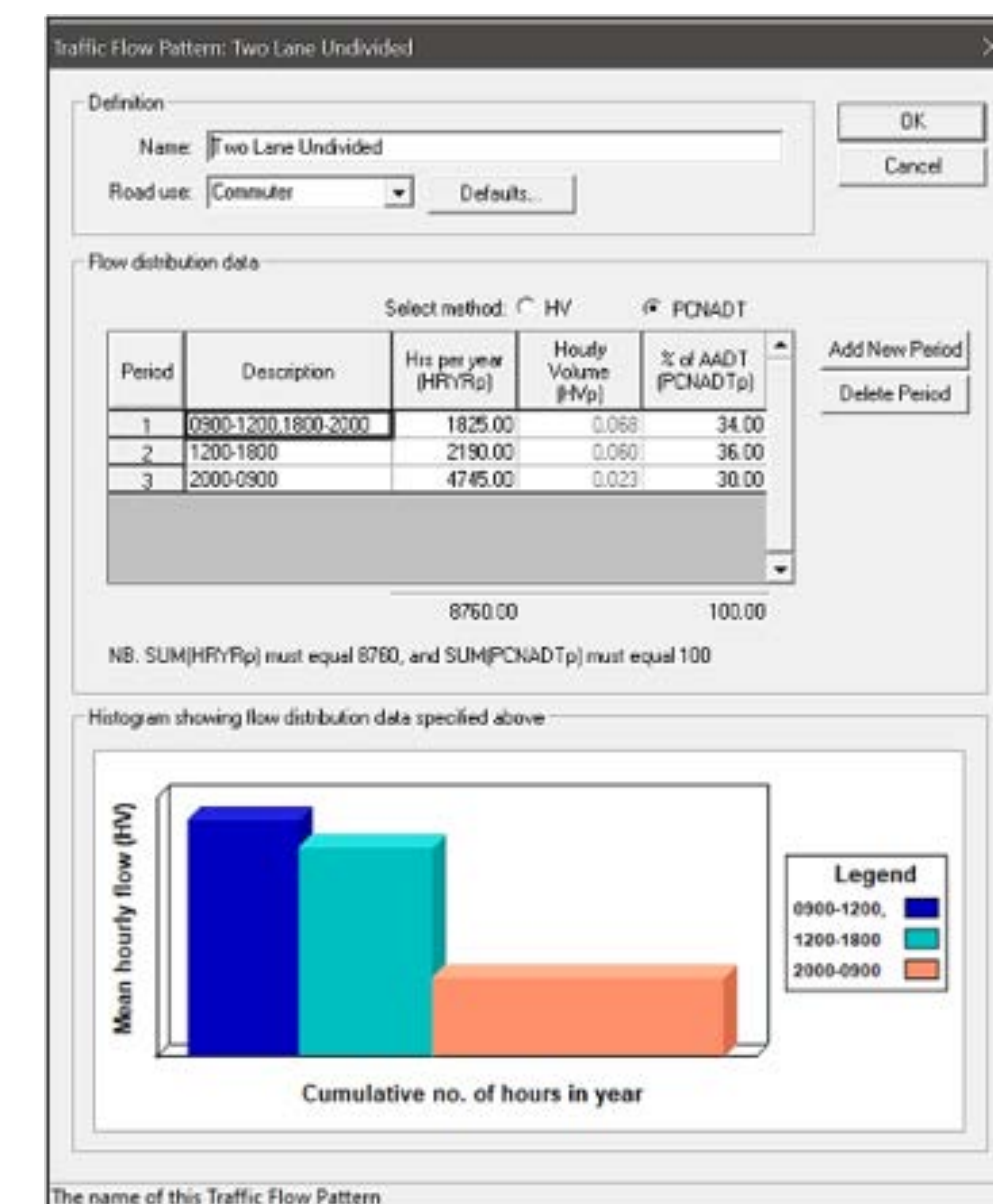
Traffic related data redesign linking networks and vehicle fleets

The management and entry of traffic related data in HDM-4 has undergone a number of changes that effect road networks, sections, vehicle fleets and the three modes of analysis.

The traffic data for a section is now defined for each section within the road network. To enable this to take place a road network is associated with a vehicle fleet. A user can enter multiple years of traffic data which is now defined in terms of absolute vehicle AADTs value.

A traffic growth set defines how the traffic grows over time and is defined within the vehicle fleet and assigned to a section within an analysis. The user interface for traffic growth sets is similar to that used in version 1.x for the definition of normal traffic. As growths sets may be used to define the traffic growth characteristics of multiple studies, the periods are defined as relative years rather than absolute years.

These improvements allow traffic data for a section to be common in each analysis in which the section is included, and for the typical traffic growths to be reused in each analysis. When creating a new analysis a user now only selects the road network to be used, as the vehicle fleet is associated with it. The user then selects the sections to be included in the study and assigns traffic growth sets to each section, using the growth sets defined in the road network's associated vehicle fleet.



HDM-4 Version 2 - New and Improved Features

Technical modes

Bituminous road deterioration and work effects

Updated specifications for the bituminous RD & WE models in HDM-4 V2 are now embedded in improvements to the pothole progression model, updated plastic deformation coefficients, updated standard deviation of rut depth model, improved user-calibration or the RD models, and updated WE models for patching and preparatory work effects.

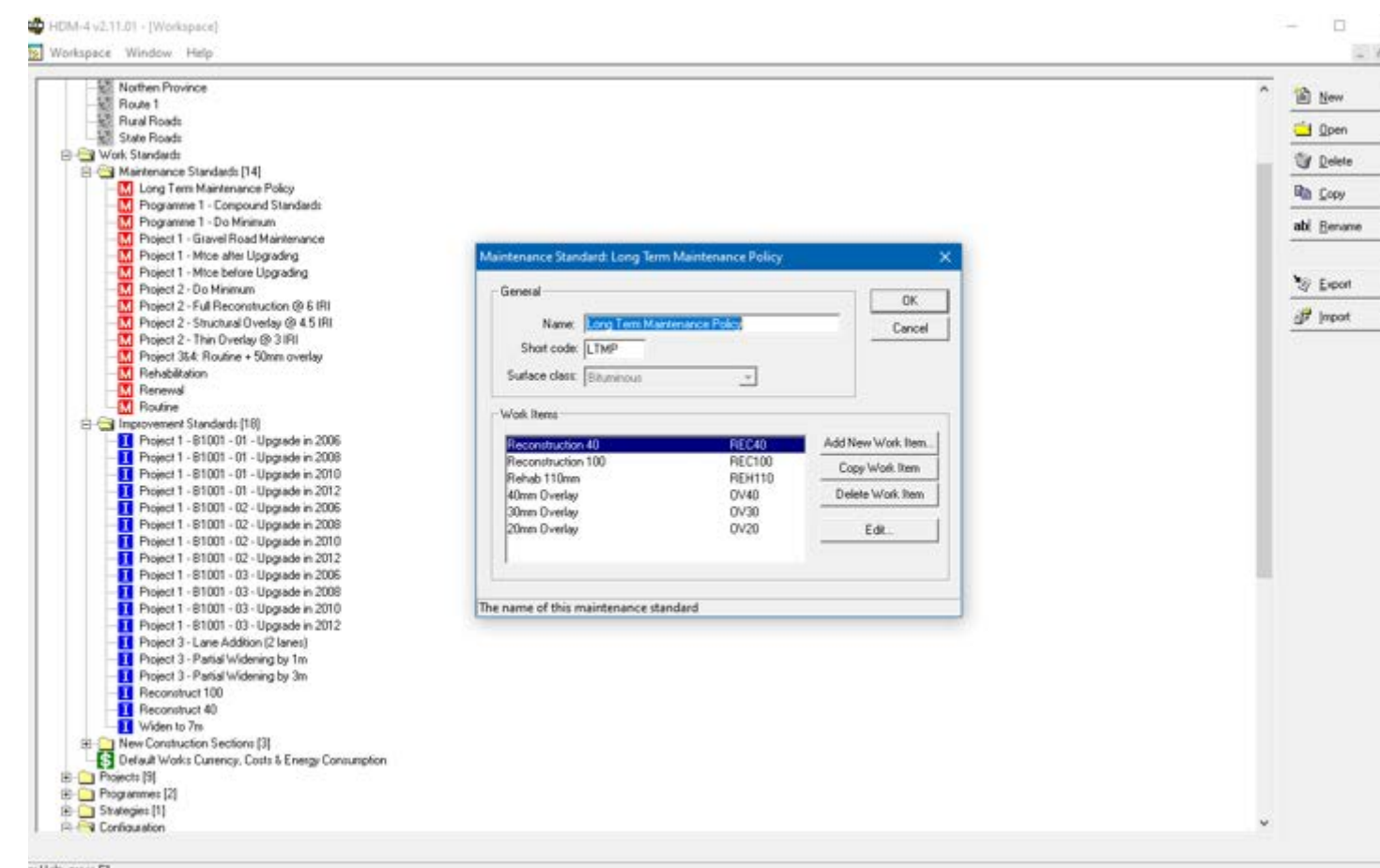
Unsealed road deterioration and work effects

Updated specifications have been applied to the unsealed RD & WE models. The most significant change is the introduction of three different grading types (non-mechanical, light mechanical grading, and heavy mechanical grading), and improved calibration of the unsealed roughness model using section calibration factors and workspace configuration parameters.

Road user effects

The Road User Effects (RUE) model in HDM-4 V2 has been updated in accordance with the specification provided by PIARC. The changes include:

- Updated engine speed model
 - Updated parts modelling to use dFUELavg rather than dFUEL
 - Constant Service Life model has been changed so it no longer depends upon the percentage of private use
- Major update to the modelling of vehicle emissions



Connectivity

Run-data in Microsoft Access format

Data is now easier to share with other users via widely available software products such as Microsoft Access, and Microsoft Excel.

Users without an HDM-4 licence can also view the run-data via a free tool: HDM-4 Version 2.0 Report Viewer.

Import/export in Microsoft Access format

The import/export data produced by HDM-4 V2 is now stored in a single file in Microsoft Access format instead of the multiple *.dbf/*.hdbf files of HDM-4 Ve1.

Import validation

A new import wizard guides users through the process of importing externally-defined data into HDM-4 V2.

Additionally, V2 provides optional validation of vehicle fleet and road network data, as the data is being imported, checking that data is within permissible ranges for analysis.

HDM-4 Version 2 - New and Improved Features

Usability and configuration

New intervention editor for the triggering logic of work items

- No need to select scheduled or responsive intervention
- Schedule work to occur in specific years
- Predefined limit parameters are now optional
- Combine AND /OR logic operators in triggers
- Any trigger attribute can be used with any work type

Calibration sets simplify defining a section

New: custom define sets of section calibration coefficients (a calibration item) for the pavement types commonly found on their road network. Sections which have the same characteristics can all use the same calibration. Calibration sets are stored under the Configuration folder in the workspace view. When a new road network is created a calibration set for that network is selected, and all sections within the network must be assigned a calibration item defined in that calibration set.

The model DLL architecture

The model architecture has been updated to improve maintainability, flexibility, and to allow future customisation, although these changes will not be visible to the user.

Post-improvement maintenance standards

New functionality via the new alternatives user-interface: option to assign a maintenance standard to be applied after a road improvement standard has been applied.

Temporary exclusion of sections from study

When setting up a project analysis it is now possible to select a section for the study, assign the traffic growth set and define its alternatives, but then exclude it from analysis without loss of data (traffic, alternatives, etc.). This makes it possible to define and refine the assignments of one section at a time without the overhead of analyzing all the other sections each time.

Improvement standard effects

After-work attributes for some improvement effects can now be defined either in terms of the change in attribute value or in terms of the final value of the attribute (i.e. either in relative or absolute terms). This is intended to make improvement standards less section specific, so that they can be applied to a group of sections.

Improved configuration

Accident Classes - A new data type allows modelling of accident effects separately from speed flow types.

Speed Flow Types - An explanatory graph has been added to the user interface to explain the relationship between the capacity characteristic parameters. Also, the Number of Lanes (NLANES) parameter has been moved to the Speed Flow Type item from the road section.

Traffic Flow Patterns - An interactive graph is now shown on this dialog to reflect the flow distribution data entered by the user.

Alternative user-interface

The user interface for the definition of analysis alternatives has been redesigned to reduce the number of dialogs, layers and buttons involved, to improve navigation through the alternatives in an easy style, and to give improved view to the user. The new user interface uses a view similar to the Windows Explorer directory navigation tree, and uses a context sensitive spreadsheet-type view that facilitates the assignment of maintenance and improvement standards from one dialog.

HDM-Sentry

Visualisation and familiarisation module

Designed for engineers with little or no HDM-4 experience, network management decision makers, and educators, HDM-Sentry is a helpful user interface to:

- do easy, fast indicative analysis, comparing the economic and engineering benefits of different maintenance and improvement investment options for road sections
- perform analysis without the need for accurate data requirements by using high-level text descriptors for many of the core inputs (which are automatically converted into detailed data used for the analysis by the HDM-4 framework)
- familiarise users with the analysis process and data types, providing a stepping-stone to full HDM-4 use
- demonstrate the principles behind economic evaluation models for road investments

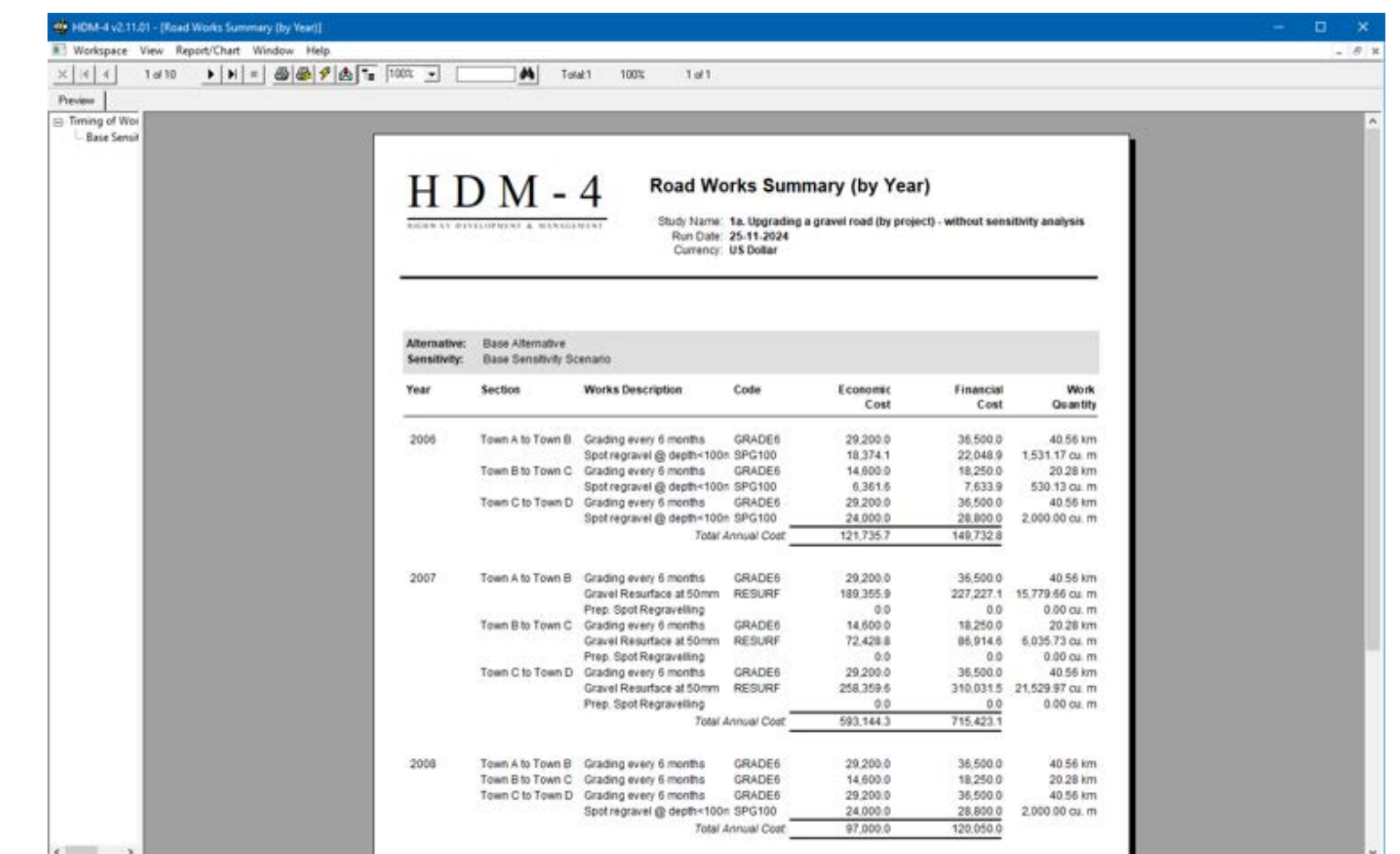
Links to HDM-4

“Sentry” derives from “simplified entry” of data into the HDM-4 framework, where the data analysis is performed. HDM-Sentry aggregates the results and presents them in basic reports. In this way the complex detail is hidden from a non-technical user, but the principles and analytical framework of HDM-4 are used.

Any data entered and prepared in HDM-Sentry can be stored for viewing and editing, or opened in the full version of HDM-4 where a user can then take advantage of the full flexibility of HDM-4. This makes HDM-Sentry a helpful teaching aid to prepare users for the full HDM-4 software.

How it works

- Four simple data entry screens guide the user through the setup and customisation process to select language, currency and datasets
- Sentry then automatically creates a HDM-4 workspace based on these options.
- Sentry prompts HDM-4 to run its analysis in the background
- Sentry presents the key results in an easy to understand high-level report format



The screenshot shows a software window titled "HDM-4 v2.11.01 - Road Works Summary (by Year)". The report is titled "HDM-4 Road Works Summary (by Year)" and includes the following details:

- Study Name: Upgrading a gravel road (by project) - without sensitivity analysis
- Run Date: 25-11-2004
- Currency: US Dollar

The report is organized by year and section, with columns for Economic Cost, Financial Cost, and Work Quantity. The data is as follows:

Year	Section	Works Description	Code	Economic Cost	Financial Cost	Work Quantity	
2006	Town A to Town B	Grading every 6 months	GRADE6	29,200.0	36,500.0	40.56 km	
		Spot regravell @ depth=100m SPG100		18,374.1	22,048.9	1,531.17 cu. m	
	Town B to Town C	Grading every 6 months	GRADE6	14,600.0	18,250.0	20.28 km	
		Spot regravell @ depth=100m SPG100		6,381.6	7,833.9	530.13 cu. m	
	Town C to Town D	Grading every 6 months	GRADE6	29,200.0	36,500.0	40.56 km	
		Spot regravell @ depth=100m SPG100		24,000.0	28,800.0	2,000.00 cu. m	
	Total Annual Cost				121,735.7	148,732.8	
	2007	Town A to Town B	Grading every 6 months	GRADE6	29,200.0	36,500.0	40.56 km
			Gravel Resurface at 50mm REBSURF		189,355.9	227,227.1	15,779.66 cu. m
		Town B to Town C	Prep. Spot Regraveling		0.0	0.0	0.00 cu. m
Grading every 6 months			GRADE6	14,600.0	18,250.0	20.28 km	
Town C to Town D		Gravel Resurface at 50mm REBSURF		72,428.8	89,914.6	6,020.73 cu. m	
		Prep. Spot Regraveling		0.0	0.0	0.00 cu. m	
Town C to Town D		Grading every 6 months	GRADE6	29,200.0	36,500.0	40.56 km	
		Gravel Resurface at 50mm REBSURF		258,359.6	310,631.5	21,529.87 cu. m	
Prep. Spot Regraveling				0.0	0.0	0.00 cu. m	
Total Annual Cost				593,144.3	715,423.1		
2008	Town A to Town B	Grading every 6 months	GRADE6	29,200.0	36,500.0	40.56 km	
		Grading every 6 months	GRADE6	14,600.0	18,250.0	20.28 km	
	Town C to Town D	Grading every 6 months	GRADE6	29,200.0	36,500.0	40.56 km	
		Spot regravell @ depth=100m SPG100		24,000.0	28,800.0	2,000.00 cu. m	
Total Annual Cost				87,000.0	120,050.0		

HDM-Sentry is an add-on module to a training, full, or SCC licence for HDM-4 Version 2.



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