

Report

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## **Guidelines for Project Documentation for Gautrans Technology Development Projects**

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Authors:

FJ Jooste  
LR Sampson

PREPARED BY:

Modelling and Analysis Systems CC.  
PO Box 634, La Montagne, 0184  
(www.modsys1.com)

and

Sampson Consulting CC.  
Postnet Suite 285, Private Bag X4  
Menlo Park, 0102

on behalf of

CSIR Built Environment  
PO Box 395, Pretoria, 0001

PREPARED FOR:

**Department of Transport  
and Public Works: Gauteng  
Directorate: Design  
Private Bag X3  
Lynn East, 0039**



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# 1 INTRODUCTION

This document provides guidelines for the compilation of project information relating to the Gautrans Technology Development projects. Specifically, the guidelines explain the different types of documentation required to systematically record and disseminate project findings, and explain the structure and basic requirements for the different types of documentation.

Reviewers and practitioners who have a need to use or implement the findings of technology development studies have limited time, and are generally interested in accessing only the most vital information elements in the minimum amount of time. In the past, however, many technology development projects have generated large volumes of documentation, much of which is difficult to assimilate and therefore is seldom read. These guidelines are primarily aimed at addressing this situation by reducing the amount of unneeded documentation while at the same time improving the quality of essential documentation. Another goal of the guidelines is to ensure that information is made available "as needed", and to minimize resources spent on documentation that is unlikely to be accessed on a frequent basis.

The specific objectives of these guidelines are therefore as follows: (i) to ensure that optimal transfer of technology or information can be effected through project documentation; and (ii) to ensure that data and documentation related to projects are structured in a manner that facilitates easy access to information when needed. A further objective of these guidelines is to minimize unnecessary documentation and costly printing of lower levels of information that is unlikely to be of interest to reviewers and practitioners.

It should be noted that, in order to address these objectives in a modern and cost-effective manner, the guidelines implement a significant deviation from the conventional methods of documentation for technology development projects. However, it is believed that these guidelines take full advantage of the current revolution in information technology, specifically to make the best possible use of the ability to store and communicate information electronically.

The scope of these guidelines is limited to project reports and supporting data and does not include guidelines, specifications of method documentation (e.g. TRH, TMH or TG documentation). The guidelines also do not address the detailed formatting of documents (e.g. font used, line spacing, etc). Service providers are allowed to use the formatting templates that are used within their organization, provided the format is consistent, neat and acceptable to Gautrans.

## 2 HIERARCHY OF DOCUMENTATION

The documentation of data, observed trends and recommendations stemming from technology development work has three objectives. These are:

- I. To provide an effective record of noted trends, conclusions and recommendations which can be used to effect technology transfer.
- II. To rigorously document methodologies and assumptions adopted for testing and data analysis, in order to clarify aspects of the approach and subsequent conclusions.
- III. To provide access to raw and processed data collected or generated during the course of the project execution.

The structure of the project documentation, as noted in these guidelines, was designed to serve the above noted three objectives. These objectives thus provide the basis for a *hierarchy of documentation*, which is summarized in Table 1. Each level of the hierarchy serves a different objective, and the structure of the documentation required at each level is designed accordingly. The three main levels of documentation are outlined below, and are discussed in detail in further sections of these guidelines.

### **Project Summary Reports**

This report is the most important mechanism for summarizing the project findings and – apart from direct verbal presentation of data – should be regarded as the primary mechanism to effect transfer of findings and developments to the intended readers. As such the project summary report should be a highly finished, highly presentable document that should be easy to read and understand. The document should concisely summarize influential findings and high quality graphics should be used where possible to illustrate concepts and trends. A key aspect of the project summary report is the provision of a table to explain the structure of supporting documentation generated during project execution. This information or data should accompany the project summary report in electronic format (compact disk). The structure and requirements of the project summary report is discussed in more detail in Section 3.

### **Technical Memoranda**

A technical memorandum is essentially a technical report that summarizes any pertinent methods, assumptions, boundary conditions, test conditions, etc. The technical memorandum also provides an intermediary level of documentation between the raw data and the summary report, and can thus be used to display more general trends and data. The technical memorandum should be as elaborate and clear as is needed to ensure that other technology development workers or advanced practitioners can use or interpret the collected data in an appropriate manner. A technical memorandum does not need to have an extensive introductory section, and – compared to the project summary report - has less stringent requirements with regards to editing and formatting. The structure and requirements of the technical memorandum is discussed in more detail in Section 4.

**Table 1: Hierarchy of Documentation**

<b>Document Type</b>	<b>Primary Purpose</b>	<b>Read or Used By</b>	<b>Key Characteristics of the Document Type</b>
<b>Project Summary Report</b>	<b>To effect transfer of information to a wider audience.</b>	<ul style="list-style-type: none"> <li>Steering Committee Members;</li> <li>Peer reviewers;</li> <li>Practitioners;</li> <li>R&amp;D Workers;</li> </ul>	<ul style="list-style-type: none"> <li>Highly finished, highly presentable format;</li> <li>Concise presentation of most relevant trends and findings;</li> <li>Main body of the report limited to 25 pages;</li> <li>Provides a breakdown of related and supporting documentation;</li> <li>Provides the context and background for the project;</li> </ul>
<b>Technical Memorandum</b>	<b>To document and clarify analysis approaches, assumptions, shortcomings, details of test methods, measurement conditions, etc.</b>	<ul style="list-style-type: none"> <li>Technical reviewers;</li> <li>Advanced Practitioners;</li> <li>R&amp;D Workers;</li> </ul>	<ul style="list-style-type: none"> <li>Serves as a memorandum of methods, assumptions, test conditions, etc.;</li> <li>Does not require an elaborate introduction section;</li> <li>Mainly intended to discuss data and analysis methods;</li> <li>Presents most relevant processed data in graphical formats;</li> </ul>
<b>Supporting Data</b>	<b>To document raw data and make such data available for use by other technology development workers or advanced practitioners.</b>	<ul style="list-style-type: none"> <li>Advanced Practitioners;</li> <li>R&amp;D Workers;</li> </ul>	<ul style="list-style-type: none"> <li>Provides a graphical summary of all relevant raw or processed data;</li> <li>Provides a tabular summary of raw or processed data;</li> <li>Makes raw and processed data available in electronic format;</li> </ul>

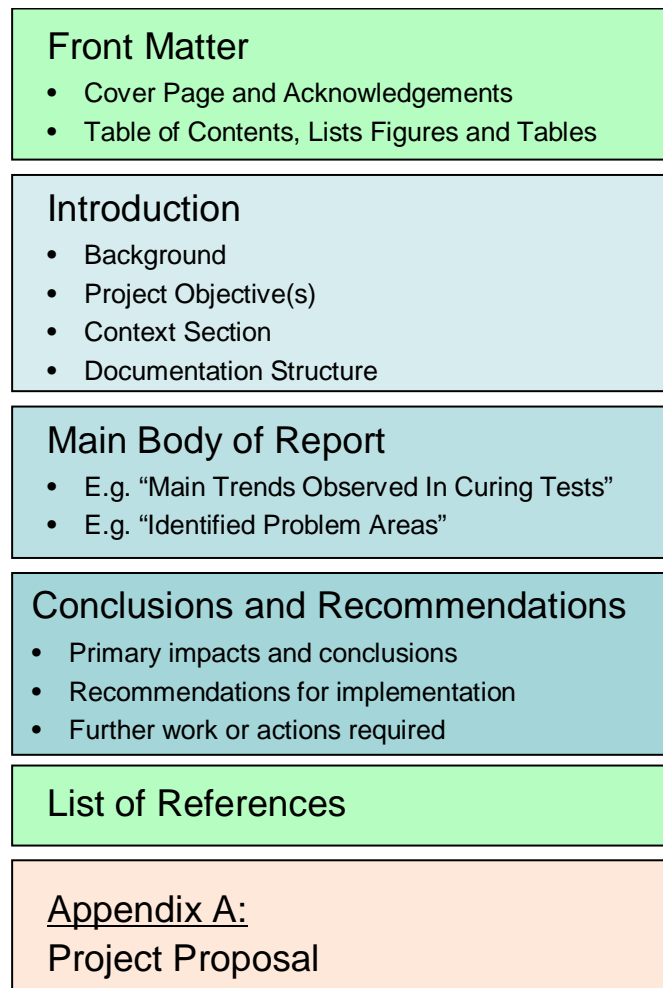
### **Supporting Data**

Supporting data should be provided mainly to allow access to the most important data elements. Where needed, supporting data files can also contain brief statements to explain how data was measured or collected. It is essential that the format of data (e.g. data contained in different columns, etc) be adequately explained. The structure and requirements of appendices and electronic data are discussed in more detail in Section 5.

## **3 THE PROJECT SUMMARY REPORT**

### **3.1 REPORT STRUCTURE AND GENERAL GUIDELINES**

The structure of the project summary report is shown in Figure 1. General guidelines with regards to the structuring and compilation of the project summary report are shown below. A more detailed discussion of some of the sections of the project summary report is provided in the following subsections.



**Figure 1: Structure of the Project Summary Report**

### General Guidelines for the Project Summary Report

- The Project Summary Report should have structure and content similar to that of an executive summary, except that the summary report should serve as a stand-alone document complete with references to supporting documentation. In this respect, the structure and content of the project summary report should closely resemble a paper intended for publication at a conference or in a journal.
- The overall length of the introduction, main report body, recommendations and references should not be more than 30 pages (preferably less than 20 pages), assuming a font size of 10 points or larger.
- Since the project summary report is likely to be read more widely than other document types, the document should be of a high standard, and detailed attention should be paid to aspects such as spelling, grammar and the quality and consistency of figures and tables. Detailed attention should be paid to language aspects such as spelling, grammar and readability.
- In writing the project summary report, keep in mind that the primary objective is to ensure effective transfer of findings or information that is most influential and important. Less important trends or findings can be discussed in the supporting documentation.
- To aid in effective transfer of ideas and concepts, figures should be used where possible. Since the project summary report is limited to 25 pages, the use of colour to improve clarity and understanding is encouraged. However, authors should ensure that any figures or tables that use colour should also be clear when printed in black-and-white or greyscale.

## 3.2 TITLE PAGE AND ACKNOWLEDGEMENTS

Guidelines for the title page layout and the acknowledgement sections are provided below. The title page of these guidelines provides an example of a typical title page for a summary project report.

**Guidelines for the Title Page and Acknowledgements**

- The title page should contain the following elements:
  - ◆ Title of the report;
  - ◆ Report number;
  - ◆ Report Data
  - ◆ Report Status (e.g. "Draft") and Version (if applicable);
  - ◆ Names of the Authors;
  - ◆ Gautrans logo and departmental details, plus the logo and details of co-funders (where applicable);
  - ◆ Details of the organization that compiled the report;
- Where needed, an acknowledgements section should be provided and should be placed on a separate page. The acknowledgements should acknowledge the contributions of any persons that impacted on the study. These would typically include:
  - ◆ The Gautrans officials charged with management of the project;
  - ◆ Persons who assisted in testing, data collection, etc ;
  - ◆ Persons who assisted in providing background information;
- Where applicable, a list of reviewers and co-sponsors should be provided. These lists can be placed on the same page as the acknowledgements section.

### 3.3 INTRODUCTORY SECTION

The introductory section should outline the context of the study within one or two pages, and should define the structure of supporting documentation and data. To outline the study context, three sections are generally needed. These are: (i) a background section, which sketches the background to the project; (ii) a section defining the project objectives; and (iii) a context section which describes the context of the study. The definition of the structure of supporting documentation or data is a vital element of the summary report, and is discussed in detail in Section 3.3. General guidelines for the introductory section are provided below:

#### **Guidelines for the Introductory Section**

- The background section should clarify earlier developments or situations that brought about the study under consideration. This section should also outline and define the *needs* that lead to the study. This information can typically be provided within four or five paragraphs (for larger projects it may be necessary to discuss the needs in a separate subsection).
- The background section should be written in a way that prompts the reader to anticipate the project objectives. The section dealing with project objectives should then define these objectives.
- If there are several project objectives, these should be itemized and discussed in separate sentences or paragraphs.
- The project objective section should also make reference to the project proposal, which should be included as Appendix A. If there are significant discrepancies between the objectives stated in the project proposal and those stated in the introductory section, then these discrepancies should be noted and clarified.
- For documents with an intricate structure an additional section can be provided to explain the structure of the summary report. This section should briefly introduce each section and – if needed – explain its relation to other sections or supporting information.
- The context section should define the context of the study. Specifically, it should state how the study fits into the strategic objectives of the development programme. The context section should also inform the reader of the following:
  - ◆ How the information in the report should or can be used;
  - ◆ How the study findings impacts on, or adds to, existing knowledge, and
  - ◆ Which existing documentation or guidelines are impacted by the study findings.

### 3.4 DOCUMENTATION STRUCTURE

It was noted earlier that a key difference between a summary report and the more traditional executive summary is that the summary report should contain detailed references to supporting documentation. It should be noted that – in the context of these guidelines – supporting documentation refers to documents or data that were developed or recorded as part of the study under consideration, *and that are not yet published or generally available*. Supporting documentation thus does not include previously published documentation that are referenced in the summary report and are included in the list of references.

To facilitate transparent and effective use of supporting information, the supporting information should be readily accessible. To ensure this, two aspects need to be addressed in the project summary report (i) the structure of supporting data should be clarified; and (ii) supporting data should be made available in electronic format on a compact disk which should be handed in with the project summary report.

Clarification of the structure of supporting data should be provided in the introductory section, and in the subsection titled "Documentation Structure". In this subsection, the structure of all supporting documentation or data should be clarified using a table format. The table should have one entry for each item of supporting documentation or data, and should have the following columns:

- **Code:** This column contains the code of the supporting documentation. The assigned code is intended for use within the project summary document, and should serve as a quick reference to locate supporting documentation.
- **Document Identification:** This column should contain the essential information to identify the supporting documentation. For supporting documentation (as opposed to supporting data), this should include the document title, authors (in brackets), document date and version.
- **Type:** This column contains a description of the document type. (e.g. "Technical Memorandum" or "ASCII Data File").
- **Outline of Contents:** This column should provide a brief outline of the contents, and should be aimed at facilitating fast location of supporting documentation when needed (e.g. to obtain a specific set of test measurements).
- **Filename and File Type on Disk:** This column should specify the name of the file, including the path (i.e. subfolders) where relevant. The file type should also be provided in brackets.

Detailed guidelines for the formulation of the documentation structure are shown below. An example of a documentation structure which illustrates the use of these guidelines is also shown below:

#### **Guidelines for the Documentation Structure**

- Key supporting documents should be listed first, roughly in order of date. Supporting documentation should be followed by supporting appendices (if these are separate documents) followed by supporting data files.
- The number and levels of supporting documents listed in the documentation structure is left to the discretion of the author. However, it is essential that all documentation or data that may be needed to further investigate or corroborate the findings of the summary report be included in the list of supporting documents.
- The information provided in the "Outline of Contents" column should be aimed at facilitating quick location of data or information by reviewers or by other research and development workers with an interest in the data.
- In the case of supporting data files, it is left to the discretion of the author to decide which files should be included. *Often, raw data files provide the most complete and basic source of information for other investigators.* Files used for further processing (e.g. to compile graphs, fit models or calculate statistics) may not be relevant.
- In the case of supporting data files, an explanation file should be included in the relevant directory on the compact disk to explain aspects such as file naming conventions, column names (if these are not explained within the files), etc.
- For future reference purposes, the label provided on the accompanying compact disk, as well as the name and e-mail address of the contact person that can clarify aspects related to the supporting documentation should be provided at the bottom of the documentation structure table.

**Example Documentation Structure**

Ref. Code	Identification	Type	Outline of Contents	Filename on Disk
SD1	Laboratory Testing on Material Used for the N7 Test Sections (F. Long and D Ventura); Version 1, 2005	Technical Memorandum	<ul style="list-style-type: none"> <li>• Properties of materials recovered from the N7 test sections;</li> <li>• Laboratory test programme details, including test types and conditions</li> <li>• Discussion of test results and key trends;</li> <li>• Graphs summarizing all test data are documented in appendices;</li> <li>• Raw data is provided in SD3</li> </ul>	\\Lab\N7Testing.doc (Adobe Acrobat)
SD2	HVS Experiment on N7 : Level 1 Data Analysis (F. Long and H Theyse); Version 2, 2004	Technical Memorandum	<ul style="list-style-type: none"> <li>• Section location, pavement structure and resilient properties before testing;</li> <li>• HVS test programme, load levels used, etc.;</li> <li>• Summary and discussion of MDD data, RSD data and stiffness trends;</li> <li>• Graphs detailing all sensor measurements are shown in Appendices;</li> <li>• Raw data is provided in SD4;</li> </ul>	\\HVS\N7Level1.doc (Adobe Acrobat)
SD3	<u>Files:</u> ITS.xls UCS.xls Atterberg.xls Info.doc	Raw Data	<ul style="list-style-type: none"> <li>• Indirect tensile strength, Unconfined Compressive Strength and Atterberg limit test results;</li> <li>• File info.doc explains the structure of the sheets in the Excel files;</li> </ul>	\\Lab\ITS.xls \\Lab\UCS.xls \\Lab\Atterb.xls (MS Excel) \\Lab\Info.doc (MS Word)
SD4	<u>Files:</u> HVS_N7_40.asc HVS_N7_70.asc Etc. (12 files) Info.doc	Raw Data	<ul style="list-style-type: none"> <li>• MDD data at different repetitions for different load levels</li> <li>• File Info.doc explains the structure of the files and the data in each column;</li> </ul>	\\HVS\*.asc (ASCII File) \\HVS\Info.doc (MS Word)

Compact Disk Label: **N7 HVS Phase 1 (2009)**Contact Person: **Jamie Johnson (jjohnson@blueskyresearch.com)****3.5 MAIN BODY**

The main body of the report should contain the most important and relevant results, trends and findings to ensue from the study. In particular, authors should focus on those information elements that are likely to impact on decision making, which prompt further investigations, or which impact on current design methods or specifications. Authors should take care to ensure that all information is presented in a clear yet concise format.

It should be noted that, although the general format of the summary report is similar to that of an executive summary, the project summary report – unlike an executive summary - should contain comprehensive and complete references to supporting documentation. This applies specifically to conclusions or measurements which require clarification or further discussion. An example of such a situation would be a result which was obtained through a particular method of analysis. In such a case,

authors should briefly - within one paragraph - outline the analysis method, but should then provide a reference to supporting documentation which should provide a more comprehensive description of the method and any underlying assumptions. An example of the reference method for such a case is provided below.

### **Examples: Use of References to Supporting Documentation**

#### Summary Report Text:

*“The stiffnesses used in the development of the failure model are illustrated in Figure 12. As can be seen from this figure, the stiffnesses measured at the start of the experiment for the base layer range from 450 MPa to 560 MPa. At the end of the experiment the stiffness values had increased to a range of 760 MPa to 980 MPa. These stiffnesses were backcalculated from the surface deflections using the standard method of backcalculation. However, in view of the stiff and coarse subgrade that existed at this site, the backcalculation model was adjusted to take the rapid stiffening of the subgrade with depth into account. Details of the backcalculation model and analysis process are provided in Section 3.4 of SD2. It should be noted that this method is well established and widely used (Johnson and Jones, 2004)”*

*or*

*“The mixes exhibited the same structural capacity at almost all combinations of density, saturation and load. However, at low density and high saturation the mixes with no cement had significantly reduced structural capacities compared to the mixes that did have cement. Data supporting these observations can be found in Section 4.2 of SD1”.*

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Footnote Example: *“In this document, references to documentation listed in the document structure (see Table 1) are shown as SD1, SD2, etc. Formal references to earlier documentation already published elsewhere are provided using the traditional reference method, and these references can be found in Section 8”.*

In the above example, note specifically the difference between references to supporting documentation (i.e. references to documentation developed during the course of the study), and formal references (i.e. references to earlier publications), and the use of a footnote to clarify the differences to the reader. When references are made to supporting documentation, authors should – where applicable – provide section specific references (e.g. “Section 3.4 of SD2”) to make it easier for interested readers to find the most relevant information.

## **3.6 SECTION DEALING WITH CONCLUSIONS AND RECOMMENDATIONS**

The “Conclusions and Recommendations” section should discuss and list the key impacts, conclusions and recommendations stemming from the study. This section is perhaps the most important of all sections in the project summary document, since it should inform the reader of the impacts resulting from, or changes needed on the basis of, the study findings. General guidelines for the documentation of conclusions and recommendations are shown below.

**Guidelines for Conclusions and Recommendations**

- The conclusions and recommendations section should list the key findings of the project, and should define the impact of the findings on further work or on the industry, where applicable.
- To emphasise impacts, conclusions and recommendations, these items should be listed as separate bullets where appropriate.
- The section should indicate which guidelines or other documentation can or should be affected by the findings.
- The section should spell out - as clearly as possible - further actions needed in order to implement or further the findings of the study.

**3.7 REFERENCES**

The references section should list all references used in the project summary report, other than those which form part of the supporting documentation.

**3.8 APPENDICES**

Appendices to the project summary report should list only essential supporting information that is needed to complete understanding of the summary report and its findings. General guidelines for appendices to the project summary report are shown below.

**Guidelines for Appendices to the Project Summary Report**

- The Appendices project summary report should ideally have only one appendix which should contain the project proposal. Any other information needed to support the summary report should preferably be listed in the supporting documentation.
- An example of a information element that can be included as an Appendix would be a new test method that is a direct outcome of the project. Other examples of suitable appendices include vital information such as a series of graphs or a breakdown of an important calculation.
- The length of items included as appendices should preferably not exceed 5 pages. Vital supporting documentation exceeding roughly 5 pages should rather be included as accompanying documentation (see next item).
- If the one or more of the supporting documents is regarded as being essential to the correct assessment or interpretation of the project summary report findings, then the author can supply copies of such documents with the project summary report. These reports should, however, be bound separate from the project summary report.

## 4 TECHNICAL MEMORANDA

A technical memorandum is essentially a report which contains technical information related to the study. The term “memorandum” is used instead of “report” to emphasize the fact that technical memoranda are not intended as a technology transfer mechanism, but are used primarily to systematically and cost-effectively document procedures, conditions and assumptions related to measurements, analysis and to the modelling and interpretation of data. As such, the formatting requirements of technical memoranda are less stringent than those of project summary reports. It should be noted, however, that technical memoranda – like project summary reports – will also be peer reviewed. However, such reviews would focus less on the quality of presentation, and more on the scientific rigour and the detail in which background information, procedures and assumptions are documented.

The less stringent documentation requirements for technical memorandums are intended to allow authors to focus more on the analysis of findings and proper documentation of data, with less emphasis being placed on the refinement of sections that are less likely to be read by the intended audience. References to technical memoranda will typically be included in the table of supporting documentation of the project summary report. General guidelines for the compilation of technical memoranda are shown below.

### Guidelines for Technical Memoranda

- A technical memorandum is primarily intended to document procedures, assumptions and data. This type of document is intended mainly for use by other technology development workers or academics who want to corroborate findings in the project summary report, or who want to use data to perform further work.
- The structure of a technical memorandum is similar to that of a conventional technical report. As with technical reports, a table of contents, lists of figures and tables etc. is required.
- The introductory section of a technical memorandum does not need to provide extensive background information or a discussion of project objectives. A brief introduction of three to five paragraphs is needed to provide the context of the document, and to briefly summarize the scope and purpose of the memorandum.
- For comprehensive studies, a summary section listing key aspects of the data or findings can be provided. However, it should be kept in mind that the project summary report will be more widely read and should thus be regarded as the formal summary for the study.
- In the case of short technical memorandums that are less than 5 pages in length, the front matter can be omitted. However, a brief introductory section will still be required to provide the context for the memorandum and to outline the scope of the contents.
- The main body of the technical report should be used to present data in graphical format, and to clarify aspects of the analysis. Where significant amounts of data or graphs are involved, appendices should be used for lower data levels. The most significant graphs or data elements can then be highlighted in the main body of the memorandum.
- Technical memoranda should contain adequate references to earlier publications where needed, and should be consistent in the manner that tables and figures are numbered and referenced.
- Rigorous language editing is not a requirement for technical memoranda. However, authors should ensure that there are no spelling errors and the documents should be edited for consistency and general readability.

## 5 SUPPORTING DATA

Most studies generate some data, which are normally recorded in a database, or in a tabular or graphical format. Typically, these data are further processed in the course of the project to determine key parameters, identify trends etc. The reason for including supporting data as part of the project documentation is not to effect technology transfer, but rather to make data available for purposes of evaluation and further study. Some advanced practitioners or other technology development workers may be interested in viewing summary graphs or tables that synthesize and summarize raw data (these should be included in technical memoranda, or – where the impact of such data is significant – in the project summary report). However, few if any readers will be interested in viewing extensive data on paper, even when these are presented in a graphical format.

If any reader is interested in raw data, the most likely reason would be to *use* this data for further research or to evaluate and corroborate findings. Therefore, raw data should be provided in electronic format as supporting data with the project summary report. Gautrans will then exercise further control over the handling and (possible) further distribution of the data to relevant persons (e.g. reviewers) or interested readers. General guidelines for documenting supporting data as well as an example of such documentation are provided below.

### **Guidelines for Supporting Data**

- Authors should keep in mind that other persons interested in the use of supporting data may not be familiar with terminology, units and conventions. Raw data files should therefore always be clarified by means of explanatory notes.
- Explanatory notes for supporting data can be contained in a separate file (e.g. “Info.doc”, to accompany the raw data files on the distribution disk), or – in the case of spreadsheets – on a separate worksheet within the same workbook.
- Authors should use their own discretion regarding the extent of supporting data that is included in electronic format as part of the project documentation structure. To clarify this decision, authors should consider which data files are likely to be of use to other technology development workers. Most often, such data would be mainly the recorded data in its most basic format, or in a processed format where it is ready for plotting and statistical analysis.
- Apart from raw or basic data files, further files (mostly spreadsheets) are typically generated to perform modelling, summarize data graphically or to calculate statistics. Since these “intermediate” data files are generally expressed in either a technical memorandum or in the project summary report, such files will typically not be included in the supporting documentation.

## 6 SUMMARY

These guidelines describe the structure of documents and data needed for the documentation of technology development projects. The guidelines define three basic types of documents. These are (i) the Project Summary Report; (ii) Technical Memoranda; and (iii) Supporting Data (in electronic format). It was shown that these document types respectively serve the three main purposes of project documentation, which are (i) to facilitate optimal transfer of ideas and information; (ii) to rigorously document methods, assumptions and test procedures; and (iii) to make data available for use by other technology development workers or practitioners (provided such access is granted by Gautrans).

The guidelines outline the requirements for each document type, and provide examples to illustrate concepts. It is hoped that these guidelines will aid authors in maximizing the benefits derived from project

documentation, and that the guideline requirements will facilitate optimal use of available technology as end resources.

### **Example: Selection of Supporting Data to Accompany the Project Summary Report**

A project that involves Heavy Vehicle Simulator (HVS) testing on two road sections generates the following data files for each road section:

1. Raw data consisting of 15 ASCII files containing the Multi Depth Deflectometer (MDD) data measured at five MDD locations and at three load levels. Each ASCII file contains columns showing the number of load repetitions and - for each of six MDD sensors - the measured resistance (in Ohm). At the top of each ASCII file are several rows containing calibration constants, temperature readings, anchor depth and operator names.
2. The raw data is processed with a special program to convert the resistance readings to displacement. The output of the processing program is another ASCII file which contains only the number of repetitions and – for each MDD sensor – the displacement at the corresponding number of load repetitions.
3. The processed ASCII files are imported into spreadsheets. There is one spreadsheet workbook for each test section. Each workbook contains 15 sheets, each of which is named to reflect the MDD location and the applied level. For example, the sheet named “MDD5-100” contains the data measured at MDD number 5 at 100 kN loading. On each worksheet are columns that show the number of load repetitions and the displacement at each sensor location. A graph is included on each sheet to plot the displacement versus number of load repetitions. These spreadsheets provide the data in a converted but raw format.
4. The project investigators now make a copy of the MDD spreadsheets. These copies are used to draw refined and annotated graphs of MDD displacements. Further processing of the data is also performed to calculate the average rate of deformation for each load level and each layer. These calculated parameters are copied to another spreadsheet and are used to draw graphs and tables that are included and discussed in a technical memorandum.

*For this situation, the most suitable data to include as part of the supporting documentation would be the data files described in steps 2 and 3. This comprises a total of 15 ASCII files and two spreadsheet files. With the supporting data, a MS Word document is included to briefly explain the naming convention of the ASCII files, and the data type and unit of all columns in each ASCII file. In the spreadsheets, a separate sheet named “Notes” is added to explain the contents of the workbook, the naming convention for each sheet and the details (data type and unit) for each column.*

*It will be noted that the more refined data files compiled in item (4) are not included with the supporting documentation. This is because these files are used primarily for calculation purposes and to refine presentation of the raw data. The data contained in these files will also be effectively summarized in the technical memorandum.*

*Finally, the selected data files to be included in the supporting documentation disk (to accompany the project summary report) are copied into logical and separate subdirectories of the compact disk, as illustrated in the example contained in section 3.3 of these guidelines.*