Northern Territory Geological Survey

NORTHERN TERRITORY DEPARTMENT OF BUSINESS,
INDUSTRY AND RESOURCE DEVELOPMENT

**Geological Survey Record
2002-001**

Guide to NTGS authors
Second Edition

Northern Territory Geological Survey
Darwin, 2002

Northern Territory Government
Department of Business, Industry & Resource Development

CONTENTS

INTRODUCTION

The Northern Territory Geological Survey (NTGS) is committed to the rapid production of high quality information products, in digital and hardcopy form, as an aid to mineral and petroleum explorers and the geoscience community in general. Expeditious production is achieved via inhouse desktop practices, generally with limited print runs and in some cases with printing on demand.

As the Survey moves away from the traditional methods of publishing, the conveniences of desktop publishing, including website publishing, should not supplant the requirements for quality writing and best editorial practice.

This guide outlines the policies and management processes for the production of textual publications. It outlines the procedures for word processing in a network, where authors are encouraged to prepare their own manuscripts up to the formal edit stage.

It also provides practical guidelines to assist staff in the writing, editing, formatting and production of NTGS publications, with emphasis on standard series written reports. A number of house rules are explained relating to text formats in Word documents, illustrations, lithostratigraphic names, definitions, references and so on.

This Guide to Authors is available both as a Geological Survey Record and via the DBIRD intranet at http://uluru.nt.gov.au/dbird/Library/InfoCntrIntro.htm. Further modifications of the Guide are expected over time and additional revised editions will be released, with the date of revision indicated in the title pages. Comments on the procedures and standards presented here may be made to the NTGS Editor.

NTGS PUBLICATION SERIES

The main publication outlet for NTGS projects is by way of standard series. NTGS regards most of its products as *publications* in the literal sense, in that they are works of scientific and technical merit, produced on a recurring basis that carry author or organisational attribution and are subject to an implied copyright.

Report series

These are reports of geoscientific substance, and are the main outlet for published geoscientific material. They have an International Standard Series Number (ISSN) of 0814-7477 and individual Reports have an International Standard Book Number (ISBN). They are quality publications in A4 size, fully formatted to prescribed standards. Text is presented in two columns and figures and plates are incorporated into the text. NTGS Reports may vary in size from 20 to 100 pages or more, and can cover a wide range of subjects such as geological regions, basin summaries, reports on National Park geology, and specialist geoscientific studies. They are reproduced by litho-printing with a print run of several hundred.

Explanatory Notes series

These accompany geological maps at 1:250 000 scale (ISSN 0814-7485) or 1:100 000 scale (ISSN 0811-6296). Individual explanatory notes have an ISBN. As with the Report series, they are quality productions in A4 size, fully formatted to prescribed standards (two columns for contents pages and main text; single column for title pages). Explanatory Notes are reproduced by litho-printing and have a print run of several hundred.

Record series

Prior to 1999, material that today would be published in the Record series was included within the unpublished GS Technical Report series. From 1999 onwards, Records have been upgraded by inhouse desktop publishing. They have an ISSN of 1443-1149 and individual Records have an ISBN. Most Records are now produced in digital format and are available on CD-ROM or can be downloaded from the internet. A limited hard copy print run of 14-50 copies is also reproduced via photocopying. Text is presented in single column format, and figures and tables are usually presented on separate pages in order to expedite production. Where relevant, Geological Survey Records will be widely promoted to clients.

Authors should note that, for the purposes of some external book or journal editors, the Record series constitutes formal publication of data and hence may negate the re-publication of this data in another form. When considering external publications, it may be wise to check with the particular editor and consider your options with regards to the timing of publishing of the same information in a Record.

Because of the limited print run, it may be necessary for NTGS Records that mention taxonomic names to present a taxonomic disclaimer on the title page, as proposed in Recommendation 8E of the International Code of Zoological Nomenclature, Fourth Edition (1999). Recommendation 8E states that "Editors and publishers should avoid including new names and the information that might appear to make names available, or new nomenclatural acts, in works that are not published for the public and permanent scientific record (such as pre-symposium abstracts, or notices of papers to be delivered at a meeting). They should ensure that such documents contain a disclaimer, so that new names published for the first time therein do not enter zoological nomenclature unintentionally and pre-empt intended publication in another work."

A work that contains a statement to the effect that it is not issued for purposes of zoological nomenclature is not published within the meaning of the Code.

Digital Information Package (DIP) series

Digital Information Packages are the main outlet for digital databases and GIS datasets, including the **I**ndustry **R**eports **M**anagement **S**ystem (IRMS) Index and **M**ineral **O**ccurrence **DAT**abase (MODAT), and are produced on CD-ROM. DIPs have an ISSN of 1445-5358, but no ISBN. They may be subjected to periodic updates, while retaining the original DIP number. The DIP version is indicated by date.

NTGS INTERNET PUBLICATIONS

NTGS also releases information over the internet. This includes text and graphics in portable document format (PDF), created from formatted standard series publications and other documents, text and graphics specific to the website in HTML format, PowerPoint presentations, databases and GIS datasets, and geophysical raster datasets delivered via the Image Web Server (IWS). Any publication that has significant textual content should be edited as described in this guide.

NTGS NON-PUBLISHED PRODUCTS

Technical Notes series

Technical Notes contain unpublished information and are generally internal documents not intended for wide distribution; only one or two copies may be produced. They contain supporting data for ongoing projects, as well as work done for the Department by consultants (eg geochronological and petrological reports) and work done by departmental staff in partnership with others. Technical Notes have no ISSN or ISBN. Prior to 1999, when this series was commenced, material that would have been appropriate for Technical Notes was included in GS Technical Reports.

ROLES AND RESPONSIBILITIES

Approval by Director

No manuscript intended for NTGS publication should be commenced unless the Director has approved it. In normal circumstances the work to be written up must form part of an approved NTGS program.

For external publication (for example in geoscientific journals), the Director should first be approached for permission to publish if the work involves NTGS time, resources and information. Encouragement will be given to publish in outside journals, provided that priority is given to NTGS publications, the work is relevant to NTGS objectives, and progress on the project is satisfactory.

Responsibility of authors

It is the authors' responsibility to prepare well-written manuscripts that are technically sound, logically structured, and complete in the information given.

If there are co-authors, the senior author should be designated at the time of commencement, and different sections allocated to respective authors.

For multi-authored texts, the designated senior author will be the person who takes initial responsibility for the collation and logical integration of all contributions into the text. In general, the senior author will also be the person who writes most of the text.

Responsibility of supervisors or section leaders

It is the responsibility of the supervisor or section leader to ensure that complete, well-written and technically sound manuscripts are submitted to the Editor.

In reality, this may require substantial rewriting or restructuring of early drafts by the supervisor/section leader. However, this is part of the supervisory and mentoring process, and every assistance should be given to authors to improve their own writing skills and manuscript. The supervisor, in consultation with the Director, will decide whether peer review of the first draft is required.

Role of the Editor

The primary responsibility of the Editor is to manage and expedite the progress of manuscripts through the publication process, so that high standards of presentation are achieved.

Ideally, the work of the Editor begins with the handover of the complete manuscript by the supervisor. Core tasks include:

- checking, correctly formatting and polishing text and accompanying information (tables, appendices, references, figure and table explanations)
- composing and correctly formatting text and graphics for covers and title pages
- ensuring that NTGS standards are imposed
- supervising the conversion from Word to the final format (PageMaker or Acrobat)
- liaising with the Cartographic Manager on figure edits
- liaising with the Government Printing Office
- checking proofs.

However, the Editor may at times take a role before the handover of complete first drafts, by monitoring standards from the beginning, and advising authors on the mechanics of preparing manuscripts. In certain situations (for example staff departures or stalled progress) the Editor may need to become involved more in the geoscience, in close consultation with the supervisor/section leader, in the interests of expediting or salvaging publications.

Role of Cartographic Manager

Under the control of the Cartographic Manager, the Cartographic Section provides graphic services for figures, images and graphics that will accompany the text.

Cartographic services

At the commencement of writing, authors should initially liaise with the Cartographic Manager to scope the drafting requirements, and then commence supplying figures progressively, and as early as possible. Once the Cartographic Manager has allocated the work, authors can liaise directly with a cartographer. The supervisor has the right to sight and approve all figures going to the Cartographic Section. Authors should discuss presentation aspects with cartographic staff, and take advantage of their skills and experience.

Once the complete first draft is formally in the hands of the Editor, authors should not deal directly with cartographers. The Editor will undertake figure edits in consultation with cartographers and, where necessary, authors.

Cartographic or secretarial staff, at the request of the Editor, will undertake the conversion of the Word document and accompanying figures and tables into PageMaker or Acrobat formats.

GUIDE TO WRITING

Good writing is the art of crafting sentences with well chosen words, to efficiently convey an unambiguous message. The writer should at all times remember to make the text clear, concise and correct. Experienced editors will agree that their basic approach is to weed out repetition between sentences, and prune unnecessary words within sentences, as well as to enforce "house rules". Errors tend to be obvious when pointed out by an editor, but can sadly be repeated. Better writing can be learned from the constructive input of colleagues and editors. Another way is to discipline yourself to critically examine your own work, using some of the principles and procedures outlined in this guide.

The process of writing and editing is akin to polishing a rough piece of timber, bringing it to a satisfying and appealing end product. It is repetitive, but after each step it looks better. Well prepared manuscripts will generally require three or more edits, before they are "satisfying and appealing". Poorly prepared manuscripts may unfortunately require three or more rewrites (including restructuring), even before the formal edit. There is no excuse for presenting poor work. After the rough-draft manuscript stage, it should only require polishing by the author(s).

There are numerous guides to writing that may be of use (see *References*). Many of them encourage authors to: write with a plan in mind; structure the writing before starting; limit paragraphs to one main concept; separate different ideas into different sentences; and write simple and concise sentences. With appropriate planning, the text will flow logically, as it explains reasons for the study, states facts, gives interpretations and offers a synthesis.

The descriptive sections of the text should, as a rule, be built from short, simple, active sentences, particularly in the first draft. Avoid abbreviations and colloquialisms, and write in the present tense, eg *the rock contains biotite* not *biotite was observed*. "Simple" sentence construction means only 1-2 points per sentence. Simple sentences are easy to cut and paste into logical order and it is usually easier to combine simple sentences into compound sentences than *vice versa*. "Active" means the following sentence construction: subject—verb—object, eg 'the sandstone contains quartz', as opposed to passive: object—verb—subject, eg 'quartz is contained in the sandstone'. To some extent, short, simple, active sentence construction inevitably engenders a style of bland uniformity and what some would call stereotypical scientific prose. But there is a certain elegance in simplicity that is appreciated by the reader. Remember that, in our business, reports are for the benefit of our readers, even though we do derive personal satisfaction from publication.

It is in the more discursive sections of a text, like the introduction, discussion, synthesis and conclusions, where the author is encouraged to develop an individual style. Look at the sentence constructions and word choices of good writers—they are easy to spot!

Getting started

The NTGS suite of publications and other products differ markedly from one another in style and content. Depending on the type of product and the intended readers, manuscripts will require different approaches and amounts of time spent in writing and applying 'polish'. For example, Explanatory Notes, which are widely distributed to a range of clients, require far more time and effort to prepare than Technical Notes intended for limited numbers of users. In choosing an appropriate medium for publication, the following questions need to be considered: is the intended purpose of the publication: to inform (eg present results or draw attention to information); to instruct (eg provide ideas or procedures to achieve a goal); to persuade (eg analyse or recommend a strategic plan); or to document (eg provide a permanent archive)? Is the publication to be internal or external to NTGS and will the readers be known or unknown? A consideration of these issues at the start of the writing process will largely determine the style and scope of the manuscript, and will greatly assist in time management.

At the commencement of writing the author should:

- become familiar with the house rules and guidelines of this document
- seek advice, where necessary, from the Editor or their supervisor
- observe the preferred formats for text, order of headings, and figures
- observe the preferred method for referencing, and become familiar with EndNote, if using this bibliography program
- store progressive drafts on the author's personal P file on the network (as C drives are not automatically backed up)
- save new versions with the date as a suffix to the file name (eg document name_yyyymmdd), to allow for recognition of the latest version and to provide backup in case errors are saved. Note the format of the date, which ensures that the latest version is at the end of any list of files.

The early manuscript

A draft **table of contents**, suitably discussed with section leaders, supervisors or colleagues should be the first task in commencing a manuscript. This is the framework for writing and for information transfer. It can be expanded into a more complete outline by adding points under the respective headings and subheadings. Writers might consider composing a statement of aims and objectives, and placing it at the start of the draft to provide focus and help in determining a logical sequence.

Experience has shown that some would-be authors are daunted at the prospect of producing a "tome" that will be subjected to peer scrutiny. It is therefore useful to manage the writing by setting small achievable goals for particular sections, rather than long-term goals for the entire text. For structured texts like Explanatory Notes, one might start with the "easier" descriptive sections, like *Stratigraphy*. Alternatively, one might tackle the most significant or important sections first; less significant text is then placed into perspective. A common practice is to write the first draft quickly and with minimal reworking. Polish is then added in later drafts. Remember also that size is not important and that with concise writing practices, the text will grow into its own appropriate dimension. Padding, whether deliberate or not, is the single greatest fault of aspiring writers.

The first draft of the manuscript should convey all salient observations, plus interpretations, with sufficient background information to provide the reader with a context. Where possible, writers should avoid mixing observations with interpretations; the facts of the case should be presented first and their implications discussed later.

Figures and tables should be kept as separate files from the Word draft. Although Word enables figures to be included in documents, they are difficult to work with and the addition of graphics can quickly increase the file size to the point of making the document unwieldy. In addition, figures and tables cannot be converted into PageMaker as part of a Word document and have to be imported separately. If appendices are in table form, they should also be kept as separate documents.

As soon as the manuscript begins to take shape (say more than 50% written), and especially after contributions are incorporated from co-authors, a copy of the current version should be placed on the Darwin network dmedwfile1 server under: \Divisions\Geological Survey\Publications Current. This then becomes accessible on the network to anyone in NTGS. From this point on, the senior author must ensure that successive upgrades are placed on the network. This filed electronic version becomes an 'insurance' for NTGS in case the authors, for any reason, are not able to complete the publication. It also becomes the prototype of the master copy of the document, which in its evolving forms, will endure until publication.

Before passing the draft on to their supervisor or section leader, writers should take the time to complete a preliminary **proofreading** of the manuscript. The following checklist may assist in completing this task:

- Have the main aims been achieved? If not, why not?
- Are descriptions and discussions arranged in logical order? If necessary, move sections around.

- Has unnecessary repetition been avoided?
- Does the manuscript digress into interesting but irrelevant topics?
- Is there excessive and unnecessary detail ("verbiage")?
- Has spelling, grammar and punctuation been checked? Use the inbuilt spell checker in Word (Tools menu), but be wary of incorrect American spellings. Make sure to spell check even the subsidiary text in captions, references, appendices and tables, and within figures (manual check generally needed), as many errors can persist through edits, or be introduced after revision. A third party will often spot errors that authors and editors miss! The inbuilt grammar checker in Word is of doubtful value, but can be helpful in some instances.

Handover of manuscripts

Following any changes that arise from supervisory (or peer) review, the author and supervisor handover the text to the Editor. From this point on, only the Editor can update the Word document.

The complete Word document at the time of hand over to the Editor should consist of:

- title page
- text main body
- tables (as separate files)
- references
- appendices
- list of figures (including photographs), tables and appendices.

After handover, the Editor will make necessary format, grammatical, spelling or style changes to the master digital copy. The Editor will continue the practice of regularly updating the Word document on the network, so that authors see all changes made by the Editor.

The Editor will make clear any technical edits or significant stylistic changes on a hard copy, and refer these to both the supervisor and the authors. Differences of professional opinion should be settled by mutual agreement at this stage. The Editor will decide on guidelines and house rules. In the event of an unresolved professional dispute, the Director will arbitrate. The Director, while respecting the rights of the geoscientist, will be guided by the principle of NTGS ownership of the intellectual property.

Format of Word documents

The first draft of a Word manuscript, which is intended for review by the supervisor/section leader, should be formatted differently from the final draft (see *Page and text formats of Word drafts*). The major differences are that the **first draft** should use 12 point font, 1.5 line spacing and no indenting of paragraphs, whereas the **final Word document** uses 10 point font, exactly 12 point line spacing and paragraphs after the first in each section are indented. The rationale for the first draft format is that the review process is aided by a larger font and spacing (eg annotations are much easier when text is more widely spaced). Standard NTGS templates, containing the appropriate styles, are available for both types of document (see *NTGS styles and templates*).

Authors should expedite production by doing much of the final formatting in Word themselves, at the time of writing. However the Editor will check all formats when the Word document is received, and make any necessary changes for the final product.

NTGS styles and templates

Styles define the appearance of various text elements of a document, such as headings, captions, and body text. When a style is applied to a paragraph or word, a whole group of character or paragraph formats or both can be applied in one simple operation. When the formatting of all the text of a particular element needs to be changed at once, it is a simple matter to change the style that's applied to that element. Styles make formatting a document easier. Additionally, they serve as building blocks for outlines and tables of contents. Styles can be applied from the formatting toolbar. Select the text or simply click into a paragraph and choose the required style from the drop-down list.

Templates are a collection of styles that collectively can be used to format and enable global changes to all the text elements of a document. Standard NTGS templates for both first and final drafts can be downloaded from the Darwin network at \\dmedwfile1\Divisions\Geological Survey\Publications Current\Editorial documents\Word_templates. The first draft template is **NTGS_Word_first_draft.dot**; the final draft template, which is suitable for all NTGS publications, is named **NTGS_publications_template.dot**. To use these files, save them to the template folder that Word looks to (usually located in the C drive); the full path can be found from the Tools menu, Templates and Add-Ins command[1]. The NTGS templates can be attached to an existing document from the Templates and Add-Ins dialogue box. If the Automatically

---

[1] Note that the location of the template folder can be specified via the File Locations tab on the Tools menu, Options command.

update document styles check box is ticked, the new styles will overwrite any existing styles with the same name from the old template, but note that any old styles with different names will be retained.

When Word is started or a new blank document is created, Word attaches a set of styles based on the 'Normal' template. To change the default styles in the Normal template to those used in NTGS publications, open the NTGS template NTGS_publications_template.dot. From the Format menu, click Style, then Organiser. Styles can then be copied or deleted as required to customise Normal.dot.

Page and text formats of Word drafts

The following summarises recommended Word formats for NTGS publications, as used in the standard templates NTGS_Word_first_draft.dot and NTGS_publications_template.dot (see *NTGS styles and templates*). Note that some features are not included in styles as indicated in footnotes and need to be applied manually.

For the document format of **all Word drafts**, there should be 16.5 mm margins at the sides of the page and 18.5 mm margins at the top and bottom. Column width should be 177 mm and the column height should be 260 mm (total height of page 297 mm, width 210 mm: standard A4).

For the **first draft**:

- paragraphs should be unjustified (left aligned) at 1.5 line spacing[2]. The font should be 12 point Times New Roman. Use one space between sentences. Use zero point spacing before and after paragraphs[3]
- references and appendices should be in 12 point Times New Roman font and use single line spacing
- figure, plate and table captions should be in 12 point Times New Roman font and use single line spacing
- text in tables generally should be in 8 point Times New Roman font and use single line spacing, as per the final version[4]
- follow the designated order for heading grades (see *Table of contents* and *Headings*). Font should be 12 point.

For the **final draft**, as submitted to the editor:

- paragraphs should be fully justified at exactly 12 point line spacing[2]. The font should be 10 point Times New Roman. First paragraphs in each section of text are not indented ('Normal' style); subsequent paragraphs are indented by 0.5 cm ('Normal indent' style)
- references should be in 10 point Times New Roman font at exactly 12 point line spacing with 0.5 cm hanging indent (second and subsequent lines are indented)[5]
- figure, plate and table captions should be in 9 point Times New Roman font at exactly 10 point line spacing[4]
- text in tables generally should be 8 point Times New Roman and use single line spacing[4]
- Follow the designated order for heading grades (see *Table of contents* and *Headings*). Font should be 10 point.

Layout of Word documents

Title pages and keywords

A cover page with the title of the manuscript, authors and a list of keywords should be supplied by the principal author. The rest of the title pages are added by the editor. In order to obtain Australia-wide uniformity, keywords should be determined with reference to the Australian Geoscience, Minerals and Petroleum Thesaurus (Australian Mineral Foundation 1996). Appropriate geographic and stratigraphic names, which are not in the thesaurus, should also be included.

Abstract

All NTGS publications (apart from some Records, eg field guides or authors guides) should have an Abstract, as this is the annotation or summary that generally gets paraphrased in national and international referencing works. Abstracts are presented in single column format, as are title pages.

The Abstract is a summary of the actual information, discussions and conclusions of the publication. It is not a summary of the layout or scope of the document; this sort of information should be included in the Introduction. Avoid sentences like: *this report outlines the evidence for a major unconformity…* or *…some stratigraphic nomenclatural changes will be discussed.* Use sentences that convey information. Although the Abstract should be concise, some of our descriptive publications may well require 1000-2000 words. Abstracts should generally not contain references, figures or tables if they

---

[2] Line spacing can be set via Format—Paragraph—Line spacing.
[3] Spacing between paragraphs can be set via Format—Paragraph—Spacing.
[4] No style designated.
[5] Hanging indent can be applied via the ruler, or via Format—Paragraph—Special—select Hanging from the drop down list and choose 0.5 cm.

are part of a longer manuscript, but they can be included sparingly if intended as a stand-alone document for a volume of Abstracts (eg AGES).

In Explanatory Notes, the Abstract normally begins with the capitalised map name followed by a footnote[6]. The footnote should read 'Names of 1:250 000 and 1:100 000 mapsheets are shown in large and small capital letters, respectively, eg TOBERMORY, TARLTON' (with example names from the text substituted). Following small capital letters can be achieved in Word by typing the first letter as a capital, subsequent letters as lower case (title case), highlighting the word, then selecting Format—Font and Small caps under the Font tab.

Table of Contents

A **table of contents** can be automatically generated in Word after NTGS styles have been applied to all headings in the text. They are generated via the Insert—Index and Tables command and Table of Contents tab. Only headings of grade 4 and above should be listed in the contents, so in the Table of Contents dialogue box, choose 4 in the Show levels pane. Provided the standard NTGS templates have been attached to the document (see *NTGS styles and templates*), a correctly formatted table of contents will be automatically generated. The table of contents can be updated at any time using the F9 function key; a choice of updating the entire table or just the page numbers can then be made.

Lists of figures and tables are abridged versions of the full captions, which should be supplied in a separate document. They will therefore need to be typed separately. The editor will apply the correct formats and page numbers after handover of the manuscript.

Headings

Authors are encouraged to use a minimal number of **heading levels**; five are permissible, but four are considered ideal. Too many levels of headings can make the text overly complex and difficult for the reader. As an alternative to level 5 and higher headings, select the key term in the text and make it *italics* or **bold**. It is not necessary to use a strict hierarchy of headings; level 3 or 4 headings may be used under level 1 headings for simple sections, if appropriate.

Heading formats for all NTGS publications are given in **Table 1** and heading styles for both the text and table of contents are included in the standard NTGS publications templates (see *NTGS styles and templates*). Note that there should be a single line break space before and after all levels of heading.

Level	Format in text	Format in Contents page
1	**BOLD CAPITALS**	**Bold upper and lower case**
2	LARGE AND SMALL CAPITALS	Upper and lower case, left justified
3	**Bold upper and lower case**	Upper and lower case, single indent
4	***Bold, italic upper and lower case***	Upper and lower case, double indent
5	*Italic upper and lower case*	not listed

Table 1. Heading formats for all NTGS publications.

Heading structures are not rigid and will vary according to content. Writers need not be constrained by the traditional structure of past publications and may adopt a framework based on convenience - for both writer and reader.

Level 1 headings are for major subdivisions of the text (eg **ABSTRACT**, **INTRODUCTION**, **STRATIGRAPHY** etc). The sorts of heading structures that might be used are discussed below.

Level 2 headings are used for geological eras and periods (eg CAMBRIAN) as well as other key headings (eg BASEMENT ROCKS, SKARN DEPOSITS) as appropriate (see below). Note that it is not obligatory to use this heading if it is considered unwarranted. For example, headings for geological eras are generally unnecessary in Proterozoic terranes.

Level 3 headings are used for lithostratigraphic groups (eg **Mount Rigg Group**), subgroups and others as appropriate.

Level 4 headings are used for lithostratigraphic formations (eg ***Tindall Limestone***) and others as appropriate.

Level 5 headings are used for lithostratigraphic members (eg *Sherwin Ironstone Member*) and others as appropriate.

In NTGS Explanatory Notes, level 1 headings have traditionally included **ABSTRACT**, **INTRODUCTION**, **REGIONAL GEOLOGICAL SETTING**, **STRATIGRAPHY**, **STRUCTURE**, **METAMORPHISM**, **GEOPHYSICS**, **GEOLOGICAL HISTORY**, **ECONOMIC GEOLOGY**, **ACKNOWLEDGEMENTS**, **REFERENCES** and **APPENDICES**, as well as other major headings as appropriate. However, this structure may tend to split related themes, and can introduce unnecessary repetition and difficulties for the reader.

The recent trend is for primary heading structures to be based on geological provinces and less on chronostratigraphy, particularly in the Proterozoic. This is often more convenient for both writer and reader, particularly where there is a strong separation between metamorphic basement and sedimentary cover, eg (from MILINGIMBI notes): **PINE CREEK**

---

[6] Footnotes are made using the Insert—Footnote command. The footnote will stay on the same page as the associated text and is set to autonumber by default. Do not overuse footnotes, as too many can detract from the readability of the text.

OROGEN ROCK UNITS, MCARTHUR BASIN STRATIGRAPHY, ARAFURA BASIN STRATIGRAPHY and so on. GEOCHRONOLOGY, METAMORPHISM, STRUCTURE, ECONOMIC GEOLOGY, etc might then appear as level 1 headings later in the text.

Another option would be to use level 1 headings and subheadings to discuss similar topics in the same part of the text: eg PINE CREEK OROGEN as a level 1 heading, and then ROCK UNITS, STRUCTURE, METAMORPHISM, ECONOMIC GEOLOGY, etc as level 2 headings beneath that.

Note, however, that level 3 headings should be retained for Groups and level 4 headings for formations.

Grid references and map datum

Grid references are to be given as full UTM eastings and northings (eg 123456mE 1234567mN). The Universal Grid Reference style (eg AB123456), as used on older NTGS publications and maps, is not to be used. The zone may be omitted if it is the same for all of the text or map, but it should at least be stated in the introduction. The datum and zone should be noted again in the caption to any tables or appendices. The following is an example of appropriate wording that might be included in the introductory section:

"Cited locations in this publication are based on Map Grid of Australia zone 53 coordinates and the GDA94 map datum, and are deemed accurate to ± 50 m. To convert from the AGD66 AMG coordinates used on older maps, block shift[7] all data 127 m to the east and 170 m to the north, or alternatively use a grid conversion program such as GDAit from Land Victoria."

Figures, images and tables

Figures and tables are **not** to be included within the draft Word document, as they make the file size too large and the document unwieldy. Word is simply not designed to handle more than token graphics within the text. Keep figures and tables as separate files and the editor will arrange for their inclusion within the text during final formatting. For litho-printed products (eg Explanatory Notes, Reports), figures and tables are best incorporated within the text using PageMaker. PageMaker-formatted documents with embedded figures can also be converted to PDF. However, in larger PDF documents, figures and tables are best kept as separate files, which are linked to the text, in order to minimise load times. Note that in Word-formatted products (eg Records), figures are included within the text only if they are few in number, and are appended in more complex documents.

Figures

Figures may be either line drawings in black-grey-white or colour. Colour figures will be used only where technically necessary, as these are an additional expense to print. Photographs should be included as figures, not plates.

Figures (and tables) may be as wide as a single column or full page, and should be prepared to fit conveniently into the double column format of a Report or Explanatory Notes, or the single column of a Record. Neither width nor length may exceed the bounds of the text field (ie 84.5 mm or 177 mm wide and 260 mm high). Ensure that room is left for the caption if planning a full-page figure. It is advisable to have the figures made to the exact final size from the start, in order to avoid any enlargement or reduction that may distort or stretch the figure.

Figures may be **composite**, in which case components should be designated alphabetically in the figure itself by lower case letters, beginning with **a**. Helvetica 14 point font is recommended for this.

Authors are encouraged to draft figures in a digital format such as MapInfo, but as the final print-ready copy will be produced in MicroStation, spending time on colour design, layout and type specifications are unnecessary tasks for the author at compilation stage.

It is recommended that authors do not produce figures in graphics packages such as Illustrator, CorelDraw and PhotoShop, as this work is best left to the Cartographer who will use the appropriate software for the particular figure type.

Images for standard series publications

The recommended standard size for **photographs** in portrait orientation is 84.5 x 127.2 mm, so as to fit within a single column. Where photographs are in landscape orientation, the recommended size is 120 x 80 mm. Full-page photographs may be used as a frontispiece, but will not normally be reproduced in the text.

Excellent print reproduction is obtained using **35 mm Ektachrome colour slide film**. High resolution scanning of 35 mm film is outsourced to a specialist firm.

Scanning of photographic prints should be done at 400 dpi, and in tiff format. Do not waste time trying to enhance image contrast, colour balance etc, as this is best left to experienced publishing staff in Cartography.

If using a **digital camera** to take photographs for print reproduction, pixel resolution ideally should be 2.5 mega pixel or greater to enable satisfactory quality. The absolute minimal resolution to use is 2.1 mega pixel. Images should be acquired as tiffs in order to facilitate production.

---

[7] Note that this 'block shift' will vary between mapsheets; consult with cartographic section for correct figures.

Images for websites

Use the **JPEG** format for most images (especially photographs) that will be displayed on websites. The **GIF** format can also be used for simple images that contain linework and flat areas of colour, such as logos and similar artwork. Large geophysical and related images may use the **ECW** format, particularly for presentation via the Image Web Server (IWS).

It is important to strike an appropriate balance between the visual appeal and load time of web pages. If used incorrectly, images can be distracting and will slow down the load time, forcing users to leave in frustration. There are a variety of techniques that can be applied to reduce the size of image files and minimise load times:

- Limit the resolution of images to 100 dpi.
- Reduce the number of colours in the image.
- Reduce the physical dimensions of the image.
- Provide a thumbnail (a smaller version) for a large image and link to the full-size copy.

Figure captions

By definition a figure or table is a graphic that is discussed in the text, and must therefore be referred to in the text (title case, in bold and in full, eg **Figure 1**, **Table 1**). Even simple photographic figures should be referred to in the text. Note that references to figures from other texts should be in plain text and the following format is preferred to avoid any possibility of ambiguity: Figure 8 of Bloggs (1992) or (Figure 8 of Bloggs 1992).

Formatting of figure captions will normally be done in PageMaker for Explanatory Notes and Reports, and in Word for other products. Every figure and table must have a text caption that is presented to the supervisor and editor in a list separate from the figures. This list should be spell checked, justified, in 9 point font and at 10 point line spacing. There should be a full stop at the end of all figure captions. Captions are cut and pasted into appropriate places in the text during final formatting of the product. A simplified version of the captions is listed in the contents section.

In composite figures, individual components should be formatted as per the following example:

Figure 1. Main title of caption (if any). (**a**) Subtitle for component a. (**b**) Subtitle for component b. (**c**) Subtitle for component c.

Note that there should be a single space between **Figure 1**. and the caption text. Letters of individual components are bold and lower case. There should be a full stop at the end of each component. Caption information should include mapsheet, grid reference and locality name.

Table formats

Please consult with a secretary or the Editor when setting up tables; they can provide advice and examples that may save time and effort. For standard column widths and heights see *Page and text formats of Word drafts*. Where possible, Word tables should be set up to match these dimensions from the start, using Times New Roman font. Spell checking is important for all tables. If a table is very large (eg geochemical data) it might be better placed as an appendix.

Note that the final font size for tables is 8 point but a larger font size may be used for drafts to make editing easier for geochemical tables etc, provided it does not greatly disrupt the format. **Table 2** is an example of a formatted table from the Sandover River Explanatory Notes, at full-page (177 mm) width.

Unit	Number of readings	Porosity (%)	SG bulk wet (kg m^{-3})	SG standard deviation	Magnetic susceptibility (x 10^{-3} SI)	Depth from (m)	Depth to (m)
Arrinthrunga Fm	2857	15.2	2730	0.15	0.02	12.5	538.0
Hagen Mbr	865	10.4	2840	0.08	0.01	538.0	669.9
Arthur Creek Fm upper	847	9.4	2780	0.09	0.03	669.9	798.8
Arthur Creek Fm lower	776	8.5	2840	0.03	0.05	798.8	917.2
Arthur Creek Fm basal shale	112	8.8	2870	0.03	0.05	917.2	934.3
Thorntonia Limestone	287	8.8	2870	0.06	0.01	934.3	978.1
metavolcanic rock	154	12.7	3010	0.06	52.10	978.1	1002.5

Table 2. Example of formatted table.

Some notes on how to format tables in Word follow:

- For correct vertical spacing of text and figures in rows, use the Format—Paragraph—Spacing command. Before and After spacing in headers is usually set to 3 points and for the body of the table, 1 point. There is no necessity to have

a blank row for greater spacing; simply increase the size of the Before and After figures. Line spacing for the whole table should be set to Single.

- To position figures in columns, use Format—Paragraph and the Alignment and Indentation commands on the Indents and Spacing tab. If the column contains a set of figures that vary in the numbers of digits and position of the decimal point (eg 7, 4568, 23.4, 43.99 etc), or if the numbers have the same numbers of digits and the decimal points are in the same position (eg columns 4 and 5 in **Table 2**), a centred alignment presents well. In most other cases, use right alignment, then right indent to position the figures in the centre of the columns.
- Text usually looks best if centred (as in headers of columns 2-8 of **Table 2**) or left aligned and slightly left indented (eg column 1 of **Table 2**).
- Unless deemed necessary for clarity, do not use vertical borders between columns and use horizontal borders on rows sparingly. To create borders, use the Tables and Borders toolbar (from the View—Toolbars menu). The thicker lines in **Table 2** are 1½ point; the thinner line is ½ point. Line colour is set to grey.
- To adjust column widths, select the column and use the Table—Cell Height and Width command. The Table—Distribute Columns Evenly and —Distribute Rows Evenly commands are also useful to force an even spacing on a selection of rows or columns.

Techniques of editing manuscripts

It is expected that many NTGS staff, and probably all geoscientists, will at some stage be involved in peer review and editing of manuscripts. The early stages of editing and peer review are best done on hard copy so that authors and supervisors can clearly see the suggested changes. As stated above, it is recommended that 12 point Times New Roman and 1.5 line spacing are used, in order to provide room for comments on the page. The document may still be printed double-sided to save paper.

In regard to annotations on the hardcopy, the reviewer should make a clear distinction between recommended inserts or changes, and questions or comments to the author. This is best done using different coloured pens. Wherever possible, reviewers and supervisors should be constructive and positive with their annotations, and not critical with overuse of general comments.

A standard set of editing symbols is shown in *Appendix 1*, reprinted from Flann and Hill (1994: 104-105, see also Style Manual (Snooks & Co 2002, Sixth edition, or Berkman 2001: 17-18). These should be followed consistently, to enable the corrections to be easily entered by the author or a typist. If a typist is used, the author or Editor may tick those edits they approve or cross through those they disagree with.

The later stages of editing, following the sign-off of the final text, may be done on a digital copy by the Editor. This stage includes the application of any necessary house rules (although it is expected that the authors will have followed this guide as closely as possible), stylistic changes and final formatting.

THE PAGEMAKER DOCUMENT

Only when the authors and supervisor agree and sign off on text, figures and tables, the text is fully formatted and spell checked by the Editor, and the Director provides final approval, should a Word document (Reports and Explanatory Notes) be transformed into PageMaker.

Difficulties have arisen in the past when the switch to PageMaker was made too early or the final text was not checked thoroughly enough. It is harder to edit efficiently in PageMaker as relatively minor edits can significantly alter the layout of the following text. It is also necessary to edit figures and tables separately in their original MicroStation or Word formats and then re-import them. In addition, there is some risk with last-minute corrections that the wrong version may be incorporated by mistake, not to mention the frustration to other staff and waste of time in reformatting if the text needs more than trivial edits. Suffice it to say: don't spare any effort to get it right in Word!

It is the responsibility of the Editor to initiate, and after the approval of the Director, to supervise the transformation into PageMaker. From this point, technical changes to the text and figures should be kept to an absolute minimum, and then only through the Editor. At this point, the work of authors and supervisors is largely finished, and they will not normally have network access to the PageMaker document. However, authors will be provided with a printout of the final PageMaker document, complete with figures, for checking prior to printing. When proofreading, authors should employ the same symbols as discussed above (see *Techniques of editing manuscripts*) and shown in *Appendix 1*.

Page format of PageMaker documents

For two column NTGS Reports and Explanatory Notes, the column widths are 84.5 mm, with 16.5 mm margins on the sides of pages and 8 mm space between columns (standard A4 width of 210 mm). The page height is 297 mm, comprising 18.5 mm margins at the top and bottom, and 260 mm column height). To avoid resizing, figures and tables for Reports and Explanatory Notes should thus be set from the start to match these standard single or double column widths and heights (see *Figures, images and tables*).

INTERNET DOCUMENTS

Electronic delivery of products to clients via the internet (or CD-ROM) is fast, efficient and relatively cheap. Products are usually presented in GIS, spreadsheet, database and Acrobat formats. For a comprehensive discussion of NT Government policies and guidelines with respect to websites and their delivery of information to both internal and external clients, refer to *NT Government website guidelines* at http://www.nt.gov.au/dcis/it_policies. Part of the following brief discussion has been sourced from this website.

HTML documents

Hypertext markup language (HTML) format is used for documents intended to be read online. HTML documents are non-linear in nature, in that they generally consist of short sections of text and images that are connected by hypertext links. Very large textual documents are generally not suitable for presentation in this format on websites. As a rule of thumb, for a document longer than about five A4 printed pages, consideration should be given to splitting it into smaller documents or creating a PDF version which can be downloaded by the reader from the site. Authors should create the draft text in Word. The NTGS web administrator will convert the text and images to HTML and appropriate image formats and provide appropriate links and other formatting where required. The branding (visual identity) of the website will be established by the web administrator by incorporating common design elements (eg colours, logos, styles, etc) into every page.

Use Arial 10 point font for HTML documents. Ensure the word count of the draft document is minimised to limit scrolling and aid online reading. People rarely read web pages word by word. Provide scannable text with highlighted keywords, meaningful headings, bulleted lists, and short paragraphs. Underlined text can be easily mistaken for a link and should not be used. The preferred method of highlighting or emphasising text is to use **bold font** style.

Text should follow the media style of writing: begin the document by giving the reader the essential facts, follow by providing the most important supporting information, and end by giving the background. This 'inverted pyramid' approach allows the user to read important information immediately and then read additional information if they want more detail.

Public documents should, where appropriate, be published electronically prior to their hardcopy equivalents. This will ensure information is made available to clients in the shortest possible time.

For information on **images** for HTML documents see *Images for websites*.

The Acrobat document

Acrobat documents use the portable document format (PDF), which is a very space-efficient file system that allows the viewing of documents in their original layout without the original software they were composed in. Authors should prepare drafts in a similar manner to other written NTGS products. If the overall file size is small (maximum 2 Mb[1]), figures and tables can be embedded within a document. However, for larger documents, figures and tables are best retained as separate files that are linked during Acrobat formatting. Bookmarks can be added to assist in navigation throughout the Acrobat document.

All links in the Acrobat document, including the Contents, should be in blue text. Links can be to any graphic, to other parts of the text, to a URL, or to other files (eg Excel or MapInfo), which will be automatically opened by the appropriate software. Separate figures generally do not have dimension or colour restrictions as they can be set to fit the screen upon opening and there is a zoom tool to examine parts of a large or complex figure in detail. However, if figures are also to be used in a printed publication, then normal specifications should apply (see *Figures, images and tables*). Very large figures will take up some file space and in general, an individual PDF file should be no greater than 2 Mb, particularly if delivery via the internet is required.

For information on **images** for Acrobat documents see *Images for websites*.

STYLE CONVENTIONS

The following is a list of recommended conventions, styles and house rules. This list is mainly intended as a guide to the preparation of NTGS publications and products. It complements and should be used in conjunction with the *DBIRD writer's guide January 2003* (http://internal.dbird.nt.gov.au/news/writer%27s_guide.pdf), which sets general standards for written material produced within the department.

Abbreviations/acronyms	Use only common and well recognised abbreviations and acronyms, otherwise spell out the word. Commonly used abbreviations do not require the period (full stop), nor a comma following them. No sentence should contain a period within it: eg with multiple author citations *et al* is now used without a period. A **list of selected common acronyms and abbreviations** is in *Appendix 2*. Some additional information on abbreviations and acronyms is in *DBIRD writer's guide January 2003*.

---

[1] Larger files download unacceptably slowly across an Internet connection.

About	Use this word only where you really mean an approximation; otherwise it is not necessary. For example *35 km from Pine Creek* is adequate. The short, plain word *about* is preferred to *approximately*. Do not use *around* when referring to numbers (see also *Over*). For geological ages, the use of *ca, approximately, ~, c., about* and so on, is generally not necessary - a certain level of quantitative imprecision is implicit in all geological writing. This also applies when errors are not quoted for radiometric dates.
Acidic/intermediate/ basic	Refers to silica content of an igneous rock. These terms should not be confused with felsic/mafic/undersaturated/oversaturated.
Aeolian/eolian	Either is acceptable, but be consistent.
Affect/effect	These words are not synonyms. If a noun is required, *effect* is usually correct, eg *the effect of metamorphism* (note that when *affect* is used as a noun, it refers to feelings or emotion). When a verb is required, a rule of thumb is that *affect* means *to have an influence upon*, eg *temperature may affect the products of diagenesis*, whereas *effect* is stronger and means *to cause*, eg *increasing temperature will effect a change in mineralogy*.
Airborne	Not *airborn*.
Alternate/alternative	Alternate means to occur or cause to occur successively or by turns. Alternative means a possibility of choice, especially between two things.
And/&	No commas before *and* except in lists with linked objects, eg *varying amounts of quartz and feldspar, and minor magnetite and titanite*. Note: avoid using *with* as a conjunction if *and* can be used instead, eg in the above example, avoid using *feldspar, with minor magnetite*.
	Do not use the ampersand (&) unless it is part of a registered corporate or company name or it is a direct quotation.
And/or	An acceptable alternative is *or...or both*, eg *red and/or green* becomes *red or green or both*.
Apostrophes	Avoid the possessive for inanimate nouns. Mostly it is not required, but if it is, then restructure the sentence: eg the *age of the formation* and not the *formation's age* (see also *DBIRD writer's guide January 2003*). Do not use apostrophes in place names, eg *Totts Creek* not *Tott's Creek*.
Approximately	See *About*.
Areal/aerial	Areal refers to area, aerial refers to aeroplanes (or to a communications antennae).
Average	This term is synonymous with arithmetic mean and should not be used colloquially. Try *typical* as an alternative, if not referring to a statistical term.
Azimuths	Azimuths are directions that can be measured in the field or on maps, and are written as 065º, 345º etc. Azimuths usually apply to structural measurements and are useful when describing dyke sets.
Basinwide	No hyphen.
Billion	The Systèm Internationale d" Unités (SI) and American Petroleum Institute (API) define a billion as 10^9, not 10^{12} as in some European countries. Both meanings have been used in Australia, but the SI unit is preferred in NTGS publications. If there is any possibility of confusion, use numerals.
Brackets	Round brackets should be enclosed in square brackets, ie use the construction [compare with Smith (1985)] rather than (compare with Smith (1985)). Use a semi-colon to replace adjacent sets of brackets, ie (Figure 4; Smith 1985) rather than (Figure 4) (Smith 1985).
Cambrian symbol	For text at 10 point, type an underscore followed by a capital C select the underscore and use the Format—Font command and Character Spacing tab; for Spacing choose Condensed by 4 points; for Position, choose Raised by 5 points. This will produce the following symbol: Є.
Capitals (title case[9]:)	The following is a brief list of some common words and phrases that should always be in title case

1. All **formal lithostratigraphic nomenclature** with the exception of beds, eg *Carpentaria Basin*, *Toolebuc Formation*, *Marla Group*, *Pascoe River beds*. Retain title case for plurals, eg *Carpentaria and Dunmarra Basins*, *Burtawurta and Wickham Formations*.
2. All **time stratigraphic units**; the preceding early, middle, late, lower, upper should be capitalised only if they are referring to formally defined time stratigraphic units, eg Jurassic Period, Toolebuc time, Early Cambrian (defined), middle Early Cambrian (not defined), early Bathonian (not defined).
3. **Geological terms**, eg Carpentaria Depression, Pine Creek Orogen, North Australian Craton, Barramundi Orogeny (see also *Geological regions* and *Appendix 2*).
4. The **names of a biological phylum, class, order, family or genus**, but not species, subspecies or variety (see also *Taxonomic names*).
5. The full names of **organised bodies and companies** (see also *Appendix 2*).
6. **Mines, prospects and workings**, eg *Lady Loretta Mine*, *Wolf Creek Prospect*, *Kings Workings*.

---

[9] Upper case first letter, remaining letters lower case.

	For further advice on the use of capital letters with respect to government, geographic and other commonly used terms, see the *DBIRD writer's guide January 2003*.
Caveats	Spare the use of words like *probably*, *about*, *may be*. Especially avoid the double caveat: eg *cross-beds **suggest** that sand **may have been** deposited in shallow water*. Use *cross-beds **indicate** that sand was deposited*, or similar.
Centred around	Incorrect. Use *centred on*.
Certainly	A bad mannerism sometimes used to intensify statements. Refrain from using it.
Closed file	Not closed-file.
Collective nouns	A collective noun, singular in form, takes a singular verb, eg the *company is*, the *department is*, the *supergroup is*. An exception to this is when the noun stands for individuals in the collective noun, eg *The (individuals in the) field party have different views about the outcrop*. Some geological unit names (eg *Rangal Coal Measures*, *Mount Read Volcanics*, *Barnard Metamorphics*) can be followed by a plural verb for the sake of readability (eg *Rangal Coal Measures are*), although strictly speaking these names are singular.
Colons/semi-colons	In a list within a sentence, use colons and semi-colons to separate the various elements, eg *these include: items a and b; item c; and items d and e*. See also *Brackets* and *Dot/bullet/numbered points*.
Commas	Commas are a personal thing, but note the modern trend to minimise their use (see also *DBIRD writer's guide January 2003*).
Comparatives	Use the words *very* and *extremely* only when really needed. They usually add little to an adverb or adjective.
Compared with/to	Use *compared with* when pointing out a difference, eg *compared with* Western Australia, the Northern Territory has few economic iron ore deposits, and *compared to* when things are being likened to one another, eg the exposed dykes can be *compared to* mafic rocks intersected in drillholes.
Compass directions	Avoid using capitalised abbreviations, eg *NW*, *NNE* etc. Write out in full as *northwest*, *north-northeast* (note hyphen). However, the use of capitalised abbreviations is acceptable in tables where space is an issue. Clumsy sentence constructions, such as *north—south-trending*, can be replaced with **either** *north-trending* **or** *south-trending*; the meaning is the same, but be consistent when referring to a particular hemisphere throughout the text. Hyphens must be used in the constructions *west-trending* or *south-plunging* (see also *Hyphens*).
	When giving bearings, do not use *southwards*/*eastwards* etc; use *southward*/*eastward* or simply *south*/*east*.
Complement/ compliment	Complement means *to complete* (verb) or *that which completes* (noun). *Compliment* means praise.
Comprise/include	Use *comprise* only when **all** of the components are included in a list, eg *the formation comprises mostly sandstone and shale* is incorrect; use either *the formation includes mostly sandstone and shale*, or *the formation comprises sandstone, shale and dolostone* (all rock types listed).
Conglomeratic	Not *conglomeritic*.
Contrast	Use *contrast with*, not *contrast to*.
Coordinate	Not co-ordinate.
Data/dataset	The word *Data* has traditionally been regarded as plural (eg *these data*) and the equivalent singular is *datum*. However, modern usage allows *data* to be singular. Another form of the plural is *datasets*, but the word *dataset* is singular. Note also the spelling of *dataset* (**not** *data set*).
Database	Not *data base*.
Dates (ages)	Present dates as follows: eg *1880 ± 3 Ma* (use non-breaking spaces either side of the error sign and before *Ma*, by typing control—shift—spacebar in Word). *SHRIMP U-Pb zircon date* is the preferred way to write it. *Age date* is a truism and should not be used. Note that dates are not absolute and their interpretation can vary, whereas ages are more absolute. For example, *a SHRIMP U-Pb zircon date of 1880 ± 3 Ma is interpreted as the igneous age of the unit*. List age ranges as follows: *1.6-1.4 Ga, 1880-1850 Ma* (oldest first, no spaces). Do not use *between/from 1880-1850 Ma*, with a hyphen substituted for the words *and/to*; use the construction *in the range 1880-1850 Ma* (see also *Geochronology*, *Years*).
	For formats of modern dates, see *DBIRD writer's guide January 2003*.
Definite articles	Definite articles (*the*, *a*, *an*) can often be deleted before place names, eg *east of Victoria River*; before compound nouns, eg *overlain by Nagi Formation rocks*; and within lists, eg *the Jalboi Formation, Arnold Sandstone and Crawford Formation*. If possible, avoid commencing paragraphs with definite articles, and especially avoid their use as the first words of several successive sentences. Be selective about removal and aim for readability. Note that in some cases, definite articles may be necessary to indicate emphasis, eg *overlies **the** limestone of the Warramunga Formation* (rather than the shale).
	Use of the words *a*, *an* should be as in Fowler (1968). For example, *a* is used before all consonents except silent *h* (*a hypothesis*, *an hour*). Use *a* before a consonantal sound, eg *a $10*

	million drilling program, *an $8 million budget*. Before abbreviations or symbols, the choice is usually determined by the sound of the letter or acronym, not the word it represents, eg *an MV*T, *a Mississippi Valley-type*.
Diacritic characters	Languages employing diacritic characters (eg French, German, Czech) can be produced using the Latin-1 subset found under <u>I</u>nsert—<u>S</u>ymbol in Word. Alternatively, an extended character set that includes diacritic, Greek, mathematical and other symbols can be produced on the keyboard using ANSI character codes, as shown in *Appendix 3*.
Different from/to	Do not use *different to* (and never use *different than*), always use *different from*.
Dolomite/dolostone	*Dolomite* is no longer used as a rock term. Use *dolostone*.
Dot/bullet/ numbered points	Use a colon to separate the initial statement from dot/numbered points. For entire sentences listed as dot/numbered points, use an initial capital letter and a full stop for each. Where the dot/numbered point is a continuation of the initial statement, the initial letter is not capitalised and no punctuation is required after each point, except for a full stop at the end of the list. The word *and* is not added to the end of the second last point. Examples are provided below.

Enlightened government policy has resulted in numerous significant achievements:

1. *Explorers are gaining access to vast tracts of underexplored land.*
2. *Several new world-class mineral deposits have been discovered.*
3. *Gas is coming onshore.*

These include:

- *items a and b*
- *items c and d*
- *items e and f.*

Drillhole/depth	*Drillhole* is one word. When referring to drillholes, separate the name from the number with a non-breaking space rather than a hyphen, eg *Colson 1* not *Colson-1*. Depth should be indicated as in the following examples: *225 m in Murphy 2*, or *Murphy 2: 225 m.* Note that the use of the word *depth* is generally not necessary.
Early/Lower	Use Early when discussing time, Lower when discussing stratigraphy, eg *in the Early Cambrian*, *Lower Cambrian rocks* (see also *Late/Upper*).
Either/neither	Singular in number. *Either of the two is* not *either are*.
Fewer/less	Use fewer with numbers, less with quantities, eg *fewer intrusions*, *less magma*.
Focused	Spell it this way, not *focussed*.
Fractions	Express as decimals, eg 2.5 km not 2½ km.
Geological regions	Geological regions of the NT should be named as in the *Geological Map of the Northern Territory* (Ahmad 2000). The words *Region* and *Province* should be in title case[10]. It is acceptable to refer to *the Tanami* and *the Arunta* throughout a text, but give the full names *Tanami Region* and *Arunta Province* in the first instance.
Hematite/haematite	Use *hematite*, as in Ferenczi (2001).
Horizon	A horizon has no thickness. Therefore expressions such as *ore horizon* should not be used.
However	Minimise use. Try alternative terms such as *nevertheless*, or *but* if within the sentence. However, if *however* is to be used, try to place it at the start of the sentence.
Hyphens	No two dictionaries or style guides will be found to give the same advice with regards to the use of hyphens; the infinite variety in modern English usage defies description. The only principle in common appears to be that the hyphen is not an ornament, but an aid to understanding and should be employed only when needed for that purpose. This rule of thumb should not be treated as dogma and in many instances, there is room for differences of opinion as to whether a hyphen is needed or not. Some guides as to their use follow: 1. The primary function of the hyphen is to indicate that two or more words should be read together as a single word with its own meaning. Thus, they are always used in **phrasal compounds** such as *state-of-the-art* and *up-to-date*, when in an attributive sense. In other words, use hyphens when the modified word follows the phrase (eg *up-to-date figures*, but not in predicative form *the figures are up to date*). 2. **Composite nouns** are usually either not hyphenated (eg *channel fill*, *dip slope*, *mud crack*) or are consolidated into a single word (eg *fieldwork*, *groundwater*, *shoreface*). A very few words are hyphenated, the most notable examples of which are *cross-section*, *cross-strata*, *cross-bed*, *cross-lamina* and their variants.

---

[10] Upper case first letter, remaining letters lower case.

3. **Composite adjectives** are usually given hyphens. Numerous grammatical combinations are possible. They include: adjective+adjective (eg *grey-green*, *north-northwest*); noun+adjective (sulfide-rich, *Territory-wide*); adjective+noun (eg *mid-ocean*, *low-angle*, *high-energy*); noun+noun (eg *rubidium-strontium*, *particle-size*); adjective+participle (eg *low-lying*); noun+participle (eg *northeast-trending*, *gold-bearing*, *ore-forming*); noun+verb (eg *Darwin-based*, *face-centred*, *quartz-filled*, *strike-slip*) and so on. These are all technically correct and acceptable, but there may be other ways to convey the message. Composite adjectives can often be recast both for variety and to reduce hyphen usage: eg *Darwin-based* might be recast, using a preposition, as *based in Darwin* and *sulfide-rich* as *rich in sulfides*. There are a number of other methods to minimise the use of hyphens, eg *fine-grained sandstone* can be recast as *fine sandstone*, with no loss of meaning, and *thin-bedded sandstone* as *thinly bedded sandstone* (see *point 4*).

4. When the first word of the compound is an **adverb**, it is usually not necessary to use a hyphen, unless there is the possibility of ambiguity (see *point 6*), eg *well bedded unit*, rather than *well-bedded unit* and *thickly bedded* rather than *thickly-bedded*.

5. **Prefixes** and **suffixes** are often accompanied by hyphens (eg *near-surface*, *pre-orogenic*, *pre-date*, *pipe-like*). See also *Sub-/super-*.

6. Sometimes hyphens are necessary to avoid **technical ambiguity**. For example, consider the construction *sandstone and chert-clast conglomerate*. Does the word *sandstone* refer to a separate rock type (ie *a sandstone bed and a chert-clast conglomerate bed*) or to another type of clast within the conglomerate (ie 'sandstone- and chert-clast conglomerate')? Another example is the phrase 'post-mining period', which should be hyphenated to avoid the (ridiculous) meaning that posts were being mined.

See also *Non-breaking hyphen*.

In/on	For explanatory notes, use *in* rather than *on*. A location should be described as *in* MILINGIMBI because it is *in* that map area, not *on* the printed map.
Infer	Do not confuse with *imply*, which means *to suggest* or *hint*. *Infer* means *to deduce* from facts and reasoning.
Inhouse	Not in-house.
Interpretive/ interpretative	These are synonyms. *Interpretive* is formed from the verb *interpret*, whereas *interpretative* is a back-construction from the noun *interpretation*. *Interpretive* is more commonly used in Australia and is preferred.
Isotopes	Express as ^{238}U, ^{40}K, ^{207}Pb/^{204}Pb (not U-238 or uranium-238, etc.)
Late/Upper	Use *Late* when discussing time, *Upper* when discussing stratigraphy, eg *in the Late Cambrian*, *Upper Cambrian rocks* (see also *Early/Lower*).
Latitudes/longitudes	No spaces, eg 27°31'00"S, not 27° 31' 00" S.
Litre	Abbreviate as L. This also applies to mL (millilitres).
Map area	This is a perfectly acceptable term and does not need to be *mapsheet area*. Similarly, *mapsheet* is acceptable.
Massive	Avoid colloquial use, eg *massive funding cut*, *massive deformation*. There are several different geological meanings: a *massive mineral deposit* (especially sulfides) is characterised by concentration of ore as opposed to disseminated and is not necessarily large; *massive igneous* and *metamorphic* rocks have a homogenous texture; a *massive sedimentary rock* occurs in thick homogenous beds lacking internal structure; and a *massive mineral* is physically isotropic, ie lacking a platy, fibrous or other structure.
Mathematical symbols	Most of these can be produced using the <u>I</u>nsert—<u>S</u>ymbol command in Word. Alternatively, an extended character set that includes diacritic, Greek, mathematical and other symbols can be produced on the keyboard using ANSI character codes as shown in *Appendix 3*.
Mount/Mt	Do not abbreviate the word *Mount* when referring to mountain names, eg *Mount Northcote*, *Mount Hodgson*, or mapsheet names, eg *MOUNT DOREEN*, *MOUNT MARUMBA*, *MOUNT LIEBIG*. Similarly, the city is *Mount Isa*, not *Mt Isa*.
Nicol	The prism used in a polarising microscope. Not to be spelt as *nichol* or *nikol*.
Non-breaking hyphen	Non-breaking hyphens keep integral text together, as per non-breaking spaces. A non-breaking hyphen is created by typing *control—shift—hyphen* and will survive into PageMaker. Note that when 'hidden symbols' (eg paragraph symbols) are visible, non-breaking hyphens appear to be too elongate, but they are the correct size when the 'hidden symbols' toolbar button is turned off and when the document is printed (see also *Hyphens*).
Non-breaking space	Non-breaking spaces keep integral text together, as Word adjusts line length, and prevents the text being spread over two lines. A non-breaking space is created by typing *control—shift—spacebar* and will survive into PageMaker. Place non-breaking spaces: before Ma, My, Ga, in *et al* (ensure this is italics), *in situ* (ensure this is italics), before and after $\pm$ (eg 1324 $\pm$ 4) before km, m, cm, mm, tonnes, Mt, t, g/t, ppm, micron, µm, nm, oz, Moz, Au, vol%, wt%, ‰, g, mole, eq, kbars, and

	any other units of measurement, after Appendix (if more than one and numbered), in spaces in large (but **not** 4 digit) numbers, eg 250 000, 10 000, after Figure and Table, and in number lists after the 'and' (eg 4, 5 and 6).
None	Singular in number. None is, not none are.
Northern Territory	Use the full name in the first instance, then the *Territory* or *the NT* after that.
Number ranges:	Present without spaces to either side of the hyphen, but with a non-breaking space before the unit: eg 10-20 m, 35-50 mm, 10 000-8 000 ybp. The smallest number comes first, except for ages and years before present [see *Dates (ages)*].
Numerals	Delete the comma from five-digit or greater numbers in favour of a non-breaking space, thus 159 000 or 1:250 000. Four-digit numbers have no space, eg 1000, except in tables where a space may be used for alignment with other numbers. Numbers in the text that are not followed by a unit of measurement should be spelt out when less than 10; for 10 or greater, use numerals. However, where a number less than ten is followed by a standard unit of measure, numerals should be used. For example: *at a point 2 km south of the crossing, there are five examples of an intrusive relationship.* Never start a sentence with a numeral.
Often/sometimes	These are time terms and should not be used to convey variability of features. Thus *the shale often has a green colour* implies that the colour might vary with time. Better to use phrases such as *in places, locally, generally* or *commonly*.
Online/offline	Not on-line/off-line.
Ooid/oolite	Ooid refers to a coated grain less than 2 mm in diameter with concentric micritic laminae, oolite to a rock composed of ooids (see also *pisoid/pisolith/pisolite*).
Open file	Not open-file.
Orient/orientate	These words are synonymous. The shorter form is preferred for NTGS publications.
Outcrop/subcrop	The meaning of *outcrop* is somewhat controversial: The Glossary of geology defines it as 'That part of a geologic formation or structure that appears at the surface of the Earth; also, bedrock that is covered only by surficial deposits such as alluvium'. Most other geological dictionaries follow this traditional definition. Thus, in this sense, outcrop does not necessarily need to be exposed. *Subcrop* is defined by the Glossary of geology as (a) 'strata in contact with the undersurface of an inclusive stratigraphic unit that succeeds an important unconformity on which an overstep is obvious' and (b) 'an area in which a formation occurs directly beneath an unconformity'. However, many geologists, particularly in the mining industry, equate outcrop with exposure and refer to rock overlain by surficial deposits as subcrop. Most previous NTGS publications have followed this usage. A strong argument can thus be made that, because they are in widespread use, these alternatives meanings should be regarded as valid. In order to avoid any confusion with regards to their meaning, a sentence should therefore be added to the *Terminology and classification* section of the *Introduction* of NTGS publications, where relevant, to define outcrop and subcrop as used therein. Like many nouns *outcrop* can also be a verb, so the expression *the rock crops out* can and should be avoided.
Over	Use *more than* rather than *over* when referring to numbers, thus *more than 200*, not *over 200*.
Pisoid/pisolith/pisolite	In carbonate terminology, a *pisoid* is a coated grain greater than 2 mm in diameter with concentric micritic laminae. In other sedimentary rocks or laterite, a *pisolith* is an accretionary body greater than 2 mm in diameter and a *pisolite* is a rock composed of pisoliths cemented together. Avoid using *pisolite* to describe individual grains (see also *ooid/oolite*).
Principle/principal	*Principle* means fundamental truth or law; *principal* refers to one who is first in importance eg a headmaster or to capital or property as opposed to interest.
Program/programme	Use *program* in preference to *programme*.
Proterozoic symbol	For text at 10 point, type a capital L followed by a capital P; select the L and use the F<u>o</u>rmat— F<u>o</u>nt command and Cha<u>r</u>acter Spacing tab. For <u>S</u>pacing choose Condensed by 6 points. This will produce the following symbol: P.
Quotations	Ensure that the original author is properly acknowledged for all quotations from other works. As a general rule, **short quotations** of less than say 30 words should be set within the text, either in *italics* or within single quotation marks (''). **Longer quotations** should be set as a separate indented paragraph in 9 point text, with one line space before and after the paragraph. It is not necessary to use italics or quotation marks. For example, from Cutovinos *et al* 2002: 16:
	In its present structural configuration, the Birrindudu Basin is essentially an inverted basin with all stratigraphy younging toward the basin margins. Uplift is attributed to a compressional event that was in part time-transgressive and initially focused in Limbunya.
Reserves and resources	Authors must use these terms in accordance with the Joint Ore Reserves Committee (JORC) code. Refer to the Australian Institute of Geoscientists website: www.aig.asn.au/jorc_code.htm.

Rock/mineral types	Rock types should normally be written as singular, eg *the succession consists of sandstone, mudstone and dolostone*. If a plural form is necessary, use *sandstone beds* or *volcanic rocks,* or similar. Mineral species are also singular, thus *zircon* not *zircons*. However, the form *zircon crystals* can be used. Note that the term *lithology* refers to the description or physical characters of a rock (see Jackson 1997) and is more or less synonymous with *petrography*; it should not be used as a substitute for *rock type*.
Sequence/succession	The term *sequence* should only be used when referring to sequence stratigraphy. Use *succession* when referring to lithostratigraphy.
Spelling	The default dictionary in Word uses American spellings and will need to be updated using the Add button in the Spelling and Grammar dialogue box (Tools menu). NTGS adopts the conventions of the Macquarie dictionary for most spellings. For example, use *colour* not *color* and the letter *s* in preference to *z* in words like *synthesise*.
Sphene/titanite	Use titanite rather than sphene, following recommendations of the International Mineralogical Association and Commission on New Minerals and Mineral Names.
Stratigraphic names as adjectives	Avoid the use of formation names as adjectives, eg *Greenschist facies rocks of the Killi Killi Formation* rather than *Killi Killi Formation greenschist facies rocks*.
Stromatolite/ microbiolite	Burne and Moore (1987) defined *microbiolite* to include stromatolites with synoptic relief, thrombolites and prone microbial mats. This term is preferred for Proterozoic examples.
Sub-/super-	When used in stratigraphy, there are no hyphens or spaces, thus *subgroup*, *supergroup* and **not** *sub-group*, *super-group,* or *sub group, super group*.
Sulfur/sulphur	*Sulfur* is now the internationally accepted spelling for the element and all its variants, thus sulfide, sulfate, etc.
Targeted	Not targetted.
Tautologies	Tautologies repeat the same thing in different words and should be avoided. Some common examples include: *actual fact*; *completely absent/empty/full/unique*; *absolute minimum/maximum*; *close proximity*; *end result*; *erode away*; *forward planning/modelling*; *general consensus*; *intrude/penetrate into*; *mix together*; *relative proportion*; *reservoir rock*; *thin veneer*; *red/black/green* etc *in colour*.
Taxonomic names	These should be in *italics*. Use title case for generic names, all lower case for species, eg *Palaeocaesalpiniaceaepites lesquereuxianus*. The author and date of publication should be appended, at least for the first mention of the name. Common names are not italicised, eg coral trout (see also *Capitals*).
Terrane/terrain	According to the Glossary of geology, *terrane* is defined as 'a fault-bounded body of rock of regional extent, characterised by a geologic history that is distinct from contiguous terranes'. *Terrain*, on the other hand, is not a geological term and refers more to geomorphology. Therefore, the term *terrane* should be used when referring to geological regions, but only if it broadly agrees with the definition above.
That/which	Use *that* for defining clauses and *which* for non-defining clauses (Flann and Hill 1994: 33). Ask yourself: does the clause define (or help define) the noun, or is it non-defining and non-essential in nature? In other words, *that* tells which one, whereas *which* adds a fact. For example, *shale that is overlain by,* as distinct from *shale, which is pyritic*. Note that the term *which* should always be preceded by a comma.

Consider leaving the words *that/which* out altogether to see if the sentence flows better and still makes sense, eg *The exposures found to the east of the road* instead of *The exposures that are found to the east of the road.* |
Tonnes	*Tonnes* is abbreviated as *t* and *millions of tonnes* is abbreviated as *Mt*.
Tufaceous/tuffaceous	*Tufaceous* refers to the chemical sedimentary rock (tufa); *tuffaceous* means containing up to 50% pyroclastic rocks, eg tuff.
Turbidite	Refers to the sediment, not to the underwater flow.
Units of measurement	Units of measurement do not require a full stop. Most are written with a *non-breaking space* following the number, eg *10.30 am*, *50 g*, *100 Ma*, *12.5 ha*, *8 mm*, *100 km*. However, no space is needed between the figure and the symbol (or letter) in expressions such as *9%*, *15°C*, *$10m*, *5c*, *2nd*. Note that units are always singular not plural, eg *km* not *kms*. There are no spaces before and after a forward slash, eg g/m^2 not g / m^2. Imperial measurements (eg feet) may be used, when quoting them from literature.
Volcani-/volcano-	Use *volcani…* in composite words, such as *volcaniclastic*, *volcanilithic*, *volcanigenic* etc, as per Schmincke and Fischer (1984) and Cas and Wright (1987).
Website	Not web site or web-site.

While	*While* means 'during the time that'. In the following example: *the rocks from area A are fluvial, **while** those from area B are lacustrine…*, the word *whereas* should be substituted for the incorrect *while*. **While** *these sediments were being deposited,…* is correct usage. Do not use *whilst*.
Years	For historical times, write as 1890-1930 if two centuries apply, or 1980-85 if the century is the same. As for age ranges, the earliest is written first (in the latter examples the first number is smaller because it refers to years AD rather than years before present). For decades use the form 1980s, not 1980's, which is possessive case [see also *Dates (ages)*].

STRATIGRAPHIC NOMENCLATURE

Lithostratigraphic names

It is important to resolve and define new lithostratigraphic names as early as possible, within reasonable constraints of getting the science and correlations right. To leave names and definitions too late can delay publication, and cause frustration to authors and managers. If new lithostratigraphic units are to be erected, authors should select names (or propose new names) from appropriate geographic features, and reserve them with the Central Register of Stratigraphic Names at Geoscience Australia (website http://www.ga.gov.au/oracle/stratnames.html) as soon as possible.

A lithostratigraphic name may be chosen from among the geographic names on any published map. The name should not have been used in the NT or in an adjacent state, even for a grossly different rock type. For example, if the Pooh Formation exists within the NT or a contiguous state, the substantive 'Pooh' cannot be used for a new unit, either alone or in combination: Pooh River, Mount Pooh, Pooh Creek, Pooh Bay and other combinations would all be inadmissible. Some relaxation of these provisions is permissible under certain circumstances: see Brakel (2000) in *The Australian Geologist* 117: 15.

It has often been necessary to use Aboriginal names in the NT (from outstations, hills or mountains), even though these names may not appear on formal maps. Possible names may be checked against existing published and reserved names using the Stratigraphic Names database, maintained by Geoscience Australia (www.ga.gov.au). Once the novelty of a proposed name has been established, it should then be formally reserved by notifying the manager of the Stratigraphic Names database.

Following Staines (1985) and a longstanding policy of the Stratigraphic Names Committee of the Geological Society of Australia, it is strongly recommended that the modifier of a geographic name be deleted from any new lithostratigraphic name, and only the substantive portion of the geographic name be used: eg *Mission Sandstone* not *Mission River Sandstone*.

Refer to Staines (1985) in the *Australian Journal of Earth Sciences* 32, 83-106 for standards recommended by the Geological Society of Australia. Note that it is Stratigraphic Names Committee policy to encourage the use of *dolostone* rather than *dolomite* in both new and existing lithostratigraphic names.

Stratigraphic nomenclature in Australia is administered by the Australian Stratigraphic Names Committee, headed by a National Convener and with constituent Subcommittees in each state and territory. Draft lithostratigraphic unit definitions should be submitted to the Convener of the NT Stratigraphic Names Subcommittee in the first instance.

Igneous and metamorphic units

While Staines (1985) is the accepted guide to all lithostratigraphic nomenclature in Australia, the naming of igneous and metamorphic units has at times proven difficult.

It is an important goal of geological mapping to create formal names for igneous and metamorphic rocks, as a convenient framework for description. We also aim to minimise the number of names in order to describe the geology as simply as possible. At times it has been considered necessary to discard old names and group similar rocks together under a single name.

A unit should remain informal where it is insufficiently understood to formally name, in which case no geographic component should appear in its name. It may also be useful for some small units or distinctive rock types to leave them as an unnamed unit within a suite (or unit within a formation). This is especially advisable if the descriptive part is considered more memorable than a formal name (eg *rapakivi granite* of the *Smith Granite Suite* may be better than *Jones Granite* of the *Smith Granite Suite*).

For granite bodies, it has recently become acceptable to use Smith Granite Suite (or Smith Suite) with the same rank as a group, and Jones Granite with the same rank as a formation. Complex is another term that may be substituted for suite (but see Staines (1985) for definition).

The dominant rock type in the unit may be used in the name: eg Vic Charnockite, Wal Gneiss, Xena Dolerite, Yak Tonalite, Zeb Schist. The technical part of any igneous rock names should be acceptable according to the IUGS scheme (Le Maitre 1989). Some past usages are discouraged (eg the Outonya Gneissic Unit in KULGERA).

A draft guide to igneous unit definition and nomenclature in Australia [see Brakel (2002) in *The Australian Geologist* 124:16-17] is currently under consideration by the Australian Stratigraphic Names Committee.

GEOCHRONOLOGY

New NTGS geochronological data should always be accompanied by a reference to a publication (such as an NTGS Record or Report, or an external publication) that contains concordia diagrams, data tables and a detailed interpretation. If no publication exists, then a more detailed description of the new data, including concordia plots and data tables, should be included in a separate Geochronology section within the document, with the approval of the geochronologist concerned. If the data is preliminary and no text or tables exist, the date should be referenced as follows (author, institute, pers comm date, preliminary data). Any new geochronological date that is quoted in the text must be accompanied by an interpretation of its significance. Maximum deposition ages of sediments should be described as follows: "The youngest population of detrital zircons in the Dufaur schist has a SHRIMP U-Pb zircon date of 1865 ± 3 Ma, interpreted to be the maximum deposition age of the unit" or similar. The term "detrital zircon age" is not appropriate for maximum deposition ages. A table of the full locations, interpreted significance and sources of all geochronological data for the area of study should be standard in any document (particularly Explanatory Notes) that contains multiple geochronological data.

When quoting dates, ensure that the full dating method and the material from which the date was derived are given, eg SHRIMP U-Pb zircon date, not just SHRIMP date or U-Pb date.

REFERENCING

The guides given here reflect a modern trend to eliminate unnecessary punctuation. Not only does this reduce keystrokes, but aesthetically improves the publication. Avoid the use of abbreviations, especially in journal names.

Note that there have been minor style changes for references since the first Edition of this guide was produced. These are indicated in the appropriate places in the text.

Textual citations

- There is no comma between author and year, but commas between citations (eg Walter 1980, Myers *et al* 1984, 1986, Nicoll 1991a, b).
- Page numbers can be shown as follows: Shergold (1981: 82) or, for page ranges: Shergold (1981: 89-99). Place a non-breaking space between the colon and page number.
- For two authors, show as Allnutt and Bubner (1985) or (Allnutt and Bubner 1985).
- For more than two authors, show as Lloyd *et al* 1990 or (Lloyd *et al* 1990). There is no period after *et al* and it should be italicised. Place a non-breaking space between the '*et*' and '*al*'.
- Where referring to illustrations or tables in a previously published work, there is potential for confusion as to whether they refer to the cited or present text. To avoid this, use Regular font style for those from a cited reference and **bold** for those from the present work. References to figures and tables from a cited work can also be made using the construction (Figure 5 of Morris 1986) to be certain of avoiding confusion.
- In some cases, it may be appropriate to cite contributors to a published work who are not themselves listed as authors in that work. Use the form: (Smith in Geyer 2000) or Smith in Geyer (2000).

Use of EndNote

EndNote is a bibliographic program that can save a lot of work of typing in references, formatting them, and checking that the reference list matches the textual citations and vice versa. EndNote can do all of this automatically. A few hours spent learning its use can save tens of hours of work in the long term on needless typing, manual formatting and checking. Installation of the EndNote program is accompanied by a Word add-on that provides a list of EndNote commands to the Tools menu in Word.

Briefly, Endnote requires the creation of a database '**library**' of references. EndNote database records can be typed, downloaded from numerous internet and library sources, or copied from an existing EndNote library. As with all databases, if typing in records from scratch, the entering of the data can take some time, but there can be advantages in terms of accuracy and correct formatting. At the time of writing, a large EndNote library containing nearly 5000 references (Main_library.enl) is available from the Darwin network at \\dmedwfile1\Divisions\Geological Survey\Publications Current\EndNote. However, note that this database has been cobbled together from numerous sources, the data has not been checked for accuracy and many entries are not correctly formatted for the NTGS EndNote style (see below). Nevertheless, it is a helpful starting point for an aspiring user. A small sample EndNote library (ntgs_sample_library.enl), which is located in the same folder as Main_library.enl, gives correct formatting of a variety of reference types (eg journal article, book, book section etc) for use with the NTGS style.

After the EndNote reference library has been created, the advantages offered by the program really become apparent. When citing a reference during the writing of a text, you can quickly switch from Word to EndNote to insert a temporary citation from the library. When finished, EndNote can compile your entire bibliography in the style you request, as well as finalising textual citations in the style required. This gives a final document that has textual citations consistent with the bibliography. A **style** designed for all NTGS publications (NTGS.ens) can be downloaded from the Darwin network at

\\dmedwfile1\Divisions\Geological Survey\Publications Current\EndNote or accessed from the Darwin server DMEDWAPP1 (in the folder V:\EndNote\Styles\Geosciences).

For details of using EndNote, see either the full manual, or access online help from the Darwin network at \\apps on 'dmedwapp1'\EndNote\Endnote3.hlp.

Order of reference list

References are listed alphabetically according to the source or authors' names, including initials. Source names are used where there is no specified author (eg BMR, CSIRO, CODES, NTGS, Shell Oil, Otter Gold, etc). If you abbreviate the source to replace the author, make sure you write out the source name in full somewhere in the rest of the reference. For example: either write BMR [Bureau of Mineral Resources, Australia] 1990 in the reference list to match the textual citation BMR (1990) or have an appendix of abbreviations (see *Appendix 2*) if there are many. Treat all *Mac*, *Mc*, *M'* and *St* entries as they come, letter by letter. Names including Bin, D', Da, De, Der, Des, Del, Van, Von etc should be listed alphabetically by these terms as per the LEDA catalogue.

The date of publication is relevant to ordering of references only if the author or authors are the same (earliest reference listed first). Single authored references are listed first, before multiple authors, but there is no difference between two or more compared to two authors. For the same author/s and same year, use a, b, c etc for the reference and list them in order of publication (if known) rather than the order of citation in the text (ie Smith 1995c may be the first Smith 1995 reference cited in the text, but it is listed as c because it was published after a and b).
The following examples illustrate the technique:

Brown D, 1979.
Brown D, 1980.
Brown D, Black R and Green L, 1992.
Brown D and Mauve G, 1980.
Brown D and Red P, 1994.
Brown D, Red P and Mauve G, 1985.
Brown D and Yellow G, 2002a. First title. *Journal A* 76, 1-5.
Brown D and Yellow G, 2002b. Second title. *Journal A* 76, 87-334.

Format of reference list

NTGS Explanatory Notes and Reports have a two-column layout for references. NTGS Records have a single column layout. There should be one line space between references and the text should be left and right justified with a hanging indent (second and subsequent lines) of 5 mm. In the main body of text, references should be in 10 point Times New Roman with line spacing at exactly 12 points. A suitable style ('References') is included in both of the standard NTGS templates (see *NTGS styles and templates*).

Minimise punctuation in names in reference lists. There should be no comma between surname and initials, no full stops after initials and no spaces between initials. With some exceptions (see *Foreign language references*), do not spell out given names.

Do not use capitals for words in the title, which are not proper nouns. If the original author or journal did so, then correct it in your list: eg 'On The Crystal Structure Of Muscovite From Rabbit Flat, Northern Territory' would become 'On the crystal structure of muscovite from Rabbit Flat, Northern Territory', with no loss of information.

Do not abbreviate journal or series names. Write them out in full.

Examples of the correct formats for references in NTGS publications are shown below for different types of publications.

Journals and periodicals

There is usually no need to list the title or editors of a special issue; there should be enough information elsewhere in the reference to identify the paper unambiguously. Note that there is no space between issue number (in brackets) and volume number (eg Reed 2002).

Jones PJ, Shergold JH and Druce EC, 1971. Late Cambrian and Early Ordovician stages in western Queensland. *Journal of the Geological Society of Australia* 18, 1-32.

Reed A, 2002. Formation of lode-style gold mineralisation during Tabberabberan wrench faulting at Lefroy, eastern Tasmania. *Australian Journal of Earth Sciences* 49(5), 879-890.

Wentworth CK, 1922. A scale of grade and class terms for clastic sediments. *Journal of Geology* 30, 377-392.

Zhao Jianxin and Bennett VC, 1995. SHRIMP U-Pb zircon geochronology of granites in the Arunta Inlier, central Australia: implications for Proterozoic crustal evolution. *Precambrian Research* 71, 17-43.

NTGS Records

Three digits are used to identify the issue following the date (cf company and petroleum reports, which use 4 digits, eg 1978-0171).

Lally JH, 2002. Stratigraphy, structure and mineralisation, Rum Jungle mineral field. *Northern Territory Geological Survey, Record* 2002-005.

AGSO/BMR volumes

Treat as if a journal regardless of whether the whole volume is by the same author/s. As for journals there is no need to list the title or editors of a special issue. Note that BMR/AGSO year and issue numbers are separated by a slash (eg 1960/71) rather than by a hyphen as in NTGS volumes (eg 1999-012). There is no need to write *Geology and Geophysics* after *Bureau of Mineral Resources*.

Laurie JR, 2000. Macrofossils from the Tomahawk beds, Georgina Basin, Tobermory 1:250 000 sheet area, Northern Territory. *Australian Geological Survey Organisation*, *Professional Opinion* 2000/34.

Shaw RD, 1991. The tectonic development of the Amadeus Basin, central Australia. *Bureau of Mineral Resources, Australia, Bulletin* 236, 429-461.

Smith KG and Vine RR, 1960. Summary of the geology of the Tobermory 4-mile geological sheet. *Bureau of Mineral Resources, Australia, Record* 1960/71.

Books or edited volumes

For books, the emphasis (*italics*) should be placed on the title rather than the publisher, as in the First Edition of this guide. Note that there is no need to quote the number of pages when referencing complete books. Note that the edition number is given in full, thus *Third* not *3rd*.

Hallenstein CP (editor), 1994. *Australian mining looks north - the challenges and choices. Proceedings, 1994 AusIMM Annual Conference, Darwin 5-9 August 1994*. Australasian Institute of Mining and Metallurgy, Melbourne.

Phillips WR, 1971. *Mineral optics*. WH Freeman and Co, San Francisco.

Reading HG (editor), 1996. *Sedimentary environments: processes, facies and stratigraphy*. *Third edition*. Blackwell, Oxford.

Articles in books or edited volumes

For articles in an edited series, italicise the names of both the book and series. Place the book name in single quotes as per the following example:

Tilley DB, 1998. The evolution of bauxite pisoliths at Weipa in northern Queensland: in Eggleton RA (editor) *'The state of the regolith.' Geological Society of Australia, Special Publication* 20, 148-156.

Explanatory Notes

These are formatted in a similar manner to books, with the emphasis (italics) on the title. Note that First/Second Edition is given in title case (upper case initial letters) in both references and where mentioned in the text.

Bultitude RJ, 1973. *Wave Hill, Northern Territory (First Edition). 1:250 000 geological map series explanatory notes, SE 52-08*. Bureau of Mineral Resources, Australia, Canberra.

Cutovinos A, Beier PR, Kruse PD, Abbott ST, Dunster JN and Brescianini RF, 2002. *Limbunya, Northern Territory (Second Edition). 1:250 000 geological map series explanatory notes, SE 52-07*. Northern Territory Geological Survey, Darwin.

Chan PA, Mikolajczak AS and Retter AJ, 1990. *Quartz, Northern Territory. 1:100 000 geological map series, explanatory notes, 5951*. Bureau of Mineral Resources, Australia, Canberra.

NTGS maps

Edgoose CJ, Close DF, Stewart AJ and Duncan N, 2002. *Umbeara, Northern Territory (First Edition). 1:100 000 geological map series, 5646.* Northern Territory Geological Survey, Darwin and Geoscience Australia, Canberra (National Geoscience Mapping Accord).

Ahmad M, 2000. *Geological map of the Northern Territory. 1:2 500 000 scale.* Northern Territory Geological Survey, Darwin.

Mineral and Petroleum Company Reports (CR, PR series)

References to reports lodged with Northern Territory government departments do not need to conclude with "unpublished". Layouts are similar to those of journals. Note that '*Northern Territory Department of Mines and Energy*' should be changed to '*Northern Territory Geological Survey*'. Four digits are used in the number after the year and hyphen, as this is the format used in the IRMS database.

All mineral and petroleum company reports are indexed into the Industry Report Management System (IRMS) database. Closed file reports may occasionally be cited, in such things as tabulations of exploration work done. However as a general guide, work done or geological findings from exploration projects still on closed file should not be referred to. If the release of closed file information is desirable because of the geological context of new findings, then written permission is required from the company, and due acknowledgement should be given in the text.

Allnutt S, 1986. Final report for the period to 30th July, ELs 4612-4617, 4625-4627. CRA Exploration Pty Ltd. *Northern Territory Geological Survey, Open File Company Report* CR1986-0288.

Alliance Petroleum Australia, 1964. Report for Tarlton Downs gravity survey. *Northern Territory Geological Survey, Open File Petroleum Report* PR1964-0005.

Geological Survey Technical Notes and Technical Reports

References to NTGS Technical Notes do not need to conclude with "unpublished". Three digits are used in the number after the year and hyphen. NTGS Technical Reports of the old GS series should be referenced as per the example below (Wygralak 1995). Note that '*Northern Territory Department of Mines and Energy*' is changed to '*Northern Territory Geological Survey*'.

Doyle N, 2001. Drill logs, particle size distribution results and dtw natural gravel and fill specifications for extractive mineral deposits in the outer Darwin area. *Northern Territory Geological Survey, Technical Note* 2001-006.

Wygralak AS, 1995. Comments on the transport directions and depositional environments of the Tawallah Group, Constance Sandstone and Wire Creek Sandstone on the Calvert Hills 1:250 000 map. *Northern Territory Geological Survey, Technical Report* GS1995-001.

Internal reports

If it is not a report lodged with a Government authority, refer to it as follows (note that a report number may or may not be assigned):

Dunster JN, 1998. Reconnaissance of the Proterozoic rocks of the Victoria River region. *North Ltd. Internal Report* QB98/261.

Internet references

For internet references, give the author and year of the original uploading, if known, followed by the organisation, if known, followed in italics by the title of the document. The publisher and place of publication is replaced by the document's URL. Omit the final full stop in the bibliographic entry to avoid URL addressing confusion. If a URL needs to be given in two lines, it should be split only after forward slashes and not between words of the location.

Fletcher G and Greenhill A, 1997. Faculty of Humanities, Griffith University, Queensland. *Academic Referencing of Internet-based Resources*. http://www.spaceless.com/WWWVL/refs.html

If author, date or organisation are not known, then a minimal bibliographic entry would appear as:

Academic Referencing of Internet-based Resources. http://www.spaceless.com/WWWVL/refs.html

Entries in MODAT, COREDAT

Give the compiler and date, followed by the entry name and ID number.

Ahmad M, 1992. Kings Table, Deposit ID No 0003. *Northern Territory Geological Survey, Mineral Occurrence Database (MODAT)*.

Personal communications

Use the construction *author, institute, pers comm date,* eg *J Bloggs, ANU, pers comm 2002*. Note that pers comms are verbal. Citations of written statements should use *in litt*.

Theses

References to theses do not need to conclude with (unpublished). Page numbers are not necessary. The type of thesis, school/department, university and location must be specified in that order.

Cooper WC, 1990. *Gold mineralisation at Bridge Creek, Northern Territory - deformational, structural and chemical controls on mineralisation.* BSc (Hons) thesis, School of Earth Sciences, James Cook University, Townsville.

Hill JH, 1973. *Lead isotopes and regional geochemistry of the north Australian uranium deposits.* PhD thesis, Department of Earth and Planetary Sciences, Macquarie University, Sydney.

Foreign language references

Languages employing diacritic characters (eg French, German, Czech) can be produced using the Latin-1 subset found under "Insert—Symbol" in Word. Alternatively, an extended character set that includes diacritic, Greek, mathematical and other symbols can be produced on the keyboard using ANSI character codes as shown in *Appendix 3*.

For references in non-Roman alphabetic languages (the Cyrillic alphabet being the most likely to be encountered by geoscientists: eg Russian language), give first the letter-for-letter transliteration, followed in square brackets by the English translation. For non-alphabetic languages (eg Mandarin), give the English translation only, in square brackets.

Write the author's name in full if considered necessary (as recommended for Chinese names). Examples, slightly modified, from Kruse 1998 (*NTGS Report* 9):

Duan Chenghua, 1984. [Small shelly fossils from the Lower Cambrian Xihaoping Formation in the Shennongjia district, Hubei province – hyoliths and fossil skeletons of unknown affinities]. *Tianjin Institute of Geology and Mineral Resources, Bulletin* 7, 143-188.

Popov LE and Solov'ev IA, 1981. Srednekembrisykie bezzamkovye brakhiopody, khantsellorii, konikonkhii I triloity Zapadnoy Antarktidy (khrebty Sheklton i Ardzhentina). [Middle Cambrian inarticulate brachiopods, chancelloriids, coniconchiids and trilobites of west Antarctica (Shackleton and Argentina Ranges)]. *Antartktika* 20, 64-72.

ACKNOWLEDGEMENTS

This guide was compiled by Tim Munson with contributions (in alphabetical order) by Gary Andrews, Joanne Boustead, Diane Cook, John Dunster, Pierre Kruse, Tracey Rogers, Jenny Saunders and Ian Scrimgeour. It is a revision of the original Guide to Authors, written by David Young, Dennis Gee and Pierre Kruse and printed as NTGS Record 2000-007. Both editions of this guide have benefited from discussions with a number of former and current NTGS staff, including (in alphabetical order) Peter Beier, Craig Bentley, Nigel Donnellan, Christine Edgoose, Phil Ferenczi, Carmel Leonard, Murray Maynard, Jacinta McKinley and Kirsi Rahikainen.

SELECTED REFERENCES

References are arranged according to topic. Some text citations are examples only (eg *Textual citations*) and are not listed.

Definitions

American Geological Institute, 1997. *Dictionary of mining, mineral and related terms. Second Edition*. American Geological Institute, Alexandria, Virginia.

Jackson JA, 1997. *Glossary of geology. Fourth Edition*. American Geological Institute, Alexandria, Virginia.

Kearey P, 1996. *The new Penguin dictionary of geology*. Penguin Books, London

Generic guides

Snooks & Co, 2002. *Style manual for authors, editors and printers. Sixth Edition*. Australian Government Publishing Service, Canberra.

DBIRD writer's guide January 2003. http://internal.dbird.nt.gov.au/news/writer%27s_guide.pdf

Eagleson RD, Jones G and Hassall S, 1990. *Writing in plain English.* Australian Government Publishing Service, Canberra.

Fowler HW, 1968. *A dictionary of modern English usage. Second Edition, revised by Sir Ernest Gowers*. Oxford University Press, Oxford.

Weiner ESC and Delahunty A, 1993. *The Oxford guide to English usage. Second Edition*. Oxford University Press, Oxford.

Editing

Berkman DA, 2001. *Field geologists' manual. Fourth Edition*. The Australasian Institute of Mining and Metallurgy, Melbourne. Monograph 9. (Contains symbols for correcting proofs on page 17-18).

Flann E and Hill B, 1994. *The Australian editing handbook.* Australian Government Publishing Service, Canberra.

Website design

Designing websites for accessibility online tutorials. http://www.parsons.lsi.ku.edu/kwcag/index.html

NT Government website guidelines. http://www.nt.gov.au/dcis/it_policies

Powell TA, 2000. *Web design: the complete reference*. McGraw-Hill, Berkeley, California.

Siegel D, 1997. *Creating killer websites: the art of third-generation site design. Second edition.* Hayden Books, Indianapolis (http://www.killersites.com).

Scientific writing guides

Day RA, 1988. *How to write and publish a scientific paper. Third Edition.* Oryx Press, Phoenix, Arizona.

O'Connor M, 1991. *Writing successfully in science.* Chapman and Hall, London.

Geological guides

Bates RL, Adkins-Heljeson MD and Buchanan RC, 1995. *Geowriting: a guide to writing, editing and printing in the earth sciences. Fifth Edition.* American Geological Institute, Alexandria, Virginia.

Hansen WR, 1991. *Suggestions to authors of the reports of the United States Geological Survey. Seventh Edition.* Government Printing Office, Washington DC.

General

Ahmad M, 2000. *Geological map of the Northern Territory. 1:2 500 000 scale*. Northern Territory Geological Survey, Darwin.

Australian Mineral Foundation, 1996. *Australian geoscience, minerals and petroleum thesaurus. Fourth Edition*. Australian Mineral Foundation, Glenside, South Australia (note that publishing rights are now owned by Chartered Information Services; future editions will be entitled *Geoscience, minerals and petroleum thesaurus*).

Burne RV and Moore CS, 1987. Microbiolite: organosedimentary deposits of benthic microbial communities. *Palaios* 2, 241-254.

Cas R and Wright JV, 1987. *Volcanic successions modern and ancient. A geological approach to processes, products and successions*. Allen and Unwin, London.

Crettenden P, 2000. GPS locations now more accurate. *MESA Journal* 19, 34.

Ferenczi PA, 2001. Iron ore, manganese and bauxite deposits of the Northern Territory. *Northern Territory Geological Survey, Report* 13.

Kruse PD, 1998. Cambrian palaeontology of the eastern Wiso and western Georgina Basins. *Northern Territory Geological Survey, Report* 10.

Le Maitre RW (editor), 1989. *A classification of igneous rocks and glossary of terms: recommendations of the International Union of Geological Sciences Subcommission on the Systematics of Igneous Rocks.* Blackwell, Oxford and London.

Schmincke H-U and Fisher RV, 1984. *Pyroclastic rocks*. Springer-Verlag, Berlin.

Staines HRE, 1985. Field geologist's guide to lithostratigraphic nomenclature in Australia. *Australian Journal of Earth Sciences* 32, 83-106.

Wygralak AS and Ahmad M, 1999. Atlas of the mineral occurrences and petroleum fields of the Northern Territory. *Northern Territory Geological Survey, Report* 10.

INDEX

28

Instruction	Textual mark	Marginal mark*
Transpose	Between characters\words\or	(trs)
Do not break these terms	⌐‾‾‾‾‾‾¬	(keep together)
Indent one or two ems	⊑ , ⊒	☐ or ① , ☐☐ or ②
Move matter to right	At left or right side of group to be moved	⌐⌐
Move matter to left	At right or left side of group to be moved	⌐⌐
Move matter to position indicated	At limits of required position	(move)
Move to next line or page	⊏	(take over) or (t/o)
Move to previous line or page	⊐	(take back) or (t/b)
Raise lines **	Over lines to be moved↑ / Under lines to be moved⌐	(raise)
Lower lines **	⌐Over lines to be moved⌐ / Under lines to be moved↓	(lower)
Correct the vertical alignment	‖At left or right ‖of lines to be adjusted	‖
Straighten lines	~~Through lines~~ to be straightened	═
Begin a new paragraph	⌐Before the first word of new paragraph	(n.p.)
No fresh paragraph here	Between⌐ ⌐paragraphs	(run on) or (r/o)
Spell out abbreviation or figure in full	Encircle word or (fig) to be altered	(spell out)
Insert omitted portion of copy	Between the⋏omitted	(out—see copy) or (OSC)
Substitute or insert comma, full stop, colon or semicolon	/ through character or ⋏ where required	⍟/ ⊙/ ⊙/ (;)/
Substitute or insert question or exclamation mark	/ through character or ⋏ where required	(?)/ or (!)/
Insert parentheses or brackets	⋏ ⋏	(|)/ or [|]/
Insert hyphen	⋏	⊢/
Insert en (half-em) rule	⋏	|en/
Insert one- or two-em rule	⋏	|em /or / 2em/
Insert apostrophe	⋏	⸲/
Insert single or double quotation marks	⋏	⸲⸲ or ⸲⸲⸲⸲
Insert ellipsis	⋏	(···)/
Insert diagonal stroke	⋏	(/) (solidus)
Cross-reference to be added later	Circle the page numbers	(cross-ref.)

* Words printed in italics in column below are instructions and not part of the marks.
** Amount of space may be indicated.

Instruction	Textual mark	Marginal mark*
Correction is concluded	None	/
Insert in text the matter indicated in margin	⋏	new matter, followed by /
Delete	Strike through characters to be deleted	ϑ
Delete and close up	Above and below letters to be taken out	ϑ
Leave as printed	Under characters to remain	(stet)
Change to italic	Under characters to be altered	(ital)
Change to roman type	Encircle characters to be altered	(rom.)
Change to bold type	Under characters to be altered	(bold)
Underline word or words	Under words affected	(underline)
Wrong font. Replace by letter of correct font	Encircle character to be altered	(w/f)
Change to capital letters	Under characters to be altered	(caps)
Use capital letters for initial letters and small capitals for rest of words	Under initial letters and under the rest of words	(c. & s.c.)
Change to even small capitals	Under characters to be altered	(s.c.)
Change to lower case	Line through characters to be altered	(l.c.)
Change damaged character(s)	Encircle characters to be altered	(x)
Substitute or insert character(s) under which the mark is placed, in 'superior' position	/ through character or ⋏ where required	⅄ under character (e.g. ˣ⅄)
Substitute or insert character(s) over which this mark is placed, in 'inferior' position	/ through character or ⋏ where required	∨ over character (e.g. ₓ∨)
Add accent to character	/ through character	character with accent
Start line full out to left margin	⌐	(f/o)
Close up—delete space between characters	lin king characters	⌢⌣
Insert space **	⋏	#
Insert space between lines or paragraphs **	Between lines to be spaced	#
Reduce space between lines **	Connecting lines to be closed up	(less #) or (close up)
Make space appear equal between words	Equal / between / words	(eq. #)
Reduce space between words **	Between / words	(less #) or #⌒
Add space between letters **	Between tops of letters requiring space	(letter #)
Place in centre of line	Indicate position ⌈with⌉	(centre)

APPENDIX 2: SELECTED COMMON ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AAPG	American Association of Petroleum Geologists
AAS	atomic absorption spectrophotometry/spectrophotometer
ABARE	Australian Bureau of Agriculture and Resource Economics
AEM	airborne electromagnetic (survey)
AGD	Australian geocentric datum 1966
AGES	Annual Geoscience Exploration Seminar
AGIA	Australian Geoscience Information Association
AGRF	Australian geomagnetic reference field
AGSO	Australian Geological Survey Organisation
AHD	above Australian height datum
AIG	Australian Institute of Geoscientists
AMG	Australian Map Grid (on AGD datum)
AMF	Australian Mineral Foundation
AMIRA	Australian Mineral Industries Research Association Ltd
ANSIR	Australian National Seismic Imaging Resource
ANSN	Australian National Seismographic Network
ANZAAS	Australian and New Zealand Association for the Advancement of Science
APCRC	Australian Petroleum Cooperative Research Centre
APIRA	Australian Mineral Industries Research Association Ltd (Petroleum Division)
APPEA	Australian Petroleum Production and Exploration Association
ASEG	Australian Society of Exploration Geophysicists
AusIMM	Australasian Institute of Mining and Metallurgy
AUSLIG	Australian Surveying & Land Information Group
BBL	barrels (of oil etc)
BIS	banded ironstone
BMR	Bureau of Mineral Resources, Geology and Geophysics
BP	before the present
BRS	Bureau of Resource Sciences
CODES	Centre for Ore Deposit Research (Hobart)
COREDAT	Core Library Database
CPC	Commonwealth Palaeontological Collection
CRC AMET	Cooperative Research Centre for Australian Mineral Exploration Technologies
CRC LEME	Cooperative Research Centre for Landscape Evolution and Mineral Exploration
CSAMT	controlled source audio frequency magnetotelluric
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DBIRD	Department of Business, Industry and Resource Development
DEM	digital elevation model
DH, DDH	drillhole, diamond drillhole
DMPR	Department of Minerals and Petroleum Resources (WA)
DOME	Department of Minerals and Energy (WA)
DTM	digital terrain model
EGRU	Economic Geology Research Unit (James Cook University)
EL/ELA	exploration licence/exploration licence application
EM	electromagnetic
EML/P	extractive mineral lease/permit
EPMA	electron-probe microanalysis/microanalyser
FIMS	fluid-inclusion mass spectrometry
Ga	billions of years (age)
GA	Geoscience Australia
GAB	Great Artesian Basin
GC–MS	gas chromatography–mass spectrometry
GDA94	geocentric datum of Australia 1994
GDF	geophysical data format standard (of ASEG)
GIS	geographic information system
GPS	global positioning system
GSA	Geological Society of Australia
GSAm	Geological Society of America
GSC	Geological Survey of Canada
GSNSW	Geological Survey of New South Wales
GSPNG	Geological Survey of Papua New Guinea
GSQ	Geological Survey of Queensland
GST	Geological Survey of Tasmania
GSV	Geological Survey of Victoria
GSWA	Geological Survey of Western Australia
GTS	gas to surface
HDR	hot dry rock
HEM	helicopter electromagnetic
HLEM	horizontal loop electromagnetic
HREE	heavy rare-earth elements
ICP–MS	inductively coupled plasma-mass spectrometry/ spectrometer
IGCP	International Geological Correlation Program
INAA	instrumental neutron-activation analysis
IP	induced polarisation
IRMS	Industry Reports Management System
IUGG	International Union of Geodesy and Geophysics
IUGS	International Union of Geological Sciences
JORC	Joint Ore Reserves Committee
KCSMD	Key Centre for Strategic Mineral Deposits (University of WA)
LAN	local area network
LOI	loss on ignition
LNG	liquid natural gas
LPG	liquid petroleum gas
LREE	light rare-earth elements
Ma	millions of years (age)
MC/L	mineral claim/lease
MESA	(Department of) Mines and Energy South Australia
MGA	Map Grid of Australia (on GDA datum)
Mg m^{-3}	tonnes per cubic metre
MMCFD	million cubic feet per day
MNF	smoothing technique for multichannel data
MODAT	Mineral Occurrence Database
MORB	mid-ocean-ridge basalt
MRT	(Department of) Mineral Resources Tasmania
MS	mass spectrometer, mass spectrometry
MSL	mean sea level
MT	magnetotelluric
NA	not available/applicable
NABRE	(GA's) 'North Australian basins resource evaluation' project
NAC	North Australian Craton
NASVD	smoothing technique for multichannel data
NCPGG	National Centre for Petroleum Geology and Geophysics
NEGMA	National Environmental Geoscience Mapping Accord
NGMA	National Geoscience Mapping Accord
NTGS	Northern Territory Geological Survey
ODP	Ocean Drilling Program
OIB	Ocean Island Basalt
OZCHRON	'Australian geochronology' (isotopic ages) database
OZMIN	'Australian mineral deposits' database
PESA	Petroleum Exploration Society of Australia
PCO	Pine Creek Orogen
PGEs	platinum-group elements
pH	acidity alkalinity indicator
PMD CRC	Predictive Mineral Discovery Cooperative Research Centre
PT diagram	pressure–temperature diagram
P–T–t path	pressure–temperature–time path
PV	pressure–volume
PVT	pressure–volume–temperature
RAB	rotary air blast (drilling)
RC	reverse circulation (drilling)
RDBMS	relational database management system
REE	rare-earth elements
RNAA	radiochemical neutron-activation analysis
RTP	reduced to pole (magnetic intensity)
SEM	scanning-electron microscopy/microscope
SHRIMP	sensitive high-resolution ion-microprobe
STRATDAT	(GA's) biostratigraphic and stratigraphic database of information from wells in Australia
STSTM	rate to small to measure
TC	total count (ie of whole gamma ray spectrum)
TEM	transient electromagnetic
TEM	transmission electron microscopy/microscope
TIMS	thermal-ionisation mass spectrometry/spectrometer
TL	thermoluminescence
TM	(Landsat) Thematic Mapper
TMI	total magnetic intensity
TOC	total organic carbon
TWT	two-way time
UHF	ultra-high frequency
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
UVFS	ultra-violet fluorescence spectrometer/spectrometry
VD	vertical derivative (of magnetic intensity)
VHF	very high frequency
VHMS	volcanic-hosted massive sulfide
VLF	very low frequency
VMS	volcanogenic massive sulfide
WAN	wide area network
XRD	X-ray diffraction
XRF(S)	X-ray fluorescence spectrometry/spectrometer

APPENDIX 3: EXTENDED CHARACTER SET

The **ANSI** (**A**merican **N**ational **S**tandards **I**nstitute; also called Latin 1) character set is used in most standard Windows fonts. To enter an ANSI character, press and hold the Alt key, type the ANSI code, then release the Alt key.

For Times New Roman, Arial (and most other character fonts), the ANSI codes up to character 0128 reproduce letters from the standard keyboard. In symbol font, the Greek alphabet and some other useful symbols are available from character 0064 onward. This table lists selected ANSI codes from this character number and higher (some characters may not display properly if you do not have TrueType enabled). If a number is missing or a cell is blank, it means that no useful character is available for that code.

ALT+	Times New Roman	Arial	Symbol	ALT+	Times New Roman	Arial	Symbol	ALT+	Times New Roman	Arial	Symbol
0064	@	@	≅	0100	d	d	δ	0138	Š	Š	
0065	A	A	Α	0101	e	e	ε	0139	‹	‹	
0066	B	B	Β	0102	f	f	φ	0140	Œ	Œ	
0067	C	C	Χ	0103	g	g	γ	0142	Ž	Ž	
0068	D	D	Δ	0104	h	h	η	0145	'	'	
0069	E	E	Ε	0105	i	i	ι	0146	'	'	
0070	F	F	Φ	0106	j	j	φ	0147	"	"	
0071	G	G	Γ	0107	k	k	κ	0148	"	"	
0072	H	H	Η	0108	l	l	λ	0149	•	•	
0073	I	I	Ι	0109	m	m	μ	0150	–	–	
0074	J	J	ϑ	0110	n	n	ν	0151	—	—	
0075	K	K	Κ	0111	o	o	ο	0152	˜	˜	
0076	L	L	Λ	0112	p	p	π	0153	™	™	
0077	M	M	Μ	0113	q	q	θ	0154	š	š	
0078	N	N	Ν	0114	r	r	ρ	0155	›	›	
0079	O	O	Ο	0115	s	s	σ	0156	œ	œ	
0080	P	P	Π	0116	t	t	τ	0158	ž	ž	
0081	Q	Q	Θ	0117	u	u	υ	0159	Ÿ	Ÿ	
0082	R	R	Ρ	0118	v	v	ϖ	0161	¡	¡	ϒ
0083	S	S	Σ	0119	w	w	ω	0162	¢	¢	′
0084	T	T	Τ	0120	x	x	ξ	0163	£	£	≤
0085	U	U	Υ	0121	y	y	ψ	0164	¤	¤	⁄
0086	V	V	ς	0122	z	z	ζ	0165	¥	¥	∞
0087	W	W	Ω	0123	{	{	{	0166	¦	¦	ƒ
0088	X	X	Ξ	0124	|	|	|	0167	§	§	♣
0089	Y	Y	Ψ	0125	}	}	}	0168	¨	¨	♦
0090	Z	Z	Ζ	0126	~	~	~	0169	©	©	♥
0091	[	[	[	0128	€	€		0170	ª	ª	♠
0092	\	\	∴	0130	‚	‚		0171	«	«	↔
0093	]	]	]	0131	ƒ	ƒ		0172	¬	¬	←
0094	^	^	⊥	0132	„	„		0173	-	-	↑
0095	_	_	_	0133	…	…		0174	®	®	→
0096	`	`	_	0134	†	†		0175	¯	¯	↓
0097	a	a	α	0135	‡	‡		0176	°	°	°
0098	b	b	β	0136	ˆ	ˆ		0177	±	±	±
0099	c	c	χ	0137	‰	‰		0178	²	²	″

ALT+	Times New Roman	Arial	Symbol	ALT+	Times New Roman	Arial	Symbol	ALT+	Times New Roman	Arial	Symbol
0179	³	³	≥	0205	Í	Í	⊆	0231	ç	ç	|
0180	´	´	×	0206	Î	Î	∈	0232	è	è	\
0181	µ	µ	∝	0207	Ï	Ï	∉	0233	é	é	⌈
0182	¶	¶	∂	0208	Ð	Ð	∠	0234	ê	ê	|
0183	·	·	•	0209	Ñ	Ñ	∇	0235	ë	ë	⌊
0184	¸	¸	÷	0210	Ò	Ò	®	0236	ì	ì	⌈
0185	¹	¹	≠	0211	Ó	Ó	©	0237	í	í	⟨
0186	º	º	≡	0212	Ô	Ô	™	0238	î	î	|
0187	»	»	≈	0213	Õ	Õ	∏	0239	ï	ï	|
0188	¼	¼	…	0214	Ö	Ö	√	0240	ð	ð	□
0189	½	½	|	0215	×	×	⋅	0241	ñ	ñ	⟩
0190	¾	¾	⎯	0216	Ø	Ø	¬	0242	ò	ò	∫
0191	¿	¿	↵	0217	Ù	Ù	∧	0243	ó	ó	⌠
0192	À	À	ℵ	0218	Ú	Ú	∨	0244	ô	ô	|
0193	Á	Á	ℑ	0219	Û	Û	⇔	0245	õ	õ	⌡
0194	Â	Â	ℜ	0220	Ü	Ü	⇐	0246	ö	ö	)
0195	Ã	Ã	℘	0221	Ý	Ý	⇑	0247	÷	÷	|
0196	Ä	Ä	⊗	0222	Þ	Þ	⇒	0248	ø	ø	)
0197	Å	Å	⊕	0223	ß	ß	⇓	0249	ù	ù	⌉
0198	Æ	Æ	∅	0224	à	à	◊	0250	ú	ú	|
0199	Ç	Ç	∩	0225	á	á	⟨	0251	û	û	⌋
0200	È	È	∪	0226	â	â	®	0252	ü	ü	)
0201	É	É	⊃	0227	ã	ã	©	0253	ý	ý	}
0202	Ê	Ê	⊇	0228	ä	ä	™	0254	þ	þ	)
0203	Ë	Ë	⊄	0229	å	å	∑	0255	ÿ	ÿ	
0204	Ì	Ì	⊂	0230	æ	æ	(				