Appendix A2

SCALES, NORTH POINTS, EXAMPLE PLAN NOTES

A2.1 Scales

A2.1.1 Standard Scales

Survey drawings and maps should be plotted at the following scales:

<table>
<thead>
<tr>
<th>Preferred</th>
<th>1:200</th>
<th>1:250</th>
<th>1:50</th>
<th>1:100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1:2000</td>
<td>1:2500</td>
<td>1:5000</td>
<td>1:1000</td>
</tr>
<tr>
<td></td>
<td>1:250000</td>
<td>1:5000</td>
<td>1:10000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1:250000</td>
<td>1:50000</td>
<td>1:100000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1:500000</td>
<td>1:1000000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Acceptable</th>
<th>1:125</th>
<th>1:400</th>
<th>1:750</th>
<th>1:800</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1:1250</td>
<td>1:3000</td>
<td>1:4000</td>
<td>1:8000</td>
</tr>
</tbody>
</table>

A2.1.2 Indication of Scales

The scale of any survey drawing shall be indicated by the reduction ratio, eg. 1:500, and by the construction of a bar scale accompanied by the notation "Lengths are in metres" [See Fig. A2.1].

The bar scale shall be divided into equal primary divisions on the right hand side of the zero, with each primary division representing 10 units or multiples thereof. To the left of the zero, 10 equal secondary divisions may be constructed so that each represents one tenth part of a primary division.

A2.1.3 Single Scale

Where only one scale is to be used on a survey drawing, it should be indicated in the title block.

A2.1.4 Multiple Scales

Where more than one scale is used on a survey drawing the title block shall be marked "SCALES AS SHOWN", and the reduction ratio clearly indicated adjacent to the view or views concerned.
A bar scale shall be included as applicable adjacent to the major part of the drawing, and a representative fraction scale may also be indicated on the drawing sheet, eg.

HORIZONTAL SCALE  1:500
VERTICAL SCALE  1:100
The ratio of the larger to the smaller of any two scales used on a drawing sheet should not be less than 2.

A2.1.5 Determination of Original Sheet Size and Scale

Where drawings have been reproduced at scales other than the original scale, the scale of the original drawing can be readily discerned from the ratio indicated in the title block. The drawing frame dimensions as indicated by the sheet size designation shown in the title block is another aid, and the ratio of the reduced sheet to the original after microfilming can be ascertained from the graduated line shown in accordance with AS 1100.101 Section 2.4.5.

A2.2 Identification of North Points on Cadastral Plans

On most cadastral plans, it is required that the north point be directed generally toward the top of the sheet.

Where the datum of the survey has been related to AMG, the north point should be drawn parallel to a direction on the plan which has an AMG bearing of grid north. In this instance, the north point should be identified with the letters ‘AMG’ accompanied by the zone number. [See Fig. A2.2].

Alternatively, if the datum of the survey is taken from other information where bearings relate to approximate true or magnetic north, the north point should be oriented to the plot of the survey so that it reflects the direction of approximate north relative to the stated bearing of the datum used for the survey.

In these circumstances, cardinal bearings relating to the datum used should be plotted up and down and across the plot sheet, with the north point rotated to indicate approximate true north. It should be identified with the words ‘Approx. True North’. [See Fig. A2.2].

Generally, the location of the north point should be confined to the top left quadrant of the sheet.
A2.3 Notes on Magnetic Declination

While much of the original survey of Victoria was set out relative to the magnetic meridian (north) at the time, some areas were set out approximately related to true north.

At Appendix A7, a plot of the magnetic declination observed over the years at Toolangi Observatory is included. This has been extended back from available information to the time of the first surveys around Melbourne. Also at Appendix A7 is an outline map of Victoria showing an overlay of the 1: 100,000 map series, and the isogonic lines for epoch 1995.0.

A2.3.1 Grid Convergence

Some care is needed to ascertain the origin of bearings in many areas, but reference to the orientation of the road pattern on medium scale maps such as the 1:100,000 series, will often provide a useful starting point. In these circumstances, the grid bearing corrected for grid convergence will provide an acceptable approximation for true north in the area under survey.

A2.4 Presentation of Survey Data on Plans

A2.4.1 General

Technical drawings must precisely convey, without ambiguity, the message intended, and leave no room for misinterpretation or an inaccurate conclusion.

The skilful presentation of a drawing requires not only a careful selection of scale and optimum use of the drawing frame, but also a logical adherence to the hierarchical importance of dimensions and symbols with accompanying descriptions which are portrayed on survey drawings.

It is not possible to formulate a comprehensive set of basic rules governing the presentation of data as exceptions will always be encountered. Even so, the hierarchy of the order of placement of dimensions and descriptions can usually be accepted as:

- Dimensions - bearing and distance
- Offsets and street and easement widths
- Street names and names of natural features
- Descriptive data
- Allotment numbers and areas.

It is important that the composition of a drawing gives some aesthetic satisfaction to the user, in addition to the prime purpose of conveying information.
The skilful placement and selection of sizes of dimensions and names not only enhances the appearance of the drawing, but increases legibility and understanding.

The sizes of lettering set out in Appendix A4 are a generally acceptable minimum. Use of sizes smaller than the stated minimums can only be justified where use is not extensive, nor a continuing departure from the specifications. If the use of smaller size lettering is deemed necessary to any extent, a larger scale should be selected for the drawing.

A2.4.2 Positioning of Lettering

Having determined the space available for lettering, there are some general rules to be observed:

- Lettering should be parallel to straight line features.
- Lettering along simply curved features should be placed in a series of straight lines aligned to the curve of the feature [See Fig. A2.3.1].

Where this is completely unsatisfactory, lettering may be placed along a smooth curve. When letters are placed on a curve, the base of the letter is always aligned tangential to the curve. [See Fig. A2.3.2].

- Lettering along features having complex shapes should be aligned along simple curves, and no attempt made to follow the intricacies of the feature.
- Undue emphasis should not be given to minor features.
- Lettering positioned vertically on the sheet should read from the lower sheet edge towards the top, ie. from left to right, when viewed from the right hand side.

A2.4.3 Typical Examples of Survey Drawings

Examples of plans and abstracts of field records of survey have been included in Appendix A8.
A2.4.4 Supplementary Abstract of Field Records of Survey

Section 20A of the Subdivision Act 1988 as amended by the Subdivision (Miscellaneous Amendments) Act 1991 requires advice to be provided to a Council that, subsequent to the completion of necessary Works, the boundaries of the land in question and all lots, reserves etc. contained within the subdivision have been marked out or defined, and that supporting monumentation required under the Surveyors Act 1978 and the Survey Co-ordination Act 1958 is in place.

The form of this advice is set out in Form 19 relative to Regulation 56 of the Subdivision (Procedures) Regulations 1989. It is based on a Supplementary Abstract of Field Records of Survey submitted by a Licensed Surveyor and, more particularly, must comply with the requirements of the Surveyors (Cadastral Surveys) Regulations 1995 and the Survey Co-ordination (Surveys) Regulations 1992.

Two examples of the form of suitable Supplementary Abstracts of Field Records of Survey are included in Layout of Plans No. 8 of Appendix A8.

Where a connection to AMG is unable to be made, an appropriate note shall be made in one of the notation boxes on the abstract of field records.

A2.4.5 Record of Having Re-established a Parcel

The Surveyors (Cadastral Surveys) Regulations 1995 require a surveyor to lodge, with the Surveyor General, a Record of Having Re-established a Parcel for all surveys in which a title boundary has been defined or re-defined. An example of such a record is included in Appendix A8 - Plan 3.

A2.4.6 Size of Plans in Handbook

Users should note that in this Handbook, for economies in publication, all plans have been reduced to a size approximating A4 for single sheet reproduction.

All plans for Land Titles Office and Office of Surveyor-General would be at A3 original size.

A2.4.7 Scale Selection for Plans

As already emphasized (See A2.4.1), careful selection of scale is important. The example plans illustrate that the scale selected should be sufficiently large to enable all lettering, except some descriptions of occupation, to be drawn not less than 2.5 mm in height.

A2.4.8 Computer Aided Drafting

The preparation of plans has moved into the computer age with fine penwork virtually becoming a craft of the past. There are many computer aided drafting software packages available and with various enhancements, these become extremely valuable tools. The end result enables the user to load field observations via a “total station” or a data recorder together with in-house computations directly into a drawing file. This file provides the basis for a wide range of final products including base maps, survey plans, field records and plans of subdivision. Setting up of menus to accommodate standard symbols, line types and text heights results in all drawings being produced to the same pre-determined standard and ensures a consistent final product.
Creation of a file storage and protection system must be developed to maintain the integrity of the drawing file. The ability to transfer these digital files by network or disk is a further option which allows for greater cohesion between individual users and organizations. Inevitably, the transfer of digital data to and from government bodies such as the Land Titles Office will become commonplace.

Implementation of this total process will streamline drawing output and eliminate much duplication of work.

Growth in this new technology has been rapid, and there are issues which require continuing consideration:

- phasing out of hard copies
- the certification of digital files by electronic signature
- the occurrence of differences between hard copy and its digital file
- in the interim, is it economical or necessary to carry out amendments to both hard copy and digital file?
- the verification of on-screen calculations
- incorporation of quality assurance procedures to negate errors.

A2.4.9 Digital Lodgement of Subdivisions

The Office of Surveyor General (OSG) and the Land Titles Office (LTO) have recognised the benefits of digital lodgement. With advances in technology and the increasing use of computer systems by the surveying industry in the preparation of plans and abstract of field records, it is appropriate to consider digital lodgement of documents.

Standards will be established to facilitate digital lodgement and a working party will be looking at existing standards including Spatial Data Transfer Standard (SDTS). Geographic Data Victoria (GDV) is developing a common data structure for the rural and urban portions of the State Digital Cadastral Database. Once this structure has been decided upon, a standard will be required to allow the incorporation of digital subdivisional information into the Digital Cadastral Database.

The data providers (surveyors) and the data customers (Utilities / LGAs) also have an interest in the establishment of a digital transfer standard for subdivision information. The data flows within and between each organisation need to be considered and the impact that probable technology will have on these data flows determined.

For Melbourne Water digital lodgement is already a reality. Currently in the urban area subdivisions over 10 lots are expected to be lodged digitally with Melbourne Water. Melbourne Water specify its own digital format for these plans.

A2.4.10 High Quality Reproduction of Plans

Prints of plans recently registered in the Land Titles Office are produced from laser printers connected to a FileNet optical disk based imaging system. The transparencies of the lodged plan are scanned on a system at 200 dots per inch (dpi) and the images are committed to optical disk. The quality of prints produced from the imaging system is, of course, dependent on the quality of the original drawings.

Guidelines to ensure good reproduction from each transparency follow established drawing practice. Nevertheless, there are some limitations to the production of a good image, and some basic points to be considered are set out as follows.

A2.4.10.1 The Medium

Most plans are produced on good quality drafting film. Dense black linework and dimensions will reproduce clearly. Where in some cases typed documents are submitted on a paper medium, the paper should be white and the type should be black and crisp.

A2.4.10.2 Contrast in Density of Text and Linework

Plans show a variety of text and graphic information, and this will scan and reproduce best if the density of the drafting is reasonably consistent over each plan sheet.

Problems occur when either the linework or dimensions, or both, are faint. It is possible that the scanner will not detect a fine line or the line will be reproduced discontinuously. Similar problems apply to faint dimensions.

Scanner operators have some latitude when dealing with a plan document which shows considerable variation in density. The scanner threshold, or density, can be varied to provide a denser image of the lighter information. This is necessarily a compromise and tends to "blob" the denser information and downgrade the professional presentation of the document. It is not a good memorial to the provider of the original plan.

A2.4.10.3 Fonts with Serifs

These should generally be avoided. Serifs usually indicate that some part of a character is of a thicker width or density than another part. There is a possibility that such characters will break up and not reproduce clearly.
A2.4.10.4 Separation of Linework and Dimensions

Problems can occur when dimensions are placed too close to, or touching linework, particularly when associated with the external boundaries of the plan, where the linework is thicker and generally denser. Here the scan may not clearly separate the linework and dimensions, resulting in "blobbing" or infilling of dimensions.

A2.4.10.5 Crowding of Dimensions

Where dimensions are tightly packed within small areas of a plan, there is potential for problems of separation in image recording. "Infilling" of dimensions, especially with the numerals eight and three may occur if "open" drawing is not practised. Such situations can be avoided with careful planning, and if necessary controlled enlargements.

A2.4.10.6 Summary

When producing a plan, a surveyor considers a range of perspectives to enable the client's objectives to be achieved. One of the objectives is to enable clear reproduction of the plan documents, particularly as a registered plan now serves the function of the former diagram on a Certificate of Title. Following established drawing practices and being aware of Land Titles Office reproduction technology will achieve this objective.