Specifying Architecture

John Gelder

a guide to professional practice

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Landscape architect: Room 4.1.3

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Preface

Specifications are the essence of things hoped for, the image of things not seen. A perfect specification writer should have graduated from Columbia Law School and Drummond's Detective Agency and then taken a course in palmistry to cover the unforeseen contingencies (Thumtack 1914).

This book is based on the supposition that building specifications are worthwhile. Decent specifications can save time, heartache, confusion, frustration, money and (occasionally) reputations. That buildings get built without the benefit sometimes of a decent specification is a tribute to the willingness and tenacity of those involved in the construction process. With a little extra effort by specifiers, their work – and that of many others in the industry – could be made a lot easier.

However, it seems that the industry has found it difficult to prepare adequate specifications, and other documents, for over 150 years:

Almost solely from sufficient pains not being taken in drawing the specifications for buildings, and from a want of proper foresight, may be traced, most of the disputes between the builder and the architect and the employer, which so often occur, and which lead to lawsuits and arbitrations, which are ofttimes so excessively and even ruinously expensive, and though final are unsatisfactory to all parties (Bartholomew 1846).

At least half the troubles in the architectural world are due to faulty and ill-expressed documents (Eggleston 1955).

The Research Report [of November 1988] argued that errors, contradictions, ambiguity in and late delivery of contract documentation, giving rise to delays and inefficiencies, are the greatest cause of claims and disputes in the construction industry ... The Report also refers to the late issue of documents particularly in relation to further documentation provided during the construction period. A view has been expressed that the quality of documentation has been

reducing over recent years with a lowering of the level and detail of documentation standards (NPWC/NBCC 1990).

In February 1994, what is now the Department of Public Works and Services (DPWS), NSW,[1] advised specifiers, both internal and external, that technical specifications "often contain inappropriate and redundant requirements". Further, they introduced unwanted risks on the part of the principal, were often out of date, and defined roles for the contract administrator that conflicted with current policies.

The problem is not confined to Australia. In the UK, the Construction Industry Board's working group 11 (concept subgroup), in response to Sir Michael Latham's *Constructing the Team* report, identified the main areas of avoidable cost as "changes, overspecification, inappropriate specification, waste and duplication, unnecessary complexity, conflict and programming" (Thompson 1996).

Finally, a survey by CSIRO found that deficiencies in documentation have been steadily increasing over the past 12-15 years, leading to poorer quality projects and an increase in overall project costs. Consultants blame this state of affairs on the reduction in design fees (Tilley and McFallen 1999).

This book is an attempt to set out best-practice guidelines for the preparation and use of contemporary specifications, and to go some way to remedying the above longstanding concerns. Rehashed versions of books on the subject originally written in the 1950s are of little help here (Whiteley 1998). The context and practice of specifying has changed completely over the past 50 years. Before going too far we need to define what is meant by a specification. Here are a couple of definitions that have been around for a while:

Specification: A detailed description prepared by a consulting engineer or architect to tell the contractor everything about the workmanship which cannot be shown on the drawings. It is written in the sequence of trades (Scott 1964).[2]

Specification: The document that prescribes the requirements with which the product or service has to conform.

NOTE – A specification should refer to or include drawings, patterns or other relevant documents and should also indicate the means and the criteria whereby conformity can be checked (ISO 8402:1986 Quality vocabulary).[3]

These conventional definitions of the specification suggest that for specifiers the primary function of the specification, and indeed the drawings, is to define precisely what is to be built by the contractor, for the benefit of both parties to the contract. We can be more precise and suggest the following:

- Specifications, the textual or written *description* of the works, provide the definition of quality and processes.
- Drawings, the complementary graphical *description* of the works, define quantity, position, assembly and extent.

1. *Formerly known as the Department of Public Works.*

2. *The 1984 edition has a rather more elaborate definition with a peculiarly British slant – it states that "… In some contracts with an unusually detailed bill of quantities, the specification, though provided, may be no part of the contract". The 1964 version was more useful here.*

3. *AS/NZS ISO 8402:1994 has a slightly different, less elegant, definition, namely a "document stating requirements".*

On small projects in particular, the two are often combined in the form of extensive annotation of the drawings,[4] but this is simply not practical for larger projects. For these, the two components of the description of the works must be separated and, therefore, properly coordinated.[5] Almost always, *both* are necessary.

Given the blurred distinction between the drawings and specification as descriptive components of the contract, not surprisingly principles that make sense for one can often be applied to the other. For example, descriptions of items that do not exist in the project should not be provided to contractors, either as drawings or as specifications.

The specification is a pivotal document in that it links the drawings, the conditions of contract, bills of quantities and referenced documents such as standards. The specification should supplement and complement this material, not duplicate it. Information peculiar to the specification includes quality control procedures, rules for substitutions, and definitions of the required quality of manufactured products, fabricated products and built products. Quality may be defined in terms of finishes, relevant standards, material grades and thicknesses, tolerances, performance requirements, and (sometimes) methods of fabrication and installation.

The specification is also a multi-purpose document. In conjunction with the drawings, it has at least nine functions (Figure P.1), including the primary function, to define precisely what the contractor is to build.

1. Design record: statements in the specification reflect, and may be the only record of, many detailed design decisions.
2. Statutory compliance: the specification is submitted to local councils and other authorities to demonstrate proposed methods of statutory compliance.
3. Pre-tender estimates: the specification is used by quantity surveyors and others to prepare progressive cost estimates.
4. Tendering by the principal, and subcontract tendering by the contractor: the specification is one of the documents tenderers use to price the work. In particular, it is disassembled for subcontract tendering.
5. Part of the contract: in this capacity the specification, with the drawings, the conditions of contract, and perhaps a bill of quantities and other documents, comprise the contract that legally binds the principal and the contractor. Indeed Standen (1995) argues that specifications (and therefore the drawings and bills as well) are nothing but a set of special conditions of contract.
6. On-site: the specification provides an on-site instruction manual and statement of requirements, and provides rules for assessing conformance of work with these requirements.
7. Disputes: arbitrators and courts will turn to the specification in a dispute, in an attempt to clarify the principal's requirements and to determine what has been agreed. In this respect, particularly if not well written, it may be a two-edged sword.

4. This annotation is still "the specification", just as a tiger in a zoo is still a tiger. Both must have teeth!

5. It has long been difficult to separate the written and graphical descriptions of the works conceptually, though. For example, the ancient Greeks used an ambiguous term, anagrapheis, which might refer to either a drawn or a written description.

8. Facility management: requirements for manuals, training and spare products e.g. luminaires, tiles will be spelt out in the specification, which also doubles as a source of information for alterations, additions and demolition, and perhaps reuse.
9. Project management: spanning these eight functions are nine project management functions – integration, scope, time, cost, quality, risk, procurement, communications and human resources. The specification addresses all of these in various ways.

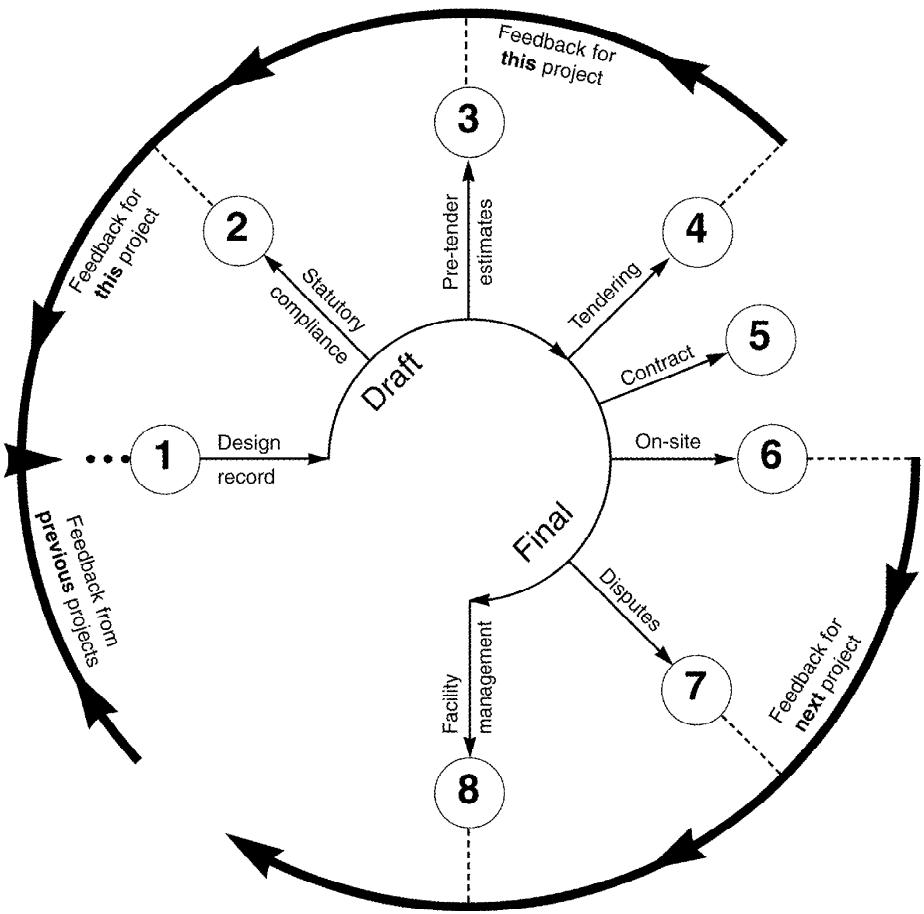

Figure P.1: Functions of the specification. The feedback loops are vital – each project must be analysed at completion and the lessons learned passed on. Everyone makes mistakes, but it is silly – and a waste of time – to repeat them. Unlike the other functions, project management is not one phase in a sequence but applies throughout so is not shown separately in the diagram.

Structure of this book

Production of a specification is a project like any other. It has a beginning and an end. It is a complex and creative task involving a multi-disciplinary team brought together for the occasion. Because it must be managed as a project, the typical project life-cycle applies to specification production:

- Inception.
- Design.
- Execution.
- Finish.

Once specifiers have finished producing the specification, others will start to use it as a product, as a tool in the execution of a separate project – the construction of the building itself. Later it will be used as a tool in the operation and maintenance of that facility (see Figure P.2).

This book examines the specification from this point of view, looking at principles and practice alongside each other. It begins with three chapters on context. Specifiers do not work in a vacuum – an understanding of context is essential. These can be skipped if you are familiar with context and if you want to get straight to the meat of the work, which deals with specification preparation (Chapters 4 to 7). Contractual matters are given extra emphasis. The book also has a chronological structure, from past to present and glimpses of the future.

But one cannot fully understand what to include in a specification, and what not to include, without understanding its use. For a complete picture, you will also need to read

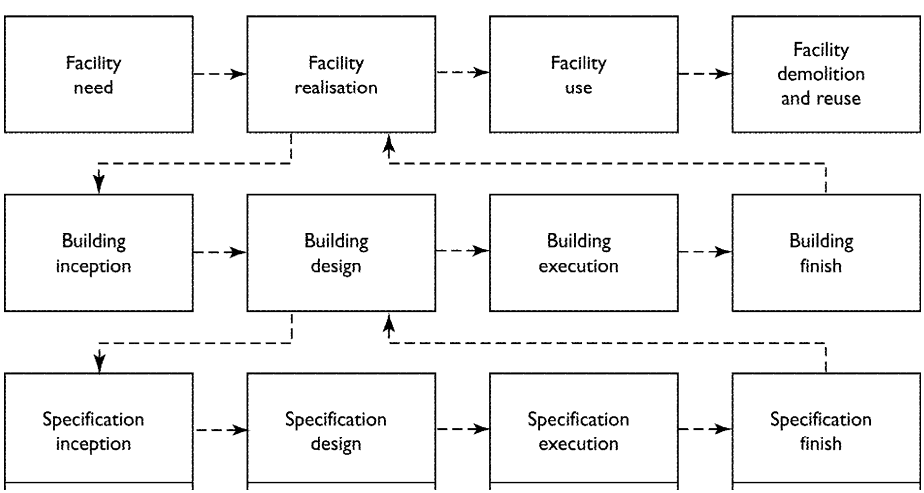

Figure P.2: Project life-cycle. The specification is a project within a project within a project!

the chapter on usage, Chapter 8. The users do not care, however, how the specification was produced. They just want a document that tells them what they need to know. It is hoped this book tells you what that is, and how to get there.

The second edition

The first edition of the book was published in 1995. Since that time a surprising amount of material has become out-of-date. Many organisations and documents referred to have changed names, disappeared or been replaced, and many new articles and books have appeared.

As well as updating this material, the second edition has provided an opportunity to expand the information in the book. A new chapter has been added on contemporary context in the United Kingdom and the United States, and the historical material has been completely revised. Contract extracts have been expanded, and extra material included on specifying construction methods, performance specifying, design and construct, use of standards, the role of manufacturers, green specifying, conformance, and plain English. It is hoped that all this helps maintain and enhance the book's relevance to Australian students and specifiers.

A note for students and teachers

The book is intended for a wide readership, from students, to part-time and full-time specifiers. Accordingly, some of the material will be too detailed for undergraduate use. It is suggested that undergraduates should be trained, at least, to prepare sound project specifications for standard residential construction, for which they should be able to

- work with the deemed-to-satisfy provisions of the domestic component of the Building Code of Australia (BCA) and domestic versions of statutory codes such as AS/NZS 3000 (2000);
- prepare tendering material for single-stage tendering;
- find and use paper, diskette and CD material from manufacturers and technical information sources;
- use a simple commercial master specification, such as *NATSPEC DOMESTIC*;
- program the creation of a simple project specification, with one specifier;
- design a simple project specification;
- coordinate with simple standard contracts, such as SBW-2;
- coordinate with drawings prepared in the specifier's office;
- coordinate worksections prepared by the specifier;
- use proprietary and descriptive methods of specifying, including management of substitution and verification;
- reference a basic set of, say, 75 Australian standards;
- prepare schedules of work;

- edit a project specification for clarity, grammar, and appearance;
- produce a specification on paper and disk;
- use a specification for design record, tendering, contractual, and on-site purposes;
- specify for construct-only procurement; and
- prepare sound traditional domestic worksections.

Acknowledgments

The second edition, of course, builds on the first edition. For this reason I would like to reiterate my thanks to those who helped at that stage, including Jocelyn Rashleigh for tidying up my first draft and for a lot of subsequent typing; Alexandra Jefferson, for editorial work, design, typesetting, graphics, patience and production; Bruce Petty for the cartoons; and Construction Information Systems (CIS) General Manager Terry Wright for pushing the project and for his inimitable editorial input and advice.

I must also thank those who kindly and constructively reviewed the first draft of that first edition, including Peter Clarke, Robin Drogemuller, Mark Irving, Tony Mussen, John Rayner and John Tyrril.

CIS staff have again assisted in getting this second edition ready for publication, notably the editor Deborah Singerman who has done a much more professional job of it than I did the first time around. Jocelyn and Terry have once again made their contributions, aided by former NATSPEC editor Greg Turner, current editor John Horridge and NATSPEC manager Noel Burke, who have dealt with my queries and, along with John Schooling and John Rayner, provided valuable feedback on the draft. The views expressed are my own, drawing in part on my own experiences and on conversations over the years with fellow professionals, and are not necessarily those of NATSPEC. And I am of course responsible for errors and remaining anachronisms.

This is the place to note the passing of two people who reviewed the book: John Schooling, the specifier at Devine Erby Mazlin (DEM) and for Bligh Lobb on Stadium Australia, and Peter MacCallum, who for many years was the lecturer in specifications at Sydney University, and active on the Royal Australian Institute of Architects' Practice Committee. I wish well his legacy, the Peter MacCallum Prize, which will be given by the RAIA to a piece of student work each year on, among other things, specification writing. I am also grateful to the following organisations for permission to reproduce material:

- Australian Building Codes Board.
- Architects Accreditation Council of Australia Inc.
- Construction Publications Ltd.
- NSW Department of Public Works and Services.
- The Law Book Company.
- Master Builders Australia.

- National Public Works Council (now Australian Procurement and Construction Council).
- Royal Australian Institute of Architects.
- Standards Australia.
- Construction Information Systems.

John Gelder
January 2001

Acronyms

AACA	Architects Accreditation Council of Australia
ABCB	Australian Building Codes Board
ACA	Australian Communications Authority
AIA	American Institute of Architects
AIQS	Australian Institute of Quantity Surveyors
ANSI	American National Standards Institute
APAS	Australian Paint Approval Scheme
APCC	Australian Procurement and Construction Council
ASTM	American Society for Testing and Materials
BCA	Building Code of Australia
BREEAM	Building Research Establishment Environmental Assessment Method
BSI	British Standards Institute
CAWS	Common Arrangement of Work Sections
CI/SfB	Construction Index/Samarbettskommitten for Byggnadsfr Cgor
CIL	Construction Information Limited
CIS	Construction Information Systems
CSI	Construction Specifications Institute
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPWS	Department of Public Works and Services, NSW
FSC	Forest Stewardship Council
GPC	Government Paint Committee
ICIS	International Construction Information Society
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization

JAS-ANZ	Joint Accreditation System of Australia and New Zealand
JCC	Joint Contracts Committee
MBA	Master Builders Australia
NBS	National Building Specification
NES	National Engineering Specification
NIST	National Institute of Standards and Technology
PCA	Property Council of Australia
QAS	Quality Assurance Services
RAIA	Royal Australian Institute of Architects'
RIBA	Royal Institute of British Architects
SA	Standards Australia
SSL	Scientific Services Laboratory
STABU	Stichting Standaardbestek voor de Burger-en Utiliteitsbouw

A NATSPEC GUIDE

What they said about the first edition

Well-designed and easy to use ... wonderful and amusing perspectives on what is generally a sober topic.

Hal Guida
Architecture Australia

John Gelder, BArch RIBA RAIA CSI, is an architect with extensive experience in project documentation and in the publishing of master specifications.

He was Chief Editor of NATSPEC in Australia and more recently has been working with its United Kingdom counterpart, the National Building Specification.

Specifying, literally "being specific", along with modelling and drawing, has been an essential part of building design from classical temples such as the Parthenon (top) to the computer-enabled "extreme architecture" of the Museum of Australia, Canberra (cover and above). Even modest buildings depend on sound specification if they are to survive the elements as at Bodie, California (bottom).

I have no hesitation in highly recommending this book, not just to specifiers, but to all involved in the building industry.

John Tyrril
Australian Construction Law Newsletter

Strip in bar-code film as white on pic-ture

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Mies van der Rohe said "Architecture starts when you carefully put two bricks together. There it begins."

***Specifying Architecture* argues that whatever the aesthetic and other design sensibilities of a building, it has to be specified – and specified well.**

The premise is that architects, engineers and other building professionals can save time, frustration and money by producing brief, precise and soundly structured specifications and working towards this end throughout their projects.

***Specifying Architecture* discusses contractual, technical, management and editorial issues in the planning, production and use of specifications. It sets out best-practice professional guidelines, putting modern specification writing into an historical and international context.**

This new edition has a new chapter on practice in Britain and the United States with expanded historical material and contract extracts. The text on specifying construction methods, performance specifying, design and construct, use of standards and product conformance has been completely revised.

The Australian practice on which it is based is a blend of UK and US techniques making this book an invaluable reference for building professionals anywhere in the world.