Canadian Handbook of Practice for Architects





Volume 1

Theory and Background

Volume 2

Management

The Canadian Handbook of Practice for Architects
1999 Edition

National Practice Program for the Profession of Architecture in Canada
The National Practice Program (NPP) is an alliance of the ten provincial associations of architecture and the Royal Architectural Institute of Canada (RAIC). This Handbook has been developed by the NPP on behalf of the architectural profession in Canada, represented by these member associations:

Architectural Institute of British Columbia
Alberta Association of Architects
Saskatchewan Association of Architects
Manitoba Association of Architects
Ontario Association of Architects
Ordre des architectes du Québec
Architects' Association of New Brunswick
Association des architectes du Nouveau-Brunswick
Nova Scotia Association of Architects
Architects Association of Prince Edward Island
Newfoundland Association of Architects
and
The Royal Architectural Institute of Canada

Editorial Board
John Bobaljik, OAA, FRAIC
Pierre Corriveau, OAQ
Michael Kohler, FRAIC
Terry Mager, MAIBC, MRAIC
Robert Ojolick, NSAA, MRAIC
Paul-André Tétreault, OAQ, FIRAC
Andrew Wach, MAA

Editor-in-Chief
Jon Hobbs, OAA, MRAIC

Managing Editor
Jim Young

Senior English Editor
Anthony Butler, OAA, FRAIC

Senior French Editor
Gilbert Paré, OAQ

Graphic Design
Aerographics Creative Services Inc.

Printing
Beauregard Printers

©1999 Members of the National Practice Program:
The Royal Architectural Institute of Canada and the Ten Provincial Associations of Architects
This Handbook may not be copied in whole or in part without the prior written permission of the Royal Architectural Institute of Canada, except for the forms, lists, and checklists which may be copied only by architects who are registered recipients or paid subscribers of the Handbook and who use the copies for the practice of architecture, all of which are subject to the following disclaimer.

Disclaimer
The National Practice Program (NPP) supports the development and maintenance of the *Canadian Handbook of Practice for Architects*; however, neither the NPP nor the Editorial Board, nor the Editors take responsibility for the accuracy or completeness of any information or its fitness for any particular purpose. The Handbook describes procedures for general practice only; there are exceptions and differences for specific circumstances.

Canadian Handbook of Practice for Architects

The National Practice Program gratefully acknowledges the following organizations which supported the development of the *Canadian Handbook of Practice for Architects*:

Sponsors

DPIC Companies
Orion Capital

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

Contributor

ENCON Group Inc.

Canadian Handbook of Practice for Architects

Table of Contents



Introduction

Acknowledgements

Photo Credits

Index

Index of Lists, Checklists, and Charts

Volume 1 Theory and Background

1.1 The Architectural Profession

1.1.1 The Architect as a Professional
1.1.2 Professional Conduct and Ethics
1.1.3 Admission to the Profession
1.1.4 The Organization of the Profession in Canada
1.1.5 International Architectural Organizations
1.1.6 The Role of the Architect

1.2 The Construction Industry

1.2.1 The Construction Industry
1.2.2 The Client and Users
1.2.3 Consultants
1.2.4 Building Regulations and Authorities Having Jurisdiction
1.2.5 Standards Organizations, Certification and Testing Agencies, and Trade Associations

Volume 2 Management

2.1 Management of the Practice

2.1.1 Organization of an Architectural Practice
2.1.2 Succession Planning
2.1.3 Public Relations and Marketing
2.1.4 Financial Management
2.1.5 Office Administration
2.1.6 Communications
2.1.7 Human Resources
2.1.8 Quality Management
2.1.9 Risk Management and Professional Liability
2.1.10 Architectural Services and Fees

2.2 Standard Forms for the Management of the Practice

- Guide to the Use of the Forms
- Forms

2.3 Management of the Project

2.3.1 Management of the Project
2.3.2 Types of Construction Project Delivery
2.3.3 Cost Planning and Control
2.3.4 Pre-design
2.3.5 Schematic Design
2.3.6 Design Development
2.3.7 Construction Documents — Drawings
2.3.8 Construction Documents — Specifications
2.3.9 Construction Procurement
2.3.10 Contract Administration — Office Functions
2.3.11 Contract Administration — Field Functions
2.3.12 Take-over Procedures, Commissioning, and Post-occupancy Evaluations

2.4 Standard Forms for the Management of the Project

- Guide to the Use of the Forms
- Forms

Introduction

The practice of architecture requires a wide range of professional skills. These include: the knowledge and skill to design buildings; a thorough understanding of sound and economical construction; proficiency in the application of business and legal principles; and the ability to motivate, coordinate, and manage a complex group of participants. The architect must be designer, construction expert, and manager. It is hoped that this new edition of the *Canadian Handbook of Practice for Architects* will contribute to improving the practice of architecture and, consequently, help to improve the built environment and architecture in Canada.

The *Canadian Handbook of Practice for Architects* is the result of a great collaborative effort by the architectural profession from every region of the country. This edition has been developed and published in both official languages.

Objectives of the Canadian Handbook of Practice

The Handbook is for practising architects and those who plan on becoming architects. With these users in mind, the Handbook's objectives are to:

- provide an instructional resource book for architectural students and intern architects;
- establish a reference document to assist architects in Canada by providing concise and current information.

The Handbook includes information and advice, in the form of summaries, lists, checklists, charts, and sample documents, as well as sources of additional reference material.

History

In March of 1974, the Ontario Association of Architects (OAA) initiated the production of a *Canadian Handbook of Practice for Architects*, specifically tailored to Canadian architectural practice. J. Hugh Westren, the Editor of the first edition, was commissioned in June 1974 to start work on a Handbook of national scope. The first edition was published in 1976. In the early 1990s, some revisions were made to a few sections of the Handbook. Many of these revisions were reprinted from information provided by The American Institute of Architects.

In January of 1997, the National Practice Program — an alliance of the ten provincial associations of architects and the Royal Architectural Institute of Canada — appointed a national Editorial Board to direct the creation of a new, updated edition of the *Canadian Handbook of Practice for Architects*. The National Practice Program approved a business plan for this venture in June of 1998 with the development costs being underwritten by every provincial association of architects. Editors were appointed, and the writing and editing of this new edition commenced in the fall of 1998.

Format

Volume 1 Theory and Background

Volume 1 is an overview of the architectural profession and architectural practice. The 11 chapters in this section provide theory and background information to the architectural profession and an introduction to the business and professional environment in which an architect works.

Volume 2 Management

Volume 2 is divided into two sections: *Management of the Practice* and *Management of the Project*. Each of the 22 chapters contains instructional and descriptive information as well as checklists and some sample forms for the practitioner to use and modify. The forms are also provided in electronic format on a 3-1/2 inch computer disk. Additional forms are provided in CCDC 24: *A Guide to Model Forms and Support Documents* contained in Volume 3.

Volume 1 and Volume 2 are also provided in electronic format on a CD-ROM.

Volume 3 Other Resources

Volume 3 contains standard documents used by the profession and the construction industry in Canada. For reference purposes, the user should obtain and insert all relevant documents which are not provided.

In addition, tabs have been provided to permit users to insert information supplied by the provincial associations of architects and the Royal Architectural Institute of Canada, as well as other relevant reference material. Order forms for other resource material have been included.

Improving the Handbook

Our profession and society as a whole are experiencing a rapid rate of change; as a result, the Handbook will require constant revision and improvement.

Your suggestions about information which should be added, or existing material which should be revised, are welcome. Written suggestions and comments should be addressed to:

The National Practice Program
c/o The Royal Architectural Institute of Canada
55 Murray Street, Suite 330
Ottawa, Ontario K1N 5M3

Updating the Handbook

The National Practice Program intends to issue regular updates to the *Canadian Handbook of Practice for Architects* by subscription. Details of the subscription program will be described in future bulletins and newsletters of the provincial associations of architects and the Royal Architectural Institute of Canada.

Thank You's

I would like to thank everyone who contributed to this Handbook, including all of the many writers. The members of the Editorial Board, who were frequently asked to review great volumes of text at short notice, are to be congratulated for providing insightful comments and suggestions. I also want to thank Tony Butler, Senior English Editor, who reviewed the chapters for correct architectural practice and procedures, and Gilbert Paré, Senior French Editor, who not only kept us informed about the distinctions of architectural practice in Québec but also translated much of the Handbook into French. Finally, I would like to thank the tremendous effort and dedication of the Managing Editor, Jim Young, whose skills as a journalist, writer, and publications manager contributed to the timeliness and success of this publication. It has been an honour to be a part of this team.

Jon Hobbs, OAA, MRAIC
Editor-in-Chief

Canadian
Handbook of
Practice
for Architects



Acknowledgements

The members of the National Practice Program gratefully acknowledge the following individuals who have contributed to the creation of the *Canadian Handbook of Practice for Architects*:

Douglas K. Allen, B.Arch., OAA, FRAIC, is a partner in Allen & Sherriff, Inc. with offices in Richmond Hill, Ontario and Mississauga, Ontario.

Gordon Archibald is a lawyer and an associate at NelliganPower, in Ottawa, Ontario, practising in the area of business law with special emphasis on the needs of technology companies.

John Bobaljik, B.Arch., OAA, FRAIC, is the Practice Advisor at the Ontario Association of Architects, in Toronto, Ontario.

Paule Boutin, B.Arch., OAQ, is a sole practitioner based in Montréal, Québec.

Anthony Butler, B.Arch., OAA, FRAIC, is a sole practitioner based in Hamilton, Ontario.

Richard Coulombe, B.Arch., M.Sc., OAQ, MPMI, is an architect and project management professional in Scéno Plus (experts in theatre and entertainment projects) in Montréal, Québec and also is a consultant in project management.

John G. Davies, B.Arch., C.Arb., OAA, MRAIC, is President of John G. Davies, Architect, Incorporated, based in Ottawa, Ontario.

Peter Dobbing, B.Arch., MRAIC, FCSC, RSW, is a retired architect and a Life Member of Construction Specifications Canada, in Ottawa, Ontario.

Thomas Emodi, B.Arch., M.E.S., NSAA, RAIC, is principal of Thomas Emodi: Architect operating in Canada and Australia, and a professor and the Dean of Faculty of Architecture at Dalhousie University in Halifax, Nova Scotia.

Michael A. Ernest, MAIBC, is the Director of Professional Services of the Architectural Institute of British Columbia.

Martin Gerskup, B.Arch., OAA, MRAIC, is principal of the building science firm, Best Consultants, and sole practitioner, Martin Gerskup Architect, based in Richmond Hill, Ontario.

Daniel B. Goodspeed, B.Arch., NSAA, MRAIC, is a partner in Kassner/Goodspeed Architects, based in Halifax, Nova Scotia.

Charles Hazell, B.Arch., OAA, is a partner at Taylor/Hazell Architects Ltd. (1992), Architects and Restoration Consultants, in Toronto, Ontario.

Lloyd A. Hilgers, B.A., M.Arch., MBA, OAA, MRAIC, is a partner in Murphy Hilgers Architects Inc. of Toronto, Ontario.

Jon Hobbs, B.Arch., M.Pl., OAA, MRAIC, is currently the Advisor, Professional Services, for the National Practice Program and the Committee of Canadian Architectural Councils, in Ottawa, Ontario.

François Hogue, B.Arch., M.Sc., is a staff architect with Desnoyers Mercure & associés based in Montréal, Québec.

Allen N. Humphries, B.E.S., B.Arch., OAA, is an employee of Webb Zerafa Menkès Housden Partnership in Toronto, Ontario and owner of Aleph 5, a consulting company.

Robert Lacoste, B.Arch., OAQ, MRAIC, is a partner in the firm Fichten Soiferman et Associés, architectes in Montréal, Québec.

Rick Linley, M.Arch., MAA, MRAIC, PMP, is a principal and Quality System Manager with Smith Carter Architects and Engineers Incorporated, in Winnipeg, Manitoba.

Terry Mager, MAIBC, MRAIC, is a director in Pacific Architectural Group Inc., in Vancouver, British Columbia.

Vivian Manasc, MBA, MRAIC, is principal of Manasc Isaac Architects and is Adjunct Assistant Professor of Architecture at the University of Calgary.

Dorothy Mazeau, OAA, MRAIC, is President of Allen Mazeau Associates, in Bolton, Ontario, a firm offering development services, with a focus on community development.

Robert J. McCrea, B.Arch., OAA, FRAIC, is a sole practitioner based in Toronto, Ontario.

Peter McLaren, B.Arch., OAA, MRAIC, is a shareholder and associate principal of Dunlop Farrow Inc. Architects and is based in the DFA Toronto office.

David Molyneux, D.Arch., RIBA, OAA, works as a development consultant with CB Richard Ellis and also provides design-build services as David Molyneux Architect, in Toronto, Ontario.

John A. Neilson, MAIBC, FRAIC, is principal of John A. Neilson Architects Inc., Victoria, British Columbia and Past President (1998-99) of the Architectural Institute of British Columbia.

David Northcote, B.E.S., B.Arch., OAA, MRAIC, is a senior associate in Reich + Petch Architects Inc. based in Toronto, Ontario and a Vice President of Reich + Petch Design International with offices in Toronto, Ontario and London, England.

Robert Northcott, B.Arch., NSAA, is a partner in Lydon Lynch Architects Limited based in Halifax, Nova Scotia.

Hershel B. Okun, B.Arch., OAA, MRAIC, is a sole practitioner and President of Okun Architect Inc., in Toronto, Ontario.

Richard O'Reilly is a lawyer and a partner at NelliganPower, in Ottawa, Ontario, practising in the areas of business law and commercial real estate.

Gilbert Paré, M.Arch., OAQ, is a sole practitioner in Montréal, Québec, specializing in architectural translation and writing.

Stephen F. Pope, B.E.S., B.Arch., OAA, MRAIC, is a sole practitioner in Ottawa, Ontario.

Jak G.P. Redenbach, B.Sc., B.Arch., MAIBC, MRAIC, AIA (Associate), practises architecture in Vancouver, British Columbia.

Roger Bruno Richard, B.A., B.Arch., M.Arch., OAQ, MRAIC, is Associate Professor and Director of the École d'architecture at the Université de Montréal in Montréal, Québec.

N. Gerald Rolfsen, B.Arch., M.Arch., D.Arch., MAIBC, FRAIC, is a principal in the consulting firm, The APRA Group Inc., in Vancouver, British Columbia.

Manfred Schulz, B.E.S., MBA, CMA, is the Chief Operating Officer for GBR Architects Limited in Winnipeg, Manitoba.

J. Brian Sim, B.A. (Hons), B.Arch., MAIBC, FRAIC, HON. FAIA, HON. FCARM, is a principal of Tielker Sim & Associates, Architecture, Planning and Interior Design in Vancouver, British Columbia.

Jean-Luc Vadeboncoeur, B.Arch., OAQ, is a project manager and head of design studio at Les architectes Dupuis Dubuc et associés, in Montréal, Québec.

Grant Van Iderstine, B.Arch., MAA, MRAIC, is a principal with Smith Carter Architects and Engineers Incorporated, a multi-disciplinary A/E firm based in Winnipeg, Manitoba.

John R. White, B.E.S., M.Arch., MAA, MRAIC, works as a senior architect with Public Works and Government Services Canada providing in-house architectural services to Parks Canada, in Winnipeg, Manitoba.

Photo Credits

The following photographs of details of buildings or "building fragments" have been used throughout this Handbook.

Architect: A.J. Diamond, Donald Schmitt and Company, Architects
Building: Richmond Hill Central Library
Photographer: Steven Evans

Architect: Annie Lebel, architecte
Stéphane Pratte, architecte
Building: Zone

Architect: Arthur Erickson, Architect
Building: Roy Thomson Hall
Photographer: Corel Stock Photo Library

Architect: Brian MacKay-Lyons Architecture + Urban Design
Building: House on the Nova Scotia Coast
Photographer: Jamie Steeves

Architect: Busby + Associates Architects
Building: Revenue Canada Office Building
Photographer: Martin Tessler

Architect: Cormier, Cohen, Davies architectes (Atelier Big City)
Building: Parc de l'aventure basque en Amérique
Photographer: Big City

Architect: Dan S. Hanganu, Architects
Building: Pavillon de design, Université du Québec à Montréal
Photographer: Michel Brunelle

Architect: Darling and Pearson, Architects
Building: Canadian Bank of Commerce
Photographer: Corel Stock Photo Library

Architect: Douglas J. Cardinal, Architect and Tétreault, Parent, Languedoc et Associés
Building: Canadian Museum of Civilization
Photographer: Corel Stock Photo Library

Architect: Florian Maurer Architect Ltd.
Building: Tr'ondek Hwech'in Cultural Centre
Photographer: Florian Maurer Architect Ltd.

Architect: Hughes Baldwin, Architects
Building: Renfrew Branch Library
Photographer: Gary Otte

Architect: Kuwabara Payne McKenna Blumberg Architects
Building: Kitchener City Hall & Civic Square
Photographer: Steven Evans

Architect: Kuwabara Payne McKenna Blumberg Architects
Building: Grand Valley Institution for Women
Photographer: Steven Evans

Architect: Larry McFarland Architects Limited
Building: First Nations Longhouse, University of British Columbia
Photographer: Steven Evans; Malak Photographs Ltd.

Architect: Levitt Goodman Architects Ltd.
Building: Strachan House
Photographer: Robert Burley / Design Archive

Architect: MacFawn and Rogers Architects Limited
Building: HMCS Sackville Interpretation Centre

Architect: MacLennan Jaunkalns Miller Architects Limited
Building: Rotary Park Pool

Architect: Montgomery and Sisam Architects
Building: Humber River Bicycle Pedestrian Bridge
Photographer: Design Archive / Robert Burley

Architect: Moshe Safdie; Associate Architects: David, Barott, Boulva
Building: Habitat '67
Photographer: Corel Stock Photo Library

Architect: Moshe Safdie in joint venture with Parkins Partnership; Associate Architects: Desnoyers, Mercure
Building: National Gallery of Canada
Photographer: Corel Stock Photo Library

Architect: Osburn Cotnam Associates, Architects in joint venture with Dunlop Farrow Aitken Cansfield Inc. Architects (now Osburn Cotnam Belair Architects); Dunlop Farrow Inc. Architects
Building: Ministry of Correctional Services, Head Office
Photographer: Panda Photography Ltd.

Architect: Peter Cardew Architect
Building: Morris and Helen Belkin Art Gallery, University of British Columbia
Photographer: Timothy Hursley

Architect: Peter Cardew Architect
Building: House in West Vancouver
Photographer: Peter Cardew Architect

Architect: Peter Cardew Architect
Building: Odium Drive Live-Work Studios
Photographer: Peter Cardew Architect

Architect: Saia et Barbarese architectes
Building: Centre Sportif de la Petite-Bourgogne
Photographer: Michel Brunelle

Architect: Saucier + Perrotte, architectes
Building: Résidence Mercille

Architect: Saucier + Perrotte architectes
Building: La Cinémathèque québécoise
Photographer: Éric Piché

Architect: Shim-Sutcliffe Architects
Building: Ledbury Park
Photographer: James Dow, Michael Awad

Architect: Stephen Teeple, Architect
Building: Burt C. Matthews Hall Addition
Photographer: Richard Jonston

Architect: Thomas Fuller, Architect
Building: Library of Parliament of Canada
Photographer: Corel Stock Photo Library

Architect: Viljo Revell and John B. Parkin (now known as NORR Partnership Limited)
Building: Toronto City Hall
Photographer: Panda Associates

Architect: Webb Zerafa Menkes Housden Partnership
Building: Royal Bank Plaza, Toronto
Photographer: Corel Stock Photo Library

Architect: Zeidler Roberts Partnership / Architects
Building: Columbus Center of Marine Research and Exploration
Photographer: Michael Dersin

Index

A

Acceptance, letter of, 2.4: 5, Form 2.7
Accountants, engaging, 2.1.4: 5
Accounting and financial records
  accountant choice, 2.1.4: 5
  balance sheets, 2.1.4: 5
  cash flow forecast, 2.1.4: 9
  cash vs. accrual system, 2.1.4: 2-3
  definitions, 2.1.4: 12-13
  invoicing, 2.1.4: 9
  project cost control information, 2.1.4: 8
  statements of income and expenses, 2.1.4: 3-4
  time reports, 2.1.4: 8-9
  types of, 2.1.4: 2
Addenda, forms for, 2.4: 4, Form 2.3
Aeronautics Act, 1.2.4: CH-11
Airports, 1.2.4: CH-11
Alberta Association of Architects (AAA), 1.1.4: CH-3
Alternative dispute resolution (ADR) – see Dispute resolution
American Institute of Architects (AIA)
  address, 1.1.5: CH-7
  Masterspec® system, 2.3.8: 8-9
  organization and functions, 1.1.5: 2
  services agreement, 2.1.10: 6
  Uniform Drawing System, 2.3.7: 4
American Institute of Architecture Students (AIAS), 1.1.5: 2
American National Standards Institute (ANSI), 1.2.5: CH-14
American Society for Testing and Materials (ASTM), 1.2.5: CH-14
American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), 1.2.5: CH-14
American Society of Mechanical Engineers (ASME), 1.2.5: CH-14
American Wire Producers Association (AWPA), 1.2.5: CH-14
Approval process (buildings), 1.2.4: 2-6, 8-10
Arbitration, in dispute settlement, 2.1.9: 4
Architects Association of Prince Edward Island (AAPEI), 1.1.4: CH-3
Architects' Association of New Brunswick (AANB), 1.1.4: CH-3
Architects' Council of Europe, 1.1.5: CH-7
Architectural Institute of British Columbia (AIBC), code of ethics, 1.1.2: 2, 5-6, 1.1.4: CH-3, 2.1.10: 6
Architectural practices
  auxiliary services for, 2.1.1: 6-7
  communications within, 2.1.6: 4
  continuing education, 2.1.7: 7
  internal structures, 2.1.1: 5
  liability for past work, 2.1.2: 5
  multi-disciplinary, 2.1.1: 4
  ownership types, 2.1.1: 2-3
  provincial requirements, 1.1.4: CH-5D, CH-5E
  quality management systems for, 2.1.8: 2-4
  retirement planning, 2.1.2: 2
  risk management planning, 2.1.9: 1
  sale of, 2.1.2: 2, 5
  skills for building planning, 2.3.4: 4-6
  succession planning for, 2.1.2: 1-5
  valuation and goodwill, 2.1.2: 5
  – *see also* Corporations; Design teams; Office management; Partnerships; Services; Staff
Architectural profession
  characteristics, 1.1.1: 3
  clients and, 1.2.2: 4
  in construction and development, 1.1.6: 3-4
  in education and research, 1.1.6: 3
  educational qualifications, 1.1.3: 1-2
  engineering and, 1.1.1: 3-4
  government practice, 1.1.6: 2-3
  history, 1.1.4: 1
  institutional/corporate practice, 1.1.6: 2
  international organizations, 1.1.5: 1-2, CH-7
  internship, 1.1.3: 2-3
  North American organizations, 1.1.5: 2-3
  private practice, 1.1.6: 1-2
  professional culture, 2.1.8: 4
  provincial associations – see Provincial associations of architects
  provincial jurisdiction, 1.1.3: 1, 1.1.4: 3
  reciprocity agreements, 1.1.4: 4
  Registration Examination, 1.1.3: 3-4, 5
  registration process, 1.1.3: 3-4
  role in society, 1.1.6: 1, 5
  university programs in, 1.1.3: 2
Asociación de Instituciones de Enseñanza de la Arquitectura de la República Mexicana (ASINEA), 1.1.5: 3
Association des architectes du Nouveau-Brunswick – *see also* Provincial associations of architects

Association of Collegiate Schools of Architecture (ACSA), 1.1.5: 2-3, CH-7
Association of Consulting Engineers of Canada (ACEC), 1.2.1: 6-7, 1.2.3: 3, 1.2.3: CH-10
Association of Higher Education Facilities Officers (APPA), 1.2.2: 5
Atomic Energy Control Act, 1.2.4: CH-11
Atomic Energy Control Board (AECB), 1.2.5: CH-14
Audits, 2.1.4: 2
Authorities Having Jurisdiction
  and approval process, 1.2.4: 5-6
  and contractors, 1.2.4: 5
  federal, 1.2.4: CH-11
  provincial, 1.2.4: CH-12
  regional/municipal, 1.2.4: CH-13
  review of plans, 2.3.6: 3
  role, 1.2.4: 1-3
  types, 1.2.4: 3

B

Balance sheets, 2.1.4: 5
Bankers, 2.1.4: 5
Bid depositories, 1.2.1: 5, 2.3.9: 4-5
Bid packages
  addenda to, 2.3.9: 5
  checklist for, 2.3.9: CH-35
  distribution list, 2.3.9: 4, 2.4: 4, Form 2.1
  drawings for, 2.3.7: 5
  preparation, 2.3.9: 3-4
Bidding, 2.1.10: 1
  analyzing bid proposals, 2.3.9: 6-7
  bid period and bid closing, 2.3.9: 5-6
  bid summary, 2.4: 4-5, Form 2.6
  checklist for, 2.3.1: CH-30
  drawings for, 2.3.7: 5
  electronic, 2.1.5: 4
  instructions to bidders, 2.3.9: 5, CH-36
  letters of acceptance, 2.4: 5, Form 2.8
  litigation risks, 2.1.9: 9
  notifying bidders, 2.3.7
  over-budget bids, 2.3.9: 7
  procedures, 1.2.1: 4-5
  rejected bids, 2.3.9: 7, 2.4: 5, Form 2.8
  types of bids, 2.3.9: 1-2, 6-7
  – *see also* Bid package
Billable hours, 2.1.4: 7
Billing rates, 2.1.4: 7
Boilers and Pressure Vessels Act, 1.2.4: CH-12
BOMI Institute, 1.2.2: 4
Bonding companies, 1.2.1: 3
Bonds, 2.3.9: 2-3, 7
British Columbia – *see also* Architectural Institute of British Columbia
British Columbia, requires Letter of Assurance, 2.4: 8
Budgeting
  calculation sheet, 2.1.4: CH-20
  general principles, 2.1.4: 2
  project, 2.3.3: 3-4
Build-to-suit construction, 2.3.2: 5
Building authorities – see Authorities Having Jurisdiction
Building codes
  and building permits, 1.2.4: 4
  jurisdiction over, 1.2.4: 2
  national, 1.2.4: 2
  provincial, 1.2.4: CH-12
  purpose, 1.2.4: 1
  – *see also* Authorities Having Jurisdiction; Zoning
Building inscriptions, 1.1.1: 4
Building inspection, 2.3.11: 7-9
  for components and systems, 2.3.12: 7-8
  process, 1.2.4: 2-3
Building owners, 1.2.1: 2, 1.2.2: 1
Building Owners and Managers Association (BOMA), 1.2.2: 4
Building permits
  denial of, 1.2.4: 3-4
  process, 1.2.4: 2-4, 5-6, CH-13
Building use – *see* Functional programming

C

CAD (computer-assisted drawing/design), 2.3.7: 4-5
Canada Mortgage and Housing Corporation (CMHC), 1.1.6: 3, 1.2.4: 5
Canada Pension Plan (CPP), 2.1.7: 3
Canadian Architectural Certification Board (CACB), address and vital statistics, 1.1.3: 1. 1.1.4: 2, CH-4
Canadian Commission on Building and Fire Codes (CCBFC), 1.2.4: 2, 1.2.5: CH-14
Canadian Construction Association (CCA), 1.2.1: 3-4, 6-7, 1.2.3: CH-10
Canadian Construction Documents Committee (CCDC), 1.2.1: 6-7
  construction contracts, 2.3.9: 7-8
  contract agreements, 2.3.2: 7
Canadian Council of Professional Engineers (CCPE), 1.2.3: CH-10
Canadian Council of University Schools of Architecture (CCUSA), 1.1.4: 3
Canadian Education Standard, 1.1.3: 1-2
Canadian Environmental Assessment Act, 1.2.4: CH-11
Canadian Gas Association (CGA), 1.2.5: CH-14
Canadian General Standards Board (CGSB), 1.2.5: CH-14
Canadian Home Builders' Association (CHBA), 1.2.1: 5
Canadian Human Rights Act, 2.1.7: 4
Canadian Institute of Quantity Surveyors (CIQS), 1.2.3: CH-10
Canadian Schools of Architecture, 1.1.3: CH-1
Canadian Society of Landscape Architects (CSLA), 1.2.3: CH-10

Canadian Standard Form of Agreement Between Architect and Consultant: Document Nine, 1.2.3: 2
Canadian Standards Association (CSA), 1.2.5: CH-14
Cash flow forecast. 2.1.4: 9, 11
Certificate of substantial performance, 2.3.10: 7, 2.3.12: 2-3
Certification and testing agencies, 1.2.5: 3, CH-15
Certification of Education, 1.1.3: 2
Certified Construction Contract Administrator (CCCA), 1.2.3: 3
Certified Technical Representative (CTR), 1.2.3: 3
Change orders/directives, 2.3.10: 6, 2.4: 6, Form 3.4
Clients
  advising on costs, 2.3.3: 1-2
  agreements with, 2.1.9: 7, 2.3.1: 1
  associations, 1.2.2: 4
  and Authorities Having Jurisdiction, 1.2.4: 3
  building relationships with, 2.1.3: 4
  changes made by, 2.3.7: 9
  client base, 2.1.1: 2
  client representatives, 1.2.2: 6
  communicating with, 2.1.6: 3
  in construction phase, 2.3.11: 2
  corporate, 1.2.2: 2-3
  in design development, 2.3.6: 1-2
  effect of type on cost planning, 2.3.3: 10
  government, 1.2.2: 3
  institutional, 1.2.2: 3
  marketing strategy for, 2.1.3: 3
  nonpayment problems with, 2.1.9: 4-5
  project risk assessment (GO NO-GO), 2.1.9: 6, CH-25
  roles, 1.2.2: 1, 2.3.10: 2
  in schematic design phase, 2.3.5: 1
  small business/individual, 1.2.2: 3-4
  timetable problems and, 2.2.3: 10-11
  types, 1.2.2: 1-4
  – *see also* Marketing; Promotion; Project delivery
Commissioning, 2.3.12: 1, 2.3.12: 5, 7-8
Commissioning agents, 2.3.12: 1, 5
Committee of Canadian Architectural Councils (CCAC), 1.1.3: 3
  address and vital statistics, 1.1.4. CH-4
  agreement with NCARB, 1.1.5: 2
  organization and functions, 1.1.4: 4
  planned code of ethics, 1.1.2: 3
  reciprocity agreements, 1.1.3: 4-5
Commonwealth Association of Architects (CAA), 1.1.5, CH-7
Communications
  external, 2.1.6: 3
  internal, 2.1.6: 4
  methods, 2.1.6: 4-6
  in project management, 2.3.1: 2
  standard forms for, 2.1.6: 6
  types and styles, 2.1.6: 1-2
  – see also Marketing; Promotion
Competition types, 2.1.3: 6
Complaints, 1.1.2: 3
Component verification, 2.3.12: 7
Comptrollers, 2.1.1: 6
Computer systems
  archiving files, 2.1.5: 4
  CAD (computer-assisted drawing), 2.3.7: 4-5
  forms for, 2.2: 1
  project information service systems, 2.1.3: 4
  project management software, 2.3.2: 22
  security, 2.1.5: 3
  setting up, 2.1.5: 4-5
  specification software for, 2.3.8-9
  upgrades, 2.1.5: 5
Concrete, 2.3.11: 5, 8
Construction Canada magazine, 1.2.3: 3
Construction documentation phase
  cost tasks, 2.3.3: 15
  checklist for, 2.3.1: CH-30
  – *see also* Documents; Specifications
Construction industry
  safety associations, 1.2.1: 6
  sectors, 1.2.1: 1-3
  statistics for, 1.2.1: 1
  trade associations, 1.2.1: 3-6, 1.2.5: 3, CH-16
  workplace safety, 1.2.1: 5-6, 2.3.11: 3
  – *see also* Contractors
Construction Industry Consultative Committee (CICC), 1.2.1: 6-7
Construction managers, 2.3.2: 2-3
  – *see also* Contractors; Project managers
Construction price index, 2.3.3: 12
Construction procurement – see Bidding
Construction Specifications Canada (CSC), 1.2.1: 6-7
  address, 1.2.3: CH-10
  functions, 1.2.3: 3
  Masterformat™, 1.2.3: 3, 2.3.8: 5-7, 2.3.3: 3
  SectionFormat system, 2.3.8: 7
Construction Specifications Institute (CSI), 1.2.3: 3, 2.3.8: 7
  agreements with, 1.2.3: 2
  drawing standards, 2.3.7: 4
Consultants
  assembling consultant team, 2.1.9: 6-7, CH-26
  associations, 1.2.3: 3
  communicating with, 2.1.6: 3
  in construction phase, 2.3.11: 2
  coordinating in project management, 2.3.1: 2
  cost, 2.3.3: 2,11
  field review activities, 2.3.11: 7-8
  managing, 1.2.3: 2-3
  in pre-design phase, 2.3.4: 1
  quantity surveyors, 2.3.3: 11-12
  role in project management, 2.3.10: 2
  types, 1.2.3: 1, CH-9
  see also Contractors
Contingencies, 2.3.3: 14
Continuing education, 1.1.3: 5, 2.1.7: 7

Contract administration phase, 2.3.10, 2.3.11
checklist for, 2.3.1: CH-30
cost tasks, 2.3.3: 15-16
– *see also* Project management
bid documents for, 2.3.9: 4-5
and building permits, 1.2.4: 5
and cost estimating, 2.3.3: 12
and holdback release, 2.3.12: 2-3, 5
information needed from, 2.3.10: 3
multiple-contract situations, 2.3.2: 1
payment procedures, 2.3.12: 3, 5
payments to, 2.3.10: 6-7
pre-qualification of, 2.3.2: 1
qualification statement, 2.4: 4
role in project management, 2.3.10: 2
as short-term staff, 2.1.7: 1
warranty items for, 2.1.9: 10
and warranty review, 2.3.12: 8
– *see also* Consultants
Contracts and agreements
client-architect, 1.2.2: 5-6, 2.1.9: 7-8, 2.1.10: 6, 2.3.1: 1
construction contracts, 2.3.9: 7-8
with consultants, 1.2.3: 2, 2.1.9: 6-7
contract administration, 2.1.9: 9-10
contract award, 2.3.9: 7
cost-plus, 2.3.2: 5, 8
design-bid-build, 2.3.2: 2
design-build, 2.3.2: 7-8
for establishing partnerships, 2.1.1: CH-17
government or "in-house", 2.3.2: 8-9
incentive-based, 2.3.2: 9
incorporating a practice, 2.1.1: CH-18
list of standard Canadian construction documents, 1.2.1: CH-8
maximum price, 2.3.2: 8
precautions for, 2.1.9: 7-8
purchase orders, 2.3.2: 9
redetermination, 2.3.2: 9
review of shareholder/partnership agreements, 2.1.2: 5
sale of architectural practices, 2.1.2: CH-19
standard forms, 2.3.2: 7, CH-31
standing offers, 2.3.2: 9
stipulated price, 2.3.2: 7
unit price, 2.3.2: 8
Copyright, 1.1.1: 4
Corporations
change of shareholders, 2.1.2: 3
definition, 2.1.1: 3
profit distribution to shareholders, 2.1.4: 1
review of shareholder agreements, 2.1.2: 5
shareholders' agreement checklist, 2.1.1: CH-18
Cost analysis, 2.3.6: 4
Cost control chart, 2.2: 8, Form 2.3
Cost planning and control, 2.3.1: 2
advising clients, 2.3.3: 1-2
architect's role in, 2.3.3: 14
building life cyle costs, 2.3.3: 16
by building element, 2.3.3: 3, 6-7
contingencies, 2.3.3: 14
energy cost analysis, 2.3.3: 17
estimate preparation, 2.3.3: 2-8
factors affecting costs, 2.3.3: 9-11
Level 1, 2, and 3 estimates, 2.3.3: 3, 5
liability issues, 2.3.3: 2
publications on, 2.3.3: 12, 14
regulations and, 2.2.3: 11
typical information, 2.3.3: 13
by unit area/volume, 2.3.3: 6, 8
value engineering, 2.3.3: 16-17
Cost plus projects, 2.3.2: 5, 8
Courier services, 2.1.6: 5-6
CPM – *see* Critical path method
Critical path diagrams, 2.3.2: 20-21
Critical path method (CPM), 2.3.2: 14-21

D

Deeds, 1.2.4: 6, CH-13
Defence Construction Canada (DCC), 1.1.6: 3
Deficiency list, 2.3.12: 3
Definitions
Accounts Payable, 2.1.4
Accounts Receivable, 2.1.4
Accreditation, 1.1.3
Addendum, 2.3.9
Aging Reports, 2.1.4
Architect, 1.1.1
Attribute, 2.3.7
Authority Having Jurisdiction, 1.2.4
Balance Sheet, 2.1.4
Base Bid, 2.3.9
Bid or Tender, 2.3.9
Bid Documents or Bid Package, 2.3.8
Bond, 2.3.9
Building Code, 1.2.4
Cash Book, 2.1.4
Cash Flow, 2.1.4
Certificate, 2.3.10, 2.3.12
Certificate of Substantial Performance, 2.3.10, 2.3.12
Certification, 1.1.3, 1.2.5
Client, 1.2.2
Code, 1.1.2
Communication, 2.1.6
Complaint, 1.1.2
Construction, 1.2.1
Construction Budget, 2.3.3
Construction Cost, 2.1.10
Construction Documents, 2.3.7
Construction Manager, 2.3.2
Constructor, 1.2.1, 1.2.4
Consultant, 1.2.3
Contract Administration, 2.3.10

Corporation, 2.1.1
Depreciation, 2.1.4
Design-Build, 2.3.2
Direct Personnel Expense, 2.1.4
Disbursement Record, 2.1.4
Discipline, 1.1.2
Division, 2.3.8
Drawing, 2.3.7
Element, 2.3.3
Employee, 2.1.7
Engineer, 1.2.3
Estimate, 2.3.3
Ethics, 1.1.2
Feasibility Study, 2.3.4
Fee, 2.1.10
Fiscal Period, 2.1.4
Fixed Fee or Lump Sum or Stipulated Price, 2.1.0
Functional Program, 2.3.4
General Ledger, 2.1.4
General Review, 2.3.11
Generic, 2.3.8
Goodwill, 2.1.2
Guarantee, 2.3.12
Holdback, 2.3.10, 2.3.12
Indemnification, 2.1.9
Independent Contractor, 2.1.7
Indexing, 2.3.3
Joint Venture, 2.1.1
Journeyman, 1.2.1
Layer, 2.3.7
Liable, 2.1.9
Lien, 2.3.10, 2.3.12
Maintenance, 2.3.12
Minutes, 2.1.6
Multiplier, 2.1.4
Office Overhead, 2.1.4
Owner, 1.2.2
Part, 2.3.8
Partnership, 2.1.1
Payroll Burden, 2.1.4
Payroll Records, 2.1.4
Percentage Fee, 2.1.10
Permit, 1.2.4
Per Diem, 2.1.10
Post-occupancy Evaluation, 2.3.12
Practice of Architecture, 1.1.1
Pre-design Services, 2.3.4
Pre-purchasing, 2.3.9
Pre-selecting, 2.3.9
Pre-tendering, 2.3.9
Prime Consultant, 1.2.3
Product or Products, 2.3.8
Profession, 1.1.1
Profit, 2.1.4
Project Budget, 2.3.3
Project Cost Control Chart, 2.1.4
Project Manager, 2.3.2
Quality Assurance, 2.1.8
Quality Control, 2.1.8
Quantity Survey, 2.3.3
Risk, 2.1.9
Schedule, 2.3.7
Section, 2.3.8
Service, 2.1.10
Shop Drawing, 2.3.10
Sole Proprietorship, 2.1.1
Staff Utilization Records, 2.1.4
Standard, 1.2.5
Statement of Income and Expenses, 2.1.4
Stop Work Order, 1.2.4
Sub-consultant, 1.2.3
Surety, 2.3.9
Tax Records, 2.1.4
Tender or Bid, 2.3.9
Total Quality Management, 2.1.8
Verification, 2.1.8
Warranty, 2.3.12
Work-in-Progress (WIP), 2.1.4
Department of National Defence (DND), 1.1.6: 3
Deposits, 2.3.9: 4
Design brief, 2.3.4: 3
Design development phase
  checklist for, 2.3.1: CH-30
  cost tasks, 2.3.3: 15
Design-bid-build projects, 2.3.2: 2, 4
Design-build projects, 2.3.2: 4-5, 7-8
Designers, 1.2.1: 2
Design(s)
  alternative, 2.3.5: 3
  development, 2.1.10: 1, 2.3.6: 1-2
  documentation, 2.3.5: 4
  engineering services in, 2.3.5: 3, 2.3.6: 2
  report, 2.3.6: 4-5, CH-33
  teams, 2.1.1: 4-5
  – *see also* Design development phase; Drawings; Schematic design phase
Desk diaries, 2.1.6: 6
Developers, 2.3.2: 5-6
Dimensioning, 2.3.7: 7
Disciplinary proceedings, provincial associations and, 1.1.2: 3
Dispute resolution, 2.1.9: 2-4
  archiving, 2.1.5: 3-4
  Canadian Construction Documents Committee and, 1.2.1: 6-7
  checking, 2.1.9: 9, 2.3.10: 3
  construction, 2.1.10: 1, 2.3.1: CH-30
  dating documents, 2.1.6: 1
  for design development, 2.3.6: 4
  dispute defences and, 2.1.9: 4
  electronic transmission, 2.1.6: 6
  field review report, 2.3.11: 6
  filing and retrieval systems, 2.1.5: 3
  filing format, 2.1.5: CH-22
  final submissions, 2.3.12: 1-2
  list of standard Canadian construction documents, 1.2.1: CH-8

preparation for contract administration, 2.3.10: 3
project directory, 2.2: 10
schematic designs, 2.3.5: 4
standard forms for communications, 2.1.6: 6
types, 2.3.8: 1, 2.3.10: 5-7
– *see also* Bid packages; Building permits; Contracts and agreements; Forms; Guidelines; Drawings; Seals; Site plans; Specifications; Stamps
Drawings
checklists for, 2.3.7: 9
computer-assisted, 2.3.7: 4-5
coordinating, 2.3.7: 9-10
detailing elements, 2.3.7: 8
elevations, 2.3.7: 8
engineering, 2.3.7: 10-11
floor plans, 2.3.7: 7-8
information content, 2.3.7: 5
notes, symbols, and dimensions in, 2.3.7: 7
organization, 2.3.7: 5-9
production, 2.3.7: 2-5
purpose, 2.3.7: 1-2
revision of, 2.3.7: 9-10
schedules of, 2.3.7: 8-9
sections, 2.3.7: 8
shop, 2.3.10: 4-5, CH-37, 2.4: 9-11
site plans, 2.3.7: 7
and specifications, 2.3.8: 2
stamps for, 2.4: 9-11
standards and specifications for, 2.3.7: 4-5
title blocks, 2.3.7: 6-7

E

E-mail, 2.1.5: 4, 2.1.6: 6
Education programs, 1.1.3: 1-3, 5
Electricity/electrical engineering
in design development, 2.3.6: 3
inspection of electrical work, 1.2.4: CH-13, 2.3.11: 8
international standards, 1.2.5: 2
Elevations, 2.3.7: 8
Elevators, 1.2.4: CH-12
Employee agreement, checklist for, 2.1.7: CH-24
Employee appraisals – *see* Performance reviews
Employees – *see* Staff
Employment agreements, 2.1.7: 2
forms for, 2.2: 2-5, Form 1.4
Employment applications, 2.2: 2, Form 1.2
Employment Insurance (EI), premium payment, 2.1.7: 3
Energy
costs analysis, 2.3.3: 17
national efficiency codes, 1.2.4: 2
Engineers/engineering services
and architecture, 1.1.1: 3-4
in building planning process, 1.2.4: 6
in design development, 2.3.6: 2-3
and drawing production, 2.3.7: 9-11
fees for, 2.1.10: 4
field review activities, 2.3.11: 7-8
mechanical, 2.3.6: 2-3
in schematic design, 2.3.5: 3
specialized consultants, 1.2.3: 1
– *see also* Consultants; Electricity/electrical engineering
Environmental assessment, 1.2.4: 1
in planning process, 1.2.4: 5, CH-11
provincial authority, 1.2.4: CH-12
Environmental management systems, 1.2.5: 2
Environmental Protection Agency (U.S.) (EPA), 1.2.5: CH-14
Estimating – *see* Cost planning and control
Ethics, codes of, 1.1.2: 1, 2-3, 5-6
Examination, registration, 1.1.3: 3-4
Architect Registration Examination (ARE), 1.1.3: 3-4, 5
Expenses
claim form, 2.2: 8, Form 2.5
projected, 2.1.4: 2
statements of, 2.1.4: 3-4

F

Facsimiles – *see* Fax
Farm buildings, 1.2.4: 2
Fax, 2.1.6: 6, 2.4: 2, Form 1.4
Feasibility studies, 2.3.4: 2
Federación de Colegios de Arquitectos de México (FCAM), 1.1.5: 3
Federal Building Heritage Review Office (FBHRO), 1.1.6: 3
Fees
calculating, 2.1.4: 6-8, 2.1.10: 3-5, 2.2: 7, Form 2.2
lump-sum/fixed, 2.1.10: 4-5
methods of compensation, 2.1.10: 2
per diem/hourly, 2.1.10: 4
potential losses, 2.1.9: 8
professional, 2.2: 4
Festival of Architecture, 1.1.4: 2
Field review
architect's role, 2.3.11: 2
checklists for, 2.3.11: 10-11, CH-39
completion inspection, 2.3.12: 3
procedures for, 2.3.11: 3-6
purpose, 2.3.11: 1
report, 2.3.11: 6, 2.4: 6, Form 3.1
timing of, 2.3.11: 4-5
Files – *see* Computer systems; Documents; Filing systems
Filing systems, 2.1.5: 3
Financial planning
budgeting, 2.1.4: 2
in building design, 2.3.4: 7
long-range, 2.1.4: 1

project cost control information, 2.1.4: 9
– *see also* Fees
Financial records, 2.1.4: 2-5
Fire safety, 1.2.4: 2, 1.2.4: CH-12, CH-13
Flammable products, 1.2.4: CH-12
Floor plans, 2.3.7: 7-8
Forms
addenda, 2.4: 4, Form 2.3
agreement with consultants, 1.2.3: 2
bid document distribution list, 2.4: 4, Form 2.1
bid summary, 2.4: 4-5, Form 2.6
for Change Orders, 2.4: 6
contractor's qualification statement, 2.4: 4
cost control chart, 2.2: 8, Form 2.3
employment agreement, 2.2: 2-5, Form 1.4
employment application, 2.2: 2, Form 1.2
expense claims, 2.2: 8, Form 2.5
fax memorandum, 2.4: 2, Form 1.4
fee calculation, 2.2: 7, Form 2.2
field review, 2.4: 6, Form 3.1
for final certification, 2.4: 8
guide to use, 2.2: 1, 2.4: 1
interview evaluation, 2.2: 2, Form 1.3
invoices, 2.2: 7, Form 2.1
job description, 2.2: 1-2, Form 1.1
letter of acceptance, 2.4: 5, Form 2.7
memorandum, 2.4: 2, Form 1.1
minutes of meeting, 2.4: 2, Form 1.2
performance evaluation, 2.2: 6, Form 1.5
project financial information, 2.4: 4
project team directory, 2.4: 3, Form 1.5
purchase order, 2.2: 9, Form 2.6
supplemental instruction, 2.4: 6
time report, 2.2: 8, Form 2.4
transmittal, 2.4: 2, Form 1.3
for warranties, 2.4: 7
Functional planning
and building size, 2.3.4: 4-6
and cost planning, 2.3.3: 10
logic diagram in, 2.3.12: 5
master plans, 2.3.4: 6
organizational planning, 2.3.4: 7
in pre-design phase, 2.3.4: 2-6

G

Gantt diagram, 2.3.2: 11-12
GO NO-GO (project risk assessment), 2.1.9: 6, CH-25
Goods and Services Tax, 2.1.4: 9-10
Goodwill, 2.1.2: 5-6
Governor General's Medals for Architecture, 1.1.4: 2
Guaranty, 2.3.12: 10

H

Harassment, 2.1.7: 4
Harmonized Sales Tax, 2.1.4: 9-10
Highways and roads, 1.2.4: CH-12
Holdback
release, 2.3.12: 2-3, 5
statutory, 2.3.10: 7
Home, work from, 2.1.7: 4
Hospitals, 1.2.4: CH-12
Hotels, 1.2.4: CH-12
Housing, 1.2.4: 2
Human resources management
leadership development, 2.1.2: 4
succession planning and, 2.1.2: 4

I

In-house studios – *see* Design teams
Incentive programs, 2.1.7: 4
Income
projected, 2.1.4: 2
statements of, 2.1.4: 3-4
– *see also* Fees
Income tax, 2.1.4: 9-10
Incorporation
names of firms, 1.1.4: CH-5E
provincial requirements, 1.1.4: CH-5D, CH-5E
– *see also* Corporations
Inflation, 2.3.3: 9
Injunction (denial of building permit), 1.2.4: 4
Inspection – *see* Field review
Institute for Research in Construction (IRC), 1.1.6: 3
Instructions, supplemental, 2.3.10: 5-6
Insurance
for company office, 2.1.5: 3
companies, 1.2.1: 3
employee benefits, 2.1.7: 3-4
requirements for, 2.1.1: 6-7
– *see also* Liability insurance
Interior Designers of Canada (IDC), address, 1.2.3: CH-10
Intern Architect Program, 1.1.3: 2-3, 5, 1.1.4: 4
International Council of Graphic Design Associations (ICOGRADA), 1.1.5: 1
International Council of Societies of Industrial Design (ICSID), 1.1.5: 1
International Council on Monuments and Sites (ICOMOS), 1.1.5: 1-2, CH-7
International Development Association (INTA), 1.1.5: 1
International Electrotechnical Commission (IEC), 1.2.5: 2, CH-14
International Facility Managers Association (IFMA), 1.2.2: 5
International Federation of Interior Designers (IFI), 1.1.5: 1
International Organization for Standardization (ISO), 1.2.5: 1-2, CH-14

International Society of City and Region Planners (ISOCARP), 1.1.5: 1
International Union of Architects/Union internationale des architectes, 1.1.1: 1, 1.1.5: 1
  address, 1.1.5: CH-7
  code of conduct, 1.1.2: 2, 3
  organization and function, 1.1.5: 1
Internet, 2.1.5: 4
Interview evaluation, forms for, 2.2: 2, Form 1.3
Investment counseling, 2.1.1: 6
Invoices, 2.1.4: 9, 2.2: 7, Form 2.1
ISO 9001, 2.1.8: 4-5
ISO standards, drawing formats, 2.3.7: 6

J-K

Job description, forms for, 2.2: 1-2, Form 1.1
Joint ventures, 2.1.1: 3

L

Laws and regulations
  administrative provisions, 1.1.2: 2
  codes of ethics, 1.1.2: 1
  competency provisions, 1.1.2: 1-2
  provincial architects acts, 1.1.2: 1
  – *see also* Authorities Having Jurisdiction
Lawyers – *see* Legal services
Layoffs, 2.1.7: 7-8
Lease-back construction, 2.3.2: 5, 6
Leave (employee), 2.2: 3-4
Legal services, requirements for, 2.1.1: 6
Letters of acceptance/letters of intent, 2.3.9: 7
Letters of Assurance, 2.3.10: 7
Liability, and specifications, 2.3.8: 4
Liability insurance, 1.1.1: 2
  and alternative dispute resolution, 2.1.9: 3
  and consultant engineers, 1.2.3: 1
  for joint ventures, 2.1.1: 3
  limitations, 2.1.9: 2
  provincial requirements, 1.1.4: CH-5B
Library, office, 2.1.5: 4, 2.3.8: 9
Licensing/registration, 1.1.3: 4-5
  in Canada, the U.S., and Mexico, 1.1.5, CH-6
  provincial requirements, 1.1.4: CH-5A
Liens, 2.1.9: 5, 2.3.12: 3, 3.3.1
Life cycle costs, 2.3.3: 16
Line of credit, establishing, 2.1.4: 5-6
Liquor licensing, provincial authority, 1.2.4: CH-12
Listening techniques, 2.1.6: 1-2

M

Mail service, 2.1.6: 5
Management system standards, definition, 2.1.8: 2
Mandamus, 1.2.4
Manitoba Association of Architects (MAA), 1.1.4: CH-3
Marketing
  definition, 2.1.3: 1
  planning for, 2.1.3: 2-3
  stages in, 2.1.3: 3-4
  – *see also* Promotion
Masonry, inspection, 2.3.11: 5, 8
MasterFormat™ system, 1.2.3: 3
  in cost estimates, 2.3.3: 3
  functions and organization, 2.3.8: 5-7
Mastering the Business of Architecture/Mastering the Business of Design, 2.1.9: 8, 2.1.10: 5
Masterspec® (master specification system), 2.3.8: 8-9
Materials inspection, 2.3.11: 5-6
Mediation, 2.1.9: 4
Meetings
  minutes of, 2.3.10: 5, 2.4: 2, Form 1.2
  planning, 2.1.6: 4, CH-23
  pre-construction, 2.3.11: 7, CH-38
  site, 2.3.11: 7
Memorandum, form, 2.4: 2, Form 1.1
Mentors, 1.1.3: 3
Mergers, 2.1.2: 2
MERX (bidding bulletin board), 1.2.2: 3, 2.1.3: 3
Mexico
  architecture organizations, 1.1.5: 3
  licensing procedures, 1.1.5: CH-6
Milestone chart, 2.3.2: 11
Mission statements, 2.1.1: 1
Mock-ups, 2.3.11: 6-7

N

National Architectural Accrediting Board (NAAB) (U.S.), 1.1.3: 1, 5
  address, 1.1.5: CH-7
  organization and functions, 1.1.5: 2
National Building Code of Canada (NBC), 1.2.4: 2, CH-11
National Bureau of Standards and Technology (NIST), 1.2.5: CH-14
National Council of Architectural Registration Boards (NCARB)
  address, 1.1.5: CH-7
  organization and functions, 1.1.5: 2
  reciprocity agreements, 1.1.3: 4-5
  rules of conduct, 1.1.2: 2, 3
National Energy Codes, 1.2.4: 2

National Farm Building Code, 1.2.4: 2
National Fire Code, 1.2.4: 2, CH-11
National Fire Protection Agency (U.S.) (NFPA), 1.2.5: CH-14
National Housing Code, 1.2.4: 2
National Master Specification, 2.3.8: 3
National Parks Act, 1.2.4: CH-11
National Plumbing Code, 1.2.4: 2
National Practice Program (NPP), 1.1.4: 3, 1.2.1: 6
National Research Council (NRC), 1.1.6: 3
National Standards System, 1.2.5: 2
Navigable Waters Protection Act, 1.2.4: CH-11
Negotiations, 2.1.6: 2, 2.1.9: 4
New Brunswick – *see* Architects' Association of New Brunswick
Newfoundland Association of Architects (NAA), 1.1.4: CH-3
Notice of Tender, 2.3.9: 1
Nova Scotia Association of Architects (NSAA), 1.1.4: CH-3

O

Office manual, 2.1.5: 1, 2.2: 1
  checklist for, 2.1.5: CH-21
Office(s)
  archives, 2.1.5: 3-4
  cleaning and maintenance, 2.1.5: 2-3
  computer systems for, 2.1.5: 4-5
  library, 2.1.5: 4, 2.3.8: 9
  procedures, 2.3.8: 10-11, CH-34
  security, 2.1.5: 3
  – *see* also Bid package; Communications; Specifications
Ontario Association of Architects (OAA), 1.1.4: CH-3
  indemnity plan, 1.2.1: 3
  Mastering the Business of Architecture/Mastering the Business of Design, 2.1.10: 5, 2.1.9: 8
Ontario, project managers in, 2.3.2: 3
Ordre des architectes du Québec (OAQ), 1.1.4: 3
  code of ethics, 1.1.2: 2
  grandfathering licensing provisions, 1.1.3: 2
Overtime
  in employment agreement, 2.2: 5
  pay, 2.1.7: 3

P

PanAmerican Federation of Architects Associations (FPAA), 1.1.5, CH-7
Parks Canada, 1.1.6: 3
Partnering (dispute avoidance), 2.1.9: 3
Partnerships
  agreements for, 2.1.1: 2-3
  change of ownership, 2.1.2: 3
  checklist, 2.1.1: CH-17
  communicating with partners, 2.1.6: 4
  profit distribution in, 2.1.4: 1
  provincial requirements, 1.1.4: CH-5C
  review of shareholder agreements, 2.1.2: 5
Payment
  for buy-out of practice, 2.1.2: 5
  certificate for, 2.3.12: 3, 5, 2.3.10: 6-7, 2.4: 8
  nonpayment problems, 2.1.9: 4-5
Performance review, 2.1.7: 6
  forms for, 2.2: 6, Form 1.5
Personnel – *see* Staff
PERT – *see* Program evaluation and review technique
Planning
  for building size, 2.3.4: 5-6
  for construction drawings, 2.3.7: 2-3
  contingency, 2.1.2: 4
  financial, 2.3.4: 7
  financial – see Financial planning
  marketing strategy, 2.1.3: 2-4
  master plans, 2.3.4: 6
  for meetings, 2.1.6: 4, CH-23
  organizational, 2.3.4: 7
  site analysis, 2.3.4: 6
  strategic, 2.1.1: 1
  succession – see Succession planning
  task, 2.3.2: 14-21
  tax, 2.1.4: 9-10
  – *see* Cost planning and control; Pre-design phase; Risk management; Succession planning
Plumbing
  National Plumbing Code, 1.2.4: 2
  permits for, 1.2.4: CH-13
Post-occupancy evaluations, 2.3.12: 1, 8-9
Pre-agreement phase
  checklist for, 2.3.1: CH-30
  cost tasks, 2.3.3: 14
  general activities, 2.3.4: 1
Prince Edward Island – *see* Architects Association of Prince Edward Island
Privilege clauses, 2.3.9: 3-4
Probation (employee), 2.2: 3
Product standards, establishment of, 1.2.1: 2
Professional development, 2.1.7: 7, 2.2: 4-5
Professional Practice Commission (UIA), 1.1.5: 1
Professional standard of care, definition, 2.1.9: 2
Professions/professionalism, codes of conduct – *see* Ethics, Profitability, 2.1.4: 1
Program evaluation and review technique (PERT), 2.3.2: 12-13
Project administration, field reviews – *see* Field review
Project cost control chart, 2.2: 8, Form 2.3
Project cost control information, 2.1.4: 8
Project delivery, options and types, 2.3.2: 1-2
Project directory, 2.2: 10
Project management
  architect's role, 2.3.10: 1-2, 4
  checklist for stages, 2.3.1: CH-30
  client's role, 2.3.10: 2

closeout tasks, 2.3.1: 3
construction schedule, 2.3.10: 3
consultants' role, 2.3.10: 2
contractors' role, 2.3.10: 2
cost control – *see* Cost planning and control
cost control chart, 2.2: 8, Form 2.3
damage inspection, 2.3.11: 5
design and documentation, 2.1.9: 8
in different jurisdictions, 2.1.9: 10-11
financial information forms, 2.4: 4
just-in-time, 2.3.2: 6
post-construction, 2.1.9: 10
pre-construction, 2.3.10: 3
project phases, 2.1.10: 1
quality management, 2.1.8: 3
risk management, 2.1.9: 6-11
scheduling models, 2.3.2: 11-21
scheduling tools, 2.3.1: 2-3
take-over phase – *see* Take-over phase
teamwork in, 2.3.1: 2
working with consultants, 1.2.3: 2-3
Project managers, 2.3.2: 3
role, 2.3.1: 1, 4
Project manuals
contents, 2.3.8: 1
drawings for, 2.3.7: 5
Project requirements – *see* Functional programming
Project team directory, 2.4: 3, Form 1.5
Promotion
materials, 2.1.3: 5, 2.3.1: 3
steps in, 2.1.3: 4-5
– *see also* Marketing
Provincial associations of architects
addresses, 1.1.4: CH-2
admission standards, 1.1.3: 1
liability insurance requirements, 1.1.4: CH-5B
organization and functions, 1.1.4: 3-4
partnership requirements, 1.1.4: CH-5C
practice requirements, 1.1.4: CH-5
professional requirements, 1.1.4: CH-5A
reciprocity agreements, 1.1.4: 4
requirements for architectural corporations, 1.1.4, CH-5D, CH-5E
and risk management, 2.1.9: 1
role, 1.1.2: 1
seals, requirements/guidelines, 1.1.4: CH-5F
vital statistics, 1.1.4: CH-3
– *see also* individual associations and provinces
Public health, 1.2.4: CH-12, CH-13
Public relations, 2.1.3: 1
Public Works and Government Services Canada (PWGSC), 1.1.6: 3
classes of estimates, 2.3.3: 20
drawing standards, 2.3.7: 4
Purchase order, 2.2: 9, Form 2.6, 2.3.2: 9

Q

Quality assurance
building commissioning and, 2.3.12: 5, 7-8
definition, 2.1.8: 2
Quality management
definition, 2.1.8: 1-2
ISO 9001, 2.1.8: 4-5
problems and benefits, 2.1.8: 4
quality management systems, 1.2.5: 2
Quantity surveyors, 2.3.3: 11-12
Québec
architectural practices in, 2.1.1: 3
engineers and architects in, 1.2.3: 1
language requirements, 1.1.3: 4
liability in, 2.1.9: 2
Office des professions du Québec
– *see also* Ordre des architectes du Québec
Québec Pension Plan (QPP), premium payment, 2.1.7: 3

R

RAIC Foundation, 1.1.4: 2
Reciprocity agreements, 1.1.3: 4-5
Regional planning, 1.2.4: 6
Registered Specification Writers, 1.2.3: 3
Regulations – *see* Building codes; Environmental assessment; Zoning
Requests for Proposals (RFPs), 1.2.2: 3, 2.1.10: 6
Retainers, 2.1.9: 4
Risk management
assessing potential projects, 2.1.9: 6, CH-25
contract administration, 2.1.9: 9-10
document checking, 2.1.9: 9
jurisdictional issues, 2.1.9: 10-11
start-up of practice, 2.1.9: 1
Roads and highways, 1.2.4: 5
Royal Architectural Institute of Canada (RAIC), 1.2.1: 6-7, 1.2.3: 3
address and vital statistics, 1.1.4: CH-4
College of Fellows, 1.1.4: 2
continuing education, 1.1.3: 5
organization and activities, 1.1.4: 1-2
RAIC Foundation, 1.1.4: 2
Syllabus program, 1.1.3: 2
Royal Australian Institute of Architects (RAIA), 1.1.5: CH-7
Royal Institute of British Architects (RIBA), 1.1.5: 1
address, 1.1.5: CH-7
quality management recommendations, 2.1.8: 3

S

Salaries and benefits
  calculating, 2.1.4: 7-9
  cost of benefits, 2.1.7: 1
  in employment agreement, 2.2: 5
  income tax deductions, 2.1.4: 9
  statutory benefits, 2.1.7: 3
Sales taxes, 2.1.4: 10
Samples, 2.3.10
Saskatchewan Association of Architects (SAA), 1.1.4: CH-3
  code of ethics, 1.1.2: 2, 5-6
Scales, 2.3.7: 6
Schedule of values, 2.3.10: 6
Schematic design, 2.1.10: 1
  checklist for, 2.3.1: CH-30
  cost tasks, 2.3.3: 14
  documents and checklists for, 2.3.5: 4
  elements, 2.3.5: 1
  engineering services, 2.3.5: 3
  information for, 2.3.5: 2-3
Seals, 1.1.1: 4, 2.1.7: 4
  provincial requirements, 1.1.4: CH-5F
SectionFormat, 2.3.8: 7
Sections, 2.3.7: 8
Services
  additional, 2.1.10: 2
  checklists of, 2.1.10: CH-28, CH-29
  identifying, 2.1.10: 2
  traditional design-bid-build, 2.1.10: 1
  trends in, 2.1.10: 5-6
Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), 1.2.5: CH-14
Shop drawings – *see* Drawings, shop
Signs and advertising, 1.2.4: CH-13
Site evaluation, 2.3.4: 6, CH-32
  and cost planning, 2.3.3: 9
  information for engineers, 2.3.6: 2
  pre-construction, 2.3.11: 7, 8
Site plans, 2.3.6: 4, 2.3.7: 7
Site visit – *see also* Field review
Space diagrams, 2.3.5: 2
Speaking techniques, 2.1.6: 2
Specifications
  checklist for preparing, 2.3.8: CH-34
  for computer-assisted drawing, 2.3.7: 4-5
  copyright, 2.3.8: 9
  definition, 2.3.8: 1
  and drawings, 2.3.8: 2
  master specification systems, 2.3.8: 8-9
  methods, 2.3.8: 3
  organizing systems for, 2.3.8: 5-7, 8-9
  outline, 2.3.6: 4
  performance, 2.3.8: 4-5
  preparing, 2.3.8: 9-12, CH-34
  prescriptive, 2.3.8: 4
  proprietary, 2.3.8: 3-4
  resources for, 2.3.8: 9-10
  types, 2.3.8: 2-3
  writing firms, 2.3.8: 9
  writing style, 2.3.8: 11-12
Specware (specification software), 2.3.8: 9
Staff
  career development, 2.1.7: 5-6
  communicating with, 2.1.6: 4
  computer training for, 2.1.5: 5
  conduct, 2.1.7: 3
  harassment/discrimination, 2.1.7: 4-5
  leave for, 2.1.7: 3-4
  morale, 2.1.7: 5
  performance review, 2.1.7: 6
  recruitment, 2.1.7: 1-2
  short-term, 2.1.7: 1
  temporary and permanent, 2.1.7: 2
  termination, 2.1.7: 7-8
  work from home, 2.1.7: 4
Stamps, office, 2.2: 10
Standards
  Canadian standards organizations, 1.2.5: 2, CH-14
  compliance mechanisms, 1.2.5: 3
  definition, 1.2.5: 1
  evolution of, 1.2.5: 2
  reference, 2.3.8: 5
  – *see also* Specifications
Standards Council of Canada (SCC), 1.2.5: 2, CH-14
Standing offers, 2.3.2: 9
Statute of limitations, 1.1.1: 2, 2.1.9: 2, CH-27
Stipulated price contract, 2.3.2: 2
Structural engineering, in design development, 2.3.6: 2
Substantial performance, certificates of, 2.3.10: 7, 2.3.12: 2-3
  forms for, 2.4: 8
Succession planning, 2.1.2: 1-5
  buy/sell agreement checklist, 2.1.2: CH-19
Supervision – *see* Field review
Supplemental instructions, 2.3.10: 5-6, 2.4: 6, Form 3.2
Swimming pools, 1.2.4: CH-13
Systems verification, 2.3.12: 7-8

T

Take-over phase, 2.3.12: 1
Task interface diagram, 2.3.2: 15, 19
Task planning, 2.3.2: 14-21
Tax planning, 2.1.1: 6, 2.1.4: 9-10
Taxes – *see* Goods and Services Tax; Income tax; Sales tax
Technical information, sources, 1.2.1: 3
TEK-AID reference documents, 1.2.3: 3
Teleconferencing, 2.1.6: 5

Tenders, 2.3.9: 1-2
Termination notice, 2.2: 3
Theatres, 1.2.4: CH-12
Time sheets, 2.1.4: 8-9, 2.2: 8, Form 2.4
Total quality management, definition, 2.1.8: 2
Trades, training, 1.2.1: 3
Transmittal, form for, 2.4: 2, Form 1.3
Turnkey construction, 2.3.2: 5, 6

U

Underwriters' Laboratory of Canada (ULC), 1.2.5: CH-14
Unemployment Insurance – *see* Employment Insurance
Uniform Drawing System, 2.3.7: 4, 6
Union internationale des architectes
  – *see* International Union of Architects
Unit rate construction, 2.3.2: 6
United Nations Centre for Human Settlements (UNCHS), 1.1.5: 1
United Nations Economic and Social Council (ESOCOC), 1.1.5: 1
United Nations Educational, Scientific and Cultural Organization (UNESCO), 1.1.5: 1
United Nations Industrial Development Organization (UNIDO), 1.1.5: 1
United States
  architectural branch offices in Canada, 2.1.1: 4
  architectural organizations, 1.1.5: 2-3
  licensing procedures, 1.1.5, CH-6
  – *see also* American Institute of Architects
Universities, 1.1.3: 2
Utilities, inspections, 1.2.4: CH-13
Utilization factors (billable hours), 2.1.4: 7-8

V

Vacation pay, 2.1.7: 3
Valuation, of architectural practices, 2.1.2: 5
Value engineering, 2.3.3: 16-17
Vancouver, building regulations, 1.2.4: CH-13
Voice mail, 2.1.6: 5

W

Warranties
  commencement of, 2.3.12: 2
  documentation, 2.4: 7
  list of warrantied items, 2.1.9: 10
  review, 2.3.12: 8
Water resources
  in planning process, 1.2.4: 5
  provincial authority, 1.2.4: CH-12
Web sites, 2.1.3: 5, 2.1.6: 6
Workers Compensation Boards, 1.2.1: 5, 2.1.7.3
Workplace Hazardous Materials Information System (WHMIS), 1.2.5: CH-14
Workplace safety
  architect's role in, 1.2.1: 5-6
  contractor's responsibility for, 1.2.4: 5
  on construction site, 2.3.11: 3
  provincial jurisdiction, 1.2.4: CH-12
Workplace Safety Insurance Board, 1.2.1: 5, 2.1.7: 3
World Health Organization (WHO), 1.1.5: 1
Writing, 2.1.6: 1, 2.3.8: 11-12

X-Y-Z

Zoning
  application for re-zoning, 1.2.4: 11
  planning for, 2.3.4: 6
  regional/municipal authority, 1.2.4: CH-13
  regulations and permit process, 1.2.4: 4

CH = lists/checklists/charts

Index of Lists, Checklists, and Charts

Number	Name	Chapter
CH-1	List: Canadian University Schools of Architecture with Accredited Programs	1.1.3
CH-2	List: Provincial Associations of Architects	1.1.4
CH-3	Vital Statistics: Provincial Associations of Architects	1.1.4
CH-4	List and Vital Statistics: National Architectural Organizations	1.1.4
CH-5	Charts: Comparison of Practice Requirements of Each Provincial Association	1.1.4
CH-5A	Comparison of Provincial Requirements regarding the Right or Authority to Practise Architecture	1.1.4
CH-5B	Comparison of Provincial Requirements regarding Professional Liability Insurance	1.1.4
CH-5C	Comparison of Provincial Requirements regarding Partnerships	1.1.4
CH-5D	Comparison of Provincial Requirements regarding the Ownership and Structure of Corporations which Practise Architecture	1.1.4
CH-5E	Comparison of Provincial Requirements regarding the Name of an Architectural Practice	1.1.4
CH-5F	Comparison of Provincial Requirements/Guidelines regarding the Application of Seals	1.1.4
CH-6	Chart: Comparison of Licensing Procedures for Architects in Canada, the United States, and Mexico	1.1.5
CH-7	List: International Organizations	1.1.5
CH-8	List: Canadian Construction Documents	1.2.1
CH-9	List: Types of Consultants on the Design Team	1.2.3
CH-10	List: Selected National Associations of Consultants	1.2.3
CH-11	Checklist: Federal Authorities Having Jurisdiction	1.2.4
CH-12	Checklist: Provincial Authorities Having Jurisdiction	1.2.4
CH-13	Checklist: Regional and Municipal Authorities Having Jurisdiction	1.2.4
CH-14	List: Standards Organizations	1.2.5
CH-15	List: Certification and Testing Agencies	1.2.5
CH-16	List: Trade Associations	1.2.5

Number	Name	Chapter
CH-17	Checklist: Issues to Consider for Partnership Agreements	2.1.1
CH-18	Checklist: Issues to Consider for a Shareholders' Agreement for Architectural Corporations	2.1.1
CH-19	Checklist: Items for Consideration in a Buy/Sell Agreement	2.1.2
CH-20	Annual Budget Calculation Sheet	2.1.4
CH-21	Checklist: Information to include in a Manual on Office Policies and Procedures	2.1.5
CH-22	Chart: A Project Filing Format	2.1.5
CH-23	Checklist: Planning a Meeting	2.1.6
CH-24	Checklist: Issues for Consideration in an Employment Agreement	2.1.7
CH-25	GO NO-GO Checklist to Assess the Degree of Risk	2.1.9
CH-26	Checklist: Issues to Consider When Assembling the Consulting Team	2.1.9
CH-27	Chart: Comparison of Statutes of Limitations in Each Province	2.1.9
CH-28	Checklist: Scope of Services	2.1.10
CH-29	Checklist: Supplemental Architectural Services	2.1.10
CH-30	Checklist for the Management of the Architectural Project	2.3.1
CH-31	Chart: Standard Forms of Construction Contract and their Application	2.3.2
CH-32	Site Evaluation Checklist	2.3.4
CH-33	Suggested Table of Contents for a Design Report	2.3.6
CH-34	Checklist: Assembling and Writing the Specifications	2.3.8
CH-35	List: The Bid Package — A List of Information Required	2.3.9
CH-36	List: Instructions to Bidders — A List of Information to be Provided	2.3.9
CH-37	Checklist: Typical Items for Shop Drawing Review	2.3.10
CH-38	Checklist: Suggested Agenda for the Pre-construction Meeting	2.3.11
CH-39	Checklist: General Items for Field Review	2.3.11
CH-40	List: RAIC Practice Builders	3.6.1

The Architect as a Professional

Introduction

> *Membership in any profession, whether law, medicine, teaching, journalism, accounting, or architecture, entails not only the mastery of a body of knowledge and skills but at its best the honoring of a social contract to advance basic human values.*
> (Boyer and Mitgang)

This dedication to advancing the human condition is one aspect which distinguishes professions from other occupations. Public trust is another.

Most professions in Canada, including architecture, are self-governing and self-regulating. The provinces, through enabling legislation (the provincial architects acts), have established associations which regulate admission to the profession in exchange for safeguarding the public. The provincial associations of architects are mandated to maintain high standards of practice and ethics among their members.

Refer also to Chapter 1.1.4, *The Organization of the Profession in Canada*.

Professionalism

Historically, the professions were the scholarly endeavours and practices of theology, law, and medicine (the so-called "learned" professions), which had certain principles and characteristics distinct from other vocations. Increasingly, other occupations are adopting some of the principles that these three professions originally exemplified.

Unfortunately, the expression "profession" or "professional" is often misused and overused, and applied to virtually all vocations. This use of the term is an attempt to capitalize on the prestige associated with the original status enjoyed by scholarly professions. Today, the expression does not necessarily represent an adherence to the principles of professionalism.

To be worthy of the term, all professionals must conduct both their personal and business lives according to certain fundamental principles. The International Union of Architects (UIA) has attempted to identify and describe these principles in its *UIA Accord on Recommended International Standards of Professionalism in Architectural Practice*.

Principles of Professionalism

All professionals are required to adhere to the following four principles:

- expertise;
- autonomy;
- commitment;
- accountability.

Expertise

Professionals possess a *systematic body of knowledge, skills, and theory developed through education and experience*. The process of professional education, experience, and examination is structured to assure the public that professionals engaged to perform professional services have acquired the expertise to perform them to acceptable standards.

To achieve proficiency, professionals undergo intensive preparation, gaining specialized knowledge in an academic setting. This education is usually followed by some period of training or internship. Because acute judgement is such an essential skill in the provision of services, professionals are required to be proficient, adept, skilled, and expert.

While in practice, professionals continue their personal scholarship, their quest for knowledge, and their growth by experience. In addition, they should be teachers and mentors to those in training for the profession.

Autonomy

Professional practitioners provide *expert advice* to their clients, independent of any self-interest. *Uncompromised professional judgement* should take precedence over any other motive. Professionals are at liberty to exercise discretion, and clients value their judgement and authority. They act independently and accept responsibility for their actions.

Professionals must also embrace the spirit and the letter of the laws governing their professional affairs, and thoroughly consider the social and environmental impact of their professional activities.

Commitment

Professionals bring a high level of *selfless dedication* to the work done on behalf of their clients and society. Members of professions are mandated to serve their clients in a competent and professional manner, and to exercise unprejudiced and impartial judgement on their behalf.

Accountability

Professionals are aware of their *responsibility to provide independent* and, if necessary, *critical advice* to their clients and for the effects of their work on society and the environment. Professionals undertake to perform professional services only when they, together with those whom they may manage or consult, are qualified by education, training or experience in the services offered.

Professionals accept personal responsibility and liability for the consequences of their professional behaviour. In the public interest, professionals must consider whether carrying professional liability insurance should be an option or a requirement. Professions vary in their requirements for their members' insurance.

Under the provincial statutes of limitations, some professions are facing a conundrum. Having a limitation period — of any duration — may be contrary to the reasonable standards of professionalism and professional accountability. Conversely, some professions are lobbying for reduced limitation periods. Nevertheless, professionals are obliged to protect not only the primary interest of their clients but also third-party interests. Professionals must provide and exercise the *standard of care* typical of their profession, but they are not required to have an extraordinary degree of skill.

Refer to the "Chart: Comparison of Statutes of Limitations in Each Province" at the end of Chapter 2.1.9, *Risk Management and Professional Liability*.

Characteristics of Professionals

Professionals consistently act with integrity and competence by adhering to the principles of professionalism. Moreover, professionals:

- *are organized through a membership registration process* for the purpose of setting standards for admission, ethics, and practice. An oath of service to the public interest is frequently required as a condition of entry to the profession;
- *set protocols for disciplining members* whose conduct does not meet professional standards or a prescribed code of conduct;
- often earn *respect* in the community;
- *share knowledge* within their profession and engage in *lifelong learning*;
- *develop specializations*, and often become expert in particular fields;
- have a strong *personal identification with the profession* and altruistic concerns for society;
- are usually *highly creative and innovative* in their research, academic pursuits, and practice, valuing discovery, invention, and expression;
- *test, challenge, and push all boundaries and parameters of the profession* in order to advance the profession's scholarly and technical capabilities.

Architecture as a Profession

Architecture, which has been described as a social art (and also an artful science), is the sole profession whose members are qualified to design and to provide advice, including technical and aesthetic judgement of the built environment. In granting this privilege to architects, the public expects the profession to provide services and solutions with technical competence and aesthetic sensitivity suitable to the physical, social, cultural, and economic environment, thereby inspiring the community and its citizens. In matters of public health and safety, architects are obliged to serve the public interest and respond to the public need. The concepts of health and safety are expanding to encompass the sustainability of the global environment and accessibility for all persons.

The four generic principles of professionalism previously outlined in this chapter apply to architecture. But what distinguishes architecture from other professions? In the broadest of terms, architecture is the profession which endeavours to identify the public need, and to serve the public interest, in matters relating to the built environment. In this context, architecture is environmental design; in fact, any manipulation of the physical environment is of potential interest to architects. Other disciplines, such as landscape architecture, share in the design of the built environment.

The practice of architecture is usually broader than the regulations governing the profession. However, legislation formalizes a specific relationship between the profession and society by setting certain regulations which limit and define membership and practice. An architect's proficiency may extend well beyond the requirements of registration/licensure — particularly after extensive experience. For example, although a statute or regulation may not define "urban design" or single-family house design as architecture, most architects would agree that it is, to a significant degree, an architectural endeavour. Not including urban design in its legislation demonstrates a jurisdiction's decision to regulate only a certain portion of architecture which it deems to be the "profession of architecture" under its legislative authority.

Although the "practice of architecture" is defined in each provincial architects act, there is no standard definition for this term. The UIA has proposed an all-encompassing definition (refer to the definition of the **"Practice of Architecture"** at the end of this chapter).

The profession's academics and philosophers are not limited or constrained in their definition of architecture, whereas practitioners face the reality and limitations of licensure and regulation. Such a divergence is healthy and encourages:

- pushing both practical and scholastic architectural limits;
- opening new opportunities;
- discovering unrecognized public needs.

The Image of the Profession

There are varying opinions of the image projected by the architectural profession.

The profession has been both blessed with a certain mystique and cursed by public misconceptions. Although the profession is respected, architects can sometimes be viewed as impractical dreamers or as strong-willed individuals. The profession's ability to synthesize and provide a broad overview can be misunderstood by the public. Instead, it is often overshadowed by an incorrect perception of architecture as the application of aesthetics without an understanding of technology. On the other hand, architects are admired for their artistic creativity and problem-solving abilities.

Every architect has the obligation to improve the image of the profession by earning respect from clients, contractors, and the general public through their service to clients and society.

Architecture and Engineering

Almost all architects work closely with professional engineers who form part of the design team. Professional engineering adheres to the principles of professionalism and is regulated in a manner similar to architecture. In Canada, most jurisdictions have legislation to identify which professional services or building types fall under the authority of architecture or engineering.

The differences between the professions of architecture and engineering can be summarized as follows:

- the educational background required for architecture is more diverse than it is for engineering;
- the experience requirement is more wide-ranging for architects and more specific for engineers;
- the architect is expected to understand, assemble, and coordinate all of the building disciplines, whereas the engineer usually specializes in one discipline;
- the architect should be involved in all buildings and environments for human habitation and occupancy, but architects are often not involved in other structures requiring engineers, such as warehouses and bridges;
- the architect is involved not only in the building design but also is concerned about the impact of a building or buildings on the character of a community;
- architects have traditionally filled the role of the prime professional responsible for managing and coordinating a project.

The Architect's Seal

An important symbol and tool of the architectural profession is the architect's seal. An architect's seal is a professional seal and **not** a business seal. The seal must be applied to certain documents prepared by the architect (or Holder of a Certificate of Practice). Issued by the provincial association, the seal assures the public and Authorities Having Jurisdiction that they may rely on these documents with confidence. For information on the proper application of the professional seal, refer to the Provincial Association Practice Bulletins and to "Charts: Comparison of Practice Requirements of Each Provincial Association" at the end of Chapter 1.1.4, *The Organization of the Profession in Canada*.

Copyright

All artistic works — including music, photography, paintings, drawings, artistic crafts, and architectural designs — are intellectual property belonging to their creator. In Canada, a copyright does not have to be registered. It rests automatically with the author, and so does the responsibility to demonstrate any ownership of copyright by the author. The *Copyright Act* protects the architect's designs and drawings from unauthorized use or copying. The ownership of the copyright rests with the architect unless the architect assigns it in writing to someone else. Architects are advised to retain ownership of the copyright in all instances. Copyright protection is also provided in the Standard Forms of Agreement. Refer to General Conditions in the *Canadian Standard Form of Agreement Between Client and Architect: Document Six*.

Building Inscriptions

Occasionally, the architect will arrange for the installation of a permanent inscription on a building, which may identify the construction date, owner, architect, and builder. Traditionally, a cornerstone was used; however, today, other suitable signs or inscriptions are provided on the permanent fabric of the building.

Definitions

Architect: A person or entity registered, licensed or otherwise authorized exclusively to use the title "architect" and to practise architecture in a province or territory.

Practice of Architecture: The practice of architecture consists of the provision of professional services in connection with town planning as well as the design, construction, enlargement, conservation, restoration or alteration of a building or group of buildings. These professional services include, but are not limited to: planning and land-use planning; urban design; provision of preliminary studies, designs, models, drawings, specifications, and technical documentation; coordination of technical documentation prepared by others (consulting engineers, urban planners, landscape architects, and other specialist consultants) as appropriate and without limitation; construction economics; contract administration; monitoring of construction (referred to as supervision in some countries); project management. (*UIA Accord on Recommended International Standards of Professionalism in Architectural Practice)*
Note: also refer to each provincial architects act for a legal definition.

Profession: A vocation or calling, especially one that involves some branch of advanced learning or science. (adapted from the *Oxford Dictionary*)

References

Boyer, Ernest L and Mitgang, Lee D. *Building Community: a new future for architecture education and practice: a special report*. Ewing, NJ: California Princeton Fulfillment Services, 1996.

Cuff, Dana. "Professions and Professional Life." In *The Architect's Handbook of Professional Practice*. David Haviland, editor. Washington, D.C.: The American Institute of Architects Press, 1994.

International Union of Architects (UIA). *UIA Accord on Recommended International Standards of Professionalism in Architectural Practice. 2nd edition*. Paris, France: UIA, April 1998.

National Council of Architectural Registration Boards (NCARB). *Architecture As It Differs From Engineering*. Washington, D.C.: NCARB, April 1995.

Ontario. Task Force on Access to Professions and Trades in Ontario. *Access!* Toronto, Ont.: Ontario Ministry of Citizenship, 1989.

Saint, Andrew. *The Image of the Architect*. New Haven, CT: Yale University Press, 1983.

Professional Conduct and Ethics

Introduction

Being a professional means having a high level of knowledge and skills; meeting certain standards of professionalism, integrity, and competence; and abiding by codes of conduct and ethics. Professional responsibility forms the basis of ethical behaviour. Like other professionals, architects are responsible to the public, their clients, their fellow professionals, and the environment. Architects are also duty-bound to ensure the continuation of the profession.

This chapter will briefly discuss codes of conduct and ethics for the architectural profession in Canada.

The Role of the Provincial Associations of Architects

Conduct is behaviour. The criteria for acceptable and unacceptable behaviour of an architect are set out in the architects acts and the subsidiary bylaws and regulations of each province. An exchange of professional rights and obligations occurs when an individual becomes registered or licensed as an architect. In most provinces, each applicant declares in writing (and in some provinces, the architect must swear an oath) to uphold the profession's standards of conduct, sometimes by reference to the architects act of the province. The architects act and its subsidiary bylaws or regulations codify the rules of conduct for architects.

The provincial architects act (or the Professional Code in Québec) authorizes a provincial association of architects to regulate its members by empowering the association to:

- set *eligibility criteria* for becoming an architect;
- set *conduct regulations* for architects;
- investigate and adjudicate allegations of an architect's *professional misconduct*;
- *discipline* an architect it judges to be guilty of misconduct.

Refer to Chapter 1.1.3, *Admission to the Profession*, for a discussion of the criteria or requirements for becoming an architect.

Each of the architects acts is worded differently and reflects the unique customs and history of the architectural profession in that province. Nonetheless, the acts and regulations are similar regarding architects' rights and obligations and disciplinary procedures. An architect who does not comply with a conduct requirement (sometimes called "professional misconduct") might be reprimanded, fined, or have his or her licence temporarily suspended or permanently revoked.

Regulations

The existing bylaws or regulations in each province can be broadly sub-divided as follows:

- *Ethical Regulations or Codes of Ethics*
  (those rules that assist in maintaining the public trust in the integrity of the profession)
  Examples include rules requiring behaviour that exemplifies traits of personal character such as honesty, impartiality, and respect for the law. Ethical principles are fundamental to all the rules and regulations. For example, honesty is implicit in the requirement that an architect shall not knowingly make a false representation.

- *Regulations regarding Competency*
  (those rules that ensure the proper provision of architectural services to the public)
  Examples include rules about the standard of care that shall characterize an architect's

advice or service; rules about the architect's supervision of staff; and rules about the application of an architect's seal.

- *Administrative Rules and Regulations* (those rules that assist in the efficient operation of the provincial association) Examples include: rules about the timely payment by an architect of annual membership fees; procedures for election to the association's council; procedures for changing a bylaw or regulation; and rules that require an architect who is aware of an apparent violation of the architects act to report it to the association.

Many rules of conduct stem from moral customs. They regulate the manner in which an architect relates to others, for example:

- rules against offering or receiving bribes;
- rules against violating laws and building regulations;
- rules that require impartial professional judgement regardless of an architect's personal interests.

It should be noted that ethical codes in architectural practice evolve and adjust to changing societal standards and expectations. For example, in the past, professional misconduct by architects included:

- engaging in construction management or construction;
- advertising their own practices.

In most jurisdictions, and subject to certain qualifications, these actions are now considered acceptable in architectural practice.

Some provincial associations have not comprehensively updated their conduct requirements for many years. Those provinces with high rates of growth and immigration have tended to periodically update their rules, sometimes comprehensively, so that conduct requirements remain clear to an expanding and increasingly diverse membership.

Codes of Ethics and Professional Conduct

As indicated above, most rules of conduct are found in the various acts, regulations, and bylaws of the provincial associations of architects. However, consolidating rules about competence and ethical conduct into a separate publication has a number of advantages:

- they can be readily referenced and understood;
- architects do not have to search for conduct rules among all other bylaws, articles of the architects act, and council rulings;
- it provides the context conducive to a full understanding of individual rules.

In the past, the provincial associations made no concerted effort to create such documents, but the trend is changing because of two developments.

First, the National Council of Architectural Registration Boards (NCARB) — the U.S. organization that sets standards, including standards of professional conduct for architects — has developed a model *Rules of Conduct* and has encouraged its adoption by its state Member Boards. The Architectural Institute of British Columbia (AIBC) has developed its own *Code of Ethics and Professional Conduct*, based on the NCARB model. The Saskatchewan Association of Architects (SAA) has adopted a similar code to that of the AIBC in its Bylaw No. 15. For a summary of these two codes of ethics and professional conduct, see the Appendix at the end of this chapter.

Second, the International Union of Architects or Union internationale des architectes (UIA), through its Professional Practice Commission, has developed *Recommended Guidelines for the UIA Accord on Recommended International Standards of Professionalism in Architectural Practice — Policy on Ethics and Conduct*, intended as a model code for the UIA member sections. The Code of Ethics of the Ordre des architectes du Québec (OAQ) is similar in format to the UIA document.

The model code, which has been adapted for use by AIBC and SAA, is organized into the following subject areas:

- competence;
- conflict of interest;
- full disclosure;
- compliance with laws;
- professional conduct.

The UIA model is organized under these headings:

- *General Obligations* (requirements to achieve and maintain competency);
- *Obligations to the Public* (requirements to ensure that professional affairs respect social standards and the environment);
- *Obligations to the Client* (requirements to ensure proper professional service and judgement);
- *Obligations to the Profession* (requirements to uphold and respect the dignity of the profession);
- *Obligations to Colleagues* (requirements to respect professional colleagues).

The Committee of Canadian Architectural Councils (CCAC) plans to develop a model Code of Ethics and Professional Conduct through a process of consensus among all provincial associations of architects. (Refer to Chapter 1.1.4, *The Organization of the Profession in Canada*, for a discussion of CCAC.) This model can then be adopted by each association.

Complaints and Discipline Proceedings

The provincial associations of architects have established similar procedures for reprimanding or punishing architects who are guilty of professional misconduct. Most associations have standing committees which investigate formal complaints against members or practices. If the complaint is found to be valid, the matter is typically referred to another committee — a "discipline committee," as it is called in most provincial associations.

In some provincial associations, the Discipline Committee may hold a hearing concerning conduct of the members referred to it. The Discipline Committee is also responsible for setting punishment for architects who are found guilty of contravening the architects act, regulations or bylaws. Disciplinary hearings are quasi-judicial proceedings and therefore must follow due process of law. The association and the architect accused of professional misconduct are sometimes represented by legal counsel. Typically, the findings of a discipline committee and its punishments are published and distributed to the membership at large. Such publication has the following benefits:

- reinforcing the prevailing ethical standard;
- demonstrating to society that the profession is exercising its mandate;
- providing a deterrent against unprofessional conduct by other architects.

Definitions

Code: A set of rules, or systematic collection of statutes or body of laws arranged to avoid inconsistency and overlap; standard of moral behaviour.

Complaint: Formal written accusation or statement of grievance.

Discipline: Order maintained among members of a profession; control exercised over members of an organization; chastisement.

Ethics: Moral principles or rules of conduct.

References

International Union of Architects (UIA). *Recommended Guidelines for the UIA Accord on Recommended International Standards of Professionalism in Architectural Practice — Policy on Ethics and Conduct*. Paris, France: November 1997, revised December 10-12, 1998, UIA.

National Council of Architectural Registration Boards (NCARB). Washington, D.C.
Procedural Requirements for Discipline of Architects. 1997.

Rules of Conduct. 1998.

Provincial Associations of Architects:
Architectural Institute of British Columbia, *Code of Ethics and Professional Conduct*, 1994.

Alberta Association of Architects, Architects Act, *Code of Ethics,* Alberta Regulations 240/81 with amendments in force as of November 28, 1984.

Saskatchewan Association of Architects, Bylaw No. 15, *Code of Ethics and Professional Conduct,* August 1997.

Manitoba Association of Architects, General By-law, Article Fifteen, *Professional Ethics and Conduct,* March 15, 1997.

Ontario Association of Architects, *Regulation 27* under the *Architects Act*, Article 42 (describing professional misconduct), 1990.

Ordre des architectes du Québec, *Regulation Respecting the Code of Ethics,* July 18, 1991.

Architects' Association of New Brunswick, General By-law No. 15, *Professional Misconduct,* as amended 1990.

Nova Scotia Association of Architects, *Architects Act*, 1977.

Architects Association of Prince Edward Island, *Code of Ethics,* 1978.

Newfoundland Association of Architects, *Code of Professional Conduct,* October 4, 1989.

Appendix — Summary of *Code of Ethics and Professional Conduct* of AIBC and SAA

The following is a summary of the Code of Ethics and Professional Conduct from the AIBC (Architectural Institute of British Columbia) and SAA (Saskatchewan Association of Architects) which is based on the model developed by NCARB (National Council of Architectural Registration Boards).

Competence

Regulations governing competence are based on the assumption that the end result of an architect's services — a building — shall be fit, in all applicable regards, for its intended purposes. These rules state that:

- architects must provide reasonable care, competence, knowledge, skill, and judgement to clients and the public;
- architects' consultants must be similarly competent;
- architects must not undertake to provide services beyond their personal competence.

The test of competence is if another architect, being reasonable and prudent, would have provided similar services at the same time and place. When a provincial association receives a complaint of incompetence against one of its members, it may respond through an evaluation of the architect's services by his or her peers. If they find incompetence, then the architect could be subject to penalties imposed by the association. The aim is to protect the public from further incompetence by ensuring that the architect *either* raises his or her skills and services to prevailing professional standards *or,* failing this, stops practising.

Conflict of Interest

Architects must avoid actions and situations in which their personal interests conflict, or appear to conflict, with professional obligations to the public, the client, and others. Rules about conflict of interest include the following:

- An architect shall be compensated by only one party on a project except when the other interested parties agree in writing to another arrangement.
- An architect with a personal association or interest in a project shall disclose this in writing to the client or employer. If they have objections, then the architect must either terminate the association or interest, or offer to give up the commission or employment.
- An architect shall not solicit or accept compensation or benefits from suppliers in return for specifying or endorsing their products, except as permitted.
- An architect acting as an interpreter of construction contract documents and reviewing construction for conformance with the contract documents shall render decisions impartially.
- An architect may be a project's owner. An architect may also be the constructor of a project of the architect's own design. In such cases, the architect shall:
  - disclose any interest in writing to the other contracting parties and the Authority Having Jurisdiction;
  - receive their written acknowledgement;
  - provide professional services as if disinterested.
- An architect who is a juror or advisor to an approved competition shall not subsequently provide services to the winner or, if there is no winner, receive any commission deriving from the competition.

Full Disclosure

This principle refers to an architect's obligation to accurately represent the full truth. For example:

- An architect shall disclose all related personal or business interests when making a public statement on an architectural issue.
- An architect shall accurately represent to the public, prospective or existing client or employer the qualifications and scope of responsibilities in connection with work for which the architect is claiming credit.
- If an architect becomes aware that the employer or client is acting against professional advice and violating applicable building regulations, the architect shall:
  - refuse to consent;
  - report the action to the Authority Having Jurisdiction;
  - terminate services on the project.
- An architect shall not knowingly make or assist others to make a false or misleading statement or omission of material fact about education, training, experience or character when applying for or renewing registration as an architect.
- An architect who knows of an apparent violation of the architects act, bylaws, or council rulings shall report such knowledge to the association.
- An architect who has a financial interest in a building product or device which the architect proposes to specify for a project shall disclose this to the client, receive the client's written approval, and include a copy of the client's approval in the construction documents.

Compliance with Laws

An architect must respect and comply with laws and regulations. For example:

- In the practice of architecture, an architect shall not knowingly violate any law or regulation.
- An architect shall neither offer nor make payment or gift to a public official (elected or appointed) with the intent of influencing the official's judgement in connection with a prospective or existing project.
- An architect shall comply with the relevant architects act and its bylaws and council rulings.
- In the practice of architecture, an architect shall take into account all applicable federal, provincial, and municipal building bylaws and regulations. The architect may rely on the advice of other professionals and qualified persons as to the intent and meaning of such regulations.

The above sections summarize the principles in the AIBC and SAA Codes of Conduct, plus additional requirements of many other Canadian provincial associations.

Professional Conduct

This section includes rules based on principles that are not covered in the preceding sections, as well as rules that may not be conduct requirements in every province. Examples of such conduct requirements include:

- the supervision of an architectural office by an architect;
- the use of the architect's seal;
- the prohibition of the following acts:
  - offering gifts other than of nominal value to a prospective client;
  - committing fraud or having wanton disregard for the rights of others;
  - performing any act that would reflect unfavourably on the profession;
  - falsely or maliciously injuring another architect's reputation or business prospects;
  - attempting to supplant another architect after the other has been retained or is in the process of being retained;
  - accepting the same commission as another architect before the other has been dismissed;
- the requirement to:
  - comply with the Canadian Rules for the Conduct of Architectural Competitions or other competition rules approved by the Council of the provincial association;
  - promptly distribute monies received for others;
  - comply with the provincial association's performance standards together with appropriate fees for services.

Admission to the Profession

Introduction

Canada's provincial governments have jurisdiction over professional practice. This responsibility is entrusted by legislation to various provincial professional associations, which regulate members of their respective professions for the protection of the public. Provincial associations of architects have established admission requirements and standards to ensure that candidates are competent to practise architecture.

The ten provincial associations of architects have adopted common admission standards, which involve:

- education or training in architecture;
- experience, or workplace internship;
- examination.

These three components may overlap, to the benefit of the student or intern. For example, internship experience acquired during an academic program enables students to better appreciate and understand the concepts being taught. Writing certain sections of the Architect Registration Examination permits the intern to apply knowledge, skills, and abilities acquired during internship.

Education

Role of the Canadian Architectural Certification Board (CACB)

The provincial associations of architects, through the Committee of Canadian Architectural Councils (CCAC), have entrusted the Canadian Architectural Certification Board (CACB) to:

- certify the academic qualifications of candidates;
- accredit programs offered by Canadian university schools of architecture.

The CACB is a committee representing:

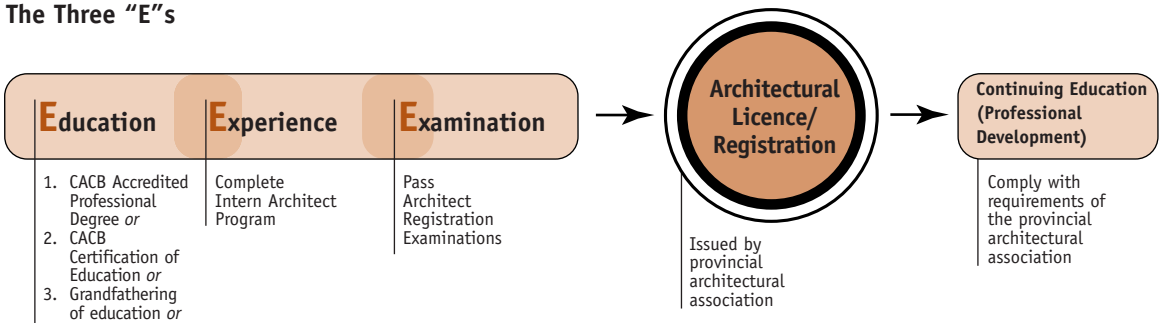
- practitioners;
- licensing authorities;
- architectural educators;
- the general public;
- students.

Canadian Education Standard

Individuals can satisfy the requirements of the Canadian Education Standard in four ways:

- *Accredited Degree*
  by obtaining a professional degree (bachelor's or master's) from an architecture program accredited by the CACB or its U.S. counterpart organization, the National Architectural Accrediting Board, Inc. (NAAB);

Pathway to the Profession
The Three "E"s



- *Certification of Education*
  by submitting the academic record of a non-accredited degree for evaluation according to the education requirements outlined in the Canadian Education Standard (candidates who have completed all or part of their post-secondary studies outside Canada must provide a statement regarding the equivalency of the courses; candidates whose records do not meet the requirements may upgrade their training by taking appropriate courses or workshops);

- *Grandfathering*
  through registration or licensing by a provincial association of architects prior to July 1, 1976;
  or, for the province of Québec, registration/licensing by the Ordre des architectes du Québec prior to 1992;
  or, for the province of Alberta, certification by the Universities Co-ordinating Council;

- *RAIC Syllabus*
  by obtaining a diploma from the Royal Architectural Institute of Canada (RAIC) Syllabus Program (a workplace apprenticeship program, supplemented by courses and examination).

Professional Degree Programs in Architecture

University programs in architecture provide training which includes critical analysis and integration of knowledge.

Analytical study (theoretical courses) provides general knowledge required to undertake the design and construction phases involved in the development of the built environment. Subject areas include:

- history;
- behavioural psychology;
- socio-cultural studies;
- programming;
- building sciences;
- construction;
- regulations;
- safety;
- structures;
- electrical and mechanical services;
- quantity surveying;
- environmental assessment.

Integration (design studios) enables students to develop their creativity and gain the necessary self-reliance to make responsible architectural decisions. Students learn to generate outcomes by putting together the various, and sometimes conflicting, requirements that are unique to each project.

Canadian programs are currently offered at both the bachelor level (B.Arch.) and the master's level (M.Arch.); however, increasingly, the professional degree is being granted only at the master's level. Programs may last from five to seven years.

Accreditation of Professional Degree Programs

To obtain accreditation from the CACB, all professional degree programs must demonstrate, through an Architecture Program Report (APR), that they follow certain procedures and meet certain criteria, including the "student performance criteria." A CACB Visiting Team travels to each school to verify the accuracy of the APR. The team also assesses examples of students' work against the student performance criteria and recommends whether to accredit the program.

Programs may be granted accreditation for two, three or five years depending on the fulfilment of CACB conditions.

Experience

Intern Architect Program

The objective of internship prior to licensing/registration is to ensure that the candidate gains enough experience to:

- meet generally recognized standards of practical skill;
- practise architecture in a way that protects the health and safety of the public.

Through the Committee of Canadian Architectural Councils (CCAC), the ten provincial associations of architects established the Intern Architect Program (IAP). The IAP is a standardized, national system for periodic documentation and evaluation of internship activities. It provides a structured transition between formal education and registration/licensing. In addition, the program encourages experienced practitioners to become more involved in the development of their future colleagues.

Candidates are advised to register for the IAP with their provincial architectural association as soon as they are eligible. Eligibility occurs after candidates have completed:

- at least 50% of an accredited professional architecture degree program;
- Part 1 of the RAIC Syllabus.

Procedures are described in the CCAC's manual, *Intern Architect Program,* which includes:

- guidelines;
- forms;
- sample letters;
- the Canadian Experience Record Book, a requirement for recording work experience.



On application, candidates must complete the appropriate form to confirm the names of employers (or the equivalent) and mentors.

Role of Employers

Employers direct and supervise interns on a daily basis, assess the quality of their work, and certify the intern's documentation of work experience. Architects usually serve as employers, but other professionals involved in the built environment are sometimes permitted to perform this supervisory role.

Role of Mentors

The mentor is an architect selected by the intern. The mentor meets with the intern to regularly review the progress of the intern's experience and to discuss his or her career goals and broad professional issues.

Experience Categories

The Intern Architect Program requires interns to complete a total of 5,600 hours of experience (over a minimum of two and a half years) in the following categories:

Categories	Minimum required hours
Design and Construction Documents	2,800
Construction Administration	560
Management	280

Categories	Total hours permitted
Related Activities	80
Discretionary	1,880

Total number of required hours	**5,600**

Architect Registration Examination

Over the years, some provincial associations of architects have used various admission examinations to determine whether candidates were competent to be licensed.

Currently, the ten provincial associations use the Architect Registration Examination (ARE), administered by the U.S. National Council of Architectural Registration Boards (NCARB). Canadian architects are appointed to NCARB Examination Committees to assist in the development of the examination, as well as to ensure that the metric system is used and that Canadian standards and terminology are provided. The examination is being progressively introduced in the French language for use in Québec (and in other provinces).

The ARE, which is administered in computer format only, is sub-divided into nine divisions which may be written in any order and at any time at various testing centres in Canada and the United States. A minimum number of internship hours is required before the candidate is permitted to write the ARE.

Interns must obtain both of the following from their provincial association of architects:

- "Authorization to Test" (the necessary permission to write the examinations);
- examination results.

The ARE is comprised of the following nine parts or divisions:

Multiple-choice Divisions:
Pre-design
General Structures
Lateral Forces
Mechanical and Electrical Systems
Materials and Methods
Construction Documents

Graphic Divisions:
Site Planning
Building Planning
Building Technology

Licensing/Registration

Procedure

After successfully completing the three common admission requirements (education, experience, and examination), interns may apply for professional licensing/registration to the architectural association of the province in which they intend to practise. The intern will be granted a licence, renewable on payment of annual dues, providing that the architect complies with the association's bylaws and code of ethics.

Some provincial associations have additional requirements such as attendance at admission courses and/or an oral examination. These additional prerequisites to licensing/registration are available from the provincial association of architects.

In Québec, French is the official language by virtue of the Charter of the French Language and it is the language used by the Ordre des architectes du Québec (OAQ) in all communications. However, a member may request the OAQ to correspond in English. Whoever becomes a member of the OAQ must demonstrate working knowledge of the French language; therefore, a written or oral examination administered by the Office de la langue française may be required.

Note: In most provinces, a distinction is made between the terms "registered (licensed) architect" and "Certificate of Practice." The Certificate of Practice is an additional permit required before providing or offering architectural services to the public.

Reciprocity Agreement Between Canadian Architectural Licensing Authorities

All provinces have adopted common admission standards. The Canadian Education Standard, the Intern Architect Program, and the generalized use of the Architect Registration Examination have made admission to the profession virtually identical across Canada. This resulted in a "reciprocity agreement" between the Canadian provincial associations of architects, which facilitates mobility from one province to another.

Specific requirements, mainly related to the unique circumstances of a province, must still be fulfilled (for example, the use of French in Québec, or knowledge of "Philosophy of Seismic Design" in British Columbia).

Inter-Recognition Agreement Between the NCARB and the CCAC

The Canadian architectural profession was the first profession to negotiate an agreement with its counterparts in the United States under the North American Free Trade Agreement (NAFTA). The accord is called the Inter-Recognition Agreement Between the National Council of Architectural Registration Boards (NCARB) and the Committee of Canadian Architectural Councils (CCAC). The common admission standards in both countries were contributing factors in reaching this agreement. The commonalities are as follows:

- The CACB's accreditation conditions and procedures are similar to those of the U.S. National Architectural Accrediting Board, Inc. (NAAB). Both organizations recognize programs accredited by each other. Certain details related to Canadian political and demographic features are different.
- The Intern Architect Program's objectives, procedures, and duration are similar to those of the Intern Development Program in the United States.
- The Architect Registration Examination (ARE) is identical.

The CCAC and the NCARB signed the Inter-Recognition Agreement. However, each Canadian provincial architectural association and each U.S. Member Board must ratify the agreement, forward a Letter of Undertaking, and append specific local requirements, where necessary.

Continuing Education

After architects are licensed/registered, they should keep up with market and technology developments, which require them to:

- continuously update their knowledge;
- gain new skills;
- diversify their sphere of activity (if applicable).

To help in this process, the provincial associations of architects and the Royal Architectural Institute of Canada (RAIC) are setting up continuing education programs, some of which are mandatory, for all members.

Definitions

Accreditation: The process that establishes that an educational program meets an established standard of achievement. Its purpose is to assure the maintenance and enhancement of an appropriate educational foundation. The process is generally done by regular, external monitoring using validated criteria and procedures.

Certification: The official or legal recognition of an individual's qualifications.

References

Canadian Architectural Certification Board (CACB). Ottawa, Ont.

A Canadian Education Standard for Admission to Provincial Architecture Associations in Canada. January 1992 (revised June 1993).

1998 Conditions and Procedures for Accreditation. July 1998.

1998 Guide to Student Performance Criteria for Faculty and Students of Professional Degree Programme in Architecture. July 1998.

Committee of Canadian Architectural Councils (CCAC). *Intern Architect Program*. Ottawa, Ont.: CCAC, 1997.

Edwards, John K. *A Guide to Architecture Schools*. Sixth Edition. Washington, D.C.: Association of Collegiate Schools of Architecture, 1998.

National Council of Architectural Registration Boards (NCARB). *ARE Guidelines*. Washington, D.C.: NCARB, 1999.

National Practice Program (NPP). *Choosing A Career as an Architect*. Ottawa, Ont.: NPP, 1998.

Royal Architectural Institute of Canada (RAIC) Syllabus. Ottawa, Ont.

RAIC Syllabus Calendar.

Studies in Architecture: the accessible alternative to university. February 1996.

List: Canadian University Schools of Architecture with Accredited Programs

University of British Columbia
School of Architecture
6333 Memorial Road
Vancouver, British Columbia
V6T 1Z2
Fax: (604) 822-3808

University of Calgary
School of Architecture
2500 University Drive N.W.
Calgary, Alberta
T2N 1N4
Fax: (403) 284-4399

University of Manitoba
Faculty of Architecture
201 Russell Building
Winnipeg, Manitoba
R3T 2N2
Fax: (204) 474-7532

Carleton University
School of Architecture
1125 Colonel By Drive
Ottawa, Ontario
K1S 5B6
Fax: (613) 520-2849

Université de Montréal
École d'architecture
Faculté de l'aménagement
5620, avenue Darlington
Montréal (Québec)
H3T 1T2
Fax: (514) 343-2455

Université Laval
École d'architecture
1 Côte de la Fabrique
Québec (Québec)
G1K 7P4
Fax: (418) 656-2785

McGill University
School of Architecture
Macdonald-Harrington Building
815 Sherbrooke Street West
Montréal (Québec)
H3A 2K6
Fax: (514) 398-7372

Dalhousie University
Faculty of Architecture
P.O. Box 1000
Halifax, Nova Scotia
B3J 2X4
Fax: (902) 423-6672

University of Toronto
Faculty of Architecture,
Landscape & Design
230 College Street
Toronto, Ontario
M5S 1A1
Fax: (416) 971-2094

University of Waterloo
School of Architecture
200 University Avenue West
Waterloo, Ontario
N2L 3G1
Fax: (519) 746-0512

The Organization of the Profession in Canada

Historical Overview

Canada's architectural profession began to be organized in the 19th century, following trends similar to those in Europe. The Industrial Revolution in the early part of the century, together with technological and societal changes, led to the emergence of architectural societies which responded to the need for:

- regulation of the profession;
- promotion, support, and professional fellowship.

Regulation was required to safeguard public health and safety. Support and promotion were deemed necessary to foster a high standard of professional competence and to influence colleagues and the public.

The first architectural society in Europe was the Society of British Architects, formed in 1834, which became the Royal Institute of British Architects in 1837. Canada followed suit 50 years later with the Architectural Guild of Toronto, established in 1887. The next step was the founding of the Ontario Association of Architects, in 1889 and its incorporation in 1890. In Québec, the Province of Québec Association of Architects was created in 1890, later to become the Ordre des architectes du Québec.

By the turn of the century, demand arose for closer professional ties between provincial groups of architects in Canada. This led to the formation in 1907 of a national organization, the Institute of Architects of Canada. The organization was incorporated under the name "The Architectural Institute of Canada" by act of the Dominion Parliament on June 16, 1908. The new Institute formed an alliance with its British counterpart, the Royal Institute of British Architects. In 1909, after receiving permission to adopt the prefix "Royal," the Canadian organization became known as the Royal Architectural Institute of Canada (RAIC).

Over the next 80 years, architectural associations developed in all other provincial jurisdictions of the country.

The Royal Architectural Institute of Canada (RAIC)

After operating as a federation of provincial licensing organizations, the RAIC became a voluntary national professional organization in 1980. Its current mission is as follows:

> *The RAIC is the voice for architecture and its practice in Canada. It provides the national framework for the development and recognition of architectural excellence.*

The role of the RAIC is to:

- act as a national forum;
- disseminate leading work in the field of architecture and architectural practice;
- encourage critique and debate;
- recognize excellence;
- link the profession at the local level to a national and international network for information-sharing.

The RAIC fulfils this role by running programs which span the full spectrum of design, technology transfer, and practice:

- *Publications:* the RAIC publishes technical and practice-oriented publications, newsletters, and directories;

- *Symposia:* the RAIC organizes national roundtables and regional events;
- *Lobbying:* the RAIC lobbies the federal government to protect the professional interests of all architects in Canada;
- *International Relationships:* the RAIC develops relationships with U.S. and Mexican architectural associations to enable members to take fuller advantage of NAFTA, and has signed professional exchange agreements with China and Chile;
- *Festival of Architecture:* the RAIC organizes the annual Festival of Architecture which provides a forum for, and raises public awareness of, architectural issues;
- *Awards:* the RAIC recognizes excellence within the profession through the Governor General's Medals for Architecture, the RAIC Gold Medal, the Allied Arts Medal, and the RAIC Awards of Excellence;
- *Career Development:* the RAIC encourages the next generation of architects through the RAIC Student Medals, the RAIC Honour Roll, the RAIC Syllabus Program, and the publication of student work.

The RAIC College of Fellows

The mission of the RAIC College of Fellows, founded in 1941, is to strengthen and reinforce efforts of the Institute in its endeavour to enhance and develop the profession of architecture.

The College of Fellows formally recognizes members and distinguished laypersons who have made outstanding contributions to the profession. Fellowship in the RAIC is an honour conferred on members singled out for their contribution to research, scholarship, public service or professional standing to the good of architecture in Canada, or elsewhere. The Investiture of Fellows, or the induction ceremony, is normally held at a convocation of the College during the RAIC's festival or conference.

The College also oversees the Institute's Honours and Awards Program.

The RAIC Foundation

The RAIC Foundation was established in 1964 as a charitable organization to receive tax-exempt financial contributions from RAIC members and the public at large. The foundation, which is a responsibility of the RAIC College of Fellows, has the following objectives:

- to promote and increase the knowledge, skill, and proficiency of the profession;
- to provide grants for research by Canadians or to undertake research in Canada in the field of architecture and in allied arts and sciences;
- to provide scholarships, bursaries, and fellowships to Canadian architects and Canadian architectural students;
- to provide equipment and teaching aids for architectural education.

Other National Organizations

The Canadian Architectural Certification Board (CACB)

Refer also to Chapter 1.1.3, *Admission to the Profession*, for a description of the composition and role of the Canadian Architectural Certification Board (CACB).

In 1976, recognizing the need for common professional standards, the registration or licensing authorities of nine provincial associations established the CACB. Its purpose was to assess and certify the academic qualifications of individuals who hold a professional degree or diploma in architecture and intend to apply for registration/licence. The Ordre des architectes du Québec joined the CACB in 1991.

The CACB now provides the following services:

- *certification* of the academic qualifications of candidates for admission to the profession;
- *accreditation* of the programs offered by the Canadian university schools of architecture.

The CACB operates by agreement of the CACC and maintains an office in Ottawa housed within the offices of the RAIC.

The Canadian Council of University Schools of Architecture (CCUSA)

The Canadian Council of University Schools of Architecture (CCUSA) is a coordinating committee of the Canadian schools of architecture. It is comprised of the heads (or designates) from each of the ten universities offering professional degrees in architecture. The CCUSA meets semi-annually to coordinate academic matters of national interest and offer a platform for collaboration and coordination among the ten schools.

The Council Chair sits as a representative to the RAIC Board of Directors (ex officio). The CCUSA also selects one of its members or former members to be Canadian Director on the Board of the Association of Collegiate Schools of Architecture. A founding partner, with CCAC, of the Canadian Architectural Certification Board, the CCUSA makes an annual financial contribution to the CACB's operating budget and directly appoints three of its members.

The National Practice Program (NPP)

The National Practice Program (NPP) is an alliance of the ten provincial associations of architects and the RAIC. Its goal is to achieve a coordinated and unified voice on practice matters on behalf of the architectural profession in Canada. Under an agreement with the provincial associations, the RAIC provides a secretariat to administer the NPP.

The NPP provides the following services:

- facilitates communication among the professional associations;
- coordinates a national consultation process on practice matters;
- develops a network with representatives and staff from:
  - other national associations;
  - federal government departments;
  - international architectural organizations;
- facilitates program-sharing among the RAIC and the provincial associations;
- monitors the development and maintenance of products and services of benefit to architects;
- appoints representatives to various national committees;
- develops and maintains standard forms of agreement for architectural services;
- updates and publishes the *Canadian Handbook of Practice for Architects*;
- supports initiatives to expand the educational base of students, interns, and architects;
- disseminates information of interest to practising architects;
- provides optional programs to assist architects, as identified by the individual members of the NPP;
- provides a national framework for continuing education.

Self-Regulation

Under the provision of the *Constitution Act*, the licensing and regulation of architects is carried out under provincial mandate. Architects, like other professionals (such as doctors, lawyers, accountants, engineers), are self-governing and self-regulating. The provincial legislatures or parliaments have enacted legislation or "Architects Acts" which establish provincial associations of architects, enabling these associations to admit members. This privilege is granted in exchange for safeguarding the public.

By contrast, in some other countries, licensing is controlled by government bodies rather than by self-regulating organizations. For example, in the United States, state government agencies license and regulate professionals.

Provincial Associations of Architects

The provincial associations of architects have been established by provincial statute.

Refer to the chart at the end of this chapter for a list of these associations. On the reverse side is a chart showing the respective enabling legislation for each association.

In this Handbook, "provincial association" is also used to refer to the Ordre des architectes du Québec (OAQ). This name and acronym have not been translated into English.

The provincial associations are governed by councils which may make regulations and/or bylaws, subject to the Lieutenant-Governor-in-Council, concerning the following matters:

- admission standards, including education, practical experience, and examination (refer to Chapter 1.1.3, *Admission to the Profession*);
- codes of conduct and ethics;
- professional standards of practice and performance;
- discipline of members for professional misconduct;
- licensing requirements, including temporary licences, Certificates of Practice;
- authority to administer a program of liability protection for the public;
- the operation of the governing council and the election of the council;
- committees and their operation;
- other matters related to the advancement of the profession and the practice of architecture.

Although the provincial licensing authorities (architectural associations) may be involved in other activities, including advocacy and promotion of the profession, their primary purpose remains the licensing of architects to ensure their competency and ability to provide proper professional services to the public.

In Québec, "The Professional Code" establishes the "Office des professions du Québec" which oversees and regulates all of the professional orders of Québec (professional associations), including the "Ordre des architectes du Québec" (OAQ).

The Committee of Canadian Architectural Councils (CCAC)

The Committee of Canadian Architectural Councils (CCAC) is comprised of representatives from each of the ten autonomous provincial associations of architects. The Committee meets semi-annually, and each provincial representative is usually accompanied at the meetings by the executive director or senior administrator from the provincial association.

The CCAC facilitates and coordinates the development of national policies and standards for admission to the profession among the provincial licensing authorities. The Committee also represents the profession on regulatory matters in the international arena.

Under an agreement with the provincial associations, the RAIC provides a secretariat to administer the CCAC. The Committee and its secretariat are funded by the provincial associations, with funding contributions pro-rated according to the number of members in each respective association. The purpose of the CCAC is to:

- facilitate communication among the associations and other related bodies;
- develop and maintain the *Intern Architect Program* manual as well as the *Canadian Rules for the Conduct of Architectural Competitions: Document Five* and other publications;
- administer and monitor the *Reciprocity Agreement Between Architectural Licensing Associations*;
- administer and monitor the *Inter-Recognition Agreement between the National Council of Architectural Registration Boards (NCARB) and the Committee of Canadian Architectural Councils (CCAC)*, including participation in the Committee of International Councils;
- coordinate with the NCARB for the preparation of the Architect Registration Examination, including the French language version;
- coordinate international liaison on regulatory matters;
- coordinate and monitor communications between the CCAC and the Canadian Architectural Certification Board (CACB) regarding certification, accreditation, and funding support;
- develop and maintain a national standard of education and experience for admission to the profession;
- develop model standards for the performance of architectural services;
- develop a model architects act and regulations.

Reference

Canada. Industry Canada. *Sector Competitiveness Frameworks — Architecture, Part 1 — Overview and Prospects*. Ottawa, Ont.: Industry Canada, 1998.

List: Provincial Associations of Architects

Architectural Institute of British Columbia
100-440 Cambie Street
Vancouver, BC V6B 2N5
Tel: (604) 683-8588
Fax: (604) 683-8568
E-mail: aibc@aibc.bc.ca
www.aibc.bc.ca

Alberta Association of Architects
Duggan House Building
10515 Saskatchewan Drive
Edmonton, AB T6E 4S1
Tel: (403) 432-0224
Fax: (403) 439-1431
E-mail: info@aaa.ab.ca
www.aaa.ab.ca

Saskatchewan Association of Architects
642 Broadway Avenue, Suite 200
Saskatoon, SK S7N 1A9
Tel: (306) 242-0733
Fax: (306) 664-2598
E-mail: saa@link.ca
www.saa.sk.ca

Manitoba Association of Architects
137 Bannatyne Avenue, 2nd Floor
Winnipeg, MB R3B 0R3
Tel: (204) 925-4620
Fax: (204) 925-4624
E-mail: maa@pcs.mb.ca

Ontario Association of Architects
111 Moatfield Drive
Toronto, ON M3B 3L6
Tel: (416) 449-6898
Fax: (416) 449-5756
E-mail: oaamail@oaa.on.ca
www.oaa.on.ca

Ordre des architectes du Québec
1825 boul. René Lévesque O.
Montréal, QC H3H 1R4
Tel: (514) 937-6168
Fax: (514) 933-0242
E-mail: oaq@videotron.ca
www.oaq.com

Architects' Association of New Brunswick / Association des architectes du Nouveau-Brunswick
1 Pleasant Avenue, Unit A
Sussex, NB E4E 1X2
Tel: (506) 433-5811
Fax: (506) 432-1122
E-mail: klcaanb@nbnet.nb.ca
www.aanb.org

Nova Scotia Association of Architects
1361 Barrington Street
Halifax, NS B3J 1Y9
Tel: (902) 423-7607
Fax: (902) 425-7024

Architects Association of Prince Edward Island
P.O. Box 1766
Charlottetown, PE C1A 7N4
Tel: (902) 566-3699

Newfoundland Association of Architects
E5204, Station A
St. John's, NF A1C 5V5
Tel: (709) 726-8550
Fax: (709) 726-1549
E-mail: naa@public.nfld.com

Vital Statistics: Provincial Associations of Architects

Architectural Institute of British Columbia (AIBC)
Established: *1920*
Enabling Legislation: *Architects Act of British Columbia, RSBC 1996*
Number of Members: *1,370 resident and non-resident*
Composition of Council: *10 members, 1 director from UBC School of Architecture or designate, 4 government appointees*

Alberta Association of Architects (AAA)
Established: *1906*
Enabling Legislation: *Architects Act, RSA 1985*
Number of Members: *550 resident and non-resident*
Composition of Council: *10 registered members, 1 government appointee, 1 licensed interior designer, 1 university appointee*

Saskatchewan Association of Architects (SAA)
Established: *1911*
Enabling Legislation: *The Architects Act, RSS 1996*
Number of Members: *80 resident, 47 non-resident*
Composition of Council: *8 registered members, 2 government appointees*

Manitoba Association of Architects (MAA)
Established: *1914*
Enabling Legislation: *Architect's Act, RSM 1987*
Number of Members: *160 resident, 110 non-resident*
Composition of Council: *8 members, and 1 university and 2 government appointees*

Ontario Association of Architects (OAA)
Established: *1889*
Enabling Legislation: *The Architects Act, RSO 1990*
Number of Members: *2,553 resident and non-resident*
Composition of Council: *14 registered members, 3 government appointees*

Ordre des architectes du Québec (OAQ)
Established: *1890*
Enabling Legislation: *Architects Act, RSQ 1994*
Number of Members: *2,381 resident, 173 non-resident*
Composition of Council: *13 members, 3 government appointees*

Architects' Association of New Brunswick (AANB)
Established: *1933*
Enabling Legislation: *An Act Respecting the Architects' Association of New Brunswick, RSNB 1987*
Number of Members: *70 resident, 50 non-resident*
Composition of Council: *7 registered members*

Nova Scotia Association of Architects (NSAA)
Established: *1932*
Enabling Legislation: *The Architects Act, RSNS 1975*
Number of Members: *15 resident and 25 non-resident*
Composition of Council: *7 registered members, 1 university appointee*

Architects Association of Prince Edward Island (AAPEI)
Established: *1988*
Enabling Legislation: *Architects Act, RSPEI 1990*
Number of Members: *12 resident and non-resident*
Composition of Council: *5 registered members*

Newfoundland Association of Architects (NAA)
Established: *1949*
Enabling Legislation: *Architects Act, RSN 1978*
Number of Members: *30 resident and 12 non-resident*
Composition of Council: *6 registered members, 2 government appointees, 1 intern architect*

Notes:
1. Membership numbers are for the year 1998. This information provides a comparison of the size of each association.
2. The number of members refers to registered or licensed members, not the total number of members.

List and Vital Statistics: National Architectural Organizations

Canadian Architectural Certification Board (CACB)
55 Murray Street, Suite 330
Ottawa, Ontario K1N 5M3
Tel: (613) 241-8399
Fax: (613) 241-5750

Established: *1977*
Composition of Board:
11 representatives:
- 3 architects appointed by the CCAC;
- 3 architectural educators appointed by the CCUSA;
- 3 architects appointed jointly by the CCAC and the CCUSA;
- 1 individual representing the public;
- 1 individual representing a national architectural student organization.

The board elects a president annually.

Committee of Canadian Architectural Councils (CCAC)
55 Murray Street, Suite 330
Ottawa, Ontario K1N 5M3
Tel: (613) 241-8341
Fax: (613) 241-5750

Established: *1984*
Composition of Board:
10 members: 1 representative from each provincial association of architects (often a president or past-president of a provincial association). The CCAC elects a chair annually from one of the 10 representatives.

Royal Architectural Institute of Canada (RAIC)
55 Murray Street, Suite 330
Ottawa, Ontario K1N 5M3
Tel: (613) 241-3600
Fax: (613) 241-5750
www.raic.org

Established: *1907*
Number of Members: *3,300 members in 1998*
Composition of Board:
11 representatives:
- the president;
- 7 regional directors;
- the chancellor of the College of Fellows;
- the chair of the CCUSA *(ex officio);*
- the past-president.

The president is elected annually from the board of directors by the board.

Charts: Comparison of Practice Requirements of Each Provincial Association

The following comparisons contain excerpts from provincial architects acts. Please refer to the full text for a complete understanding of the legislation.

5A: Comparison of Provincial Requirements regarding the RIGHT or AUTHORITY to Practise Architecture
5B: Comparison of Provincial Requirements regarding PROFESSIONAL LIABILITY INSURANCE
5C: Comparison of Provincial Requirements regarding PARTNERSHIPS
5D: Comparison of Provincial Requirements regarding the OWNERSHIP and STRUCTURE OF CORPORATIONS which Practise Architecture
5E: Comparison of Provincial Requirements for the NAME of an Architectural Practice
5F: Comparison of Provincial Requirements/Guidelines regarding the APPLICATION of SEALS

Chart 5A: Comparison of Provincial Requirements regarding the RIGHT or AUTHORITY to Practise Architecture

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirement to Practise Architecture
AIBC	registration and *Certificate of Practice;* registration of practices
AAA	registration only of architect, visiting architect or architects corporation
SAA	registration and *Licence to Practice Architecture*
MAA	registration of firm for all partnerships, groups of members, or sole proprietors; and *Certificate of Approval* for corporations
OAA	registration and *Certificate of Practice* [Note: Certificate of Authorization is required from the Professional Engineers of Ontario if practice is providing engineering services]
OAQ	registration
AANB	registration and *Certificate of Practice*
NSAA	registration
AAPEI	registration and *Certificate of Practice*
NAA	registration, and for partnerships or corporations only, a *Certificate of Approval*

Chart 5B: Comparison of Provincial Requirements regarding PROFESSIONAL LIABILITY INSURANCE

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirement for Professional Liability Insurance
AIBC	• *recommends* coverage of $250,000 per claim and $500,000 annual aggregate • Certificate of Practice holder *must notify client* in writing whether or not professional liability insurance is held and under what terms *(Bulletin 66)*
AAA	• no current requirement
SAA	• no current requirement
MAA	• corporations must have minimum coverage of $250,000 • Act permits establishment of a Professional Liability Claims Fund (none established to date)
OAA	• *mandatory* Professional Liability Insurance for all Certificates of Practice through OAA Indemnity Plan if office is in Ontario; otherwise, proof of PL coverage to same limits • minimum coverage $250,000 per claim
OAQ	• all architects having their own practice *must contribute to the professional liability insurance fund* of the OAQ (Fonds d'assurance de la responsabilité professionnelle de l'Ordre des architectes du Québec) • minimum coverage $250,000 per claim (annual aggregate $500,000)
AANB	• no current requirement
NSAA	• no current requirement
AAPEI	• no current requirement
NAA	• all resident and non-resident Certificates of Approval require professional liability insurance

Chart 5C: Comparison of Provincial Requirements regarding PARTNERSHIPS

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirement for Partnerships
AIBC	65. (1) A member, architectural firm or licensee must not practise architecture in partnership with a person not entitled to practise architecture, or make an agreement or arrangement or do an act that will enable the person to practise architecture contrary to this Act. (2) A person registered or licensed under this Act may enter into a partnership with a professional engineer registered under the laws of British Columbia for the practice of the person's profession. *(Architects Act)*
AAA	11(1) An architect may enter into a partnership with (a) one or more registered architects, or (b) one or more architects corporations, or any combination of them. (2) Subject to section 3 of the Act, an architect may enter into a partnership with one or more engineers or engineer's firm as defined in Section 17 of the Act. (3) If 1 or more architects hold and retain a majority interest in a partnership an architect may, with the consent of Council, enter into a partnership with a restricted practitioner or with 1 or more individuals or corporations if (a) their practice is confined to their profession, discipline or occupation, (b) they are of good character, (c) they have, in the opinion of Council, either sufficient academic or practical training or a sufficient combination of both in the profession, discipline or occupation of which they are a member or in which they are engaged, and (d) they are otherwise satisfactory to the Council. (4) Notwithstanding subsection (3), if an architect enters into a partnership with licensed interior designers, or professional engineers or both, then not less than 50% of the ownership of the partnership shall be vested in one or more architects, but if, (a) a person other than an architect, licensed interior designer or professional engineer becomes an owner, or (b) neither a licensed interior designer nor a professional engineer continues to be an owner, subsection 3 applies. *(Professional Practice Regulation)*
SAA	13.01 Where a firm other than a corporation is constituted for the practice of architecture the majority of the principals of the firm must be members of the Association. *(Bylaws)*
MAA	15(1) No person or firm is entitled to practise as an architect in Manitoba, or to take or use in Manitoba the designation "architect" or "architects", either alone or in combination with any other words or any name, title, or description, implying that he or they is or are an architect or architects unless the person or each member of the firm is a member of the association in good standing and registered as such. *(Architects Act)*
OAA	15(1) The Registrar shall issue a certificate of practice to a partnership of members of the Association that applies thereof in accordance with the regulations and that proposes to engage in or hold itself out as engaging in the practice of architecture. (2) the Registrar shall issue a certificate of practice to a partnership of members of the Association of Professional Engineers of Ontario that applies thereof in accordance with the regulations and that, (a) holds a certificate of authorization; and (b) employs at least one member of the Association who will personally supervise and direct the practice of architecture by the partnership. (3) the Registrar shall issue a certificate of practice to a partnership of one or more members of the Ontario Association of Architects and one or more members of the Association of Professional Engineers of Ontario that holds a general certificate of authorization and that applies in accordance with the regulations and that proposes to engage in or hold itself out as engaging in the practice of architecture. *(Architects Act)*

Provincial Association	Requirement for Partnerships
OAQ	a "partnership of architects" is the only recognized partnership in Québec
AANB	13(3) Members or licensees may practice architecture in a name other than their own and conduct their business as a partnership with members, licensees, engineers or other individuals, or with corporations meeting the requirements of paragraphs 13(4) (a) and (c) if (a) at least two thirds of the partners who are individuals are architects or engineers and at least one of whom is an architect; (b) one of the principal and customary functions of the partnership is the practice of architecture; (c) the practice of architecture is carried out under the responsibility and supervision of an architect who is a partner, an employee of the partnership or an officer, director or employee of a corporate partner; and (d) the partnership holds a valid Certificate of Practice. *(Architects Act)*
NSAA	18(1) No member of the Association shall enter into a partnership for the practice of architecture with any other person who is not a practising member of the Association unless such other person is a person or corporation authorized to practise or to apply engineering under the Engineering Profession Act or a person referred to in subsection (2). (2) Notwithstanding subsection (1) of this Section any person not a practising member of the Association who was on the first day of February, 1968, a member of a partnership engaged in the practice of architecture duly registered under the Partnerships and Business Names Registration Act of the Province of Nova Scotia may continue to be a partner in that firm until the dissolution thereof or may enter partnership with any other practising member or members with whom he may become associated but such person shall not be entitled to practise architecture unless he is a practising member of the Association or is acting under the supervision of or in concert with a practising member of the Association. (*Architects Act)*
AAPEI	(3) Members or licensees may practise architecture in a name other than their own and conduct business as a partnership with other members, licensees or other individuals, or with corporations meeting the requirements of clauses (4) (a) and (c) if (a) at least one of the individual partners is an architect having an interest in the partnership of not less than that of any other individual or corporate partner; (b) one of the principal and customary functions of the partnership is the practice of architecture; (c) the practice of architecture is carried out under the responsibility and supervision of an architect who is a partner, or an officer or director of a corporate partner; and (d) the partnership holds a valid certificate of practice. *(Architects Act)*
NAA	24 (1) The Council shall issue a Certificate of Approval to a resident partnership or firm where Council is satisfied in writing that (a) one of the principal and customary functions of the partnership or firm is to practise architecture; (b) the practise of architecture is the responsibility of, and is carried out under the supervision of, a partner in the partnership, or a principal of the firm who is registered or licensed to practise architecture in the province; and (c) two-thirds of the partners of the partnership or two-thirds of the principals of the firm are qualified to practise in the design professions. Note: *"Design profession"* includes the professional practice of architecture or engineering, landscape architecture, town planning, environment planning, interior design and related professions but does not include the practice of drafting. *(Architects Act)*

Chart 5D: Comparison of Provincial Requirements regarding the OWNERSHIP and STRUCTURE OF CORPORATIONS which Practise Architecture

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	REQUIREMENTS FOR CORPORATIONS which practise architecture
AIBC	• incorporated under the *Company Act* and in good standing, • **majority** of each class of voting shares is legally and beneficially owned by architects, • **majority of directors** are architects, • **CEO is an architect,** • all persons practising on behalf of corporation are under direct supervision of an architect who is a continuing employee or shareholder, • corporations of engineers and architects also permitted (similar rules apply), • transfer of voting rights to non-architects not permitted if majority control would be altered, • Certificate of Practice required *(Architects Act)*
AAA	• must be registered/incorporated under *Companies Act* or *Business Corporations Act*, • must be approved by Council to be an architects corporation, • no transfer of shares to take place which would contravene Professional Practice Regulation, • no business carried on or director appointed which would contravene the Professional Practice Regulation, • one or more permanent employees or shareholders who are registered architects for direct personal supervision, direction and control of the practice of architecture, • beneficial ownership of **majority** of voting shares vested in one or more registered architects and a **majority of its directors and officers** will be registered architects, • others (non-architects) to be of good character, sufficient academic or practical training in their discipline and satisfactory to Council, • if beneficial ownership includes interior designers and/or engineers 50% of voting shares must be held by one or more architects. *(Professional Practice Regulation)*
SAA	• principal function is to practise architecture and the practice is under supervision of a member who is employed by the corporation and who individually assumes function of and responsibility as a member for architectural services, • all documents filed and approved by Council, • **one of the directors** must be a member, • control of corporation vested in members, and at least **51%** of voting shares shall be beneficially and absolutely held by members, • no agreement to transfer voting rights from a member to a non-member, • alterations or amendments to corporate structure approved by Council, • in good standing with the Director of Corporations. *(Bylaws)*
MAA	• practice is under direct supervision and control of a permanent employee or shareholder who is a registered member, • beneficial ownership of a **majority** of all issued voting shares in the capital stock is vested in registered members, • **majority of directors** are registered members, • **at least one officer** is a registered member, • primary and customary business is the practice of architecture, • liability insurance in minimum amounts and under terms and conditions as prescribed by Council, • corporation has a Certificate of Practice from the association, • Certificate of Approval required/Corporation stamp issued. *(Architects Act)*

Provincial Association	REQUIREMENTS FOR CORPORATIONS which practise architecture
OAA	• **majority of directors** are members of OAA or members of Professional Engineers of Ontario • **majority of each class of shares** owned by members of OAA or PEO, • other persons owning shares must be full-time employees, • primary function is to engage in practice of architecture, • one director or full-time employee must be a member who will supervise and direct the practice of architecture, • **no person** (**non-architect** or non-engineer) may **own**, directly or indirectly, or exercise control or direction, or beneficially own, directly or indirectly, shares of any class together with another shareholder or other shareholders exercise control over **more than 49%** of any class of shares; • joint shares between member and non-member are deemed to be owned by a non-member, • "associated with another shareholder" means: • one shareholder is a corporation of which the other shareholder is an officer or director, • one shareholder is a partnership of which the other shareholder is a partner, • one shareholder is a corporation controlled directly or indirectly by the other shareholder, • both shareholders are corporations controlled by the same individual that controls the other shareholder, • both shareholders are members of a voting trust relating to the shares of a corporation, • control means 50% of shares are held for the benefit of one person or corporation. *(Architects Act 14 & 21)*
OAQ	The practice of architecture by a corporation is not permitted in Québec; however, attention is drawn to the following regulation with respect to the Code of Ethics: 3.05.08 An architect may make an agreement for his professional services directly with: … b) any architect, partnership of architects or **corporation controlled by architects**; … *(Code of Ethics)*
AANB	• one of the principal functions of the corporation or of each corporate partner is the practice of architecture, • the practice of architecture is carried out under the responsibility and supervision of a director, officer or employee who is an architect, • at least **two-thirds of the directors** of the corporation or of each corporate partner are architects or engineers and at least one of whom, for each corporation, is an architect, and the **majority of** the issued **shares** of each class of voting shares are beneficially owned by and registered in the name of the architects and engineers, • Certificate of Practice required. *(Architects Act)*
NSAA	• **majority** of the issued voting **shares** are held by and registered in the name of practising members of the Association, • a **majority** of the **directors** are practising members of the Association, • practice of architecture is done under the supervision of a full time employee who is a practising member of the Association. *(Architects Act as amended 1975)*
AAPEI	• one of the principal and customary functions of the corporation or each corporate partner is the practice of architecture, • practice of architecture carried out under the responsibility and supervision of a director, officer or employee who is an architect, • **at least one director** and **each corporate partner** is an architect and is the beneficial and registered owner of **no fewer** of each class of voting shares **than the number of such shares held by any other shareholder** or director, • Certificate of Practice required. NON-RESIDENT Corporations • **two-thirds** of the partners, principals or **directors** must be architects, • **majority** of issued **shares** of each class of voting shares beneficially owned and registered in the name of architects. *(Architects Act)*
NAA	• one of principal and customary functions is the practice of architecture, • practice of architecture carried out under the supervision of a **director** who is **registered** in the province, • **two-thirds** or more of **directors** qualified to practise **in a design profession**, if corporation has three or more directors, if less than three directors at least **one** must be an **architect**, • not less than **51%** of shares beneficially owned and registered in the name of directors in the **design professions** as above, or 100% of shares are beneficially owned by architects registered in the province. NON-RESIDENT Corporations • each director who is an architect must be registered in the province. *(Architects Act)*

Chart 5E: Comparison of Provincial Requirements regarding the NAME of an Architectural Practice

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirements/Restrictions for the NAME of an Architectural Practice
AIBC	No architectural firm shall use a name which is misleading or unprofessional and all architectural firm names shall be subject to approval by Council. *(Bylaw 15.1)*
AAA	**13**(1) subject to the Act, an architect or a registered practitioner may engage in the practice of architecture a) in his own name; b) in the case of a partnership of registered architects, in the names of one or more of the partners; c) in the case of a partnership of architects corporations, in the principal names of one or more of the corporations; d) in the case of an architect's corporation or a partnership, in the names of one or more shareholders of the corporation or one or more partners of the partnership who are registered architects or engineers, but if the name contains the name of one or more engineers, it must also contain the name of at least one architect; e) in the case of a partnership of registered architects and architects corporations, in the names of one or more of the registered architects or the principal names of the corporations or any combination of names of partners; f) regardless of the mode of practice, in the name of one or more partners or shareholders if i) the name of at least one partner or shareholder who is an architect is used in the name of the firm, and ii) the only other name used is the name of one or more engineers or licensed interior designers; g) as an anonymous firm designation provided that i) the designation is not self-laudatory and not misleading to the public, ii) the name contains the word "architect", "architects", "architectural", or "architecture", and iii) the name is first approved by Council; but not otherwise. 2) Regardless of the mode of practice, the name of the firm shall include the word "architect", "architects", "architectural", or "architecture". 3) Regardless of the mode of practice, the name of the firm may not include the word "architects" or any other term that implies that more than one architect is involved in the firm unless more than one registered architect works with the firm as a partner or shareholder. 4) Notwithstanding subsection (2), the name of a restricted practitioner firm may not include the word "architect", "architects", "architectural", or "architecture". **14**(1) Subject to prior approval by Council, a firm may retain the name of a retired or deceased architect in firm titles if a) the architect was a partner or shareholder for more than three years, b) architect has agreed in writing to allow his name to be used by the firm, c) in the case of a retired architect, the architect does not practice in Alberta or any other jurisdiction, d) the letterhead of the firm clearly indicates that the architect is a retired member of a provincial association of architects or is deceased, and e) the letterhead indicates the architects responsible for the practice of architecture in the firm. *(Bylaws)*
SAA	12.01 .3 the name of the corporation shall not be worded in such a manner that might mislead the public; 13.02 the name of the firm shall not be worded in such a manner that it might mislead the public. *(Bylaws)*
MAA	a) No Registered Member(s), Firm or Corporation shall carry on, in any way, business under a name or style that: i) is the same or similar to a name being used by a Registered Member, Firm or Corporation that engages in the practice of architecture so that its use would, in the opinion of Council, be likely to deceive or confuse the public; ii) is otherwise misleading; iii) is scandalous, obscene or immoral; or iv) indicates a superior level of practice, a special level of expertise, or compares abilities, either expressly or by implication with other Registered Members, Firms, or Corporations. b) The name or style under which a Registered Member, Firm or Corporation carries on the practice of architecture shall include the word "architect" or an abbreviation, derivation or variation thereof approved by Council. c) The letterhead used by a Firm or Corporation must indicate, either in the Firm or Corporation name, or elsewhere on the letterhead, the names of all Registered Members who are: i) partners in the Firms, or ii) Directors of the Corporation. d) The name and a copy of the letterhead to be used by a Registered Member, Firm or Corporation in the practice of architecture shall be submitted to Council for approval prior to the Registered Member, Firm or Corporation being entitled to practice architecture. *(Bylaw 15.4)*

Provincial Association	Requirements/Restrictions for the NAME of an Architectural Practice
OAA	No holder of a certificate of practice, a certificate of practice issued under section 23 of the Act or a temporary licence shall use a name designation or letterhead that is, a) the same as or similar to the name of a sole proprietorship, partnership, corporation or joint venture that engages in the practice of architecture in Ontario so that its use would be likely to deceive; b) a number name; c) in the case of a corporation that does not have a number name, a name other than the name of the corporation; d) otherwise misleading; e) scandalous, obscene or immoral; or f) self-laudatory. *(Regulations – 40)*
OAQ	5.03.02 The name of a partnership of architects shall include the names of the members of the Order who practise together. 5.03.03 When an architect withdraws from a partnership, his name must be removed from the partnership name except in the cases provided for in section 5.03.04. 5.03.04 When an architect withdraws from a partnership to practise alone, to join another partnership or to perform duties that are incompatible with the practice of his profession, his name must be removed from the partnership name within 6 months from his withdrawal, unless there is an agreement to the contrary. 5.03.05 Notwithstanding section 5.03.02, a partnership of architects may retain in its name the name of a deceased or retired architect for 1 year following the death or retirement, provided that the architect was a member of the partnership at the time of his death or retirement. 5.03.06 Notwithstanding section 5.03.05, the name of a partnership of architects may include the name of a deceased or retired architect provided that the architect was a member of that partnership during the 5 years preceding his death or retirement and provided that the architect, his heirs or his successors have concluded an agreement to that effect. Such agreement may be revoked for cause. *(Regulations)*
AANB	6.5.1 A holder of a Certificate of Practice shall not use a name, designation or letterhead that is a) the same as or similar to the name, designation or letterhead of a sole proprietorship, partnership, corporation or joint venture that engages in the practice of architecture in New Brunswick so that the use would be likely to deceive or confuse; b) a number name of a corporation; c) a name other than the name of the corporation; d) misleading; e) scandalous, obscene or immoral; or f) self-laudatory. 6.5.2 Styling of firm, company or corporate names and the composition of letterheads of persons applying for a Certificate of Practice shall be approved by Council. 6.5.3 Names and designations for firms or corporate names shall comply with the following: a) anonymous designations are in general acceptable. A name or designation may include the name, names or initials of a past or present member. The name, names or initials of past or present members of the Association of Professional Engineers of New Brunswick may be included; b) Firm names or designations shall not include the name or initials of individuals other than as authorized in subsection 6.5.3 (a); and c) Firm names or designations may use the word "Architect", or any addition, abbreviation, derivation or variation thereof, and also the term "partner(s)", "associate(s)", "and associate(s)" or "partnership" if associates or partners in fact exist. The term "associate" or "partner" in this context means another member of the design professions. d) The design professions in this context shall include persons duly qualified in the fields of landscape architecture, community planning and interior design, but does not include technicians or technologists. Any dispute as to the meaning or eligibility shall be referred to Council, whose decision shall be final. *(Bylaws)*
NSAA	No regulation regarding selection of name.
AAPEI	14 (2) Members or licensees may practise architecture in a name other than their own and conduct their business as a proprietorship if… (3) Members or licensees may practise architecture in a name other than their own and conduct their business as a partnership with other members, licensees or other individuals, or with corporations meeting the requirements of clauses (4)(a) and (c) if… . (4) A corporation may practise architecture in its own name or in partnership with a member, licensee or other corporation if… *(Architects Act)*
NAA	C.1 (a) Styling of Firm or company names and composition of letterhead shall not be such as to be misleading to the general public, and shall comply with the following requirements: 1) Any proper names appearing in the Firm Title shall be those of the constituent members of the firm. Professional designation of each constituent member must also be included in the composition of the letterhead. 2) Anonymous designations may be used for Firm or Company names in strict compliance with the Architect's Act, provided that the principals of the Firm or Company and their designation are listed on the Firm or Company letterhead. 3) No designation shall be used which refers to the plural term (Architects, Engineers, etc.) or Associates, Partners, etc., when such do not exist. 4) The Firm name or letterhead shall not incorporate any words which would imply that offices are maintained in any other City, Province or Country when such is in fact not the case. 5) Firm titles or letterheads shall not incorporate any wording which would mislead potential clients. *(Code of Professional Conduct)*

Chart 5F: Comparison of Provincial Requirements/Guidelines regarding the APPLICATION of SEALS

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirements or Guidelines re: SEALS
AIBC	77 (1) An architect must apply a seal, with signature and date, to letters of assurance, certificates, drawings and specifications prepared by or under the architect's supervision, direction or control if the architect practises architecture… 78 A member of the institute or a licensee must not affix his or her seal to a plan, working drawing, detail drawing, specification or other document unless it was prepared under the supervision, direction or control of the member or licensee. *(Architects Act)*
AAA	2 (2) No person except a registered architect, visiting project architect, architects corporation or architects and engineers firm shall … (c) affix a seal or a stamp of a registered architect or the stamp of a visiting project architect, architects corporation or architects and engineers firm, or permit that seal or stamp to be fixed, to a plan, drawing, detail drawing, specification, or other document or a reproduction of any of them unless (i) that plan, drawing, detail drawing, specification or other document or reproduction was prepared by or under the personal supervision, direction and control of, and (ii) the seal or stamp is affixed with the knowledge, consent and in accordance with the direction of the registered architect or visiting project architect to whom or the architects corporation or architects and engineers firm to which the seal or stamp was issued by the Registrar. *(Architects Act)*
SAA	2.02 Every member shall have a seal, supplied by the Association, the impression of which shall contain the name of the member, the member's registration number and place of business, and the words "Registered Architect, Saskatchewan" and the name of the Association. .1 The seal when affixed to drawings, shall bear the member's signature and the date. *(Bylaws)*
MAA	11.3 (b) All working drawings, specifications and the certificates involved in the practice of architecture when issued shall bear the seal and signature of the Registered Member responsible for the design as well as the date on which the seal and signature were affixed. (c) Whenever a Registered Member uses his seal, his signature shall appear across the seal. In the case where there is more than one name on the seal, at least one of the Registered Members named there-on shall sign the seal. 11.4 (b) All working drawings, specifications and certificates involved in the practice of architecture which are prepared by, through or on behalf of a Corporation, shall bear the seal and signature of the Registered Member responsible for the design and the stamp of the Corporation, as well as the date on which the stamp, seal and signature were affixed. (c) Whenever a Corporation uses its stamp, the signature of the Registered Member responsible for the design shall appear across the stamp of the Corporation. *(*General Bylaws*)* • Seals are required on working drawings, specifications, and certificates. • Also, seals are required on reports prepared by Corporations.
OAA	The seal and signature must be applied to "every design prepared under his or her personal supervision and direction and issued or exhibited to a person who is not a holder and is submitted as part of an application for a building permit or is used for the construction, enlargement or alteration of a building, except in the case of an open competition in which anonymity is a requirement" *(Regulation 27, 42(21))* • advises to avoid "pre-signed, self adhesive reproductions, and removal of seal for "record drawings"," • computer seals are permitted, but **not** computer scanned signatures. *(Practice Bulletin A.1)*

Provincial Association	Requirements or Guidelines re: SEALS
OAQ	An architect must identify by means of his signature and seal all plans, preliminary or working specifications, work supervision reports, payment certificates, change orders, work completion certificates and experts' reports, prepared for architectural work by himself or under his immediate control and supervision. *(Regulation respecting the Code of Ethics 3.04.01)*
AANB	15(3) Unless exempted by by-law, every member or licensee practising architecture in New Brunswick in his own name shall sign, date and affix his stamp to all designs, specifications, reports, contracts and other documents pertaining to the practice of architecture which have been prepared by the member or licensee, or under the direct supervision of the member or licensee. 15(5) Every person authorized to practice architecture under this Act who fails to sign and affix their stamp to a final construction document, as required by this section, is guilty of professional misconduct. *(Architects Act)*
NSAA	52. Every practising member of the Association shall have a seal, the impression of which shall bear the name of the member and the words "Registered Architect — N.S. Association of Architects" with which he shall stamp all plans and specifications and other documents prepared by him. *(Architects Act)*
AAPEI	16. (3) Every member or licensee practising architecture in Prince Edward Island in his own name shall sign and affix his stamp to all final designs or construction documents which have been prepared by such person or under the supervision of such person. (4) Every proprietorship, partnership or corporation practising architecture in Prince Edward Island shall affix its stamp to all designs which have been prepared by the proprietorship, partnership or corporation, and have such designs signed by a member or licensee designated on the certificate of practice. (5) Every person authorized to practice architecture under this Act who fails to sign and affix their stamp to a final design or construction document, as required by this section, is guilty of professional misconduct. *(Architects Act)*
NAA	33.2 (2) All final drawings, specifications, plans, reports and other documents involving the practice of architecture, when issued, shall bear the signature and seal of the architect who prepared or approved them. *(Architects Act)*

International Architectural Organizations

Introduction

Most nations have some form of professional or legal organization for their architects. This Handbook cannot outline them all, but will briefly describe two international bodies and those organizations within North America which affect the Canadian architectural community. In the past, Canadian architects were closely affiliated with Britain and the Commonwealth, and many were members of the Royal Institute of British Architects (RIBA). Today, however, most architects in Canada have closer ties with their colleagues in North America and often provide services worldwide.

International Organizations

International Union of Architects (UIA)

The International Union of Architects, or Union internationale des architectes (UIA), was founded in 1948 in Lausanne, Switzerland, as a federation of professional societies from 22 countries. Today the UIA, an international non-governmental organization, has more than 90 national architectural associations or nation-members, representing more than one million architects.

The UIA's mission is to represent the global community of architects and to promote the profession within the following organizations:

- the UIA Member Sections (approximately 91 professional architectural organizations);
- other non-governmental organizations (in order to develop interdisciplinary contacts):
  - ICOMOS (International Council on Monuments and Sites);
  - ICSID (International Council of Societies of Industrial Design);
  - ICOGRADA (International Council of Graphic Design Associations);
  - IFI (International Federation of Interior Designers);
  - ISOCARP (International Society of City and Region Planners);
  - INTA (International Development Association);
- intergovernmental institutions (in which the UIA is the only officially recognized association for architecture):
  - UNESCO (United Nations Educational, Scientific and Cultural Organization);
  - UNCHS (United Nations Centre for Human Settlements);
  - ECOSOC (United Nations Economic and Social Council);
  - UNIDO (United Nations Industrial Development Organization);
  - WHO (World Health Organization).

The UIA has also established the Professional Practice Commission, which has developed a basic framework regarding international standards of professionalism for architects. Adopted at the 1999 UIA Congress in Beijing, this framework will assist nations and professional architectural associations in reaching mutual recognition agreements for the practice of architecture.

International Council on Monuments and Sites (ICOMOS)

The International Council on Monuments and Sites (ICOMOS) is an international non-governmental organization which permits professionals in the field of conservation and preservation of historic monuments and sites to exchange information and experiences. It was founded in 1964 in Venice by the Second International Congress of Architects and

Technicians of Historic Monuments. The following year, the organization held a constituting assembly in Warsaw with the support of UNESCO. The assembly adopted the Venice Charter, which is universally accepted as the instrument for promoting quality in preservation.

ICOMOS is dedicated to furthering the conservation, protection, rehabilitation, and enhancement of monuments, groups of buildings, and sites. The organization operates through national committees of professionals and has a secretariat based in Paris. Serving more than 5,000 members in more than 90 countries, ICOMOS is UNESCO's principal advisor in matters concerning the conservation and protection of monuments and sites. ICOMOS Canada was founded in 1977.

North American Organizations

The American Institute of Architects (AIA)

The American Institute of Architects (AIA) was founded in New York City in 1857. The AIA is a representative body rather than a governing or controlling body. It divides the United States into regions, each of which is represented by a member on the Board of Directors. The regions have chapters; the number of chapters per region depends on the population density. The chapters' bylaws are set by the national body.

The AIA currently has about 62,000 members and is a voluntary professional association dedicated to organizing and uniting the profession. The AIA requires its members to commit to a code of ethics and professional conduct, as well as to professional development through its program of continuing education.

Members of the RAIC may become associate AIA members. Refer to Chapter 1.1.4, *The Organization of the Profession in Canada*, for information on the RAIC.

National Council of Architectural Registration Boards (NCARB)

The National Council of Architectural Registration Boards (NCARB) is a not-for-profit corporation. All the legally constituted architectural registration boards of the 50 U.S. states and five territories are members. The NCARB assists its 55 Member Boards through the following activities:

- preparing and delivering a uniform examination — the Architect Registration Examination (ARE);
- establishing standards in education and training;
- verifying qualifications of applicants and certifying architects;
- developing standards for professional conduct;
- administering the Intern Development Program.

The Committee of Canadian Architectural Councils (CCAC) works closely with the NCARB, and, in 1994, an Inter-Recognition Agreement was signed between the two organizations. This agreement assists architects in Canada and the United States to obtain architectural licences in most jurisdictions in each other's country. In addition, Canadian provincial associations of architects use the ARE to assess the competency of intern architects.

National Architectural Accrediting Board, Inc. (NAAB)

Formed in 1940, the National Architectural Accrediting Board, Inc. (NAAB) is responsible for accrediting professional degree programs in schools of architecture in the United States. This is similar to the accreditation function of the Canadian Architectural Certification Board (CACB) which has adopted most of the NAAB's accreditation criteria. The NAAB has a board of directors comprised of appointees from the following organizations:

- AIA (The American Institute of Architects);
- NCARB (National Council of Architectural Registration Boards);
- ACSA (Association of Collegiate Schools of Architecture);
- AIAS (American Institute of Architecture Students).

Association of Collegiate Schools of Architecture (ACSA)

The Association of Collegiate Schools of Architecture (ACSA) is similar to the Canadian Council of University Schools of Architecture (CCUSA). The Association is comprised of 145 schools of architecture including several in Canada. A forum for "ideas on the leading edge of architectural thought," the ASCA publishes the *Journal of Architectural Education (JAE)* and a newsletter *(ACSA News)*.

Federación de Colegios de Arquitectos de México (FCAM)

The Federación de Colegios de Arquitectos de México (FCAM), or the Federation of the Colleges of Architects of Mexico, is a national professional organization, with headquarters in Mexico City. Membership in FCAM is voluntary. Mexico has about 112,000 architects; some 15,000 of them are FCAM members.

Most Mexican jurisdictions (states) have a professional association known as a "Colegio," and these associations have united to form the national federation. The Colegios, which are responsible for establishing codes of ethics, deal with issues of professional practice and public complaints.

FCAM's mission is to:

- coordinate the needs and interests of its members;
- encourage professional development;
- develop standards of practice;
- promote the profession to the public.

As a result of the North American Free Trade Agreement (NAFTA), the FCAM is working with its Canadian and U.S. counterparts to develop a mutual recognition agreement.

Asociación de Instituciones de Enseñanza de la Arquitectura de la República Mexicana (ASINEA)

The Asociación de Instituciones de Enseñanza de la Arquitectura de la República Mexicana (ASINEA) has a similar function to the Canadian Council of University Schools of Architecture (CCUSA) and the Association of Collegiate Schools of Architecture (ACSA). Comprised of 81 schools of architecture, ASINEA has a multifaceted objective: the exchange of pedagogic, administrative, social, and academic information. As part of its efforts to continually enhance the several Schools and Facultades (faculties) of architecture within the Mexican Republic, ASINEA also deals with architectural criteria for education standards and curriculum.

Reference

National Council of Architectural Registration Boards (NCARB). *Architect Overseas Practice Standards — A Guide to Selected Countries*. Sixth edition. Washington, D.C.: NCARB, 1998.

Chart: Comparison of Licensing Procedures for Architects in Canada, the United States, and Mexico

	Canada	U.S.A.	Mexico
Education	Professional degree accredited by CACB or individual certification	Professional degree accredited by NAAB	Professional degree "Professional examination" 480 hours of social service
	Graduation (professional degree) National	Graduation (professional degree) National	Cédula ARCHITECT[1] National
Certification of Academic Qualifications	CACB	NCARB	**SEP**[2]
Experience	Intern Architect Program (IAP) 5,600 hours experience National	Intern Development Program (IDP) 5,600 hours experience National (not mandatory in all states)	
Examination	Architect Registration Examinations (9 Divisions) National	Architect Registration Examinations (9 Divisions) National	
Certification of Professional Qualifications	Provincial associations	NCARB (optional)	
Licence	Responsibility of **provincial association of architects**	Responsibility of **state government agency**	
Practice	**Architect** Most provinces have additional requirements for "Practice" (such as Certificate of Practice, Professional Liability Insurance)	**Architect** No restrictions	**Architect and/or Director Responsable de OBRA** No restrictions (in certain jurisdictions only)

Notes:
- Information has been developed from site visits by U.S.A./Canada Team to Mexican architectural education institutions, as part of Tri-National Committee on Architecture and NAFTA. (March 1, 1997)
- Information regarding Mexico is to be confirmed by Mexico.
- This chart is a simplified graphic representation of general procedures for licensing.
- "National" means that a national standard exists.

Footnotes:
1. The scope of practice allowed at the initial "Cédula" is restricted with regard to building size and type.
2. SEP is "Secretaría de Educación Publica".

List: International Organizations

International

- The Architects' Council of Europe
  Avenue Louise 207, Bte 10
  B-1050 Brussels, Belgium
  Tel: 32 2 645 09 05
  Fax: 32 2 645 09 64

- Commonwealth Association of Architects (CAA)
  66 Portland Place
  London W1N 4AD England

- PanAmerican Federation of Architects Associations (FPAA)
  SHI-SUL Q.I. 15 Conjunto 03 casa 18
  LAGO SUL
  Brasilia D.F.C.P. 71635-230 Brazil
  Tel: 5561 248 1016
  Fax: 5561 248 7227

- Union internationale des architectes (UIA) / International Union of Architects
  51, rue Raynouard
  75016 Paris, France
  Tel: 33 (1) 45 24 36 88
  Fax: 33 (1) 45 24 02 78
  www.uia-architectes.org

- ICOMOS:
  - Canada
    P.O. Box 737, Station B
    Ottawa, Ontario K1P 5R4
    Tel: (613) 749-0971
    Fax: (613) 749-2071

  - International Secretariat
    49-51 rue de la Fédération
    75015 Paris, France
    Tel: 33 (0) 1 45 67 67 70
    Fax: 33 (0) 1 45 66 06 22

Mexico

Federación de Colegios de Arquitectos de México (FCAM)
Insurgentes Sur 1828, Mezzanine
Col. Insurgentes, Mixcoac
03920
México, D.F. MEXICO

United States

- The American Institute of Architects (AIA)
  1735 New York Avenue, NW
  Washington, D.C. 20006-5292 U.S.A.
  Tel: (202) 626-7300
  www.aiaonline.com

- National Council of Architectural Registration Boards (NCARB)
  1735 New York Avenue, NW, Suite 700
  Washington, D.C. 20006 U.S.A.
  Tel: (202) 783-6500
  Fax: (202) 783-0290
  www.ncarb.org

- National Architectural Accrediting Board, Inc. (NAAB)
  1735 New York Avenue, NW
  Washington, D.C. 20006 U.S.A.
  Tel: (202) 783-2007
  Fax: (202) 783-2822

- Association of Collegiate Schools of Architecture (ACSA)
  1735 New York Avenue, NW
  Washington, D.C. 20006 U.S.A.
  Tel: (202) 785-2324
  Fax: (202) 628-0448

Others

- Royal Institute of British Architects (RIBA)
  66 Portland Place
  London W1N 4AD England
  www.riba.org

- Royal Australian Institute of Architects (RAIA):
  - National Office:
    2a Mugga Way
    Red Hill ACT 2603
    P.O. Box 3373, Manuka ACT 2603 Australia
    Tel: (02) 6273 1548
    Fax: (02) 6273 1953
    www.raia.com.au

  - Practice Services:
    2nd floor, 41 Exhibition Street
    Melbourne V1C 3000 Australia
    Tel: (03) 9650 2477
    Fax: (03) 9650 3364

The Role of the Architect

The Architect in Society

The role of the architect has evolved over the centuries. Architects have been:

- powerful confidants to the pharaohs in ancient Egypt;
- philosophers/planners in ancient Greece and Rome;
- artisans and craftsmen in medieval times;
- "master builders" throughout the Renaissance.

Today, the architect is usually a professional service provider or "middleperson" between a builder and an owner. Technological and sociological changes have affected both the way architecture is practised as well as the role of the architect in society.

See "The Evolving Role of the Architect" illustration at the end of this chapter.

The Architect as a Generalist

Today, an architect is a professional with a general knowledge of the many disciplines involved in the design, construction, maintenance, and alteration of buildings. An architect must also have the skills necessary to synthesize and coordinate various parts of a project into a composite whole not only to satisfy functional requirements, but also to contribute to an orderly, visually-pleasing, and sustainable environment. The individual architect may become an expert in particular aspects of design, production or management, or become an expert in a specific building type. There is a growing trend to specialize, such as architects as code consultants or programmers, and to become accredited or certified in specialties such as building envelope consultants (in British Columbia). However, the architect maintains a *general* expertise in all aspects of the profession.

The practice of architecture is interrelated with many other design disciplines, from various types of engineering to landscape design, to sociological and planning studies. In the complex task of coordinating the many specialists involved in a project, the architect develops a unique role and set of skills. Whereas the contractor is often driven by the profit motive, most architects have joined the profession because of a desire to improve the environment in which people live and work. This holistic view of the built environment has enabled architects to undertake a variety of roles in society.

Professional Responsibility

The architect's responsibility extends beyond the client to fellow professionals, the profession, and society as a whole. The amount of responsibility an architect is prepared to accept will determine how he or she practises architecture. The employed or salaried architect has little direct responsibility to his employer's client, whereas the sole practitioner carries the entire responsibility. Architects in partnership share this responsibility. The architect's responsibility varies depending on the architect's role in society. Refer also to Chapter 1.1.2, *Professional Conduct and Ethics*, for more information on professional obligations and responsibilities.

Architects in Private Practice

The general public traditionally views the architect as a private practitioner.

> *Architectural Practice is the setting where ethos and circumstances lock horns, where individual and professional goals combine with budgets, deadlines, skills, organization, power, context and regulations.*
> (Cuff)

Architects in private practice may be:

- self-employed;
- employed (salaried) architects working for other professionals;
- independent contractors providing services to other architects;
- specialist consultants in various fields, such as project management, building codes, conservation, and specifications.

Self-employed architects may be:

- sole proprietors;
- in partnership with other architects or engineers;
- directors or shareholders of an architectural corporation.

Self-employed architects in private practice must maintain expertise in two distinct areas:

- the performance of architectural services;
- the operation and management of a practice, including staff.

Refer also to Chapter 2.1.1, *Organization of an Architectural Practice*. The architect in private practice accepts liability for the architectural commissions which the architect undertakes.

Refer also to Chapter 2.1.7, *Human Resources*, for a discussion of employees and independent contractors in the design professions.

Institutional and Corporate Architects

Many institutions and corporations — that do not practise architecture — employ architects as members of their staff. For example, universities and hospitals require in-house expertise for the management and expansion of their buildings and physical plant. Similarly, many large corporations employ architects in their real estate, design, construction, and facilities management divisions. The architect working for a corporation must nevertheless comply with the provincial requirements for practice and the use of the professional seal. Some of these architects may provide a full range of professional services for their employer, the corporation. Alternatively, they may simply manage the design and construction by selecting architects and consultants, and by coordinating the provision of architectural services as a representative of the corporation or institution.

Frequently, institutional or corporate architects provide services in:

- site selection;
- project planning;
- programming;
- consultant selection;
- contract negotiations;
- construction contract administration;
- facilities management.

The special skills of the architect who is committed to an organization's culture and goals can result in promotion to the executive levels of an organization.

Architects in Government

The architect can also serve society as a public service worker, that is, as an employee of the government, either at the federal, provincial/territorial or municipal level. Government employees are not personally liable for their professional work to the same extent as their private-sector counterparts. Architects in government can exert influence and develop policies related to the built environment. Opportunities within government may include positions at a technical, managerial or policy level. All levels of government construct and fund building projects as well as regulate the built environment. Architects play a variety of roles within the following levels of government.

Architects in government must be tactful and diplomatic in order to facilitate communication with the general public, officials, other architects, developers, and contractors.

Because many decisions regarding the built environment are made in the political arena, some architects choose to run for office for:

- various levels of government;
- school boards;
- professional or business associations.

Architects employed in government are not always required to maintain "professional" registration with a provincial association of architects. The lapse, or absence, of a professional licence can create a distance between the government "professional" and fellow architects, and can lead to a lack of currency and knowledge of the profession. Governments and the profession are working to redress this situation.

Federal

At the federal level, architects work as:

- employees of Public Works and Government Services Canada (PWGSC), Department of National Defence (DND), Defence Construction Canada (DCC), and several other federal government departments;
- conservation architects within the Federal Building Heritage Review Office (FBHRO) and Parks Canada, the guardians of national historic sites;
- researchers within federal government agencies such as the Canada Mortgage and Housing Corporation (CMHC) and the Institute for Research in Construction (IRC) of the National Research Council (NRC);
- technical representatives and policy developers or other officials related to the built environment and building codes.

Provincial/Territorial

At the provincial/territorial level, architects work as:

- employees of various provincial/territorial government ministries, crown corporations, and agencies related to the built environment (for example, education, public works and government services, housing, planning, tourism, health, building codes and regulations, and heritage);
- researchers and technicians;
- policy developers for the provincial/territorial government.

Municipal

At the municipal level, architects work as:

- building inspectors and plans examiners;
- administrators and designers within municipal departments of Planning and Development, specializing in areas such as land-use planning and zoning, urban design, heritage conservation.

Architects in Education and Research

Architects may pursue a career in academia as faculty members at the university schools of architecture or as researchers in a variety of settings. The ten university schools of architecture in Canada have faculty on a full-time, visiting or adjunct (part-time) basis. (Refer to "List: Canadian University Schools of Architecture with Accredited Programs," in Chapter 1.1.3, *Admission to the Profession*.) Some architects who teach also practise the profession or undertake research.

Many architects also teach at the various community colleges, technical institutions, and cégeps ("collèges d'enseignement général et professionnelles" in Québec) which train architectural technicians, technologists, and other students who study design and the construction industry.

Architects may be involved in both pure and applied research. Opportunities exist in various government agencies, universities, manufacturers of building products, and with certain specialized institutes of research.

Architects in Construction and Development

Increasingly, architects are selecting careers directly in the construction industry or real estate development. As designers, planners, and managers, they can contribute significant skills to this sector of the economy. Typical careers include:

- developer;
- construction manager;
- contractor;
- Design-Builder;
- real estate agent.

Many developers have their own in-house staff to plan and coordinate the provision of design services for projects, and many building

contractors are involved in "Design-Build" work, employing architects directly. The following skill sets can be especially marketable to builders and developers:

- marketing;
- economic feasibility studies;
- conceptual problem-solving;
- design;
- construction planning;
- estimating;
- construction administration.

Architects must confirm with the provincial associations of architects that their services and roles comply with provincial regulations. Architects occasionally lead the development and building process; in fact, the number of architect-led Design-Build firms, particularly in the United States, is growing.

Other Roles for Architects

An architectural education is often valuable for other fields of endeavour. Architects look beyond architecture for careers related to design, planning, and construction, and as specialist consultants. New career opportunities are also available to architects willing to pursue studies in related professions and become specialists with a multi-disciplined background. Some examples include:

- expert witness;
- architect/engineer;
- architect/planner/urban designer;
- architect/lawyer;
- architect/business administrator;
- architect/facilities planner;
- designer of virtual environments for computers;
- mediator/arbitrator;
- forensic investigator.

Refer to the NPP brochure entitled *Building a Dream... Choosing a Career as an Architect* for a list of some of the non-traditional jobs for architects.

References

Cuff, Dana. *Architecture: The Story of Practice*. Boston, MA: Massachusetts Institute of Technology Press, 1991.

National Practice Program (NPP). *Building A Dream... Choosing a Career as an Architect*. Ottawa, Ont.: NPP, 1998.

The Evolving Role of the Architect — Selected Milestones in the Development of the Architectural Profession

WORLD		CANADA
the Great Pyramid of Khufu, Egypt	**2550 B.C.**	
completion of the Parthenon, the Acropolis in Athens	**438 B.C.**	
Vitruvius — the ten books of *De architectura*	**30 B.C.**	
construction of the Great Wall of China	**1360-1644**	
completion of St. Peters Cathedral, Rome, by Michelangelo — master builder (started by Bramante)	**1546**	
	1600s	French settlements established in Canada
Royal Academy of Architecture established in France	**1671**	
	1700s	British Classicism expands in Canada
	1800s	Northwest Company and Hudson Bay Company expand depots throughout western Canada
École des Beaux Arts founded, Paris	**1819**	
Royal Institute of British Architects (RIBA) established	**1837**	
Elisha Otis invents and perfects the safe elevator	**1850s**	
Crystal Palace completed, London	**1851**	
The American Institute of Architects founded in New York City	**1857**	
	1867	Canadian Confederation; first Dominion Parliament buildings completed by architect Thomas Fuller
Chicago fire leads to building innovation and regulation	**1871**	
first skyscrapers erected in Chicago	**1880s**	
	1889	Ontario Association of Architects established
	1890	Province of Québec Association of Architects created (later to become Ordre des architectes du Québec)
	1890-1935	Canadian Pacific builds château-style hotels
	1907	Royal Architectural Institute of Canada (RAIC) founded
	1930	Château Montebello constructed — largest log building in the world
Union internationale des architectes (UIA) formed	**1948**	
	1967	Expo 67 — Canada's architectural showcase to the world
	1975	CN Tower completed (world's tallest freestanding structure)
	1981	West Edmonton Mall completed (world's largest shopping centre)
first version of AutoCAD software released, leading to changes in the way architecture is practised	**1985**	
	1992	Reciprocity Agreement between Canadian Architectural Licensing Authorities

The Construction Industry

Overview

The Canadian construction industry employed 20,000 general contractors and 107,500 trade contractors in 1995 (the latest year for which statistics are available). The industry delivered approximately $100 billion worth of construction, roughly two-thirds ($66 billion) of which was carried out by the contracting sector. The balance was undertaken by institutions not primarily engaged in construction (for example, utilities, governments, and private corporations). In 1995, the industry employed 724,000 workers (representing 5.4% of the total Canadian work force) and comprised approximately 15% of Canada's gross domestic product.

The construction industry is divided into three major sub-sectors, each accounting for approximately one-third of the total construction industry. These sub-sectors:

- respond to different market forces;
- use different construction techniques and materials;
- employ different labour forces.

All three sub-sectors are quite distinct:

- the **residential construction** sub-sector covers all dwellings from single-family homes to large apartment buildings;
- the **institutional, commercial, and industrial construction** sub-sector covers all buildings other than residential;
- the **engineering (or heavy civil) construction** sub-sector covers all non-building construction projects, including roads, sewer and water, bridges, dams, railways, ports, airports, pipelines, and oil and gas facilities.

The construction process is multifaceted and involves the following phases:

- developing the concept;
- securing financing;
- developing the design;
- obtaining regulatory approval;
- building the project;
- maintaining the asset after project completion;
- demolishing the asset.

Components of the Construction Industry

The building sub-sectors are composed of many loosely coordinated components, most of which fall into four major groups:

- **owners** — the public- and private-sector buyers of construction;
- **designers** — architects, engineers, interior designers, planners, and various other consultants and technical personnel engaged by the owners, responsible for the design documentation and overseeing of construction;
- **constructors** — contractors, sub-contractors, trade contractors, manufacturers, suppliers, and trades responsible for construction of buildings;
- **others** — lending institutions such as mortgage and finance companies, real estate services, trade associations, researchers, analysts, Authorities Having Jurisdiction, and other miscellaneous official and service agencies.

Owners

Building owners can be divided into two distinct groups:

- the public sector — responsible for projects ranging from simple school additions to major institutional and military installations;
- the private sector — ranges from homeowners requiring simple home renovations, through to corporations which build complex industrial and commercial buildings.

Governments at the federal, provincial, and municipal level contribute to — and influence — the construction industry in two ways:

- by enacting legislation regulating construction;
- by procuring, owning, leasing, managing, and maintaining their buildings.

Refer also to Chapter 1.2.2, *The Client and Users*, for a more detailed discussion on owners.

Designers

Many kinds of designers are involved in the construction industry. However, because of the unique training that architects receive, they often act as prime consultant — or manager and coordinator — for all *building* design work meant for human occupancy. Other buildings (such as industrial plants and warehouses), as well as other engineering construction (such as bridges), may involve an architect but not usually as the prime (or coordinating) consultant.

A host of specialist professionals and para-professionals assist architects in this role. Refer to Chapter 1.2.3, *Consultants*, for the roles of other consultants and designers in the construction industry.

Constructors

Construction is undertaken, for the most part, by:

- **general contractors** who assume overall responsibility for the construction of a project;
- **trade contractors** who perform specialized services.

Trade contractors usually operate as sub-contractors to general contractors on new construction, but they often contract directly with owners for repair or renovation contracts, or when "Construction Management" is the selected method of construction procurement. To limit their financial exposure, construction firms operate with overheads that are low relative to the size of the projects that they undertake. Contractors traditionally use bank and supplier credit to finance their operations, and often lease equipment or finance it through chattel mortgages.

Contractors employ skilled labour and trades to build projects using custom-manufactured or standard products and components, supplied either directly from the manufacturer or through a system of individual suppliers and wholesalers.

Labour force and hiring practices in the construction industry are driven by market fluctuations. Most workers are hired on a project-by-project basis, often through union (and in some provinces, non-union) hiring halls. Often, only key personnel are employed on salary over the long term. Consequently, firms quickly expand and contract their operations (and enter and exit the industry) in a relatively flexible manner in response to changing business conditions.

Manufacturers and Suppliers

In many instances, materials and products selected for construction are manufactured to established requirements of codes and standards. Product standards used in the construction industry are established by various standards-writing bodies, composed of a combination of:

- users/owners;
- manufacturers;
- technical and trade specialists;
- Authorities Having Jurisdiction;
- building design professionals;
- testing agencies.

The architect selects materials and products meeting these requirements for incorporation into the work. Materials and products may be "off the shelf" or custom manufactured for each project.

Refer also to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations.*

Manufacturers and suppliers can be excellent sources of technical assistance for the architect. Typically, manufacturers provide the architect with technical literature and product samples to review and to include in the office library. *Sweet's Canadian Construction Catalogue File* (or *Sweet's*) is one common example containing manufacturers' technical information. Manufacturers and suppliers frequently participate in construction industry trade shows which:

- showcase new and existing products and building components;
- provide the latest technical information.

Trades

Trade or specialty sub-contractors employ skilled labour to:

- incorporate pre-manufactured and custom products and materials into the built work;
- undertake specialized construction procedures (such as scaffolding or core drilling).

These skilled tradespeople include carpenters, masons, plasterers, plumbers, steel workers, electricians, and many other classes of skilled workers.

Workers are trained on the job as journeymen or apprentices until they achieve the required level of competence. Community colleges/cégeps (collège(s) d'enseignement général et professionnel) and vocational schools, in consultation with trade unions and other standards-setting organizations, provide supplementary training. Certain skilled workers — such as plumbers, electricians, and elevator installers — must be licensed.

Refer also to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

Bonding and Insurance Companies

An important part of the construction industry are the different companies which:

- provide bonds, known as sureties, to contractors;
- underwrite and provide insurance to contractors and owners;
- provide professional liability insurance to design professionals.

For more information on construction insurance, refer to CCDC 21, *A Guide to Construction Insurance*.

For more information on bonds and sureties, refer to CCDC 22, *A Guide to Construction Surety Bonds*.

In some jurisdictions, architects and engineers are required to carry professional liability insurance. There are a few private insurance companies which provide this specialized insurance.

The Ontario Association of Architects has established its own indemnity plan which provides the mandatory indemnification required by the Ontario *Architects Act*.

In Québec, by virtue of the Professional Code and the regulations of the OAQ, architects who practise on their own must contribute to the Professional Liability Insurance Fund of the OAQ.

Refer to "Charts: Comparison of Practice Requirements of each Provincial Association" in Chapter 1.1.4, *The Organization of the Profession in Canada,* for the professional liability insurance requirements for architects in each province.

Canadian Construction Association (CCA)

Founded in 1918, the Canadian Construction Association (CCA) is a national body with a membership of more than 20,000 individuals and companies. The CCA represents the interests of the construction industry throughout Canada. Seven active sections and eleven standing committees take responsibility for completing the CCA's ongoing tasks in the following areas:

- apprenticeship;
- contract and bidding practices;
- electronic dissemination of bid documents;
- employment equity;
- the environment and sustainable development;
- infrastructure promotion;
- interprovincial trade barriers;
- research and development;
- taxation issues affecting the construction industry and employment insurance reform.

The CCA is governed by an executive committee and a board of directors comprised of volunteer members. The members, who are selected from a variety of constituent groups with different construction-related interests, are elected at the annual general meeting.

Based in Ottawa, the CCA represents the industry's national interests when lobbying the federal government.

For further information, contact:

Canadian Construction Association
400-75 Albert Street
Ottawa, Ontario K1P 5E7
Tel: (613) 236-9455
Fax: (613) 236-9526
www.cca-acc.com

Provincial and Local Construction Associations

Most urban communities throughout Canada have construction associations.

Membership in these associations often includes a fully integrated affiliate membership in the Canadian Construction Association. In this case, members enjoy all the benefits and privileges of membership in the national association as well as those offered by the local associations.

Local construction associations have the following aims and objectives:

- representation at local, provincial, and (through the CCA) federal levels of government;
- the provision of education and professional development to industry members;
- the operation of display services for plans and specifications for the convenience of owners, designers, and member firms;
- the provision of labour relations services;
- the provision of alternative dispute resolution services;
- the promotion of business relations between members of every sector of the construction industry in the community;
- resolution of industry-related concerns raised by members.

To achieve these aims and objectives, each association periodically elects a chairperson and board of directors selected from the membership at large. Equal representation is sought from the following industry sectors:

- general contractors;
- trade contractors;
- mechanical and electrical contractors;
- manufacturers, supply and service companies, and professionals.

Elected representatives from each construction association or local chapter within a province also form a provincial council. The council's tasks include lobbying the provincial government on issues such as:

- workers compensation;
- health and safety legislation;
- lien legislation;
- provincial tax matters;
- employment equity;
- other construction industry-related issues.

For more information on affiliated provincial, regional, and local construction associations, contact the provincial or local construction association.

Construction Associations and Bid Depositories

Most urban communities throughout Canada have a bid depository.

In many instances, bid depositories operate as an adjunct to the local construction association under the direction of a chair and board of directors, who are elected periodically from volunteer representatives of local user groups and professionals.

Construction associations and their bid depositories help to manage the bid process by:

- disseminating bid documentation, information, and addenda;
- promptly collecting trade contractor bids for multiple-trade projects.

These trade or sub-contractor bids are distributed to general contractors so that they may be included in the general contractor's bid for major construction projects.

Bidding through bid depositories follows a strict set of rules and guidelines. The purpose of these rules is to:

- minimize confusion;
- limit bid shopping;
- make all required information available to all members of each bid depository and to all general contractor bidders registered with that bid depository.

Bid depositories are usually organized at the provincial level. Boards or committees are elected or appointed to:

- prepare rules and procedures;
- provide dispute resolution services if a dispute arises out of the bidding process.

For more information on rules, procedures, and other services, contact the local bid depository.

Canadian Home Builders' Association (CHBA)

The Canadian Home Builders' Association (CHBA) represents Canada's residential construction industry, with more than 6,000 member firms across Canada. CHBA members represent every area of Canada's housing industry — new home builders and renovators, land developers, trade contractors, product and material manufacturers, building product suppliers, lending institutions, insurance providers, service professionals, and others.

For further information on the CHBA, contact:

Canadian Home Builders' Association
150 Laurier Avenue W., Suite 200
Ottawa, Ontario K1P 5J4
Tel: (613) 230-3060
Fax: (613) 232-8214
www.chba.ca

Construction Safety

The architect needs to understand the importance of construction safety and the environment in which construction safety is regulated. Construction safety is a provincial responsibility, and there are means both for insuring workers and for securing a safe construction site in every jurisdiction. The architect should be familiar with the requirements in the province in which each project is located.

Workplace Safety Insurance Board or Workers Compensation Boards

Construction, like many industries, is hazardous. Many serious and permanent injuries, or even deaths, occur on construction sites each year.

To minimize the proliferation of individual personal injury lawsuits resulting from workplace injuries, each province has assumed the responsibility for paying compensation to injured workers. This benefit is in return for workers surrendering their rights to pursue lawsuits or legal action. Workers compensation legislation varies province by province. In some provinces, workers compensation and health and safety are administered by one organization.

The adjudication of claims is overseen by a board or commission, which reviews each case on its own merits and awards benefits to injured workers based on pre-established policies and a scale of compensation.

To finance this system and its claims, employers are assessed based upon the degree of exposure to workplace hazards by their workers. The board establishes installments or premiums, which are to be paid by each employer for every worker in its employ. All employers are required to maintain installments in good standing to the compensation board. Failure to comply can result in significant fines or even prosecution.

Architects, just like contractors, employ workers exposed to the dangers of construction sites, and thus are required to maintain such installments in good standing. Because not all provinces require architects to pay workers compensation premiums, architects should confirm their obligations with Workers Compensation Boards in the province in which they practise.

In addition, architects — as part of the construction administration services performed for clients — should verify that all construction workers employed by contractors on each project are covered by workplace safety insurance by obtaining letters of good standing. Architects should routinely request from the general contractor a certificate of good standing issued by the local provincial workplace safety insurance board to verify that all workers are protected. Failure to do so may result in involving the client, the constructor, and the injured worker. Refer also to Chapter 2.3.10, *Contract Administration — Office Functions* and Chapter 2.3.11, *Contract Administration — Field Functions*.

For more information on workplace safety (compensation) insurance, contact the provincial workplace safety insurance board.

Construction Safety Associations

Some provincial construction safety associations offer a broad range of products and services to help reduce the number of job-site accidents, injuries, occupational diseases, and fatalities.

In most instances, construction safety associations operate under the provincial workers compensation legislation to promote health and safety in the construction industry.

The associations operate through a system of joint labour/management committees, which:

- review worksite health and safety problems;
- make recommendations to government and other organizations for improvements to legislation and regulations affecting the construction industry.

The associations engage consultants to:

- conduct safety audits and accident analysis;
- design programs for general safety and projects for special needs.

Besides acting as a secretariat to the labour and management committees, these associations also offer training and educational programs through community colleges/cégeps and other venues for apprentices, journeymen, trade unions, management organizations, and individual firms.

In addition, these safety associations:

- conduct research on hazardous products;
- develop safety procedures;
- compile statistics;
- publish periodicals.

For more information on activities, services, products, and publications, contact the provincial construction safety association.

Construction Industry Consultative Committee (CICC)

The Construction Industry Consultative Committee (CICC) is comprised of the chief elected and senior staff officers of the following national organizations:

- Association of Consulting Engineers of Canada (ACEC);
- Canadian Construction Association (CCA);
- Construction Specifications Canada (CSC);
- Royal Architectural Institute of Canada (RAIC), representing the National Practice Program (NPP).

Refer to this chapter for a description of the CCA. Refer to Chapter 1.1.4, *The Organization of the Profession in Canada,* for a description of the RAIC. Refer to Chapter 1.2.3, *Consultants,* for a description of the ACEC and of the CSC.

The CICC's role is to provide a forum for the exchange of information, views, and policy on issues of general and specific interest to the construction industry. The CICC attempts to express these positions in a coordinated and consistent manner, representative of the entire construction industry, and to communicate its position to government or other public bodies.

Its administrative function is to oversee, coordinate, and direct the activities of the Canadian Construction Documents Committee (CCDC) and to promote the use of CCDC Documents.

For further information on the CICC, contact:

The Secretary
Construction Industry Consultative Committee
400-75 Albert Street
Ottawa, Ontario K1P 5E7
Tel: (613) 236-9455
Fax: (613) 236-9526

Canadian Construction Documents Committee (CCDC)

The Canadian Construction Documents Committee (CCDC) is comprised of skilled and experienced practitioners from each sector of the consulting and construction industry, to represent their sector interests. The practitioners are selected by the following national organizations:

- Association of Consulting Engineers of Canada (ACEC);
- Canadian Construction Association (CCA);
- Construction Specifications Canada (CSC);
- Royal Architectural Institute of Canada (RAIC), representing the National Practice Program (NPP).

In addition, there are two representatives from "owners" groups or organizations as well as a representative of the legal profession.

The CCDC's activities are governed by the Construction Industry Consultative Committee, which sets an annual agenda of activities for the CCDC.

The CCDC's role and responsibilities are to periodically revise, update or draft new standard forms of contract and other national, standard guides and documents, for general use by the construction industry in both the private and public sectors throughout Canada.

All decisions of the CCDC are reached through consensus. Only when consensus is achieved on an entire document, is it offered to the four national organizations with a recommendation for endorsement. All constituent bodies must endorse all CCDC-prepared documents before publication.

For further information on the CCDC, contact:

The Secretary
Canadian Construction Documents Committee
400-75 Albert Street
Ottawa, Ontario K1P 5E7
Tel: (613) 236-9455
Fax: (613) 236-9526
www.ccdc.org

Refer to "List: Canadian Construction Documents" at the end of this chapter.

Definitions

Construction: The erection, installation, extension or repair of a physical structure.

Constructor: A person who contracts with an owner or the owner's authorized agent to undertake a project; includes an owner who contracts with more than one person for the work on a project, or who undertakes the work on a project or part thereof. (National Building Code)

Journeyman: Apprentice or employee of a specialized trade contractor.

References

Canada. Industry Canada. *Sector Competitiveness Frameworks: Construction: Part 1 — Overview and Prospects*. Ottawa, Ont.: Industry Canada, 1998.

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.

CCDC 21, *A Guide to Construction Insurance*. 1999.

CCDC 22, *A Guide to Construction Surety Bonds*. 1979.

Carson, John C., Q.C. *Carson's Construction Dictionary: Law and Usage in Canada*. Willowdale, Ont.: Toronto Construction Exchange, 1989.

CMD Building Reports. Toronto, Ont.

Bulletins. Project Reports. Published weekly.

CMD Building Reports Online. Available online.

Keyfax/Keycard/Keyline. Available by fax, mail or electronic delivery.

Crailer Communications. *Building*. A regular (bi-monthly) journal for the construction and development industry. Toronto, Ont.

Daily Commercial News/Journal of Commerce.

Daily Commercial News. Daily newspaper. Toronto, Ont.

Journal of Commerce. Semi-weekly newspaper. Vancouver, BC.

Forbes, J.R. *Dictionary of Architecture and Construction — French/English and English/French*. Second edition. Paris, France: Technique et Documentation — Lavoisier, 1990.

Maclean, James H. and John S. Scott. *Dictionary of Building*. Fourth edition. London, England: Penguin Books, 1995.

Revay and Associates Limited. *The Revay Report*. Published quarterly. Montréal, QC: Revay and Associates Limited.

Stein, J. Stewart. *Construction Glossary*. Toronto, Ont.: John Wiley & Sons, 1980.

List: Canadian Construction Documents

Reference	Title	Source
CCA-L-1	Canadian Stipulated Price Subcontract between Contractor and Subcontractor (Long Form)	CCA
CCA S-1	Canadian Stipulated Price Subcontract between Contractor and Subcontractor (Short Form)	CCA
CCDC 2	Stipulated Price Contract	CCDC
CCDC 3	Cost Plus Contract	CCDC
CCDC 4	Unit Price Contract	CCDC
CCA 5	Canadian Standard Construction Management Contract Form between Owner and Construction Manager	CCA
CCAC 5	Canadian Rules for the Conduct of Architectural Competitions	CCAC
NPP 6	Canadian Standard Form of Agreement Between Client and Architect	NPP
CCA 7	Equipment Rental Agreement	CCA
NPP 7	Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version	NPP
CCA 8 A	Waiver of Lien (Mortgage Fund Use)	CCA
CCA 8 B	Waiver of Lien (General Purpose Use)	CCA
NPP 9	Canadian Standard Form of Agreement Between Architect and Consultant	NPP
CCDC 9A	Statutory Declaration by Prime Contractor for Release of Holdback or Security Deposit upon Substantial or Total Performance	CCDC
CCDC 9B	Statutory Declaration by Contractor/Subcontractor for Second and Subsequent Progress Claims	CCDC
CCDC 9C	Statutory Declaration by Subcontractor for Release of Holdback or Security Deposit upon Substantial or Total Performance	CCDC
CCDC 10	Stipulated Price Construction Bid Form	CCDC
CCDC 11	Contractor's Qualification Statement	CCDC
CCDC 12	Project Financial Information	CCDC
Document 14	Design-Build Stipulated Price Contract	CSC-CCA-RAIC
Document 15	Design-Builder/Consultant Contract	CSC-CCA-RAIC
CCA 16	Guidelines for Determining the Costs Associated with Performing Changes in the Work	CCA
CCA 17	Stipulated Price Contract for Trade Contractors on Construction Management Projects	CCA
CCDC 20	A Guide to the Use of CCDC 2	CCDC

Reference	Title	Source
CCDC 21	A Guide to Construction Insurance	CCDC
CCDC 22	A Guide to Construction Surety Bonds	CCDC
CCDC 23	A Guide to Calling Bids and Awarding Contracts	CCDC
CCDC 24	A Guide to Model Forms and Support Documents	CCDC
CCA 28	A Guide to Improving Cash Flow in the Construction Industry	CCA
CCA 29	A Guide on Standard Contracting and Bidding Procedures	CCA
ACEC 30	Guide Document on use of Documents 31 and 32	ACEC
ACEC 31	Prime Agreement between Client and Engineer	ACEC
ACEC 32	Agreement between the Engineer and the Sub-consultant	ACEC
ACEC 33-S	Agreement between Client and Geotechnical Engineer	ACEC
ACEC 36-S	Agreement between Client and Engineer (for studies)	ACEC
CCDC 40	Rules for Mediation and Arbitration and Construction Disputes	CCDC
CCDC 43	A Guide to the Use of CCDC 3	CCDC
CCDC 220	Bid Bond	CCDC
CCDC 221	Performance Bond	CCDC
CCDC 222	Labour and Material Payment Bond	CCDC
CCA A	Guide to Construction Management Contracts	CCA
CCA B	Guide to the Design-Build Method of Construction	CCA
CCA C	Performance Standards for Project Management and Scale of Fees for Project Management Services	CCA
	Recommended Guidelines for Provision of Geotechnical Information in Construction Contracts	ACEC-CCA
	A Trade Contractor's Guide and Checklist to Construction Contracts	CCA
	Design Responsibilities and the Trade Contractor	CCA

Sources:

ACEC Association of Consulting Engineers of Canada
CCA Canadian Construction Association
CCAC Committee of Canadian Architectural Councils
CCDC Canadian Construction Documents Committee
NPP National Practice Program

The Client and Users

Introduction

"The Client is King"

This simple phrase is the motto for many successful companies. It has been stated that good architecture is not possible without a good client. To ensure good architecture, the architect must be dedicated to establishing and nurturing successful relationships with all clients.

Clients may range from individuals to multi-national corporations, from large government agencies to small private-sector firms, from offshore developers to the actual occupants of a building. The importance of a client cannot be underestimated, as the adaptation of a poster from a U.S. mail-order company, pictured on this page, suggests.

In contrast to a "customer" (someone who purchases goods or products), a "client" purchases professional services. This chapter discusses the various types of clients and their relationship with the architect.

What is a Client?

A **Client** is the most important person ever in this office… in person or by mail (we might add: or by fax, or phone or E-mail).

Clients are not dependent on us… we are dependent on them.

Clients are not an interruption of our work... they are the purpose of it. We are not doing a favour by serving them… they are doing us a favour by giving us the opportunity to do so.

Clients are not people to argue or match wits with. Nobody ever won an argument with a Client.

Clients are people who bring us their wants. It is our job to handle those wants profitably for the client and for ourselves.

Adapted from an L.L. Bean poster

The Client

In response to some sort of demand, the client decides to pursue a course of action which could result in a building project. The client:

- usually selects the prime participants;
- usually pays for the required design, construction, and subsequent operation of the facility;
- may be the owner, the user or the occupant of the building, or a combination of all three;
- may be a Design-Builder.

In addition to understanding the distinctions between an owner, a user, and an occupant, the architect must address the requirements of each.

Owners

Owners usually hold the ownership or legal title to the land or site and to the completed building project. The owner may or may not be the client, and may or may not be the user of a building. For example:

- a government office building may be owned by the "Crown" (that is, the government);
- the client may be a government department such as Public Works and Government Services Canada (PWGSC);
- the user may be a different agency of government;
- the occupant may be public service workers and the general public.

Illustration 1: The Client

BUILDING	Owner	User	Occupant	Client
Federal Prison	"the Crown"	prison authority (Correctional Service Canada)	guards, staff, prisoners, visitors	*(client may be **PWGSC**)*
Church	religious organization	local congregation or parish	community groups, churchgoers, clergy, staff	*(client may be represented by a **Building Committee**)*
Custom Residence	married couple	family (married couple and their two children)	family, relatives, and guests	***married couple***

Users

Users are the groups or individuals who use the building. They may include the prime tenant(s) of a building or its residents. Typically, the users are "stakeholders" in the building and are concerned with the following building elements:

- location and site selection;
- life span;
- design, including comfort and safety;
- operation and maintenance.

Occupants

Occupants are the end-users or individuals who occupy or use the facility on a day-to-day basis. They may be apartment dwellers, workers, secondary tenants, businesses, or the general public who may use the building as patients, restaurant diners, shoppers, tourists, etc. Occupants have no direct involvement with the design and implementation of a building project.

Others

Many other groups may be involved in the building, including:

- building managers or facility management companies;
- local residents, neighbours, and ratepayers associations;
- financial institutions that fund the design and construction;
- Authorities Having Jurisdiction.

The architect must respond to the requirements of all these groups and, at the same time, ensure that the client's requirements are paramount.

Client Types

Each client has a unique personality, a style of operating, and a different expectation of involvement in the project. Client types include:

- corporate;
- government;
- institutional;
- small business owners or individuals.

Some of the characteristics of each client type are listed below.

Corporate

Corporate clients are either:

- private-sector businesses that are incorporated; or
- not-for-profit corporations; or
- public-sector Crown corporations.

These clients could be small, family-owned enterprises or large, multi-national conglomerates. The method for decision-making, funding approvals, and architect selection may vary significantly from one corporate client to another. Typically, a corporation will appoint a representative to liaise with the architect and manage the project for the corporation. The client's representative may have limited authority and is usually accountable to a

committee, a board of directors, or a president and chief executive officer. At times, it may be prudent to obtain a copy of a resolution of the board of directors assigning authority to the client representative.

Corporate clients:

- may be sophisticated clients with significant in-house expertise;
- may never have been involved in an architectural project;
- may include developers who are sophisticated in the design and construction process;
- tend to be business-oriented;
- expect excellent and prompt service;
- may not be accustomed to using industry standard client-architect agreements, preferring instead to use purchase orders or "in-house" contracts.

Government

Government clients can come from the municipal, regional, provincial or federal level. Legislative and regulatory procedures, as well as public accountability, will dictate the approach of government clients to building projects. The decision-making process is democratic and usually transparent but often very slow. Multiple reviews of documents and lengthy approvals are typical. Each government agency has its own unique requirements and "bureaucratic personality," and it may be fragmented into various departments. Government clients, especially provincial and federal governments, are usually more experienced and have access to in-house professional and technical expertise to assist them with their projects.

The federal government and, increasingly, other levels of government and certain public agencies list their project opportunities and Requests for Proposals (RFPs) on a central electronic bulletin board known as MERX. Architects interested in public commissions should regularly review this Web site, located at *www.merx.cebra.com*

Examples of typical government clients are:

- Public Works and Government Services Canada (PWGSC);
- Canada Post;
- British Columbia Building Corporation (Crown corporation);
- Ontario Realty Corporation (Crown corporation);
- The Regional Municipality of Ottawa-Carleton;
- The City of Saint John;
- The Village of Saint-Joseph-de-la-Rive.

Government clients frequently have their own form of standard contract. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for the pitfalls of non-standard contracts.

Institutional

Institutional clients typically receive monies from government, public fund-raising efforts, grants, endowments, or other external sources of funds. These clients include hospitals, school boards, museums, social service organizations. In some respects, institutional clients are like government clients in that they may have similar methods for selecting architects and have the same requirements for accountability (to government, public funding agencies, donors, benefactors). Some institutional clients do not have professional or technical staff. Sometimes, institutional clients include volunteers on governing boards who may be involved in building committees which liaise with the architect.

Examples of typical institutional clients are:

- Calgary Board of Education;
- Hôpital Général du/the Lakeshore General Hospital;
- Winnipeg Art Gallery;
- John Howard Society;
- central business district associations;
- ratepayers groups.

Large institutional clients sometimes have their own form of standard contracts. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for the pitfalls of non-standard contracts.

Small Business Owners or Individuals

These clients — which include small business owners and individuals — are frequently the owner, user, and occupant of the building. Small business owners who may require premises for their business operations, or leasehold improvements to existing facilities, are typical private clients. Individuals, couples, and families who want to renovate an existing home or construct a new custom home are also typical of this client type.

Informal procedures and inexperienced clients may mean that the architect has to be more rigorous about documentation, communications, expectations, and presentation. The architect may find that these small business owners or individual clients will need to be educated and guided through the design and construction process. Others may be small developers or builders who may be more knowledgeable and demanding.

Client Relationships

It is important for the architect to understand the client and his/her motives for constructing the building. Because the client has retained a professional, it is assumed — and upheld by legal precedent — that the client is not knowledgeable and is dependent on the guidance of a professional, in this instance, the architect. When dealing with the client, the architect must exercise professional judgement at all times. The architect must never submit to ill-informed client requests nor neglect to inform the client of project problems and their consequences. As well, the architect must develop and analyze all options, and obtain the client's support for and approval of the solution to a problem.

Clients differ in their level of involvement in architectural projects as well as in the role they expect of architects. Sometimes the architect is given considerable latitude and autonomy; on the other hand, the architect may have a very narrowly-defined role and be able to make only a few decisions without client approval. The architect should avoid misrepresentation to a client; for example, the architect should not indicate that architectural services will "take care of everything" for the client.

Managing client relationships and personalities is similar to other issues involving the management of people and human resources. Refer to the many management and business publications for information on developing and sustaining client relationships.

Client Associations

A common interest in owning, managing, maintaining, and operating buildings has led to the formation of client associations, the best known of which is the Building Owners and Managers Association.

Building Owners and Managers Association (BOMA)

The Building Owners and Managers Association (BOMA) International is an international federation of 87 U.S., 10 Canadian, and 3 international associations.

BOMA is primarily concerned with office buildings, and its principal members own or manage commercial office space. Associate members provide the goods and services needed to operate these buildings.

Founded in 1907, BOMA has the following mission:

> *... to actively and responsibly represent and promote the interests of the commercial real estate industry through effective leadership and advocacy, through the collection, analysis, and dissemination of information, and through professional development.*

The association publishes numerous research and reference materials including the *Standard Method for Measuring Floor Area in Office Buildings*, the standard known as ANSI/BOMA Z65.1-1996.

BOMA Canada is affiliated with BOMA International and has chapters in Toronto, Ottawa, and Québec. Its Web site is found at: *www.boma.ca*

Others

A number of other organizations and institutes are dedicated to the management of buildings.

BOMI Institute
Affiliated with BOMA, the BOMI Institute offers courses and designation programs for property managers, facilities managers, building engineers, and building technicians.

BOMI Institute
1521 Ritchie Highway
Arnold, Maryland
21012 U.S.A.
Tel: (800) 235-2664
Fax: (410) 974-1935
www.bomi-edu.org

The Association of Higher Education Facilities Officers (APPA)
The Association of Higher Education Facilities Officers (APPA) serves facility planners in the education community, particularly universities and colleges.

APPA
1643 Prince Street
Alexandria, Virginia
22314-2818 U.S.A.
Tel: (703) 684-1446
Fax: (703) 549-2772
www.appa.org

The International Facility Managers Association (IFMA)
The International Facility Managers Association (IFMA) has a certification program for Certified Facility Managers (CFMs) and publishes *Facility Management Journal*.

IFMA
1 E. Greenway Plaza, Suite 1100
Houston, Texas
77046-0194 U.S.A.
Tel: (713) 623-4362
Fax: (713) 623-6124
E-mail: IFMAhq@ifma.org
www.ifma.org

Client-Architect Agreements

When providing professional service to a client, the architect should always have a written agreement which outlines:

- the services provided;
- the fee for the services;
- the various terms and conditions which govern the agreement (including client responsibilities).

At the outset, architects should provide the client with a detailed explanation about what is included and **not** included in the agreement. Most disputes occur at the end of the project due to the differing expectations of the parties to the agreement.

The *Canadian Standard Forms of Agreement Between Client and Architect (Documents Six and Seven)* outline certain client responsibilities. The client may choose to retain the architect as prime consultant, with the architect retaining the engineers and other necessary consultants as sub-consultants (see Illustration 2). On the other hand, the client may retain the architect separately and also retain the engineers directly through separate agreements (see Illustration 3). In this instance, the architect must ensure that the architect's services and fees for coordination and management of the consultants are clearly understood and agreed to.

Responsibilities

Frequently, the architect has to educate the client of the need for timely and accurate information and approvals during the course of the project. The client is responsible for providing the architect with:

- a program or design brief (refer to Chapter 2.3.4, *Pre-design*);
- a construction budget;
- required information, surveys, reports, and other specialist professional services.

The architect often assists the client in obtaining some of the necessary information.

The services of many of the specialist consultants required at the pre-design phase of a project, such as geotechnical engineers and environmental consultants, are not covered in most professional liability insurance policies. As a result, the architect should ensure that the client retains these consultants directly. However, the architect may:

- assist the client in the engagement of these specialists;
- identify the information required, such as a typical grid for topographic survey, the location and size of a building for the geotechnical engineers.

Client Representative

To ensure clear and non-conflicting instructions from the client, only **one voice** should give direction to the architect. Any other situation would be unwieldy and inefficient, for example, establishing a building committee for a project where the architect's day-to-day contact is with all members of the committee.

The standard forms of agreement indicate that one of the client's responsibilities is to appoint a representative or to "authorize in writing a person to act on the Client's behalf and define that person's scope of authority with respect to the Project when necessary." Sophisticated clients, or those who are very involved in the construction process, frequently have a professional engineer or architect as a representative. Others, such as private or individual clients, may act as their own representatives. Volunteer committees may appoint one individual to liaise with the architect. It is important to establish the client's representative early in the project.

Illustration 2: Architect as Prime Consultant

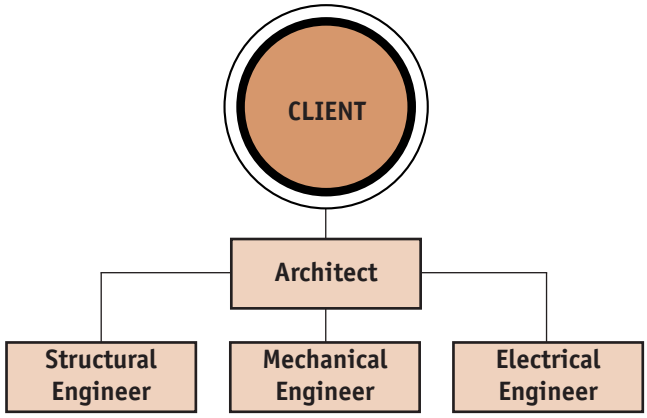
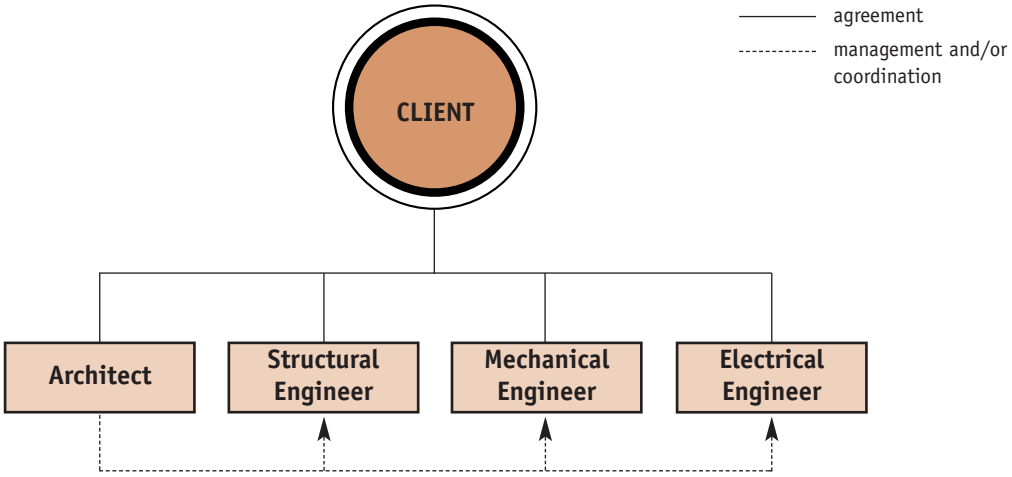


Illustration 3: Separate Agreements:
Architect as Managing and Coordinating Consultant



Definitions

Client: A person using the services of a professional (adapted from the *Oxford Dictionary*).

Owner: The person or entity identified in the agreement. The term "owner" means the owner or the owner's authorized agent or representative as designated to the contractor in writing, but does not include the consultant (from CCDC 2, *Stipulated Price Contract*).

Consultants

Introduction

Architects are required to provide a wide range of services and expertise in the course of designing and coordinating a building project, and they usually do so with the help of consultants. Projects in which the architect is the sole individual responsible for design are rare, with small residential and commercial projects probably the only examples. The size, scope of services, or complexity of the project usually exceed the architect's qualifications, skills or ability, making it necessary to seek the expert advice of others. The kind and amount of expertise required will vary with each building type or building classification and with the size and scale of the project.

A significant part of the practice of architecture, therefore, involves the coordination of information, advice, and designs provided by consultants who are knowledgeable in various fields. The architect usually provides the leadership, as well as the management and coordination skills, to synthesize the services of various consultants.

Whether acting alone or with numerous consultants, the architect's goal is to provide seamless service to the client, in addition to well-coordinated construction documents and a smooth execution of the construction or project delivery. Consultants are full participants in the **design team**.

Types of Consultants

Architects engage a wide variety of consultants. Some are professionals licensed under statute, such as engineers, who must meet rigorous requirements for membership in professional associations (see "Consultant Associations" below), as do architects. Others provide technical services such as CAD drafting or advice on hardware. Still others may be specialists in a particular field such as landscape architecture, marketing, interior design or kitchen equipment.

Engineering Consultants

The consultants most often engaged by architects are structural, mechanical, and electrical engineers. Together with the architect, these engineers could be considered **basic** consultants. Architects are usually engaged by the client as **prime** consultants for most building classifications (building codes classify buildings by major occupancies). The exception is industrial building projects, where the prime consultant is typically an engineer. In Québec, the engineers are usually engaged directly by the client. There is no contractual link between architects and engineers.

There are firms in Canada with some or all of the basic engineering consultants and architects within one organization. Such multi-disciplinary firms are not typical in Québec.

Other engineers frequently consulted for building projects are acoustical engineers, civil engineers, and engineers who specialize in the science of building envelopes. Others include geotechnical engineers, seismic engineers, traffic engineers, and environmental remediation engineers. Geotechnical and environmental remediation engineers and certain other specialists (such as land surveyors) should be retained directly by the client because architectural professional liability insurance policies do not cover these services.

Specialist Consultants

Building projects often require specialist consultants. Many of them are members of an association or may be certified to perform their services. This is typical of specification writers, building envelope consultants, interior designers in certain jurisdictions, and others. Some consultants gain expertise through years of specialization and experience. Many architects become specialist consultants themselves. Refer to "List: Types of Consultants on the Design Team" at the end of this chapter.

Agreements with Consultants

The architect should execute a written agreement with all consultants that he or she directly engages. Before such an agreement is executed, the architect should confirm that each consultant can meet both the requirements of the client and the architect. These include:

- licensing requirements in the jurisdiction of the project;
- professional liability insurance requirements;
- capacity to perform the services;
- ability to meet the project time schedules and budget.

The use of the *Canadian Standard Form of Agreement Between Architect and Consultant: Document Nine* is recommended for an agreement with engineering consultants and other design professionals such as other architects, landscape architects, interior designers, and food service consultants. This standard form of agreement has been endorsed by the Association of Consulting Engineers of Canada (ACEC) and by the architectural profession. Document Nine is **not** a "stand-alone" agreement and it is expected that the "prime agreement" (Document Six or Seven), or alternatively the relevant portions of the prime agreement, be appended to it. This ensures that the consultants have a full understanding of the expected and required services.



The architect should prepare a separate agreement for other consultants such as those with a limited role, who may not carry professional liability insurance and who may not be design professionals. This agreement should clearly outline the services required as well as the fees for these services, and may have to include clarification on the ownership of the copyright. The architect should ensure that the copyright on the limited consulting services provided for an architectural project is assigned in writing to the architect.

Managing and Coordinating Consultants

One of the architect's important roles is to manage and coordinate the work of consultants, whether they are retained directly by the architect or separately by the client. It is important to start the process early and to obtain input from the consultants during schematic design. Also, it may be helpful to involve certain consultants in project planning and budgeting prior to commencing design work. Consultants usually work as independent professionals with a significant degree of freedom. However, during the entire course of the project, the architect or project manager:

- monitors consultant performance;
- ensures consultants' ongoing commitment to the project;
- motivates consultants;
- provides recognition to consultants.

The coordination of consultants also includes:

- establishing budgets, design criteria, and time schedules;
- arranging meetings;
- routing all communications;
- setting standard formats for documentation (primarily working drawings and specifications).

Refer to "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, for a list of tasks required to coordinate and manage consultants at each phase of the project.

Consultant Associations

Most of the specialists which an architect consults are organized into professional, para-professional or technical associations. Because of the large number of such associations in Canada, this Handbook will outline only those associations which participate on the Construction Industry Consultative Committee (CICC) and the Canadian Construction Documents Committee (CCDC). These four associations are:

- Association of Consulting Engineers of Canada (ACEC);
- Canadian Construction Association (CCA);
- Construction Specifications Canada (CSC);
- Royal Architectural Institute of Canada (RAIC).

Refer to Chapter 1.2.1, *The Construction Industry,* for the composition and role of the CICC and the CCDC, as well as for a description of the Canadian Construction Association (CCA).

Refer to Chapter 1.1.4, *The Organization of the Profession in Canada,* for a description of the Royal Architectural Institute of Canada (RAIC).

The ACEC and the CSC are discussed below.

Association of Consulting Engineers of Canada (ACEC)

The Association of Consulting Engineers of Canada (ACEC), founded in 1925, is the national voice of independent consulting engineers in Canada. Member companies offer professional engineering services to Canadian architects and to private-sector and government clients. ACEC's mission is to promote and safeguard the business and professional interests of the Canadian consulting engineering industry in Canada and abroad.

The Association's membership consists of approximately 700 independent consulting engineering firms as well as 11 provincial and territorial member organizations. Members range in size from single-person operations to multi-national companies employing more than 6,000 people.

Refer to "List: Selected National Associations of Consultants," located at the end of this chapter, for the ACEC's address and Web site.

Construction Specifications Canada (CSC)

Construction Specifications Canada (CSC) is a multi-disciplinary association dedicated to the improvement of communications, contract documentation, and technical information in the construction industry. CSC liaises with its sister U.S. organization, the Construction Specifications Institute (CSI), and works with the CSI to develop and maintain the MasterFormat™ system.

CSC publishes *Construction Canada* magazine and the TEK-AID series of reference documents which can assist architects in developing specifications. CSC also offers a variety of certification programs, including:

- the Certified Construction Contract Administrator (CCCA);
- the Certified Technical Representative (CTR);
- Registered Specification Writer (RSW).

Refer to "List: Selected National Associations of Consultants," located at the end of this chapter, for the CSC's address and Web site.

Testing Agencies and Inspection Services

During the construction administration phase of a project, architects occasionally require expertise to test components of the construction (such as the compaction of sub-soils, concrete samples) or to conduct detailed inspections (for roofing systems, welds, piping, etc.). This expertise is discussed in Chapter 2.3.11, *Contract Administration — Field Functions*.

Refer also to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations.*

Definitions

Consultant: One from whom advice is sought. The requirements for licensing vary depending on the professional field of activity. (adapted from *Carson's Construction Dictionary*)

Engineer: A professional skilled in the design, development, and construction of physical works. To practise or hold oneself out to the public as an engineer, the individual must be licensed under provincial or territorial legislation.

Prime Consultant: The consultant that is retained directly by the client for the provision of the main part of professional services; these services usually include management and coordination of sub-consultants and other consultants engaged directly by the client or others.

Sub-consultant: The consultant that is retained by (or under contract to) the prime consultant.

References

Construction Specifications Canada. *Construction Canada*. Published six times a year. Toronto, Ont.

National Practice Program (NPP). *Canadian Standard Form of Agreement Between Architect and Consultant: Document Nine*. Ottawa, Ont.: NPP, 1997.

List: Types of Consultants on the Design Team

Specialist Consultants:

- Acoustical consultant
- Airport consultant
- Architectural historian
- Art consultant
- Building code consultant
- Building envelope consultant
- Computer or CAD consultant
- Conservation architect
- Construction manager
- Cost consultant
- Demographer
- Economist
- Education consultant
- Elevator consultant
- Energy management consultant
- Environmental consultant or ecologist
- Facilities manager
- Food service/kitchen consultant
- Graphic artist
- Hardware consultant
- Hospital consultant
- Interior designer
- Land surveyor
- Landscape architect
- Lighting consultant
- Marketing consultant
- Programmer
- Psychologist
- Public relations consultant
- Quantity Surveyor
- Realtor
- Security consultant
- Signage or graphics consultant
- Sociologist
- Specifications writer
- Technologist
- Theatre consultant
- Translator
- Transportation planner
- Urban and regional planner
- Urban designer
- Value engineering consultant
- Wayfinding consultant
- Wind/snow studies consultant

Engineering Consultants:

- Acoustical engineer
- Civil engineer
- Electrical engineer
- Environmental engineer
- Geotechnical engineer
- Hydrological engineer
- Mechanical engineer
- Process engineer
- Seismic engineer
- Structural engineer
- Traffic engineer

List: Selected National Associations of Consultants

Association of Consulting Engineers of Canada (ACEC)
616-130 Albert Street
Ottawa, Ontario K1P 5G4
Tel: (613) 236-0569
Fax: (613) 236-6193
www.acec.ca

Canadian Construction Association (CCA)
75 Albert Street
Ottawa, Ontario K1P 6A4
Tel: (613) 236-9455
Fax: (613) 236-9526
www.cca-acc.com

Canadian Council of Professional Engineers (CCPE)
116 Albert Street, Suite 401
Ottawa, Ontario K1P 5G3
Tel: (613) 232-2474
Fax: (613) 230-5759
www.ccpe.ca

Canadian Institute of Quantity Surveyors (CIQS)
P.O. Box 124, Station R
Toronto, Ontario M4G 3Z3
Tel: (905) 471-0882
Fax: (905) 471-7545
www.ciqs.org

Canadian Society of Landscape Architects (CSLA)
286 Brunton Side Road
RR #6
Smiths Falls, Ontario K7A 4S7
Tel: (613) 253-4938
Fax: (613) 253-5585
www.csla.ca

Construction Specifications Canada (CSC)
100 Lombard Street, Suite 200
Toronto, Ontario M5C 1M3
Tel: (416) 777-2198
Fax: (416) 777-2197
www.csc-dcc.ca

Interior Designers of Canada (IDC)
260 King Street East, Suite 414
Toronto, Ontario M5A 1K3
Tel: (416) 594-9310
Fax: (416) 594-9313

Building Regulations and Authorities Having Jurisdiction

Introduction

The architect's duty to the public is implemented, in part, by interpreting and complying with building regulations. Every project undertaken by an architect is subject to a maze of statutes, codes, standards, and bylaws. It is not uncommon for a project to be regulated by several levels of government (municipal, provincial and/or federal) as well as by First Nations, regional or metropolitan governments.

The numerous government requirements will vary from project to project. A few examples are the regulations governing:

- hospitals, theatres, nursing homes, hotels, and office and industrial buildings;
- toxic and hazardous materials;
- air, noise, and water pollution;
- fire, construction safety, and public health;
- seismic performance;
- accessibility for persons with disabilities.

The architect must have a general understanding of the complete regulatory environment, even though some regulations may not directly affect architectural services or the design process. For example, although construction safety regulations apply strictly to the contractor and to the operation of the construction project, and as such are the responsibility of the contractor, the architect must be aware of these regulations and the accompanying responsibility.

Certain environmental assessment requirements may demand soil or archaeological studies, which could have an impact on the project funding, schedule, and costs. The architect should be familiar with any such regulations, indeed, all regulations pertaining to the project. In addition, the architect should know which Authorities Having Jurisdiction are responsible for the administration of the regulations.

This chapter explains the role of building regulations and their administration by Authorities Having Jurisdiction, and suggests how the architect can work effectively with them.

The Role of Authorities

Building Codes and Regulations

Construction of sound, safe buildings and structures is fundamental. Building codes and regulations provide these minimum safety standards.

Most codes and regulations were established to protect the public, that is, to prevent and mitigate such hazards as structural collapse, fire, accidents, and disease.

Some regulations ensure safe buildings by requiring an adequate supply of potable drinking water, sanitary conveniences, minimum spatial dimensions, and illumination levels, and other features which affect the building design. However, not all regulations govern building safety. A municipal zoning bylaw or land-use regulation, for example, regulates land use and density as well as the bulk, height, and location of buildings. Such a regulation, which is intended to govern the planned and orderly development of the municipality, can markedly affect the architectural design of a building.

Building codes often adopt standards set by public and private organizations. Refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*, for more information on standards.

Enabling Legislation

Adopting and enforcing codes and statutes requires federal or provincial legislation. Under the *British North America Act*, and its successor, the *Constitution Act*, responsibility for building regulation rests with the provinces (except for buildings on federal land). Enabling provincial legislation authorizes municipal councils (and others) to appoint staff and assign duties and responsibilities to administer regulations. Sometimes, codes are provincially enacted; sometimes, they are municipal bylaws. The local municipal building official usually administers the building code by means of the building permit and building inspection processes. Building officials are empowered to determine that the erection and maintenance of buildings comply with these regulations.

National Building Codes

The **National Building Code (NBC) of Canada** is a "model" code. The NBC is a code of regulations for public health, fire safety, and structural sufficiency with respect to buildings. It establishes a minimum standard of safety and accessibility for the construction of buildings (including extensions and alterations), the evaluation of buildings involving a change of occupancy, and upgrading of buildings to remove an unacceptable hazard. Serving as a basis for other building codes, the NBC is modified to reflect regional requirements or procedures and then adopted as a provincial or municipal building code.

The **National Fire Code** is also a model code of minimum requirements to ensure an acceptable standard of fire prevention, fire fighting provisions, and life safety in existing buildings and within the community at large. Although life safety is the primary objective of the National Fire Code, it also includes measures of property protection to the extent that they make a direct contribution to life safety and for the purpose of controlling conflagrations or large loss fires.

The **National Plumbing Code** (Part 7 of the NBC) covers the design and installation of plumbing systems in buildings.

The **National Farm Building Code** deals with the particular requirements for farm buildings.

The **National Housing Code** and Illustrated Guide is a compendium of requirements in the National Building Code which apply to detached, semi-detached, and row houses.

The **Model National Energy Code of Canada for Buildings** and the **Model National Energy Code of Canada for Houses** provide standards for the construction of energy-efficient buildings.

These codes are "model" documents only and must be adopted provincially in order to come into effect.

The Canadian Commission on Buildings and Fire Codes (CCBFC) issues the National Building Codes, written by various technical committees and published by the National Research Council of Canada. A process is currently underway to revise the NBC by using "objective-based" requirements to make it more logical, understandable, and flexible.

The Building Permit and Inspection Process

The client or his/her agent (sometimes the architect) must submit an "application to build" to local building officials, and usually must verify the correctness of the application by a statutory declaration. The application is accompanied by a stipulated number of sets of architectural, structural, mechanical, and electrical documents for the proposed building. Officials review the application for compliance with municipal bylaws, regulations, and the building code. Other municipal bodies — such as fire, planning, health, and public works departments — may also review the application. When the documents are approved, a building permit is issued. The applicant is advised of any non-complying items.

During construction, municipal building officials review the work for general compliance with the approved documents and building codes. In the case of deviations, revised plans must be submitted to and approved by the building department.

Building officials are authorized to:

- issue compliance orders;
- stop work until corrections have been made;
- lay charges in the case of serious infractions.

Building officials deal primarily with contractors; however, they are also often in contact with project architects, who must review and confirm that the work generally conforms to the documents forming the basis of a building permit.

Other levels of government may also require the submission of construction documents. These Authorities Having Jurisdiction could include:

- the regional, provincial or federal departments of labour;
- public health departments;
- roads, transportation, and communications authorities;
- the office of the fire marshal.

Building Officials

Building officials:

- require and receive applications to erect, enlarge, alter, demolish or move buildings;
- review plans, specifications, and reports to determine that the proposed work meets all applicable regulations;
- issue a permit to commence construction, when the application is complete and complies with all applicable regulations;
- inspect construction in progress for compliance with the approved documents and applicable regulations;
- report contraventions to the appropriate persons;
- issue orders to correct outstanding contraventions prior to use or occupancy, or sooner where circumstances dictate;
- initiate action according to policy when orders are not carried out within the stipulated time;
- issue a certificate of compliance or a similar document when regulations have been met;
- assess unsafe and inadequately maintained conditions within buildings and order corrective action;
- exercise judgement in the application of regulations;
- keep records as required;
- report regularly to managers and municipal councils;
- review proposals for equivalencies to code requirements.

Building officials must be well-versed in the regulations and their application, and must understand their importance to public safety. They must:

- know the current legislation;
- be aware of changing building technology and its effects;
- have an understanding of what best serves the public interest.

Building officials must also interpret the meaning of the regulations, their current relevancy, and the need for change. To do so, the officials must communicate effectively with:

- the public, to help the public understand regulations and procedures;
- municipal councils;
- design professionals;
- the construction industry;
- associations concerned with public safety in buildings and structures;
- committees and persons who prepare regulations;
- other building officials.

Relationships with Authorities

The client, the architect, consultants, and the contractor may all have to deal with various Authorities Having Jurisdiction.

The Authority and the Client

The client may become directly involved with an authority during the pre-design stages. Experienced clients may also make initial inquiries to the authorities prior to the appointment of an architect, or in conjunction with the architect. The client may apply directly for the building permit.

If a permit is denied, even when all documentation for compliance with zoning bylaws and the building codes is provided, the client should consult the architect. If necessary, legal counsel can be sought.

The following are possible legal procedures affecting the construction of buildings:

- an injunction;
- a mandamus.

An *injunction* is sought when a public body applies to the court for an order restraining a private individual or other body from violating an applicable law. In the construction industry, it is often applied to stop an individual or company from constructing a building contrary to regulations, codes or bylaws. A typical example is a "stop work order."

A *mandamus* is an order directing a public body to exercise a public duty, such as the issuance of a building permit. If a municipality refuses to issue a building permit and forces the client to apply to the court for a *mandamus*, the architect must be sure that all building plans and specifications comply fully with municipal bylaws and building codes.

The Authority and the Architect

For the architect, the most important Authorities Having Jurisdiction are those which administer the zoning and development bylaws and the applicable building code.

Analysis of zoning and code requirements commences early in the design of a project and the architect begins the process of communication with the various Authorities Having Jurisdiction. Together with the sub-consultants, the architect will usually be the prime contact with authorities during the design and contract document stages. Refer to Chapter 2.3.5, *Schematic Design*.

The architect must be thoroughly familiar with the building code. It contains many requirements, in addition to structural ones, which affect the design of the building, such as:

- window openings;
- means of egress;
- design of stairways and their enclosures;
- openings between floors;
- compartmentalization for fire safety;
- accessibility for persons with disabilities;
- travel distance to exits.

Most officials encourage early consultation with architects to clarify zoning bylaws and building code requirements before the construction documents are advanced. In some instances, the local authority requires payment of the permit fee before providing consultation. For major projects, it is advisable to hold a series of meetings with the Authority Having Jurisdiction as the design progresses. Minutes of these meetings should be prepared and distributed. Such consultations will help to encourage cooperation, improve communications, and resolve differences of interpretation with respect to the zoning bylaw or building code. This in turn will help avoid the costly delays that result from revisions to construction documents.

Early consultation with building officials also enables the architect to determine which approvals from other government bodies will be needed to obtain the building permit. As well, the authority becomes familiar with the pending application and should be able to process it more efficiently.

It is good practice for the architect to include a detailed schedule or building code analysis as part of an application for a building permit. This analysis may be part of the construction documents.

Architects are also advised to submit the building permit application — completed and signed by or on behalf of the client — before or during the call for bids, together with the permit fee. This allows the building department to review the plans and prepare the building permit for the successful bidder before construction contract award. Such a procedure avoids potential delays and allows time to make changes to the plans before the contract is signed. Some owners require the successful contractor to obtain and pay for the building permit, which may result in delays.

The architect should develop professional relationships with building officials and deal with any conflicts in code interpretation tactfully.

Refer also to Chapter 2.3.10, *Contract Administration — Office Functions*, for Letters of Assurance in British Columbia. These documents, required at the building permit and occupancy permit stages, indicate the code-related responsibilities of the owners, architects, and engineers.

The Authority and the Contractor

Contact between the Authority Having Jurisdiction and the contractor normally occurs after the building permit is issued. Without the building permit, the contractor cannot legally begin construction. Permit delays can be extremely costly, as workers and equipment stand idle and contractual obligations are unfulfilled.

In many cases, the contractor is responsible for:

- obtaining a permit from the municipality to occupy public property for the construction of a hoarding or covered way for public protection;
- designing the shoring for excavation or other temporary structures such as scaffolding or guards;
- obtaining separate approvals from the building departments such as a demolition permit or a sewer connection permit.

During construction, the contractor must keep the approved building permit documents on the job site so that the building official can consult them and be satisfied that construction is in general compliance with the approved documents. The contractor must not deviate from these documents without consent of the authority and the architect, and the architect must notify the authorities of any changes. To avoid problems, the architect should review any significant changes with the Authorities Having Jurisdiction, prior to preparing instructions or Change Orders for the contractor.

The contractor has a responsibility as"constructor" to strictly adhere to the applicable construction safety act and regulations. In some instances and in certain jurisdictions, the owner may be the "constructor" and is therefore responsible for construction safety. The situation usually occurs when the owner is performing some of the work directly or has hired more than one contractor. Safety officials inspect construction operations frequently and have the authority to issue compliance or stop work orders in the event of infringements. Refer also to Chapter 1.2.1, *The Construction Industry*.

The architect should be aware that the architect and all employees of the architect are also subject to the construction safety act and regulations.

Approvals

The following authorities are listed in the approximate chronological order in which they may be contacted by the architect.

Planning:
- planning department — for architectural and site control, consultation, and zoning bylaw interpretation;
- committee of adjustment, or planning board, or committee of variance — for minor variances;
- planning board or committee or advisory planning commission — for initial approvals;
- municipal council — for approvals such as re-zoning and special agreements;
- provincial municipal board — for contentious council decisions;
- design panel.

Canada Mortgage and Housing Corporation (CMHC): CMHC should be consulted early in the process for multiple-unit residential projects involving CMHC financing.

Roads and Highways:
- provincial highways authority — consult early in the design stage for approval required for projects abutting major highways outside metropolitan areas;
- provincial, county, metropolitan or regional planning and traffic authorities, and roads departments — consult early in the design stage for approval of entrances, exits, grades.

Environment, and Water Resources:
- consult regarding approval if land abuts or includes flood plains, water courses, streams, and low-lying areas or ravines;
- consult regarding approval for both land use and sewage systems for projects which have no municipal sewage available to property, for example, cottages or resort hotels;

- consult regarding environmental impact of previous or proposed use of a site;
- consult if the site has contaminated soils.

Regional Planning:
These bodies, responsible for setting official plans for larger areas, often include a group of smaller municipalities. Although local municipalities may administer site-plan approval, regional planning authority approval may also be required. To minimize confusion, the architect should determine jurisdictional responsibilities at the outset of a project.

Institutional and Other Regulating Bodies:
- hospital commissions and boards;
- housing for special needs and users;
- public health departments;
- provincial education authority;
- other authorities, for specific building types or conditions.

Deed Restrictions and Architectural Approval:
- building limitations placed by the vendor as conditions of sale;
- restrictive covenants registered on title;
- building plan approvals are sometimes instituted by industrial and residential land developers as a further means of controlling the design of buildings. Because negotiations can be very complex, the client should check "agreements to purchase" for any such restrictions, and consult the architect or the vendor;
- certain jurisdictions (such as the National Capital Commission in Ottawa) require approval of the architectural design.

Construction:
- building department — for all building permits;
- provincial authority for occupational health and safety — for commercial and industrial buildings;
- provincial fire marshal — usually for institutions receiving provincial funding and for assembly occupancies;
- municipal fire authority — usually for projects other than single-family housing.

Engineering:
- engineering departments — consult for approval of site services. Design approval may be complicated by the division of certain responsibilities to other levels of government. For example, regions may have control over the design of water services and sanitary sewers, while municipalities control storm sewers;
- municipal plumbing departments — consult for special approvals, for example, industrial waste disposal, restaurant and food preparation wastes, water and service connections, and design of special septic systems;
- works departments — for items affecting streets, easements or other public property.

Definitions

Authority Having Jurisdiction: A body having jurisdiction in certain matters of a public nature; a body having power under a statute to pass regulations to direct, specify, and govern elements or activities of construction projects such as safety, health, or standards of manufacture or installation; a government body responsible for the enforcement of any part of the building code, or the official or agency designated by that body to exercise such function (as per the NBC).

Building Code: A regulation which describes minimum requirements for public health, safety, and welfare for the design and construction of buildings.

Constructor: A person who contracts with an owner or the owner's authorized agent to undertake a project; includes an owner who contracts with more than one person for the work on a project, or undertakes the work on a project or any part thereof (as per the NBC).

Permit: A document issued by an Authority Having Jurisdiction allowing work or an activity which is specified.

Stop Work Order: An order to a constructor by an Authority Having Jurisdiction ordering the work to be stopped.

References

The American Institute of Architects (AIA). *An Architect's Guide to Building Codes & Standards*. Second Edition. Washington, D.C.: AIA Press, 1990.

Canada. National Research Council of Canada. *National Building Code of Canada*. Ottawa, Ont.

Scott, James G. *Architecture Building Codes: A Graphic Reference*.

Yatt, Barry D. *Cracking the Codes: An Architect's Guide to Building Regulations*. Toronto, Ont.: John Wiley & Sons, 1999.

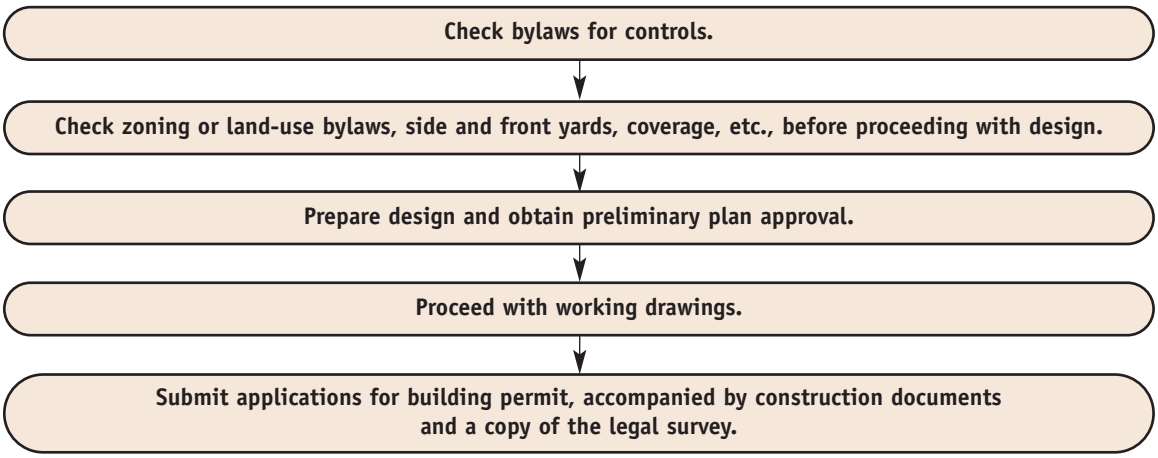
Appendix — Examples of Typical Approval Processes

The following examples demonstrate the complex procedures often required for project approval:

1. private house on a private lot
2. addition to house on a private lot
3. office building or factory
4. shopping centre on a major traffic route
5. town housing project in a suburban area
6. application for re-zoning

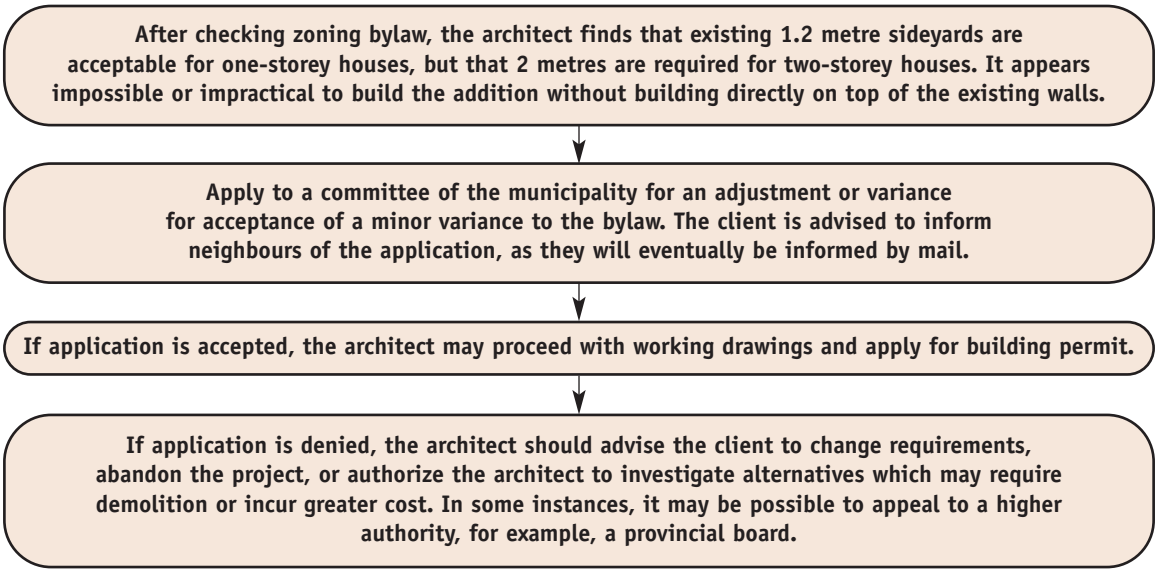
Requirements may vary from municipality to municipality. Therefore, the architect should ascertain the approval process in the jurisdiction of the project.

Example 1. Private House on a Private Lot:



Example 2. Addition to House on a Private Lot:

In this example, the client wishes to build a second floor over a portion of an existing one-storey house.



Example 3. Office Building or Factory:

Confirm zoning bylaw requirements and submit application.

↓

Check with client's purchase agreement to see if the vendor requires architectural approval. If vendor approval is required, arrange to meet the consultant or staff architect in charge of approval for preliminary plan examination.

↓

Meet with the building department and, depending on the jurisdiction, meet with occupational health and safety inspector at this stage, particularly if the building is large or the design is complex.

↓

Complete construction documents and submit necessary plan sets, if required, to occupational health and safety inspector and obtain approval. Retain approved sets for building permit application.

↓

Submit appropriate number of sets with building permit application.

Example 4. Shopping Centre on a Major Traffic Route:

After initial review of requirements with the client, establish requirements for re-zoning, site plan approval, and other approvals. Prepare interview list which may include the following:

- municipal planners;
- municipal traffic department;
- regional, metro or county roads department, and provincial department of highways if property abuts provincial highway;
- fire marshal;
- health and safety environment inspector;
- building department.

After schematic studies are approved by the client, begin discussions (in approximately the above order) with departments whose approvals are required. Consider suggestions where possible, and negotiate the best alternatives.

↓

When the design is finalized, apply for final site plan approval from planning boards and councils.

↓

Obtain preliminary design approvals from Planning Board and councils.

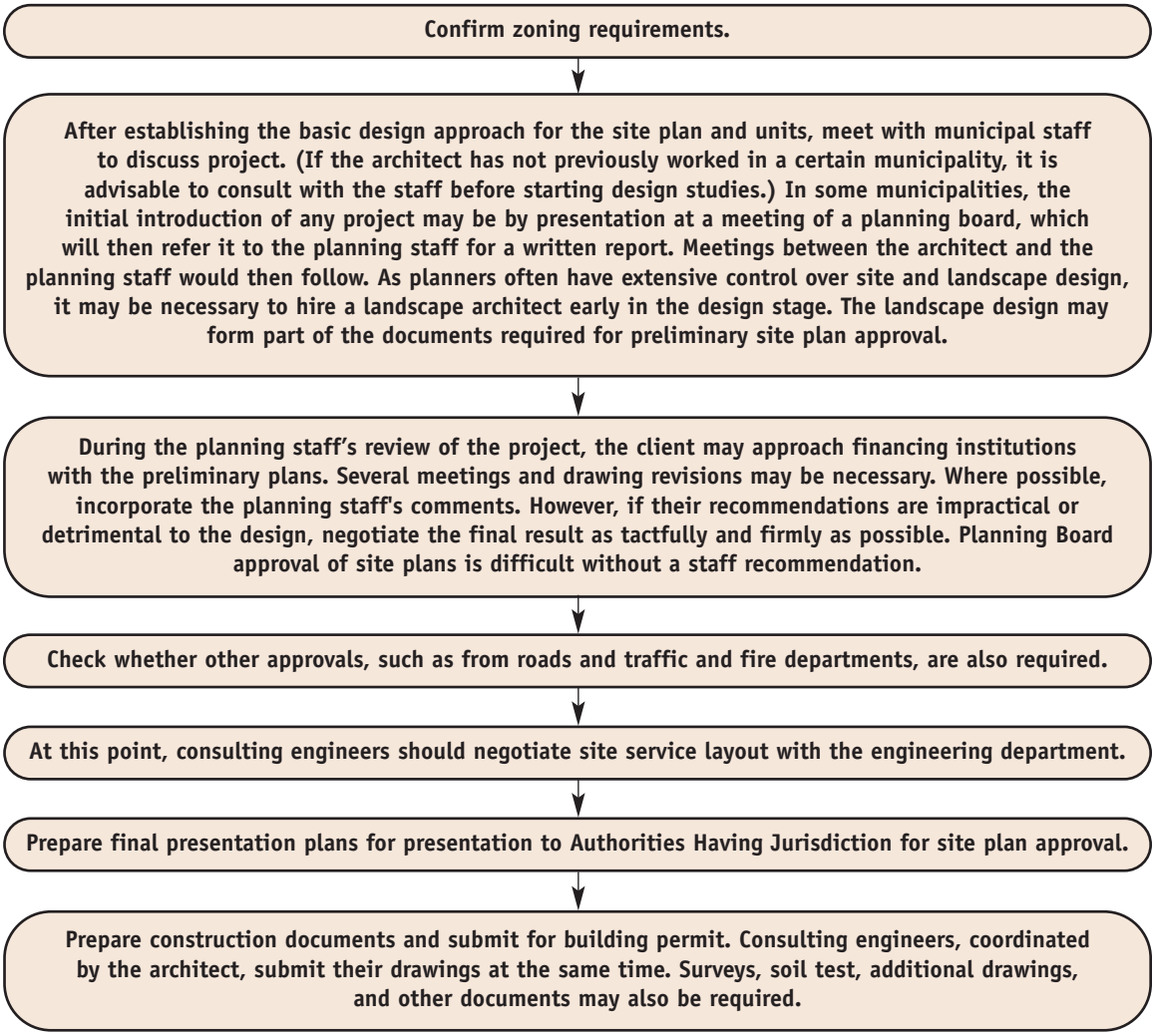
↓

When preliminary design approvals have been obtained, arrange meeting with the fire marshal, occupational health and safety inspector, and building department to ascertain fire safety and specific construction requirements.

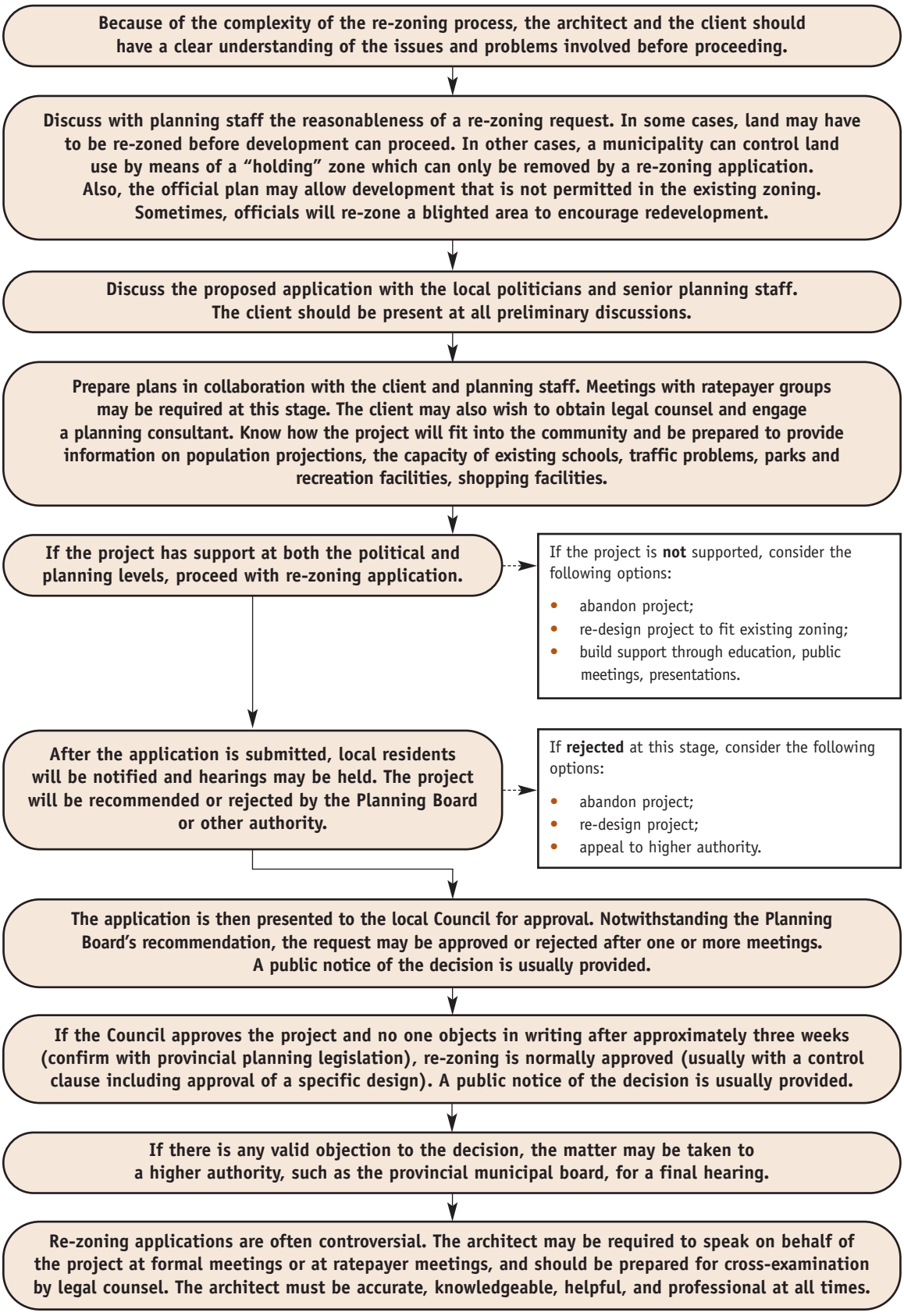
↓

Submit the completed construction documents to occupational health and safety inspector, if required, and to the building department for permit, together with site plans, surveys, and soil test reports that may be required.

Example 5. Town Housing Project in a Suburban Area:



Example 6. Application for Re-zoning:



Checklist: Federal Authorities Having Jurisdiction

The following is a list of the principal federal legislation and regulations.

Aeronautics Act:

The legislation authorizes the federal minister regulating transport to establish height, location, and building-use regulations in the vicinity of airports. It constitutes a zoning regulation and must be registered against the lands.

Canadian Environmental Assessment Act:

This legislation requires assessment and auditing of Crown land and federal property based on a wide range of environmental concerns.

Canada Marine Act:

This act establishes the Port Authorities which administer regulations for construction within a port. The Port Authority issues a permit for construction.

National Fire Code:

The Dominion Fire Commissioner has jurisdiction over all federal buildings constructed on any federal property in Canada, a responsibility similar to the provincial fire marshal and/or the local fire department.

Atomic Energy Control Act:

The federal government is the prime authority for ionizing radiation. Provincial officials authorized as inspectors under the Act may come from various provincial departments.

National Building Code:

The National Building Code is a model code which has no legal status unless adopted by a provincial or municipal authority. However, federal government buildings and other buildings which depend upon Canada Mortgage and Housing Corporation mortgage financing must comply with the code to qualify for financing.

Navigable Waters Protection Act:

This statute requires an approved application before any structure may be built in or over navigable waters.

National Parks Act:

This act and its subsidiary regulations govern buildings within federally owned parks.

Checklist: Provincial Authorities Having Jurisdiction

Each province has its own statutes and codes which, although titled differently, essentially govern the same matters. The following list is representative of areas regulated by legislation in most provinces. The architect should confirm the exact name and responsibility of the Authority Having Jurisdiction in the province.

Boilers and Pressure Vessels:

Although the *Boilers and Pressure Vessels Act* does not usually require permits, equipment must be inspected.

Building Construction:

In most provinces, provincial building codes have superseded all municipal building bylaws regulating construction of new buildings. Despite being provincial statutes, they are administered and enforced by the local municipality. Local building bylaws may apply to all existing buildings and to construction projects involving minor alterations to existing buildings. The provincial building codes may also include a requirement for professional design and field review of specified buildings.

Construction Safety:

Construction safety legislation governs the safety of workers during the construction, demolition or moving of buildings. The legislation stipulates the safety precautions that must be observed during construction and that may indirectly affect the contract documents.

Elevating Devices Construction:

Authorities responsible for elevators, hoists, and lifts provide for their inspection and for licences to operate them. Design and construction should be approved in advance by the appropriate provincial authority.

Environmental Protection:

Environmental authorities administer extensive regulations for the control of air pollution, toxic waste and other environmental requirements, and noise. They are administered by the appropriate provincial authority.

Fire Safety:

The provincial fire marshal and the local fire department have authority to inspect existing buildings, to order repairs and alterations, and to make regulations applicable to new buildings. Many municipalities withhold building permits for schools, hospitals, hotels, and buildings funded by the province, until plans are approved by the fire marshal. Fire safety requirements typically use the National Fire Code as a model.

Fire Safety for Hotels:

The provincial fire marshal may require that hotel plans be approved prior to construction.

Flammable Products:

Various provincial authorities administer regulations for service stations and for the storage and handling of flammable liquids and solids.

Float Homes:

In British Columbia, float homes must comply with provincial regulations.

Highway Improvement and Transportation:

The appropriate provincial authority controls/limits access to properties. Under the regulations, building permits are required to construct buildings or structures within a prescribed distance of a controlled access road. Projects within the specified distance require a municipal building permit, as well as approval from the appropriate provincial authority.

Home Owners Protection:

The provincial authority regulates residential builders and provides requirements for project warranties.

Hospitals:

The provincial hospital authorities require that all hospital plans be approved, which in turn requires approval of the provincial fire marshal. Approval by these two provincial authorities is usually required before the local municipality issues a building permit.

Liquor Licence:

The appropriate provincial authority must issue a licence, and approve the building plans, before an establishment is permitted to sell alcoholic beverages.

Public Health:

The local municipality, through a bylaw, regulates a wide range of public health concerns, including restaurants and food preparation establishments.

Theatres:

The appropriate provincial authority approves plans for all theatres before it issues a building permit.

Water Resources:

Authorities for water resources and conservation govern natural water courses and adjacent plumbing installations.

Workplace and Industrial Safety:

The appropriate provincial authority requires that plans for such buildings as industrial buildings, restaurants, office buildings, and arenas be approved prior to construction.

Checklist: Regional and Municipal Authorities Having Jurisdiction

Regional Government Authorities

In many areas, regional authorities have additional building permit requirements. Regional government authorities may require that the setback from the street line and points of ingress and egress for all buildings located on metropolitan roads be approved. In regional municipalities, the regional health unit must approve installation of septic tanks or similar sewage disposal units.

Municipal Authorities

The following is a partial list of areas regulated by municipal authorities:

Planning:
Development applications and sub-division agreements often require that the local or regional planning authority approves building and site plans before it issues a building permit.

Zoning:
Land use, bulk, height, location, and site density — which can significantly influence the architectural design of a building — are regulated by municipal authorities.

Building:
Municipal bylaws or provincial statutes containing all structural and fire safety requirements for new buildings are administered by the local municipality. Separate permits may be required for heating systems.

Plumbing:
All sanitary and plumbing installations must be in accordance with provincial regulations. The separate permit required for plumbing is usually obtained by the mechanical contractor.

Signs:
Signs and advertising devices require separate permits and must comply with applicable sign bylaws.

Swimming Pools:
Swimming pools and their protective enclosures must comply with municipal bylaws and usually require separate permits.

Public Health:
Building permits for all buildings and structures subject to public health legislation provisions are usually withheld until the plans are approved by the Public Health Authority. Included are food preparation and serving facilities and public swimming pools. Health department approval may also be required for installation of a septic tank or similar private sewage disposal system.

Public Works:
Building permits are normally withheld until the municipal public works departments are satisfied as to the availability of municipal services, and curb and sidewalk protection during construction, provision of drainage system for surface water, deposits for culverts and curb cuts, etc.

Fire Safety:
Many municipalities do not issue building permits until the local fire department has approved plans for compliance with the fire protection requirements of the building code.

Business Licences:
Local municipalities pass bylaws to license and regulate restaurants, public garages, dry-cleaning establishments, laundries, and pool halls. Each bylaw may contain regulations which affect building design or construction.

Electricity:
Electrical inspections are arranged through the local offices of the electrical authority. In addition, industrial safety officers, assistants to the fire marshal, and other inspection personnel look for electrical hazards. When a hazard is located, they may direct that corrective measures be taken to comply with the provincial electrical code, or they may request that the authority conduct a more complete inspection.

The electrical contractor may be required to submit documents to the local electrical power authority to obtain a separate electrical permit.

Municipal or Private Utilities and Services

The architect should check for the requirements of the following services:

- electricity;
- gas;
- sanitary sewer and storm drains;
- telephone;
- water;
- roads and highways;
- railways;
- cable TV.

Private Acts

Passed by the legislature, these acts give cities, private individuals or individual municipalities specific power to govern — which may not be applicable to the province as a whole.

For example, the City of Vancouver has a separate charter and sets its own building regulations and codes independently of the rest of the province.

Deed Restrictions

These require a deed check for possible easements, rights of way, air rights for telecommunications, and other similar development constraints or restrictive covenants.

Standards Organizations, Certification and Testing Agencies, and Trade Associations

Introduction

> *Standardization — the development and application of standards — brings people together to pursue better, safer and more efficient methods and products. Standardization is an essential element of technology, innovation and trade.*
> (The Standards Council of Canada)

Like other industries and professions, the construction industry has, over time, developed accepted practices, uniform technical requirements, and agreed-upon terminologies. This has been accomplished through the adoption of **standards**.

Standards are publications prepared by experts, frequently by consensus. Once a standard has been adopted, then manufacturers, suppliers, and **testing** agencies **certify** that a product or material meets the selected standard.

Other procedures and standards are developed and promoted by trade associations, which are organizations comprised of members of similar construction trades or manufacturers. Examples of trade associations include the Canadian Portland Cement Association (CPCA) and the Architectural Woodwork Manufacturers Association of Canada (AWMAC).

This chapter discusses the role of standards and standards organizations, certification and testing agencies, and trade associations in the construction industry.

Standards and Standards Organizations

Because of the increase in global trade and the requirements of certain trade agreements, Canada is under pressure to "harmonize" its standards with those of its trading partners and with other international standards. Harmonizing standards is difficult because the mandates of the various standards-writing organizations differ. For example, in one nation, the mandate for the development of a certain standard may be restricted to electrical safety, whereas in another country, it may include not only electrical safety but also operator safety, energy efficiency, and other requirements. For this reason, architects must review any changes in updated standards and not assume that the scope, details or minimum level of performance of a standard will be the same as in the previous version.

International Organization for Standardization (ISO)

The International Organization for Standardization, or ISO, is a non-governmental federation of national standards bodies from 130 different countries. ISO was created to facilitate the international coordination and unification of industrial standards. Its technical work is decentralized, involving some 2,850 technical committees, sub-committees, and working groups. ISO works with member countries to develop standards that will improve operating efficiencies and reduce trade barriers among nations. The results of this work are

international agreements, published as International Standards. ISO covers standardization in all fields except electrical and electronic engineering, which is the responsibility of the International Electrotechnical Commission (IEC).

Canadian Standards Organizations

Standards in Canada are written and promoted by many different organizations, including government, industry, trade, public interest groups, and professional organizations.

Funding for the development and maintenance of standards comes from a variety of sources, including:

- industry;
- government;
- membership fees;
- the sale of standards.

Standards Council of Canada (SCC)

The Standards Council of Canada (SCC) is a federal Crown corporation with the mandate to promote efficient and effective standardization. The SCC coordinates and oversees voluntary standards development, promotion, and implementation in Canada through the National Standards System. It also coordinates Canada's participation in international standardization through the IEC and ISO.

The SCC has accredited approximately 250 organizations. Some of these develop standards; others are conformity assessment bodies or certification agencies, which determine the compliance of products or services to the requirements of a standard. The list of accredited organizations includes:

- standards development organizations;
- certification agencies;
- testing and calibration laboratories;
- quality management systems (QMS) registration organizations that perform registrations to the ISO 9000 series standards;
- environmental management systems (EMS) registration organizations that perform registrations to the ISO 14000 series standards;
- certifiers and trainers who certify and train QMS and EMS auditors.

Standards and the Architect

Standards developed by non-government organizations in Canada have no force in law unless they are referenced in legislation. Many of the standards encountered by architects are referenced in:

- national building and fire codes;
- provincial building codes;
- occupational health and safety acts.

Even if a standard is not required by legislation, it cannot be ignored. Some standards carry weight in the marketplace because an industry or trade association promotes them and enforces compliance by its members. Other standards ensure that products specified by architects are of a known quality.

Architects must be familiar with current standards when preparing specifications. Refer also to Chapter 2.3.8, *Construction Documents — Specifications*.

Standards cannot be static, because they must respond to:

- changes in industrial processes;
- the introduction of new techniques or materials;
- new safety or environmental priorities.

Feedback about current standards may lead to their withdrawal or revision or to the development of new ones. A standard may be withdrawn because:

- it is no longer needed;
- no one wants to fund its maintenance any longer;
- it is cheaper to adopt a standard developed elsewhere.

Many standards are reviewed on a regular cycle such as every five years. The schedule for updating standards and for revising legislation which references standards (for example, building codes, electrical codes) may bear no relation to one another. As a result, the latest standard is not necessarily the version referenced by regulations or codes.

Refer to the "List: Standards Organizations" at the end of this chapter for various standards-writing organizations.

Certification and Testing Agencies

A standard is not useful unless compliance with its requirements can be verified. Certification is the confirmation, usually by an independent organization, that a product or service meets a requirement. Certification of a product, process or system may involve:

- physical examination;
- testing;
- plant examination;
- unannounced follow-up inspections of a manufacturing site or service provider.

This procedure leads to the issuing of a formal assurance or declaration — by means of a seal, label, trademark or certificate — that the product, process or system fully conforms with the requirements of the standard. Certification indicates that a product or system has been evaluated under a formal process and that the product complies with all applicable standards.

In the past, a third party was used to certify and test for conformance to most standards. Recently, there has been a shift from third-party certification to self-certification in order to reduce the costs and the time involved in obtaining certification. Permission to self-certify is only granted after a manufacturer or service provider has implemented quality assurance procedures and submitted to examination and testing by a recognized authority.

Refer to the "List: Certification and Testing Agencies" at the end of this chapter.

Refer also to Chapter 2.1.8, *Quality Management*.

Trade Associations

The construction industry has many trade associations whose purposes include:

- promoting their industry or sector;
- developing good practices and standards for their trade or product;
- conducting research and development within the specific field of the trade associations;
- publishing and distributing information, guides, and manuals to members and others;
- lobbying government and others regarding issues specific to the trade or product.

Although trade associations vary in size and sophistication, many conduct research and prepare standards. The architect should be aware of these standards. The research on products, materials, and procedures can contribute to the design process, and many trade association standards should be referenced in project specifications.

Refer to the "List: Trade Associations" at the end of this chapter.

Definitions

Certification: The verification that a product or procedure meets a specific standard; the certification may be in the form of a certificate, seal or permission to use a trademark from an Authority Having Jurisdiction.

Standard: A publication which describes recognized or approved procedures, practices, technical requirements, and terminologies.

References

The American Institute of Architects (AIA). *An Architect's Guide to Building Codes & Standards*. Second edition. Washington, D.C.: The AIA Press, 1990.

American National Standards Institute (ANSI). *ANSI Standards Catalogue*. New York, NY: ANSI.

American Society for Testing and Materials (ASTM). *ASTM Standards Catalogue*. West Conshohocken, PA: ASTM.

Association of Architects in Private Practice of Quebec (AAPPQ). *CNC*: *Compendium de normes de la construction*. Montréal, QC: AAPPQ, 1990.

Associations Canada. *Associations Canada: The Directory of Associations in Canada*. Published annually. Toronto, Ont.

Canada. National Research Council of Canada. *Registry of Product Evaluations*. Ottawa, Ont.: Institute for Research in Construction, Winter 1995-1996.

Canadian Commission on Building and Fire Codes (CCBFC). National Research Council of Canada. *National Building Code of Canada*. Ottawa, Ont.: CCBFC, January 1994.

Canadian Standards Association (CSA). *Construction Plus: A Guide to CSA Construction Standards*. Third edition. Toronto, Ont.: CSA, 1993.

Hewett, Robert A. and Gordon L. Walt. *Canada's Framework for the Regulation and Design of Buildings*. *Building Science Insight*. Ottawa, Ont.: National Research Council, 1992.

International Conference of Building Officials (ICBO). *Uniform Building Code Book of Standards*. Whittier, CA: ICBO.

National Fire Protection Association (NFPA). Quincy, MA.

NFPA Codes and Standards Catalogue.

Life Safety Code (NFPA 101).

Southern Building Code Congress International (SBCCI). *Standards Building Code Book of Standards*. Birmingham, AL: SBCCI.

List: Standards Organizations

International Standardization Organizations

IEC International Electrotechnical Commission
3, rue de Varembé
Case postale 131
CH - 1211 Genève 20
Switzerland
www.iec.ch

The IEC is a worldwide body representing 47 member countries focusing on the international harmonization of standards for electrical, electronic, and telecommunications products and systems. The IEC's work includes standardizing the symbols used on building construction and engineering drawings.

ISO International Organization for Standardization
1, rue de Varembé
Case postale 56
CH - 1211 Genève 20
Switzerland
www.iso.ch

Refer also to the section on ISO in this chapter.

Canadian Standardization and Standards-writing Organizations

SCC Standards Council of Canada
45 O'Connor Street, Suite 1200
Ottawa, Ontario K1P 6N7
www.scc.ca

Refer to the section on the SCC in this chapter.

AECB Atomic Energy Control Board
6711 Mississauga Road
Streetsville, Ontario L5N 2W3

The AECB is a Crown agency, authorized to regulate and control atomic energy materials, equipment, and information in the interest of safety, physical welfare, and national and international security. The AECB also promotes research.

CCBFC Canadian Commission on Building and Fire Codes
1500 Montreal Road
Ottawa, Ontario K1A 0R6
www.ccbfc.org

Under the auspices of the National Research Council, the CCBFC produces the National Building Code (NBC), the National Fire Code (NFC), the Canadian Plumbing Code (CPC), the Canadian Farm Building Code (CFBC), and the Canadian Housing Code (CHC).

CGA Canadian Gas Association
243 Consumers Road, # 1200
Toronto, Ontario M2J 5E3
www.cga.ca

CGSB Canadian General Standards Board [SCC accredited]
Place du Portage Phase III, 6B1
11 Laurier Street
Hull, Québec K1A 1G6
www.pwgsc.gc.ca/cgsb

The CGSB, a part of Public Works and Government Services Canada, is mandated to provide standardization and conformity assessment services in support of government purchasing and other requirements. The CGSB is the only accredited federal government standards-development body in Canada.

The CGSB's services include:

- publication of approximately 1,600 standards, specifications, manuals, and guides in both English and French;
- listings of pre-qualified products and services;
- ISO 9000 conformity assessment services;
- accredited ISO 9000 quality system registration services;
- accredited ISO 14000 environmental management systems services.

CSA Canadian Standards Association
(CSA International)
[SCC accredited]
178 Rexdale Boulevard
Etobicoke, Ontario M9W 1R3
www.csa.ca

The CSA is an independent, not-for-profit organization in Canada, the United States, and around the world. CSA standards are available in book form, disk, or on the new CD-ROM CSA Standards Browser. The Standards Browser lets architects quickly examine the scope of a variety of standards. The CSA also offers seminars, guidelines, user guides, and handbooks.

The CSA develops standards in the following areas of interest to architects:

- **Business/Management Systems**
- **Communications/Information**
- **Construction:** Building Materials and Products; Concrete; Masonry; Forest Products; Plumbing Products and Materials; Industrialized Building Construction; Structures (Design)
- **Electrical and Electronics:** Canadian Electrical Code Part I; Canadian Electrical Code Part II, Wiring Products, Industrial Products, Consumer and Commercial Products; Canadian Electrical Code Part III, Electrical Engineering Standards, Performance of Electrical Products
- **Energy:** Renewable Energy; Energy Conservation in Housing; Fire Safety and Fuel Burning Equipment
- **Environment:** Environmental Technology; Environmental Management Systems
- **Gas Equipment:** Food Processing and Food Refrigeration; Gas-Fired Domestic and Commercial Heating Equipment and Air Conditioning; Large Input Commercial and Industrial Equipment; Domestic and Commercial Water Heaters and Boilers; Incineration and Accessories; Laundry Equipment; Manual Valves, Hose, Couplings, and Assemblies
- **Life Sciences:** Health Care Technology; Public Safety; Occupational Health and Safety
- **Materials Technology:** Welding, Metals, and Metal Products
- **Transportation/Distribution:** Materials Handling and Logistics; Oil and Gas Systems and Materials

ULC Underwriters' Laboratories of Canada
[SCC accredited]
7 Crouse Road
Scarborough, Ontario M1R 3A9
www.ulc.ca

The ULC develops standards in the following areas of interest to architects:

- Automotive Equipment
- Building Construction Materials
- Burglar Alarm Equipment and Systems
- Factory-Built Fireplaces, Chimneys, and Vents
- Fire Alarm Equipment and Systems
- Fire Extinguishers, Extinguishing Systems, and Fire Extinguishing Media
- Fire Fighting Apparatus and Equipment
- Fire Protection Equipment
- Fittings and Associated Equipment for Flammable Fuels
- Fittings and Associated Equipment for Gases
- Kitchen Exhaust Equipment
- Physical Security Equipment
- Tanks and Associated Equipment
- Thermal Insulation

WHMIS Workplace Hazardous Materials Information System (Product Safety Branch, Consumer and Corporate Affairs, Government of Canada)

North American Standardization and Standards-writing Organizations

ANSI American National Standards Institute
11 West 42nd Street
New York, New York
USA 10036
www.ansi.org

ANSI — a private, not-for-profit membership organization — is the administrator and coordinator of the U.S. private-sector voluntary standardization system. ANSI does not itself develop American National Standards (ANSs). ANSI has accredited more than 175 distinct entities to develop standards.

ASHRAE American Society of Heating, Refrigerating, and Air Conditioning Engineers
1791 Tullie Circle N.E.
Atlanta, Georgia
USA 30329-2035
www.ashrae.org

ASHRAE's purpose is to advance the arts and sciences of heating, ventilation, air conditioning, and refrigeration through research, standards writing, continuing education, and publications. ASHRAE writes standards that set uniform methods of testing and rating equipment and establish accepted practices for the industry worldwide, such as the design of energy-efficient buildings. ASHRAE's research program investigates numerous issues, such as identifying new refrigerants that are environmentally safe.

ASME American Society of Mechanical Engineers, Inc.
Three Park Avenue
New York, New York
USA 10016-5990
www.asme.org

ASME International maintains and distributes 600 codes and standards for the design, manufacturing, and installation of mechanical devices. The standards are used in more than 90 countries throughout the world. ASME also publishes technical journals, books, and reports on mechanical engineering.

ASTM American Society for Testing and Materials
100 Barr Harbor Drive
West Conshohocken, Pennsylvania
USA 19428-2959
www.astm.org

Organized in 1898, the ASTM is a not-for-profit organization that publishes standard test methods, specifications, practices, guides, classifications, and terminology. The ASTM's standards development activities encompass metals, paints, plastics, textiles, petroleum, construction, energy, the environment, and many other areas. The ASTM has developed more than 10,000 technical standards, which are published each year in the 72 volumes of the *Annual Book of ASTM Standards*.

AWPA American Wire Producers Association
515 King Street, Suite 420
Alexandria, Virginia
USA 22314
www.awpa.org

The AWPA is an international trade association for the ferrous wire and wire products industry in North America.

EPA Environmental Protection Agency
401 M Street, SW
Washington, D.C.
USA 20460
www.epa.gov

The EPA is a U.S. government agency mandated to protect human health and to safeguard the natural environment.

NBS National Bureau of Standards [now known as the National Institute of Standards and Technology (NIST)]
See NIST listing.

NFPA National Fire Protection Agency
1 Batterymarch Park
Quincy, Maryland
USA 02269-9101
www.nfpa.org

The NFPA's technical committees develop more than 300 codes and standards known collectively as the *National Fire Codes*. NFPA codes and standards are available as the 12-volume *National Fire Codes*, as more than 300 individual documents, or on disk.

NFPA periodicals supplement the *Fire Protection Handbook* with current information. *Fire Technology* provides reports on current research in the technical aspects of fire protection. The NFPA established the not-for-profit National Fire Protection Research Foundation to research fire risk assessment as well as new technologies and strategies.

Commonly used NFPA codes and standards include the following:

- *National Electrical Code* (NFPA 70);
- *Life Safety Code* (NFPA 101);
- *Flammable and Combustible Liquids Code* (NFPA 30);
- *Standard for the Installation of Sprinkler Systems* (NFPA 13);
- *Standard for the Storage and Handling of Liquefied Petroleum Gases* (NFPA 58);
- *Standard for Health Care Facilities* (NFPA 99).

NIST National Institute of
Standards and Technology
A903 Administration Building
Gaithersburg, Maryland
USA 20899-0001
www.nist.gov

Formerly known as the National Bureau of Standards, NIST is an agency of the U.S. Department of Commerce's Technology Administration and was established to advance measurement science and develop standards.

SMACNA Sheet Metal and Air Conditioning
Contractors' National Association
4201 Lafayette Center Drive
Chantilly, Virginia
USA 20151-1209
www.smacna.org

SMACNA is an international association of union contractors with chapters throughout the United States, Canada, Australia, Japan, and Brazil. SMACNA develops technical standards and manuals for all facets of the sheet metal industry, including duct construction and installation, air pollution control, energy recovery, and roofing. SMACNA's Technical Resources Department answers technical questions from architects and others.

List: Certification and Testing Agencies

This is a partial list of various certification and testing agencies in Canada. Some of these organizations also prepare standards.

BNQ	Bureau de normalisation du Québec
CLAS	Calibration Laboratory Assessment Service/NRC
CAEAL	Canadian Association for Environmental Analytical Laboratories Inc.
CGA	Canadian Gas Association
CLSAB	Canadian Lumber Standards Accreditation Board
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
COFI	Council of Forest Industries
ITS	Intertek Testing Services
KPMG	KPMG Quality Registrar Inc.
NLGA	National Lumber Grades Authority
QMI	Quality Management Institute, a division of CSA
QUASAR	Quality Systems Assessment Registrar
SGS	SGS International Certification Services Canada Inc.
ULC	Underwriters' Laboratories of Canada
UL	Underwriters Laboratories (U.S.)
WHPS	Warnock Hersey Professional Services

List: Trade Associations

This is a partial list of trade associations organized by the MasterFormat™ divisions. The list includes Canadian and U.S. references. The contact information can be found through a search on the Internet or in the following sources:

- **National Master Specification (NMS) — Division 1, Section 01420, References;**
- **Associations Canada — *The Directory of Associations in Canada*.**

Division 2

AWWA	American Water Works Association
ASPT	Association of Asphalt Paving Technologists

Division 3

ACI	American Concrete Institute
ACPA	American Concrete Pavement Association
ACPA	American Concrete Pipe Association
CPCA	Canadian Portland Cement Association
CRSI	Concrete Reinforcing Steel Institute
NPCA	National Precast Concrete Association
PCI	Precast/Prestressed Concrete Institute

Division 4

BIA	Brick Industry Association
BSI	Building Stone Institute
CMCA	Canadian Masonry Contractors Association
CBAC	Clay Brick Association of Canada
NCMA	National Concrete Masonry Association

Division 5

AA	Aluminum Association
AWS	American Welding Society
AWPA	American Wire Producer's Association
AMA	Architectural Metals Association
CCBDA	Canadian Copper and Brass Development Association
CISC	Canadian Institute of Steel Construction
CSSBI	Canadian Sheet Steel Building Institute
NAAMM	National Association of Architectural Metal Manufacturers

Division 6

AHA	American Hardboard Association
AITC	American Institute of Timber Construction
AWPA	American Wood-Preservers Association
AWMAC	Architectural Woodwork Manufacturers Association of Canada
CITC	Canadian Institute of Timber Construction
CLA	Canadian Lumbermen's Association
CPI	Canadian Plastics Institute
CWC	Canadian Wood Council
FPS	Forest Product Society
FCC	Forintek Canada Corporation
HI	Hardwood Institute
NHLA	National Hardwood Lumber Association
TPIC	Truss Plate Institute of Canada
WCLIB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association

Division 7

AI	Asbestos Institute
CRCA	Canadian Roofing Contractors' Association
EIMA	EIFS Industry Manufacturer's Association
TIAC	Thermal Insulation Association of Canada

Division 8

AAMA	American Architectural Manufacturers Association
AGMCA	Architectural Glass and Metal Contractors Association
CSDFMA	Canadian Steel Door and Frame Manufacturing Association
FGMA	Flat Glass Manufacturers Association
LSGA	Laminators Safety Glass Association
WDMA	Windows & Door Manufacturers Association

Division 9

AWCI	Association of Wall and Ceiling Industries International
CCI	Canadian Carpet Institute
CPMA	Canadian Paint Manufacturers Association
CTCA	Ceramic Tile Contractors Association
NFCA	National Floor Covering Association
TTMAC	Terrazzo, Tile and Marble Association of Canada
WACCA	Walls and Ceilings Contractors Association

Division 15

ARI	Air Conditioning and Refrigeration Institute
AMCA	Air Movement and Control Association Inc.
API	American Petroleum Institute
CGA	Canadian Gas Association
FMEC	Factory Mutual Engineering Corporation
HRAI	Heating, Refrigerating and Air Conditioning Institute of Canada
——	Hydronics Institute
MECAC	Mechanical Contractors Association of Canada
SMACNA	Sheet Metal and Air Conditioning Contractors National Association

Division 16

CASA	Canadian Alarm and Security Association
CECA	Canadian Electrical Contractors Association
CEMA	Canadian Electrical Manufacturer's Association
EEMAC	Electrical and Electronic Manufacturers' Association
IEEE	Institute of Electrical and Electronics Engineers
MSS	Manufacturers' Standardization Society of Valve and Fittings Industry
NEMA	National Electrical Manufacturers Association

Organization of an Architectural Practice

Introduction

Architects decide to set up their own practices for many different reasons. Some of these include:

- the desire to control one's own professional destiny;
- the wish to specialize in a certain field of architecture or market niche;
- an offer to form a partnership or to purchase shares from an established firm or colleague;
- the award of a significant commission, either through a competition or from a business associate;
- layoff from an architectural firm;
- the desire to exercise leadership;
- the desire to increase income.

Anyone considering such a change should be aware from the outset that establishing an architectural practice has serious implications for one's personal, professional, and business life. The individual should carefully weigh all the implications before embarking on this course.

Establishing and maintaining an architectural practice demands certain skills. One must be able to:

- market one's services and get work;
- negotiate terms and compensation in client-architect agreements;
- hire and manage qualified staff;
- perform the full range of architectural services efficiently and effectively;
- work with engineers and other consultants;
- work with the construction industry and administer contracts;
- operate profitably and provide stability to the practice.

The first key steps in launching a practice are to assess one's own abilities, set long-term goals, and develop a strategic plan.

Strategic Planning

A strategic plan is a document that charts a course for the development of an architectural practice in clear, simple terms. It should identify the following:

- the architectural practice's unique offerings in the marketplace;
- a vision for the future of the practice;
- measurable goals or milestones.

Typically, a strategic plan would encompass a time frame of five years. The plan should address the following issues:

- the *goals* of the architectural practice;
- a *service* plan for providing architectural services to clients;
- a *financial* or *business* plan;
- a *human resources* plan for staff and principals;
- a *public relations* and *marketing* plan;
- a *succession* plan.

These various topics are discussed elsewhere in this section 2.1, *Management of the Practice*. Strategic Planning is a process which should be updated annually. Strategic plans usually assess:

- strengths;
- weaknesses;
- opportunities;
- threats.

Styles of Architectural Practices

Many organizations develop a mission statement which helps to ensure that all members of the organization focus on the goals established in the strategic plan.

The mission statement should define the style of practice, to a certain extent. A particular style might emphasize one or more of the following:

Design
Many architectural practices, in their strategic plans and marketing efforts, choose to emphasize design, or design excellence, or their own unique design style. Architects are particularly well-trained for this kind of practice.

Innovation
Training in problem-solving and in technology qualifies many architects to establish practices which specialize in or emphasize innovation. This may mean innovation in aesthetics or in scientific or technical solutions.

Production
Many practices, especially some larger firms, distinguish themselves by offering the rapid and efficient production of construction documents and the ability to process large projects.

Service to the Client
Some architectural practices make service the top priority. They stress the importance of working closely with the client, responding to the client's business agenda, and managing information in support of the client.

Construction Administration Services
Some architectural practices elect to specialize in services related to construction. These firms may provide full construction management or project management services.

Client Base

An architect can attract clients and expand the practice's client base in a number of ways, including:

- specializing in a field of expertise or in a particular building type;
- developing new markets;
- providing pre-design or post-construction services to encompass the life of a facility;
- expanding the geographic base of the practice.

Refer to Chapter 2.1.3, *Public Relations and Marketing,* for information on marketing architectural services.

Types of Ownership of an Architectural Practice

Architectural practices are structured according to size and complexity. Frequently, a practice will start as a simple entity, such as a sole proprietorship, and evolve into a more complex legal structure, such as a corporation or a partnership of corporations. Several factors affect the type of ownership, including relationships with professional colleagues, tax implications, and exposure of personal assets. Architects should seek the advice of a lawyer and an accountant before structuring a practice.

Agreements

All business relationships should be based on a written agreement. Business partners should share certain values and financial goals, and architects are no exception. For partners or shareholders, a well-structured agreement provides a vehicle to deal with expansion, difficulties, and disagreements, as well as with disasters. Obtaining professional advice from a lawyer and an accountant in preparing an agreement which outlines the ownership of an architectural practice is essential.

The structure of the practice must comply with the various architects acts and regulations of the provincial associations of architects as well as with other business regulations.

Refer to the "Charts: Comparison of Practice Requirements of Each Provincial Association" in Chapter 1.1.4, *The Organization of the Profession in Canada*.

Sole Proprietorships

A sole proprietor is a single, unincorporated owner of an architectural practice. This architect has full personal control over all aspects of the practice. A sole proprietor can range from someone with a small, home-based office practice to an architect who employs many professionals and para-professionals. Most architectural practices in Canada are sole proprietorships.

Partnerships

A partnership is comprised of two or more partners. Most provincial associations impose restrictions on whom an architect may form a partnership with.

Refer to "Comparison of Provincial Requirements regarding Partnerships" in Chapter 1.1.4, *The Organization of the Profession in Canada*.

A partnership may include "associates"; however, only the partners bear personal responsibility for the control and liabilities of the practice. Each partner is both jointly and severally liable for the partnership's full obligations. Because a partnership is a more complex form of ownership, its terms should be spelled out in a partnership agreement. For items to include in a partnership agreement, refer to "Checklist: Issues to Consider for Partnership Agreements" at the end of this chapter.

Corporations

A corporation is a legal, collective entity authorized by statute to act as an individual business unit. Most provincial associations of architects have regulations which restrict the share ownership and the qualifications of directors of architectural corporations.

In Québec, a company cannot practise architecture; only individuals, partnerships or consortia can practise architecture. However, an architect may provide professional services through a company in which he or she is a majority shareholder. Furthermore, an architect cannot practise in any type of arrangement with non-architects such as engineers, urban planners, interior designers. However, these other individuals may be minority shareholders in a company of which one or more architects are majority shareholders.

Refer to "Comparison of Provincial Requirements regarding the Ownership and Structure of Corporations which Practise Architecture" in Chapter 1.1.4, *The Organization of the Profession in Canada*.

Incorporating a practice is done for a variety of reasons. The issues should be reviewed with a lawyer and an accountant before forming a corporation and entering into a shareholders' agreement. For items to include in a shareholders' agreement, refer to "Checklist: Issues to Consider for a Shareholders' Agreement for Architectural Corporations" at the end of this chapter.

Partnership of Corporations

A partnership of corporations is an architectural practice formed to preserve the individual identities of two or more corporations. There are a variety of reasons for creating this form of business entity. Such an entity:

- enables individual architects who are incorporated for business or tax reasons to practise with both the advantages of a partnership and the advantages of their corporation;
- allows two or more corporate practices to retain separate identities for certain types of projects but join forces for other types of projects;
- allows the bringing together of complementary but differing interests and ownership — for example, one corporation may focus on architectural services, while the other is a corporation providing support through drafting services, equipment, and real estate and other chattels.

Joint Ventures

Joint ventures are usually formed to create one architectural entity for the purpose of a single specific project. Frequently, a joint venture is set up to provide complementary services for a particular project — for example, a practice specializing in hospital work may need to team up with a firm located near the project site to provide contract administration services, especially field review.

Joint venture projects may require special liability insurance, often on a single project basis, to protect the parties forming the joint venture. Architectural practices should clearly define — in writing — their share of the services and fees before entering into a joint venture. Some provincial associations regulate joint ventures and their names.

Multi-disciplinary Firms

Multi-disciplinary firms are professional companies which include architects and other professionals, usually engineers. Such firms may also include urban planners, landscape architects, interior designers, and other consultants. Any multi-disciplinary firm must comply with the requirements of the provincial associations of architects in order to practise architecture. It can sometimes be beneficial to have all disciplines on a building project readily available in-house. Such an arrangement can simplify communication among, and coordination of, the various disciplines.

Foreign Firms

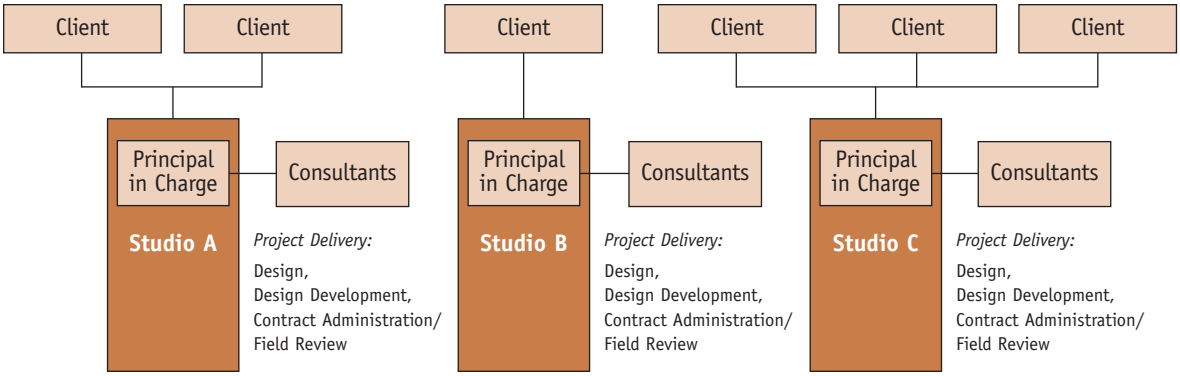
Recently, certain architectural firms from the United States have established branch offices in Canada. The structure of the foreign firm and its ownership must nevertheless comply with the requirements of the provincial association of architects. Several Canadian firms have established branch offices in the United States or overseas to better serve foreign clients or Canadian clients with foreign projects.

Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for a discussion of the risks in foreign jurisdictions.

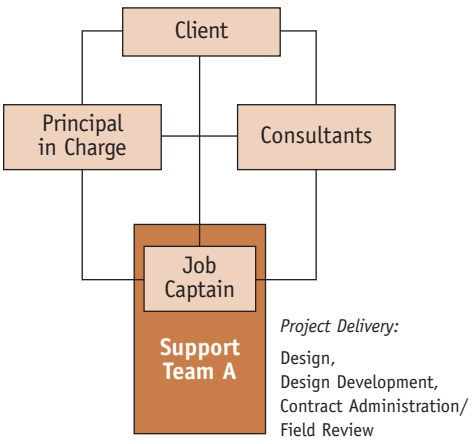
Internal Structure of an Architectural Practice

Once a firm is established and grows, it requires an internal structure and mechanism for delivering architectural services. The structure of the practice depends on its leadership and its values and culture, and on the needs of the project.

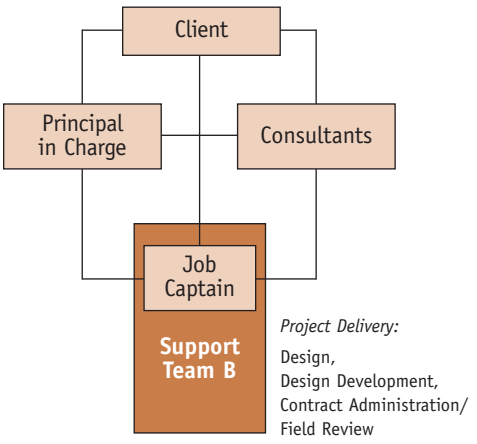
Illustration 1: Design Teams or In-house Studios



Project A



Project B



There are several models:

- design teams or in-house studios (see Illustration 1);
- departments (see Illustration 2);
- any combination of the above.

Design Teams or In-house Studios

A design team is usually assembled for a specific project, drawing on the skills of personnel in the office. The team leader, typically a project architect, coordinates and manages the team and deals with the client, sometimes together with the "principal in charge." Occasionally, some architectural practices establish permanent studios which remain together as efficient working teams for an indefinite period of time.

Departments

Some larger architectural practices sub-divide staff into groups or departments. Usually each department is responsible for a different phase of the project, such as:

- marketing;
- design and design development;
- construction documents;
- contract administration.

Sometimes, a project architect or senior employee (often called a project manager) is responsible for ensuring proper coordination when the project passes from one department to the next.

Other Combinations

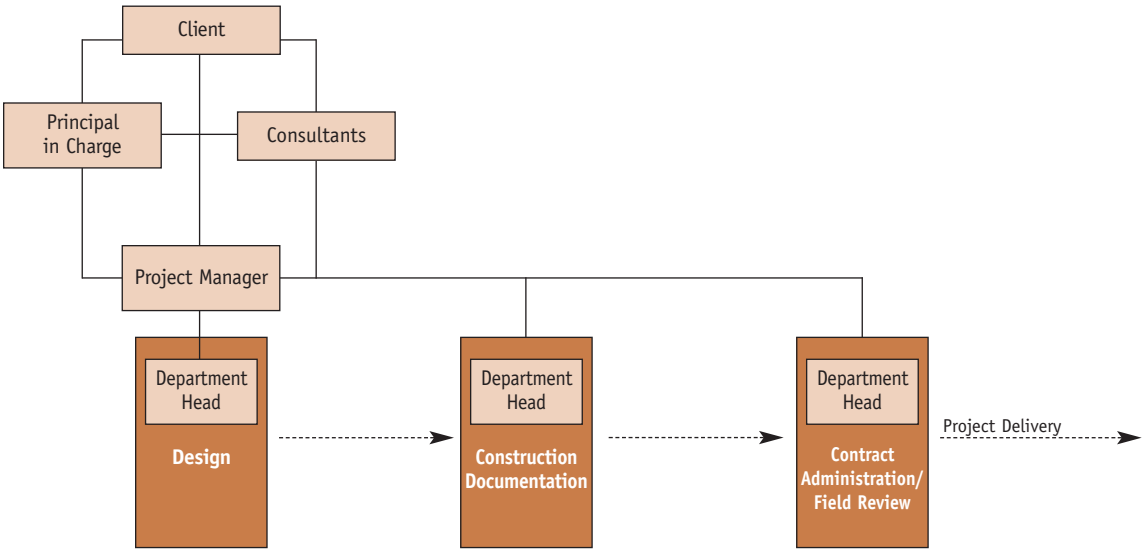
It is possible to create various combinations of design teams, permanent studios, and departments with or without project managers.

Other Professional Services

Several professional services are required to support an architectural practice. These include:

- legal;
- accounting and tax planning;
- investment and retirement planning;
- insurance.

Illustration 2: Departments Within an Architectural Practice



Legal

Establishing a professional relationship with a lawyer is important for the architect. Legal services may be required for the following:

- establishing a partnership or corporation;
- preparing annual minutes for the corporation;
- entering a lease or purchasing office property;
- preparing certain employment agreements with staff;
- reviewing professional liability insurance options and claims;
- reviewing non-standard client-architect agreements or amendments to standard agreements;
- reviewing non-standard owner-contractor agreements or amendments to standard agreements (on behalf of the client);
- assisting in the collection of accounts which are in dispute;
- handling other disputes or legal issues (such as filing and processing liens and legal hypothecs; human resources problems).

It may be necessary to establish a relationship with a number of different lawyers who have expertise in specific fields of practice; or, alternatively, with a larger firm of lawyers that has a range of in-house expertise.

Accounting and Tax Planning

It is also necessary to establish a relationship with an accountant. Accounting services may be required for the following:

- establishing a practice, whether a sole proprietorship, partnership or corporation;
- establishing financial terms of a partnership or shareholders' agreement;
- preparing a financial or business plan;
- preparing periodic balance sheets and profit/loss positions;
- preparing annual financial statements;
- preparing personal and corporate income tax returns;
- assisting in the preparation of sales and value-added tax returns;
- assisting a lawyer in the preparation of a corporation's annual minutes;
- analyzing the financial position of the practice;
- providing tax planning advice.

Some larger architectural practices employ a comptroller, usually an accounting professional, who directs and monitors the day-to-day financial operations of the practice. It may still be required to engage an accountant to provide tax planning advice and ongoing advice on the financial position of the firm, as well as annual financial statements and, if required, audited statements.

Refer also to Chapter 2.1.4, *Financial Management*, for other issues to discuss with an accountant and for an overview of the financial operations of an architectural practice.

Investment and Retirement Planning

All architects should plan for retirement and therefore seek the advice of a financial investment professional to ensure proper planning for retirement.

Refer also to Chapter 2.1.2, *Succession Planning*, for other considerations related to retirement planning.

Insurance

An architectural practice will have a variety of insurance requirements. Some of these include:

- Medical and Dental:
  - extended medical care
  - dental care
  - vision care
- Workers Compensation
- Disability Insurance, to cover:
  - office overhead
  - loss of business
  - personal income (income protection)
- Life and Accident Insurance:
  - personal
  - business partners and directors
- Professional Liability Insurance:
  - general coverage
  - special project coverage
  - add-on insurance or "excess" coverage
- Office Premises and Automobiles:
  - theft and vandalism
  - accident
  - fire and other damage
  - owned and leased vehicles

To ensure that the practice is properly and adequately covered, consult an independent risk management advisor and an experienced insurance agent.

A few provincial associations of architects have established liaisons with certain insurance underwriters who provide discounted premiums to architects. Professional liability insurance is a specialized type of insurance provided by a limited number of insurance underwriters and also by the Ontario Association of Architects Indemnity Plan for Certificate of Practice Holders of the OAA and by the Fonds d'assurance de la responsabilité professionnelle de l'Ordre des architectes du Québec for members of the OAQ.

Office Policies and Administration

Providing good service to the public requires that an architectural practice be well-organized and well-managed. Refer to Chapter 2.1.5, *Office Administration*, for information on the day-to-day management of the practice and for "Checklist: Information to include in a Manual on Office Policies and Procedures."

Definitions

Corporation: A legal collective entity which acts as an individual business unit requiring a legal instrument to create the entity as a commercial corporation.

Joint Venture: A defined business relationship between two or more architectural practices for a limited purpose or objective, without some of the inherent duties and responsibilities of a partnership.

Partnership: An unincorporated relationship between architects (or other professionals as may be permitted by provincial requirements) for carrying on business in common.

Sole Proprietorship: An architectural practice owned and controlled exclusively by one person.

References

Cramer, James P. *Design + Enterprise: Seeking a new reality in architecture*. Washington, D.C.: The American Institute of Architects Press, 1994.

Cuff, Dana. "Professions and Professional Life." *The Architect's Handbook of Professional Practice*. Washington, D.C.: The American Institute of Architects Press, 1994.

Harris, H.M., Jr. *Superior Performance for Design Professionals: The Application of Strategic Planning to Management of the Firm*. Washington, D.C.: American Consulting Engineers Council, 1996.

Pressman, Andy. *Professional Practice 101: A Compendium of Business and Management Strategies in Architecture*. Toronto, Ont.: John Wiley & Sons, 1997.

Stasiowski, Frank A. *Strategic Planning: Preparing Your Firm for Success in the Future*. Newton, MA: PSMJ Resources, Inc., 1997.

Checklist: Issues to Consider for Partnership Agreements

Establishment of the Partnership
- ❑ Identification of Partners
- ❑ Partnership Name and Trademark or Logo
- ❑ Registration of Partnership under Partnerships Registration Acts
- ❑ Right to Use Former Partner's Name(s)
- ❑ Place of Business
- ❑ Description of Architectural Practice

Term and Termination
- ❑ Commencement Date
- ❑ Termination or Dissolution
- ❑ Liquidation or Distribution of Assets
- ❑ Ownership of Clients

Disposition of Partnership Interests
- ❑ Admission of New Partners
- ❑ Retirement, Bankruptcy, Prolonged Illness or Death of Partner
- ❑ Sale of Partnership Interest To Third Party
- ❑ Valuation of Partnership Interest
- ❑ Prohibition of Assignment or Encumbrance of Partnership Interest
- ❑ Expulsion of Partner
- ❑ Grounds for Dissolution of Partnership
- ❑ Purchase Options: On Death, Retirement or Expulsion, or By Successors from Continuing Founders
- ❑ Power Of Attorney
- ❑ Indemnification for Retired Partners or Deceased Estate when Name Used

Accounting
- ❑ Accounting Principles
- ❑ Auditor
- ❑ Fiscal Year and Budget
- ❑ Banking Arrangements
- ❑ Partnership Assets and Personal Assets

Restriction on Partners
- ❑ Restrictions on Use of Partnership Name
- ❑ Liability for Personal Obligations
- ❑ Indemnities of Partners for Prohibited Acts
- ❑ Payments of Separate Debts
- ❑ Devotion of Full Time and Attention to Business
- ❑ Non-Competition
- ❑ Requirements of Partners to enter into Marriage Contracts with Spouses
- ❑ Insurance
- ❑ Maintenance of Good Standing and Architectural Licence

Management of the Partnership
- ❑ Partners' Authorities
- ❑ Appointment of Managing Partner
- ❑ Management Committee
- ❑ Contracting with Third Parties
- ❑ Division of Responsibilities

Capital and Income
- ❑ Contribution of Capital
- ❑ Division of Net Profits
- ❑ Drawing on Partnership Funds
- ❑ Limitation of One Partner's Share in Profits and Losses
- ❑ Inclusion of Salaries and Benefits in Determining Partners' Profits
- ❑ Liability to Account for Outside Income
- ❑ Remuneration for Outside Income

General
- ❑ Mediation and Arbitration
- ❑ Ownership of Copyright and Waiver of Moral Rights
- ❑ Confidentiality and Trade Secrets
- ❑ Further Assurances
- ❑ Loss of Professional Membership of Any Partner
- ❑ Volunteerism

The foregoing is a list of common concerns and clauses in partnerships and partnership agreements. The list is not exhaustive, will vary in individual circumstances, and cannot replace legal advice. Architects should consult their lawyer(s) before negotiating and entering into a partnership or a partnership agreement.

Checklist: Issues to Consider for a Shareholders' Agreement for Architectural Corporations

Construction of the Agreement
- ❑ Parties to the Agreement
- ❑ Parties Who Are Not Non-residents
- ❑ Requirements of Provincial Associations of Architects
- ❑ Number of Shares and Classes of Shares Held by Each Shareholder
- ❑ Shares Free and Clear of Liens and Encumbrances
- ❑ Warranty of the Corporation Regarding Authorized Capital and Issued and Outstanding Securities
- ❑ Unanimous or Non-unanimous Agreement
- ❑ Termination of Prior Shareholders' Agreements
- ❑ Jurisdiction of Incorporation
- ❑ Incorporation of Articles and Bylaws

Rights and Obligations of Shareholders
- ❑ Permitted Outside Activities
- ❑ Employment of Shareholders
- ❑ Protection of Shareholders
- ❑ Management Contracts with Shareholders
- ❑ Maintenance and Good Standing with Provincial Associations of Architects

Default
- ❑ Events of Default
- ❑ Procedure on Default
- ❑ Opportunity to Remedy
- ❑ Consequences of Default

Financing
- ❑ Bank Financing and Signing Officers
- ❑ Calls on Shareholders for Additional Financing
- ❑ Guarantees of Debt of the Corporation
- ❑ Use of Surplus and Net Income
- ❑ Dividends
- ❑ Auditors and Bankers of the Corporation

Management of the Company
- ❑ Business of the Company
- ❑ Organization and Management of the Company as per Architects Act
- ❑ Composition of the Board of Directors
- ❑ Limitations on Authority of the Board as per Architects Act
- ❑ Matters for which the Shareholders are to be Notified and Addresses for Notices
- ❑ Officers of the Corporation and Term of Office
- ❑ Appointment and Replacement
- ❑ Time to be Devoted by Officers
- ❑ Remuneration of Officers and Directors
- ❑ Proper Books and Records
- ❑ Meetings of the Directors and Shareholders

Issuance of Additional Shares
- ❑ General Procedure
- ❑ Pre-emptive Rights

Term and Termination Options
- ❑ Effective Date
- ❑ On Death of a Party
- ❑ On Sale of Business
- ❑ Upon There Being One Shareholder

Insurance
- ❑ Lives Insured
- ❑ Payment of Premiums
- ❑ Payment of Benefits under Insurance Policy

Valuation Methods
- ❑ Agreed-to Value
- ❑ Book Value
- ❑ Fair Market Value
- ❑ Formula Value
- ❑ Independent Appraisal
- ❑ Timing of Valuation

Sale of Shares

- ❑ Restrictions on the Transfer of Shares
- ❑ Sale of Shares to a Holding Company
- ❑ Guarantee of Principal of Holding Company
- ❑ Rights of First Refusal
- ❑ Permitted Encumbrances
- ❑ Funding a Buyout
- ❑ Shotgun Clause
- ❑ Auction
- ❑ Option to Purchase/Sell
- ❑ Continued Disability of Shareholder
- ❑ Forced Sale
- ❑ Piggyback Clauses
- ❑ Matched Bids
- ❑ Corporate Share Re-purchase
- ❑ Death or Bankruptcy of Shareholder

General Sale Provisions

- ❑ Notice Periods
- ❑ Resignation of Vendor
- ❑ Cash or Promissory Note
- ❑ Security for Unpaid Balance
- ❑ Provisions Regarding the Restrictions on the Corporation and Shareholders Pending Full Payment of the Purchase Price
- ❑ Default of Payment
- ❑ Retiring Allowance or Consultant's Fee
- ❑ Release of Guarantees and Indemnities
- ❑ General Release
- ❑ Repayment of Debts
- ❑ Failure to Complete Closing
- ❑ Non-competition and Non-disclosure
- ❑ Family Law Considerations
- ❑ Deferred Sale
- ❑ Tax Planning

General Contract Provisions

- ❑ Mention of Shareholders' Agreement on Share Certificates
- ❑ Addresses for Delivery of Notices
- ❑ Mediation and Arbitration
- ❑ Further Assurances
- ❑ Time of Essence
- ❑ Entire Agreement and Amendment
- ❑ Applicable Law
- ❑ Severability
- ❑ Effect of Waiver/Non-waiver
- ❑ Ownership of Intellectual Property and Know-how and Waiver of Moral Rights
- ❑ Confidentiality and Trade Secrets
- ❑ Maintenance of Good Standing with Provincial Association of Architects
- ❑ Loss of Professional Membership of any Shareholder

The foregoing is a list of common concerns and clauses in a shareholders' agreement. The list is not exhaustive, will vary in individual circumstances, and cannot replace legal advice. Architects should consult their lawyers before negotiating or entering into a shareholders' agreement.

Architectural Services and Fees

Introduction

Architecture is a rapidly changing, knowledge-based, service industry. As a result, providing and determining compensation for architectural services is more challenging than ever. This chapter will help architects meet the challenge by discussing how to identify appropriate services for their clients and how to valuate those services.

The Architect's Traditional Services

Before an agreement (or interim agreement) is prepared and before beginning work on a project, the architect must propose an appropriate complement of services to the prospective client. The services should be based on the project requirements, the client's own in-house competencies (if any), and the architect's capabilities. Because the architect is required to provide an appropriate level of professional services, fees must be adequate to enable and ensure that this level is maintained.

Basic and Additional Services

Traditionally, architectural services were limited to the design and construction of buildings, a fact reflected in the following five sequential phases of a project:

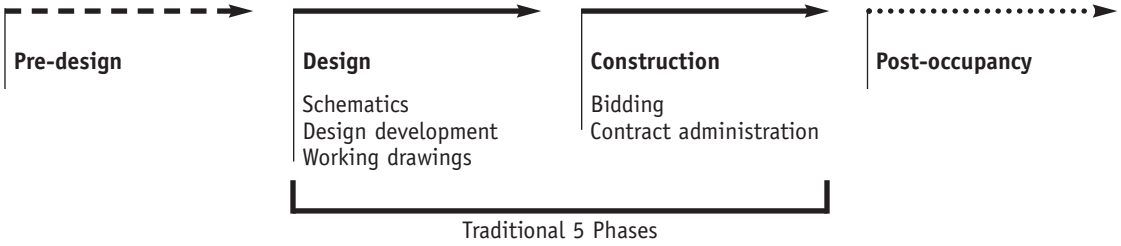
- Schematic Design;
- Design Development;
- Construction Documents;
- Bidding and Negotiation;
- Construction Phase (Contract Administration).

Refer to the *Canadian Standard Form of Agreement Between Client and Architect: Document Six* and to several of the chapters in Section 2.3, *Management of the Project*, for a full outline of architectural services contemplated for each phase.

These five phases have become so entrenched that they are used in all of the Canadian standard forms of agreement between the client and the architect. Furthermore, the standard forms of agreement embrace the concept of **basic** and **additional** services.

Basic services are those services the client and the architect have agreed are necessary for the implementation of the project, using "Design-Bid-Build." Basic services are deemed by the profession, to be, with few exceptions, the minimum level of services.

Illustration 1: Linear ("Basic Services") View



Reprinted with permission from:
The American Institute of Architects

Additional services (defined in Schedule B of Document Six) are those services for which the degree of the architect's involvement with regard to input and time cannot be clearly defined or estimated, or the need for which is not determined at the time of signing the agreement. Fees for additional services are frequently invoiced on the basis of agreed hourly rates. These basic and additional services, organized by project phase, are listed in the "Checklist: Scope of Services" at the end of this chapter.

Understanding the value of additional services significantly broadens the potential scope of practice, and creates markets for new services that can benefit the practice and, in many cases, the client.

Document Six identifies approximately 30 types of additional services that cover a broad range of expertise and activity — such as providing financial feasibility studies and preparing functional programs, submissions to authorities, and life cycle cost studies. Clients are often unaware of, or choose to ignore, the distinction between basic services and this other related professional work. Architects who also ignore this distinction may not be receiving full value for their efforts, and may be providing additional services on a *pro bono* basis for a significant segment of their market.

Practices should prepare a briefing document that can be supplied to prospective clients. This document should:

- outline the types of services for which the firm has expertise;
- clarify the distinction between basic architectural services and other services that the firm might provide.

Identification of Services

The success of a project depends on the proper identification of services. At the outset, the architect — together with the client — must determine the professional services required for the project. Once this is done, the architect can prepare an estimate of the professional fee and negotiate an agreement with the client.

Occasionally, the required services cannot be identified at the outset of the project. For example, the site may not be selected, or a functional program may not have been prepared. In these instances, it is prudent to work on a per diem basis, until the project is better defined.

To identify required services, prepare a list of tasks to be performed and a time frame for each. The process also involves identifying and selecting engineers and other consultants necessary for the project. The services outlined in the standard forms of agreement can serve as a checklist or "menu" for selecting the appropriate services.

The Architect's Fee

The architect must obtain the latest fee schedule, tariff of fees, and conditions of engagement from the appropriate provincial association of architects.

See the References section of this chapter for a list of these documents.

Methods of Compensation

Both parties — architect and client — will benefit if the architect receives adequate compensation for the professional services provided. Compensation is usually by one of the following methods:

- percentage (of the construction cost);
- time basis (per diem or hourly rates);
- lump sum (or fixed fee); or
- any combination of the above.

Occasionally, in some provinces, architects are paid on a unit basis for projects such as multiple-unit housing or hotels, which have a repetitive element. Unit fee determinations are frequently arbitrary and do not relate to the nature and scope of architectural services.

The standard forms of agreements have been crafted to accept any of these forms of compensation. *Construction cost* has been clearly defined in the agreements. Fees should never be confused with *reimbursable expenses* (sometimes called disbursements) which are also clearly defined in the agreements.

Fee Calculation

Refer also to Chapter 2.1.4, *Financial Management*.

When calculating the distribution of the fee over the traditional five phases of a project, the following breakdown is typical:

Phase	% of total fee
Schematic Design	12-18
Design Development	12-18
Construction Documents	35-45
Bidding and Negotiation	2.5-6.5
Construction Phase (Contract Administration)	25-35

Typically, services are rendered and payments are made progressively, with final accounting (100% of total fee) at Substantial Performance of the construction or after the preparation of the final Certificate for Payment to the contractor.

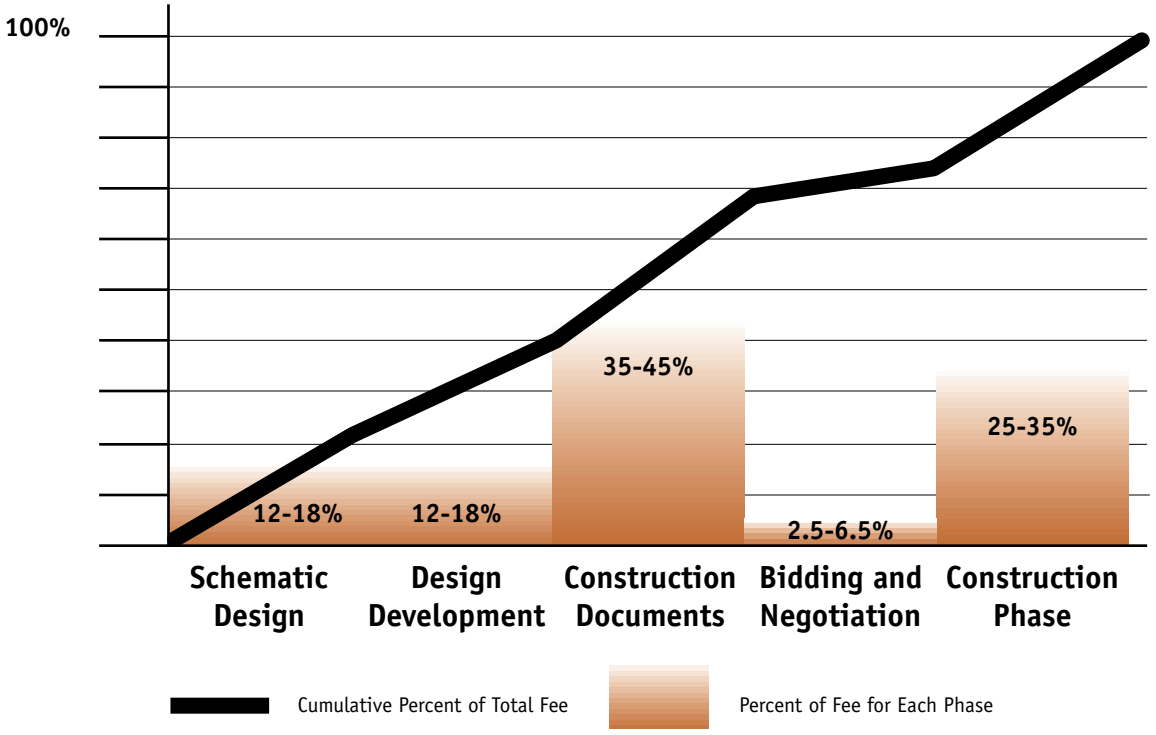
The three usual methods of compensation use the following methods of fee calculation:

Percentage of the Construction Cost
Architects should base their fees on the recommended schedules prepared by the provincial associations of architects. Obtain the most current schedule available, as they are occasionally updated.

Percentage fees are contingent on the size and type of project as well as the scope of services required. For example, the schedules recommend:

- lower percentages for simple buildings or buildings with a higher construction cost;
- higher percentages for buildings which are more complex or have a lower construction cost.

Illustration 2: Typical Allocation of Fees for a "Traditional" Architectural Project



The percentage fee provides a base fee, which can be adjusted depending on the scope of services. By applying the fee to a known cost or approved estimate at the start of each project phase, the fee can be accurately determined and both the client and the architect can budget accordingly. The recommended percentage fees anticipate the following project conditions:

- the architect is providing full, basic services (traditional approach);
- the project is a unique, "one-off" design for a single client;
- the project will be tendered once, as a single, coordinated package of construction documents;
- the method of project delivery is the use of a Stipulated Sum Contract (such as CCDC 2);
- the project size is not extreme (neither very large nor very small);
- there are no delays, or the progress of the project is not intermittent (thereby incurring repetitive "start-up" costs);
- the percentage fee is calculated at each phase as a percentage of the construction cost as defined in the agreement.

In most provinces, percentage fees usually include the fees of structural, mechanical, and electrical engineers — the three common engineering disciplines. Other specialist consultants are not included in the percentage fee.

In some provinces, "net percentage fees" are occasionally used, which exclude the provision of engineering services. This is sometimes the case in multiple-unit housing projects. This method can also be used when the architect is engaged under separate agreement, with the client engaging the engineers directly and the architect providing coordination services.

In all cases, ensure that sufficient fees are allocated for complete coordination. Provincial tariffs or fee schedules usually include coordination services in the net percentage provided. However, the architect should verify this and compare the suggested percentage with the actual coordination requirements and the team composition. Architects can use the following rule of thumb: the cost to the architect for coordinating engineering consultants is approximately 25% to 33% of the engineering fee. Engineering services can also be negotiated as a percentage of the total construction cost to avoid disagreement over the amount to which the percentage is applied.

To ensure the validity of the amount, use the percentage fee method as a check when calculating a fixed fee (lump sum) quotation.

Time Basis (per diem and hourly rates)
A per diem or hourly rate is often the most appropriate method for establishing a fee, especially in the early stages of a project. Some other situations when this approach would be appropriate include:

- pre-approved work being changed;
- small projects;
- pre-design or other types of feasibility studies;
- intermittent work or services.

Per diem or hourly rates are usually determined by the following:

- a multiplier of direct personnel expense [payroll cost (+) payroll burden (x) a multiplier (usually 2.5)];
- provincial association-recommended minimums for per diem or hourly rates;
- existing market conditions.

Per diem rates are usually calculated as hourly rates ($/hour) x 7.5 hours (a typical day).

Traditionally, provincial associations have recommended higher per diem rates for special expertise such as acting as an expert witness or providing a unique or highly specialized service.

Lump Sum or Fixed Fee
To use the fixed fee basis, both the client and the architect must thoroughly understand and agree on all tasks required and on the project schedule. The method also requires calculating all costs and making a comparison with the two other methods of compensation. Refer to Form 2.2, "Fee Calculation Sheet," provided in Chapter 2.2, *Standard Forms for the Management of the Practice*. When preparing a fixed fee quotation, include the following:

- all direct and indirect labour costs;
- all expenses, including materials;
- overhead and profit;
- risk factors involved with this client and this project;
- consultant costs;

- costs for coordination of consultants;
- marketing costs;
- a contingency.

Double-check the price proposal and do a "reality check" based on market conditions by:

- determining fees as though they were based on a percentage of anticipated construction costs;
- re-calculating the costs to provide the fees very conservatively, using a worst-case scenario;
- checking the staff utilization rates and profit history of similar projects;
- ensuring that staff or partners double-check or independently verify the fee calculation.

With clear parameters, including a well-defined scope of services and quality of project, the fixed fee can be a satisfactory approach for both the client and the architect. However, when unknown factors or an ill-defined project are involved, the fixed fee method can cause strained relationships and lead to substantial losses for the architect. Verify that all agreements include provision for determining the fee for:

- changes in scope;
- preparation of Change Orders;
- time delays (caused by the owner or contractor).

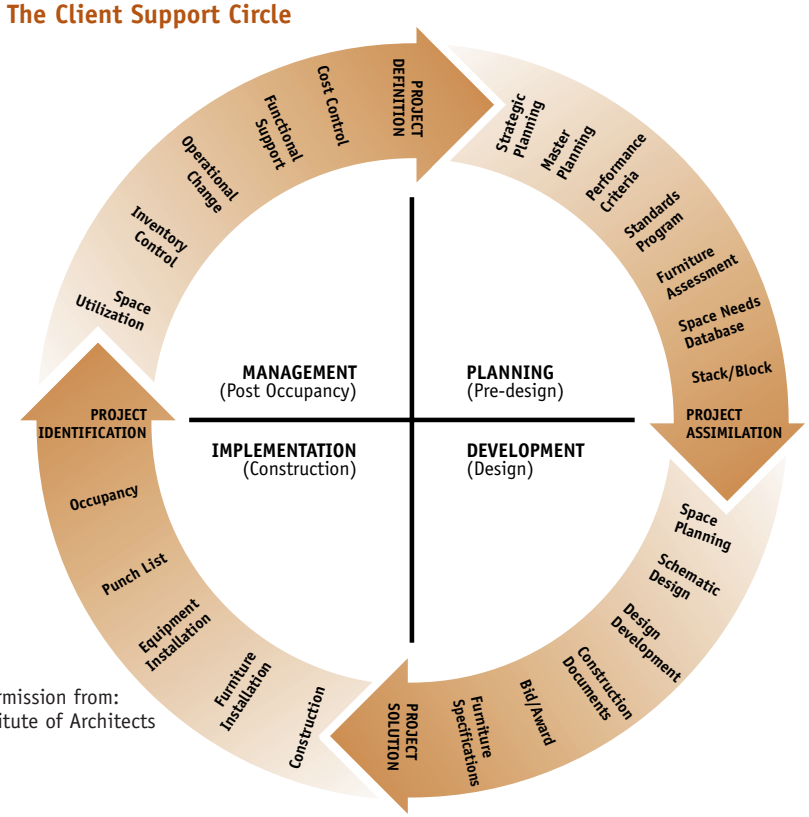
Trends in Architectural Services

Today, the architect often provides services in a different manner, including any combination of the following:

- partial services (where the requirement for basic services is more limited);
- expanded services (new services not previously offered, such as facility management and computer renderings);
- services through different project delivery methods (refer to Chapter 2.3.2, *Types of Construction Project Delivery*).

The Ontario Association of Architects (OAA) has produced a kit entitled *Mastering the Business of Architecture* (outside of Ontario, called *Mastering the Business of Design)* which addresses these new trends in services and fee calculation.

Illustration 3: The Client Support Circle



Reprinted with permission from:
The American Institute of Architects

The scope of services varies for *each* project, *each* client, and *each* form of project delivery. As a result, it is now more common for architects and clients to identify services from a "menu" or "shopping list." This flexible approach is recognized by the checklist in Schedule A of the *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: Document Seven*. The American Institute of Architects (AIA) has totally revised the basic agreement, B141, to recognize this reality. The AIA document, which views architectural services as a continuum in the life of a facility, groups the services as part of the following four stages:

- Planning or Pre-design;
- Development or Design;
- Implementation or Construction;
- Management or Post-occupancy.

(Refer to Illustration 3.)

This arrangement expands the possibility of architectural involvement beyond the "traditional" phases of a project.

Some of these expanded, non-traditional services are outlined in "Checklist: Supplemental Architectural Services," at the end of this chapter.

Requests For Proposals

As requirements for professional services continue to change, so will the methods for engaging design professionals.

In seeking competitive submissions from architects, clients are frequently choosing to use requests for proposals (RFPs) as a method of selecting architects. In responding to an RFP, the architect must carefully evaluate all conditions within the terms of reference to ensure that the architect will not be bound to provide services for which the architect is not competent or willing to provide. For example, some RFPs issued by governments occasionally insert clauses requiring the architect to assign the copyright for the project design.

Some RFPs outline a minimum "scope of services" but permit the proponent to offer additional services. Too frequently, RFPs are evaluated primarily or totally on the fee for professional services, without careful analysis and understanding of the full scope of services offered by the proponent. The architect must clarify and understand thoroughly the level of professional services required before providing a fee quotation.

Client-Architect Agreements

Regardless of the type of project, the architect should prepare and execute a written agreement with the client after identifying the full scope of services and negotiating a fee.

In British Columbia, written agreements are required by the Architectural Institute of British Columbia (AIBC).

It may be advisable to use an interim agreement or "binder" in order to start work while a full agreement is being prepared. Some provincial associations have a single-page or short form agreement suitable for this purpose.

Architects should not use customized stand-alone agreements developed for the specific use of their own architectural practice. They stand to gain from promoting and adopting the Canadian standard forms of agreement between the client and the architect. These are produced by the architectural profession and accepted nationally. Furthermore, there is broad consensus on the meaning of the "General Conditions," and a certain amount of case law has been built up in their interpretation. These agreements are also consistent with CCDC contracts.

The guides contained with each of the standard agreements explain the use of the agreements and their terms as well as how to complete the forms. These two agreements — contained in Volume 3, *Other Resources* — are:

- *Canadian Standard Form of Agreement Between Client and Architect: Document Six;*
- *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: Document Seven.*

Definitions

***Construction Cost*:** The contract price(s) of all project elements designed or specified by or on behalf of the architect, permit fees, contingency amounts, and all applicable taxes including such value-added taxes as the GST, whether recoverable or not. Where there is no contract price for all or part of the project, the Construction Cost shall be the estimated cost of the construction as determined by the architect, at market rates at the anticipated time of construction. The Construction Cost does not include the architect's compensation, architect's consultants, the land cost or other costs which are the client's responsibility.

***Fee*:** The amount of compensation paid to the architect for the provision of specific services. Reimbursable expenses or disbursements are not included.

Fixed Fee or ***Lump Sum*** or ***Stipulated Price*:** One stated sum of money for the performance or provision of specific services.

***Percentage Fee*:** A method of compensation which links the fee for architectural services to a percentage of the construction cost of the project. The percentage will vary depending on the type of building, the construction value, and the type of construction contract.

***Per Diem*:** Allowance or payment for each day.

***Service*:** Work performed, or the doing of work on behalf of an employer or client; benefit conferred, or exertion made, on behalf of someone; work comprised in whole or in part of labour, advice or supervision.

References

The American Institute of Architects (AIA). *The Architect's Handbook of Professional Practice*. Washington, D.C.: The AIA Press, 1994.

National Practice Program. Ottawa, Ont. 1999.

Canadian Standard Form of Agreement Between Client and Architect: Document Six. Latest edition.

Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: Document Seven. Latest edition.

Provincial Associations' Schedule of Fees or Tariff of Fees.

Architectural Institute of British Columbia. *Tariff of Fees for Architectural Services*. Third edition. January 1996.

Alberta Association of Architects and the Association of Professional Engineers, Geologists and Geophysicists of Alberta. *Recommended Conditions of Engagement and Schedule of Professional Fees for Building Projects*. May 1998.

Saskatchewan Association of Architects. *Bylaws of the Saskatchewan Association of Architects*, August 1997. Refer to Bylaws No. 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25.

Manitoba Association of Architects. *Schedule of Suggested Professional Charges*. 1990.

Ontario Association of Architects. *Outline of Services and Schedule of Recommended Fees*. January 30, 1988 (including October 1, 1989 revisions).

Association of Architects in Private Practice of Quebec/Association des architectes en pratique privée du Québec.

Architects' Tariff: The services, responsibilities and fees of the architect. 1986.

Contrat entre maître d'ouvrage et architecte. 1990.

Agreement between Client and Architect. 1987.

Architects' Association of New Brunswick. *Schedule of Recommended Fees*. March 1, 1993.

Architects Association of Prince Edward Island. *Conditions of Engagement and Suggested Schedule of Minimum Professional Charges*. Latest edition.

Nova Scotia Association of Architects. *Conditions of Engagement and Schedule of Minimum Professional Charges*. Latest edition.

Newfoundland Association of Architects. *Schedule of Minimum Fees for Architects and Professional Engineers on Building Projects*. Latest edition.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives Inc., 1999.

Checklist: Scope of Services

This chart is a typical checklist of services offered by the architect and his or her sub-consultants. The nature of the individual project and the services customized to the client's needs will determine the scope of services required.

Project Inception | Project Assessment | Concept Approval | Approvals from Authorities | Awards of Construction Contract | Substantial Performance of Construction/Occupancy Permit

1.0 Pre-design	2.0 Schematic Design	3.0 Design Development	4.0 Construction Documents	5.0 Bidding or Negotiation	6.0 Construction — Contract Administration	7.0 Post-construction
Architect's Services ❑ Facility Programming ❑ Space Relationships/ Flow Diagrams ❑ Project Development Scheduling ❑ Project Budgeting ❑ Life Cycle Cost Studies ❑ Economic Feasibility Studies ❑ Agency Consulting/ Review/Approval ❑ Site Selection/ Analysis Utilization ❑ Environmental Studies ❑ Energy Studies ❑ Existing Facilities Surveys ❑ Client-Supplied Data Coordination ❑ Services Related to Project Management ❑ Presentations ❑ Marketing Studies ❑ Project Financing ❑ Special Studies ❑ Re-Zoning Assistance ❑ Project Promotion **Special Consultants' Services** ❑ Legal Survey ❑ Geotechnical Analysis	**Architect's Services** ❑ Client-supplied Data Coordination ❑ Program and Budget Evaluation ❑ Review of Alternative Design Approaches ❑ Architectural Schematic Design ❑ Schematic Design Drawings and Documents ❑ Statement of Probable Construction Costs ❑ Client Consultation ❑ Interior Design Concepts ❑ Special Studies (Future Facilities, Environmental Impact, etc.) ❑ Special Submissions or Promotional Presentations ❑ Special Models, Perspectives or Computer Presentations ❑ Project Management ❑ Agency Consultation **Consultants' Services** ❑ Structural Design Concepts ❑ Mechanical Design Concepts ❑ Electrical Design Concepts ❑ Statements of Probable Costs **Special Consultants' Services** ❑ Civil Design Concepts ❑ Landscape Concepts ❑ Statements of Probable Costs	**Architect's Services** ❑ Client-supplied Data Coordination ❑ Design Coordination ❑ Architectural Design Development ❑ Design Development Drawings and Documents ❑ Statement of Probable Construction Costs ❑ Client Consultation ❑ Interior Design Development ❑ Special Studies/Reports (Planning Tenant or Rental Spaces, etc.) ❑ Promotional Presentations ❑ Models, Perspectives or Computer Presentations ❑ Project Management ❑ Agency Consultation **Consultants' Services** ❑ Structural Design Development ❑ Mechanical Design Development ❑ Electrical Design Development ❑ Statements of Probable Costs **Special Consultants' Services** ❑ Civil Engineering Design Development ❑ Landscape Development ❑ Detailed Construction Cost Estimates or Quantity Surveys	**Architect's Services** ❑ Client-supplied Data Coordination ❑ Project Coordination ❑ Architectural Construction Documents (Working Drawings, Form of Construction Contract and Specifications) ❑ Document Checking and Coordination ❑ Statement of Probable Construction Costs ❑ Client Consultation ❑ Interior Construction Documents ❑ Alternative Bid Details and Special Bid Documents ❑ Project Management ❑ Agency Consultation **Consultants' Services** ❑ Structural Construction Documents ❑ Mechanical Construction Documents ❑ Electrical Construction Documents ❑ Statements of Probable Costs **Special Consultants' Services** ❑ Civil Engineering Construction Documents ❑ Landscape Documents ❑ Detailed Construction Cost Estimates or Quantity Surveys	**Architect's Services** ❑ Client-supplied Data Coordination ❑ Project Coordination ❑ Issue Bidding Documents ❑ Issue Addenda ❑ Bid Evaluation ❑ Construction Contract ❑ Client Consultation ❑ Separate Bids or Negotiated Bids ❑ Services Related to Bidders' Proposals ❑ Project Management **Consultants' Services** ❑ Issue Bidding Documents ❑ Issue Addenda ❑ Bid Evaluation **Special Consultants' Services** ❑ Issue Bidding Documents ❑ Issue Addenda ❑ Bid Evaluation	**Architect's Services** ❑ Construction Review ❑ Progress Reports/Evaluation ❑ Process Certificates for Payment ❑ Interpretation of Contract Documents ❑ Review of Shop Drawing Product Data/Sample ❑ Change Orders ❑ Substantial Performance Report and Certification ❑ Client Consultation ❑ Interior Construction Inspection ❑ Full-time Project Representation ❑ Administration of Separate Contracts ❑ Project Management ❑ Promotional Material ❑ Record Drawings ❑ Agency Consultation **Consultants' Services** ❑ Structural Inspection/Reports ❑ Mechanical Inspection/Reports ❑ Electrical Inspection/Reports ❑ Record Drawings ❑ Certification of Progress **Special Consultants' Services** ❑ Civil Construction Inspection ❑ Landscape Inspection ❑ Detailed Cost Accounting	**Architect's Services** ❑ Field Review ❑ Deficiency Assessment ❑ Instructions for Correction of Deficiencies ❑ Review of Warranties ❑ Total Performance Inspection and Certification ❑ Client Consultation ❑ Start-up Assistance ❑ One-year Warranty Inspections **Other Services** ❑ Fine Arts/Crafts/Graphics ❑ Non-building Equipment Selection ❑ Building Analysis and Reports ❑ Services Related to Alterations and Demolition ❑ Life Cycle Cost Monitoring ❑ Environmental Monitoring ❑ One-year Warranty Inspections **Consultants' Services** ❑ Start-up Assistance ❑ Systems Performance Review ❑ Non-building Equipment Selection ❑ Life Cycle Cost Monitoring ❑ Services related to Alterations and Demolition

Checklist: Supplemental Architectural Services

The following is a list of some of the specialized services offered by architectural practices or coordinated with special consultants.

Pre-design Services

- ❑ Facilities Programming
- ❑ Feasibility Studies
- ❑ Existing Site and Facilities Analysis
- ❑ Traffic and Parking Studies
- ❑ Existing Equipment and Furniture Inventories
- ❑ Energy Analysis
- ❑ Master Programming and Planning
- ❑ Environmental Studies
- ❑ Space Schematics/Flow Diagrams
- ❑ Marketing Studies
- ❑ Financial Analysis
- ❑ Project Financing
- ❑ Advisor for Architectural Competitions
- ❑ Preparation of Proposal Call Documents

Post-construction Services

- ❑ Commissioning Services
- ❑ Post-occupancy Studies
- ❑ Maintenance and Operational Programming
- ❑ Building Maintenance Manuals
- ❑ Post-occupancy Evaluation

Site Development Services

- ❑ Site Analysis and Selection
- ❑ Site Development Planning/ Site Plan Agreement
- ❑ Detailed Site Utilization Studies
- ❑ On-site Utility Studies
- ❑ Off-site Utility Studies
- ❑ Environmental Studies and Reports
- ❑ Zoning and Land Use Amendments
- ❑ Geotechnical Engineering
- ❑ Site Surveying
- ❑ Legal Survey
- ❑ Landscape Design

Materials and Systems Testing

- ❑ Procurement of Testing Services
- ❑ Review and Analysis of Testing

Interior Design and Design Services

- ❑ Space Planning
- ❑ Adaption of Mechanical and Electrical Systems and other Systems to Tenant Needs
- ❑ Preparation of Furnishing Requirements
- ❑ Bidding or Purchasing Procedures for Furniture
- ❑ Furniture and Equipment Selection and Layout
- ❑ Special Furnishings Design
- ❑ Tenant-related Services
- ❑ Interior Partition Location
- ❑ Furniture and Finishing Specifications
- ❑ Selection of Interior Materials, Finishes, and Colours
- ❑ Procurement of Furniture
- ❑ Coordination of Installation and Delivery of Furniture
- ❑ Design of Interior and Exterior Signage and Symbols
- ❑ Selection or Acquisition of Fine Arts or Crafts
- ❑ Graphic Design
- ❑ Documentation of Requirements and Procurement of Graphics Work

Project Administration and Construction Management Services

- ❑ Project Administration
- ❑ Disciplines Coordination/Document Checking
- ❑ Consulting with and Review and Approval of Authorities
- ❑ Submittal Services
- ❑ Owner-supplied Data Coordination
- ❑ Schedule Development/Monitoring
- ❑ Testing and Inspection Administration
- ❑ Project Representation
- ❑ Supplemental Documentation
- ❑ Administration of Multiple Contracts
- ❑ Detailed Cost Estimates and Quantity Surveys
- ❑ Value Analysis or Value Engineering
- ❑ Life Cycle Cost Analysis
- ❑ Coordination of Mock-ups
- ❑ Facility Management

Promotion and Public Relations

- ❑ Preparation of Press Releases
- ❑ Preparation of Promotional Brochures
- ❑ Presentations at Public Meetings
- ❑ Preparation of Leasing Material
- ❑ Preparation of Models
- ❑ Preparation of Renderings
- ❑ Condominium Documentation
- ❑ Computer Presentations

Documentation Services

- ❑ Preparation of Special Certificates and Letters of Assurance
- ❑ Certified Area Calculations
- ❑ As-Built Drawings and Computer Files
- ❑ Preparation of Measured Drawings
- ❑ Building Inspection and Reporting
- ❑ Aerial Site Photography
- ❑ Still Photography of Existing Conditions
- ❑ Periscope Photography of Models
- ❑ Presentation Photography of Renderings or Models
- ❑ Construction Progress Photographs
- ❑ Architectural Photography of Completed Building or Site
- ❑ Videotaping
- ❑ Computer Database
- ❑ Inventories of Materials, Equipment or Furnishings

Architectural Conservation

- ❑ Historic Building Documentation
- ❑ Heritage Conservation District Studies
- ❑ Conservation Reports

Expert Witness

- ❑ Testimony at Court or Hearing
- ❑ Opinion on Codes or Regulations

Computer Applications

- ❑ Computer Renderings
- ❑ 3-D Computer Presentations and Walk-throughs
- ❑ Electronic Communication and Distribution
- ❑ Computer Analysis and Mock-ups
- ❑ Project Scheduling
- ❑ Project Accounting

Urban Design

- ❑ Streetscape Design
- ❑ Drafting of Zoning Bylaws and Regulations
- ❑ Shadow Studies
- ❑ Urban Design Studies
- ❑ Wind Studies
- ❑ Land Use Studies
- ❑ Transportation Studies

Research

- ❑ Research in Construction Materials and Methods
- ❑ Building Envelope Investigation

Succession Planning

Introduction

Principals of architectural firms often neglect or avoid thinking about what will happen to their practice after they retire or leave for other reasons. Planning for this transition — commonly called succession planning — is very important. Effective succession planning will:

- enable architects who own a firm to extend their practice beyond the span of their own careers;
- allow young, emerging architects to develop the skills necessary for future leadership;
- permit owners (of architectural firms) to obtain a financial return on their investment of money, energy, and commitment.

Although of concern to all practices, succession planning is especially important for the many architects who practise in sole proprietorships and small firms. They often have few standby resources and, therefore, face the greatest risk of succession failure.

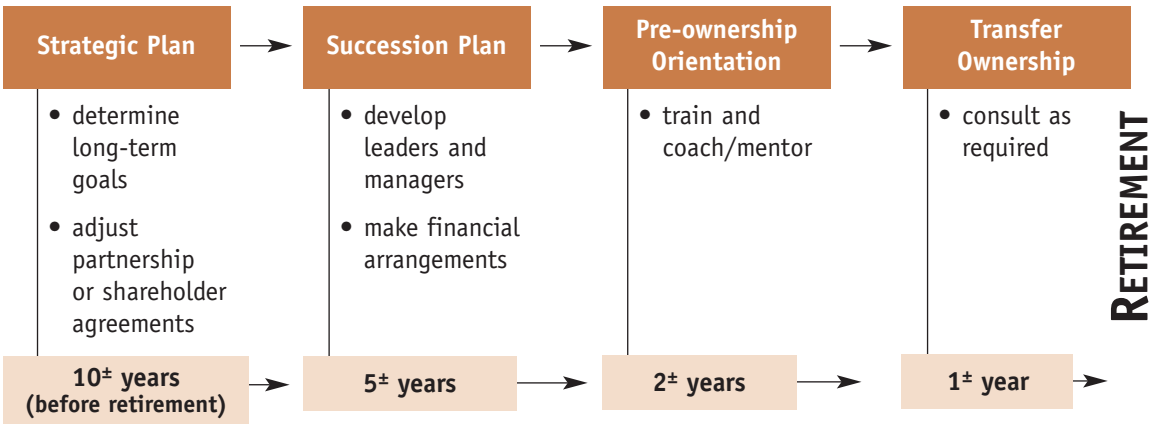
According to management expert Peter Drucker, "the best way to predict the future is to create the future." Effective succession planning requires careful thought and an implementation strategy that can span up to ten years. A good start is to determine one's retirement goals and work backwards to the present. This notion seems elementary, but is complicated to put into practice.

A comprehensive succession plan will:

- set out a transition strategy;
- present a profile of a buyer or buyers capable of taking over the architectural practice;
- establish the financing;
- determine the practice's value;
- deal with tax, legal, and professional liability insurance issues.

Keep in mind the success test for succession planning: Can the founding architect's clients, staff, and legacy be entrusted to the hands of others without any decrease in the firm's level of professionalism? People may miss the founding architect personally, but they will still be well served if the successors ensure that the firm's professional standards are maintained.

Illustration 1: Timeline for Ownership Transition



Options for Succession Planning

This chapter describes five succession planning options. Each specific practice will have unique characteristics that will result in different chances of success, selling prices or firm valuation, and planning horizons. Actual outcomes will vary according to the size of the firm, and the effectiveness of the strategy and its execution.

Dissolution of the Practice

A disproportionate number of small firms dissolve upon the retirement of the principal architect. Although the dissolution of the practice may seem like a failure of succession planning, this option may be necessary in some situations, for example:

- death;
- illness;
- disability;
- divorce;
- shareholder or partner dispute;
- personal choice;
- bankruptcy.

Contingency planning may reduce the need to resort to this option.

Architects who choose to retire and dissolve the practice should:

- comply with all provincial regulations regarding withdrawal from practice;
- secure a policy for professional liability insurance coverage for retirement years.

Contingency planning under this option should ensure that the practice's drawings and documents are not lost or destroyed, but retained. They can be transferred to:

- another architect;
- an archiving agency such as a university or a provincial or national archive;
- some other acceptable organization;
- a storage facility.

Some provincial associations have regulations requiring retention of an architect's archives. Regardless of whether regulations exist, archives must be retained because of the varying statutes of limitations on an architect's liability (refer to Chapter 2.1.9, *Risk Management and Professional Liability*).

Sale of the Practice

The firm could be sold to an architect or architects outside the practice. It is common practice for the "founders" to be retained by the "successors" as advisors or consultants for a period of time to ensure a smooth transition for both the practice and ongoing projects.

Advantages:
- may sustain the firm's legacy;
- may yield some financial return for the founding architect.

Disadvantages:
- the seller is unlikely to have much influence over the firm's future style or philosophy;
- outside principals will usually pay less for the practice than will inside successors, due to the valuation of goodwill.

Merger

Merging the practice with another architect or firm may be a very good option if the founding architect is one to three years away from retirement and if there are no internal staff available or capable of sustaining the practice. This option is similar to selling the practice in that persons previously external to the firm will have managerial influence over the practice. A significant difference is that the retiring architect may retain greater influence over the future of the composite entity.

When mergers are unsuccessful, the primary reason is that the two firms do not fit well together. Consequently, the architect may wish to test the fit before finalizing a formal merger by first entering into a joint venture and/or strategic alliance. Keep in mind that for mergers to be truly effective, the strengths, weaknesses, and opportunities of and threats against the founder's practice must be balanced against those of the other firm. Ideally, the new firm will be greater than the sum of the parts, and able to increase its competitive position and market opportunities.

Reapportioning of Ownership

Ownership can be distributed in different proportions to existing partners or shareholders. This option is only available if the firm has other partners and shareholders who are prepared to buy the retiring principal's shares. In these situations:

- if the demand for the shares is high, the seller will usually be able to obtain a higher price under this option than through a sale or merger because internal buyers typically value the acquisition more than do external buyers;
- if all goes well, the sustainability of the practice is high — especially if the existing partners are capable leaders.

New Partners or Shareholders

Inviting new architects to become part of an existing practice as partners or shareholders is another option, if the existing partners:

- are close to retirement; or
- want to develop younger talent.

If executed well, this option has a good chance of success. The selling price will also be high, especially if the new shareholders have the cash resources to fund the transfer of ownership. A longer planning horizon is generally required to properly develop people from within the internal talent pool and to give the buyer more time to provide payment for the share transfer.

The following illustration summarizes some of the differences between succession planning options.

Illustration 2: Succession Planning Options

Options	Origin of Successor	Success Probability	Selling Price	Planning Horizon
Dissolve the practice	--	--	--	0-1 year
Sell the practice to outside principal(s)	external*	low	low	1-2 years
Enter into a merger with another firm	external & internal**	medium	medium	1-3 years
Reapportion ownership among existing partners or shareholders	internal	medium/high	high	1-5 years
Accept new partners or shareholders	internal & external	high	high	3-10 years

** outside the architectural practice*
*** within the architectural practice*

The Strategic Human Resources Planning Process

Succession planning is most successful when leadership can be transferred gradually within the architectural practice. This process can take up to ten years of internal staff development time and encompasses the following four stages:

Phase 1. Strategic Planning

- know the firm's culture because leadership begins with an understanding of the firm's values;
- develop a strategic plan, which is essential for the firm to effectively integrate business components such as:
  - marketing;
  - production;
  - information technology;
  - finance;
  - human resources;
- realize that the strategic plan will provide a framework for more detailed human resource development.

Phase 2. Development of the Talent Pool

- identify and communicate the measures that future leadership must take to maintain staff commitment and motivate people to achieve success;
- assess existing staff and acquire new talent in areas of deficiency;
- provide opportunities for leadership and cross-functional experience;
- establish a meaningful performance evaluation system to monitor and foster ongoing development through:
  - coaching;
  - review;
  - feedback on performance achievements and performance gaps;
- keep in mind that ownership is not an end in itself, but a way to give a financial incentive to the person identified as a major contributor to the firm;
- implement a continuing education program to nurture the acquisition of professional knowledge.

A common concern regarding staff education programs is that only a limited number of staff groomed for promotion will actually advance within the firm, while others may leave and become informed competitors. While it may seem counterproductive to train potential competitors, remember that: "the only thing worse than training your employees and losing them, is not training them and keeping them" (Zig Ziglar).

Phase 3. Selection and Transition

- select a successor or successors and monitor their ongoing development and performance;
- provide prospective successors with a transition period to management and ownership which involves:
  - management training;
  - leadership development;
  - orientation before taking ownership;
  - professional development to achieve the stature of a senior partner.

Phase 4. Continuous Renewal

- relentlessly continue the process;
- watch for opportunities to use the experience and succession plans of the other owners (if any) to regularly facilitate a staged ownership transition upon successive retirements.

It is healthy to continue with professional involvement after ownership transition/retirement through such activities as mentoring, community service, and committee work.

The Issues

Architects must consider a variety of specific issues during the succession planning process.

Contingency Planning

Such planning is important because it:

- allows for faster succession in case of unforeseen circumstances such as illness, disability, divorce or shareholder/partnership disputes;
- minimizes risk of failure by making the succession plan more flexible, and by building the talent pool.

Review of Shareholder and Partnership Agreements

When reviewing agreements, sellers should:

- seek professional accounting advice and legal counsel when drafting or amending shareholder/partnership agreements;
- ensure that agreements have a termination clause which addresses misfits or poor performers or those with a mental or physical incapacity;
- conduct a detailed regular review of the agreements with new/prospective owners to ensure the ongoing appropriateness and relevance of the agreements.

Liability for Past Work

Generally, the liability for past work stays with the practice, although some insurers or provincial jurisdictions may hold the original principal responsible. Thus, it is important to:

- verify whether individual protection against potential long-term liability exposure after succession should be maintained;
- seek professional counsel for guidance within a specific context and legal jurisdiction.

Payment

Keep in mind that:

- many prospective internal buyers may have a high personal debt load (home mortgages, car loans, etc.);
- buyers may encounter difficulties providing payment for the acquisition of shares during the succession period;
- it is a significant advantage for the practice to be highly profitable during this period, especially if buyers expect to finance the purchase from the practice's earnings through increased salaries or bonuses;
- the buy-in must be feasible and attractive to new (typically younger) principals who need assurance that their investment will pay off;
- a "sinking fund" could assist the second-generation owners to buy-in and pay-out the first-generation "founders."

Valuation of the Practice

The value of the practice may be estimated through:

- earnings capitalization;
- discounted net cash flow;
- excess assets;
- a modified book value procedure that recognizes the economic worth of the firm (the net realizable value, or NRV) as opposed to an historic assessment based upon generally accepted accounting principles. In most cases, the firm's accounting records are an objective starting point to begin the process of determining the NRV.

Sellers and purchasers should seek independent professional advice when estimating the value of the practice.

Goodwill

Goodwill is a subjective asset. Keep in mind that:

- intangible assets are notoriously difficult to evaluate;
- typically, goodwill is over-valued by the seller because of emotional considerations and under-valued by the buyers due to self-interest;
- the valuation gap between buyers and sellers is even more pronounced when the buyer is from outside the architectural practice;
- the valuation of specific intangible factors "should be restricted to those assets whose utility can be transferred to other parties independent of the business and therefore have some hope of a value in exchange. Even for these, hard evidence should be available to justify the basis of valuation." (Skinner)

Definition

Goodwill: The intangible element of the value of a business (including the worth of the architect's legacy, image, and client base) calculated as the amount by which the value for sale or investment exceeds the sum of net identifiable assets. This is sometimes measured as the current value of expected future earnings in excess of the return required for sale or investment, or calculated as a multiple of earnings performance averaged over a period of five or more previous years.

References

Barlow, Kenneth J. *Internal Transfer of Ownership: A practical guide for consulting professionals*. Clarkson, Ont.: Clarkson Publishing Ltd., 1986.

Royal Architectural Institute of Canada (RAIC). *Firm Valuation*. RAIC Practice Builder. Ottawa, Ont.: RAIC.

Skinner, Ross. *Accounting Standards in Evolution*. Toronto, Ont.: Holt, Rinehart and Winston of Canada, 1987.

Stasiowski, Frank A. *The Complete Guide to Ownership Transition*. Newton, MA: PSMJ Resources, Inc., 1996.

Stratem Consultants, Inc. *Succession Planning Within Consulting Engineering Firms*. Ottawa, Ont.: Association of Consulting Engineers of Canada, 1996.

Checklist: Items for Consideration in a Buy/Sell Agreement

Identification of Business and Payment

- ❑ Assets — Land and Leases Inventory, Work In Progress (WIP), Supplies & Equipment, Goodwill, Contracts & Royalties, Accounts Receivable
- ❑ Liabilities
- ❑ Purchase Price, Deposit, Payment of Balance — Cash, Shares, Earn-out Security for Payment
- ❑ Terms of Letter of Intent

Securities and Other Regulations

- ❑ Securities Act Compliance and Exemptions
- ❑ Change of Control of Ownership
- ❑ Investment Canada — Exemption, Notification or Reviewable Transaction (for foreign purchasers)
- ❑ Bulk Sales Act Requirements
- ❑ Provincial Architects Acts

Pre-Closing Matters

- ❑ Insurance and Good Faith Operation of Business until Closing
- ❑ Preview and Seek Required Consents (e.g., from landlord, etc.)
- ❑ Right to Conduct Due Diligence
- ❑ Documents to be Delivered on Closing
- ❑ Independent Legal Advice
- ❑ Other Condition Precedents to Closing

Tax Issues

- ❑ Allocation of Purchase Price
- ❑ GST or HST and Tax Rollovers
- ❑ Tax Filing on Deemed Year End
- ❑ Non-Resident Vendors Tax Certificate
- ❑ Land Transfer Tax
- ❑ Loss Carry Forwards and other Tax History
- ❑ Retail Sales Tax

Representations and Warranties of Vendor and Due Diligence of Purchaser

- ❑ Employment and Consultant Agreements
- ❑ Employment Standards
- ❑ Employee Benefit and Pension Plans
- ❑ Environmental Matters
- ❑ Threatened or Pending Litigation or Outstanding Judgements
- ❑ No Other Purchase Agreements Outstanding
- ❑ Contractual and Regulatory Approvals
- ❑ Incorporating and/or Partnership Documents and Licences
- ❑ Compliance with Incorporating and/or Partnership Documents
- ❑ Financial Statements
- ❑ Partnership or Shareholder Agreement
- ❑ Indebtedness
- ❑ Commitments for Capital Expenditures
- ❑ Tax and Source Deductions and Remittances
- ❑ Restrictions on Doing Business
- ❑ Clients and Outstanding Agreements
- ❑ Good Standing of Agreements
- ❑ Affiliations and Joint Ventures
- ❑ Insurance
- ❑ Government Assistance
- ❑ Liens, Charges, and Title to Assets
- ❑ Work Orders and Deficiencies
- ❑ Construction Liens affecting the Practice
- ❑ Real and Intellectual Property
- ❑ Leases of Equipment
- ❑ Condition of Property and Equipment
- ❑ Status of Vendor, i.e., Bankruptcy, Citizenship, Arms Length

Post-Closing Matters

- ❑ Non-Competition — Continuing Employment
- ❑ Confidentiality
- ❑ Employees — Restructuring Employment
- ❑ Release by Vendor
- ❑ Announcements
- ❑ Releases from Guarantees
- ❑ Indemnities and Set Off of Obligations
- ❑ Other Obligations Continuing After Closing

The foregoing is a list of common concerns and clauses in agreements for the sale of a practice. The list is not exhaustive, will vary in individual circumstances, and cannot replace legal advice. Architects should consult a lawyer before negotiating or entering into such an agreement.

Public Relations and Marketing

Introduction

> *Marketing and public relations are an integral part of every architect's practice. Firms of every size and type must devote some level of attention to securing commissions and bringing their work before the public.*
> (Cooper and Moore)

As the above quotation points out, today's architectural practice must develop a public relations and marketing strategy to succeed and flourish.

Public relations for architects involves communicating the value of architecture and of architectural practice to a wide range of audiences. Public relations is directed to the community at large, whereas **marketing** usually focuses on specific projects and clients. A coordinated and integrated strategy is necessary to promote the practice and acquire new projects.

This chapter briefly discusses public relations and marketing within an architectural practice.

Public Relations

Public relations is a series of activities which provide opportunities for the architect to become known in the community. Good public relations sets the stage for successful marketing.

These activities may include:

- community involvement, such as:
  - giving lectures and speaking in public on architectural topics;
  - conducting seminars;
  - sitting on volunteer boards;
  - joining service clubs;
  - providing "pro bono" architectural services to community organizations;
  - conducting design charrettes;
  - sponsoring community events;
- good media relations, such as:
  - issuing news releases;
  - publishing technical papers, or articles in journals;
  - participating in trade shows;
  - undertaking professional criticism of architectural projects;
  - entering design competitions;
  - preparing and distributing newsletters for the practice;
  - promoting design or architectural awards.

Architects should strive to better inform the public about the value of architecture and architects. Public awareness about the value of architectural services can open new markets for the architectural practice and helps to create a receptive environment for the architect in future marketing activities.

Marketing

Many architects contend that "marketing" should be a significant element of the "Strategic Plan" of all architectural practices. (Refer to Chapter 2.1.1, *Organization of an Architectural Practice*, for a brief discussion of a strategic plan.) Marketing activities can vary widely based on the size of the practice; however, all firms should establish an appropriate annual budget for marketing. Marketing is not merely overhead; there is a correlation between a firm's profit and growth and the amount spent on marketing.

Some people distinguish between "marketing" and "selling." In an architectural context, marketing includes everything related to business development, including the planning and administration of all marketing activities,

as well as obtaining new clients and ensuring the delivery of high standards of architectural services for repeat business. Selling essentially means identifying who requires architectural services and securing the commission.

Marketing can be viewed as one part philosophy, one part process, and one part function.

As a *philosophy*, marketing should engage the architect in the never-ending pursuit of client satisfaction. It compels every architect to search out new ways for efficiently meeting, or exceeding, client expectations. The architect must learn to be "client" oriented rather than "production" or "design" oriented. Refer also to Chapter 1.2.2, *The Client and Users*.

Marketing as a *process* involves identifying potential clients. An effective marketing strategy sub-divides "market demand" into manageable segments. Each segment is made up of a group of potential clients who share common needs, attitudes, and behaviours that are different from other market segments. By bringing these similarities and differences into clearer view, it is easier to identify:

- who to pursue for future projects and architectural services;
- what to include and highlight in presentation material;
- potential risks and rewards from each market segment.

Refer also to the "GO NO-GO Checklist to Assess the Degree of Risk" in Chapter 2.1.9, *Risk Management and Professional Liability*.

The marketing terms and concepts of "client satisfaction," "value creation," and "market segment" require that marketing be integrated into the daily operations of the architect's practice as a *function*. It is important to track the "proposal closing rate," that is, to identify the number of successful commissions compared to the number of proposals prepared. The "proposal closing rate" can be compared with various marketing activities to determine which methods work best for the practice. Ongoing marketing as a part of the daily routine of all principals will help control the type, amount, and pace of the practice's work.

Marketing: Two Points of View

In developing a marketing plan, all activities must be viewed from two different perspectives:

- the perspective of the architect or architectural practice;
- the perspective of the actual or potential client.

The Architect's Perspective

To develop a marketing strategy, the architect must answer the following questions:

- What types of client and project does the practice want?
  - individual, corporate or institutional?
  - what type of reputation?
  - what size of construction budget?
  - what type of building?
  - what values regarding design and project management?

- What service does the practice want to provide for these clients?
  - what are the firm's strengths?
  - what are the firm's interests and aspirations?
  - what are the firm's capabilities?

- How does the practice want to provide these services?
  - geographically?
  - with what resources?
  - technologically?

- When to work?
  - what hours of the day?
  - what days of the month?
  - what months of the year?
  - at what stage in the life of the facility?
  - at what point in the client's decision-making process?

- Why does the practice want to do this?
  - to meet lifestyle goals?
  - to meet career goals?
  - for financial reasons?
  - to satisfy architectural goals?
  - to satisfy ideological or altruistic beliefs?

- How will the work be carried out?
  - composition of design team?
  - financial arrangements?
  - operational arrangements?

- What are the risks involved?
  - with this particular client?
  - for the services offered?
  - for the fees charged?
  - in the place of the work?
  - for marketing and promotion to win the project?

The Client's Perspective

These same issues should be considered from the client's point of view. Other partners or associates in the practice can help to develop and analyze this perspective. Client satisfaction surveys can also help in this process.

To help identify clients in the preferred market segments, pose the following questions:

- What market segments are of interest to the practice?
- What are the prevalent needs, wants, and behaviours among prospective clients in these segments?

It is helpful to ask questions about competitors to determine the competitive position of the practice:

- Within each market segment, who are the main providers of architectural services?
- What is their share of the market?
- What is the basis for their competitive advantage?
  - fees?
  - specialized architectural services?
  - reputation for quality/leading-edge design?
  - promotion?
  - location?
- Can this practice make an offer that is unique and compelling to prospective clients given the other choices available to them?
- What drew former clients to this practice?

Once some of the elements of a marketing plan have been determined, potential clients or "leads" need to be identified. Some techniques for identifying "leads" include:

- compiling names of the potential clients or purchasers of architectural services in each of the preferred market segments (building a database using the latest "contact" software);
- developing a list of organizations and the person(s) responsible for decisions related to architectural services, and for the selection of the architect;
- maintaining a "clipping" service (to monitor relevant articles from newspapers and journals);
- organizing business development meetings;
- networking;
- surveying past clients;
- researching Web sites;
- consulting MERX.

MERX is an electronic project information service for public-sector contracts. Federal, provincial, and territorial governments — as well as certain institutions in the "MASH" sector (municipalities, academic institutions, school boards, and hospitals) — use MERX for posting project opportunities and bids in Canada. The Web site for MERX is *www.merx.cebra.com*

The best source for both new business and new business leads is from existing or former clients.

Once leads have been identified, these prospects should be qualified by determining:

- their current and potential demand for architectural services;
- the main criteria they will use to select an architect.

A wide range of "contact" software is available. This type of software tracks leads and potential clients as well as the frequency and type of contact (for example, telephone call, letter, luncheon date).

The practice should situate each lead in the appropriate stage of the relationship-building process and plan the details of subsequent marketing and promotion. An action plan can then be prepared for each lead or prospect.

After an initial contact, the practice should evaluate the response from each lead and adjust the action plan based on:

- the prospect's reputation as a client;
- the likelihood of the project proceeding;
- the architectural practices from which the prospect will solicit proposals;
- the likely value of the commission;

- the risks attached to winning the commission;
- the cost of pursuing the prospect further.

In pursuing the lead, the architect should remember that a prospective client may actually include several people:

- those who influence the decision-makers — "influencers" in marketing jargon;
- the decision-makers themselves — "buyers" in marketing jargon.

Professional Relationships

If one function of marketing is to create value and client satisfaction, the best form for achieving these is through a long-term, contractual relationship. True value will emerge from the provision of consistent, committed, efficient, and high-quality service over time.

Service in this context is not limited to design: architects are often asked to fulfil a number of roles such as facilitator, efficiency expert, construction accountant, mediator, and problem-solver. Building professional relationships, or "relationship marketing," should be a major part of a marketing plan. A professional relationship is started when a prospective client attaches an image to an architect's name.

Promotion can play a role in developing a relationship. Usually, a professional relationship begins when a prospective client is about to select a consultant. Although the initial contact may not result in a commission, the architect should take advantage of the situation and start to build a solid long-term relationship with this prospective client.

Promotion

Promotion is providing information, motivation, and direction to those individuals who will decide on the timing and terms of selection of an architect. Promotion leads the architect to prospective clients and provides the opportunity to propose a potential offer for services, instead of leaving the opportunity to chance, circumstance or the competition.

The success of effective promotion, like effective design, is based on the efficiency with which the promotion brings about the desired response. Effective promotion brings the right message at the right time to the right audience using the right medium. There are four stages of promotion.

Stage 1: Build Market Awareness

The marketplace needs to know about the architectural practice. The architect must promote the practice and its service, and disseminate the following information:

- the name of the practice and all contact information;
- the services available;
- the preferred building type(s);
- business, architectural, and financial credentials;
- the reasonableness of fees in relation to the quality of service;
- the performance record;
- the skills and availability of principals and staff;
- evidence for substantiating all such claims.

The objective at this stage of promotion is to motivate potential clients to want to learn more about the architect, and to tell them how to get more information about the practice.

Stage 2: Reinforce Interest

"Awareness-building" should result in prospective clients wanting to learn more about the kinds of services the architect can provide. In reinforcing the interest of a potential client, communications should progress from supplying general to more specific information on how the practice can fulfil the client's needs.

Stage 3: Generate Client Commitment

If the prospective client's interest is met or surpassed, the prospective or potential client should perceive that a "fit" is possible. The challenge at this stage is to discuss, and then negotiate, the various terms of an agreement. The prospect may be conducting similar negotiations with other architects at this stage.

Stage 4: Support the Commission

Once the contract has been executed, the architect should take steps to ensure that the new client understands how much the architect values the commission. Just what action should be taken to develop and maintain a professional relationship depends on the architect, the client, and the value of the contract.

Methods of Promotion

Each of the following methods for promoting an architectural practice is based on the "stage" of promotion as described above.

Building Market Awareness

The firm can use:

- corporate stationery and business cards;
- directory listings;
- articles, such as those published:
  - by members of the firm;
  - about the firm and its work;
- lectures and speeches;
- exhibits;
- sponsorships;
- membership in community organizations;
- philanthropy;
- volunteerism;
- original research and surveys.

Web Sites

Establishing a Web site for the practice is another way to build market awareness. However, a site is only as valuable as it is useful and thus architects should consider why they want to create a Web site. Possible reasons include:

- creating a presence on the Internet and a convenient method for displaying images of built work and designs;
- providing clients and project team members with access to information about a specific project;
- providing useful information to the public about the built environment.

Although a Web site can do all these things, using it as a marketing tool is probably the primary motive. Its effectiveness depends on it being part of a larger marketing plan.

Reinforcing Interest

The firm can use:

- brochures;
- Web pages;
- slide presentations, videos, and computer presentations;
- display boards;
- exhibits;
- letters of introduction;
- postcards or greeting cards;
- direct mail;
- newsletters.

Generating Client Commitment

The firm can use:

- one-on-one interviews and presentations;
- portfolios (including targeted portfolios);
- photographs and videos;
- customized computer presentations;
- models of previous projects;
- proposals.

Supporting the Commission

The firm can use:

- announcements or news releases;
- advertisements;
- special events;
- newsletters;
- greeting cards.

Promotional Material and Proposals

As projects are completed, every architectural practice should establish standard procedures to document information needed for presentation material or firm brochures. Refer to Chapter 2.3.1, *Management of the Project*, for details on assembling material as part of the office routine at project closeout.

Promotional material should be gathered at the start of a project. The practice should compile the following information:

- initial budgets — these can be compared with actual construction costs;
- concept sketches — these show creativity and the design process;
- samples of functional programs and design briefs — these are useful for written descriptions of a project;
- a complete project history at close-out.

In preparing promotional brochures or proposals, the architect must:

- **always provide the proper credit** for all projects (to avoid misrepresentation, describe the role of the architect in each project accurately);
- **notify references** that their names will be used and request permission for their use (if the response is enthusiastic, request a letter of reference which can be used in promotional material and brochures; however, if the client is reluctant it may be prudent to avoid using the reference).

Refer also to Chapter 2.1.6, *Communications*.

When preparing proposals, the architect should ensure that the fee, if requested by the prospective client, will be adequate to provide the appropriate services. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*.

Competitions

Many architects establish their reputations through architectural competitions of which there are two types:

- open competitions;
- limited competitions.

Open competitions for building projects are restricted to licensed/registered members. The competitions must be conducted according to the rules prepared by the Committee of Canadian Architectural Councils (CCAC) and outlined in *Canadian Rules for the Conduct of Architectural Competitions: Document Five* or to those outlined in the *Guide des concours d'architecture du Québec* prepared by the OAQ. These rules require the engagement of an architect as a professional advisor, who is responsible for:

- advising the owner or sponsor;
- preparing the conditions of the competition;
- making arrangements for the competition.

Limited competitions are usually restricted to a short list of participants. Several provincial architectural associations have rules or guidelines for the conduct of limited competitions.

International competitions for architectural projects may be conducted under conditions unique to the country holding the competition. The International Union of Architects (UIA) has prepared guidelines for conducting international architectural competitions in its publication, *Instructions and recommendations to promoters of international competitions in architecture and town planning*.

References

Committee of Canadian Architectural Councils (CCAC). *Canadian Rules for the Conduct of Architectural Competitions: Document Five*. Ottawa, Ont.: CCAC, 1990.

Cooper, David and Barry M. Moore. *Marketing and Public Relations*. Washington, D.C.: The American Institute of Architects Press, 1988.

International Union of Architects (UIA). *Instructions and recommendations to promoters of international competitions in architecture and town planning*. Paris, France: UIA, 1978.

Pickar, Roger l. *Marketing for Design Firms in the 1990s*. Washington, D.C.: The American Institute of Architects Press, 1991.

PSMJ Resources, Inc. *Marketing Tactics*. A monthly journal. Newton, MA.

Royal Architectural Institute of Canada (RAIC). RAIC Practice Builders. Ottawa, Ont.

An Intense Look at Decision Makers.

60 Winning Proposal and Presentation Tips.

Strategic Planning = Market Share.

Tips for Successful Marketing.

Shenson, Howard L. and Jerry Wilson. *138 Quick Ideas to get more Clients*. Toronto, Ont.: John Wiley & Sons, Inc., 1993.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives, Inc., 1999.

Financial Management

Introduction

This chapter will provide a short introduction to financial management, an essential activity for every architectural practice. Good financial management systems will help the practice reach its strategic objectives as well as financial goals.

Profit

The practice of architecture is a business and must produce a profit. Appropriate financial planning should always include a reasonable profit. After a percentage of the profit is set aside as a capital reserve, the balance may be distributed to shareholders (if the practice is incorporated) and to staff. In "lean" years, the capital reserve may be very little or non-existent; however, in "very profitable" years, the capital reserve could be as much as 50% of the practice's profit.

A profit is required in order to:

- build a reserve for cyclical downturns;
- purchase assets;
- pay out retiring or dismissed employees;
- build a successful financial history for borrowing funds;
- invest in research and professional development;
- reward owners for efforts expended and risks taken.

Distribution of profits to staff should be based on the practice's established policy and on factors determined in a performance review, such as:

- ability;
- productivity;
- professional growth.

Refer to Chapter 2.1.7, *Human Resources*, for information on performance reviews.

When the practice is owned by shareholders or partners who have invested capital in the practice, their investment should earn interest at the bank's prime rate of interest, plus an additional percentage which represents a reasonable return for their financial risk.

Financial Planning

Financial planning should be a part of the strategic plan of every architectural practice. **Long-range financial planning** can span two to ten years. Usually, long-range financial planning covers a five-year period. It is the basis for managing an architectural practice, and should include:

- strategic goals and objectives of the practice;
- revenue projections;
- goals for profit;
- budgets for overhead expenses, including any new capital expenditures;
- staffing plans, including number and type of staff.

This financial plan should identify income and expenses projected for any new direction for the practice, for example, the delivery of new services and associated costs required to:

- hire staff;
- undertake research and marketing;
- buy or lease new premises;
- finance professional development and training;
- purchase or lease new furnishings, equipment, and software.

If the practice must downsize as a result of an economic downturn or for another reason, a financial plan is necessary to resolve issues, such as:

- relief from a lease for office space;
- the need to lay off staff (refer also to Chapter 2.1.7, *Human Resources*).

Short-term financial planning, usually called **budgeting**, covers a time period of 12 months primarily because of the requirements for annual financial statements and the normal fiscal year. Budgets show projected income and expenses.

The budget — including all income, expenses, and profit — should be constantly monitored, usually on a monthly basis. The budget should also record the previous year's revenue and expenses, as well as the difference between the budgeted and actual revenue or expenses.

Projected income includes:

- work-in-progress;
- anticipated professional income (based on the previous year's records);
- other anticipated income.

Projected income must be adjusted to account for the current and projected economy in the construction industry and any extraordinary conditions.

Projected expenses include:

- estimated expenses (based on the previous year's records);
- changes in expenses which have occurred or will occur (such as staff pay raises or rent increases);
- increased expenses to meet long-range planning targets, for example:
  - increased staff requirements;
  - increased office space or other overhead expenses.

Profits are usually estimated as a percentage of projected revenues and should be identified in relation to the long-range financial plan.

The architect can use the "Annual Budget Calculation Sheet" at the end of this chapter to help prepare an annual budget.

Both budgeting and long-range financial planning should include appropriate salaries — commensurate with ability and experience — for principals and directors.

Accounting

Accounting provides information useful for making financial and economic decisions. There are two types of accounting:

- internal accounting;
- external accounting.

Internal accounting, sometimes called management accounting, is done within the architectural practice — often by staff, a bookkeeper, or other professional such as a comptroller.

External accounting, usually performed by an independent accountant, frequently includes the preparation and examination of financial statements in order to express an opinion on the financial position of the practice.

An audit is an independent and objective examination of accounting records and other necessary documentation in order to express an opinion on the fairness of a balance sheet and other financial statements.

Accounting Systems

Records of accounting are statutory requirements. The better and more accurate the records, the greater the opportunity for more accurate long-range planning and budgeting and, in turn, the greater the opportunity for profit. There are two different systems of accounting:

- cash system;
- accrual system.

Cash System

The **cash system** records each "cash" transaction as it occurs, using two types of entries:

- income or receipts;
- expenses or payments.

Entries begin with the bank balance, and they are made in three columns as they occur:

- deposits or income (first column);
- payments or cheques issued (second column);
- the running balance (third column).

[Note: a negative balance is identified with brackets or with a minus (-) sign.]

Although the cash system shows the actual cash position at any given moment, it is of little value for financial statements and does not provide any information related to profit and loss.

Accrual System

The **accrual system** records all income — including work-in-progress — and expenses as they occur in the general ledger. It shows the current financial position of the architectural practice, usually on a monthly basis.

Using the accrual system, two types of financial reports are prepared:

- statement of income and expenses;
- balance sheet.

Statement of Income and Expenses

A **statement of income and expenses** provides:

- a summary of income, including work-in-progress;
- expenses incurred against all income, including work-in-progress;
- an accounting of profit or loss for the time period.

Most accounting software will provide this information at regular periods.

The statement has three principal components:

- income;
- expenses;
- profit.

Income includes:

- professional fees invoiced [Note: fees for consultants are received "in trust" and if payments to consultants are not made as fees are received, the monies owing should be put into a separate account until due and payable];
- work-in-progress [Note: if all accounts are invoiced monthly, reporting of work-in-progress is not necessary];
- reimbursable expenses invoiced;
- interest income;
- miscellaneous income.

Income recording can also be sub-divided to identify income from separate offices or separate areas of practice, or by individual projects.

Expenses include:

- salaries [Note: this can be sub-divided into categories such as principals (partners or directors), professionals, technical staff, support staff];
- payroll burden;
- consultants' fees;
- overhead expenses, sub-divided by category.

Refer to Illustration 1 for a typical "Statement of Income and Expenses" for a medium-sized architectural practice. This statement would be prepared after all financial records for the fiscal year 1999 had been completed. The left-hand column reflects a **history** of the practice's financial activities for 1999. The right-hand column illustrates a budget or **future** financial activities based on anticipated revenue and expenses. The increased revenues may be predicted as a result of recently acquired projects or a buoyant economic environment. Similarly, an increase is projected for wages and benefits as more staff will be required to undertake the increased workload. Other costs are projected to increase proportionately as a result of increased staff and work.

Illustration 1: Sample Statement of Income and Expenses

Revenue	1999	Budget for 2000
Professional fees	$890,000	$1,060,000
Reimbursable expenses	90,000	106,000
Interest revenue	1,000	0
Other income	0	0
TOTAL	**981,000**	**1,166,000**
Expenses	**1999**	**Budget for 2000**
Wages and benefits	$390,000	$466,000
Consulting fees	70,000	85,000
Management fees	70,000	90,000
Printing and reproduction	14,000	17,000
General office supplies	30,000	42,000
Rent	26,000	26,000
Temporary employment services	8,000	6,000
Insurance	28,000	33,000
Travel	20,000	22,000
Automobile expenses	25,000	25,000
Depreciation and amortization	24,000	22,000
Bad debts	26,000	20,000
Bank charges and interest	8,000	9,000
Legal and accounting fees	6,500	7,000
Telephone and facsimile	7,500	8,000
Delivery and postage charges	9,000	8,000
Photography	4,000	4,000
Architectural supplies	6,500	8,000
Business taxes	7,500	7,500
Memberships and dues	4,000	4,500
TOTAL	**784,000**	**910,000**
Revenue less expenses	**$197,000**	**$256,000**

Balance Sheet
Usually an accountant will prepare annual financial statements, including a **balance sheet** and a 12-month statement of income and expenses using the following architect-supplied information:

- the general ledger;
- payroll records;
- statements of income and expenses;
- other information.

Balance sheets are important for the monitoring of profit margins and loan commitments as well as for financial planning. The balance sheet indicates the assets and equity position of the practice as well as all liabilities including debts. A balance sheet, and a 12-month statement of income and expenses, are sometimes required by:

- banks, for a line of credit or a loan;
- professional liability insurers;
- governments, for taxation purposes;
- other architects, when restructuring the ownership of the practice or selling the practice.

Financial Professionals

Accountants

An accountant is a licensed professional who adheres to certain professional standards and the use of established accounting principles. An accountant should respond to the needs of the practice by advising on the type and extent of financial services required for the size and complexity of the practice.

The accountant's task will be easier, resulting in lower fees for accounting services, if the architect practises good financial management and keeps proper books of account, including:

- general ledger;
- accounts payable;
- accounts receivable;
- payroll records.

Later in this chapter, the section "Project Cost Control Information" lists a few software programs which are available for keeping these accounts. Accountants should be familiar with most of these software programs and be able to provide advice on the software suitable to the size and complexity of the practice. Generally, all payroll software should be for use in Canada.

When engaging an accountant, as with all professionals, it is necessary to establish a clear understanding of the following:

- the services to be provided;
- the "deliverables" or financial reports;
- the professional fee.

The architect involved in the financial aspects of the practice should develop a rapport with the accountant. Nevertheless, it is good practice to request proposals from other accounting firms every three to five years. Proposals from firms of various sizes — and from certified general accountants or certified management accountants, in addition to chartered accountants — should be considered.

Bankers

It is also important to establish a professional relationship with a banker. Proper long-range financial planning and the establishment of a capital reserve should eventually enable the architect to avoid having to finance day-to-day operations. When funds for the operation of the practice are not required, it is possible to "tender" for the bank service fees by asking two or more banks to quote on the charges for various banking services. Instead of acquiring a short-term loan to finance operating expenses, many businesses negotiate a line of credit which can be used when and as required up to a limit arranged with the bank.

The best time to negotiate for a line of credit is when financing is not required. In this case, the cost is usually reasonable in the form of a low standby fee, and the line of credit will be in place when it is required. The interest rate quoted will probably be determined by the bank's perception of the level of risk in financing the architectural practice. The interest rate charged by the bank will be expressed as the percentage over the "bank rate" or "prime rate." (The prime rate is the fluctuating rate which banks charge their best customers.)

When the practice does need to borrow funds, the architect should provide complete records of past performance, plus detailed budgets and long-range financial plans. This information assists the banker in deciding on a line of credit for the practice. The amount of credit is usually a percentage of the accounts receivable and work-in-progress. If the amount requested is high, the bank may demand a higher percentage rate of interest over "prime" on the loan, and usually requires personal guarantees from principals, directors or major shareholders.

A well-prepared cash flow projection (see Illustration 3) for the year ahead is necessary to successfully negotiate a line of credit with the bank. An accountant can provide advice on the information required by banks for approving loans and a line of credit.

Information for Financial Management

Accurate and complete financial information can assist the architect in preparing accurate budgets, and in monitoring and controlling expenses incurred in providing architectural services. Various forms for financial management purposes are provided in Chapter 2.2, *Standard Forms for the Management of the Practice*, including the following:

- Invoice;
- Fee Calculation Sheet;
- Project Cost Control Chart;
- Time Report;
- Expense Claim Form;
- Purchase Order.

Fee Calculation

When determining fees for services, the architect must identify and determine the following:

- each component of the services to be provided;
- the cost of production for each component (including direct and indirect costs);
- the profit margin to be achieved.

All projects should generate a profit. The only possible exception to this principle is when the loss is part of a long-range or short-term strategy (such as undertaking a new and unknown building type). Such a loss can be endured only if:

- the loss is clearly forecast;
- adequate reserves are available to underwrite the loss.

The various methods of compensation, or methods of fee calculation, are outlined in Chapter 2.1.10, *Architectural Services and Fees*.

Regardless of which method is selected, the architect should also estimate the amount of time needed to complete all the required tasks for the project, as well as the associated costs, by using staff "billing rates" (also called charge-out rates). This estimate can be used to check whether the proposed fee will be adequate to complete all the services to be contracted, and if a profit can be realized.

For example, when estimating the fees for schematic design, the architect should:

- calculate how many hours it will take to develop one schematic design, by whom, and at what billing rate;
- estimate the time to develop subsequent designs using the same procedure, as it may be necessary to undertake two or three schematic designs;
- define in the agreement how many different alternative schematic designs will be developed;
- quote an additional fee for each subsequent alternative beyond the number quoted.

A "Fee Calculation Sheet" is provided in Chapter 2.2, *Standard Forms for the Management of the Practice*, for this purpose.

Adequate profit margins may not be achieved if:

- additional time on the project is required due to unexpected circumstances;
- additional time is not billable as an "additional service";

- too low a fee was offered or negotiated;
- the time required to provide adequate services was incorrectly estimated;
- the project was poorly managed.

[Note: Additional time is often required when the project is a building type with which the practitioner is not familiar.]

Billing Rates

The *Canadian Standard Form of Agreement Between Client and Architect: Document Six* defines "direct personnel expense" and provides the opportunity to invoice for services using multipliers when the fees are charged on an hourly basis.

Establishing billing rates is becoming more complex in today's competitive business environment. Billing rates must include overhead costs, including:

- office rent and operating costs;
- equipment purchasing or leasing, and maintenance;
- secretarial, clerical, and bookkeeping services.

Some large offices may have several staff positions that contribute to office overhead; their services are not chargeable directly to clients.

The salaries and benefits of each employee in the practice are known factors and can be converted to an hourly direct personnel expense by dividing the annual salary-plus-benefits (as defined in Document Six) by the number of *billable hours* in a year. One method for determining the number of billable hours in a year is to multiply regular daily hours by 365 days and deduct the following:

- weekends;
- statutory public holidays (nine to twelve per year);
- two to four weeks for vacations;
- an allowance for sick leave;
- an allowance for non-productive time.

The billing rate is determined by applying a multiplier to the calculated hourly direct personnel expense. The multiplier is a factor which includes overhead plus profit, and can vary from 1.8 to 3.0 depending on the size of the practice and its location (such as an urban centre with high costs).

A rule of thumb for calculating billing rates is to add 20% to the hourly rate for payroll burden, double the total for overhead, and add 50% of the overhead for profit. This is the equivalent of a multiplier of 2.5 applied to the direct personnel expense.

The following is an example for an employee with an hourly wage of $20. In this example, the profit is 20%.

Employee's hourly wage	$20	
Payroll burden (20% of $20)	$4	
Sub-total (direct personnel expense)		$24
Overhead		$24
Profit (50% of $24)		$12
Billing Rate		**$60**

Utilization Factors

The percentage of billable hours as compared to the total hours of work in a year is called the "utilization factor." Utilization factors may range from:

- 50-65% for principals;
- 70-80% for senior architects;
- 80-85% for project architects and technical staff.

Some personnel, such as those involved only in marketing or management, may have no billable hours and therefore no utilization factor. Utilization factors should be monitored regularly because of the direct correlation between high utilization factors and high revenue potential.

Illustration 2 is a typical utilization analysis:

Illustration 2: Calculation of Utilization Factors

1. Calculation of Total Available Billable Hours		
1.1 Available hours:	37.5 hours x 52 weeks =	1,950 hours
1.2 Non-billable hours:		
Vacations	14 days	
Statutory holidays	8 days	
Other	4 days	
Sub-total	26 days x 7.5 hours = 195 hours	
Reduced summer hours	22 days x 2.5 hours = 55 hours	
Total non-billable hours		(250 hours)
1.3 Total Available Billable Hours		**1,700 hours**

2. Utilization Factor					
Staff	**Actual Billable Hours**	**Total Available Billable Hours**	**Utilization Factor**	**Billing Rate**	**Fees Billed**
Principal	935	1,700	**55%** $\left(\frac{935}{1700}\right)$	$125/hour	$116,875
Senior Architects (2)	1,360	1,700	**80%** $\left(\frac{1360}{1700}\right)$	$90/hour	$244,800
Junior Architects (2)	1,445	1,700	**85%** $\left(\frac{1445}{1700}\right)$	$75/hour	$216,750
Architectural Technologists (5)	1,580	1,700	**93%** $\left(\frac{1580}{1700}\right)$	$50/hour	$395,000

Project Cost Control Information

Information used to control project costs helps the architect to monitor income, expenses, and profit for each segment of the work on a project. A sample form, "Project Cost Control Chart," is provided in Chapter 2.2, *Standard Forms for the Management of the Practice*. This is a very basic chart; however, many other software programs are available to assist the architect in monitoring project costs. Some of the common software programs include:

- Wind2;
- Timberline;
- Semaphore;
- Clerk of the Works;
- Protrax.

Project cost control information should be monitored weekly to ensure that all tasks are completed within the estimated time and budget.

Time Reports

Time reports or time sheets should record sufficient information to provide summaries of time spent, on a weekly basis, for each task or portion of architectural service. The type of service and phase of the project should be accurately identified in order to measure budgeted time against actual time spent.

For example, if a fee for schematic design has been budgeted at $12,000 and if one person with an hourly wage of $20 per hour will be

assigned to produce this schematic design, the practice must budget $60 per hour, which calculates out to $12,000 ÷ $60 = 200 hours. If the individual has a utilization rate of 90%, then 90% of 37.5 hours per week = 33.75 hours of billable time. At a rate of 33.75 hours per week, it would take 200 ÷ 33.75 = 5.92 weeks (say 6 weeks) to complete the work. Reviewing the weekly time sheets in conjunction with the progress of the work will help to verify whether or not the design is advancing at approximately 17% per week.

A "Time Report" form is provided in Chapter 2.2, *Standard Forms for the Management of the Practice*.

Cash Flow Forecast

A cash flow forecast is helpful in projecting the practice's cash position over a 12-month period. Such a forecast is needed to determine how much cash will be required to meet expenses for the short term and for any additional requirements of working capital from a line of credit.

The forecast should reflect the following on a monthly basis:

- operating funds required;
- line of credit required;
- relationship between revenues and operating expenses.

Several computer software programs are available to assist in the preparation of these forecasts. In preparing a cash flow forecast, a client's payment history should be considered because many clients take longer than 30 days to pay invoices. The forecast should be monitored every month by comparing actual revenues and expenses with those forecast. The forecast should be updated quarterly. A sample cash flow forecast is shown on Illustration 3.

Invoicing

The use of the invoice form is discussed in section 2.1 of Chapter 2.2, *Standard Forms for the Management of the Practice*. Useful tips on invoicing and collecting accounts are found in Chapter 2.1.9, *Risk Management and Professional Liability*.

Other Financial Management Issues

Compensation

Ideally, compensation for all professionals in an architect's office should be similar to compensation paid in other professional practices, assuming similar levels of responsibility as well as similar time and energy expended. In reality, all staff — including senior, junior, and intern architects; technical staff; and support staff — are compensated based on market conditions. Compensation also includes comfortable working conditions and professional career opportunities and challenges.

Surveys and information on standard levels of compensation are available from:

- federal government surveys;
- surveys by professional associations;
- surveys by architectural journals;
- an exchange of information with other architectural practices.

Proper financial management and current statistics enable the architect to properly compensate staff, thereby helping to increase productivity.

Tax Planning

Accounting advice should be sought for proper tax planning. The financial management of an architectural practice must consider the following taxes:

- **Goods and Services Tax** (GST), or Harmonized Sales Tax (HST) in some provinces, must be collected on all income. The total amount collected is reduced by the amount of GST/HST paid to vendors. The difference due to the government is usually paid quarterly.
- **Employees' income tax** is deducted by the practice for every employee for every pay period. Payment is made to the federal government at intervals determined by the pay period. Income tax deductions include provincial income taxes as well as federal income taxes, CPP, and EI.

  In Québec, federal income tax and EI are paid to the federal government; provincial income tax and QPP are paid to the provincial government.

- **Personal income tax** is usually based on the previous year's income taxes and should be remitted in quarterly installments. An accountant may provide the architect with a schedule for remittances.
- **Provincial sales tax** (PST) is paid as supplies are purchased. Unless these supplies are sold again, PST is not collected or required to be collected by architectural practices, except in Québec where it must be collected.
- **Corporate taxes**, if the practice is incorporated, will be estimated by the accountant and should be remitted quarterly.
- **Business taxes** are charged by some municipalities for operating a business in their jurisdiction. [Note: in some municipalities, an architectural practice requires a business licence in order to provide services for a project located in that municipality, even though the practice is located elsewhere.]

[Note: the penalties for late payment are severe, and taxes should always be remitted on time.]

Illustration 3: Sample Cash Flow Forecast

Cash Flow Forecast													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Cash/Bank Begin Month	$12,500	$13,590	$6,700	$4,790	$5,180	$4,570	$8,660	$2,050	$(360)	$3,030	$10,920	$11,510	$15,350
Revenue													
Acme Addition	$8,500	$4,000	$4,000	$1,500	$1,500	$1,500	$1,500	$1,000	$500	$500	$500	-	$25,000
Dromme House	$4,000	$4,000	$3,000	$3,000	$3,000	$2,500	$1,500	$500	$500	$500	-	-	$22,500
St. Bergen Church	$6,500	$3,000	$2,500	$1,000	$1,000	$1,000	$500	$500	$500	$500	-	-	$17,000
Drummville School	$5,000	$2,500	$2,500	$1,500	$1,000	$500	$500	$500	-	-	-	-	$14,000
Roberts Montessori	$4,500	$3,500	$2,000	$1,000	$500	$500	$500	$500	-	-	-	-	$13,000
Glayburne Residence	$1,000	$4,000	$2,500	$1,500	$500	$500	$500	-	-	-	-	-	$10,500
Boros Cottage	$500	$3,500	$1,500	$500	-	-	-	-	-	-	-	-	$6,000
Muffler Shop	$1,000	$1,000	$2,500	$4,500	$1,500	$500	$500	-	-	-	-	-	$11,500
Spirios Restaurant	$500	$1,500	$2,500	$6,000	$2,000	$1,000	$1,000	$500	$500	$500	$500	-	$16,500
Port Hope Townhouses	-	$1,500	$2,500	$6,500	$12,000	$12,000	$3,500	$3,000	$3,000	$2,000	$1,000	$1,000	$48,000
Boros Apartment	-	-	-	$1,000	$4,500	$8,000	$7,000	$1,500	$1,500	$1,000	$1,000	$1,000	$26,500
Sub-total	$31,500	$28,500	$25,500	$28,000	$27,500	$28,000	$17,000	$8,000	$6,500	$5,000	$3,000	$2,000	$210,500
Marketing Target (potential projects)	-	-	-	-	-	$5,000	$10,000	$15,000	$20,000	$25,000	$25,000	$30,000	$130,000
Forecast Total	$44,000	$42,090	$32,200	$32,790	$32,680	$37,570	$35,660	$25,050	$26,140	$33,030	$38,920	$43,510	$355,850
Expenses													
Payroll	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$192,000
Consultants	$9,500	$7,000	$6,500	$6,000	$6,500	$8,000	$6,500	$4,500	$2,000	$1,000	$6,500	$7,500	$71,500
Rent	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$28,800
Membership dues	-	$1,280	-	-	-	-	-	-	-	-	-	-	$1,280
Insurances	-	$6,200	-	-	-	-	$6,200	-	-	-	-	-	$12,400
Supplies	$250	$250	$250	$250	$250	$250	$250	$250	$250	$250	$250	-	$2,750
Marketing	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	$9,600
Reproductions	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$2,400
Furniture/Equipment	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600	$7,200
Telephone	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160	$1,920
Miscellaneous	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$2,400
Legal/Accounting	$300	$300	$300	$1,000	$1,000	$300	$300	$300	$500	$500	$300	$300	$5,400
Forecast — Total Expenses	$30,410	$35,390	$27,410	$27,610	$28,110	$28,910	$33,610	$25,410	$23,110	$22,110	$27,410	$28,160	$337,650
Cash/Revenues — Expenses (end of month)	**$13,590**	**$6,700**	**$4,790**	**$5,180**	**$4,570**	**$8,660**	**$2,050**	**$(360)**	**$3,030**	**$10,920**	**$11,510**	**$15,350**	**$18,200**

Definitions

Accounts Payable: A record of accounts of money payable to consultants and to other suppliers for overhead expenses.

Accounts Receivable: A record of professional fees and disbursements which have been invoiced, whether or not payment has been received.

Aging Reports: A record of invoices due and past due.

Balance Sheet: A record of all **assets** such as bank funds, receivables, furniture, computer equipment, and all **liabilities** such as accounts payable and loans, and retained earnings which state the financial position of the practice at a particular point in time.

Cash Book: A record of the day-to-day cash position of the practice using the cash accounting method. All transactions are entered and a running balance is calculated.

Cash Flow: Adequate cash and other liquid assets to meet current payroll, consultants' fees, and other overhead expenses.

Depreciation: The percentage by which capital assets may be depreciated according to government tax regulations (referred to as Capital Cost Allowance).

Direct Personnel Expense: The salary of the architect's or the architect's consultant's personnel engaged on the project plus the cost of such mandatory and customary contributions and employee benefits as employment taxes and other statutory benefits, insurance, sick leave, holidays, vacations, pensions, and similar contributions and benefits.

Disbursement Record: A record of billable reimbursable expenses.

Fiscal Period: A 12-month period for which financial records start and end. (Previously, it was an advantage for a fiscal year to end early in the calendar year. Legislation now requires most professionals to pay taxes on the basis of a calendar year, which encourages the fiscal year-end to correspond to the calendar year.)

General Ledger: A record of all accounts, including receivables, payables, income and expenses, payroll, tax payments, disbursements, etc.

Multiplier: A percentage or figure by which direct personnel expense of staff is multiplied to cover overhead expenses and profit. (The result is used to establish a change-out, or billing rate.)

Office Overhead: Includes expenses for rent and utilities, office supplies, computer maintenance, automobile expenses, promotion and advertising, books and subscriptions, annual dues, leasing expenses (except as noted below), postage, delivery services, bank charges, interest charges, business taxes, donations, seminar and training expenses, and depreciation. [Note: consultant expenses, which are required to provide architectural services, are excluded from overhead. However, other consultants such as legal, accounting, and marketing are included in overhead expenses. The purchase or lease of major expenditure items such as automobiles, computers or office renovations are charged as office overhead only to the extent that such expenses can be depreciated in accordance with tax regulations.]

Payroll Burden: Includes required deductions (statutory benefits), including Employment Insurance (EI), Canada Pension Plan/Québec Pension Plan (CPP/QPP), health taxes, and workers compensation in addition to discretionary benefits such as insurance and pension plans, and bonuses.

Payroll Records: A record of salaries, taxes due and paid, and payroll burden for each employee.

Profit: An excess of revenue over expenses.

Project Cost Control Chart: A financial record of each project, which includes professional fees, consultants' fees, staff time expended, budgeted time, expended payroll, and profit and loss for each phase of the work.

Staff Utilization Records: Identifies monthly and year-to-date hours spent by each staff person on direct labour for projects, as well as hours for vacation, holiday time, sick leave, and miscellaneous overhead duties. The record should indicate a percentage of direct (billable) to indirect (non-billable) time. These records are used to develop billing rates for individual staff members, as well as for short- and long-term planning.

Statement of Income and Expenses: A report, often prepared monthly, documenting all income, all expenses, and the resulting profit or loss.

Tax Records: Includes personal income taxes, corporate taxes, and GST or HST.

Work-in-Progress (WIP): Work underway or complete but not yet invoiced.

References

Dauderis, Henry. *Basic Accounting*. Toronto, Ont.: Holt, Rinehart and Winston, Inc., 1978.

Getz, Lowell.

Financial Management for the Design Professional. New York, NY: Whitney Library of Design, 1984.

An Architect's Guide to Financial Management. Washington, D.C.: The American Institute of Architects Press, 1997.

Stasiowski, Frank A. FAIA. *Dollars & Sense — PSMJ's Guide to Financial Management*. Newton, MA: PSMJ Resources, Inc., 1997.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives, Inc., 1999.

Annual Budget Calculation Sheet

INCOME	Previous Year	Budget	Change
Professional fees			
Reimbursable expenses			
Interest			
Other income			
TOTAL			
EXPENSES	**Previous Year**	**Budget**	**Change**
Salaries			
Professional staff			
Technical staff			
Support staff			
Payroll burden and benefits			
Consultants' fees			
Management fees and expenses			
Legal fees			
Accounting fees			
Insurance			
Professional liability insurance			
Office insurance			
Life and disability insurance			
Other insurance			
Professional dues			
Professional development and training			
Office premises			
Rent			
Utilities			
Office maintenance and repair			

EXPENSES	Previous Year	Budget	Change
General office administrative expenses			
Printing and reproduction			
Leases for equipment			
Telephone, facsimile, electronic mail			
Office supplies			
Computer hardware, software, and maintenance			
Photography			
Postage and courier			
Taxes			
Business			
Property			
Other taxes			
Interest			
Charitable donations			
Automobile expenses			
Public relations and marketing			
Travel and entertainment			
Printing and proposal preparation			
Depreciation			
Losses and bad debts			
TOTAL			
PROFIT (income less expenses)			

Office Administration

Introduction

An architectural practice must be well-organized and well-managed in order to provide proper architectural services to the public and to be profitable. As well, good management decreases exposure to risk and liability. (Refer also to Chapter 2.1.9, *Risk Management and Professional Liability*.) This chapter discusses a few methods for improving the administration or management of an architectural practice.

Office Policies and Procedures

It is important to establish policies and procedures which govern the day-to-day operations of the architectural practice and to ensure that all employees are familiar with them. Therefore, policies and procedures should be documented in writing, ideally in the form of an "office manual." Amendments or new information may be added from time to time. The office manual is an important tool for both large and small offices. It becomes a guide to both management and staff regarding the many aspects of managing an architectural practice.

One advantage of such a manual is that, by adhering to its policies, all staff are treated fairly and consistently. The office manual is also a valuable resource when interviewing and hiring new staff. Prospective employees are understandably interested in learning about the firm's policies on such basic issues as working hours, overtime (if applicable), vacations. With an up-to-date office manual, principals can respond to these questions confidently and in a manner that is consistent with the policies already applied to existing staff.

The office manual can also help to communicate the firm's philosophy, goals, and, possibly, "mission statement." This ensures that staff are aware of the principals' underlying objectives and what is expected of staff. Some practices require all staff members to sign and date an acknowledgement attesting to the fact that they have read the office manual and agree to its terms.

At the end of this chapter, the "Checklist: Information to include in a Manual on Office Policies and Procedures" lists some of the issues to resolve and to include in an office manual.

Office Premises

The architect's office is a multi-functional operation. In addition to being the centre for the operation of the practice, it also fulfils a promotional role. The appearance of the office makes a statement about the practice's image and, to a certain extent, its degree of organization. As well, the space provides an opportunity to display examples of built projects and current designs. The first impression that visitors or prospective clients receive when they visit the office will be a lasting one. Therefore, the office should reflect the firm's philosophy by being orderly and well-organized. The premises also should support the organization and facilitate the control of all types of documentation.

Maintenance

The busier and more successful a practice becomes, the easier it is to ignore minor maintenance needs to the detriment of the office's professional image. One solution is to engage a reliable maintenance person — perhaps on an ongoing, as-needed basis — to address minor repairs quickly and economically.

Arrange regular office cleaning to suit the size of the firm and the level of activity in the office. Small practices may require a cleaning person once per week and may choose to have staff

take on some chores. Mid-sized offices may require more frequent service, and larger offices may require cleaning every evening. Cleaning services may be part of the lease in an office building.

When engaging office maintenance firms, architects should consider the need for office security and requirements for a bonded company.

Security

An architectural practice may have two areas of concern for security:

- security of computer systems;
- external security.

Security of Computer Systems
Security for each computer station is usually accomplished by the use of password protection. One approach for a small architectural practice which is not "networked" is to provide limited password protection. Under this system, access via a password is limited to certain files or projects. Principals may wish to set up password protection for certain managerial files. Computers used for accounting or bookkeeping purposes may require separate security provisions.

For networked offices, a hierarchy of security may be required. By definition, a networked office is designed to share information — particularly drawing files — among members of the firm. Too much security could reduce efficiency. A balanced approach to security and access to information should provide both without sacrificing either.

External Security
External security refers to the need to protect the office itself from intrusion to avoid theft or vandalism. Adequate security is important to protect confidential documents and computer databases. Some offices have a fire-rated "vault" for the storage of important documents and original software. It is also common practice for principals to store copies of documents in an off-site location, such as their personal residences.

Security systems vary in their complexity and features. A minimum standard should include an electronic alarm system, connected to a siren or signal and possibly monitored by a central security office.

Control of office keys is a concern too because of staff turnover. The practice should maintain a master log to control the distribution and retrieval of all keys. Depending on the rate of staff turnover, it may be appropriate to re-key locks on a regular basis.

Office Insurance

Insurance protection is important for covering the physical assets of the architectural practice. Most commercial office insurance policies are "package" forms, meaning that certain coverages are automatically included. Some of the extensions to property insurance usually available with a commercial policy package include the following:

- office contents, such as furnishings and computer hardware, software, and data;
- accounts receivable;
- exterior signs;
- personal effects of employees;
- glass coverage;
- valuable papers;
- property off premises (that is, located in site offices, employees' homes, etc.);
- property in transit;
- newly acquired location coverage;
- crime coverage.

In addition to property coverage, the policy should include Commercial General Liability (C.G.L.) protection.

The practice should consider other insurance protection, including:

- tenants' legal liability coverage;
- non-owned automobile liability coverage;
- employer's liability protection.

If the practice is a home-based business, a "Home-run Business" endorsement may be required on the home insurance policy.

An insurance broker can discuss the operation of the practice and advise on office insurance requirements.

Refer also to Chapter 2.1.1, *Organization of an Architectural Practice*, for other types of insurance requirements.

Filing and Retrieval Systems

It is good practice to thoroughly document all project activities and communications. Documentation minimizes the potential of future conflicts and provides the basis of a solid defence in the event of a claim being made by any project participant or if the architect is faced with other legal action.

Some of the types of documentation that the architect should maintain are described in Chapter 2.2, *Standard Forms for the Management of the Practice*, and Chapter 2.4, *Standard Forms for the Management of the Project*.

This section discusses possible filing systems in an architect's office for storing and retrieving this documentation.

Filing Systems

A successful filing system provides a central location for all project documentation and, more importantly, permits easy and immediate retrieval of information. The architect should consider printing file numbers on all correspondence to identify incoming mail, facilitate routing, and, finally, coordinate with filing procedures. Refer to Chapter 2.2, *Standard Forms for the Management of the Practice*, for a sample stamp for all correspondence. Files should not be created unless there is sufficient documentation or correspondence to warrant them. If a piece of communications discusses more than one subject, it should be duplicated and placed in all the appropriate files.

An architectural practice will require at least two types of filing systems:

- filing of information relating to the management of the **practice**;
- filing of information related to the management of the **project**.

Information related to the management of the practice may include employee records, business and professional liability insurance information, and overall financial records. This information requires a special — and possibly confidential — filing system, organized to meet the needs of each practice.

In addition, a separate file or series of files is usually established for each project, frequently filed by the project number. Key information should be at the start of the project file. Refer to Form 1.5, "Project Team Directory," in Chapter 2.4, *Standard Forms for the Management of the Project*, for a sample form.

One suggested system for filing project information is based on an architectural project's major phases:

- Pre-design;
- Design;
- Construction Documents;
- Bidding/Contract Award;
- Construction;
- Post-construction.

Within each phase, general headings can be provided which include categories for correspondence by, or to, the design or construction team members. This system provides flexibility and can be changed or expanded to suit the requirements of a particular project. Colour-coding the filing system can be used to identify file folders quickly.

The "Chart: A Project Filing Format," at the end of this chapter, suggests a possible project filing system. The Project Filing Format is intended as a guide only, and should be adapted to suit the needs of the individual architectural practice.

Retaining Files

The architect should always be aware of the potential for professional liability. Therefore, records should be maintained well beyond completion of the project. Good records help to prepare a good defence. However, maintaining extensive files for long periods may create storage problems. The architect should consider outside storage or microfilming of documents, once the contractor's one-year guarantee/ warranty has expired.

At a minimum, all project records should be retained until after expiry of the limitation period for pursuing a claim for professional negligence. The time period contained in the statutes of limitations varies from province to

province. Refer to the "Chart: Comparison of Statutes of Limitations in Each Province," in Chapter 2.1.9, *Risk Management and Professional Liability*.

Archiving Project Records

One final task often overlooked on a project is organizing records so that files will be orderly, well-labelled, up-to-date, and easily located. This is critical when information on a project is needed at a later date. Frequently, the retrieval is done by others not involved in the original project. It is good practice to place one copy of all final reports in the office library as reference material for future projects.

Archiving Electronic Files

It is also important to archive electronic files. The technology for storing this data is constantly changing and improving. When new software and hardware are purchased, the architect should ensure that they are compatible with the existing system used for storing electronic files.

The Office Library

In addition to a filing system, every architectural office should maintain a reference library. This library may include some of the following:

- information on building design and architectural practice;
- technical information on specific building products (product literature and samples);
- standards, codes, and other information such as statutes and regulations from Authorities Having Jurisdiction;
- information and practice bulletins from the architectural licensing authorities.

These materials should be stored in a central area, where they are easily accessible to the staff for daily use.

Product literature may be in the form of CD-ROMs, manufacturers' three-ring binders, or loose information (often gathered at trade shows or conferences, or received in the mail). Binders should be stored for easy access and identification. Some practices require a "sign-out" sheet for borrowing these binders. The common method for organizing product information is the use of the MasterFormat™ 16 division system with a number on each binder or piece of literature corresponding to the section number of the MasterFormat™ system.

A part of the library should be reserved for codes, standards, and municipal bylaws — many of which can be ordered or accessed through the Internet. Codes, standards, municipal regulations, and provincial legislation must be kept current.

Computer Systems

Architectural offices are becoming increasingly computerized. In setting up a computer system, the practice needs to determine its software requirements before purchasing hardware. Software programs and the need for networking will dictate hardware requirements. If computer systems form a significant portion of assets, and the practice relies on computers entirely for its operations, then it is prudent to engage an information technology (IT) consultant who is always on call.

E-mail and the Internet

All practices should be connected to the Internet and have the capability to receive and transmit E-mail and electronic files. E-mail can be used for the following:

- identifying project or architectural opportunities (such as on the MERX system);
- communicating with clients and consultants;
- posting bid opportunities and documents (as with Construction Opportunity On-Line Network or COOLnet);
- transmitting electronic drawing files;
- marketing;
- research;
- contract administration, including transmittal of photographs and video field reviews.

Even though all architectural documents are subject to copyright, it should be noted that any electronic drawing which is posted on a "public" Internet site can easily be copied.

Computer Systems for Office Administration

Basic programs for office administration include the following:

- word processing and specification editing software;
- spreadsheet software;
- bookkeeping and accounting software (refer also to Chapter 2.1.4, *Financial Management*);
- project management software (refer also to Chapter 2.3.2, *Types of Construction Project Delivery*);
- contact software (used for marketing);
- anti-virus software;
- human resources management and payroll software.

Computer Systems for CAD

It is important to determine the practice's needs for design, drawing, and graphic applications and then select the appropriate software before choosing the computer hardware. Hardware must be selected based on the required speed, memory, and networking capabilities to accommodate the selected software.

A rigid schedule and protocol must be developed and adhered to for the backup of all electronic information. Because back-up tapes could be destroyed in the event of a fire or other disaster, they should be stored off-site. Refer also to Chapter 2.3.7, *Construction Documents — Drawings*.

Computer Training

If staff of an architectural practice are not adequately trained to use the available software, the benefits of increased productivity will not be realized. Formal computer training, as well as informal in-house training programs, can lead to significant improvement in performance. An annual budget for computer training should be established for this basic need.

Upgrading Hardware and Software

Computer technology requires that both hardware and software be monitored, reviewed, and upgraded when it is necessary to remain current and competitive. Software upgrades may be needed when the software companies develop new versions of their programs. Hardware upgrades are required on an ongoing basis (to provide greater speeds, better resolution, faster or different outputs, or more memory). Careful management of the inventory of computer software and hardware is an ongoing necessity of office administration.

References

Franklin, James R. *Current Practices in Small Firm Management: An Architect's Notebook*. Washington, D.C.: The American Institute of Architects Press, 1990.

Ingardia, Michael P. and John F. Hill. *Effective Computer Systems Management for Design Firms*. Washington, D.C.: American Consulting Engineers Council, 1999.

Stitt, Fred. *The Operating Manual for the Small Design Office*. Orinda, CA: Guidelines, 1993.

Checklist: Information to include in a Manual on Office Policies and Procedures

Firm

- ❑ History of Firm
- ❑ Background of Principals
- ❑ Mission Statement, Philosophy, Goals

Staff Engagement

- ❑ Staff Information
  - Job Descriptions, etc.
- ❑ Overtime Classification
  - Hourly Paid Employees (payment for overtime as per office policy and provincial legislation)
  - Salary Paid Employees (no payment for overtime, subject to provincial employment standards)
- ❑ Performance Review
- ❑ Work Outside Office
- ❑ Codes of Conduct
  - Discrimination
  - Sexual Harassment
- ❑ Notice of Termination

Office Hours, Work Periods, and Personal Leave

- ❑ Working Hours
- ❑ Salaries and Wages (Pay Days)
- ❑ Time Sheets
- ❑ Overtime
- ❑ Personal Time
- ❑ Bereavement Leave
- ❑ Absenteeism
- ❑ Leave of Absence / Parental Leave
- ❑ Time Off for Elections
- ❑ Vacations
- ❑ Public Holidays
  - Paid Holidays
  - Eligibility for Holidays
  - Holidays Occurring During Weekends
  - Holidays Occurring During Vacation
  - Working on Holidays
  - Alternate Days Off
  - Religious Holidays

Benefits

- ❑ Temporary Sick-leave Benefits
- ❑ Pension Benefits
- ❑ Health Insurance Benefits
  - Dental
  - Extended Care
  - Vision Care
- ❑ Professional Development
- ❑ Parking at Office
- ❑ Dues for Membership in Professional Associations
- ❑ Expenses related to the Intern Architect Program (dues, examination expenses)
- ❑ Other

Allowances and Expenses

- ❑ Automobile Allowances
- ❑ Parking
- ❑ Taxi Expenses
- ❑ Entertainment Expenses
- ❑ Travel Expenses
- ❑ Expense Reports

Filing Systems and Retrieval

- ❑ General Filing System
- ❑ Project Files
  - Master Project Number Index
  - Standardized Project Filing Format
  - Technical Files Index
  - Office Administration Files Index
- ❑ File Retrieval
- ❑ New Filing and File Return
- ❑ Financial Files
- ❑ Computer and Electronic Files
- ❑ Sample Library
- ❑ Office Library
- ❑ CAD Standards

Office Administration

- ❑ Visitor and Telephone Reception
- ❑ Opening and Closing the Office
- ❑ Access to Office / Keys or Pass Code
- ❑ Meeting Rooms, Kitchen, and Lunchroom
- ❑ Word Processing
- ❑ Plotting / Printing
- ❑ Equipment (such as hard hats, safety boots)
- ❑ Requisition for Supplies / Dispensing of Supplies
- ❑ Facsimile — Outgoing / Incoming
- ❑ Couriers
- ❑ Telephone Messages / Personal Use of Telephone
- ❑ Internal and External Mail / Circulation of Trade Information
- ❑ Internet and E-mail
- ❑ Coffee and Refreshments
- ❑ Security Systems / Computer Passwords
- ❑ Housekeeping
- ❑ Maintenance of Equipment and Office Premises

Employee Acknowledgement

- ❑ Signed and dated acknowledgement from each staff member that they have read and agree to Office Policies and Procedures.

Chart: A Project Filing Format

1. General		
1.1 General	1.1.1	Request for Proposal (RFP) and Proposal
	1.1.2	Project Team Directory
	1.1.3	Newspaper Clippings, etc.
1.2 Client / Architect	1.2.1	Correspondence
	1.2.2	Minutes of Meetings
	1.2.3	Agreements
1.3 Construction Cost	1.3.1	Project Budget
	1.3.2	Estimates
1.4 Project Management and Control	1.4.1	Personnel
	1.4.2	Fee Calculation Sheet
	1.4.3	Project Cost Control Chart
	1.4.4	Time Reports
1.5 Project Accounts	1.5.1	Invoices
	1.5.2	Reimbursable Expenses and Expense Claim Forms
	1.5.3	Additional Services

2. Pre-design		
2.1 Client / Architect	2.1.1	Correspondence
	2.1.2	Minutes of Meetings
	2.1.3	Functional Program or Feasibility Studies
	2.1.4	Client's Consultants
2.2 Consultants	2.2.1	as required
2.3 Construction Budget	2.3.1	Construction Budget
2.4 Site Information	2.4.1	Photographs
	2.4.2	Surveys
	2.4.3	Soils or Geotechnical Reports
	2.4.4	Utilities

3. Design		
3.1 Client / Architect	3.1.1	Correspondence
	3.1.2	Minutes of Meetings
	3.1.3	Design Report
	3.1.4	Client's Consultants
3.2 Consultants	3.2.1	Structural Engineer
	3.2.2	Mechanical Engineer
	3.2.3	Electrical Engineer
	3.2.4	Other Consultants
	3.2.5	Minutes of Meetings
3.3 Construction Cost	3.3.1	Budget
	3.3.2	Construction Cost Estimate
3.4 Approvals	3.4.1	Municipal Authorities Having Jurisdiction
	3.4.2	Regional Authorities Having Jurisdiction
	3.4.3	Provincial Authorities Having Jurisdiction
	3.4.4	Federal or Other Authorities Having Jurisdiction

4. Construction Documents		
4.1 Client / Architect	4.1.1	Correspondence
	4.1.2	Minutes of Meetings
	4.1.3	Client's Consultants
4.2 Consultants	4.2.1	Structural Engineer
	4.2.2	Mechanical Engineer
	4.2.3	Electrical Engineer
	4.2.4	Other Consultants
	4.2.5	Minutes of Meetings
4.3 Construction Cost	4.3.1	Budget
	4.3.2	Construction Cost Estimate
4.4 Construction Documents	4.4.1	General Information
	4.4.2	Drawings
	4.4.3	Specifications
4.5 Approvals	4.5.1	Municipal Authorities Having Jurisdiction
	4.5.2	Regional Authorities Having Jurisdiction
	4.5.3	Provincial Authorities Having Jurisdiction
	4.5.4	Federal or Other Authorities Having Jurisdiction

5. Bid and Contract Award		
5.1 Client / Architect	5.1.1	Correspondence
	5.1.2	Minutes of Meetings
5.2 Consultants	5.2.1	Structural Engineer
	5.2.2	Mechanical Engineer
	5.2.3	Electrical Engineer
	5.2.4	Other Consultants
5.3 Construction Cost	5.3.1	Final Estimate
5.4 Bid Documents and Addenda	5.4.1	Bid Documents
	5.4.2	Addenda
5.5 Bidders	5.5.1	Invitation to Bid and Advertisements
	5.5.2	Pre-qualifications
	5.5.3	Deposits and Records
	5.5.4	Bid Depository
5.6 Bids	5.6.1	Bid Forms
	5.6.2	Bonds and Bid Security
	5.6.3	Analysis of Bids
	5.6.4	Alternatives and Substitutions
5.7 Contract	5.7.1	Contract Documents
	5.7.2	Bonds
	5.7.3	Insurance

6. Construction

6.1 Client / Architect	6.1.1	Correspondence
	6.1.2	Minutes of Meetings
6.2 Consultants	6.2.1	Structural Engineer
	6.2.2	Mechanical Engineer
	6.2.3	Electrical Engineer
	6.2.4	Other Consultants
6.3 Construction Cost	6.3.1	Schedule of Values and Applications for Payment
	6.3.2	Certificates for Payment
	6.3.3	Substantial Performance
	6.3.4	Certificates for Release of Holdback and Final Payment
6.4 Supplemental Instructions and Change Orders	6.4.1	Supplemental Instructions
	6.4.2	Proposed Changes
	6.4.3	Change Orders
	6.4.4	Change Directives
6.5 Contractors	6.5.1	Correspondence
	6.5.2	Minutes of Meetings
6.6 Submittals	6.6.1	Time Schedules
	6.6.2	Shop Drawings
	6.6.3	Samples
	6.6.4	Deficiency Lists
	6.6.5	Maintenance and Operating Manuals
	6.6.6	As-Built and Record Drawings
6.7 Field Review	6.7.1	Field Review Reports
	6.7.2	Inspection and Testing Reports
	6.7.3	Photographs and Other Records
6.8 Authorities Having Jurisdiction	6.8.1	Correspondence
	6.8.2	Minutes of Meetings

7. Post-construction

7.1 Client / Architect	7.1.1	Correspondence
	7.1.2	Minutes of Meetings
7.2 Consultants	7.2.1	as required
7.3 Construction Cost	7.3.1	Cost Analysis
7.4 Contractors	7.4.1	Correspondence
	7.4.2	Minutes of Meetings
7.5 Deficiencies	7.5.1	Warranty Inspections and Defective Work
7.6 Project Records	7.6.1	Occupancy Permits and Other Certificates
	7.6.2	Warranties and Maintenance Bonds

Communications

Introduction

The spoken word is as ephemeral as the breath with which it is spoken.

The written word may last thousands of years.

These two facts demonstrate the importance of effective communications and good documentation.

The value of the spoken word should never be underestimated; in fact, impassioned speeches and great architectural presentations have inspired people to take action that has created monuments and changed the course of history. Nevertheless, the practising architect should rigorously follow two rules: "*say what you mean*"; and "*put it in writing*."

The practice of architecture always requires good communications. Some of the many situations in which communications play a key role include:

- confirming a client's functional program or statement of requirements;
- explaining a design concept to the technologist who will draw it up;
- advocating approval for a zoning change to a public body or authority;
- resolving a problem on a construction site.

This chapter will discuss the principles of good communication and describe some of the procedures to improve communications in an architectural practice.

Three Types of Communication

Architects typically communicate through drawings. Some other ways of communicating are:

- writing;
- listening;
- speaking.

Writing

Written communication can easily be monitored and controlled. However, it should be noted that electronic communication can be saved for years and may also be delivered to thousands of people.

Maintaining accurate written records of all professional and business dealings, for both the management of the practice and the management of all projects, is important. Clear, written, and complete records are the best defence against legal action; every record will receive detailed scrutiny by lawyers of both parties in the event of a lawsuit.

All documents, both incoming and outgoing, as well as internal memos, should be dated. The date on correspondence creates an accurate chronology of events over the course of a project, such as the order in which design sketches were created or the timeliness of supplemental instructions. This chronology of events may have to be recreated years after everyone involved on a project has left the practice (and perhaps the city or province or country) or may be deceased.

Listening

One half of all the time spent communicating should be devoted to "listening." Developing skills in "active listening" not only improves an architect's services but can also increase a client's respect for the architect. Active listening is necessary for understanding the requirements of a problem and especially for undertaking any pre-design services.

Active listening includes:

- *observing*, by watching and paying attention to a client's actions, thoughts, feelings, and intentions;
- *amplifying*, by asking for more information;

- *reflecting*, by restating or paraphrasing the client's comments;
- *clarifying*, by seeking further elaboration and understanding of a comment;
- *interpreting*, by offering a conclusion to a remark;
- *summarizing*, by recapitulating the main issues discussed.

Speaking

Most architects are aware that a message is conveyed by more than the words being spoken. Communication also includes the tone of voice and body language. Conveying one's message requires a constant awareness of all these different communication methods, and a willingness to hone and practise presentation and communication skills.

Some tips for effective speaking and presentations include:

- assess the setting:
  - where you will stand;
  - where visual materials will be situated;
  - what options are available for lighting;
  - what your relationship will be with the audience;
- use simple, non-technical language;
- speak loudly and enunciate clearly;
- rehearse using a video;
- exaggerate gestures;
- maintain good posture;
- establish eye contact;
- eliminate "blather" (expressions such as "actually," "umm," "like");
- pause frequently.

Negotiating Techniques

For an architect, negotiating is an essential method of communications. Architects, especially principals, need to understand basic negotiating techniques which are useful in reaching satisfactory agreements with:

- clients;
- contractors;
- consultants;
- staff;
- suppliers and others.

There are many "how-to" books and media materials on negotiation techniques, and it is recommended that all principals learn as much as possible about negotiations. The advice of most of these books is to strive for a "win-win" resolution — a reasonable and fair exchange where both parties are better off than they would be without an agreement.

In every negotiation, there are three critical factors:

- time;
- power;
- information.

It is important to remember that price is not always the most important issue and that different people want different things. Negotiations should never be narrowed down to just one issue.

Many claim that physical factors, such as seating arrangements and body language, are significant communication elements when negotiating. It is important to learn and understand negotiating tactics, which may be used against you. Refer to the publication *Mastering the Business of Design* (in Ontario, titled *Mastering the Business of Architecture*) for an explanation of these tactics.

It has been claimed: "Be patient, be personal, be informed — and you can bargain successfully for anything."

Successful negotiations usually conclude with the following characteristics:

- both sides feel a sense of accomplishment;
- both sides feel that the other side cared and was fair;
- each side would deal with the other side again;
- each side feels that the other side will keep the bargain.

External Communications

External communications means communication with those people *outside* the architectural practice. In all communications involving the architectural practice, the architect must:

- be professional;
- be courteous;
- learn to listen;
- respect the confidentiality of clients and the practice.

For forms dealing with external communications, refer to Chapter 2.4, *Standard Forms for the Management of the Project*. It contains the following forms:

- Memorandum;
- Minutes of Meeting;
- Transmittal;
- Fax Transmittal;
- Project Team Directory.

Clients

The architect's role is to enable the client to make informed decisions; therefore, developing a one-to-one relationship with the individual client or client group is important. The keys to building and maintaining a good relationship with any client include:

- promote "active listening" (see above);
- use simple, straightforward language in all communications;
- be honest, which includes:
  - endeavouring to facilitate the resolution of problems;
  - being willing to admit to not knowing an answer, but promising to find the answer;
- propose solutions rather than problems;
- empathize with the client (for example, do not expect a client to understand graphic images easily; architects are trained to read drawings but clients may not be);
- document thoroughly all decisions relating to a project and confirm their accuracy;
- recognize the client's right and responsibility to make major decisions regarding a project.

The greater the rapport between architect and client, the more easily the relationship will weather any contentious issues which may arise during construction.

Refer also to Chapter 1.2.2, *The Client and Users*.

Consultants

Consultants are the architect's teammates on a construction project, whether they are engaged by the architect or retained directly by the client. The goal of the design team is to provide the client with a building project that satisfies the client's needs.

In communicating with consultants, the architect must:

- document all decisions relating to a project thoroughly and confirm their accuracy;
- understand all recommendations made by consultants;
- ensure that consultants are kept current and fully informed about a project's development.

Refer also to Chapter 1.2.3, *Consultants*.

Contractors

The primary means of communication with the contractor is through the construction documents. When preparing the construction documents, the architect must always remember that they are a communication tool and view them from the standpoint of the contractor. Ensure that the construction documents respond to the following questions:

- Is information easy to find?
- Is information clearly presented?
- Are all unusual conditions and construction details thoroughly explained?

Clearly written bid documents should result in:

- lower bids;
- a smaller spread between high and low bids;
- fewer delays on the construction site;
- a lower final cost to the building owner.

Regardless of how carefully construction documents are prepared, issues requiring additional communication by the architect will arise on site.

Communication during construction requires maintaining a proper balance between the need for a speedy response and careful consideration of the instruction or change. The following tips help to maintain good communications with a contractor:

- review the contract and construction documents before answering any questions;
- outline clearly the information or supplemental instructions needed by the contractor;
- confirm all communications promptly in writing, using one of the following:
  - minutes of meetings;
  - Supplemental Instructions;
  - Change Orders;
  - Change Directives;
  - correspondence;
  - field review reports;
- make a note of **every** telephone call with the site, either on a recording form or in a desk diary.

Refer also to Chapter 2.3.11, *Contract Administration — Field Functions*.

Internal Communications

Internal communications refers to communications *within* an architectural practice.

Principals

Good communications between principals is essential to a healthy practice. Because partnerships usually involve individuals with complementary strengths, the principals are likely to have different ways of viewing the same set of issues and circumstances. This makes good communication even more important.

Marty Grothe and Peter Wylie give useful advice on the meaning of effective communication among principals, in a 1982 article in *Professional Services Management Journal*:

> *Accepting your partners as having a right to be different from you and not trying to make them be more like you;*
>
> *Being willing to sit down periodically and talk openly about your relationship with each other;*
> *Being able to listen to the other person's point of view, especially when it's different from your own thoughts and feelings, especially when there are problems;*
> *Taking responsibility for the contribution you're making to problems in the relationship, rather than blaming it all on the others;*
> *Being willing to look for solutions to problems that everyone can live with rather than trying to have it all your own way.*

Staff

The staff of an architectural practice is its most valuable resource. Staff members represent the practice through their communications with clients, contractors, and the public. Good communications skills on the part of staff members depend to a certain extent on the culture and goals of the practice.

The following tips help build good communications skills:

- communicate regularly with "crits" and reviews;
- communicate openly about issues facing the firm;
- seek out and listen to staff's concerns, and act on valid points;
- be clear and direct in performance evaluations;
- use memos rarely, and only to announce general information.

Refer to Chapter 2.1.7, *Human Resources*.

Communication Methods

The following section briefly describes various types of communication.

Meetings

Although some people consider most meetings a waste of time, a face-to-face meeting is often an effective way to resolve an issue. Planning and organization are essential for all effective meetings.

Refer to "Checklist: Planning a Meeting" at the end of this chapter.

The following steps help to ensure a "well-run" meeting:

- circulate the agenda and background information ahead of time, if possible;
- state the meeting's purpose;
- begin on time, do not wait for latecomers, and, if appropriate, do not "recap" the past discussion when they arrive;
- stick to the agenda and set time limits for each item;
- keep minutes that record the following:
  - new information;
  - decisions made (not the discussion);
  - further action required, by whom and when;
- defer items that require more in-depth discussion;
- defer items requiring further information, and assign someone to follow up with the research.

A form, "Minutes of Meeting," is available in Chapter 2.4, *Standard Forms for the Management of the Project*.

Telephone Conference Calls

Teleconferencing permits people working in different locations to conduct telephone "meetings" without the cost and time associated with travel. Although the benefits of face-to-face and non-verbal communication are lost, teleconferencing is a quick way to exchange views, to poll a group when a vote is required, or to gain consensus for a decision. Most telephone companies also have an inexpensive three-way calling option.

The following tips help ensure effective teleconference calls:

- arrange the meeting well in advance to ensure that all parties are available;
- verify time zones of the participants;
- assign a chairperson for the teleconference;
- provide an agenda ahead of time;
- distribute the minutes of the meeting as soon as possible after the meeting.

Video Conferencing

Video conferencing provides the benefit of visual communication to participants in distant locations thereby eliminating the need for travel. It can be useful for conferences and professional development, architectural presentations, interviewing or training. Telephone service providers and other companies have video conferencing rooms located in most major cities around the world.

Voice Mail

Voice mail — a system for leaving (and retrieving) telephone messages — can be an effective communication tool. The following tips are helpful:

- speak clearly and slowly, and repeat telephone numbers;
- include enough detail to enable the recipient to provide requested information on the originator's voice mail (this helps to reduce "telephone tag");
- keep messages factual and professional (voice mail messages can be archived and used as legal evidence in a dispute);
- advise when and where you can be reached (such as cellular phone, home, another office).

Mail

Although slower than courier services, the basic service provided by Canada Post still has the distinct advantage of being the most economical way to send material from one location to another. Not everything is urgent and, with careful planning, fewer couriers may be required. Confidential material may be sent by mail and can be registered if necessary.

Courier

A courier can deliver material in as short a time as it takes to travel from an architect's office to the final destination. As with other forms of communication, planning saves money — the less urgent the delivery, the lower the costs.

Architects normally use couriers when material such as proposals, contracts, legal instructions or other objects must reach their destination by

a specific time. It is important to verify that the courier will guarantee delivery and carries insurance to cover lost items.

Facsimiles

Most day-to-day written communication can be sent via facsimile (fax). Exceptions to this form of communication include:

- legal documents requiring original signatures;
- lengthy documents, which are more appropriately mailed, sent by courier, or transmitted electronically;
- confidential information.

The volume of paper can be reduced by omitting the fax cover sheet for letters which are already addressed to the recipient.

Electronic Media

With the development of electronic information transfer, it is now possible to access and exchange great quantities of information and data in a very short time. Electronic mail (E-mail), company-wide intranet, the Internet, and local area networks (LANs) can be very useful methods of communication. Misused, they can expose an architectural practice to greater liability because every electronic message can become a permanent record.

Project-specific Web sites that can be accessed by consultants, contractors, and clients are becoming popular as a comprehensive source of project information and as a project management tool. All project documentation, as well as site photographs and construction videos, can be viewed on these Web sites.

Transfer of Electronic Files

Electronic transfer of construction drawings is a revolutionary development in the technology of architectural practice. There is also a trend to distribute bid documents electronically without printing any sets of documents. Contractors can use the electronic files as a basis for quantity take-offs. Some municipalities and construction associations already accept electronic submission of documents. Building permit applications are also being processed electronically through various departments within a municipality. Municipalities claim that this improves the ability of information transfer and reduces the time required to process applications. Furthermore, documents can be transferred directly to the construction site.

However, a number of issues must still be addressed, such as:

- enforcement of the copyright (electronic documents are very easy to copy);
- increased professional liabilities resulting from undetectable alterations to the electronic documents;
- the application of professional seals and signatures;
- the assurance that electronic files will be readable in the future.
  [Note: although it is widely believed that electronic media deteriorates over time, no one knows for certain the rate or nature of possible deterioration.]

Desk Diary

The architect's desk diary can be a valuable communication tool both for the architect and for office staff. Some diaries are now mini-computers or electronic pocket diaries. The purpose of a diary is to:

- schedule, at least tentatively, appointments and meetings which require the architect's attendance;
- record every appointment, phone call, and significant event in the day;
- remind the architect of past and pending appointments;
- assist staff and others in contacting the architect in an emergency.

Some architects may use a telephone log.

Forms for Communication

Standard forms are essential for managing communications and the amount of documentation required in an architectural practice. Chapter 2.4, *Standard Forms for the Management of the Project,* provides the following forms for General Communications (together with their purpose and the information to be included in the forms):

- Memorandum;
- Minutes of Meeting;
- Transmittal;
- Fax Memorandum;
- Project Team Directory.

Definitions

Communication: The science and practice of transmitting information; the act of imparting news; information given; social dealings.

Minutes: The record or notes of a meeting or transaction; a brief summary of the proceedings of a meeting; an official memorandum authorizing or recommending a course of action.

References

Alessandra, Tony. *The Dynamics of Effective Listening* (audiocassette). Niles, IL: Nightengale-Conant Corporation, 1994.

Angell, David. *The Elements of E-mail Style*. Don Mills, Ont.: Addison-Wesley Publishing, 1994.

Carroll, Jim and Rick Broadhead. *Canadian Internet Handbook*. Scarborough, Ont.: Prentice Hall Canada Inc., 1996.

Safford, Dan. *Proposals: On Time, On Target*. Ottawa, Ont.: Association of Consulting Engineers of Canada, 1997.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives, Inc., 1999.

Checklist: Planning a Meeting

When planning a meeting, consider the following checklist:

1. Planning

- ❑ Establish a need for the meeting.
- ❑ Define the problem(s).
- ❑ Research the facts and issues.
- ❑ Establish objectives for the meeting.
- ❑ Determine the most suitable type of meeting.
- ❑ Outline meeting expectations and accomplishments.
- ❑ Consider leadership (identify a chairperson and a discussion leader for each item).
- ❑ Develop and distribute a preliminary agenda.
- ❑ Determine who should attend, and why.
- ❑ Determine the pre-meeting information needed by each participant as well as the data each participant is required to bring to the meeting.
- ❑ Allow sufficient preparation time for research and preparation of each agenda item.

2. Organizing

- ❑ Prepare and distribute a final agenda, identifying who is responsible for each topic or item.
- ❑ Prepare and distribute background information.
- ❑ Discuss with the chairperson the style of the meeting and the chairperson's role.
- ❑ Determine the format of the minutes, including a report system regarding achievement.
- ❑ Consider a dry-run — if necessary, make appropriate changes.
- ❑ Determine the criteria for agreement on contentious issues.
- ❑ Consider the contributions required from the participants.
- ❑ Identify a convenient time and location, and confirm this with participants.
- ❑ Become familiar with the actual meeting place and surroundings.
- ❑ Prepare meeting material and organize logistics (audio-visual aids, reports, handouts, coffee).
- ❑ Determine who will be the recording secretary; define this person's role; obtain agreement as to expectations and timing.

3. Role of the Chair in Facilitating the Meeting

- ❑ Introduce the participants and their roles, and the meeting's objective.
- ❑ State the problems and criteria for agreement (agenda).
- ❑ Establish the guidelines for solutions.
- ❑ Ensure all possible solutions are reviewed.
- ❑ Keep on the subject, periodically restate the meeting's objectives, and continually monitor the time.
- ❑ Summarize problems and agreements.
- ❑ Encourage inter-group communications.
- ❑ Restate objectives and conclusions, and obtain agreement.
- ❑ Resolve problems or conflicts.
- ❑ Decide on a course of action, i.e., implementation of conclusions or decisions.

4. Minutes

- ❑ Develop a format for minutes.
- ❑ Establish a method for distributing minutes.
- ❑ Determine the recipients of minutes (in addition to attendees).
- ❑ Distribute the minutes as soon as practical after the meeting.

Human Resources

Introduction

The most valuable resource of an architectural practice is its people: principals and staff. Over the years, the science of human resource management has evolved and generated various theories about the factors that motivate people to be productive. Current theories suggest that self-actualization, or self-fulfillment, is the sole motivating factor.

Vital to every organization, especially an architectural practice, is the collective personality and value system, or "culture," that emerges from the combined talent pool. The mix of individuals in a firm is as important as the individual strengths of each member in determining the future of the practice. Therefore, to help shape its culture, a firm needs proper screening and evaluation procedures for selecting employees.

The principals of the practice should develop and agree on the culture and values of their firm in a strategic plan. Refer to Chapter 2.1.1, *Organization of an Architectural Practice*, for the contents of a strategic plan.

This chapter will discuss human resources issues within an architectural practice.

Recruiting Staff

When the principals of a practice require additional skills or help, they must determine whether to hire new employees or to retain consultants to fill the gap. Projected billings for both the short and intermediate term must be considered in order to determine what type of human resources staffing the firm can support. All the alternatives should be reviewed. The principals must consider the following costs:

- cost of salaries, plus approximately 15% to 20% to cover statutory employer contributions such as Canada/Québec Pension Plans (CPP/QPP), Employment Insurance (EI), workers compensation premiums, vacation pay, health tax. [Note: an accountant will be familiar with the specific requirements];
- indirect costs to provide management, direction, and professional development for employees.

The three possibilities for meeting human resources needs are:

- independent contractors (sometimes incorrectly termed "contract workers" or "contract employees");
- temporary employees;
- permanent employees (full-time and part-time).

For the ramifications of each, the architect should consult relevant publications from Revenue Canada as well as the provincial labour laws. If necessary, the architect should obtain legal advice.

Independent Contractors

Independent contractors are similar to consultants and are normally retained on a short-term, per-project basis. They may be supplied by another firm or agency, or contracted directly. They are usually paid a stipulated hourly rate or fixed fee, with no deductions for income tax, Canada/Québec Pension Plans (CPP/QPP), or Employment Insurance (EI), and they receive no vacation pay. Because independent contractors are responsible for their own contributions, they are usually paid a higher hourly rate than a permanent employee.

The terms of engagement should always be confirmed in writing prior to the commencement of work, and payment should be made only after the contractor submits an invoice. The terms of engagement should also include issues such as:

- confidentiality;
- copyright;
- credit for authorship;
- use of documents in portfolios, etc.

Hiring an independent contractor, or "out-sourcing," is a common technique for determining project costs and limiting payroll responsibilities. The architect should ensure that the work is suitable, such as task-oriented work where a specific product (such as a certain number of drawings) or service is known. The actual work may occur within the architect's office but with *minimal* supervision by the architect. According to Revenue Canada regulations, work by independent contractors is *not* a legally acceptable substitute for most employment situations.

Temporary Employees

Temporary employees work for a fixed period of time, determined prior to the commencement of work. Generally, temporary staff work under identical terms and conditions as permanent employees, except that certain benefits offered to permanent employees may not apply to temporary employees. In addition, less investment is required for professional development.

Typically, temporary employees fill staffing voids created by short-term absences of permanent employees. However, they may also "fill in" during short-term peaks in workload to avoid burdening permanent staff with overtime work. The morale of permanent employees is improved by retaining a core staff and augmenting them with temporary help, instead of hiring and firing as the workload ebbs and flows. Temporary clerical or professional staff may provide efficiencies by performing tasks not requiring the skills of senior people. This frees up senior people to concentrate on more valuable activities.

Finally, temporary employees can compensate for gaps in the skills of existing staff — for example, a retired or other senior professional can provide additional expertise for a specific project.

Permanent Employees

Permanent employees are vital to the long-term health and stability of an architectural practice. An appropriate mix of professional staff, technologists and technicians, and support or administrative personnel is necessary to realize both the business objectives and mission of the firm. Some practices, with a focus on design, hire architects and intern architects exclusively, augmented only by support staff. Other firms, with a focus on service, rely heavily on senior technical staff to manage and deliver projects. When engaging new employees, the architect should determine if their personal objectives and ambitions will mesh with the requirements and culture of the practice.

Recruiting

When hiring new staff, the architect should develop an appropriate job description, seek qualified candidates, and conduct interviews. Forms contained in Chapter 2.2, *Standard Forms for the Management of the Practice*, can assist in the hiring process. These forms are:

- Typical Job Description;
- Application for Employment;
- Interview Evaluation Form;
- Employment Agreement.

Employment Agreements

An offer of employment is a contract with legal implications. Often a verbal offer is accepted during an interview. To avoid misunderstandings, verbal offers should be confirmed **in writing**, stating all the terms of engagement. Refer to the "Checklist: Issues for Consideration in an Employment Agreement" at the end of this chapter. The checklist is based on OAA Practice Bulletin C.3a. In addition, a sample "Employment Agreement" and a detailed guide for its use is contained in Chapter 2.2, *Standard Forms for the Management of the Practice*.

Managing Human Resources

Managing professionals presents unique challenges, because professionals need to be managed in special ways. Professionals are career-oriented and strive for upward mobility.

Office Conduct

The success of any architectural practice depends on the conduct, manners, and performance of staff or the "team." All staff in an architectural practice expect and deserve professional treatment. Consultants, peers, and employees should all be treated with the same respect and courtesy. The architect should ensure that all staff understand the importance of civility in building goodwill and the well-being of the practice.

When working in stressful, "deadline-oriented" environments, architects can sometimes become impatient. Architects must realize that the urgency "to get the job done" has to be balanced with the cost of damaging goodwill. Principals and staff who are confrontational lose the respect and cooperation of their colleagues.

Valuable time and effort is lost when alienated employees leave a practice. It has been stated that architectural practices spend approximately 25% of a lost worker's salary in recruiting and training a replacement. An architect's time is more effective when spent on strategic activities for the practice rather than hiring and training new staff.

Standard office policies and procedures for conduct should be established and included in an "office manual." Refer to Chapter 2.1.5, *Office Administration*, for information to include in the manual.

Statutory Benefits

The architect is required by law to provide employees with the following benefits:

- **Employment Insurance (EI)** — EI is calculated on the basis of each employee's insurable earnings. The employer contributes 140% of the amount (or 1.4 x) that the employee contributes. When an employee stops working, a Record of Employment (Form INS 2106) must be filed with Revenue Canada. Depending on the number of weeks of work and the salary level, benefits are payable by the Government of Canada.
- **Canada Pension Plan (CPP)/Québec Pension Plan (QPP)** — CPP/QPP is calculated on the basis of pensionable earnings. The employer and employee contribute equally. Benefits are generally not payable until after the age of 65 and relate to an employee's total lifetime earnings.
- **Workers Compensation or Workplace Safety Insurance Board** — The payment of premiums is required. (Refer also to Chapter 1.2.1, *The Construction Industry*.)
- **Vacation Pay** — Employee vacation pay varies from province to province. The amount is usually three weeks per year, but it is two weeks in some jurisdictions. Check with provincial labour legislation. Vacation pay or vacation period is frequently increased at certain intervals at the discretion of employers to reward long-serving or senior employees. Vacation pay is accrued on the basis of a pay period and is payable immediately when an employee leaves the practice.
- **Overtime** — Employees paid on a salary basis are generally not required to be paid for overtime, subject to provincial employment regulations and standards. Workers paid hourly are often required to be paid overtime, usually at a rate of time-and-a-half. **The length of the standard work day and work week determines when and if overtime must be paid, and this varies from jurisdiction to jurisdiction, as do overtime rates for holidays.**

Some practices pay non-professional staff overtime, but do not pay overtime for professionals. A few practices pay all staff overtime pay as a form of additional benefit. Others track overtime for professionals and compensate them with "time off" in lieu of payment for overtime. When not paid out as it accrues, overtime compensation can create significant financial liabilities and should be carefully monitored.

Time Off

Time off for sick time, religious days, personal time, bereavement, etc., is at the discretion of the employer. To clarify the issue and to prevent

abuse, principals should establish an office policy which states the circumstances in which paid time or unpaid leave may be taken. Some firms set a limit for the number of days that may be taken in a year. Excessive use of time off by staff is an indication of management problems and warrants investigation.

Other Benefits

In addition to statutory benefits, some firms offer other benefits such as:

- extended health care;
- life insurance;
- pension plans;
- disability insurance;
- dental and vision care plans.

These benefits are usually provided on the basis of shared contributions by the employer and the employee. Insurance programs and pension plans vary. As these also have tax planning implications, the architect should seek professional advice before offering them.

Incentive programs are a management tool to reward productive employees. Many firms offer bonuses, but only in profitable years. Some practices use profit-sharing or share ownership to distribute profits. Others believe that staff should be rewarded through higher salaries, and that bonuses or profit-sharing become institutionalized and eventually lose their incentive value.

Other benefits may include:

- coffee and beverages (at the office);
- use of company vehicles;
- social events;
- provision of safety equipment (such as hardhats, safety boots).

Work from Home

Some practices allow employees to perform part or all of their work from home, through E-mail or some other form of electronic communication. Supervising work prepared off site may be difficult. The burden of coordination and checking is sometimes more onerous, and mistakes can easily be overlooked. Furthermore, the architect must determine whether the off-site work can be under the "care and control" or "direct supervision" (also called "responsible control") of the registered member in order to apply the architect's seal, as required under certain provincial Architects Acts. Refer to the chart, "Comparison of Provincial Requirements/ Guidelines regarding the Application of Seals," in Chapter 1.1.4, *The Organization of the Profession in Canada*.

Harassment

Harassment includes any unwanted physical or verbal conduct that offends or humiliates. It can foster a negative work environment which interferes with job performance and productivity. Employers are liable under the *Canadian Human Rights Act* for harassment occurring on the job, whether or not management is a direct participant. Harassment will be considered to have taken place if a reasonable person ought to have known that the behaviour was unwelcome.

Harassment includes:

- threats, intimidation or verbal abuse;
- unwelcome remarks or jokes about subjects such as race, religion, disability, sexual orientation or age;
- displaying racist, sexist or other offensive pictures or posters;
- sexually suggestive remarks or gestures;
- unnecessary physical contact such as touching, patting, pinching or punching;
- physical assault, including sexual assault.

As an employer, the architect's duty is to:

- make it clear that harassment will not be tolerated;
- establish a policy dealing with harassment;
- make sure every employee understands the policy and procedures for dealing with harassment;
- inform supervisors and managers of their responsibility to provide a harassment-free environment;
- investigate and take corrective action as soon as a harassment incident occurs, even if a formal complaint has not been received.

Discrimination

Discrimination takes place when one person does not have equal opportunities because of race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, age, record of offences, marital status, family status, or handicap. As an employer and professional, the architect's duty is to ensure that discrimination is neither practised nor tolerated within the architectural practice.

Motivation and Job Satisfaction

Motivation is a result of personal success and the organization's success. Most studies indicate that money, although important, is a relatively small factor in motivating professionals. Motivation requires the hands-on support of a "coach" who makes time to pay **individual** attention to each staff member.

Motivation works in spirals: success breeds success, whereas failure can likewise feed on itself and become systemic. To break out of a motivational crisis, principals must examine all human resource management systems, including:

- recruiting;
- work assignments;
- performance evaluation and feedback;
- promotion.

The workplace environment sets the tone for motivating professionals. Flexible work situations allow employees to schedule work on their own terms. Clear work instructions permit staff to work independently. This autonomy not only builds independence, but also aids in developing skills and provides more time for management to focus on other activities. However, work performed independently requires affirmation or correction. The architect should hold formal design "crits" or reviews for each project so that employees can learn from each other.

Employees should be involved in making decisions regarding the delivery of services. Their opinions and talents should be used to find ways for more effective recruitment, project management, quality control, etc.

The structure of the practice can influence its ability to provide meaningful work, as the following quote points out:

> *Although there is considerable variation from one office to another in terms of architects' benefitting from these* [design] *opportunities, the office that is subdivided into smaller self-contained components is the one that is structurally more conducive to providing such opportunities.*
> (Judith R. Blau)

Design is a significant part of an architect's training; thus, involvement and connection with design activities is frequently a major determinant in job satisfaction.

Not all duties in the practice can be design-related, but all work must be purposeful. Sometimes, inexperienced employees are assigned mundane tasks. However, everyone wants to contribute in a meaningful way to the work and to the world at large. In an architectural practice, **all** work is valuable; pejorative or apologetic attitudes about certain assignments should never be projected. When unskilled tasks are indeed required, the architect should offer opportunities for more challenging work on upcoming projects, and this promise should be fulfilled.

The following are some tips to help nurture staff at various stages of their career development:

Students and Intern Architects
Principals should:

- assign a senior person to be an advisor or "buddy" to each student or intern architect;
- determine what skills are lacking or which tasks (experience requirements) need to be completed;
- develop generalist skills among students and intern architects at this stage of their careers;
- use this opportunity to recruit the best graduates.

Newly Registered Architects and Technologists
Principals should:

- allow architectural technologists and newly registered architects to work independently with minimum direction;
- foster close working relationships between other staff and newly registered architects and technologists;
- nurture young staff and help them find a professional niche;
- ensure their career objectives are being met;
- consider investing the time required to make each individual a specialist to the extent that it is affordable.

Senior Professionals
Principals should:

- encourage senior professionals to share their accumulated wisdom;
- designate individuals as practice managers for particular tasks — design, specifications, contract administration, marketing, etc.;
- encourage senior professionals to develop new skills, both for themselves and others.

Performance Review

Performance reviews are meant to be objective evaluations of employee performance. However, there is debate about the purpose of employee appraisals — whether the outcomes should be linked to salary or whether they are tools for improving employee performance. When performance reviews are done badly, they reflect negatively on management and can lead to serious problems in morale and even legal action.

> *Appraisees seem to have greater acceptance of the appraisal process, and feel more satisfied with it, when the process is directly linked to rewards.*
> (Archer North and Associates)

Architects can use several methods for conducting performance reviews:

- **Essay method** — This is a subjective description of the attributes of the employee. It is flexible, but time-consuming, and produces variable results if more than one supervisor is involved.
- **Management by objectives or results method** — This method measures the extent to which the employee conforms to a pre-determined goal or result. The review measures "outcomes" instead of identifying attributes of the employee. It only considers the employee's own ability to improve performance, and does not take into account other factors which may hamper performance. As well, the consequences of *how* the job gets done are not measured.
- **Rating scales method** — This type of performance review provides a range of possibilities (positive to negative) in response to structured and standardized questions. It is well-accepted because of its perceived objectivity; however, the questions must be relevant to various job descriptions and the appraisers must share a common understanding of the meaning of the questions.

All methods are subject to bias by the appraiser. To be meaningful, performance reviews should be done by a supervisor who is familiar with the employee and has the employee's respect. Both the employee and the appraiser should prepare in advance for the meeting. If the performance review is only conducted once a year, it should be formalized. Constructive feedback should be given at the performance review **and** on an ongoing basis. Formal performance reviews should not replace spontaneous praise or criticism, which are essential to good human resources management.

Other types of performance reviews include:

- employee self-appraisal (useful as a complement to supervisor appraisal);
- the "360 Degree Performance Appraisal" in which peers, subordinates, supervisors, and clients comment on performance.

Refer to Chapter 2.2, *Standard Forms for the Management of the Practice*, for a sample Performance Evaluation Form.

Professional Development or Continuing Education

Ongoing professional development is an important part of architectural practice. In fact, some provincial associations of architects require continuing education to maintain a professional licence or registration. The firm's resources and the principals' commitment to a "learning culture" will help determine the form and extent of professional development for employees. Professional development is good business practice. It is the equivalent of a research and development investment by other sectors of the economy.

The architect should establish a variety of continuing education opportunities and learning modes, including:

- individual learning:
  - professional reading;
  - individual research;
  - professional writing (including articles, reports for journals, and newsletters);
  - speeches and presentations;
  - tours of architectural sites;
  - videos;
  - participation in the activities of the professional association.

- group learning:
  - conferences;
  - workshops;
  - courses;
  - teaching;
  - discussion groups;
  - in-house seminars.

Termination of an Employee

Voluntary Resignation

A certain amount of staff turnover can be expected in any organization, but architectural practices experience a higher turnover rate than do many other professional firms. Voluntary resignations (quitting) occur for a variety of personal and professional reasons and often correspond to the availability of other work opportunities. Although the loss of an employee can prompt an emotional response, the architect should:

- accept the resignation gracefully if the employee cannot be dissuaded;
- not belittle or berate the employee for this decision;
- resolve the terms of termination to everyone's benefit, but complete the termination as rapidly as possible to preserve employee morale;
- consider offering an immediate severance payment if the employee is very dissatisfied;
- conduct an exit interview to determine the reasons for the decision. (An exit interview should be conducted soon after the notice and, if possible, performed by two different individuals representing the practice);
- use the exit interview to probe for weaknesses in the practice and seek constructive criticism;
- listen and avoid being argumentative;
- endeavour to part on good terms. (Former employees may be future clients or client representatives.)

Layoffs

In an economic downturn, the practice should consider all other possibilities before laying off employees. A smaller staff affects the firm's ability to gain future commissions. Some possibilities include:

- eliminating overtime;
- suspending benefits;
- reducing overhead costs;
- accelerating project start or completion dates;
- asking employees to take accrued vacation time.

If further "belt-tightening" measures are needed, consider:

- cutting salaries;
- reducing the work week for all employees;
- job-sharing;
- loaning employees to other firms temporarily.

It may be helpful to check with Human Resources and Development Canada regarding programs to assist companies facing layoffs.

The principals should communicate the need for adjustments to work assignments in a staff meeting as soon as the layoffs are required. However, the layoffs should be handled *first* and then followed by a meeting with the staff to allay concerns.

Firing

Firing an employee has serious legal ramifications. In all situations, the basic principles of fairness must apply. Firings must be, and be seen to be, non-discriminatory business decisions. Notice of unacceptable performance or behaviour must be documented progressively. Office policies and procedures must be applied evenly and should be used as standards for judging the employee's behaviour and performance. Performance evaluations and formal feedback can document sub-standard work. Include the employee's version of the situation as part of the investigation.

An employee should never be fired in a moment of anger or "on the spot." This may increase the likelihood of legal action. If necessary, it is better to suspend an employee for outrageous behaviour, thereby giving one time to "cool down" and investigate the matter.

Procedures for Firing and Layoffs

Termination of a valued employee is traumatic for members of the practice as well as a shock to the employee. Employees who have been fired may be hostile or even violent. The architect should be familiar with the appropriate provincial employment standards and labour legislation and, if necessary, seek legal advice or assistance from a human resources specialist. The following tips and procedures help to preserve the dignity of the employee and manage the situation:

- have both the immediate supervisor and a principal attend at the meeting at which the employee is to be fired;
- conduct the meeting in privacy, possibly outside the office;
- hold the meeting early in the day and early in the week to avoid the potential to brood or consider retaliation during the weekend (earlier in the week allows the employee to focus on the future; earlier in the day is less stressful);
- prepare ahead of time;
- communicate the reason for the dismissal but do not provide a step-by-step analysis of the documentation supporting the firing;
- advise that the decision is final and cannot be reversed;
- emphasize that all relevant factors were reviewed;
- stress that the decision was agreed to by everyone involved in management (if applicable);
- advise of the effective date of termination;
- review with the employee a written summary of benefits, including severance pay, vacation accrual, continuation of health/life insurance or other benefits;
- have final paycheques ready if termination is immediate and inform the employee about how to collect personal belongings and leave the premises; **or,** provide the employee with a written summary of projects to be transferred to ensure a smooth transition if the employee will remain as an active employee for a time **and** outline the steps in the termination process, such as last day of work, return of keys or other company property;
- finish by indicating that there will be notification of any other matters outstanding;
- wish the employee good luck for the future.

If the termination is a firing rather than a layoff, more time is required to discuss the reasons for firing by asking the employee's version of events, even if an investigation has determined this. Allow the employee to vent emotion. The principals should not interrupt or argue with the former employee, but be firm about the decision and stress that the meeting's purpose is simply to communicate an irrevocable decision.

Definitions

Employee: One who works for and under the full direction of another individual or entity (employer); a person working either full time or part time for an employer and in a manner that satisfies Revenue Canada's criteria for determining employer-employee relationships.

Independent Contractor: An individual or entity that is not entirely dependent on a single source for business and is distinguished from an employee by having a chance for profit, risk of loss, and a degree of self-control and ownership of tools; a person or firm providing services who is not an employee under Revenue Canada criteria for determining employer-employee relationships.

References

Herman, Roger E. *Keeping Good People: Strategies for Solving the #1 Problem Facing Business Today*. Ottawa, Ont.: Association of Consulting Engineers of Canada, 1999.

Ontario Association of Architects (OAA). OAA Practice Bulletin C.3a, *Employment Agreement Checklist of Issues for Consideration*. May 1997.

Pacific Leadership Inc. *From Potential to Prosperity: Human Resources in the Canadian Consulting Engineering Industry*. Ottawa, Ont.: November 1994.

Woodward, Cynthia A. *Human Resources Management for Design Professionals*. Washington, D.C.: The American Institute of Architects Press, 1990.

Checklist: Issues for Consideration in an Employment Agreement

❑ Determine whether the proposed relationship is that of an employee-employer or an independent contractor.

❑ If the relationship is one of employment, the parties should consider the following issues:

- *Identification of Parties* — What is the legal status of the employer? Does the employer's representative have authority to commit the practice to a contract?
- *Position* — What does the employee have to do for the employer?
- *Commencement Date* — When does employment start?
- *Term of Employment* — Does it run indefinitely or for a set period?
- *Probationary Period* — Is there a probationary period? What are the conditions and obligations?
- *Hours of Work* — What are the daily and weekly hours of work?
- *Compensation* — What is the monetary compensation? How and when is it paid? What deductions are made? How is overtime work compensated? When is compensation reviewed?
- *Benefits* — What are the medical, dental, and professional fees paid or other benefits offered (if any)?
- *Office Manual* — Has the employee reviewed and acknowledged the office manual on policies and procedures? Refer to the "Checklist: Information to include in a Manual on Office Policies and Procedures," in Chapter 2.1.5, *Office Administration*.
- *Equipment* — What will the employer provide and what is the employee expected to provide?
- *Professional Development* — Does the employer have policies on assisting the employee gain experience, attend courses and seminars, etc., leading to improved professional status and advancement within the employer's practice?
- *Expenses* — For what expenses is the employee compensated?
- *Vacation, Holidays, Personal Leave* — Under what conditions may the employee take time off? Is the length of vacation adjusted with length of service?
- *Insurance* — What provisions (if any) are included in the employer's Insurance(s)/ Indemnity Plan to protect the employee?
- *Legal Advice* — Have the parties to the agreement sought and received legal advice?

- *Termination* — Under what conditions may either party terminate the agreement? What is the length of required notice? Does the notice period increase with length of service to the employer?

- *Confidentiality* — What information learned during the course of employment is to be kept confidential?

- *Restrictive Covenants* — Are there any non-competition requirements after termination?

- *Copyright* — To what extent may an employee in his/her proposal portfolio use the employer's copyrighted material (hard copy and/or electronic reproductions) which the employee prepared?

- *Assignment* — Can the contract of employment be assigned to a successor or other employer?

- *Severability* — Include a statement to the effect that should any part of the agreement be declared not to be legally binding, all other parts remain in force.

❑ Set out an agreement in writing and have both the employer and the employee sign and date it.

Refer to the Employment Agreement and its Guide in Chapter 2.2, *Standard Forms for the Management of the Practice*.

Quality Management

Introduction

Any discussion of "quality" necessarily involves distinguishing between products and services. Architects, like most other professionals, provide a "service."

Product

Although architectural services usually result in the construction and operation of a building (a product), the product of an architectural practice is not the building itself. The product is *information*. This product is manifested in contract documents, drawings, specifications, reports, certificates, and other correspondence.

Service

Service is the way a product is delivered. In architecture, the product should be delivered in a competent, professional, and timely manner (incorporating good skills in communication, planning and organization, and synergistic problem-solving).

What is Quality?

Although no universally accepted, clear or rigorous definition of quality exists, certain elements help to define quality as it relates to architectural services. These elements (adapted from the Standards Council of Canada) include:

- providing value to clients;
- doing the right things — right the first time, on time, all the time and to the client's satisfaction;
- fitness for purpose (offering solutions that fit the purpose);
- providing service which consistently meets or exceeds performance levels required by the client.

According to the International Organization for Standardization (ISO):

> *Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.*

Long before the service sector of the economy took a strong interest in quality, manufacturing industries recognized the following principles:

- quality is determined to a much greater degree by management than it is by staff or workers;
- quality applies both to the product itself and the process of creating that product (service);
- the cost of avoiding mistakes is usually less than the cost of correcting them;
- quality must be planned, not simply inspected for;
- as quality goes up, costs go down.

Quality can be achieved only when the services are delivered in a consistent, professional manner. Because of the diversity and complexity of architectural practice, the achievement of quality is an ongoing challenge. This chapter briefly discusses Quality Management within an architectural practice.

Terminology

Over the years, management consultants and standards-writing organizations have developed terms which relate to quality. Understanding this terminology is important.

Quality Management

Quality Management refers to what an architectural practice does to manage its processes and activities (the architectural services it delivers).

Quality Management is a systematic way of achieving quality at every stage of a process to ensure that the client's requirements are met on time and all the time. A small practice may have no "quality management system" as such, whereas a larger practice may have extensive written procedures, instructions, forms, and records — in other words, a system.

Quality Assurance

Quality Assurance is sometimes used incorrectly, and interchangeably, with "quality control." It can be defined as: all the planned and systematic activities implemented within the quality management system and demonstrated as needed to provide adequate confidence that an architectural practice will fulfil requirements for quality. For example, an architect's field review could be considered *"quality assurance"*; whereas, the builder's supervision could be considered *"quality control."*

The adoption of a quality management system provides **assurance** to clients and others that the **service** will be **consistent**. Currently, ISO 9000 certification is a mark of Quality Assurance. "Peer review" or some other form of verification may assist in quality assurance. A peer review is an independent, unbiased review — by a professional — which may examine:

- the policies and practices of the entire office;
- a single project, or design phase of a single project.

Total Quality Management

Total Quality Management (TQM) is a term originally used by the U.S. Navy to describe a Japanese-style of management which is based on the participation of all members of an organization in improving an organization's processes, products, services, and culture.

TQM includes the concepts of:

- continuous improvement;
- empowerment of staff;
- development of a program to prevent errors.

Management System Standards

Management System Standards, or "generic" management system standards, are standards which apply to any organization, large or small. They outline a "quality assurance model" to set up and operate a management system.

Management system standards are different from standards developed for physical products and processes, which are very technical and specific. For a description of these "technical" standards, refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

Quality Management Systems in Architectural Practice

Quality management for architects focuses on a process to ensure that professional services are consistent and continuously improving. This process will vary from practice to practice and from project to project. A good quality management system has the following objectives:

- ensure a common understanding of the service required and expected;
- ensure that the client receives the expected service and always remains satisfied;
- prevent errors in all aspects of architectural practice;
- prevent delivery delays;
- reduce the costs of architectural practice;
- increase productivity;
- continuously improve the reliability of services;
- meet all the quality assurance requirements agreed to by the client and the architect.

Implementing a quality management system requires the architect or managing principals to:

- seek work that falls within the expertise of the practice and its consultants;
- recruit, train, and retain staff who contribute to both their own individual success and the success of the practice;
- realize the potential of every staff member by providing consistent and creative work methods as well as opportunities for greater involvement;
- facilitate the staff's professional development;

- ensure that all staff participate in, and influence the quality of, service provided to clients;
- ensure that tasks to be performed and objectives to be achieved are understood, including how they affect quality;
- encourage contributions that enhance quality by giving due recognition and reward for achievement;
- assess periodically the factors that motivate personnel to provide quality service;
- use appropriate information technology and management methods;
- provide a work environment that fosters excellence;
- implement and maintain a Quality Management System.

The Royal Institute of British Architects (RIBA) recommends a two-tier approach to a quality management system:

- quality management for the practice;
- quality management for the project.

Quality Management Systems for the Practice

No matter how the practice is organized, ensuring the provision of quality architectural services requires that a number of strategic and administrative functions must be in place, including:

- a committed leadership;
- a mission statement and possibly also a "quality" statement;
- a clear organizational structure (refer also to Chapter 2.1.1, *Organization of an Architectural Practice*);
- a staffing plan and opportunities for professional development and empowerment (refer also to Chapter 2.1.7, *Human Resources*);
- an office manual on policies and procedures (refer also to Chapter 2.1.5, *Office Administration*);
- good document and data filing and retrieval systems (refer also to Chapter 2.1.5, *Office Administration*).

Quality Management Systems for the Project

The quality management system must be used for every project and for every phase of the project. This includes thorough project planning to ensure that services are delivered on time, accurately, and within budget. Refer also to Chapter 2.3.1, *Management of the Project*. The following four activities must be considered in planning and implementing a project.

- *Project Planning,* including:
  - design and construction schedule;
  - construction budget;
  - design requirements;
  - communications;
  - staffing requirements;
  - risk management;
  - method of construction project delivery;
  - project cost control.

- *Project Definition*
  This is the pre-design or analysis stage of a project, used to determine quality requirements, including implied and stated needs. Ideally, these needs are described in a functional program. (Refer also to Chapter 2.3.4, *Pre-design*.)

- *Project Design and Documentation*
  The quality management system should be applied to all processes during the following project phases: schematic design, design development, and construction documents. (Refer also to Chapter 2.1.9, *Risk Management and Professional Liability*, which provides guidelines for checking documentation; Chapter 2.3.6, *Design Development*; Chapter 2.3.7, *Construction Documents — Drawings*; and Chapter 2.3.8, *Construction Documents — Specifications*.)

- *Project Implementation*
  Quality management systems must also be applied throughout the construction process, including:
  - procurement (refer also to Chapter 2.3.9, *Construction Procurement*);
  - construction monitoring and control (refer also to Chapter 2.3.10, *Contract Administration — Office Functions,* and Chapter 2.3.11, *Contract Administration — Field Functions*);
  - close-out, commissioning, and servicing (refer also to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*).

Challenges of Quality Management

Many challenges must be overcome to implement a quality management system in an architectural practice.

The Architectural "Culture"

Some claim that the greatest challenge to implementing a quality management system is the unique culture prevalent within the architectural profession. The culture is influenced by the following realities:

- architects are very diverse and individualistic;
- architects require self-actualization and they need to feel in control of their destiny;
- architects are creative and require an environment conducive to creativity.

These characteristics may contribute to the reluctance of architects to adopt systematic quality management, because they:

- fear losing individual control over their work processes;
- perceive that such a system creates a work environment that stifles creativity;
- believe that a quality management system controls the design process.

Size of Architectural Practice

Because small practices have the advantage of being "tightly knit" firms with few staff to consult and train, one might assume that implementing a quality management system within such a firm would be easy. However, small firms often lack the financial resources and time to develop policies, procedures, and standard documents. In addition, client demands and cash flow may not provide management (often a sole proprietor) with adequate time to develop and implement a quality management system.

Larger architectural practices are usually able to dedicate more time and resources to quality management systems. Because of their size, larger firms may have had to establish certain policies and procedures. The greatest challenge for larger practices in implementing an effective quality management system is winning the acceptance of staff, who have strong views on work processes and a strong need to control their careers and destinies.

The length of time required to achieve measurable results with a quality management system may seem excessive. Architectural practices focus on project work and billable hours, and may find it difficult to get excited about — and make time for — the implementation of a quality management system. Foresight and commitment are needed to be aware of the benefits to be derived from a quality management system.

Quality Management Benefits

Quality management systems do pay off in the following ways:

- improved service and client satisfaction;
- improved efficiency and effectiveness and ultimately higher profit margins;
- increased "marketability";
- greater "peace of mind" for principals dedicated to quality;
- greater job satisfaction.

Any one of these improvements is sufficient to justify the implementation of a quality management system.

However, the greatest potential benefit of widespread implementation of quality management systems is an improved public perception of the architectural profession. Quality management can help to ensure that the services and the work of architects are respected and successfully transformed into buildings that improve the human condition.

ISO 9001

The International Organization for Standardization (ISO) has developed the 9000 series of standards for quality management. Some of the benefits claimed by the ISO 9000 quality systems are:

- an internationally consistent set of standards;
- a single set of standards applicable to all industries;
- objective, third-party verification of quality assurance;
- opportunity for continuous improvement.

ISO 9001, one of these 9000 series standards, is the standard applicable for service providers such as architects. ISO 9001 certification does not warrant the quality of the product itself. However, a quality system based on ISO 9001 should assure clients, suppliers, principals, and staff that the services are delivered consistently and predictably.

ISO establishes the following simple guidelines for an architectural practice:

- develop a process for performing the work, even if the project is small;
- never improvise;
- put the process in writing;
- verify that the process has been followed.

The Royal Australian Institute of Architects (RAIA) has developed an office manual, suitable for use in ISO 9001 certification, for small and medium-sized architectural practices. This generic manual states:

"Plan What You Do — Do What You Plan"

(See Chapter 1.1.5, *International Architectural Organizations*, for RAIA's address.)

Once an architectural practice has instituted an ISO 9001 quality system, the practice may become registered by undergoing an audit conducted by a third-party certifier. Upon registration, the architectural practice can "market" itself as being "*ISO Certified*."

Although a few architectural practices have been ISO certified, the architectural profession as a whole has been somewhat reluctant to adopt the ISO standards. Some of the arguments for not adopting ISO 9001 include:

- the architectural profession is already highly regulated;
- standards and quality are determined upon admission to the profession;
- the costs for implementation and registration/certification can be prohibitive, particularly for smaller practices;
- the required documentation is over-extensive and bureaucratic.

Architects should be aware of the trend — especially for certain larger institutions, governments, and international clients — to do business only with "suppliers" who are certified as having implemented the appropriate ISO Quality System Standards.

Definitions

The following definitions are adapted from ISO 8402.

Quality Assurance: All the planned and systematic activities implemented within the quality system and demonstrated as needed to provide adequate confidence that an architectural practice will fulfil requirements for quality.

Quality Control: Operational techniques and activities that are used to fulfil requirements for quality.

Total Quality Management: A management approach of an organization centred on quality, based on the participation of all of its members and aiming at long-term success through client satisfaction and benefits to all members of the organization and to society.

Verification: Confirmation by examination and provision of objective evidence that specified requirements have been fulfilled. [Note: verification typically deals with a "process," whereas validation is concerned with a "product."]

References

American Consulting Engineers Council (ACEC). *Quality Assessment Workbook*. Washington, D.C.: ACEC, 1997.

The American Institute of Architects (AIA). *The Architect's Handbook of Professional Practice*. Washington, D.C.: The AIA Press, 1994.

Harrington, H. James and Dwayne D. Mathers. *ISO 9000 and Beyond: From Compliance to Performance Improvement*. New York, NY: McGraw-Hill, 1996.

International Organization for Standardization (ISO). Geneva, Switzerland.

International Standard ISO 8402: Quality management and quality assurance — Vocabulary. Second edition. 1994.

ISO 9000 for Small Businesses: What to do — Advice from ISO/TC 176. 1996.

ISO 9001; 1994. Quality systems — Model for quality assurance in design, development, production, installation and servicing. 1994.

Johnson, Perry L. *ISO 9000: Meeting the International Standards*. New York, NY: McGraw-Hill, 1996.

National Society of Professional Engineers (NSPE). *Quality, Risk & Project Management: Guidelines for Engineers and Architects*. Alexandria, VA: NSPE, 1994.

Project Management Institute. *A Guide to the Project Management Body of Knowledge*. Newton Square, PA: Project Management Institute, 1996.

Riddle, Dorothy I. *Quality Assurance in Services: An ISO-9000 Workbook for Small Professional Service Firms*. Ottawa, Ont.: Industry Canada, 1995.

Royal Architectural Institute of Canada (RAIC). *ISO 9000 and Your Practice*. RAIC Practice Builder. Ottawa, Ont.: RAIC.

Saylor, James H. *TQM Simplified: A Practical Guide*. Second edition. New York, NY: McGraw-Hill, 1996.

Shearer, Clive. *Practical Continuous Improvement for Professional Services*. American Society for Quality, 1994.

Stasiowski, Frank A. and David Burstein. *Total Quality Project Management for the Design Firm: How to improve quality, increase sales, and reduce costs*. New York, NY: John Wiley & Sons, 1994.

Stimson, William A. *Beyond ISO 9000: How to Sustain Quality in a Dynamic World*. Washington, D.C.: American Consulting Engineers Council, 1998.

Walton, Mary. *The Deming Management Method*. City: Putnam Publishing Group, 1986.

Williams, David J. *Planning a Quality Management Process for Architects & Engineers in Private Practice*. 1997.

Risk Management and Professional Liability

Introduction

Every business enterprise involves risk. Management of risk requires the identification of potential risks, an assessment of the degree of risk, a considered decision of whether or not to assume the risk, and, if the risk is assumed, what steps to take to mitigate any potential impacts.

Liability for professional services performed is one risk encountered by every architectural practice. Incorporated architectural practices (where permitted) can limit some of the liabilities for the business side of their operations. However, all architects are liable for the professional services they provide.

To a certain degree, risk management is the application of "common sense" and involves proper consideration of all the issues and their potential ramifications.

Risks occur throughout an architect's career, from setting up a practice, during the life of the practice, and after retirement. One can never totally eliminate risk. Inaction can sometimes be riskier than action, and either course can have unforeseen consequences.

This chapter cannot deal with every conceivable risk in an architect's practice, but will review certain kinds of risks in order to assist the architect in developing a risk management strategy.

Risks Related to Management of the Practice

Setting up a Practice

Refer also to Chapter 2.1.1, *Organization of an Architectural Practice*, for further information on setting up a practice.

The architect should check the regulations of the provincial architectural association, particularly those requirements for:

- structure and ownership of an architectural practice;
- permitted names for an architectural practice;
- other operating requirements such as:
  - *bona fide* address;
  - telephone, etc.

In addition, the architect should confirm the following requirements of municipal authorities:

- business taxes;
- zoning or land use restrictions for the proposed office.

At the outset, the principals should prepare a "strategic plan" which includes a business and financial plan. Refer also to Chapter 2.1.4, *Financial Management*, and Chapter 2.1.1, *Organization of an Architectural Practice*, for more information on these plans.

Professional Liability Insurance

One method of reducing risks is to obtain and maintain professional liability insurance (sometimes referred to as Errors and Omissions Insurance). This type of insurance is mandatory in some provinces. Refer to "Comparison of Provincial Requirements regarding Professional Liability Insurance" in Chapter 1.1.4, *The Organization of the Profession in Canada*.

All architects are expected to perform their services to a "**professional standard of care**." This means that architects are required to provide service with the degree of care and skill that would be rendered by reasonably competent architects under the same circumstances and in the same geographic location. An architect who does not meet this standard may be found to be **negligent**.

An architect held to be negligent might be held personally accountable for the damages. Professional liability insurance provides protection from such claims and is intended to cover such liabilities.

A professional liability insurance policy does not necessarily afford total protection, because insurance policies typically have exclusion clauses which void coverage for certain specific activities. The architect should read and understand the policy and pay particular attention to exclusions. Premiums are usually proportionate to the volume of work in the practice. It may be necessary to purchase excess coverage over and above the basic level of protection required by the regulations or legislation of a particular province. If possible, the excess coverage should cover any exclusions in the primary policy.

The *Canadian Standard Form of Agreement Between Client and Architect: Document Six* contains a clause, Article 5.5, limiting the architect's liability to the client. A similar clause should be included in all other non-standard, client-architect agreements. However, this clause will not limit exposure to third parties; therefore, additional coverage may still be advisable.

If a situation arises in which the architect believes that a claim might be made, the architect should discuss the situation with the professional liability insurer to minimize exposure. Notify the insurer at the first indication of the likelihood of a claim and follow the insurer's advice in order not to put the insurance coverage at risk.

Every province has a different statute of limitations. These statutes of limitations usually provide a time limit when a claim can be made. These laws indicate the number of years after which no legal proceeding may be undertaken following a date when the damage (or negligent act) was discovered or ought to have been discovered. However, no time limitation applies to recognition of damage (or negligence) in the life of a building. In other words, professional responsibility and potential liability for each and every project remains with the architect for life.

In Québec, the liability of architects is based in the following articles of the Civil Code:

Article 1457 — General Liability
Article 1458 — Contractual Liability
Article 2118 — One Year Liability for workmanship of a Contractor
Article 2120 — Five Year Liability in the case of loss of work — this is joint and severable with engineers and the contractor with the possibility of release.

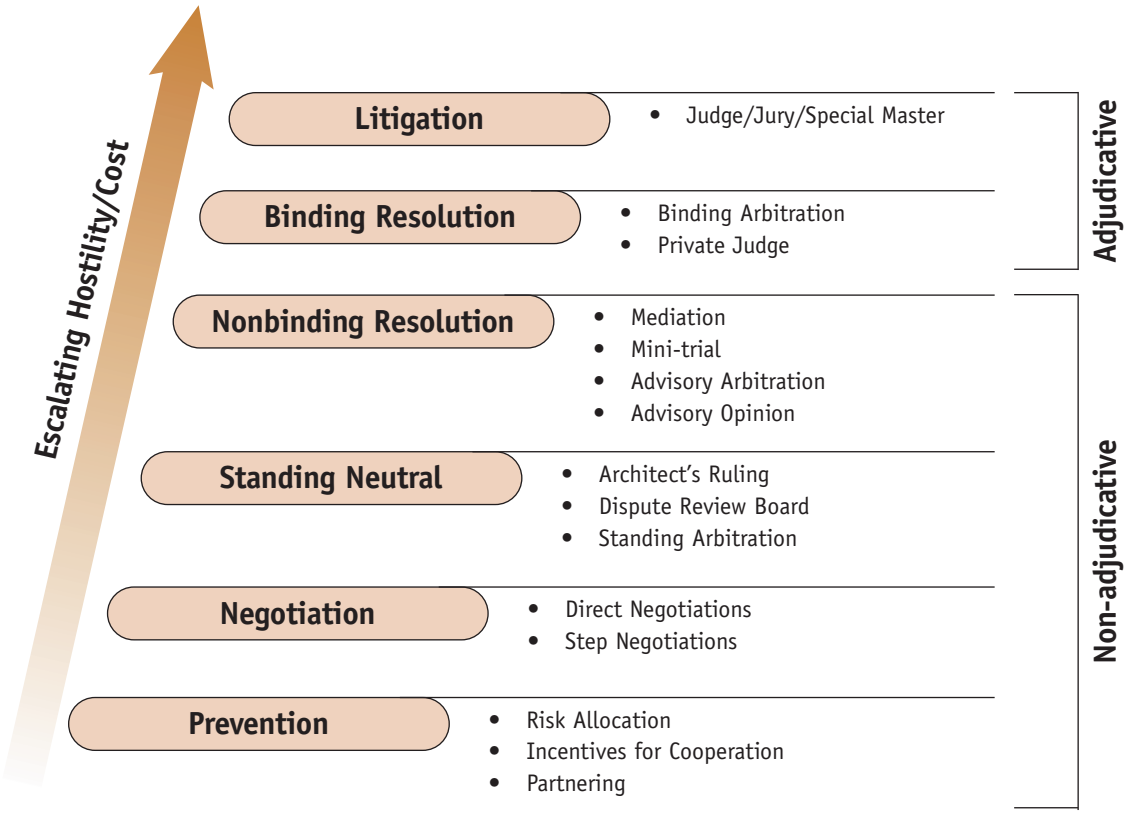
Refer to the "Chart: Comparison of Statutes of Limitations in Each Province" at the end of this chapter.

The architect should always require sub-consultants to carry professional liability insurance with the appropriate coverage for each project. All consultants should be required to verify that they have obtained this coverage when the architect engages consultants for a project.

Alternative Dispute Resolution (ADR)

In the event of a dispute, the architect may occasionally be requested to participate in some form of Alternative Dispute Resolution (ADR) such as mediation or arbitration. ADR is a conflict management strategy that seeks to avoid the very costly (to all parties) and very lengthy process of litigation. This approach is usually proposed when amicable negotiations do

Illustration 1: Dispute Resolution Steps



Reprinted with permission from:
DPIC — Security Insurance Company of Hartford

not achieve a mutual agreement to resolve a matter under dispute. Always discuss a proposal for ADR with the professional liability insurer prior to agreeing to participate. The insurer or their legal counsel may wish to represent the architect in these circumstances.

The ideal, of course, is to avoid disputes in the first place. Clear, concise, correct, well-coordinated, and well-checked contract documents will reduce the likelihood of a dispute, but cannot totally eliminate the possibility.

Illustration 1 shows a sequence of dispute resolution techniques. These methods of ADR are ranked in ascending order from low to high escalation of hostility and of costs for the parties in dispute.

Partnering

Developed as a method of **dispute avoidance**, partnering has the following objective: to solve problems as they arise, in a manner that will best achieve agreed-upon collective goals rather than trying to affix blame. Partnering is a relatively new concept and involves a team comprised of owners, design professionals, and contractors (prime contractors and sub-contractors). Each participant in the process earns the trust, respect, and understanding of the others concerning the expectations, goals, and objectives in implementing a construction project. This is often accomplished through a facilitated working session or meeting. Partnering typically takes a few days of meetings which culminate in the issuance of a "charter" stating the mutual "buy-in" or acceptance by the partners to the project's common goals.

As with all contractual relationships, the "chemistry" among the participants must be compatible; partnering can enhance the chemistry but will not likely replace it.

Negotiation
In the event of a dispute, the parties may initially attempt to resolve the matter by negotiation. Negotiated settlements based on strict interpretation of the terms of a contract are generally less successful than those negotiations which focus on the underlying interests of the parties.

Mediation
When two or more parties mutually agree to refer their dispute to mediation, a neutral person is usually appointed to act as a mediator. The mediator is a type of facilitator, assisting the parties in their negotiations with one another to resolve or settle the dispute. The mediator:

- does not impose a settlement;
- is not a decision-maker;
- does not act as an expert providing an opinion.

Although the mediator does not need to have special expertise in the matter under dispute, some parties may believe that such expertise is useful.

Once a settlement is made, appropriate written documentation — which releases someone from an obligation or from further legal action — is necessary. These releases should be prepared by a lawyer.

Arbitration
In arbitration, two or more parties submit a dispute to an independent and impartial arbitrator or arbitration panel, mutually agreed upon by the parties in dispute. The arbitrator makes a final and binding determination in a judicial manner. The experience and qualifications required for an arbitrator are similar to those required for a judge. An arbitrator must have knowledge of:

- the law, in order to allocate liability between the parties in dispute and determine the amount of related damages;
- statutory procedures applicable to conducting a hearing;
- relevant legislation, relating to arbitration and judicial procedures.

Special expertise in the matter under dispute is not required, although this knowledge may be helpful.

Records

Depending on the provincial statute of limitations or other regulations regarding an architect's archives, it may be necessary to store the large quantities of documentation, files, and drawings which a practice will accumulate over time. Accurate and comprehensive records can be invaluable when mounting a defence against a claim. Because a long period of time can elapse between the filing of records and the need for retrieval, it is important to establish a retrieval system that can be easily understood and accessed by the senior members of the practice.

In some cases, long-established practices have had to defend against a claim related to a project designed and constructed before any of the current principals or staff were part of the practice. The records of these projects are the sole source of reference to the project and activities at the time.

Getting Paid

One of the risks an architect faces is a client who, for whatever reason, is delinquent in honouring a contractual obligation to pay invoices in a timely manner.

The following tips help to reduce the risk of late payment or non-payment of invoices:

- Obtain a retainer representing 5% to 10% of the total fee at the execution of the contract.
- Advise the client that the retainer will be applied against the final invoice. (Note: some architects are reluctant to request a retainer, although many architects do ask for and receive retainers on a regular basis. If the retainer is not requested, it is not likely that one will be offered. A retainer is especially important if the client is unknown to the architect or has a reputation for being difficult to collect from.)
- Ensure that the terms and conditions of the agreement have been discussed with the client, including the right to stop rendering services in the event of non-payment of fees.
- Advise the client that non-payment or late payment is a serious matter and that services will be stopped if payment is not received.

- Stop work if necessary — if services are not halted at the first instance, there will be no credibility if late payment should re-occur.
- Issue invoices twice a month, every second week, or weekly, in some cases. (Although invoicing is typically a monthly operation, there is no obligation to be bound to a monthly policy. More frequent invoicing will not only improve cash flow, but will be an early alert of a delinquent payer. Computerized invoices facilitate more frequent invoicing.)
- Include a statement of interest on overdue accounts. (Because an architectural practice is not a financial institution, the rate of interest should never be more attractive than that charged by those who fund projects. Even if there is no intention to charge and collect the interest, it should be included in the agreement and its impact on overdue accounts demonstrated in a statement of account.)
- Separate the fees for professional services from reimbursable expenses by using two separate invoices. (This will reduce the chances that the client may withhold payment of an invoice by questioning one or two small items.)
- Follow up invoices to certain clients with a telephone call, after an appropriate period of time, asking whether payment can be expected within the agreed-to time period. (Do not wait until the payment is overdue to make the call. Establish and implement a policy for a sequence of "reminder" calls, perhaps one week apart. Each call should be polite but firm, and after the first two calls, ask for a meeting if payment has not arrived by the due date.)
- Send a letter to the client outlining attempts to receive payment to date, if past-due payment has not been received after three weeks of calls and a meeting. The letter should state that at no time has the client expressed any problem with the invoices. Refer to the clause in the contract providing for the withholding of services for non-payment and express the wish not to have to invoke this, which could seriously affect the success of the project.
- Be aware of provincial lien legislation, particularly for different time limitations for filing a lien for a "contractor" (prime consultant) or "sub-contractor" (sub-consultant). Be prepared to initiate lien action within the time periods specified in the legislation.
- In the event that repeated attempts to receive payment have been unsuccessful, give serious consideration to stopping services and initiating one of the following:
  - send a lawyer's letter to the client;
  - file a lien against the property;
  - attempt to reach an agreement through a mediation process;
  - attempt to reach a decision through an arbitration hearing;
  - turn the collection over to a reputable collection agency;
  - initiate legal action.

[Note: the final alternative to withholding services may be to resign the commission.]

- Notify the building department, whether or not the decision is to withhold services until payment is made, or to resign the commission. These Authorities rely on the architect to provide a general review of the project.
- Be ready to prepare a defence against counter-claims by the client, whatever course of action is selected (mediation, arbitration, lien action or litigation). The client may make a variety of accusations, including poor performance and negligence.
- Take care not to issue idle threats: if legal action has been threatened for non-payment of an invoice by a certain date, initiate the action on the following day.
- Record everything, for example, all attempts at contact for purposes of payment (faxes, E-mail, phone calls, letters, memos, conversations). These records will be important in formal hearings in resolving the matter of collection.

Risks Related to Management of a Project

Clients/Projects — GO NO-GO

Each prospective client and each prospective project should be considered in a similar fashion, whether the architect is:

- pursuing a specific sector of the market;
- responding to a request for proposal;
- entering a competition;
- negotiating with a single client for engagement of services.

This consideration includes a rigorous appraisal of the commission against a "GO NO-GO" checklist. Such a checklist identifies the risks involved if the architect decides to pursue the "opportunity." Many checklists have been developed by both large and small practices, and by management companies and financial advisors. Some checklists are short and others exhaustive. Some use a rating formula (for example, if 5 out of 20 questions score negatively, the project should not be pursued). Other checklists permit the architect to determine the degree of risk after answering all the questions. The architect should recognize that the honest answer to a number of questions may be "don't know."

There is a common misconception that the GO NO-GO analysis generates only one of two responses. However, the main function of the checklist is to identify which issues need to be changed in order to move from a NO-GO to a GO position, particularly if these issues are readily negotiable or can be corrected.

One of the hardest lessons for an architect to learn is when to decline a project. A proper GO NO-GO checklist and subsequent analysis can help make such a decision.

Each practice should devise its own GO NO-GO risk analysis process and use it rigorously prior to accepting a commission. The analysis can minimize the risks of accepting a commission under poor terms or conditions.

Refer to the "GO NO-GO Checklist to Assess the Degree of Risk" at the end of this chapter.

Assembling the Consulting Team

If the GO NO-GO checklist process leads to pursuit of the project, it will be necessary to minimize risk by assembling the proper consulting team. The architectural practice may need to hire additional staff, engage another practice as a sub-consultant, or form a joint venture with another practice. Each of these options requires careful consideration concerning:

- the competitive position of the practice;
- the performance of services in the event of success in being awarded the project.

Use the "Checklist: Issues to Consider When Assembling the Consulting Team," at the end of this chapter, to select the main engineering sub-consultants (structural, mechanical, and electrical engineers).

Even if the client plans to engage the consultants directly through separate agreements, the architect will have to manage and coordinate their work; therefore, the above referenced checklist is still relevant.

It is also important to recognize the importance of team "chemistry." The success of a project often depends on team chemistry, that is, the ability of all team members to work well together.

The use of the same consultants on a continuing basis may save the architect time, money, aggravation, and billable time, thereby improving overall quality, coordination, client satisfaction, and project profits. On the other hand, selecting new or different consultants for a specific project may put the architect in a better position to be awarded the commission, particularly if special expertise or client preferences are a consideration.

A written agreement should be prepared outlining the roles, expectations, and responsibilities as well as payment for each consultant. Avoid relying on past experience as the normal method of operating. Good relationships can be soured because of a lack of mutual understanding of routine items such as the number of site visits or the responsibility for

the review of shop drawings. Nothing should be taken for granted. The use of the *Canadian Standard Form of Agreement Between Architect and Consultant: Document Nine* is recommended.

Client-Architect Agreements

Good contracts always allocate risks fairly. It is not only professional, but also good business practice, to have a clear, written agreement which outlines the roles and responsibilities of both parties. The use of the *Canadian Standard Form of Agreement Between Client and Architect: Document Six* or *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: Document Seven* is always recommended. These documents have been prepared by the National Practice Program on behalf of the architectural profession.

There is no reason to use a customized letter as a form of agreement in place of the Standard Forms of Agreement. Some architects argue that the standard forms of agreement will "intimidate the client." However, these same "timid" clients may have no difficulty in launching a lawsuit against the architect. Often, the lawsuit will be over the very issues covered in the "intimidating" standard form of agreement, but which are not included in the customized letter form of agreement which was executed.

Oral agreements should **never** be used. Most provincial associations of architects have a short form agreement to be used as an interim or "binder" agreement until a full standard form of agreement can be prepared and executed.

One of the best ways of minimizing risk is to spend time with the client at the outset, carefully discussing the client-architect agreement, clause by clause, describing:

- what services will be provided;
- what the services entail;
- what will **not** be included in the agreement.

Architects must manage expectations as well as risks. Problems often occur later in the project because the expectations of the two parties differ. Early review of the agreement helps to avoid problems. Amendments to the standard forms of agreement should be included only if necessary, and if signed or initialled by both parties.

If the client is a corporation, ensure that the person signing the agreement for the client actually has the authority to commit the corporation. If in doubt, request a copy of the appropriate minutes of the board of directors meeting which confers such authorization on the individual.

Some corporate and institutional clients, particularly larger companies and some government departments, will prefer to use their own "standard agreement" forms instead of the *Canadian Standard Forms of Agreement Between Client and Architect*. These agreements generally are written in favour of the client, often to the detriment of the architect's interests. Prior to executing such an agreement, the architect should review it carefully with legal counsel and with the professional liability insurer to ascertain the extent of risk that is being assumed over and above those risks in the standard forms of agreement.

Client-initiated variations to the standard forms of agreement may typically include the following phrases:

- *architect to warrant contractor's work;*
- *architect to assign copyright to client;*
- *client will not pay for reproduction of drawings;*
- *architect will supply 24 sets of drawings and specifications;*
- *architect will guarantee building permit will be issued;*
- *architect will guarantee construction cost estimate;*
- *architect will visit site only when called by client;*
- *architect will engage surveyor, soils consultant, and hazardous materials consultant.*

Certain clients say, "All other architects accept and sign this agreement, why won't you?". This statement is a "red flag," and the architect should seriously consider whether or not to assume such risks by signing the agreement. Consider the following:

- the statement is incorrect — "all other" architects do **not** sign such agreements;
- others may have signed and crossed their fingers hoping all goes well (all may indeed go well, but is it worth the gamble?);
- other architects have signed and have suffered the consequences or damages.

When such clauses are proposed, the prudent architect should:

- discuss the questionable clause with architects who have allegedly signed it;
- review the proposed agreement with legal counsel, the professional liability insurer, and the provincial architectural association;
- determine the extent to which the practice can be exposed to such risk;
- attempt to negotiate contract changes with the client.

Many clauses inserted in contracts not only increase the architect's liability but also are not covered by professional liability insurance. Examples include:

- warranty of performance;
- guarantee of conformity to code;
- guarantee the work of all others.

The architect should **never** warrant or guarantee any aspect of professional services.

When the architect is prepared to sign a contract with such adjustments and assume the subsequent risks, it is prudent to review the portions of the agreement that will be the responsibility of the sub-consultants and to obtain their concurrence **before executing the agreement** with the client. For example, sub-consultants may not be prepared to relinquish their copyright, even though the architect may be prepared to do so. These issues must be resolved prior to execution of the contract, or the architect will not be in a strong negotiating position after the agreement has been executed.

The Project: Design and Documentation

The two main risks in the design and construction documentation phases of an architectural project are:

- the practice will lose money in producing the documents;
- an error or omission in the documents will result in a claim.

Consider the following issues in managing these risks:

Composition of the Design Team
The "chemistry" among the various people on the project may require re-assessment. (Consider changing the personnel if working relationships are not harmonious.)

Professional Fees
The fees may not be commensurate with the professional service required. (If the fees cannot be re-negotiated, the loss should be taken into consideration when calculating fees on future projects.) In any event, **the professional services must not be compromised**. Do not assume that the loss will be offset by gains during the contract administration phase; surveys indicate clearly that profits during contract administration are generally only 50% of profits in the earlier phase of a project.

The fee must always be commensurate with the scope of services required for the project. Refer to *Mastering the Business of Architecture* (outside Ontario, called *Mastering the Business of Design)*. This publication, prepared for the Ontario Association of Architects, itemizes services that the architect can provide. The client and the architect can jointly use the publication to select the services required for a specific project, following which the two parties can readily establish and agree upon an appropriate fee.

Project Management
Use some form of project planning to track actual costs (time and expenses) against those anticipated. A number of software programs are available to facilitate the management process.

Refer also to Chapter 2.3.1, *Management of the Project*, and to the Appendices in Chapter 2.3.2, *Types of Construction Project Delivery*, for a list of software and project management techniques.

Checklists
One of the most important elements in the management of risk is a thorough and comprehensive checking process. Unfortunately, this is often rushed or omitted due to inadequate scheduling or unreasonable deadlines. **This element may be the singular most important one in mitigating the risk of incomplete, incorrect, non-comprehensive or uncoordinated documents**. Many practices develop and use exhaustive checklists to ensure that the many items required to complete a set of drawings have been included.

A proper checking process is highly disciplined and should be followed rigorously. A simple method is to apply — *without exception* — the rule that the drawings and specifications are not to be sealed until after the checking process has been completed.

For other checklists, refer to "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, and to the references in Chapter 2.3.7, *Construction Documents — Drawings*.

Someone other than the originator (designer or draftsperson) should check drawings. Once the documents are assembled for checking, consider using a colour-coded checking process for printed checksets.

- *Step 1*: Check all notes and dimensions. Use a yellow line to cover the agreed-to or correct items, circle incorrect items with a red line, and place the corrected item or information next to the red circle.
- *Step 2*: After the "red-lined" information is corrected, draw a green line over the item on the marked-up print immediately after the correction is made on the original. The individual who did the original checking with red and yellow lines should be the same one to review the corrected original against the red-lined version to confirm that all corrections have in fact been made.
- *Step 3*: Upon confirmation, a heavy black line is then drawn across the green line on the marked-up print. The checking process is not complete until every print is fully marked with yellow for correct items and red-plus-green-plus-black for items requiring correction.

This process — known as "back checking" — is not complete until the back checker signs off on each print. Only after "sign off" are the documents ready for seal and signature, and not before.

Checking to this extent is time-consuming. However, such a rigorous check will avert problems later on, when they are much costlier to correct. All architects should allocate and budget appropriate time for this aspect of risk management.

The Project: Bidding and Contract Award

The risk of litigation by unsuccessful bidders can be minimized by using clear and concise criteria setting out the method of contractor selection, and adhering strictly to these criteria. All privilege clauses in the bid documents — such as *"The lowest or any bid may not necessarily be accepted"* — should be reviewed and written based on recent court decisions.

A decision to award the contract to other than the lowest *bona fide* bidder can cause legal action. To minimize this risk, the architect should advise the client to obtain legal advice respecting any award to other than the lowest bidder.

The Project: Contract Administration

This phase of the project is prone to many risks which expose the architect to potential claims. Refer also to Chapter 2.3.11, *Contract Administration — Field Functions*, for more detailed information. The architect can reduce these risks by rigidly adhering to standard routines, forms, and policies. Some of these include:

- a pre-packaged kit for field reviews;
- proper safety equipment;
- a checklist for field review;
- pre-determined format for field review reports;
- pre-set notes of site meetings;
- timely response to all contractor requests, to avoid potential delays;
- timely review and processing of all shop drawings, samples or mock-ups;
- recognition and understanding of the roles of all participants in the project (avoid assuming issues or problems that do not

fall within the architect's scope of work, otherwise the contractor will readily assign responsibility to the architect);
- adequate assessment of the contractor's application for payment (experienced contract administrators will review the application with the contractor on the site before the application is finalized by the contractor);
- care in issuing the Certificate of Substantial Performance and Statement of Completion (once issued, these documents cannot be rescinded and they activate the timing for the release of holdback);
- impartiality between the client and the contractor;
- documentation of all communications, findings, and observations, in part to support future defence of any claim.

The Project: Post-construction

Most client-architect agreements provide for the termination of the agreement one year following the date of substantial performance. The architect should maintain contact with the owner and should bring critical or annoying warranty items to the contractor's attention promptly for rectification. Provide a list of warranty items for correction by the contractor, following a final on-site review scheduled shortly before expiry of the warranty period. Ensure that the critical date is logged in calendars or in a "bring-forward" system to avoid the risk of missing this final field review prior to the expiration of the warranty period. Refer also to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*.

Projects in Other Jurisdictions

Architects working outside their base jurisdictions should learn about the differences in construction practices and professional services in other jurisdictions which may increase risks. The further from home, the greater the differences. Some differences to watch for include:

In other municipalities within the same province:

- different zoning, land-use, and other bylaws;
- different building code interpretation;
- different processes in applications to Authorities Having Jurisdiction;
- local customs.

In other provinces within Canada:

- different legislation (such as lien legislation);
- architectural registration/licensing and provincial policy with respect to seeking work in another province without a licence;
- applicable provincial law (for example: Civil Code in Québec vs. common law in other provinces);
- local customs;
- bylaws in specific municipalities.

Outside Canada:

- different laws:
  - whether the architect can legally provide services in the jurisdiction;
  - liability laws;
  - tax laws which may affect profitability;
  - laws respecting travel, visas, and freedom of movement;
  - international agreements and treaties;
  - applicable building codes;
- different customs:
  - cultural differences;
  - language which may govern contracts;
  - payments to "sponsors" for the privilege of working in the jurisdiction;
  - political alliances (allies, neutral parties, and enemies);
  - local trade practices;
- forms of contract:
  - standard international contracts, for example, the contract of the International Federation of Consulting Engineers (FIDIC);
  - uninsurable clauses such as guarantees, warranties, higher standards of performance than in Canada, greater indemnification of owner than Canadian architects are accustomed to (for example, the following are not insurable: major disasters, a major settlement of a lawsuit several years after project completion);

  - unusual clauses (for example: "if there is a discrepancy in the documents, that which best suits the client will govern");
- payment:
  - make payment terms very clear;
  - be aware of exchange rate fluctuations if payment will be in a foreign currency;
  - make arrangements for transfer of funds before accepting the commission because many countries forbid local currency leaving the country;
  - be aware that some foreign jurisdictions require fees to be either held for performance holdbacks or guaranteed by letter of credit;
- other differences:
  - different time zones between the main office and the overseas location mean that there may be little or no time in which both offices are operating simultaneously;
  - increased communication costs;
  - collaboration — many foreign clients want to deal with a firm that has a strong local presence; this could entail an alliance with a foreign architectural practice, or the opening of an office in the jurisdiction, either of which will require review of the architect's status with both local and foreign associations, as well as with the professional liability insurer.

Definitions

Indemnification: Where one party agrees to pay certain damages or losses incurred by another party.

Liable: Legally bound; subject to penalty; under obligation to do; exposed or open to suffer something undesirable. (adapted from the *Oxford Dictionary*)

Risk: A chance or possibility of danger, loss, injury or other adverse consequences. (adapted from the *Oxford Dictionary*)

References

Association of Consulting Engineers of Canada (ACEC). *Professional Liability and the Canadian Design Consultant*. Ottawa, Ont.: ACEC, 1984.

Butterworths Canada Ltd. *Construction Law Letter*. Published six times a year. Markham, Ont.

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.
Partnering. November 1998.

Alternate dispute resolution (ADR) processes. November 1998.

Consultant's role in ADR processes. November 1998.

DPIC Companies, Inc. *DPIC Companies' Guide to Better Contracts*. Monterey, CA: DPIC Companies, Inc., 1990.

ENCON. "Partnering." *Loss Control Bulletin 94*. By Peter Needra, P.Eng., dated November, 1993. 1998.

Ontario Association of Architects. Toronto.
Practice Bulletin 10.a. *Employed Architects' Liability*. May 1990.

Practice Bulletin 17.c. *October 1, 1989 Revisions to the Outline of Services and Schedule of Recommended Fees*. January 1990.

Practice Bulletin 32.b. *Liability Prevention Checklist*. September 1991.

Practice Bulletin 33. *Fair and Reasonable Fees*. March 1986.

Practice Bulletin 45. *Co-ordination of Consultants*. April 1988.

Practice Bulletin B.3. *Mediation and Arbitration*. August 1998.

Practice Bulletin D.1b. CCDC 2. *Stipulated Price Contract*. September 1994.

Ontario Association of Architects Indemnity Plan. Toronto.
Indemnity Plan Note 1. "Claims Reporting." Revised January 1990.

Indemnity Plan Note 2. "Notification of Claim or Circumstance." May 1990.

Indemnity Policy No. 1. April 1, 1999.

Indemnity Policy No. 2. April 1, 1999.

Indemnity Policy No. 3. April 1, 1999.

Indemnity Policy No. 4. February 28, 1999.

Ordre des Architectes du Québec. Montréal.
Articles du Code civil d'intérêt particulier pour les architectes. 1993.

Articles of the Civil Code of Particular Interest to Architects. 1993.

Royal Architectural Institute of Canada (RAIC). *Guide to Using Consultants*. RAIC Practice Builder. Ottawa, Ont.: RAIC.

Stone, David A.
Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives Inc., 1999.

Vance, Thomas L. and Jack Doran. *Professional Liability in the Construction Process: A Guide for Risk Managers*. Monterey, CA: DPIC Companies, Inc., November 1997.

Victor O. Schinnerer & Company. Chevy Chase, MD.
Partnering — A Dispute Avoidance Strategy. 1996.

Quality Assurance Check List. 1996.

GO NO-GO Checklist to Assess the Degree of Risk

Issue	Yes	No	Don't Know	Comment
A. Adherence to Marketing Plan				
1) Does the project meet our design objectives/goals?				
2) Does the project match our target markets as defined in our marketing and business plan?				
3) Does the project match our target services?				
4) Is the project within our geographic reach?				
5) Is the project consistent with our minimum/maximum project size objectives?				
6) Does the project present us with an unusual opportunity to break into a new market that we had not foreseen?				
7) Does the project offer repeat client potentials?				
8) If we get this job, will it preclude us from further work with this client?				
B. Profit Potential				
1) Can we make a profit doing this job?				
2) Are there any prevailing reasons to want the job, even though we cannot make money on it?				
C. Project Financing				
1) Are project funds secured?				
2) Is it likely they will be?				
3) If not, will funds be secured before we complete working drawings?				
4) Is the client experienced or inexperienced in contracting design services?				
5) Is there a discrepancy between the proposed scope of services and the fee?				
6) Is the fee adequate?				
7) Can we propose a competitive fee?				
8) Are there other factors that negatively affect the project's viability?				
9) Is the client's financial and general reputation good?				
10) Is the project free of speculative aspects?				
D. Architect Selection Process				
1) Is the selection process reasonable?				
2) Is the job "wired" to another firm?				
3) Can we compete effectively under the conditions of the selection process?				

Issue		Yes	No	Don't Know	Comment
E.	**Location**				
1)	Is our location favourable in terms of the client's criteria?				
F.	**Human Resources**				
1)	Do we have the available human resources to produce the work in the client's time frame?				
G.	**Marketing / Staff**				
1)	Do we have the staff and time available to pursue this project in a first-class fashion?				
H.	**Client Contact**				
1)	Are we known by the client?				
2)	Is it a past client with whom we have had a good reputation?				
3)	Have we become known to the prospect?				
4)	Will we have adequate opportunity to research the client's needs before the marketing process begins?				
5)	Do we have any inside tracks with the primary decision-maker?				
6)	Do we have any inside tracks with others who are or may be influential in the decision?				
I.	**Competition**				
1)	Do we know the likely competition? (identify)				
2)	Do we have a chance against them?				
3)	Does this project offer us an opportunity to compete at a "higher level" against firms with whom we would like to be identified in the marketplace?				
J.	**Message**				
1)	Do we have a strong message?				
2)	Are we uniquely qualified to do the job? (identify)				
3)	Can we compete effectively?				
K.	**Making the Short List**				
1)	Are our odds of being shortlisted good? (explain)				
2)	Are our odds good if/when we make the shortlist? (explain)				
L.	**Cost to Pursue**				
1)	Will marketing time and effort required be in proportion to our odds?				
2)	Will the marketing costs be relative to the potential profit? (Spending our profit to get the job may be sufficient reason to decline.)				
M.	**Other**				
1)	Are there specific requirements that we will have difficulty in accommodating? Such as:				
	a) Insurance requirements?				
	b) Copyright assignment?				
	c) Engagement of specialty consultants?				
	d) Guarantees?				

Checklist: Issues to Consider When Assembling the Consulting Team

Issue	Yes	No	Don't Know	Comment
1. Are the professionals with previous relevant experience still with the engineering consulting firm, and will they be assigned to this project?				
2. Does the client know the proposed engineering consultant?				
3. Will the client object to the use of this consultant?				
4. Does the consultant have experience in this project type and this client type?				
5. Does the consultant have prior working experience with your practice?				
6. Does this consultant have prior working experience with the other proposed consultants?				
7. Was prior working experience with this consultant positive?				
8. Is the consultant's proposed fee competitive?				
9. Does the consultant have any conflicts of interest on this project or with this client — either actual or perceived?				
10. Do the consultants all carry professional liability insurance to the limits required for this project?				

Chart: Comparison of Statutes of Limitations in Each Province

The limitation period to bring an action relating to negligent architectural services varies from province to province and with the type of damage that results. The basic rule is that the limitation period starts to run from the date the cause of action arose. Usually, this occurs when the party suffering the loss discovers, or ought to have discovered, that it had the right to sue for damages. The damage may not be discovered for many years after the construction is complete (for example, precast concrete panels may fall off after incorrectly specified anchors have rusted or corroded and failed).

The following chart sets out the appropriate limitation periods according to whether the action is one in contract or tort (that is, negligence) and whether the damage is to property or person.

This is a very general outline only and does not replace proper advice, from professional liability insurers and lawyers, which should be obtained as soon as possible in the event of a potential claim.

Province	Limitation Period (Number of Years)	Relevant Legislation
British Columbia	• Negligent design and/or construction or breach of contract causing damage or injury to person or to property: 2 years • Time will be postponed if the action is for fraud or breach of trust	*Limitations Act,* R.S.B.C. 1996 ss.3(2)(a), (5), 6(3)
Alberta	• Negligent design and/or construction: 2 years • Breach of contract: 2 years	*Limitations Act,* S.A. 1996, c.L-15.1, s.3
Saskatchewan	• Negligent design and/or construction: 6 years Causing injury to a person: 2 years • Breach of contract: 6 years	*Limitations of Actions Act,* R.S.S. 1978, c.L-15, s.3(1)(e)(i),(d)(i),(f)(i),(j)
Manitoba	• Negligent design and/or construction causing: Injury to real property: 6 years Injury to personal property: 2 years Injury to a person: 2 years • Breach of contract: 6 years	*Limitations of Actions Act,* L.R.M. 1987, s.2(1)(f),(g),(i),(n)
Ontario	• Negligent design and/or construction: 6 years • Breach of contract: 6 years	*Limitations Act,* R.S.O. 1990, s.45(1)(g)
Québec	• Negligent design and/or construction: if the work was completed: 8 years if not completed: 3 years • Breach of contract: 3 years	*Civil Code of Quebec* Art.2925, 2118
New Brunswick	• Negligent design and/or construction: 6 years • Breach of contract: 6 years	*Limitation of Actions Act,* S.N. 1997, c.L8, s.9
Nova Scotia	• Negligent design and/or construction: 6 years • Breach of contract: 6 years	*Limitations of Actions Act,* R.S.N.S. 1989, c.258, s.2(1)(e)
Prince Edward Island	• Negligent design and/or construction: 2 years • Breach of contract: 6 years	*Architects Act,* S.P.E.I. 1990, c.4, s.34 & *Statute of Limitations Act,* R.S.P.E.I., 1988, c.S-7, s.2(1)(g)
Newfoundland	• Negligent design and/or construction: 6 years • Breach of contract: 6 years	*Limitation of Actions Act,* R.S.N. 1990, c.L-15, s.2(2)(b),(d),(e)

Standard Forms for the Management of the Practice

Guide to the Use of the Forms

Purpose of the Forms

The forms in this section of the Handbook are provided to assist the architect in the overall business administration or management of the practice. Standardized forms within an architectural practice are an essential management tool.

Office Manual

The architect should ensure that all employees are familiar with the forms adopted by the practice and that the forms are included in an Office Manual (refer also to Chapter 2.1.5, *Office Administration*). Directions for the use of the forms, particularly for Time Reports and Expense Claim forms, should be included in the Office Manual.

Computer Application of the Forms

The forms are also provided in both WordPerfect and Word software formats, on a disk in a plastic sleeve at the end of Volume 2. The forms have been developed as *templates* which may be customized by each architectural practice. Refer to the appropriate software application for instructions on the use of templates and how to customize the forms.

Other Forms

This section provides only the basic forms used by most architectural practices. Certain practices may require some of the many other forms, including:

Other Forms for Human Resources Management

- **Letter of Acknowledgement** (for job application)
- **Letter of Regret** (for unsuccessful job applicants)

Other Forms for Financial Management

- **Statement of Account** (outstanding invoices less payments)
- **Record of Printing and Plotting**
- **Record of Telephone Calls** (long distance and fax charges)

Other Forms for Marketing

- **Letter of Introduction** (to prospective clients)
- **Typical Résumé** (for proposals)
- **Project Data Sheet** (for proposals)
- **Client Contact Data Sheet** (for marketing)

Refer to Chapter 2.4, *Standard Forms for the Management of the Project*, for Forms for General Communications, such as a Memorandum, Transmittal, and Fax Memorandum.

1. Forms for Human Resources Management

1.1 Typical Job Description

Purpose
Job descriptions:

- assist in recruiting staff and preparing advertisements;
- assist staff in understanding their responsibilities;
- clarify the organization of the practice and lines of reporting;
- assist in performance evaluation of staff;
- assist in identifying human resource overlaps or deficiencies within the practice.

Content
Job descriptions should contain the following basic information:

- job title or name of position;
- employment status (i.e., permanent, temporary, part-time, independent contractor, etc.);

- reporting and relationship within the architectural practice;
- description of duties and responsibilities;
- educational requirements;
- experience requirements;
- requirements for membership in professional or technical associations;
- special conditions of employment related to the position (special skills, travel requirements, languages, etc.).

1.2 Application For Employment

Purpose
An application form, which assists in recruiting new staff, also:

- helps analyze potential employees;
- provides a sample of the applicants' skills (e.g., presentation, use of language, organization);
- provides a database for office use.

Content
The Application Form should request the following information:

- name of position applied for;
- name and contact information (address, telephone and fax number, E-mail address);
- date;
- education;
- work experience;
- professional licence/registration and affiliations;
- references.

The Application Form may also request the following information:

- volunteer and community work experience;
- personal interests and hobbies;
- career goals;
- most current salary;
- fluency in languages.

In addition, the form may provide space for the interviewer's comments about the applicant.

Because human rights codes and employment standards acts are in effect in most provinces, Application Forms may NOT request the following information:

- age;
- marital status;
- family status (e.g., single parent);
- disabilities;
- record of offences;
- citizenship, race, ancestry, place of origin, colour, ethnic origin, or creed;
- sex or sexual orientation;
- record of offences.

Ensure that the application form complies with the requirements of the applicable province.

1.3 Interview Evaluation Form

This form can be appended to the Application Form; however, it may be preferable to separate the two forms for purposes of confidentiality.

Purpose
This form is used to make:

- a record of the interview;
- a record of the interviewer's personal notes and observations;
- an appraisal of the applicant.

Content
The Interview Evaluation Form should contain the following information:

- date of interview;
- name of applicant;
- name of interviewer;
- personal notes and observations;
- salary expectations;
- verification of references.

1.4 Employment Agreement

An employment agreement is also discussed in Chapter 2.1.7, *Human Resources*.

Purpose
The agreement:

- creates a contract;
- outlines terms and conditions of employment;
- identifies probationary periods, if any;
- prevents misunderstandings.

Content
A sample Employment Agreement is provided as a template. The following is a **guide,** based on the OAA Practice Bulletin C.3a, for the use of this agreement.

Guide for the use of Form 1.4, Employment Agreement

1.4.1. *Names:* Identify the legal names of the employer and the employee at outset of the agreement.

1.4.2. *Probation:* Care should be taken in establishing the length of the probationary period. A three- to six-month period is typical.

1.4.3. *Termination:* The period of notice to be given by the employer to the employee must be carefully established. Verify what length of notice period is required in provincial legislation. For consistency, a common notice period should be established for all employees. A longer notice period for a senior employee, owing to contribution to the practice, might be considered.

This period of notice given by the employee to the employer must also be carefully established. However, consideration should be given to agreeing to a notice period the same as that from employer to employee. A longer notice period for a senior employee, owing to contribution to the practice, should be considered.

1.4.4. *Restrictive Covenant:* The employee should carefully consider this section. In a small or remote location, this clause (if the time period is too lengthy) may effectively prevent an employee from quitting and establishing his or her own architectural practice.

1.4.5. *Notice:* State the address for which official notice is to be sent for employer and employee.

1.4.6. *Date:* The Agreement is effective as of the commencement of employment. This date is identified above the witnessed signature of the employee and of the person with the authority to bind the employer. If the commencement of the term of employment differs from the term of the agreement, adjust article 1 "Term of Employment" accordingly.

Schedule A

1.4.7. *Position:* The employment position (i.e., job title or job description) should be indicated or described. Refer to 1.1, "Typical Job Description," above. Despite the use of a specific job title, it should be recognized that employees in many architectural practices may be called upon to undertake a wide range of tasks. If a job description is preferable to a title, a Schedule "B" could be created to describe the job requirements and then appended to the agreement. If this approach is used, cross-reference the Schedule at article A.1.

1.4.8. *Hours of Work:* Insert the hours of the length of the work day, start and end time, and duration of the lunch period and coffee breaks.

Suggested text: "A normal work day is _____ hours, beginning at _____ and ending at _____ , and includes a lunch period of _____ hour(s). A normal work week, excluding holidays and vacations, is five days, Monday to Friday inclusive. A normal work year is 52 weeks, including holidays and vacations."

1.4.9. *Vacation:* Insert the terms and duration of vacation. Verify provincial requirements for vacation periods. Normally, all other staff, other than architects or students of architecture, must receive at least two weeks vacation each year. For consistency between employees, a minimum two-week vacation should be given to all employees. Consideration of a longer vacation period for a senior employee is usual.

Suggested text: "A vacation with pay of _____ week(s) duration shall be provided each year. The employee shall obtain at least _____ week(s) advance approval from the employer of the dates of the vacation. Such approval shall not be unreasonably withheld."

An established formula for increasing the vacation period is recommended. Consistency between employees should be established. Additional vacation of one or two days per full year of employment — following an initial period of employment, with a limit to the maximum length of vacation time — might be considered.

Suggested text: "Additional vacation with pay shall be earned at the rate of _____ additional day(s) per _____ full year of employment following an initial period of _____ years, to a maximum of _____ days."

1.4.10. *Personal Leave:* Verify if your province has a legislated requirement for personal leave. One day of paid personal leave per month of employment to a maximum of twelve days is recommended.

Suggested text: "Personal Leave is provided for illness of the employee or dependant, emergency child care, religious observances or for other needs of a personal nature. Personal Leave is not to be used as vacation time. The employee shall accumulate days for personal leave at the rate of _____ day(s) per full month of employment to a maximum of _____ day(s). The employer shall/shall not compensate the employee for unused days of personal leave at the termination of the employee's employment."

(Strike out "shall" or "shall not" to reflect the practice's policy.)

1.4.11. *Bereavement Leave:* An office policy of leave of absence for an employee's bereavement due to a death in the family should be set out to avoid awkwardness of administration at a difficult time.

1.4.12. *Benefit Plan/Profit-sharing Plan:* Check appropriate box and add Schedule "C" if applicable.

1.4.13. *Professional Fees:* List groups, such as the provincial architectural association or the Royal Architectural Institute of Canada, in which the employee is expected to maintain membership.

(Strike out "shall" or "shall not" to reflect compensation policy.) If membership in a professional association is a condition of employment, the employee should be compensated by the employer for the fees and dues.

1.4.14. *Performance Evaluation:* Fill in the month. A yearly performance evaluation is recommended. It may coincide with the month of start of employment, the year-end of the business or other convenient time. (Refer also to 1.5, "Performance Evaluation Form.")

1.4.15. *Career Development:* Identify the terms of career development. This section may also be used to address the needs of intern architects to gain specific experience in order to complete the Canadian Experience Record Book.

Suggested texts: "The employer will/will not compensate the employee for the cost of employer-approved career development courses."

(Strike out "will" or "will not" to reflect the practice's policy.) "The Employer may compensate salary, tuition, travel, accommodation, and other related expenses of professional development courses provided advance approval of the employer is granted."

"The employer recognizes that the employee is an intern architect seeking the work experience necessary to obtain licensure. The employee shall provide the employer with an Education Plan

which identifies areas of needed work experience and a method of obtaining that experience. The Education Plan shall be reviewed and updated quarterly. The employer will assist the employee, as much as reasonably possible within the workload and nature of the practice, to gain the required experience. The employee acknowledges that the workload and nature of the practice may not be able to accommodate all required experience."

1.4.16. *Compensation:* Identify the monetary compensation, hourly rate or yearly salary as applicable, deductions, and pay period.

Suggested texts: "The employer shall compensate the employee on the basis of an hourly rate of $_____ /hour of work."

"The employer shall compensate the employee on the basis of a yearly salary of $_____ ."

"The employer shall make all necessary statutory deductions and provide the employee with a statement of pay and deductions at each pay period."

"The employer shall pay the employee on a weekly/bi-weekly/twice monthly/ monthly basis, commencing on _____ ."

1.4.17. *Overtime:* Identify extent of overtime that may be required as a condition of employment. Identify the compensation for overtime work.

Overtime work at one and one-half times the regular rate, for work in excess of 44 hours per week, is the typical requirement. **This should be verified with provincial legislation and regulations.**

Suggested alternative texts:
"The employee shall be paid for each hour worked in excess of _____ hours in any standard week, at an hourly rate of $_____ /hour."

"The employer shall compensate the employee for unpaid overtime work by granting one hour paid leave for each hour of overtime work."

"The employee shall be paid for each hour in excess of _____ hours in any standard week at a rate of _____% of the standard hourly rate."

"The employer will not compensate the employee for overtime work. The employee at his or her own discretion shall provide unpaid overtime work from time to time when essential to provide a professional level of service to the employer's client. Notwithstanding, unpaid overtime work shall not exceed _____ hours per standard work week or _____ hours per year."

1.4.18. *Expenses:* Identify out-of-pocket expenses for which the employee will be compensated, and reimbursement procedure (e.g., travel, mileage at _____ /km, long distance charges, etc.).

1.4.19. *Equipment:* Identify the equipment and supplies to be provided by the employer and the employee, respectively (e.g., computers, drafting equipment, safety boots, construction helmet, cameras).

1.4.20. *Other Conditions:* Identify other relevant conditions of employment such as religious holidays not covered by the usual statutory holidays, use of the employee's vehicle, computer use, variation in hours of work (e.g., flex-time, different office hours in summer).

1.4.21. *Amendments:* Use amendments to change the agreement at a future date whenever terms or conditions change. Both parties must sign to acknowledge the change.

Review the agreement at least yearly concurrent with the Performance Evaluation.

1.5 Performance Evaluation Form

Refer also to Chapter 2.1.7, *Human Resources,* for information on Performance Reviews and Evaluation.

Purpose
This form:

- describes an employee's attributes;
- identifies career and professional goals;
- measures productivity;
- adjusts salary or pay scales;
- assists as a tool to improve performance.

Content
The content of this form varies, based on the approach of the architectural practice to employee performance evaluation. Some possible information includes:

- name of employee;
- existing job description;
- review of current workload;
- assessment of competency — the fulfilment of duties and responsibilities;
- communications and interpersonal relations;
- professional development or training;
- objectives:
  - a specific outcome or "deliverable";
  - a method of measurement;
  - a time frame for completion;
- signatures of employee and employer.

2. Forms for Financial Management

2.1 Invoice

The Invoice is the document which lists professional services rendered, together with prices and charges, based on the Client-Architect Agreement. The invoice should indicate the basis for the fee (fixed, percentage of construction cost, per diem, etc.), and provide an orderly calculation of the fees itemizing the services rendered and fees for same. In addition, reimbursable expenses may be included in the Invoice; however, some practices prefer to bill reimbursable expenses separately. Expenses may be supported by receipts or proof of the expense.

Contents
The invoice should contain the following information:

- name of client;
- date;
- project name and number;
- Business Number issued by Revenue Canada (Goods and Services Tax [GST] number or Harmonized Sales Tax [HST] number);
- list of professional services rendered;
- fee earned for services rendered to date;
- list of reimbursable expenses (this may be a separate invoice or appended to the invoice);
- previous payments;
- appropriate taxes (such as GST, HST or TVQ);
- current amount due and payable.

Refer to the sample invoice in this chapter.

This example represents an invoice submitted at 60% of the completion of the construction contract. In the example, the estimated cost of construction at the design stage was $200,000; at the working drawing stage (construction documents phase), the estimate was $220,000. The successful bidder's tender of $218,000 was accepted, and Change Orders during the construction adjusted the contract amount to $226,000.

Additional services, billed hourly for design and documentation involved in the preparation of the Change Orders, are shown on the sample invoice (as per Schedule B, Additional Services, of *Canadian Standard Form of Agreement Between Client and Architect: Document Six*). Only the contract administration services for the Change Orders are covered in the percentage fee which is based on the revised contract amount.

The architect's fee is 8%. The fee during the construction administration phase is applied to the current contract amount plus GST or HST (i.e., $226,000 + 7% GST = $241,820).

To facilitate payment, cash flow, and cost control, it is sometimes preferable to issue separate invoices for:

- fees for basic services;
- fees for additional services;
- reimbursable expenses.

Refer also to Chapter 2.1.4, *Financial Management*, and to Chapter 2.1.9, *Risk Management and Professional Liability*.

2.2 Fee Calculation Sheet

The practice must determine the costs of providing the necessary services before submitting a proposal or fee quotation. This form is sometimes called a fee forecast.

Purpose
A fee calculation sheet is necessary to:

- determine the payroll cost and other costs of providing the service;
- identify appropriate personnel and consultants for the service;
- assist in scheduling work within the office;
- assist in fee negotiations with the client.

Content
The sheet should provide the following information:

- project name and number;
- construction value for the project;
- list of professional services required;
- fee forecast:
  - payroll costs;
  - consultants' fees;
  - overhead and profit.

2.3 Project Cost Control Chart

This form can serve as a tool for tracking payroll costs related to a specific project.

Purpose
The form can be used as:

- a status report on each project;
- a performance evaluation tool;
- a reference for future fee calculations;
- a warning to indicate when payroll costs have exceeded the budgeted amount;
- a project planning tool.

Content
The form should include the following information:

- project name and number;
- construction value of the project;
- percentage of architectural services completed to date;
- staff involved, including project manager;
- person-hours expended to date;
- budgeted person-hours remaining;
- payroll and other costs to date;
- fee billed to date;
- fee remaining;
- budget comparison (comparison with Fee Calculation Sheet).

2.4 Time Report

Time reports are a very valuable management tool and should be completed on a weekly basis by every partner, shareholder, and employee in the practice as well as by billable independent contractors.

Purpose
Time reports are:

- a basis for remuneration to employees and independent contractors;
- an historical reference for project scheduling and allocation of human resources;
- a record for monitoring payroll costs and scheduling;
- an evaluation tool for employee performance;
- a documented record of services and additional services provided to clients;
- a management tool for analysis of work activities;
- a record to assist in the completion of the *Canadian Experience Record Book* for intern architects.

Content
Every time sheet should include the following information:

- employee name (and number for larger firms);
- time period;
- project name and number;
- type of work activity;
- tabulation of daily and weekly activities by hours;
- employee and supervisor signatures.

2.5 Expense Claim Form

The use of the Expense Claim Form must be coordinated with the Office Manual to ensure that allowances for travel (rate per kilometre), meals, etc., are fair and current. Receipts for expenses are usually attached to the form in order to substantiate expense claims.

Purpose
Expense claim forms are used as:

- part of normal accounting records which are subject to audit;
- a record to prepare invoices for reimbursable expenses;
- a management tool for project budgeting.

Content
Expense Claim Forms should include the following information:

- name of claimant;
- time period;
- approval signature (if required);
- purpose of expense;
- project name and number;
- itemized list of expenses (with receipts):
  - travel (mode, distance, and destination);
  - parking;
  - meals;
  - lodging;
  - other out-of-pocket expenses;
- amount of advances;
- total amount claimed;
- signature of claimant.

2.6 Purchase Order

Larger firms often require a purchase order for the supply of materials or equipment.

Purpose
A Purchase Order creates a contract between the architectural practice and the supplier. It also:

- outlines the terms and conditions of the purchase;
- helps control overhead costs within the firm;
- provides a record of material and equipment (reconciliation or a type of partial inventory).

Content
A Purchase Order Form should contain the following information:

- name of supplier and purchaser (architectural practice);
- purchase order number;
- method of shipment;
- quantity and description of product;
- unit price and total price, including taxes;
- conditions of purchase (warranties, support, delivery schedules, etc.);
- project name and number (if applicable).

Purchase order forms are often pre-printed and sequentially numbered to control purchases. Some architectural practices advise their suppliers that invoices will not be paid without an authorized purchase order.

3. Forms and Stamps for the Management of the Practice

3.1 Project Directory

The project directory, which includes all projects undertaken by the architectural practice, is helpful as:

- a list to use as a filing reference;
- identification of senior staff responsible for each project;
- a reference for the date of project commencement;
- a management tool;
- a financial management tool, if it provides the following additional information:
  - construction value;
  - percentage complete.

3.2 Office Stamps

Each architectural practice should obtain a series of stamps (either rubber stamps with a separate ink pad or self-inking stamps) which are used to indicate the status of a document or drawing.

The following are some common stamps used in an architectural practice:

3.2.1 *Received/Routing Stamp*

Purpose
This stamp registers the date of receipt of all incoming documents (correspondence, trade journals, catalogues, transmittals, drawings, etc.). The date is particularly important in documenting the receipt of items such as shop drawings and Contractors' Requests for Payment which must be processed under certain contractual obligations.

This stamp can also be used to indicate the routing or circulation of the document.

Content
The following are two samples:

Logo or Name of Architectural Practice

Date Received:

File or Project No.:

Routing:

Action:

Logo or Name of Architectural Practice

Date Received:

File or Project No.:

Routing:

3.2.2 *Other Stamps*

Other useful stamps are illustrated below.

FOR DEPOSIT ONLY

DAY FILE

COPY

Logo or Name of Architectural Practice

Job Description

Name of Position:

Employment Status:

(i.e, part-time, permanent, contract, etc.)

Reports to:

Responsibilities:

Education and Work Experience Requirements:

Professional or Technical Memberships and Affiliations:

Benefits:

Salary Range:

Date:

Logo or Name of Architectural Practice

Application for Employment

Name:

Address:	**Home Phone:**
	Business Phone:
	Fax:
	E-mail:
	Date:

Application for Position of:

Outline of Education:

Institution:	From:	To:	Remarks (Diploma, Degrees, etc.)

Outline of Experience:

Employer:	From:	To:	Remarks (Duties, Responsibilities, etc.)

Comments by Applicant:

The applicant is invited to comment on any item which would be of assistance in appraising his or her qualifications for the position, such as details of experience, special achievements, field of specialization, career goals, special interests.

References:

1.

2.

3.

Logo or Name of Architectural Practice

Interview Evaluation Form

Position:

Name of Applicant:

Name of Interviewer:

Date of Interview:

Interviewer's Personal Comments:

Salary Expectations:

Verification of References:

1.

2.

3.

Logo or Name of Architectural Practice

Employment Agreement

This Agreement is made:

Between the Employer:

_____

and the Employee:

_____

The Employer and Employee agree as follows:

1. *Term of Employment*

   The employment of the Employee shall commence on the date of this agreement and continue for an indefinite term until terminated in accordance with the provisions of this agreement.

2. *Probation*

   The parties hereto agree that the initial _____ month period of employment under this agreement is "probationary" in the following respects:

   (a) the Employer shall have an opportunity to assess the performance, skills, and other employment-related attributes and characteristics of the Employee;

   (b) the Employee shall have an opportunity to learn about both the Employer and the position of employment;

   (c) either party may terminate the employment relationship at any time during the initial probationary period without advance notice or cause, in which case there will be no continuing obligations of the parties to each other, financial or otherwise.

3. *Compensation*

   In consideration of the services to be provided by the Employee hereunder, the Employee, during the term of employment, shall be compensated as set out in the attached Schedule "A" which forms a part of this agreement, less applicable statutory deductions.

4. *Termination of Employment*

   Subsequent to completion of the probationary term of employment referred to in paragraph 2 herein, the Employer may terminate the employment of the Employee at any time:

   (a) for cause at common law, in which case the Employee is not entitled to any advance notice of termination or compensation in lieu of notice;

   (b) without cause, in which case the Employer shall provide the Employee with advance notice of termination or compensation in lieu of notice equal to:

   _____ week(s), or _____ week(s) per full year of completed service with the Employer, whichever is greater, to a maximum of _____ weeks.

   The Employee may terminate his or her employment at any time by providing the Employer with advance notice of his or her intention to resign equal to:

   _____ week(s) plus _____ week(s) per full year of completed service with the Employer, to a maximum of _____ weeks.

5. *Restrictive Covenant*

   Following the termination of the employment of the Employee by the Employer, with or without cause, or by the voluntary withdrawal by the Employee from the Employer, the Employee shall, for a period of _____ month(s) following the said termination or voluntary withdrawal, within the province of _____ refrain from either directly or indirectly soliciting or attempting to solicit the business of any client of the Employer for his or her own benefit or that of any third person or organization. (For the purpose of this provision, a client means any active client or prospective client with whom the Employer was engaged or was pursuing engagement at any time during the period of two years prior to the date of termination.) The Employee covenants that he/she will refrain from either directly or indirectly attempting to obtain the withdrawal from the employment of the Employer of any other Employee of the Employer having regard to the same geographic and temporal restrictions. The Employee shall not directly or indirectly divulge any financial information relating to the Employer or any of its affiliates or clients to any person whatsoever. The Employee shall respect the Employer's copyright. The Employee shall not take any documents or materials of the Employer without written permission.

6. *Confidentiality*

The Employee acknowledges that, in the course of performing and fulfilling his or her duties thereunder, he or she may have access to and be entrusted with confidential information concerning the present and contemplated financial status and activities of the Employer, and that the disclosure of such confidential information to competitors of the Employer would be detrimental to the interest of the Employer. The Employee further acknowledges and agrees that the right to maintain the confidentiality of such information constitutes a proprietary right which the Employer is entitled to protect. Accordingly, the Employee covenants and agrees with the Employer that he or she will not, during the continuance of this agreement, disclose any of such confidential information to any person, firm or corporation, nor shall he or she use same, except as required in the normal course of his or her engagement hereunder, and thereafter he or she shall not disclose or make use of same.

7. *Assignment*

This agreement shall be assigned by the Employer to any successor employer and shall be binding upon the successor employer. The Employer shall ensure that the successor employer shall continue the provisions of this agreement as if it were the original Employer. This agreement may not be assigned by the Employee.

8. *Severability*

Each paragraph of this agreement shall be and remain separate from and independent of and severable from all and any other paragraphs herein except where otherwise indicated by the context of this agreement. The decision or declaration that one or more of the paragraphs are null and void shall have no effect on the remaining paragraphs of this agreement.

9. *Notice*

Any notice required to be given hereunder shall be deemed to have been properly given if delivered personally or sent by registered mail to:

Employer at

_____

_____

Employee at

_____

_____

10. *Indemnification*

The Employer hereby agrees to save harmless and indemnify the Employee, his or her heirs, executors, and administrators against any liability arising out of or in respect of any error, omission or negligent act in the performance by the Employee of professional services (other than intentional acts) on behalf of the Employer and to pay on the Employee's behalf out of the funds of the Employer all sums which the Employee becomes liable to pay as damages, interests, costs, fees and expenses, as a result of or sustained or incurred in or about any action, against the Employee or the Employer whether before or after the termination of employment and to defend the Employee in any such action, suit or proceeding at the expense of the Employer and to make no claim against the Employee with respect thereto for contribution or indemnity.

11. *Interpretation of Agreement*

The validity, interpretation, construction, and performance of this agreement shall be governed by the laws of the province of _____. This agreement shall be interpreted with all the necessary changes in gender and in number as the context may require and shall enure to the benefit of and be binding upon the respective successors and assigns of the parties hereto.

12. *Schedule "A"*

Compensation and general conditions of employment are appended to and form part of this agreement.

In witness whereof the parties hereto have read and understand this agreement and acknowledge that they have had the opportunity to obtain independent legal advice in respect of it and have duly executed this agreement as of _____.

_____

(witness) **(employer)**

_____

(witness) **(employee)**

SCHEDULE "A" COMPENSATION AND GENERAL CONDITIONS OF EMPLOYMENT

A.1 Position

The employment position is:

_____

A.2 Hours of Work

Hours of work are:

_____
_____
_____
_____
_____

A.3 Vacation with Pay

Terms of vacation are:

_____
_____
_____

Should the employment be terminated with vacation time earned but not taken, the Employer shall pay the Employee the vacation pay.

Terms of earning additional vacation with pay as the length of employment increases are:

_____
_____
_____

A.4 Public Holidays

The Employee is granted paid holidays for all statutory holidays, including New Year's Day, Good Friday, Victoria Day, Canada Day, August Civic Holiday, Labour Day, Thanksgiving Day, Christmas Day, Boxing Day, and _____ (adjust statutory holiday as per provincial law).

A.5 Personal Leave

Terms of personal leave are:

_____
_____

A.6 Bereavement Leave

Terms of bereavement leave are:

_____
_____

A.7 Pregnancy and Parental Leave

Pregnancy and parental leave shall be granted in accordance with the requirements of the applicable provincial legislation.

A.8 Benefits Plans

❑ The Employer does not offer a benefit plan.

or

❑ The Employer offers the Benefit Plan described in the attached Schedule "C" for the Employee.

A.9 Profit Sharing

❑ The Employer does not offer a profit-sharing plan.

or

❑ The Employer offers the profit-sharing plan described in the attached Schedule "C" for the Employee.

A.10 Professional Fees

The Employee shall maintain membership in good standing in the following groups:

_____
_____
_____
_____

The Employer *shall/shall not* compensate the Employee the cost of maintaining membership in the foregoing groups.

A.11 Performance Evaluation

The Employer shall assess the Employee's performance at the end of the probationary period and annually thereafter during the month of _____. The Employer and Employee shall meet and discuss the Employee's performance, compensation, and other conditions of employment.

A.12 Career Development

Terms of career development are:

A.13 Compensation

Terms of compensation are:

A.14 Overtime Work

Terms of overtime work are:

A.15 Expenses

Terms of Reimbursement of Expenses are:

A.16 Equipment

A.17 Other Conditions

A.18 Amendments

Logo or Name of Architectural Practice

Performance Evaluation Form

1. Name: **Date of Performance Evaluation Interview:**

2. Job Description:

(append Job Description or provide Summary)

3. Employment Status:

(i.e, part-time, permanent, independent contractor, etc.)

4. Relationship and Reporting:

5. Workload:

(attach schedules or workplans as applicable)

6. Assessment of Competency:

7. Communications and Interpersonal Relations:

8. Professional Development:

9. Salary Range: **Date Established:**

10. Salary Adjustment:

11. Objectives

11.1 Review of past objectives

11.2 Future outcomes or deliverables

11.3 Method of measurement

11.4 Time frame for completion

Acknowledgement:

Signature of employer or evaluator

Signature of employee

Logo or Name of Architectural Practice

Invoice

To: Acme Co. Ltd.
77 Skyway Drive
Anytown, ON
Y2K 2Y2

INVOICE No.: 98094
Project: Acme Office Addition
Project No.: 98051
Date: 16 October 1998
GST No.: R109976007

For Professional Services Rendered:

- Reference: Client-Architect Agreement
  Document Six, dated May 29, 1998

Fees to: 15 October 1998

- Earned to date:

Design	100% of 25% of 8% of $200,000	$4,000.00
Contract Documents	100% of 50% of 8% of $220,000	$8,800.00
Contract Administration Services	60% of 25% of 8% of $241,820	$2,901.84

Additional Services

Change Orders 1, 2, and 3
6 hours @ $120/hour = $720
15 hours @ $60/hour = $900

$1,620.00

Total fee earned to date	$17,321.84
Less previously invoiced	$16,084.76
TOTAL FEE DUE THIS INVOICE	$1,237.08
Reimbursable expenses due (excluding GST) (see Schedule A attached)	$104.60
Sub-total	$1,341.68
GST	$93.92
TOTAL DUE THIS INVOICE	$1,435.60

Logo or Name of Architectural Practice

Schedule A

Invoice (continued)

To: Acme Co. Ltd.
77 Skyway Drive
Anytown, ON
Y2K 2Y2

INVOICE No.: 98094
Project: Acme Office Addition
Project No.: 98051
Date: 16 October 1998
GST No.: R109976007

Reimbursable Expenses:

• Previously invoiced		$754.55
• Current Expenses		
Travel	$26.50	
Photocopies (39 @ $0.15 ea)	$5.85	
Printing (11 prints @ $1.25 ea)	$13.75	
Long distance calls	$27.66	
Postage and delivery	$17.20	
• Sub-total	$90.96	
Administrative charges (15% of $90.96)	$13.64	
Total Expenses to date		$859.15
Expenses due this invoice		$104.60

Logo or Name of Architectural Practice

Fee Calculation Sheet

Project No.: **Date:**

Client:

Sub-consultants

DISCIPLINE	Firm NAME	FEE
Structural		
Mechanical		
Electrical		
Other		
	Sub-total	

In-house Costs

PHASE	HOURS and Rate	Payroll Cost	Sub-total
Pre-design	1.		
	2.		
Schematic Design	1.		
	2.		
Design Development	1.		
	2.		
Construction Documents	1.		
	2.		
	3.		
	4.		
Bidding & Contract Negotiations	1.		
	2.		
Construction Administration	1.		
	2.		
Post-construction	1.		
Other	1.		
Total Payroll Cost			
Other costs			
Sub-consultant's fees			
Overhead			
Profit			
TOTAL FEE Estimate			

Estimated Construction Value:

Comparison with percentage fee of construction cost:

Logo or Name of Architectural Practice

Project Cost Control Chart

Project: Addition & Renovations to Brooks Clinic

Project No.: 94-17

Date: Dec 94

Fee available to project (budget): $84,120.00

CODE	ACTIVITY	%	DOLLARS	HOURS	$/HOUR
1.	Pre-design/meetings	0.0%	$0	0	$85.00
2.	Programming/analysis	0.0%	$0	0	$0.00
3.	Schematic Design	15.0%	$12,600	168	$75.00
4.	Design Approvals	0.0%	$0	0	$75.00
5.	Design Development	15.0%	$12,600	168	$75.00
6.	Construction Documents	45.0%	$37,860	631	$60.00
7.	Specifications	0.0%	$0	0	$60.00
8.	Building Permit/Approvals	0.0%	$0	0	$60.00
9.	Tendering/Negotiations	5.0%	$4,200	70	$60.00
10.	Contract Administration	20.0%	$16,860	281	$60.00
11.	Client Revisions	0.0%	$0	0	$60.00
12.	Extra Services	0.0%	$0	0	$60.00
13.	Post-construction/occupancy	0.0%	$0	0	$60.00
14.	Construction/Management	0.0%	$0	0	$60.00
15.	Estimating	0.0%	$0	0	$60.00
16.	Interior Design	0.0%	$0	0	$60.00
17.	Drawing and Document Assembly	0.0%	$0	0	$60.00
18.					
19.					
20.					
TOTALS		100.0%	$84,120	1,318	

Logo or Name of Architectural Practice

Time Report

Name: John Doe **No.:** 164 **Dept.:** Production **Week Ending:** 15 Oct. 99

Project:	Project No.:	Activity Code:	Sat.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Total
Statutory Holiday		2			7½					7½
ACME Offices	99-175	8				5	4	1	7½	17½
		9					3			3
	99-175	13					1½			1½
Miller Addition	99-192	6				2½		2		4½
Tyler Clinic	99-164	10						6		6
Regular					7½	7½	7½	7½	7½	37½
Overtime							1	1½		2½
Total					7½	7½	8½	9	7½	40

Activity Codes

1. Illness/Absent
2. Vacation/Holiday
3. Office Overhead
4. Promotion
5. Pre-design/Requirements
6. Schematic Design
7. Design Development
8. Working Drawings
9. Specifications
10. Contract Administration — Office Functions
11. Contract Administration — Field Functions
12. Post-construction
13. Additional Services

Signature of employee

Signature of supervisor

Logo or Name of Architectural Practice

Expense Claim Form

Claimant: John Doe **Period covered by report:**

Approved by: **From:** 1 Sept. 98 **To:** 31 Oct. 98

Date:	Project No.:	Details:	R*	Expense
21 Sept. 98	98-034	Travel to site, 20 KM @ .32¢/KM	R	6.40
23 Sept. 98	98-034	Travel to Millwork shop to		
		inspect cabinets, 35 KM @ .32¢/KM	R	11.20
28 Sept. 98	98-032	Travel to site, 15 KM @ .32¢/KM	R	4.80
28 Sept. 98	98-032	Film for Building Photographs		4.50
4 Oct. 98	98-075	Plane fare to Ottawa	R	368.50
4 Oct. 98	98-075	Lunch		9.50
4 Oct. 98	98-075	Taxi	R	6.75
5 Oct. 98	98-164	Travel to site, 20 KM @ .32¢/KM		6.40
5 Oct. 98	98-175	Travel to ACME, 25 KM @ .32¢/KM		8.00
7 Oct. 98	98-175	Film Processing		11.00
			Total	**$** 437.05

R*: Recoverable from Client. Invoice reimbursable expenses for this amount.

Settlement:

Personal Charges:	Magazine Renewal	$ 18.00
Temporary Advance:	Plane Ticket Plus $20.00	$ 388.50
Subtracted from Expenses:		$ 406.50
Payment:		**$** 30.55

Cheque No.:

Logo or Name of Architectural Practice

Purchase Order

Supplier:

Order No.:

Date of Request:

Ship to:

Please supply the articles or services specified below:

Quantity	Item (indicate project name and number if applicable)	Unit Price	Taxes	Total Price per Item
			Total Price	

Other conditions:

Approved:

Date:

Management of the Project

Introduction

This chapter describes the role of the project manager (also called a project architect or project director) — the person in an architect's office who directs and administers an architectural project. Effective management of the project is an essential element of good professional practice.

This chapter does **not** cover:

- *project management* as a separate professional service;
- *construction management* as a form of project delivery.

These topics are discussed in Chapter 2.3.2, *Types of Construction Project Delivery*.

The project manager may be a senior architect or other individual (preferably an architect) with experience in the practice of architecture and management.

Refer to "Appendix — Characteristics of an Effective Project Manager" at the end of this chapter.

Role of the Project Manager

The project manager is a leader responsible for:

- ensuring that the project proceeds through successive stages from program approval to project implementation;
- keeping the project on time and within budget;
- managing the progress of the project by:
  - directing an internal team;
  - directing and coordinating the contribution of engineers and other consultants;
  - achieving the firm's financial objectives;
- providing proper project closeout.

Client-Architect Agreements

The project manager should review the client-architect agreement before starting work.

It is preferable to use either the *Canadian Standard Form of Agreement Between Client and Architect: Document Six* or the *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: Document Seven*, because:

- these agreements are widely recognized and accepted;
- the architect's and the client's responsibilities are clearly defined;
- they clearly identify the scope of work by distinguishing between Basic Services and Additional Services.

The prudent project manager will review the terms of the agreement, to fully understand the scope and limitations of the consulting services to be provided. This should forestall later misunderstandings or unreasonable expectations. The project manager should identify any increase in fees as a result of additional services which the specific needs of the project may require.

Refer to Chapter 2.1.9, *Risk Management and Professional Liability,* for more detail on client-architect agreements.

Project Cost Control

Generally, clients prepare overall project budgets at the beginning of projects. The project manager's goal is to:

- manage the design team;
- administer the design and construction of the best possible project within the available funds;
- achieve the firm's financial objectives (profit margin) for the project.

Refer to Chapter 2.3.3, *Cost Planning and Control*, for information on planning and controlling costs for a specific project. Refer to Chapter 2.1.4, *Financial Management,* for controlling costs within the architectural office.

Project Organization

Good project management means:

- selecting and managing people, including in-house staff and outside consultants;
- ensuring continuous and effective communications;
- delegating tasks appropriately;
- arranging and managing meetings;
- controlling and managing design changes;
- managing time effectively;
- applying computer software for scheduling, estimating, and project control.

In-house Teams

For small projects, project managers may carry out several of the tasks themselves. For large and complex projects, several people participate in the same task. The project manager must identify the individuals and skills required, and must also constantly direct and motivate the in-house team. The composition of the team is the key factor in achieving both architectural and financial objectives.

The team may include the project manager and several architects and technicians. More complex projects or very specialized services (such as acoustics, vertical transportation systems, architectural conservation, and wind studies) often require hiring outside experts.

Coordinating Engineers and Other Consultants

Usually the "design team" has already been selected when the commission is awarded. Refer to Chapter 1.2.3, *Consultants,* regarding the role of consultants and agreements with consultants. Refer to Chapter 2.1.9, *Risk Management and Professional Liability,* for issues to consider when assembling the design team.

The project manager is responsible for:

- providing engineers and consultants with all information promptly and clearly in order to optimize their participation;
- ensuring that their designs and specifications are properly coordinated;
- maintaining morale as well as ensuring the respect and recognition of all consultants.

Communications

Managing communications throughout the entire project is crucial to its success. Good communications require the efficient and effective management of:

- meetings;
- telephone communications;
- electronic and paper messages such as correspondence, memos, E-mail;
- record-keeping, such as meeting minutes, notes, project files, and other documentation.

Refer also to Chapter 2.1.6, *Communications*.

Scheduling the Project

Project schedules are planning tools that help project managers and teams organize various defined tasks in order to meet deadlines or dates which may be set out in an agreed-upon schedule or in the contract. In addition, schedules help to monitor tasks until the project is complete. Although many different scheduling techniques are available for many types of projects, the project manager must select a method which can be adapted to the scale and complexity of the work.

Simple bar charts and milestone charts are usually appropriate for scheduling architectural projects. However, for complex projects with many teams and tasks coordinated by project managers, refer to the scheduling techniques outlined in "Appendix — Project Management" in Chapter 2.3.2, *Types of Construction Project Delivery*.

Project Closeout

When the project is complete, the project manager and team should review the experience, drawing any lessons from it that could contribute to the practice.

Promotional Documentation

Based on some of the project documents (such as sketches, perspectives, plans, and photographs) and data, project managers should prepare a "project record" or "project data sheet" that can be added to the firm's portfolio for future use. This record should highlight the project's special features and main challenges, as well as demonstrate the architect's contribution to its success. Refer also to Chapter 2.1.3, *Public Relations and Marketing*.

Project Evaluation

The firm should assess whether the project has achieved its financial and professional objectives. The project manager should analyze the project and, if the objectives were not met, determine why and suggest corrective action for future projects.

Archiving

Project documents should be kept and filed so that they may be readily and quickly retrieved if they are needed for other projects or must be consulted in the event of a claim.

Firm Database

The project manager should extract any information which could be used to develop a database for future work, such as the preparation of construction cost estimates, or for re-usable construction details or specifications.

Use of the "Checklist for the Management of the Architectural Project"

A "Checklist for the Management of the Architectural Project" has been provided at the end of this chapter. The checklist is based on the Ontario Association of Architects Practice Bulletin Number 67, *Architect's Project Progress Record*. The document has been reformatted, references to provincial terms have been modified, and minor editorial improvements have been included.

Although the design and management of architectural projects are not necessarily linear nor quantifiable, this checklist can assist the architect in scheduling and recording the status of principal tasks during the course of a project.

References

The American Institute of Architects (AIA) and David S. Haviland. Washington, D.C.: The AIA Press.

Managing Architectural Projects: Three Case Studies. 1981.

Managing Architectural Projects: The Effective Project Manager. 1981.

Managing Architectural Projects: The Project Management Manual. 1984.

PSMJ Resources, Inc. *Project Management (PM)*. Published monthly. Newton, MA.

Appendix — Characteristics of an Effective Project Manager

Whether a principal or an employee, the effective project manager:

- attacks aggressively every problem on design projects;
- is organized: plans, organizes, directs, and controls the entire project;
- is enthusiastic about achieving high design standards, budget control, and schedule performance for the client;
- delegates well;
- communicates well with each person on the team and with the client and other people outside the firm;
- motivates the staff to perform so that project goals are met;
- has the ability to modify a project so that it can meet a client's changing goals;
- is results-oriented, keeping the final outcome of the project in mind at all times and achieving every goal that has been established;
- knows that it takes an entire architectural design team to accomplish the greatest possible results on a project and gives proper credit to the design team;
- listens well to both team members and others involved in a project in order to interpret clearly their objectives and opinions;
- can convince clients and team members of the right way for the project to proceed and can persuade others in a pleasing and nonbelligerent manner;
- always has a conscious sense of time: knows exactly how much time it takes to accomplish a task and how much time is left to accomplish remaining tasks;
- is capable of managing multiple projects without letting the requirements or details of any one project fall through the cracks;
- knows where to find the answers for all technical problems and can converse intelligently with clients, internal team members, and external building officials and consultants about any aspect of the project.

(reprinted with permission from PSMJ Resources, Inc.)

Checklist for the Management of the Architectural Project

Periodic Tasks to be undertaken throughout every phase of the Project

TASK/PHASE	Pre-agreement	Schematic Design	Design Development	Construction Documents	Bidding and Negotiating	Contract Administration	Post-construction
Review and update project schedule							
Maintain project accounting records							
Review internal office budget							
Submit monthly or periodic invoices to client							
Update project directory							
Update project brief							
Review and approval by Authorities Having Jurisdiction							
Review and coordinate with consultants							
Update estimate of construction cost							
Obtain client approvals							

Pre-agreement	Schematic Design	Design Development	Construction Documents	Bidding and Negotiation	Contract Administration	Post-construction

Checklist for the Management of the Architectural Project

Tasks for each phase of the project

I Pre-agreement Phase

Upon receipt of notification from a prospective client, undertake the following tasks prior to a submission or execution of an agreement.

1.	**Determine if other architects are or were involved with the project.**		
	If "yes," comply with provincial association requirements.		
	Address issues pertaining to copyright, credits, liability.		
2.	**Assign project number.**		
3.	**Determine scope and type of project.**		
4.	**Verify ability to provide professional services, including professional liability insurance requirements and licensing.**		
5.	**Determine if the client is financially sound.**		
6.	**Make preliminary assessment of project viability:**		
	• special considerations		
	• financing		
	• economics		
	• social or community groups		
	• zoning/development approval		
	• environmental impact		
	• heritage designation		
	• other		
7.	**Determine required professional services.**		
8.	**Determine type of professional services agreement:**		
	• Standard Form of Agreement (Document Six)		
	• Abbreviated Version of Agreement (Document Seven)		
	• client's contract		
	• identify special provisions which may require input of legal counsel or professional liability insurers		
9.	**Ascertain method of construction contract.**		
	.1 Traditional Bid Process:		
	• single bid package		
	• multiple bid packages (how many?)		
	• direct selection by the client		
	• invited bidders		
	• open bidding		
	.2 Construction Management		
	.3 Design-Build		
	.4 other		

10. Review the client's budget and resources.		
Determine if budget includes:		
A. General		
• land or site acquisition		
• demolition		
• renovation		
• real estate fees		
• legal fees and/or title search		
• legal survey		
• environmental audit		
• environmental remediation		
• financing		
• property taxes, levies, etc.		
• project management fees		
• professional fees (architecture and engineering)		
• permits		
• estimated construction costs:		
• off-site utilities		
• on-site utilities		
• demolition		
• base building		
• tenant improvements		
• furniture/equipment		
• landscaping		
• items purchased by the client		
• allowances:		
• artwork		
• hardware		
• interior finishes (e.g., carpet)		
• exterior finishes (e.g., brick)		
• landscaping		
• service connection costs		
• other		
B. Authorities Having Jurisdiction		
• official plan amendment		
• zoning or land use amendment		
• bylaw variance or development appeal		
• site plan agreement		
• demolition permit		
• construction permit(s)		
• Provincial Ministry of Labour permits		
• municipal/regional fees (utility connections, park levies)		
• other		
C. Consultants' Fees		
• planning		
• civil engineering		
• architecture		
• structural		
• mechanical		
• electrical		
• landscape architecture		
• interior design		
• cost consultant or quantity surveyor		
• other		
D. Special Consultants' Fees		
• acoustical		
• architectural conservation		
• art		
• building code		
• building envelope		
• construction management		
• energy		
• environmental contaminate		
• food service		
• furniture/equipment		
• geotechnical		
• hardware		
• marketing		
• security		

D. Special Consultants' Fees (continued)		
• seismic		
• signage — graphics		
• special lighting		
• surveyor		
• traffic		
• wind/snow studies		
• other		
E. Miscellaneous costs		
• contingency		
• inspection and testing:		
• soil		
• concrete		
• steel		
• roofing		
• asphalt paving		
• building audit (condominiums)		
• other		
• adjacent building damage survey		
• geotechnical report/inspection		
• models/professional renderings		
• full-size mock-ups		
• inflation		
• financing costs		
• client disbursements		
• consultant disbursements		
• other		
F. Insurance		
• excess professional liability		
• property damage		
• builder's risk insurance		
• other		
11. Determine the client's requirements for:		
• CADD		
• unit of measurement (imperial/metric)		
• language translation		
• other		
12. Determine whether project budget, project time schedule, and project program are compatible.		
13. Organize teams (structural, mechanical, electrical, and special consultants).		
Negotiate tentative compensation in accordance with basis of services determined above.		
Verify consultants' abilities to meet the client's requirements:		
• time schedule		
• liability insurance		
• licensing requirements		
• construction cost estimates		
• other		
14. Prepare project estimate in accordance with agreement:		
• internal office budgets		
• production schedules		
• personnel		
15. Determine fee (refer to Form 2.2, Fee Calculation Sheet, in Chapter 2.2).		
16. Prepare and forward interim Letter of Agreement.		
17. Prepare client-architect agreement and forward to the client for review.		
Direct legal counsel and professional liability insurer (as appropriate) to review any modifications or specific provisions required by the client.		
18. Review final agreement with own legal counsel and professional liability insurer (if necessary). Approve any modifications made by the client, or renegotiate.		
19. Verify authority of party signing for the client (required for public agency, institutional, and corporate clients).		
20. Execute the agreement.		
21. Prepare project directory (refer to Form 1.5, Project Team Directory, in Chapter 2.4).		

II Schematic Design Phase

Part A — *Tasks prior to starting the schematic design phase*

1. Obtain name of the client's authorized representative.		
2. Obtain the client's project brief.		
Confirm the client's space needs and other program requirements.		
3. Establish project filing system.		
4. Assign personnel to the project:		
• project architect		
• designer		
• technical staff		
• other		
5. Assemble and review all applicable requirements of Authorities Having Jurisdiction (e.g., site plan control, applicable zoning or land use, and code requirements).		
Review with Authorities (refer to Chapter 1.2.4).		
6. Establish project schedule, including completion dates for each phase of project.		
Advise the client, staff, and all consultants.		
Negotiate, prepare, and execute consultant agreements. When required, obtain the client's approval of consultants:		
• structural		
• mechanical		
• electrical		
• other		
Request and receive from each consultant proof of professional liability insurance coverage:		
• structural		
• mechanical		
• electrical		
• other		
7. Distribute copies of pertinent portions of client-architect agreement to staff and consultants who require copies.		
8. Distribute copies of pertinent portions of consultant agreements to staff members who require copies.		
9. Confirm unit of measurement:		
• imperial		
• metric		
10. Obtain, from the client, the following surveys:		
• legal		
• topographical		
• other		
Assist the client in securing surveys when necessary.		
Advise the client to obtain adjacent building condition survey when necessary.		
11. Obtain the consultants' requirements for investigation and testing necessary for proper execution of their work and request approval from the client.		
Assist the client in securing proposals for this work.		
12. Instruct consultants to review site information and report:		
• structural		
• mechanical		
• electrical		
• civil		
• other		
13. Instruct appropriate staff members and other consultants to review site information and examine site.		
Instruct appropriate staff and consultants to review and record existing conditions for existing building.		
14. Determine preliminary space requirements (area and volume) using the client's functional program.		
15. Prepare functional program, if part of architectural services.		
16. Review functional program with the client to determine if construction budget and program are compatible.		
17. Obtain the client's written authority to proceed.		

Part B — *Tasks to be started after completion of Part A*

1. Initiate project brief.		
2. Review all assembled data, including program, budget, requirements of Authorities Having Jurisdiction, site data, and special requirements.		
3. Prepare functional space diagrams.		
4. Provide consultants with pertinent program data and functional space requirements.		
5. Receive and review results of all investigations and tests, including geotechnical reports and analyses.		
Request additional information, if necessary.		
Forward final information to appropriate consultant(s).		
6. Confer with consultants to determine systems to be used in the project.		
Obtain analyses of comparative systems, with recommendations.		
Obtain space and location requirements for selected systems, after review and acceptance by the client.		
7. Prepare schematic design documents in compliance with applicable codes, including:		
• site plan		
• principal floor plans		
• building sections		
• general descriptive views (elevations)		
• illustrative sketches, models or renderings		
• other		
8. Identify all documents with project number and date, and name of the practice.		
9. Calculate areas and volumes.		
Analyze plan efficiency and applicable net-to-gross ratios.		
10. Update project brief to include system and equipment descriptions.		
11. Obtain from each consultant an estimate of construction cost for their system or components:		
• structural		
• mechanical		
• electrical		
• civil		
• other		
12. Prepare written estimate of construction cost based on all available data. Include appropriate contingencies.		
13. Submit schematic design documents, including drawings, project brief, calculations, and estimate of construction costs to the client.		
14. Obtain the client's written authorization to proceed to design development phase, and funding agency approval where applicable.		

III Design Development Phase

Part A — *Tasks prior to starting the design development phase*

1. Review schematic design checklist to ensure phase completion and that all required data have been obtained.		
2. Have the client provide any additional requirements and confirm in writing.		
3. Assist the client in obtaining models, perspectives or professional renderings when requested.		
4. Review program and verify compliance.		
5. Review schematic documents for compliance with all applicable codes and regulations.		
6. Select additional consultants, if required, and establish contractual relationship.		
Obtain the client's written approval as required.		
7. Review all other data received from the client, consultants, etc.		
Request additional data if necessary.		
8. Obtain the client's standards and requirements, if any, for drawings and for other material.		
Check against requirements of Authorities Having Jurisdiction.		
9. Develop and forward to consultants, or alternatively obtain from consultants, a list of specialized systems required, such as:		
• cable TV		
• clock		
• closed circuit TV		
• compressed air		
• electronic or communication systems		
• energy management system		
• fire suppression systems		
• gas		
• intercom		
• lighting		
• lightning protection		
• oxygen		
• photovoltaic		
• pneumatic tube		
• remote control operations		
• security		
• steam		
• telephone		
• vacuum		
• voice communication		
• waste recycling and storage		
• other		
Obtain the client's approval of list and notify consultants of approval or revisions.		
10. Define occupancy load for each area and forward to consultants.		
11. Instruct the structural consultant to investigate and confirm in writing a review of applicable codes and regulations.		
12. Instruct the mechanical and electrical consultants to:		
• contact utility companies and public authorities regarding all services, and receive written approval for all service connections;		
• investigate and confirm in writing their review of all applicable public and utility regulations;		
• review architectural and structural schematic drawings to establish adequate provision for specialized systems;		
• prepare estimates of operating costs with recommendations.		
13. Review the consultants' estimates of operating costs and forward to the client.		
Obtain the client's approval of selected energy source.		

Part B — *Tasks during the design development phase*

1. Prepare site plan indicating building location(s) and site improvements.		
2. Prepare all other necessary drawings:		
• plans		
• elevations		
• sections		
• schedules		
• other		
3. Prepare area calculations (net and gross) and volume calculations, including site coverage and density, as defined in zoning/land use regulations.		
4. Prepare preliminary or outline specifications:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
5. Instruct consultants to prepare layouts and drawings as required to illustrate and describe their portion of project:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
6. Obtain detailed cost estimate, if specifically authorized by the client as part of architectural services:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
7. Direct each consultant to prepare an estimate of construction cost for their discipline:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
8. Update estimate of construction cost.		
9. Submit design development documents, including drawings, outline specifications, and updated estimate of construction cost to the client.		
10. Have the client confirm type of construction contract required.		
11. Obtain the client's written approval of design development documents.		
Revise as required.		
12. Obtain the client's written authorization to proceed to construction documents phase.		
Verify, where applicable, that all authorities and agencies have given authorization to proceed.		

IV Construction Documents Phase

Part A — *Tasks prior to starting the construction documents phase*

1. Review checklist for previous phase to ensure completion.		
Review program and verify compliance.		
2. Review design development documents for compliance with applicable codes and regulations.		
3. Select additional consultants, if required, and establish contractual relationships.		
Obtain the client's approval as required.		
4. Determine scope of drawings, including schedule of required drawings, sequence of drawings, information to appear on each sheet, scale, and sheet size, etc.		
Review requirements of the client and authorities.		
5. Determine method of production drawing set.		
Determine drawing requirements for type of construction procurement (bid, multiple bid, Design-Build).		
6. Develop title block format and layering system.		
Check the client's requirements.		
7. Establish check set review schedule with client, consultants, and authorities.		

Part B — *Tasks during the construction documents phase*

1. Prepare final specifications and drawings to include plans (including site plan and landscaping), elevations, sections, details, notes, dimensions, and schedules, and require all consultants to do the same.		
2. Arrange for preparation of finish hardware schedule, if required.		
3. Identify components requiring separate prices.		
4. Determine acceptable alternatives to specified materials or systems.		
5. Identify components requiring unit prices.		
6. Determine required cash allowances:		
• testing allowance		
• contingency		
• utility connections		
• other		
7. Prepare colour and finish schedules.		
8. Prepare testing and quality control program budgets, and assist the client in selection of testing agencies.		
Determine if these costs are to be included in the construction contract.		
9. Obtain the client's instructions regarding application and payment of necessary permits such as building, Ministry of Labour, etc.		
10. Obtain the client's instructions regarding insurance and bonds.		
11. Obtain the client's instructions regarding construction contracts and bidding procedures.		
12. Obtain the client's requirements for phased occupancy or other special requirements.		
13. Determine items or work to be furnished by the client, or not to be included in the construction contract.		
14. Review, with the client, the schedule for delivery and installation of client-furnished materials.		
15. Review bid period in project schedule.		
Determine time, date of bid closing, and place of bid receipt.		
16. Prepare and assemble specifications concurrently with preparation of drawings. Include:		
• notice to bidders		
• advertisement or invitation to bid		
• instructions to bidders		
• bid form		
• construction contract		
• General Conditions		
• Supplementary Conditions		
• cash allowances		
• other		

Part B — *Tasks during the construction documents phase* (continued)

17. Submit copies of General Conditions and Supplementary Conditions for the client's review or obtain the client's specific contract requirements.		
18. Assist the client's legal counsel or representative, if necessary, with review of:		
• General Conditions		
• Supplementary Conditions		
• form of construction contract		
19. Check completed documents for coordination, compliance with program, accuracy, and cross-coordination with consultants' work.		
Direct the consultants to carry out required coordination:		
• architectural		
• structural		
• mechanical		
• electrical		
• other		
20. Revise documents as required after check and instruct consultants to do the same:		
• architectural		
• structural		
• mechanical		
• electrical		
• other		
21. Prepare final calculations of net and gross area, and volume.		
22. Obtain from each consultant further update of estimate of construction cost:		
• architectural		
• structural		
• mechanical		
• electrical		
• other		
23. Prepare final estimate of construction cost.		
24. Submit drawings, specifications, estimate of construction cost, and building calculations and analyses to the client for review.		
Obtain the client's written approval.		
Revise as required.		
25. Review list of potential contractors with the client.		
26. Obtain qualification statements, if required, from interested bidders and review.		
Obtain assistance from consultants if separate prime contracts are to be awarded.		
27. Stamp documents for intended purposes (e.g., bid, building permit, construction).		
Affix the architect's seal and signature and date on documents. Ensure that consultants seal, sign, and date documents:		
• architectural		
• structural		
• mechanical		
• electrical		
28. Assist the client in filing documents for approvals and permits.		
29. Obtain the client's written authorization to proceed to bidding or negotiation phase.		

V Bidding and Negotiation Phase

Part A — *Tasks during the bidding and negotiation phase*

1.	**For open bidding:**		
	Assist the client in publishing the advertisement for bids. If separate contracts are to be awarded, separate advertisements may be necessary.		
	Obtain qualification statements from interested bidders and review.		
2.	**For invited bidding:**		
	Notify selected bidders.		
3.	**For direct selection:**		
	Assist the client in selection as requested.		
4.	**Determine number of sets of bid documents required and order same.**		
	Review client-architect agreement for agreed-upon number of sets (if applicable).		
5.	**Distribute documents to bidders and obtain deposits.**		
6.	**Issue documents to local construction association for viewing.**		
7.	**Hold pre-bid meeting and site tour as required.**		
8.	**Record all bid document inquiries.**		
9.	**Prepare and issue addenda as necessary. Ensure that the bidders have a reasonable amount of time to review prior to bid closing.**		
10.	**Return deposit to bidders who withdraw upon satisfactory return of bid documents.**		
11.	**Return deposit to disqualified bidders upon satisfactory return of bid documents.**		
12.	**Receive, open, tabulate, and analyze bids as per procedure established with the client. Obtain assistance of consultants as required.**		
13.	**Advise the client on selection of alternatives, separate prices.**		
	Review bids and analysis with the client.		
	Obtain the client's instructions.		
14.	**Notify successful bidder of acceptance and basis of acceptance.**		
15.	**Update project directory.**		
16.	**Assist the client in issuing letter of intent if contract cannot be executed immediately.**		
17.	**Notify unsuccessful bidders and obtain return of bid documents.**		
18.	**Return unsuccessful bidders' deposit upon satisfactory return of bid documents. (Retain bid deposit of lowest bidders until contract signing.)**		
19.	**Request and receive submission of post-bid information:**		
	• performance bond		
	• labour and material payment bond		
	• insurance certificates		
	• workers compensation		
	• other		
20.	**Prepare or assist the client's legal counsel in preparation of construction contract. If separate contracts are awarded, obtain assistance of consultants as required.**		
21.	**Assist the client and contractor in execution of the construction contract.**		

VI Contract Administration Phase

Part A — *Tasks to be completed prior to start of construction and after execution of contract(s)*

1. Request, from the contractor, all bonds and insurance policies required in contract documents.		
Forward documents to the client for analysis and acceptance by experts.		
Advise the client to obtain legal confirmation.		
2. Advise the client to file copies of property insurance policies with the contractor, where applicable.		
3. Request the client to purchase special insurance (hazard, etc.) as part of property insurance policy, as appropriate.		
4. Remind the contractor to secure and pay for all required permits as specified in contract documents.		
5. Obtain and review the contractor's construction schedule.		
6. Obtain and review the contractor's schedule of required shop drawings and samples.		
7. Obtain and review the contractor's schedule of values.		
8. Furnish the contractor with required copies of contract documents.		
9. Assist the client, or direct the consultants to assist with applications for gas, water, electricity, telephone, and other services, as required.		

Part B — *Tasks during the contract administration phase*

1. Establish and/or advise regarding lines of communication among all parties concerned (i.e., contractors, the client and/or the client's representative, consultants).		
2. Establish, with the contractor, requirements for testing and inspection of specific materials and work by inspection and testing companies.		
Arrange for distribution of reports through proper channels for action if necessary.		
3. Prepare colour and finish selections. (Note: this is sometimes done in Construction Documents phase.)		
Obtain the client's approval.		
Issue to the contractor.		
4. Review submitted shop drawings.		
Instruct the consultants to review as appropriate.		
5. Review submitted samples where applicable and comment accordingly.		
Instruct the consultants to review as appropriate.		
6. Maintain shop drawing and sample record (refer to Form 5.4, Log of Shop Drawings and Samples, in Chapter 2.4).		
7. Advise on interpretation of contract documents.		
Issue supplemental details and instructions as required (refer to Form 3.2, Supplemental Instructions, in Chapter 2.4).		
8. Attend site meetings.		
9. Make site visits to observe specific events as required.		
Submit — to the client, to the contractor, and to Authorities Having Jurisdiction — all field review reports, including those of professional engineering consultants (refer to Form 3.1, Field Review Report, in Chapter 2.4).		
Issue written instructions to the contractor when applicable.		
10. Advise on interpretation of contract documents and on contemplated changes.		
Process and coordinate changes to contract after consultation with the client.		
Review contractor's submissions for changes in contract sum and time in conjunction with professional engineering consultants.		
Advise the client on validity of claims for extras.		
Issue Change Orders as required.		
Obtain the client's signature/approval.		
Copy appropriate authorities as applicable.		

Part C — *Ongoing scheduled tasks during the contract administration phase*

1. Make periodic visits to site to determine whether construction is in general conformity with contract documents.		
2. Coordinate general reviews and other services of professional engineers and direct findings through proper channels for action or review.		
3. Obtain and review the contractor's updated progress schedule and advise the client of potential revisions to date of substantial performance (if required).		
4. Evaluate work performed and materials supplied in relation to the contractor's progress application.		
Issue appropriate Certificate for Payment covering the contractor's request.		

Part D — *Project take-over tasks*

1. Review prescribed procedures, e.g., specifications and other documentation.		
2. Arrange for appropriate personnel to attend demonstration(s) of systems, including take-over of applicable operating systems and instructions.		
Obtain appropriate record.		
3. Receive, from the contractor, application for Certificate of Substantial Performance and list of items to be completed or corrected.		
4. Carry out site visit for substantial performance.		
5. Review findings in relation to contract and provincial lien legislation.		
Certify substantial performance or notify the contractor if substantial performance not certified, and provide reasons.		
6. Obtain and review required documents for release of holdback monies.		
Issue Certificate for Payment for release of holdback.		
7. Assist the client in obtaining occupancy permit if required or requested.		
8. Obtain from the contractor:		
• warranties		
• certificates of inspection		
• equipment manuals		
• workers compensation certificate		
• operating instructions		
• statutory declaration documents		
• keying schedules		
• maintenance stock		
• As-Built drawings		
• other specified items		
9. Receive, from the contractor, application for statement of completion.		
10. Carry out site visit for completion.		
11. Review findings in relation to contract and provincial lien legislation.		
Issue:		
• statement of completion or notify contractor if project not found to be complete		
• reasons		
12. Issue Certificate for Payment of holdback for work based on the contractor's application for statement of completion.		
13. Receive the contractor's written notice that all work has been totally completed.		
14. Perform final visit to site.		
Issue site visit report.		
15. Receive, from the contractor, final application for payment.		
16. Issue final Certificate for Payment.		
17. Prepare record drawings if required.		
18. Submit final invoices to the client.		
19. Advise professional liability insurer of project completion date, as required.		
20. Review reported defects during one-year warranty period.		
Notify the contractor of items requiring correction.		
21. Carry out review of reported defects or deficiencies prior to expiry of one-year warranty period.		
Notify the contractor of items requiring correction.		

VII Post-construction Services

1. Assist the client in administering corrective action by the contractor where defects or deficiencies occur within extended warranty period.		
2. Prepare Project Data Sheets for marketing purposes (include photographs, client testimonials, etc.).		

Pre-agreement	Schematic Design	Design Development	Construction Documents	Bidding and Negotiation	Contract Administration	Post-construction

Contract Administration — Office Functions

Introduction

An architect looks out for the client's interests during construction through the services known as "contract administration." These services require an experienced architect or contract administrator, and many architects specialize in this field. Clients do not always value the professional services provided for contract administration, and sometimes try to reduce or eliminate the role of the architect during this phase. However, many jurisdictions now require professional involvement in the construction phase of certain building types.

This chapter focuses on **office functions** under contract administration. It is important to understand that "office functions" support "field functions" undertaken during construction. Refer to Chapter 2.3.11, *Contract Administration — Field Functions*.

At the start of construction, in a traditional design-bid-build contract, a new participant — the contractor — is introduced to the project and takes on the responsibility and control of the construction. Because the contractor may not have been involved at the project's conception and design, this party cannot be expected to share the same goals as the architect or the client.

Purpose of Contract Administration

Simply put, contract administration is needed to ensure that the contractor and the owner are fulfilling their respective roles and obligations outlined in a construction contract (typically, CCDC 2). In addition, it provides an opportunity for the architect to assist in realizing the project by providing the contractor with technical interpretations and information.

The resources, money, time, and effort invested in the development of the project, as well as the value of the completed work, require that the contractor's performance be monitored throughout the construction period.

The nature of the project, the type of construction contract, and the method of contract award all have a direct bearing on the level and nature of the monitoring that will be required. For example:

- an open and public tender, or a more technically sophisticated project in a fixed-price contract, will require more monitoring;
- a simple project, or a project under a cost-plus type contract awarded to one of a pre-selected list of contractors, may require much less supervision;
- a tight construction schedule will require more monitoring than one with fewer time constraints.

The nature and scope of the architect's services during the construction phase are defined by both the construction contract (such as CCDC 2) and the client-architect agreement (such as Document Six).

Role of the Architect

The nature and scope of the architect's services during the contract administration phase are outlined in the client-architect agreement. Furthermore, the architect's role is described in many construction contracts. For example, "Administration of the Contract" (Part 2, CCDC 2) clearly outlines:

- the authority of the "Consultant";
- the role of the "Consultant";
- the "Consultant's" role in correcting "defective work."

In addition, if the consultant is unable to resolve differences between the owner and the contractor regarding "the interpretation, application or administration of the contract," the consultant is obligated under "Dispute Resolution" (Part 8, CCDC 2) to provide instructions to prevent delays in the event of a dispute.

The architect is usually the prime consultant for building projects.

The architect's specific office functions include:

- representing and providing advice to the client;
- preparing all documentation for the contractor and the client and others, including:
  - Supplemental Instructions;
  - Field Review Reports (refer to Chapter 2.3.11, *Contract Administration — Field Functions*);
  - Change Orders;
  - Change Directives;
  - summary of Change Orders;
  - certificates;
- coordinating the services of consultants;
- reviewing shop drawings;
- rendering interpretations.

Sometimes, the architect is responsible for recording minutes of site meetings.

Role of Others

Client
The client or owner is the entity which has entered into a contract with the contractor. The client's basic responsibilities are:

- providing financing information if required;
- making payments to the contractor;
- authorizing changes in the work;
- providing prompt decisions and directions.

Consultants
These may be sub-consultants engaged by the prime consultant, that is, the architect, or they may be professionals engaged directly by the client through separate contracts. The prime consultant's role usually includes the **coordination** of consultants.

Consultants assist the architect in office functions by:

- reviewing relevant shop drawings;
- interpreting their part of the contract documents;
- issuing supplemental instructions on their part of the contract documents;
- assisting in the preparation of Change Orders when required;
- reviewing their portion of the work to determine the percentage complete (which assists the architect in the preparation of Certificates for Payment);
- providing advice to assist the architect in the preparation of other certificates.

Contractor
As a party to the contract with the owner, the contractor is responsible for the execution of all the work, means, and procedures required to carry out the construction work as described in the contract documents.

Specifically, the contractor:

- studies the contract documents and fulfils all requirements including regulatory requirements to the extent provided for in the contract documents;
- supervises and coordinates the work of all trades and sub-contractors;
- executes the work by selecting all construction methods, techniques, sequences, etc.;
- is responsible for construction safety and all workplace regulations;
- pays for all labour, products, and sub-contracts.

Office Functions

Office functions for the contract administration phase of a building include managerial work undertaken at the following stages:

- prior to construction;
- during construction;
- at close-out;
- during the warranty period.

Prior to Construction

Before the beginning of the construction phase, the architect carries out the following tasks:

- prepares the contract form in duplicate for signing by the owner and the contractor;
- assembles two sets of contract documents (refer also to Chapter 2.3.9, *Construction Procurement,* for details on the preparation of the contract);
- assembles and issues sets of drawings and specifications required by the contractor for the work;
- issues (in some cases) a set of updated documents showing all changes and revisions made during the bidding period to ensure that:
  - there is no confusion over the appropriate document;
  - no obsolete document remains in circulation.

The architect checks the contract documents, in particular, the General Conditions and the Supplementary General Conditions, for all required documents and information to be submitted by the contractor at commencement of work. These include:

- performance bond;
- labour and material payment bond;
- insurance certificates;
- construction schedule;
- schedule of values for the parts of the work (which forms the basis for applications for progress payments).

Prior to mobilization, the architect should also obtain the following information from the contractor:

- complete list of sub-contractors and suppliers;
- statement of qualifications of contractor's site superintendent;
- proof of current standing of contractor (and sub-contractors) with the Workplace Safety and Insurance Board or Workers Compensation Board;
- required approvals from Authorities Having Jurisdiction for start-up;
- job-site accident prevention program;
- list of personnel with authorized access to the construction site.

After a specified number of days following the award of the contract, the architect sometimes requires:

- a schedule of dates for submission and review of shop drawings;
- a site organization and hoarding plan;
- designs for temporary supports;
- proof of the contractor's application for special permits and authorizations from Authorities Having Jurisdiction, public utility companies, etc.

[Note: the General Conditions of the construction contract require the owner to obtain and pay for the building permit. Frequently, the architect may apply for the building permit on behalf of the owner as soon as documents are issued for bidding, to avoid delay in the start of construction.]

Construction Schedule
Usually, the contractor is required to submit a construction schedule.

Construction schedules:

- set out the timetable for the construction work;
- indicate the contractor's intended construction methods and sequence;
- reveal the contractor's ability to successfully manage the work to meet the owner's intended date of occupancy;
- expose shortcomings in planning and organizing.

The construction schedule must be carefully reviewed.

Scheduling methods vary from simple bar charts to complex, computer-generated critical path diagrams. The architect should become familiar with various methods, and select and specify the most appropriate method for the project.

Refer to the Appendix in Chapter 2.3.2, *Types of Construction Project Delivery,* for various types of construction scheduling.

During Construction

The standard stipulated-sum construction contract and the client-architect agreement require the architect to:

- review shop drawings, samples, and product data submittals;
- provide timely interpretation of the contract by issuing *Supplemental Instructions*;
- prepare and issue *Proposed Change* forms in a timely manner;
- review the contractor's quotations prepared in response to:
  - *Proposed Changes;*
  - claims for additional costs initiated by the contractor;
- prepare and issue:
  - *Change Directives* if the adjustments to the contract price and time have not yet been agreed upon;
  - *Change Orders* once the adjustments to the contract price and time have been agreed to;
- review progress payment requests, usually on a monthly basis, in order to:
  - monitor progress of construction against the contractor's schedule;
  - compare the contractor's schedule of values with the actual work performed;
  - verify receipt of *Statutory Declarations and Certificates* from the Workplace Safety and Insurance Board or Workers Compensation Board for the second and subsequent submissions;
  - prepare *Certificate for Payment* and forward it to the owner;
- provide support to field functions (refer to Chapter 2.3.11, *Contract Administration — Field Functions*):
  - prepare and distribute field review reports;
  - prepare agenda for special site meetings.

At Close-out

At the end of construction, the contract documents usually require the contractor to submit the following for review by the architect:

- municipal *Occupancy Permit*;
- an annotated set of "as-built" drawings and specifications showing all changes made during construction;
- manuals, incorporating the following data:
  - maintenance and operating instructions;
  - all warranties for materials, equipment, and products;
  - copies of all the permits and certificates of authorization issued by the various public utilities companies and Authorities Having Jurisdiction;
- final *Clearance Certificate* from the Workplace Safety and Insurance Board or Workers Compensation Board;
- *Statutory Declarations* for application for release of holdback from the general contractor and all sub-contractors;
- final reports on work carried out to correct deficiencies;
- replacement materials, maintenance products, special tools, etc.

The architect reviews the documents and submits them to the owner with comments or recommendations regarding their conformity with the contract requirements.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*, for tasks to be undertaken after the construction is substantially complete.

Shop Drawings, Samples, and Mock-ups

Shop Drawings

Shop drawings ensure and confirm the accuracy, size, and other specific data about a product or material prior to final purchase, fabrication or delivery. Shop drawings are prepared to indicate:

- accurate dimensions, size, quantity, and location;
- precise fabrication methods;
- construction and/or field erection techniques;
- information to coordinate related trades or adjacent work;
- elaboration on diagrammatic information;
- confirmation of the selection of options, such as colour or finish.

At the initial pre-construction meeting with the contractor, the architect must establish the standard procedures for submittal and review of shop drawings, samples, and mock-ups. Before submitting shop drawings to the architect for review, the contractor is responsible for verifying:

- quantities;
- dimensions;
- accuracy;
- completeness;
- compliance with the specifications.

The number of copies required for submission and the format for shop drawings should be contained in the specifications. Certain shop drawings must be reviewed by the consultants. Shop drawings do not supersede the contract documents but **supplement** them to assist in the construction.

The review of shop drawings carries certain liabilities for the architect. The architect must take care to review only those portions of the shop drawings which relate to the architectural design. The consultants and engineers are responsible for reviewing their part of the design. The application of shop drawing stamps and the precise wording of the shop drawing stamps is important.

Refer to Chapter 2.4, *Standard Forms for the Management of the Project*, for suggested use and wording of shop drawing review stamps.

It is also important to ensure the timely review of, and to track, all shop drawings.

Refer to Chapter 2.4, *Standard Forms for the Management of the Project*, for the use of a "Log of Shop Drawings and Samples."

Samples

Samples provide the architect with an opportunity to review and finalize selection of finishes, colours, textures, etc., and to confirm specific design and aesthetic intentions prior to ordering a product.

Mock-ups

Refer to Chapter 2.3.11, *Contract Administration — Field Functions*, for a discussion of mock-ups.

Documentation

The architect must ensure that accurate and thorough documentation is developed during the construction phase of the project. This documentation assists in providing:

- technical communication with all parties;
- a project history;
- documentation in the event of a claim.

Typical types of documentation include:

- minutes of meetings;
- Supplemental Instructions;
- Change Orders;
- Certificates for Payment;
- other certificates:
  - Certificate of Substantial Performance;
  - Letters of Assurance;
  - Statements of Completion.

Many of these standard forms for contract administration are available in CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*.

Minutes of Meetings

The architect usually attends many meetings in the course of a project, and it is important that all decisions be recorded.

Refer to Chapter 2.3.11, *Contract Administration — Field Functions*, for a discussion of site meetings and for "Checklist: Suggested Agenda for the Pre-construction Meeting."

Refer to Chapter 2.4, *Standard Forms for the Management of the Project*, for a form and example of "Minutes of Meeting."

Supplemental Instructions

The architect (sometimes with the assistance of consultants) issues Supplemental Instructions to **clarify** or **interpret** the contract documents. Supplemental Instructions can also be issued to provide direction to the contractor concerning a problem which may have resulted during the course of construction.

If there are changes to the contract price or to the contract time, the architect should issue a Change Order or Change Directive.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*, for the information to be contained in a Supplemental Instruction and for a sample form.

Change Orders

Change Orders cover only changes to the **contract price** or **contract time**. Sometimes the process for making changes can be demanding and time-consuming. Change Orders are required for the following reasons:

- additional requirements or changes in the requirements made by the client/owner;
- new or different interpretation of requirements by Authorities Having Jurisdiction;
- work not described in the contract documents;
- work inaccurately or incorrectly described in the contract documents;
- substitutions which may affect the contract time or contract price.

Proposed Change
The process is usually started by the issuance of a form known by one of the following terms:

- Proposed Change;
- Notice Of Change;
- Contemplated Change Order; or
- Change Notice.

CCDC recommends the term "**Proposed Change**." The purpose of this form is to alert the contractor to the proposed change and to provide him/her with the opportunity to submit a quotation for the additional cost (or credit) or a change in time (if any) for the proposed change.

Change Directive
If the contractor's price cannot quickly be agreed to, the architect may issue a Change Directive if the proposed changes are within the general scope of work described in the contract documents. A Change Directive avoids delays and permits work to proceed while negotiations continue over the price of the proposed change.

Change Order
The Change Order is the final form which indicates the agreement between the client/owner and the contractor on specific additions, deletions or revisions to the contract documents.

Summary of Changes
Tracking and tabulating all Change Orders is important for two reasons: to establish the revised contract price (and time), and to process Certificates for Payment. Typically, all Change Orders are listed on a table or chart identifying all credits, extras, and the new contract price.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*, for the information to be contained in a "Proposed Change," a "Change Order," and a "Summary of Changes," and for sample forms.

Certificates for Payment

In typical stipulated-sum construction contracts, the architect is responsible for preparing Certificates for Payment indicating when and how much a client must pay the contractor. Certificates for Payment are based on:

- the schedule of values agreed to and prepared at the start of construction;
- the architect's determination of the percentage of work completed, based on a field review;
- the applicable holdbacks required in the provincial lien legislation.

Schedule of Values
Usually the contractor submits a schedule of values at the start of the project. The schedule of values is typically sub-divided by divisions, major sub-trades or quantifiable elements related to the construction. The work performed by the general contractor's own forces — as well as the costs for mobilization, supervision, overhead, and profit — are usually indicated. Also, sub-trade breakdowns or the value of sub-trade contracts assist in facilitating the progressive release of holdback monies for lien purposes.

The architect should review the schedule of values for completeness and for an accurate and realistic distribution of cost. It can be compared with the last construction cost estimate for major discrepancies.

Percentage of Work Complete
Payments to a general contractor under a construction contract are usually made on a monthly basis in response to the contractor's submission of a "progress claim." The architect should conduct a field review to determine if

the percentage of work completed corresponds with the contractor's progress claim. Any discrepancies should be discussed with the contractor in order to provide an opportunity to make changes to the progress claim or to identify work which the architect may have overlooked. Assistance in determining the percentage completed of certain structural, mechanical, and electrical components will require a field review and advice from the engineering consultants. Once the architect has determined a representative percentage, a Certificate for Payment can be prepared.

Statutory Holdbacks
The architect prepares a Certificate for Payment based on the percentage of work complete and the contractor's progress claim. Change Orders must be accounted for in the Certificate for Payment as well as the appropriate holdback required by the provincial lien legislation.

Refer to Chapter 3.3.1, *A Comparison of Lien Legislation in Canada*, and the appropriate provincial lien act to determine the amount of holdback and requirements for release of holdback monies.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*, for the information to be contained in a "Certificate for Payment" and a "Schedule of Values" and for sample forms.

Other Certificates

The architect is required to prepare other documentation attesting to the status of the construction contract and the actual performance of the work. Two common forms of certificates are listed below. Moreover, it is common for the architect to provide a variety of documentation to Authorities Having Jurisdiction attesting to the general conformity of the building to applicable codes and other regulations.

Certificate of Substantial Performance
In most provinces, the date of substantial performance of the construction contract must be documented. This certificate sets a date which triggers the beginning of the warranty period and the release of holdback monies (lien funds) which have been established to provide some financial protection to sub-contractors.

The architect must understand the provincial lien legislation in the province where the project is located and prepare a Certificate of Substantial Performance based on this legislation.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*.

Refer also to Chapter 3.3.1, *A Comparison of Lien Legislation in Canada*, and the appropriate provincial lien act to determine the amount of holdback and requirements for the release of holdback monies.

Letters of Assurance
A Letter of Assurance is required in the province of British Columbia. All architects practising in this province should refer to the *Guide to the Letters of Assurance in the British Columbia Building Code*.

Letters of Assurance must be signed, sealed, and dated by registered architects who are practising (principals) in architectural firms or who hold Certificates of Practice in designated engineering firms. The purpose of a Letter of Assurance is to provide certification to Authorities Having Jurisdiction.

The standard forms of Letters of Assurance must always be used as provided in the British Columbia Building Code (or the Vancouver Building Bylaw's counterpart forms).

Definitions

Certificate: A document attesting to the truth of a fact; in construction, a certificate is prepared by a professional, either an architect or an engineer.

Certificate of Substantial Performance: A certificate issued under the appropriate lien legislation attesting that the contract between the owner and the contractor is substantially complete.

Contract Administration: The services provided by an architect during the construction phase of a project. For stipulated construction price contracts, these services are outlined in detail in Article 2.6.2 of the *Canadian Standard Form of Agreement Between Client and Architect: Document Six*.

Holdback: A percentage of the monetary amount payable under a (construction) contract, which is held as security for a certain period of time. The percentage and period of time are based on the provincial lien legislation.

Lien: A legal claim on real property to satisfy a debt owed to the lien claimant by the property owner. This claim can carry the right to sell the property upon default.

Shop Drawing: A drawing, diagram, schedule or data prepared on behalf of the contractor to indicate precise details of the construction materials, products or installation. Usually prepared by the "shop" or trade or manufacturer, supplier or fabricator responsible for the particular product.

References

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.

CCDC 2, *Stipulated Price Contract*.

CCDC 24, *A Guide to Model Forms and Support Documents*.

Mays, Patrick C. and B.J. Novitski. *Construction Administration: An Architect's Guide to Surviving Information Overload*. Toronto, Ont.: John Wiley & Sons, 1997.

National Practice Program (NPP). *Canadian Standard Form of Agreement Between Client and Architect: Document Six*. Ottawa, Ont.: NPP, 1997.

O'Brien, James J. *Construction Change Orders: Impact, Avoidance, and Documentation*. New York, NY: McGraw-Hill, 1998.

O'Leary, Arthur. *A Guide to Successful Construction: Effective Contract Administration*. Los Angeles, CA: Building News Inc., 1996.

Ontario Association of Architects (OAA). Toronto, Ont.

Practice Bulletin Number 12a, Construction Phase — Contract Administration. August 1986.

Practice Bulletin Number 35a, Site Visit Report at Completion of Construction. May 1990.

Ordre des architectes du Québec (OAQ). *Guide d'utilisation des formulaires d'administration de contract*. Montréal, QC: OAQ, 1997. The forms are also available in English.

Sandori, Paul. Editor. *Construction Law Letter*. Published six times a year. Markham, Ont.: Butterworths Canada Ltd.

Checklist: Typical Items for Shop Drawing Review

This list is NOT all-inclusive, but it does suggest certain typical elements which may require shop drawings. The list also indicates some parts and features of the shop drawings which may require review by the architect and the engineers. The list is extensive and not typical for most projects. [Note: this list also includes some samples and mock-ups.]

Product or System	Items to review	Review by:
Division 1. General		
Building Layout (surveyor's drawing)	- general layout - dimensions	Architect
Construction Sign and Hoarding Drawings	- design - colour - construction - location - dimensions - capacity of sign to withstand lateral forces from wind loads	Architect Structural Engineer
Scaffolding	- general layout and location - design and connections	Architect Structural Engineer
Division 2. Site Work		
Excavation: (shoring, bracing, and sheet piling)	- location - design, including calculations - construction - dimensions - levels	Architect and Structural Engineer Structural Engineer
Piling: (caissons and piles)	- locations - dimensions and sizes - reinforcing - welding - design - transition caps - concrete strength - elevations and levels - as-built drawings	Structural Engineer
Site Furnishings	- colour - finish - layout and dimensions	Architect
Pre-cast Curbs	- dimensions and sizes - shape - holes for ground rods - locations and quantity - finish - weep holes	Architect
Pre-cast Unit Pavers	- dimensions and sizes - shape - finish - joint details and location - extent of unit pavers - materials - base and/or support	Architect

Product or System	Items to review	Review by:
Division 3. Concrete		
Cast-in-Place Concrete	- reinforcing (size, location, quality) - location of elements - concrete strength - dimensions of elements - opening sizes - spans - footing levels - stepped footing	Structural Engineer
	- construction joints - expansion joints - slab depressions - recesses - form tie pattern and spacing - dimensions - size and location of openings - waterproofing recesses and joints - stepped walls - weep holes - mechanical and electrical services locations	Architect
Pre-cast Concrete	- reinforcing (size, location, quantity) - connection and bearing details and location - concrete strength - provisions for lifting	Structural Engineer
	- materials - dimensions and sizes - shape - location - finish and colour (sample) - drips - reglets - joint details - anchor bolts and/or inserts for other materials - waterproofing - openings - mechanical and electrical services locations	Architect
Division 4. Masonry		
Masonry Walls (mock-ups sometimes required)	- masonry units - mortar colour and texture - joint tooling technique - joint size - coursing - masonry ties	Architect

Product or System	Items to review	Review by:
Division 5. Metals		
Structural Steel	- grades of steel - anchor bolt plan layout and dimensions - dimensions and sizes of members - specific deviations from grid lines - heights and levels of beams - connection details - base plate details - anchors required for other materials - size and location of openings through members - bearing details - expansion joint details - painting - framing around openings - lintels - provision for future additions - fireproofing (sample)	Structural Engineer
	- dimensions - method of fireproofing (sample) and/or rated assembly - finish (sample)	Architect
Steel Joists	- engineering certificate - sizes - spacing and location - bearing details - bracing and/or bridging locations - bottom chord extensions	Structural Engineer
	- mechanical services locations - finish	Architect
Metal Decking	- type - gauge of metal - finish - fastenings - location of openings and framing - location and details of closure plates - loads	Structural Engineer
Metal Fabrications, Miscellaneous Metals, Metal Stairs and Railings, Ornamental Metal	- location - dimensions and sizes - finish - hangers and fastening details - construction and installation - material - railing expansion joints - compliance with codes with respect to resistance to horizontal and vertical loads	Architect
Load-bearing Metal Stud Framing	- gauge and galvanic finish - spacing - connection details	Structural Engineer

Product or System	Items to review	Review by:
Division 6. Wood and Plastics		
Timber Framing and Prefabricated Structural Wood	- engineering certificate - sizes - spacing and location - bearing details - bracing and/or bridging locations - connections	Structural Engineer
	- finish - exposed connection design - mechanical services locations	Architect
Architectural Woodwork and Millwork	- design - dimensions and sizes - location - material (species, grain direction, and pattern) - finish (sample) - mechanical and electrical services locations - construction and installation - hardware and location - interference between hardware and door or drawer operation - plastic laminate (sample)	Architect
Division 7. Thermal and Moisture Protection		
Metal Cladding	- profile - material construction - finish and colour - dimensions and sizes - openings - installation details - fixing details to structure - cladding support system - weatherproofing (flashing, sealing, etc.)	Architect
Roof Insulation (tapered)	- thickness - locations of penetrations - slope	Architect
Exterior Insulation and Finish Systems	- insulation - colour (sample) - finish (sample) - expansion and control joints - decorative features - reinforcement details	Architect

Product or System	Items to review	Review by:
Division 8. Doors and Windows		
Doors and Frames	- material - construction - finish - location - dimensions and sizes - size of undercut - glass and louvre openings - finishing hardware locations - door swings - frame profiles - frame installation details - fire ratings - bumpers	Architect
Aluminum Doors, Frames, and Screens	- location - type - dimensions and sizes - frame profile - anchorages - location with respect to wall thickness - transom panel - finishing hardware location - door swings - construction - grilles - finish - gauge of material - bumpers - reinforcing for hardware - astragal - rebate sizes - stop location and size - door head frame wide enough for specified hardware - glazing - fire ratings	Architect
Windows	- profile - sizes - material - finish - location in relation to wall thickness - sealant at perimeter of frame - anchorages - tolerances for structural movement, especially at head - material thickness - insect screen - opening and locking mechanism - weeping holes - glazing (type) - weather bars if specified - sill detail - fixed and operable window section	Architect
Hardware (schedules)	- type - finish - location - function - fire rating - keying system - electrical requirements	Architect Electrical Engineer

Product or System	Items to review	Review by:
Division 9. Finishes		
Generally, shop drawings are not supplied, unless required, except for special treatment such as travertine walls, marble floors, etc., where joint lines and grain direction are important. All finishes are normally approved on the basis of material **samples** submitted to the architect for reviewing against the specifications and colour schedule.		
Special Finishes or Treatment	- material - finish - location - extent of application - joint type location, size, and detail - panel sizes - grain direction and pattern - base, ceiling, and corner details - fixing and location - location and size of openings	Architect
Carpeting and Resilient Flooring	- location - access to electrical underfloor duct system - installation and accessories - seam locations and pattern direction	Architect
Division 10. Specialties		
Manufactured Specialties	- finish and colour - location - fixing details - construction - dimensions and sizes - material - gauges - dimensions and sizes	Architect
Washroom Accessories	- type - finish and colour - fixings - construction - materials - gauges - dimensions and sizes	Architect
Toilet Partitions	- location - type - dimensions and sizes - material - finish and colour - reinforcing for accessories - door swing - hardware - construction - gauges	Architect
Signs and Directories	- location - dimensions and sizes - construction - finish and colour - material - fixings - electrical and mechanical services locations if applicable - access - glazing - lettering	Architect

Product or System	Items to review	Review by:
Division 11. Equipment		
Special Equipment (e.g., kitchen equipment, computers, controls, machinery, lifts, etc.)	- location - clearances required around equipment for maintenance - access for replacement	Architect
	- loading and vibration - dimensions and sizes - finish and colour - installation details (isolation — structure, sound, heat)	Structural Engineer
	- mechanical services, sizes, and location	Mechanical Engineer
	- electrical services, sizes, and location	Electrical Engineer
Division 12. Furnishings		
Blinds and Window Treatment	- type - finish and colour - fixings - dimensions and sizes - operation	Architect
Division 13. Special Construction		
Special Construction	- location - extent - material - dimensions and sizes - construction - finish and colour - installation - clearances - presence of electrical services - presence of mechanical services	Architect

Product or System	Items to review	Review by:
14. Conveying Systems		
Elevators, Lifts, and Dumbwaiters	- shaft construction - shaft sizes - clearances and heights - door frame details and finishes - cab sizes - design and finish of cab - design, finish, and location of name plates, push buttons, hall indicators, etc. - equipment location - shaft projections - number of stops - operation (fire fighter's elevator)	Architect
	- imposed loads - sizes of structural members, hoist beams, etc. - bearing of load capacity members	Structural Engineer
	- shaft and machine room ventilation requirements	Mechanical Engineer
	- electrical services and equipment and location of same	Electrical Engineer
Escalators	- location - size of floor openings - escalator dimensions - material - finish and colour - access - installation details with respect to adjacent areas - clearances around escalators	Architect
	- imposed loads - sizes of structural members, hoist beams, etc. - bearing of load capacity members	Structural Engineer
	- electrical services and equipment and location of same	Electrical Engineer
Pneumatic Tube System	- tube runs and tube sizes - station location - station design - materials - finish and colour - operation and speed - construction - openings required in structure - exhaust and its location - station interconnections - accessories such as carriers, speed controllers - type of sending and receiving terminals - station access for maintenance	Architect
Conveyors	- shaft dimensions - shaft construction - conveyor routing - material - finish and colour - clearances - dimensions and sizes - access for maintenance - operation - number of stations and location	Architect

Product or System	Items to review	Review by:
Division 15. Mechanical		
Sprinkler Systems	- location and spacing - finish - special requirements	Architect
	- conformity with NFPA and insurance underwriter standards - pressure and flow - calculations based on correct data - design - equipment and pipe sizes - water storage tanks, pumps, valves - sprinkler control trees - clearances, access - supports, foundations	Mechanical Engineer
Plumbing Fixtures	- colour - controls - mounting and installation requirements	Architect
	- quantity - roughing-in requirements - connections	Mechanical Engineer
HVAC Units	- size and weight	Structural Engineer
	- location and required openings	Architect
	- all performance data	Mechanical Engineer
	- controls and electrical requirements	Electrical Engineer
Boiler Room Equipment (boilers, pumps, tanks)	- size and clearances - installation and mounting requirements - louvres and ventilation sizes	Architect
	- size and weight - location of openings - clearances, heights	Structural Engineer
	- all performance data	Mechanical Engineer
	- controls - power, panels, shut offs	Electrical Engineer
Diffusers	- colour - finish	Architect
	- louvre direction - other features (dampers, etc.)	Mechanical Engineer

Product or System	Items to review	Review by:
Division 16. Electrical		
Light Fixtures	- quantity - colour - finish - options - location - lamps - lamps - performance and installation	Architect Electrical Engineer
Distribution Equipment	- location and size - clearances - all features	Architect Electrical Engineer
Fire Alarm System, Security System, and Communications System	- location of components - size and colour - all features - quantity - rough-in requirements	Architect Electrical Engineer

Contract Administration — Field Functions

Introduction

The field functions of contract administration are done concurrently and in coordination with a variety of office tasks. Refer to Chapter 2.3.10, *Construction Administration — Office Functions*, for a description of the office work that supports field functions.

The terms used to describe the functions performed by an architect during the construction — or contract administration — phase of a project, on site or out of the office, are:

- field review;
- general review;
- site review;
- site observations.

The terms *"supervision"* and *"inspection"* refer to completely different levels of service **not** normally provided by an architect.

- "Supervision" implies the overseeing of the construction work, including the activities undertaken by workers on site, which is the responsibility of the contractor, not the architect.
- "Inspection" means a "close examination" (of construction); once again, this level of service is beyond the architect's responsibilities.

The architect's duty during field review is to carry out sufficient periodic site visits at appropriate intervals during the various stages of construction to determine if the work is in general conformity with the contract documents which form the basis for issuing a building permit. In addition, the architect reports on the progress of the work and observations made on site.

Purpose of Field Review

The architect's field review work has the following three purposes:

- to monitor the contractor's performance in maintaining both the construction schedule and the standards or quality of construction;
- to provide guidance to the contractor by interpreting the contract documents and issuing necessary Supplemental Instructions;
- to fulfil performance standards of general review as required by the client-architect agreement, Authorities Having Jurisdiction, and provincial associations of architects.

Site visits must be more than a brief stop at the construction site to speak with contractors, walk around, and take a few notes to forward to the client. Site visits are essential to the project's success; the architect must, therefore, assign a senior or experienced staff member to perform field reviews.

All field functions should follow these principles:

- carefully describe, to the client, the architect's duties and role during the construction phase and adhere to these responsibilities;
- keep the client well-informed of the progress of the work, in part by sending copies of field review reports to the client and all appropriate parties;
- ensure that consultants review their portion of the work and submit field review reports;
- avoid the words "*inspect*" or "*supervise*" in all agreements, correspondence, and documentation;
- use qualified personnel for field review and ensure that they are properly trained;

- prepare a manual with proper procedures for field personnel;
- keep proper documentation including reports, logs, photographs, and videotapes;
- promote good communications with the contractor and building officials.

Role of the Architect

The architect's role in a project changes from designer to contract administrator once the construction of a project is underway. Refer to the *Canadian Standard Form of Agreement Between Client and Architect: Document Six*, for a list of the architect's responsibilities during the construction phase of a project. The architect is both a representative of the client and an interpreter of the contract documents. Normally, the architect is present on site to:

- conduct a general review;
- attend site meetings;
- interpret contract documents or resolve problems;
- observe testing or other procedures;
- review and accept samples, mock-ups, etc.;
- meet with consultants, contractors or the client regarding the progress of the construction;
- determine the percentage of the work completed (information which is used to prepare certificates).

In most agreements, the architect is not required to make exhaustive inspections or continuous on-site review; nor is the architect responsible for the construction methods or procedures or for construction safety. However, the architect should understand workplace safety and practise "due diligence" on the construction site.

Role of Others During Construction

The architect communicates with many others who may visit the site during the construction phase of a project, including:

- the client or his/her designated representative;
- the consultants or design team;
- the contractor, sub-contractors, and suppliers;
- Authorities Having Jurisdiction;
- inspection and testing firms;
- other institutions, such as lending institutions and insurance agents.

Client

The client's role varies depending on the client's expertise and interest in the construction phase of a project. Some clients will assign a representative dedicated to this phase or hire a clerk of the works to monitor and account for construction activities. On the other hand, some clients rely exclusively on the architect as their representative. The client or designated representative usually attends regular job-site meetings.

Consultants

The field functions of consultants are critical to the success of a project. Typically, the architect is responsible for notifying and coordinating consultants as well as ensuring their attendance on site at the appropriate times. Consultants usually review the portion of the work which they have designed or for which they are responsible. They also determine, as does the architect, whether their portion of the work is in general conformity with the contract documents. In addition, engineering sub-consultants assist the architect in preparing certificates by attesting to how much of their portion of the work has been completed. Consultants may also be involved with other inspection and testing procedures.

Contractor

The role of the contractor is described in a construction contract, such as CCDC 2, and in the project specifications. Generally speaking, the contractor is responsible for the construction schedule, the quality of construction, and the construction methods and procedures. The contractor is also responsible for supervising his/her crew and coordinating sub-contractors. Typically, if a project is of a certain minimum value, most contractors will assign one individual to manage the project. This person — known as the site superintendent — is usually assigned to only one project at a time, frequently setting up an office temporarily in a construction trailer or part of a building which is under renovation. The contractor usually contacts the architect at varying stages of the project to schedule reviews.

Construction Safety

The constructor (usually the general contractor) is solely responsible for construction safety at the workplace and for:

- complying with the rules, regulations, and practices required by the applicable occupational health and safety legislation;
- initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the work.

Neither the owner nor the architect is responsible for safety at the construction site, unless the owner has awarded separate contracts or is using his/her own forces for parts of the project. Some provinces have legislation which defines the owner as the *constructor* in these situations. The architect should review all applicable provincial occupational health and safety legislation to determine the architect's responsibilities in the workplace.

If an unsafe or life-threatening situation is observed, the architect is obliged to report immediately to the contractor, and to record the observation. When developing the scope of the architect's services in discussions with the client, avoid inadvertently assuming responsibility for site safety, especially when offering full-time, resident or expanded field services. The architect should make it clear to the owner and the contractor that the architect is **not** responsible for:

- the means, methods, sequence, procedures, techniques or scheduling of construction activities;
- job-site safety.

Conducting a Field Review

Procedures

The architect must establish credibility on the job site from the start of the project. This is accomplished through a detailed knowledge and understanding of the project and the contract documents. The architect must conduct reviews deliberately and thoroughly. Upon completion of a field review, the architect should prepare written reports for the owner and the contractor and, when required, for building officials. Site observations should be consistent, responding to the stage, progress, and quality of the work.

Some architects bring half-size sets of drawings to the site. These are very useful for comparing observed work with the contract documents. Other important tools to bring on site are:

- hard hat and safety boots;
- camera (preferably with a time and date record);
- tape recorder and/or note pad;
- tape measure.

Consider also bringing some of the following items, as needed:

- flashlight;
- binoculars;
- coveralls;
- pocket knife;
- chalk, markers, carpenter's pencil, crayon, spray paint;
- approved samples;
- video camera;
- pocket level;
- small mirror such as a dentist's mirror;
- thermometer;
- moisture meter;
- pocket calculator.

Upon arrival at the site, the architect should either:

- talk to the site superintendent or leave a note for him/her; or
- contact the contractor's other site personnel.

A site visit can include:

- a quick overview, to get a general impression of the progress of the work relative to the schedule and to the last site visit;
- a tour with the contractor and/or owner to understand their problems and concerns;
- a tour with a single sub-contractor to concentrate on key trades in progress at the time.

The architect should not leave the site without speaking with the site superintendent or the contractor. Observations should be reported to the contractor's superintendent at the conclusion of the visit in order to:

- indicate to the superintendent any problems which have been noted;
- provide the superintendent with an opportunity to rectify deficiencies before a formal report is issued.

The architect should endeavour to promote good communication and a close working relationship at all times with the contractor. However, if it is not possible to resolve on-site problems, the architect should ensure that the deficiencies are recorded in a field review report. Refer to "Checklist: General Items for Field Review" at the end of this chapter and to the many published checklists for:

- items to review during site visits;
- construction administration services.

Frequency and Timing of Site Visits

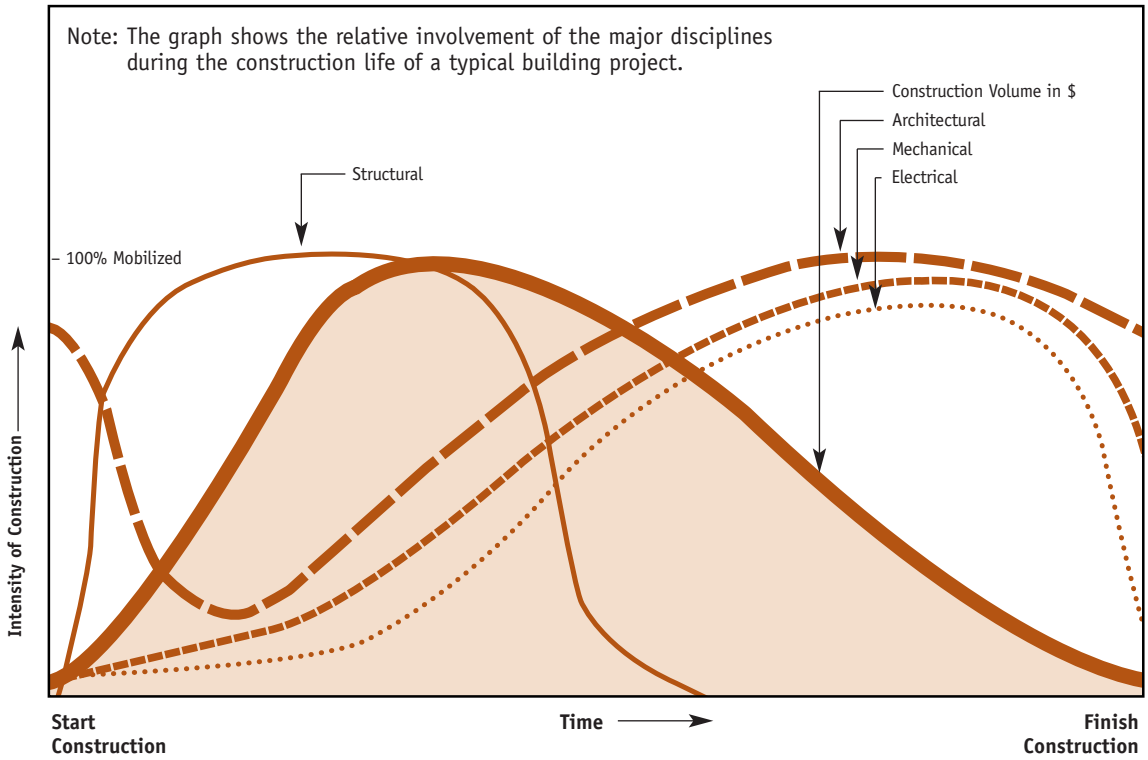
The architect should schedule site visits at intervals appropriate to the construction. The frequency and timing is left to the judgement of the architect. Visits should be conducted at different times of the day and on different days of the week. This prevents familiarity with the architect's routine and the scheduling of some construction when it might not be readily observed. In addition, it may be necessary to make strategically timed site visits to deter the contractor from becoming complacent about his/her contractual obligations.

Before processing progress claim applications, the architect must also visit the site and make detailed observations to determine:

- the percentage of work completed;
- the amount of materials stored on site (or on the "extended site").

Usually, more visits are required at the start-up and close-out of construction. Structural engineering review is more intense at the early stages of a project, whereas mechanical and electrical consultants are more involved near the completion of construction.

Illustration 1: Graph Showing Duration and Intensity of Work on Site — By Discipline



The following are general guidelines on **when** to conduct field reviews:

- at project start-up and/or excavation;
- at the start of major sub-contractors' work on elements forming the enclosure of the building, such as:
  - forming and framing;
  - structural steel;
  - masonry;
  - waterproofing;
  - cladding;
  - window systems;
  - roofing;
- at the start of finishing trades, such as:
  - floor finishes;
  - cabinetwork;
  - wall finishes;
  - painting;
- when significant new materials and equipment are delivered to the site.

Because many types of work (masonry, for instance) cannot be corrected readily without replacement, timely field review is needed to preclude rejection of work which has been underway for several weeks.

Additional field reviews should be considered immediately before and during concrete placement to review:

- key dimensions;
- placement of reinforcing steel and inserts;
- presence of any debris, rust, water, etc., within formwork;
- concrete placement.

When the work of one trade is covered up by another trade, it is too late for observation; therefore, field reviews must be done before the following work is covered up:

- insulation;
- fireproofing/firestopping;
- vapour barriers;
- blocking and furring.

Scheduling reviews **before** work is covered up allows for deficiencies to be corrected prior to permitting the completion of the remainder of the installation.

The architect should conduct a field review after any serious or unexpected change in the weather — which can have an adverse effect on work in progress — to determine whether any damage has been done to existing work, such as:

- undermining or weakening of footings or foundations by heavy rain;
- freezing of concrete or mortar due to sudden drops in temperature;
- frost penetration of sub-soil;
- damage to roofing membranes and unbraced walls by strong winds;
- improper curing or drying out of materials from prolonged heat.

Finally, the architect should:

- carry out a detailed review before the owner takes early occupancy of any area, prior to completion of the entire project;
- prepare a deficiency list for acceptance by the contractor and the owner before partial occupancy takes place.

Field Locations

The architect may be required to make and record observations in three possible locations:

- the construction site;
- the "extended" site;
- the plant or location of off-site fabrication.

The Construction Site

The construction site — the location identified in the contract documents where the building is situated — is called "Place of the Work" in CCDC documents. This is where most of the construction activities take place and where the architect will conduct most of the field reviews, unless the building is prefabricated off-site.

Extended Site

An extended site refers to a location where products may be stored away from the construction site. The value of major items delivered to an off-site location is considered eligible for payment once the following conditions have been met:

- after authorization or approval (usually for products which are costly or custom-made);

- after the contractor has made provision for:
  - secure storage (for example, a bonded warehouse);
  - insurance;
  - bonding;
- after the architect has made visits to observe the items at their storage location.

The idea of certifying payment for items located at an extended site is currently under review. There are two unresolved issues:

- the payment for the cost of bonding off-site items;
- the credit for any savings in interest charges.

Plant or Off-site Locations
Review of work which is fabricated or assembled in a plant may also be necessary. The architect or consultants observe work in the plant to:

- examine the manufacturing facilities and capabilities of the sub-contractors before a contract is awarded;
- check or confirm progress of items, such as:
  - items whose schedule for delivery is critical to the progress of the project;
  - items which come to the construction site pre-assembled and could not be properly reviewed after delivery;
- resolve problems noted by inspection and testing companies, such as:
  - truss welding details;
  - prefabricated wall panel details;
- resolve manufacturing problems concerning details which prove to be impractical, such as:
  - the size of metal breaks;
  - prefabricated wall panels;
- witness tests undertaken in the plant, such as:
  - tests for curtain wall mock-ups;
  - tests on specialized prefabricated roof structures;
  - tests of air diffusers;
- review mock-ups, such as:
  - elevator cabs;
  - special ceiling systems;
- determine the source of problems occurring in the field which can be traced to plant manufacture or fabrication, such as:
  - welding deficiencies;
  - efflorescence.

Reporting

The architect should write a report after every visit spent observing work in the field. At a minimum, the field review report should include the following information:

- name and position of the person conducting the field review;
- date, time, and duration of the visit;
- weather conditions, including any extreme conditions;
- names of those present or name of the site superintendent and the general contractor;
- percentage of work completed by trade;
- work progress compared to the contractor's schedule;
- work now underway or being accomplished;
- work scheduled to be completed before next visit;
- questions raised by the contractor or the owner;
- determinations made by the architect;
- outstanding issues requiring action;
- the list of people receiving copies of the report;
- status of deficiencies or outstanding issues from previous report;
- the report number for filing purposes.

Refer also to Chapter 2.4, *Standard Forms for the Management of the Project*, for a sample form for a field review report.

The architect should refer to one of the several available checklists for the review of building construction. Many checklists are organized by trade in the MasterFormat™ system. Architects can take a photocopy of the relevant sections of the checklist to the job site and use it to assist in recording observations and writing field review reports.

Mock-ups

Mock-ups are usually full-scale, partial constructions of a certain system or building component. The contractor or sub-trade prepares a mock-up, when specified, to:

- demonstrate a full understanding of the drawings and specifications;
- uncover any problems;
- represent the quality of construction expected by the architect.

The architect should establish procedures for the review of mock-ups at a pre-construction meeting.

Site Meetings

Pre-construction Meeting

The tone, format, and efficiency of all subsequent meetings is often set at the pre-construction meeting. The architect must be well prepared for this first meeting.

Before work commences on the site, the architect should make a detailed review of the site with the contractor, and should document the condition of the existing site (existing structures, sidewalks, etc.) in order to:

- establish the state of existing facilities before work starts;
- provide a basis for settling any disputes arising from damages which may occur during construction.

Refer to "Checklist: Suggested Agenda for the Pre-construction Meeting," located at the end of the chapter, for issues to be discussed and resolved at this important first meeting.

Regular Site Meetings

One of the architect's responsibilities during construction is to participate in job-site meetings. The architect should be familiar with the progress of the job prior to any regularly scheduled job meeting. Regularly scheduled weekly or semi-weekly site meetings are essential to:

- communicate the client's expectations to the construction team;
- ensure good communication between all parties;
- exchange and transmit technical information such as shop drawings;
- provide a structured opportunity for field review;
- resolve problems and discuss all relevant design and construction issues;
- assist in making judgements and determinations;
- review schedules and progress claims.

Site meetings provide an excellent opportunity for the architect to establish an on-site presence. Minutes of the site meetings should always be recorded. They should indicate what actions are required and who is responsible for the action. Minutes should be distributed within 48 hours of the meeting. Either the architect or the general contractor prepares the minutes, depending on the architect's choice and the general requirements of the specifications.

Field Review Services of Consultants

The architect is usually the prime or "managing and coordinating" consultant, and is responsible for coordinating the field functions of the engineering and other consultants. It is important to call upon the services of the consultants at the appropriate stage of construction. All consultants should be required to submit field review reports in a format similar to that used by the architect, and the architect should distribute the reports as required. In addition, the architect relies on the consultants to determine the value or percentage of work completed by each respective discipline in order to prepare Certificates for Payment.

Engineers

The field review by engineers is critical to a successful building. The architect must:

- be familiar with the engineering work;
- note significant issues during site visits;
- bring those issues to the attention of the respective disciplines.

The role of engineering consultants in the contract administration phase of the project follows the role of the architect. The engineers must:

- review and provide the field functions as required at times appropriate to the stage of construction;
- provide written field review reports each time they visit the site.

Some aspects of review by engineering consultants differ from that of the architect. For example, some engineering disciplines — especially mechanical and electrical — provide information

in a more diagrammatic manner than is presented in typical architectural drawings. Therefore, the trade or sub-contractor can use more discretion in the installation and operation of various equipment and systems. This diagrammatic information requires more interpretation on the part of both the engineer and the sub-contractor.

Testing Agencies and Inspection Services

Independent inspection provided by specialist inspection and testing firms is required on most construction projects. The following summarizes the relationship of these specialists with the architect:

- inspection and testing is usually recommended by the architect or the engineers;
- these specialists do not supersede the architect's authority;
- these services are ancillary to the architect's basic construction administration services;
- the architect must ensure that he/she is only assisting in the process and does not assume a contractual obligation;
- inspection and testing firms undertake tests and issue timely reports, but they do not interpret the results of these tests or issue instructions to the contractor;
- interpretations are made by the contractor in the first instance and finally by the architect and the engineering consultants.

Inspection and testing firms are frequently selected by methods typically used for selecting other professionals, that is, by soliciting proposals. The cost of these services is generally paid for by the owner either contracted:

- directly with the inspection agency; or
- indirectly through the general contractor.

Inspection and testing services are frequently paid through cash allowances provided for in the construction contract. Sometimes, inspection and testing services are included as a sub-contract. For example, air balancing is frequently a sub-contract of the mechanical contractor. Also, manufacturers representatives — such as certain roofing membrane manufacturers — commonly inspect the installation of their products by the trades to ensure compliance with their standards.

The following are typical examples of inspection and testing required:

Division 2 — Sitework
- additional geotechnical reports
- soil-bearing capacity
- testing and inspection for hazardous materials
- approval of backfilling materials
- compaction of soils or fill
- load tests on, and inspections of, piles and caissons
- inspection of underpinning and shoring
- inspection of soil stabilization

Division 3 — Concrete
- test for air entrainment
- slump test
- load testing on cylinders
- core drilling and testing
- inspection of placement of steel reinforcement
- X-ray of existing concrete slabs

Division 4 — Masonry
- mortar test and chemical composition
- testing of masonry units for compressive strength, absorption, etc.

Division 5 — Metals
- inspection of welds, fabrications, etc.
- field inspection
- inspection of load-bearing metal stud framing

Division 6 — Wood and Plastics
- special lumber grading

Division 7 — Thermal and Moisture Protection
- building envelope
- inspection of fireproofing and firestopping
- roofing inspections (installation and cut tests)

Division 9 — Finishes
- flooring and painting inspections

Division 14 — Conveying Systems
- elevator testing and certification

Division 15 — Mechanical
- testing and certification of sprinkler systems
- air balancing

Division 16 — Electrical
- testing of communications systems
- testing of controls
- verification of fire alarm system
- testing of emergency lighting and emergency power supply

Testing off complete systems, such as the building envelope, may also be required.

Continuous On-site Representation

For certain large and complex projects, or some fast-track projects, continuous on-site representation is required. If provided by the architect, it is considered an additional service requiring negotiation of a fee over and above the basic fee. Alternatively, the client may choose to directly hire a clerk of the works. Usually, the responsibilities of a clerk of the works are limited and do not include contract document interpretation. The clerk of the works records construction activities and quantities, often for unit price contracts.

A continuous, on-site architectural representative may undertake some of the following duties:

- coordinating all communications;
- interpreting contract documents;
- assisting in the preparation of Change Orders and certificates;
- arranging for inspection and testing;
- preparing as-built drawings;
- attending site meetings;
- providing continuous field review and maintaining a daily log which contains:
  - weather conditions;
  - major material and equipment deliveries;
  - daily construction activities, percentage of completion of work, and work force;
  - records of work stoppages and reasons for them;
  - occurrence of inspection and testing and their results;
  - special visitors;
  - unusual conditions or significant developments on site.

The architect's role as a continuous, on-site representative should be carefully and clearly defined, and an appropriate fee negotiated with the client.

Definition

General Review: Visits to the place of work at intervals appropriate to the stage of the construction that the architect considers necessary to become familiar with the progress and quality of the work and to determine that the work is in general conformity with the contract documents.

References

Mahoney, William D. Editor. *Construction Inspection Manual*. Los Angeles, CA: Building News Inc., 1998.

National Practice Program (NPP). *Canadian Standard Form of Agreement Between Client and Architect: Document Six*. Ottawa, Ont.: NPP, 1997.

Stitt, Fred A. *Construction Administration Checklist*. Orinda, CA: Guidelines, 1993.

Appendix A — Tips for Site Observations

The architect undertaking field review should refer to one of the many published checklists for assistance in conducting site visits. The following list of items for review may be helpful.

Architectural Items

A1 **Aesthetics** includes the location and appearance of exposed mechanical and electrical components, particularly in areas exposed to view which should be finalized during roughing-in.

A2 **Cleaning** of trapped areas must be undertaken continually. The architect should ensure that accumulated dirt and dust is not allowed to build up and be covered up by the work of later trades. This includes dirt and food products left inside chase walls, above ceiling areas, and in interstitial spaces which could eventually find its way into areas occupied by the public. This also includes cleaning of areas such as cavity wall spaces which could affect the performance of weep holes.

A3 **Code Requirements** include stairs, exiting, life support systems, and anything which involves public health and life safety.

A4 **Datums and Tolerances** involve points used to determine floor levels with respect to outside grades or adjacent structures. Also required to maintain setbacks from other buildings or property lines and plumbness of vertical elements such as elevator shafts.

A5 **Deflections** require that appropriate allowances be made during and after construction for the deflections that will occur in beams, floors, and slabs as they are loaded. Beams and lintels above masonry and deflection of steel decking under roof parapets are typical examples.

A6 **Drainage** includes the provision of adequate slopes to drain water in floor slabs, pits and vaults, paving areas, and below slab weeping tiles. Inadequate slopes and drainage are a major cause of claims and litigation.

A7 **Expansion and Control Joints** must align with related joints in the building structure and at areas of expected movement. Joints should be consistent in all planes of the building envelope and interior, must not be constrained by construction, and must be allowed to expand and contract freely. The damage to the building fabric and visual impact of improperly designed joints are among the most significant problems with construction.

A8 **Fireproofing** of building structures requires checking the thickness and densities of materials. There must be sufficient room to apply spray on fireproofing, and it must not interfere with mechanical and electrical systems. Patching of damaged fireproofing must be undertaken so as to not impair the tested ratings of the system, and testing and inspection should be done by recognized testing companies.

A9 **Fire Protection** must maintain the required fire separations mandated by building codes. Provision must be made where fire separations are penetrated by other building systems such as mechanical and electrical systems as well as vertical services such as elevators and stairs. The materials used must meet current standards. Confirm that the materials have the required fire ratings, that they are installed by approved methods and in all required locations.

A10 **Hardware** on building projects is subject to substitutions and changes of hardware, changes of use or occupancy, and requested changes from Authorities Having Jurisdiction. The architect should have the hardware supplier check and accept the methods of installation and confirm that the requirements of the occupants and Authorities Having Jurisdiction are met.

A11 **Humidity and Water Infiltration** trapped in wall and roof systems during the construction phase can lead to problems with rot and damage. The architect should check for excessive moisture in insulation materials, windows, and roofing systems. Excess humidity during the installation of many building materials will also lead to long-term problems. Gypsum board or acoustic ceiling panels will swell or sag when subjected to moisture levels exceeding permitted levels.

A12 **Mechanical and Electrical Equipment** such as elevators, escalators, fans, pumps, and operable doors, etc., require break-in periods. To avoid excessive breakdowns and callbacks by the contractor, these break-in periods should be done before the owner accepts the building. Access panels and other items require coordination with architectural finishes.

A13 **Operating space** is required to allow maintenance operations to be undertaken when the building is turned over to the owner. This includes space to allow staff easy access to filters, fans, valves, air handling equipment, and life safety items. The architect should ensure that equipment is installed so that maintenance and replacement is simplified and also so that space is available to move equipment in and out. This includes doors, access panels, and corridors.

A14 **Public Safety** requires that proper hoarding, overhead protection and scaffolding, and barriers be provided. The architect should be aware that the contractor is responsible for controlling the site and its safety. If the architect sees a potential problem, he/she should report this immediately to the project site superintendent and follow up with a notice to the owner. The architect should **not** make any recommendations as to how the safety problems should be solved.

A15 **Wall and Floor Thicknesses** should be confirmed on site to ensure that they are sufficient to conceal the services which are to be installed inside them. Typical services include ductwork, plumbing and waste stacks, washroom equipment, etc. The architect should be observant to ensure that any required fire resistance ratings are maintained where services are installed in walls or in furred-out walls. Services which are installed in concrete floors should also be reviewed so that sufficient cover remains to ensure that the fire rating is maintained or the structural requirements are not impaired.

A16 **Water** in new construction poses particular problems because systems installed on wet or damp substrates can have long-term problems. For example, the architect should be aware that when materials such as bituminous membranes are installed on wet concrete or damp masonry, the adhesion may fail. The contractor should be made aware of the importance of protecting all sensitive materials and the strict adherence to manufacturers' requirements for moisture content.

Checklist: Suggested Agenda for the Pre-construction Meeting

1. **Introduction**
   - all attendees and who they represent.

2. **Administrative Procedures**
   - schedule of meetings;
   - who will record and distribute minutes;
   - format of minutes;
   - general communications;
   - procedures for distribution and routing and for the review and/or approval of information, including:
     - correspondence;
     - shop drawings, including format, turn-around time, etc.;
     - samples, including mock-ups and schedule;
     - substitutions;
     - tests and inspections, including identifying companies and reporting circulation;
     - progress payments;
     - Change Orders, including procedure and forms.

3. **Project Team Directory**
   (as per Form 1.5 of Chapter 2.4, *Standard Forms for the Management of the Project*)

4. **Current Project Status**
   - receipt of:
     - building permit;
     - insurance and bonds;
     - certificates of good standing from Workers Compensation Board;
   - identification of Authorities Having Jurisdiction;
   - permits for gas, electrical services, other utilities, etc.

5. **Job Site Documents**
   - permit set;
   - codes and standards;
   - geotechnical report.

6. **Review of Information from Contractor,** including:
   - construction schedule;
   - schedule of values for progress draws;
   - cash flow projections.

7. **Site Issues**
   - parking;
   - loading and storage;
   - garbage, construction waste, and recycling requirements;
   - hoarding and fencing;
   - tree protection;
   - project identification and signage;
   - snow removal;
   - operational constraints (use of existing washrooms, maintenance of existing services, etc.);
   - hazardous materials (handling and disposal).

8. **Construction Services and Utilities,** including:
   - water;
   - heat;
   - light;
   - power;
   - toilets;
   - construction office;
   - communications systems.

9. **Requirements for Pre-construction Surveys**
   - recording existing conditions;
   - setting out of foundations, establishing property boundaries.

Checklist: General Items for Field Review

1. **Permits and Inspections**
   - determine whether the contractor has arranged for all permits and inspections required for compliance with local, provincial, and federal regulations, including:
     - building permits;
     - environmental permits, if applicable;
     - safety and labour department permits.

2. **Code Requirements**
   - observe whether construction is proceeding in accordance with the requirements of applicable codes:
     - the contractor is responsible for compliance with all regulations for construction methods;
     - the architect is responsible for design.

3. **Shop Drawings and Samples**
   - confirm that the contractor has reviewed copies of all applicable shop drawings on site and they are being used for construction;
   - confirm that approved samples are kept on site for reference and comparison with the completed work.

4. **Mock-ups**
   - before the work commences, have the contractor prepare on-site mock-ups and retain them for reference for:
     - the work of certain trades;
     - significant repetitive elements;
   - mock-ups allow tradespeople to see what impact and interface is required between trades before work begins on, for example:
     - masonry walls;
     - through-wall flashings;
     - window installations;
     - roofing and flashings.

5. **Materials and Equipment**
   - review materials and equipment immediately after delivery to the site for conformance to the contract documents by the architect or the consultant;
   - advise the contractor to store materials so that they can be readily observed.

6. **Fabrication**
   - a visit to the plant for certain critical work and items with a long lead time may be warranted.

7. **Workmanship**
   - remind the contractor of the required quality of workmanship:
     - from the start of the project;
     - through the contractor so that all trades are aware of the standards;
   - make frequent spot checks so that the standards established initially are maintained.

8. **Handling and Storage**
   - note the methods of delivery, handling, and storage of materials and equipment;
   - observe whether these meet applicable standards and no damage to the project or materials will result.

9. **Protection**
   - observe:
     - insulation exposed to sunlight;
     - masonry exposed to rain or snow or wind;
     - millwork and carpentry exposed to the elements;
     - structure overloaded by pallets of materials concentrated close together.

10. Erection and Installation

- the contractor is solely responsible for construction methods:
  - the architect risks incurring liability by offering suggestions;
- during the installation and erection of work, the architect checks the procedures being used by reviewing:
  - specifications;
  - notations on shop drawings;
  - agreed-to instructions and correspondence;
- the architect reports any concerns about erection procedures for structural work to the structural engineer immediately.

11. Relation to Prior Work

- review the work of trades already completed;
- establish with the contractor whether corrective work is necessary before the work of the next trade contractor begins;
- request the contractor to obtain acceptance of the previous work by the next trade contractor, for example, acceptance of:
  - steel decking before installation of roofing;
  - concrete floors before installation of finish flooring;
  - gypsum board substrates before painting.

12. Cooperation Between Trades

- review with the contractor the need for coordinating the work between trades;
- observe whether the trades are cooperating and that one is not disregarding the requirements of another;
- make proper interference drawings available, especially drawings for the mechanical and electrical trades showing:
  - ductwork;
  - sprinklers;
  - lighting fixture layouts.

13. Clean-up and Safety

- check that the site is being maintained in a clean and safe condition;
- an untidy site indicates potential problems:
  - fire hazards;
  - accidents;
  - lowered productivity;
  - Authorities Having Jurisdiction may close the work down if serious problems are not rectified;
  - the owner may develop a negative image of both the contractor and the architect, even though the architect has no control over how the work is being performed;
- if unsafe working conditions or practices are evident, notify the contractor's superintendent immediately and record the notification and circumstances;
- if action is not forthcoming, report immediately to the proper authorities.

14. Inspection and Testing

- establish that arrangements with the inspection and testing companies have been made and verify that:
  - representatives of those companies are or have been on site when required;
  - necessary test or control procedures are being made;
  - detailed reports are being prepared and issued.

(Refer to "Testing Agencies and Inspection Services" earlier in this chapter.)

15. Contract Document Review

- check the work against:
  - original contract documents;
  - addenda;
  - Change Orders;
  - Supplemental Instructions.

16. As-Built Drawings

- remind the contractor to update the drawings regularly as the work progresses.

17. Site Visits with the Owner

- make visits with the owner as the work of various trades is completed;
- make a site visit or series of visits with the owner's representative before the work is accepted.

Take-over Procedures, Commissioning, and Post-occupancy Evaluations

Introduction

As the construction of a project nears completion or after the building is complete, the architect continues to provide professional services to the client. Some of these services include:

- take-over procedures;
- commissioning;
- post-occupancy evaluation.

Take-over procedures are a normal part of the architect's basic services performed at the end of contract administration. After take-over, the architect is responsible for reviewing defects and deficiencies during the warranty period and for notifying the contractor of items to be corrected. Most client-architect agreements terminate after the one-year warranty period. Therefore, work extending beyond this period is an additional service.

Commissioning is a term often misused to refer to those activities that occur when a project is taken over by the client. In actual fact, commissioning is a separate and distinct service, which may commence at the beginning of a project and may continue until occupancy by the owner. Take-over, by contrast, starts when a project nears construction completion. Commissioning is an additional service often provided by an independent third party — a commissioning agent. Large or complex projects may require the participation of a commissioning agent to manage and verify the performance of all the components of the building's operation. [Note: some clients continue to use the term "commissioning" to describe take-over procedures.]

Post-occupancy evaluation is a service provided to investigate and assess the performance of completed buildings. The evaluation may examine the technical performance of a system or an assembly such as the building envelope, or functional performance such as the efficiency of the layout of the building's interior.

Following occupancy, the architect should:

- review the effectiveness of the architectural practice's in-house procedures;
- record information about the project for future reference;
- prepare presentation material for incorporation into the practice's promotional material.

Take-over Procedures

Take-over procedures are required for the orderly take-over and transition of the building project by the owner. They are also necessary to protect the interests of the owner, the contractor, and the architect. Architects should be thoroughly familiar with the lien legislation in the province where the project is located.

Refer to Chapter 3.3.1, *A Comparison of Lien Legislation in Canada*, for a summary of the requirements of the lien legislation in each province.

Final Submissions

Prior to occupancy of the building by the owner, the contractor forwards various items and documentation to the architect for review. These may include:

- operations instructions and maintenance manuals;
- a complete set of keys;
- record documents, which may include as-built drawings and shop drawings;
- maintenance materials and spare parts;
- warranties;
- certification of the operation of various systems, such as:
  - fire alarm;
  - sprinkler system;
  - HVAC systems;
  - security system;
  - boiler plant.

The architect and the engineers must scrutinize these items carefully, because they may be inaccurate or incomplete on first submission and require re-submission before they are acceptable. If the submission process is left to the last minute, the unacceptability of the documentation can delay the completion of training sessions and performance testing. It is good policy to notify the contractor of the amount of the contract that cannot be certified until submissions are satisfactory.

The final submission may be in two stages:

- Stage 1: those items required for the proper operation of the premises for occupancy and, therefore, for certification of substantial performance;
- Stage 2: those items necessary to complete the contract.

In addition to final submissions, it is typical to arrange for a demonstration of all building systems with the following present:

- the owner or owner's designated representative;
- the owner's maintenance personnel;
- the design professionals;
- the sub-contractors or trades responsible for the systems;
- the Authorities Having Jurisdiction (for certain systems only, such as testing of fire alarm systems).

Substantial Performance

The first step in the take-over process is certification of substantial performance of the work. Under the terms and conditions of CCDC 2, *Stipulated Price Contract*, and if permitted by the local lien legislation, the contractor may apply for early release of the holdback related to a sub-contractor's or supplier's work which was substantially performed earlier (such as structural steel fabrication and erection). The architect should review the definition of substantial performance in the appropriate lien legislation. For example, in some provinces, such as Ontario, the following must be satisfied before the architect can certify substantial performance:

- the "improvement" is ready for use or is being used for the purposes intended;
- the "improvement" can be completed at a cost no higher than the percentage of the contract price defined in the legislation.

[Note: certain provisions permit the value of parts of the work which cannot be completed (for reasons beyond the control of the contractor, such as weather, or by agreement between the owner and the contractor) to be deducted from the contract price in determining substantial performance.]

Some provinces require the certificate to be on a form prescribed by the legislation. The contractor may also be required to arrange for the certificate to be published in a construction trade newspaper. The architect should request proof of the publication date. The publication serves as formal notification to all sub-contractors and suppliers who have the right to place a lien on the project that the period for making a lien claim will expire within a certain number of days, as defined in the provincial lien legislation, from the date of publication.

The warranty period for the project commences on the date of certification of substantial performance of the total contract.

It is possible to waive the Certificate of Substantial Performance and to proceed directly to a statement of total completion (as defined

in the lien legislation). In this case, the warranty period commences on the date of total completion. This is often used on small projects when the time period between substantial performance and total completion is short.

Certification of Release of Holdback

The architect prepares a certificate authorizing payment of the amount of holdback which has accrued to the date of substantial performance. The certificate should be dated for payment one day after the termination of the lien claim period. When issuing the release of the holdback certificate, the architect should advise the owner to ensure that no liens have been registered or notices of liens have been received. Typically, the owner will instruct his or her lawyer to undertake this determination. The architect should **not** perform this legal service; however, the architect should notify the owner that, if no liens exist, the holdback is payable on the date of the certificate.

The terms of CCDC 2 require the owner to place the holdback amount in a bank account (if a separate holdback account has not already been established), in the joint names of the owner and the contractor, ten days before the expiry of the holdback period. In some provinces, such as British Columbia, the lien legislation requires that the holdback monies be paid into a holdback trust account with each and every progress payment to the contractor. The holdback monies are a trust fund; this fund is **not** intended to enforce the performance of the contractor nor to ensure that deficiencies are corrected. **Certification of payment for known deficiencies should never be made until the performance of the work is acceptable, even if this causes a delay in certifying substantial performance.**

Refer to Illustration 1 for the process of preparing the Certificate of Substantial Performance. (The following diagrams are based on *OAA/OGCA Take-Over Procedures*, Document 100.)

Statement of Completion

When the contractor is satisfied that the work is completed, a request is made in writing for an inspection by the architect.

The inspection often reveals outstanding deficiencies, in which case the architect prepares and issues a deficiency list. At the same time, the architect should determine the cost to complete the deficiencies. A date for the completion of deficiencies is mutually agreed upon by all parties, and the architect conducts another inspection after this date. The final completion or correction of deficiencies can be frustrating for the architect for the following reasons:

- progress towards final completion of outstanding deficiencies seems to be very slow;
- the architect's authority to certify payments and thus influence the contractor to work expeditiously decreases once the major part of the holdback has been released;
- many contractors tend to lose interest in the project when there is no longer a significant financial incentive for its completion, particularly when the outstanding work is the responsibility of sub-contractors.

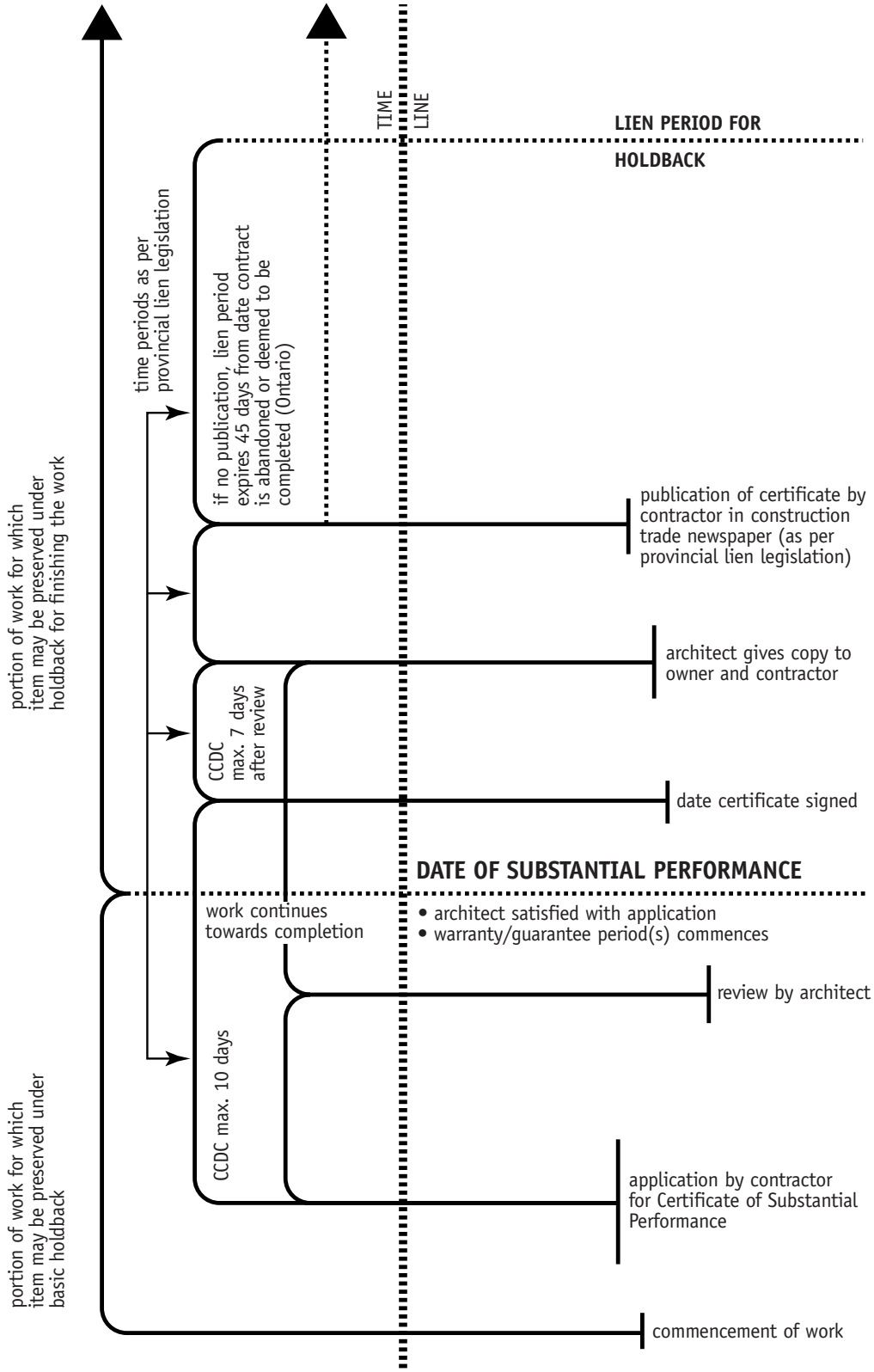
After all the deficiencies have been satisfactorily completed, the architect prepares:

- a statement of completion identifying the date when the project is deemed to be complete;
- a final Certificate for Payment for work completed to the date of completion.

Final Certificate for Payment

Once the architect is satisfied that **all** deficiencies have been corrected and that all work under the contract has been completed, the contractor can apply for payment for the outstanding amount. The architect then prepares and issues the final Certificate for Payment. The date on this certificate will usually be the date of *deemed completion* of the contract, but, in some circumstances, the deemed date of completion may be an earlier date. In either case, the certificate should specifically confirm the deemed date of completion as stated in the statement of completion.

Illustration 1: Time Chart for Certificate of Substantial Performance



Reprinted with permission from the Ontario Association of Architects and the Ontario General Contractors Association

The definition of *completed*, in some provincial lien acts, permits a small dollar value to remain outstanding. This outstanding amount is the cost of:

- actual total completion;
- correction of known defects;
- last supply of services or materials.

The architect also prepares a certificate for the release of the remaining holdback monies on this final amount, based on the number of days defined in the lien legislation after the date on which the contract is deemed to be complete.

If the contractor is efficient in correcting all the deficiencies, the date of this certificate may precede the date for release of final holdback. This certificate is understood by those in the construction industry to have a similar meaning as a "Certificate of Total Completion" or "Certificate of Total Performance."

Refer to Illustration 2 for the time chart for Date of Completion.

OAA/OGCA Take-Over Procedures, Document 100, is an excellent reference, which graphically explains and charts the take-over procedures and the transferring of the project from the contractor to the owner. It is written in the context of CCDC 2 and the amended *Construction Lien Act, 1997* of Ontario.

Commissioning

Commissioning includes a range of activities undertaken to transform the design of a facility into a fully integrated and operating system. It is a process of quality assurance which:

- begins with the definition of the "design intent" and ends with the delivery of a building;
- confirms the contractor's implementation of the architect's design as defined in the contract documents;
- confirms the ability of the architect's design to satisfy the client's defined requirements;
- addresses any shortcomings.

One product of the commissioning process is an accurate project database.

For large and complex projects, the owner may engage a commissioning agent as an independent third party to verify that both the facility design and the resulting construction satisfy the client's objectives and requirements. In addition, the commissioning agent verifies the contractor's performance of the contract. Early involvement of a commissioning agent as a project team member can assist in clear communication of the design intent to both the architect and the contractor.

The commissioning agent can:

- provide useful and objective input to the problem-solving process;
- oversee and verify results by conducting tests.

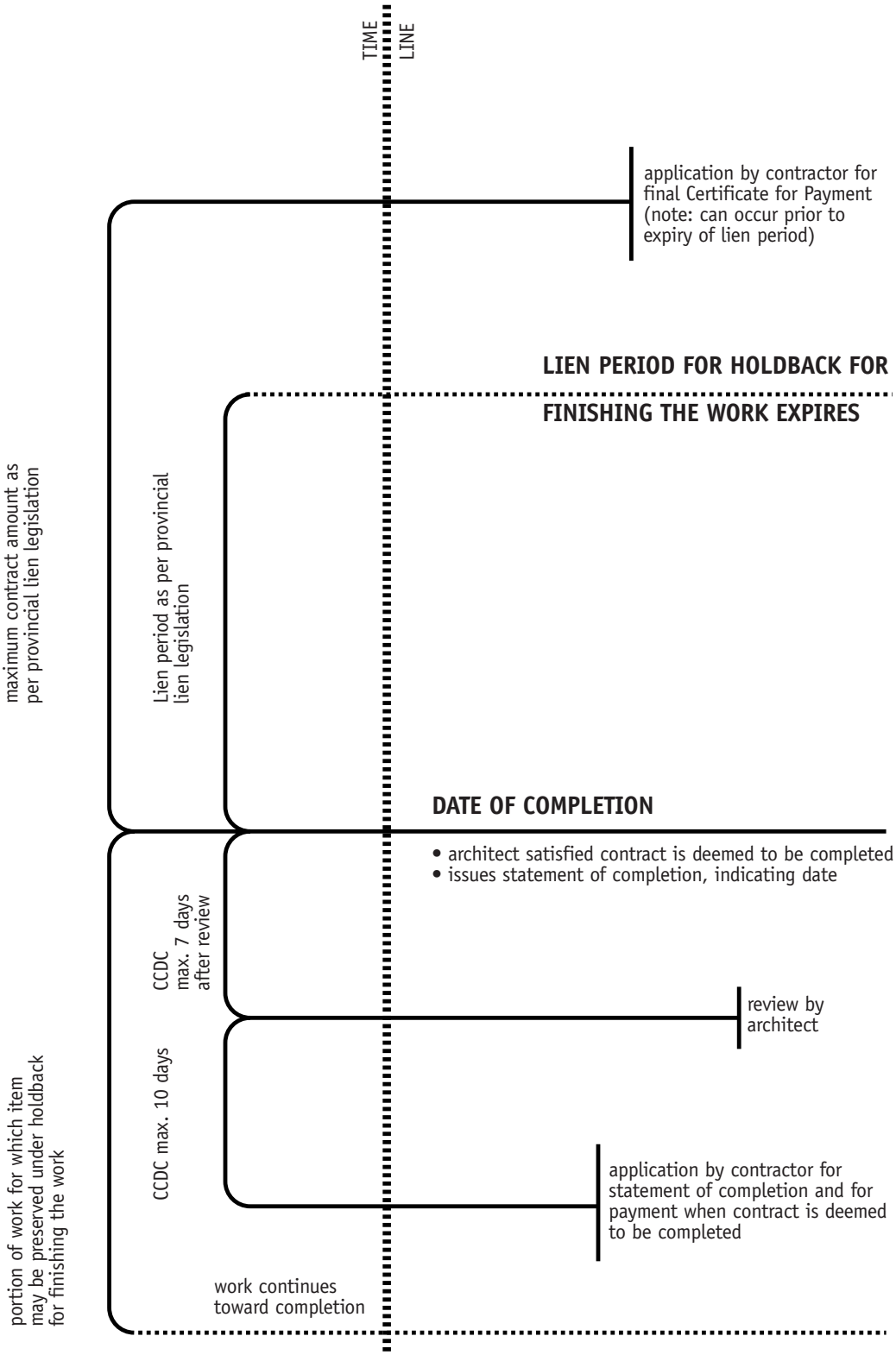
Pre-occupancy Services

Commissioning may begin at the pre-design stage of a project with an interpretation of the client's expectations in the functional program. Refer to Chapter 2.3.4, *Pre-design*, for information on functional programs.

The client's expectations are documented, working from the general to the specific, in order to develop a logic diagram. The design intent identifies paths of activity necessary to accomplish stated goals. The logic diagram and the functional program should be reviewed regularly during the project's design stages and construction. The architect's responsibility is to communicate the design intent to the building constructor and, ultimately, to the building operator. Commissioning is a quality assurance tool to achieve this.

Because the contractor is usually a late arrival to the project team, an explanation of the verification and testing procedures by the commissioning agent should appear in the bid documents. This will assist bidders in evaluating the time and cost implications of a commissioning agent's participation and the agent's impact upon acceptance of the work.

Illustration 2: Time Chart for Date of Completion



Reprinted with permission from the Ontario Association of Architects and the Ontario General Contractors Association

Bid documents prepared with input from the commissioning agent should include:

- the commissioning plan, including the scope and sequence of the commissioning program;
- the commissioning specifications, including a manual with examples of verification forms and testing procedures, noting probable duration;
- any specialized documentation related to testing, such as CSA Standards, which may describe options for testing methods;
- standards for submission and acceptance of:
  - shop drawings;
  - contractor's tests;
  - product, system, operations, and maintenance manuals;
  - training programs;
  - post-occupancy or seasonal testing;
- the consequences of non-compliance.

Component Verification

The use of performance specifications often results in the supply of components with service characteristics or operational outputs which require minor revisions to the design. The component verification process is an excellent tool to highlight these variances. The commissioning agent should prepare checklists for the verification of each construction element to be tracked, using the risk management assessment classifications — such as *fundamental, critical,* and *essential* — to record compliance with the specifications. In the case of material substitutions, variances from the specifications must include a written statement of recommendation for acceptance by the architect and the acceptance by the owner. Shop drawings and mock-ups are documented, as are the results of tests and the receipt of manuals and warranties.

Systems Verification

The process of systems verification begins after all components within the system are accepted and deficiencies are corrected. The architect and the engineers should establish contract values for items in the verification program so that the contractor is aware of the potential financial impact on progress billing applications and subsequent Certificates for Payment. The contractor's schedule for the timing, sequencing, and proving of systems will require regular commissioning meetings to ensure that all parties are available to:

- verify that all prerequisites to testing are in place;
- review test procedures and acceptable results;
- witness tests.

Attendance at testing procedures by the independent commissioning agent and by the future building operator is beneficial.

Systems verification procedures may require:

- extra time due to the demonstrations of various controls;
- specialized equipment, such as:
  - pressure testing;
  - thermal-scanning of the building envelope.

The timing and circumstances of verification and testing are often beyond the contractor's control, as happens when testing for part of the HVAC systems must be done in a different season.

Failure to verify can seriously affect the construction schedule and can result in delays and claims. To avoid delays:

- have the trades responsible prove or test systems prior to witnessing by the commissioning agent;
- provide for trade and sub-trade acceptance on verification forms prior to contractor acceptance.

After sign-off by the contractor, the consultants should then certify their recommendation of acceptance using standard verification sheets. Variances from the design identified during systems testing will require investigation and reporting by the architect and the engineers. Testing after occupancy can release the contractor from continuous attendance on the site.

Because many integrated systems tests require that certain post-occupancy conditions be in place (for example, all equipment, furnishings, and building users in operation), the architect and the commissioning agent should consider preliminary or conditional testing and recommended acceptance of certain sub-systems. If alteration to the design is required, it must be carefully documented and the project data base altered to suit.

A recommendation by the architect or the engineer to deny acceptance of a system may result in a dispute by the contractor over the design. For this reason, the architect should always provide a method of dispute resolution in the contract.

Once conditional acceptance is established, a building operator training program can be started. Before beginning a training program, the owner's building operator must have:

- complete and accurate operating and maintenance manuals;
- a description of the systems' intended operation;
- the warranties and information outlining maintenance contracts.

Warranty Review

The architect will be responsible for reviewing defects and deficiencies during the warranty period on behalf of the client and for notifying the contractor of items requiring attention. Prior to the anniversary date of the one-year warranty, the architect must arrange a review of the project. The review should include:

- the architect;
- the engineers;
- the client, and probably the client's operations and maintenance personnel;
- the contractor;
- the commissioning agent (if there is one on the project).

After a review of each situation, the architect should:

- direct the contractor to correct the problem as required under a typical construction contract; or
- advise the client to deal with the condition, because it is a maintenance problem.

A summary of problems and construction deficiencies should be compiled. The architect should verify the accuracy of the list and forward it to the contractor, before the contractor's obligations under the contract expire.

If the contractor fails to rectify a warranty item in a reasonable time, the architect should review the client's rights under the bonding and insurance provisions in the contract.

The architect may conduct periodic reviews of the project following occupancy to confirm with the client or the client's personnel that all systems are operating. These reviews determine how well the client's personnel understand the operations manuals and any programmed default settings within the systems. The architect should also advise the client that alterations to any work by the client's own forces during the warranty period may void portions of the contractor's obligation under the contract.

During the first year of operation, it is usually necessary to confirm the performance of mechanical or electrical systems which are used primarily during a certain season of the year. The architect must arrange for such inspection and verification with the engineers (and possibly with the commissioning agent). The contractor must demonstrate that these systems, which were conditionally accepted at the time of substantial performance, satisfy all design requirements before the architect can recommend final acceptance. The architect must document any adjustment or revision to these systems as well as modify the project database and the owner's appropriate operating and maintenance manuals.

The architect and the contractor may be called upon to account for deficiencies uncovered during post-occupancy, either as a result of defective workmanship or the original design.

Post-occupancy Evaluations

Post-occupancy evaluations review a building's performance. These evaluations may review:

- functional performance, including:
  - social and behavioural review;
  - efficiency of spatial arrangements;
- technical performance such as the performance of building envelope or finishes.

When evaluating functional performance, the architect attempts to quantify and measure performance in terms of explicitly stated needs of occupants and users. Occupational therapists and social scientists have developed useful information in this field. However, many architects who are experienced programmers may also be qualified to provide valuable feedback on user needs. In many cases, these needs would have been defined in the original functional program for the project. Refer to Chapter 2.3.4, *Pre-design*.

Post-occupancy evaluations which include a technical review of the building and certain architectural components, such as finishes or the building envelope, are used to develop a long-term maintenance plan or the requirements for future projects.

Post-occupancy evaluations assist clients — especially those who undertake many repeat buildings, such as retail outlets and fast-food restaurants — to determine how their future facilities may be improved and how costs may be reduced. Post-occupancy evaluations also assist in developing new functional programs and plans for facility management, future renovations, and master plans.

Finally, the post-occupancy evaluations may review the method of project delivery and contractual arrangements to determine how to improve the design, contract documents, and project management methods for future projects.

Definitions

Certificate: A document attesting to the truth of a fact; in construction, a certificate is prepared by a professional, either an architect or an engineer.

Certificate of Substantial Performance: A certificate issued under the appropriate lien legislation attesting that the contract between the owner and the contractor is substantially complete.

Guarantee: A three-party agreement in which the third party (such as a surety) guarantees the performance of an obligation to the second party (such as an owner) in the event of default of the first party (such as a contractor). (adapted from CCDC)

Holdback: A percentage of the monetary amount payable under a (construction) contract, which is held as security for a certain period of time. The percentage and period of time are based on the provincial lien legislation.

Lien: A legal claim on real property to satisfy a debt owed to the lien claimant by the property owner. This claim can carry the right to sell the property upon default.

Maintenance: The act of keeping a building system, process or property in proper and efficient working condition.

Post-occupancy Evaluation: An assessment of the performance of a building after the building has been occupied. The evaluation may address one or more different aspects of building performance.

Warranty: A two-party agreement which provides an assurance by a builder or a seller of goods (such as a contractor, sub-contractor, or supplier), to a purchaser (such as an owner), that the warrantor will assume stipulated responsibilities for correction of defects in the goods within a stated period of time. (adapted from CCDC)

References

Canadian Construction Documents Committee. Ottawa, Ont.
Construction Warranties (bulletin), November 1998.

Warranty vs. Guaranty (bulletin), November 1998.

Cooper, Barbara A.; S. Ahrentzen; and B. Hasselkus. "Post-occupancy Evaluation: an environment-behaviour technique for assessing the built environment." *Canadian Journal of Occupational Therapy*, 1991. (This publication contains a lengthy reference list.)

Ontario Association of Architects (OAA) and Ontario General Contractors Association (OGCA). OAA/OGCA *Take-Over Procedures*, Document 100. Toronto, Ont.: OAA/OGCA, April 1997.

Types of Construction Project Delivery

Introduction

The design and construction industry is changing at a rapid pace. Options for project delivery have multiplied and more than one option is available for each project, depending on the client's needs and the project team's ability to deliver. *Project delivery* methods in the construction industry have evolved in response to:

- increased owner requirements;
- more urgent time frames;
- increased demands for quality and safety;
- the need to reduce adversarial relationships in construction;
- economic pressures.

Project delivery is a general term describing the comprehensive process used to successfully complete the design and construction of buildings and other facilities. The term is used to include all the procedures, actions, sequences of events, obligations, interrelations, contractual relations, and various forms of agreement.

There is no "best" delivery system; each is appropriate in particular circumstances.

Contractors

Each type of project delivery has variations, which can be organized to suit the requirements of the project and the involvement of the contractor. Selecting the contractor best suited to the particular type of project delivery is an important decision.

Pre-qualification of Contractors

The purpose of pre-qualification is to ensure that the selected contractor is capable of delivering quality and value specific to the project requirements. Pre-qualification is frequently used for public projects, where the opportunity to be considered as the contractor must be open to all. The client then, through pre-determined criteria, eliminates candidates who cannot demonstrate that they have the necessary financial capacity, technical expertise, managerial ability, and relevant experience for the project at hand. Refer also to Chapter 2.3.9, *Construction Procurement*.

CCDC 11, *Contractor's Qualification Statement*, is the standard document used for pre-qualification.

Implications of Multiple Contracts

Two general types of multiple-contract situations exist when:

- two or more general contractors are working on the same site;
- the owner may be undertaking some of the work with his/her own forces, concurrent with a general contractor.

Some provinces have legislation which defines the owner as the *constructor* when there are multiple contracts. This has the effect of making the owner responsible for safety at the construction site.

Types of Construction Project Delivery

This section provides:

- a brief description of common delivery methods;
- a basis for comparing them;
- a general evaluation of their advantages and disadvantages.

Stipulated Price Contract (Design-Bid-Build)

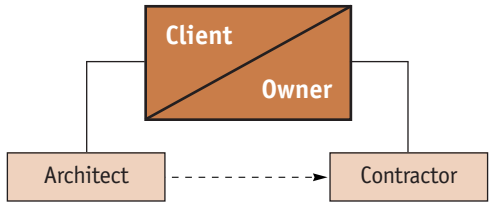
Most building projects follow this traditional method of project delivery (sometimes referred to as "Design-Bid-Build") in which:

- the owner engages an architect to prepare the design, drawings, and specifications;
- the owner hires a contractor by competitive bidding to build the facility under a construction contract (usually CCDC 2, *Stipulated Price Contract*);
- the architect administers the contract, and reviews and certifies the construction.

This *design-bid-build* form of project delivery is characterized by:

- its three distinct phases;
- its two independent contracts between:
  - the architect and the client/owner;
  - the contractor and the client/owner;
- the linear sequencing of the work.

Illustration 1: Design-Bid-Build



Key to the Diagram
____ contract between two parties
----- monitor/review/administer

Advantages
- widespread use and familiarity;
- clear roles assigned to each party;
- thorough resolution of design prior to construction;
- usually has a known price before construction begins.

Disadvantages
- sequential process can be lengthy;
- separation of design and construction restricts useful communication;
- the contractor is unknown when the construction documents are prepared.

Construction Management

Construction management is a broad term covering a variety of project delivery scenarios in which a construction manager (CM) is added to the building team at an early stage to oversee such elements as schedule, cost, construction method, or building technology. A construction manager may be:

- an architect;
- a contractor;
- an engineer or developer;
- someone with specialized training in construction management.

Because this method adds a consultant and the associated fee, it is more commonly used on large, complex projects than those that are relatively small and simple. However, occasionally an architect acts as the construction manager on small projects such as house additions and renovations. Construction management is not a licensed activity in most provinces.

CMs can serve in different capacities with varying degrees of authority (advisor, agent or constructor). Depending upon how the project is organized, a CM can:

- act as an **advisor** during a particular phase of the design, documentation or construction process;
- **manage** the construction of the project, with the owner contracting directly with each trade contractor. In this case, the CM may, or may not, be permitted to assume responsibility for construction activities typically outlined in General Conditions of the specifications (for example, temporary facilities, site layout, clean-up).

True savings in project costs are usually achieved only by the use of a delivery system that returns savings on sub-contractor bids directly to the owner.

The fee paid to the construction manager is relative to the services to be performed. Refer to CCA 5, *Canadian Standard Construction Management Contract Form* and its guide, *A Guide to Construction Management Contracts*.

Typical responsibilities of a CM include:

- assisting in preliminary planning relative to the design requirements for the project;
- advising on schedules, budgets, and costs of various alternative methods, on material selection and availability, and on detailing during the design phase;
- advising on and arranging for all services and all trade contractors to carry out the various phases of the work;
- planning, scheduling, coordinating, and supervising the activities of all trade contractors;
- providing technical and clerical services in the administration of the project.

Advantages

- direct contractual relationship with the owner;
- construction advice during the design process;
- the opportunity to call bids sequentially, thus saving time by permitting a start on construction before all documentation has been completed ("fast track");
- careful monitoring of costs and schedule (different checks and balances apply during design and construction because the architect, trade contractors, and CM are independent entities).

Disadvantages

- construction commences before the total costs are known;
- added costs and time in selection of an additional consultant;
- direct communication may be suppressed between the owner and the architect or the contractor, and traditional roles may be confused;
- potential for less control over final cost in an unstable construction market;
- Change Orders and delay claims are possible from prime or trade contractors who bid too low;
- complex relationships;
- potential for adversarial relationships;
- the owner, as the "constructor," may not want to accept responsibility for construction safety;
- multiple construction contracts increase administrative costs and coordination problems.

Project Management

In this delivery method, the Project Manager (PM) is usually hired by an owner during the pre-design phase to **manage the entire project** and engage all the disciplines required, including the architect and the consulting engineers. The typical project management project may have the same three phases (Design-Bid-Build) as traditional project delivery, or it may use sequential tendering to achieve earlier completion.

> *The main difference between PROJECT MANAGEMENT and CONSTRUCTION MANAGEMENT is that the Project Manager has a contract with a client and in turn employs the architectural and engineering consultants to form his group, whereas under the Construction Management aspect the owner engages the architectural and engineering consultants, and at the same time or shortly afterwards, engages the services of a Construction Manager.* (Canadian Construction Association, *A Guide to Construction Management Contracts*)

Advantages

- a well-informed owner is better able to make decisions on cost-versus-quality issues;
- the quality of the design may improve when the architect can draw on the PM's experience.

Disadvantages

- this arrangement is NOT permitted by the regulations of *most* provincial associations of architects. For example, in Ontario, unless the Project Manager is a "Design-Builder," this is contrary to OAA Regulation 42(55) as well as the Code of Ethics of OAQ and the *Architects Act* of British Columbia;
- unless the architect can maintain a direct link with the owner, the owner's ability to control construction quality is reduced because efficiencies or cost reductions implemented by the PM that affect quality may not be discussed directly with the owner.

Design-Build

In Design-Build, the owner contracts with one firm to provide both design and construction. A Design-Build project usually has two phases:

- *Phase 1:* The Design-Builder provides architectural design services and, throughout the design process, monitors costs to ensure the building remains within the owner's budget. Based on the design developed in the first phase, the Design-Builder usually proposes a stipulated maximum price, which includes a fee for managing the construction.
- *Phase 2:* The parties enter into a stipulated price contract for the completion of the building. Refer to Document 14, *Design-Build Stipulated Price Contract*.

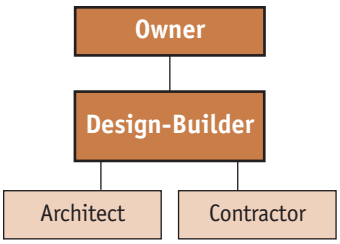
It is also possible to have a cost plus fee agreement in the Design-Build method of project delivery. The builder works to save costs during construction. Any savings accrue to the owner, who pays only the actual cost of construction, plus the Design-Builder's fee.

The following chart is a simplified comparison of Design-Bid-Build vs. Design-Build.

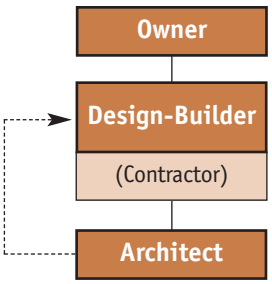
Illustration 2: A Comparison of Design-Bid-Build vs. Design-Build

Design-Bid-Build	Design-Build
Two contracts with the owner (more if engineers hired directly by the owner).	One contract with the owner (one point of primary responsibility).
Architect has contract with the owner.	Architect has contract with the Design-Builder (or is the Design-Builder).
Architect is usually engaged, and design and drawings complete, before the contractor is known.	Contractor is engaged before the design is complete.
Design and construction process is usually linear.	Design and construction process is more suitable for "fast track."
Familiar relationships: insurable, bondable, and acceptable under professional regulations.	Emerging relationships: terms of reference need to be checked for insurability, bondability, and acceptability under professional regulations.

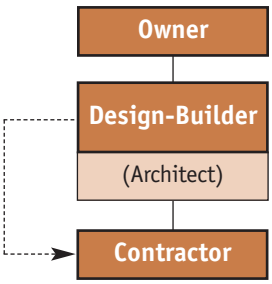
Design-Build (generic)



Design-Build (contractor-led)



Design-Build (architect-led)



Key to the Diagram

—— contract between two parties
------ monitor/review/administer

Advantages

- functional program (statement of owner's requirements) and owner's decisions are committed early;
- cost benefit analysis is addressed early in the design process;
- immediate feedback is received from the contractor on design options;
- flexibility because design alternatives are reviewed by the builder during the process;
- streamlined process can increase efficiency;
- team approach is reinforced.

Disadvantages

- the responsibility for design approvals shifts from the owner to the Design-Builder;
- decisions by the Design-Builder are based more on initial cost rather than on design or long-term value;
- the cost is determined before the design is complete;
- architect's role as leader of the design team is reduced;
- high risk to the architect for preparing the proposal, which may or may not be successful;
- potential for tension between the "regulated" professional (architect) and the "unregulated" building contractor;
- potential conflicts of interest in preparing Change Orders and certification because the architect's client and builder are one and the same.

Refer also to the *Design-Build Project Delivery: Practice Manual* published by the National Practice Program.

Cost Plus

In the cost plus method, the contractor is compensated for the actual costs of the work, plus a fee. The fee is based on:

- an agreed-upon fixed sum; or
- a percentage of the cost of the work.

Often called "time and materials," this method is appropriate for small, complicated projects in which time is a factor or total costs are initially difficult to determine. A variation of cost plus is "cost plus to a maximum upset price" or guaranteed upset price. The cost plus method normally uses CCDC 3, *Cost Plus Contract*, but is now frequently replaced by the construction management delivery method, which includes many of the advantages and few of the disadvantages.

Advantages

- costs are based on actual quantities and mark-ups with no "unknown factor";
- suitable when time frame is more important than construction costs (saves time because a formal tender call is not required);
- flexible in response to unknowns at the start of construction;
- suitable where extraordinary quality is required;
- construction may begin before design is complete.

Disadvantages

- no incentive to avoid cost overruns;
- often not permitted on publicly funded projects;
- total cost is unknown until project completion.

Developer Proposal

In this delivery method, the services of the architect, the contractor, and (to some extent) a real estate developer are combined into one entity. Also known as *turnkey construction*, or *sale-lease-back*, or *build-to-suit*, the developer proposal delivery method is characterized by the legal transfer of title to real property. It involves two principal players: the developer and the owner. In the developer proposal method:

- an owner initiates the process and contracts for services with the developer, and services usually include acquiring land and obtaining financing;
- ownership passes from the developer to the owner when construction is complete and the project is functional.

The owner's early involvement distinguishes this process from speculative development.

This delivery method is characterized by three phases:

- **Phase 1:** an owner prepares preliminary design information to define a project, set the budget, and hire a developer. Cost commitments may be made in the form of a guaranteed maximum price at the point of hiring the developer.

- **Phase 2:** the developer completes the project's design and carries out construction. After construction is complete, the developer operates the building long enough to ensure that all systems are functioning properly.
- **Phase 3:** the developer sells the property to the owner, transferring title or, instead, the user or "intended owner" signs a long-term lease on the building.

Advantages

- effective for owners unable to obtain financing for a new building;
- the owner is purchasing a fully functional building as a package from one supplier;
- the risk to the owner is greatly reduced because the developer is providing financing, land acquisition, and an early cost commitment;
- interactions between parties are limited, which saves time;
- the owner can prepare performance specifications which the developer must meet;
- time delays, delay claims, and Change Orders are substantially reduced;
- conflicts between project professionals are internalized and do not involve the owner.

Disadvantages

- a project built without owner participation in the design process may not meet owner expectations;
- the developer proposal method is not well understood and can be too complex, particularly for owners with little experience in the building industry;
- the owner may not have the time or expertise to prepare adequate performance specifications to realize the full potential of the developer proposal method;
- the architect does not directly serve the owner;
- the developer's cost commitment is not based on full design and documentation;
- the owner may not have access to the actual costs of the project;
- "lease-back" financing can be more costly than "owner-arranged" financing;
- if the developer is selected on the basis of price alone, quality may be compromised.

Unit Rates

Use of this method is limited primarily to heavy civil engineering work — such as roads, and site preparation — where the contractor is paid for measured quantities at quoted unit rates. The method could be appropriate for the cost of repetitive units or identical buildings. The architect should ensure that unit rates are applied only to the design and documentation phases. The bidding and contract negotiations phase, as well as the contract administration phase, require full services.

Others

Other methods of construction project delivery include:

- just-in-time;
- turnkey development;
- lease-back;
- BOT ("Build-Own-Transfer");
- BOOT ("Build-Own-Operate-Transfer");
- DBOOT ("Design-Build-Own-Operate-Transfer").

Just-in-Time

This approach combines aspects of fast tracking, partnering, systems architecture, and strong incentives for repeat work. Large projects are broken into small work packages. Small teams of architects and contractors program, plan, demolish, and construct these areas on an hourly basis driven primarily by schedule, where time is the most critical factor.

Turnkey Development

Turnkey is generally described as a project delivery method that includes various real estate functions as well as design and construction. These functions may include site acquisition, entitlements, construction and/or long-term financing or other functions. This method may be carried out under Design-Build or developer proposal methods.

Lease-back

Under this method, the project is financed, constructed, and owned by the builder, and the building is "leased-back" to the owner.

BOT/BOOT/DBOOT
BOT/BOOT/DBOOT represent variations of a comprehensive Design-Build project delivery method, in which the developer participates in the financing, design, construction, and operating aspects of the project.

Types of Construction Contracts

Standard Forms of Contract

The construction industry has recognized the advantages of jointly preparing standard forms of contract. Many of the documents are developed and endorsed by the Canadian Construction Documents Committee (CCDC). Refer to Chapter 1.2.1, *The Construction Industry*, for the composition and role of this committee.

The CCDC publishes Standard Contract Forms, including:

- CCDC 2, *Stipulated Price Contract*;
- CCDC 3, *Cost Plus Contract*;
- CCDC 4, *Unit Price Contract*.

The forms, which are available in both English and French, are sub-divided into three parts:

- Agreement between Owner and Contractor;
- Definitions;
- General Conditions.

The use of CCDC Standard Contract Forms is recommended. Because each document is reviewed periodically by the CCDC and revised as required, the architect should obtain and complete the latest edition when preparing construction contracts for the client's use and execution.

Refer to "List: Canadian Construction Documents" at the end of Chapter 1.2.1, *The Construction Industry*.

Stipulated Price Contract
[CCDC 2, *Stipulated Price Contract* + CCDC 20, *A Guide to the Use of CCDC 2*]
This is the most common type of fixed-price contract. The stipulated price is established through bidding — either open bidding or invitation of bids from pre-qualified bidders. The successful contractor is paid a fixed price for the completed construction. The fixed price or time for construction can only be adjusted by Change Orders.

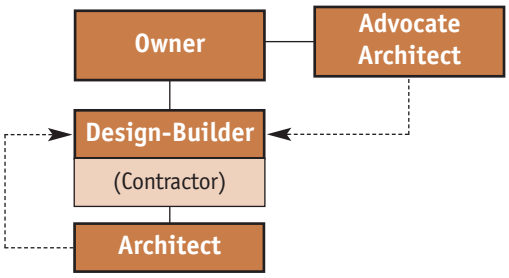
The contractor is required to perform work called for in the contract, regardless of what it actually costs. Thus, the contractor must take great care when pricing such work, taking into account potential cost increases caused by inflation, material shortages, or difficulties in meeting performance requirements.

A stipulated price contract can produce maximum profit for the contractor, who also assumes maximum risk, including the risk of unexpected additional costs such as those that might result from inflation or material shortages. This type of contract should be used when the construction costs are reasonably predictable and when full documentation is available.

Design-Build Stipulated Price Contract
[Document 14, *Design-Build Stipulated Price Contract*]
In the Design-Build stipulated price contract, the owner deals with one single business entity, which arranges to provide both design services and construction of the project under one contract package. Prices established before design is completed may cause disagreement over the scope of the work or the details of construction intended for inclusion in the stipulated price.

The prime contract is between the owner and the Design-Builder, where the Design-Builder could be a contractor, an architect, a broker, or a joint venture between a contractor and an architect. The architect should contact the respective provincial association to verify regulations concerning the architect's role as a Design-Builder, and for joint venture restrictions. The Design-Builder's consultants are the only consultants recognized in the contract, although the owner may also appoint an advocate architect or other consultants to represent the owner's interests.

Illustration 3: Bridging



Key to the Diagram

—— contract between two parties
------ monitor/review/administer

The second contract is between the project's Design-Builder and the architect.

Cost Plus Contract (percentage or fixed fee)
[CCDC 3, *Cost Plus Contract* + CCDC 43, *A Guide to the Use of CCDC 3*]
In a cost plus contract, the contractor is compensated for the actual costs of the work, plus a fee based upon either an agreed-upon fixed sum or a percentage of the costs. Often called *time and materials*, this method is appropriate for small, complex projects in which total costs are initially difficult to determine.

A cost plus contract is one of the simplest types of cost-reimbursement contracts. It has the following features:

- the owner reimburses the contractor for the allowable costs incurred in the course of construction;
- costs are paid regardless of the progress of the work and no matter how far the task is from completion;
- work may cease when the construction costs equal the funds provided for under the contract.

Guaranteed Maximum Price Contract
[CCDC 3, *Cost Plus Contract* with Guaranteed Maximum Price Option]
In this type of contract, the contractor is compensated for the actual costs, plus a fee with an agreed-upon maximum price. This is sometimes called an *upset price* contract. The contractor bears all costs beyond the pre-determined maximum. If the actual costs are below the maximum, the contractor may share the savings with the owner, depending on the terms of the contract. The guaranteed maximum price can be adjusted only by Change Order.

Unit Price Contract
[CCDC 4, *Unit Price Contract*]
In a unit price contract, the contractor is paid a pre-determined price for each unit or quantity of work or material used in the project's construction. The unit price can be derived through bidding or negotiation. The actual quantities involved are generally verified by independent inspection, for example, by a clerk of the works or a quantity surveyor.

Unit prices form the basis for payment of the contract price. Quantities in the schedule of prices are estimated. The contract price is:

- the final sum of the product of each unit price stated in the schedule of prices;
  multiplied by
- the actual quantity of each item that is incorporated in or made necessary by the work;
  plus
- lump sums and allowances, if any, stated in the schedule of prices.

Currently, CCDC 4, *Unit Price Contract*, has limited use in Canada for building construction. It is used primarily for civil engineering work.

Other Types of Contracts

Other types of construction contracts include:

- government or "in-house" contracts;
- contracts with economic price adjustment;
- redetermination contracts;
- incentive-based contracts;
- as and when contracts or standing offer contracts;
- purchase order contracts;
- oral contracts.

Government or "In-house" Contracts
Various federal, provincial, and municipal governments have their own forms of contract which include different General Conditions. These documents are printed forms, and normally are not amended.

In some instances, a public body or large corporation will choose to prepare its own forms of contract for construction. The architect

required to administer these documents should review these contracts prior to providing a proposal for contract administration services. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for the pitfalls in the use of non-standard contracts.

Contracts with Economic Price Adjustment
Some fixed-price contracts contain economic price adjustment clauses that protect the contractor and the client against wide fluctuations in labour or material costs when market conditions are unstable. These clauses may provide for adjustment of the contract price for increases or decreases from an agreed-upon level measured against the following:

- published or established prices of specific items;
- specified costs of labour and material actually experienced during performance;
- specified labour or material cost standards or indices, such as the consumer price indexes.

Redetermination Contracts
The contractor and the owner's contracting officer establish:

- initial price;
- ceiling price;
- time for price redetermination (at time of redetermination, the contractor submits a proposal based on the actual costs of performance and the estimated cost of any incomplete work).

Incentive-based Contracts
(also known as incentive contracts, cost-plus-incentive-fee contracts, and cost-plus-award-fee contracts)

The contractor and the owner's contracting officer agree on:

- target cost;
- target profit;
- target fee;
- incentive formula for determining the final fee.

The formula provides for an adjustment in the fee, based on any difference between the target cost and the total allowable cost of performing the contract. The award amount paid varies according to the client's evaluation of the contractor's performance in such areas as:

- quality;
- completion time;
- ingenuity;
- cost-effective management.

As and When Contracts or Standing Offer Contracts
Government or institutional clients may retain one or more consulting firms, or construction companies pre-qualified by proposal call, to provide professional or construction services on an *as and when requested* basis (sometimes referred to as being "on retainer" or "on call"). Occasions arise when consulting or construction services are required to augment existing resources within a professional and technical services branch of government. Such a situation can encompass:

- peak workload relief;
- project review to ensure a higher degree of performance;
- situations where in-house expertise is not available.

Purchase Order Contract
Authorized officials (public or private) may purchase design and construction services not exceeding a stated amount using purchase orders. The use of purchase orders is usually restricted to:

- small transactions;
- one delivery and one payment;
- off-the-shelf items;
- small repairs.

Oral Contracts
Oral contracts should *never* be used. All agreements should be in writing.

Written client-architect agreements are a requirement of the Architectural Institute of British Columbia.

Definitions

Construction Manager: An individual employed to oversee and direct the construction elements of a project, usually the whole of the construction elements, and the parties who are to perform them; a company which contracts with an owner to perform such services for a fee.

Design-Build: Methods of project delivery in which one business entity or alliance (Design-Builder) forges a single contract with the owner, and undertakes to provide both the professional design services (architectural/engineering) and the construction.

Project Manager: The leader of the team of all necessary disciplines (design, construction, supply, etc.). The project manager provides all major essentials for the project. (The term "project manager" may be confused with construction manager; the meaning has become blurred and is currently often used merely for the individual within the conventional hierarchy.)

References

Associated General Contractors (AGC) of America. *Project Delivery Systems For Building Construction*. Alexandria, VA: AGC, 1997.

The American Institute of Architects (AIA). *Handbook on Project Delivery*. Sacramento, CA: The AIA California Council, 1996.

Canadian Construction Association (CCA). Ottawa, Ont.

CCA 5, *Canadian Standard Construction Management Contract Form* and *A Guide to Construction Management Contracts*.

CCA 17, *Stipulated Price Contract for Trade Contractors on Construction Management Contracts*.

A Guide to Construction Management Contracts.

Performance Standards for Project Management and Scale of Fees for Project Management Services.

Canadian Construction Association, Construction Specifications Canada, and the Royal Architectural Institute of Canada (endorsed by). Document 14, *Design-Build Stipulated Price Contract*. Ottawa, Ont.

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.

CCDC 2, *Stipulated Price Contract*.

CCDC 3, *Cost Plus Contract*.

CCDC 4, *Unit Price Contract*.

CCDC 11, *Contractor's Qualification Statement*.

CCDC 20, *A Guide to the Use of CCDC 2*.

CCDC 43, *A Guide to the Use of CCDC 3*.

Fisk, Edward R. *Construction Project Administration*. 5th Edition. Upper Saddle River, NY: Prentice Hall Press, 1997.

Gould, Frederick E. *Managing the Construction Process: Estimating, Scheduling, and Project Control*. New York, NY: Prentice Hall Press, 1997.

Kerzner, Harold. *Project Management: A Systems Approach to Planning, Scheduling, and Controlling, 6th Edition*. New York, NY: Van Nostrand Reinhold, 1997.

Lewis, James P. *The Project Manager's Desk Reference: A Comprehensive Guide to Project Planning, Scheduling, Evaluation, Control Systems*. Chicago, IL: Probus Pub. Co., 1993.

Litwin, Paul et al. *Access '97 Developer's Handbook — 3rd Edition*. Alameda, CA: Sybex, 1997.

National Practice Program (NPP). *Design-Build Project Delivery: Practice Manual*. Ottawa, Ont.: NPP, 1996.

Pierce, David R., Jr. *Project Scheduling and Management for Construction*. Second Edition. Kingston, MA: R.S. Means Co., Inc., 1998.

Appendix — Project Management

1. Scheduling the Project

Project schedules are planning tools that help project managers and teams organize various defined tasks in order to meet deadlines or dates which may be set out in an agreed-upon schedule or in the contract. In addition, schedules help to monitor tasks until the project is complete. Although a variety of scheduling techniques are available for many types of projects, the project manager must select a method which can be adapted to the scale and complexity of the work.

Milestone Chart

This simple method of scheduling involves setting target dates for each project activity. The name of the person responsible for each activity may also be noted. This method is used for:

- bidding;
- simple projects with a linear implementation;
- summaries of more complex scheduling arrangements.

This chart has limited potential because it can only indicate the end date — not the start date — of activities. Moreover, it does not show relationships between activities.

Diagram A: Milestones in the Bid Process

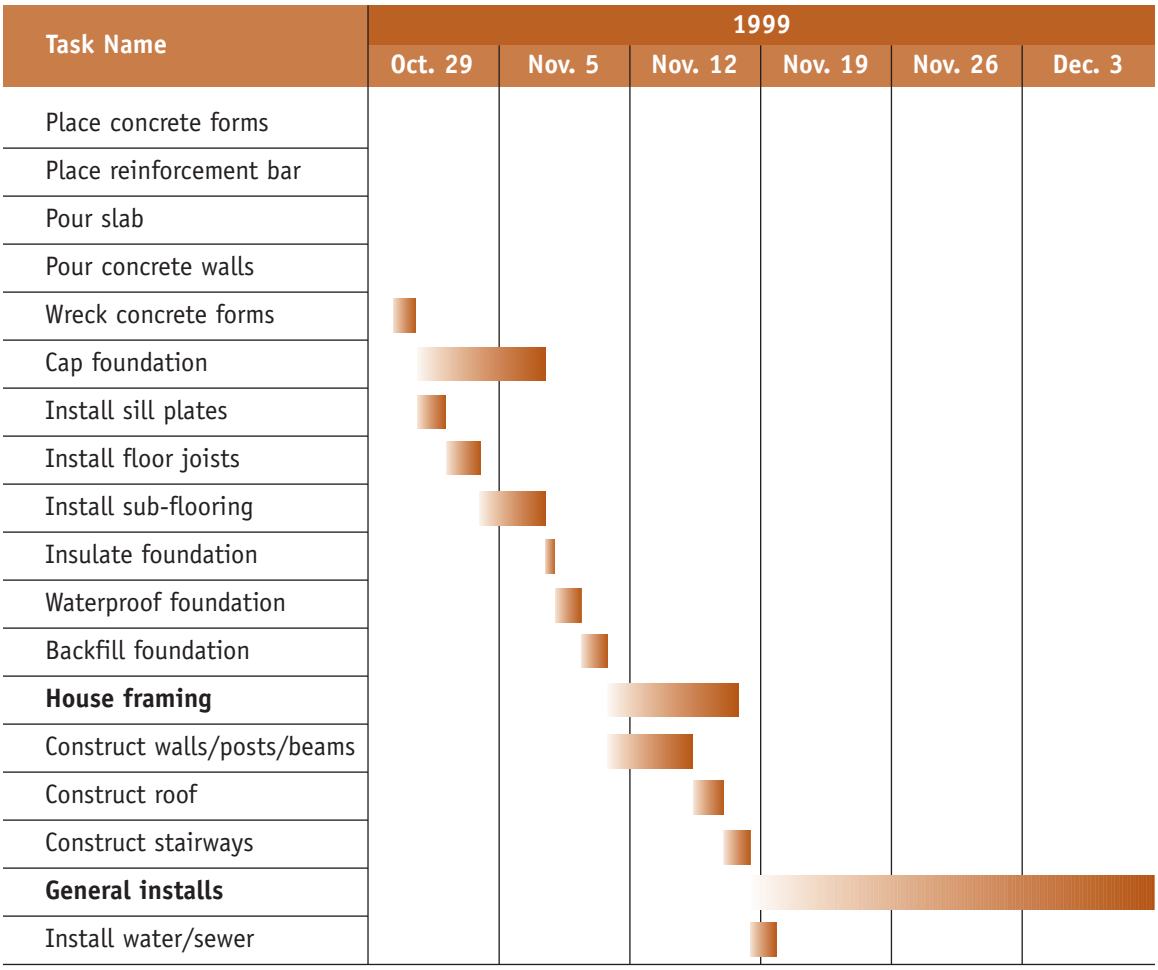
Task	Milestone Date
Issue text to newspapers	February 1, 1999
Distribute documents to bid depositories	February 4, 1999
Publish advertisements for bidders	February 5, 6, and 8, 1999
Issue final addenda	March 4, 1999
Bid closing	**March 11, 1999**
Analyze bids	March 12, 1999
Report to building committee	March 15, 1999
Notice of award of contract	March 17, 1999
Prepare and distribute CCDC 2 and contract documents	March 26, 1999
Start-up meeting	**April 19, 1999**

Gantt Diagram

Unlike a milestone chart, a Gantt diagram (a type of bar chart) lists all the required activities together with a horizontal line for each activity to indicate the beginning and end of each task in accordance with a time period shown at the top of the chart.

The bar chart is very common because it is easy to use, visually clear, and satisfies the requirements for most projects. On the other hand, it does not provide any information on the relative importance of tasks or their interrelationships.

Diagram B: Partial Gantt Chart or Bar Chart



Program Evaluation and Review Technique (PERT)

The Program Evaluation and Review Technique (PERT) is another method for monitoring the progress and periodically adjusting the schedule. PERT involves:

- defining the various tasks and milestones;
- linking these tasks in sequence;
- assigning a time estimate for the completion of each task.

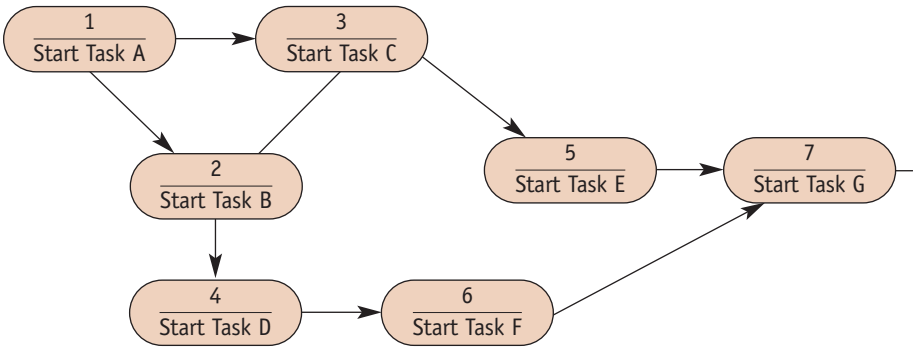
PERT is usually a graphical representation of the *dependency* network for an entire project. Dependencies are timing relationships between tasks which determine the *sequence of activities* or work flow in a project. Tasks are usually represented as boxes, and dependencies are represented as lines connecting the boxes.

PERT has one basic weakness: the fundamental assumptions of the length of time for completing each task are merely estimates and are not precise. Occasionally, formulae are used to increase the probable accuracy of the time estimate. For example, a better estimate of mean time can be achieved using the following formula:

$$T = \frac{a + 4m + b}{6}$$

T = mean time
a = most optimistic time, i.e., the shortest time for completion (best case scenario)
b = most pessimistic time, i.e., the longest time for completion (worst case scenario)
m = most likely time, i.e., the time that the work would most likely be completed based on its execution several times under randomly varying conditions

Diagram C: The PERT Network



T_e = earliest estimated completion time
T_1 = latest estimated completion time
S = slack time

Task A **Cure concrete**
T_e = 0 days
T_1 = 0 days
S = 0 days

Task B **Construct concrete block foundation wall**
T_e = 2 days
T_1 = 2 days
S = 0 days

Task C **Strip formwork**
T_e = 1 day
T_1 = 1 day
S = 0 days

Task D **Install anchors and sill plates**
T_e = 9 days
T_1 = 9 days
S = 0 days

Task E **Install filter fabric, gravel, and drainage tile**
T_e = 2 days
T_1 = 11 days
S = 9 days

Task F **Frame ground floor**
T_e = 11 days
T_1 = 11 days
S = 0 days

Task G **Backfill**
T_e = 13 days
T_1 = 13 days
S = 0 days

Critical Path Method (CPM)
This scheduling method uses arrows or lines to graphically demonstrate the relationships between:

- which activity must be undertaken first;
- which activity cannot be started until another has been completed;
- which activities can be carried out concurrently.

The chart helps to determine *the critical path* and identifies the stages which, if they are delayed, will slow down the entire project. It also identifies which activities can be delayed and for how long without having an impact on the duration of the project. Such delay capacity is called "float."

This type of project scheduling is frequently used for construction projects because many activities are underway at once, each dependent on the other.

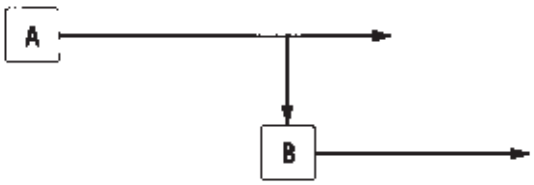
2. Preparing a Critical Path Method (CPM) Schedule

The following section is reprinted with permission from PSMJ Resources, Inc.

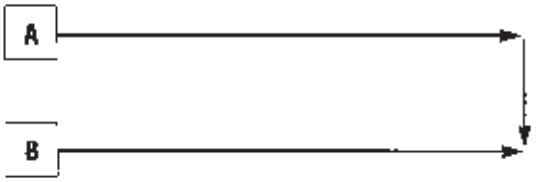
Step 1. Identify Task Interrelationships. The first step in preparing a CPM schedule is to identify systematically all task interrelationships. One way of doing this is to use a task interface diagram, also known as a precedence diagram. This diagram describes each of the three distinctive types of



interrelationships graphically as follows:



Task A must be completed before task B can begin.



Task A must be partially completed before task B can begin.
Task A must be completed before task B can be completed.

An example of the first case would be:

Task A = determine heat loads
Task B = select air conditioning unit

Obviously the air conditioning unit cannot be selected until the heat loads are known.

An example of the second case would be:

Task A = prepare structural calculations
Task B = prepare structural drawings

Although structural calculations are necessary for the structural drawings, it is not necessary that the calculations for *all* the structures be completed before the drawings of *some* of the structures can begin. Thus, task B cannot be started until a certain amount of progress has been made on task A.

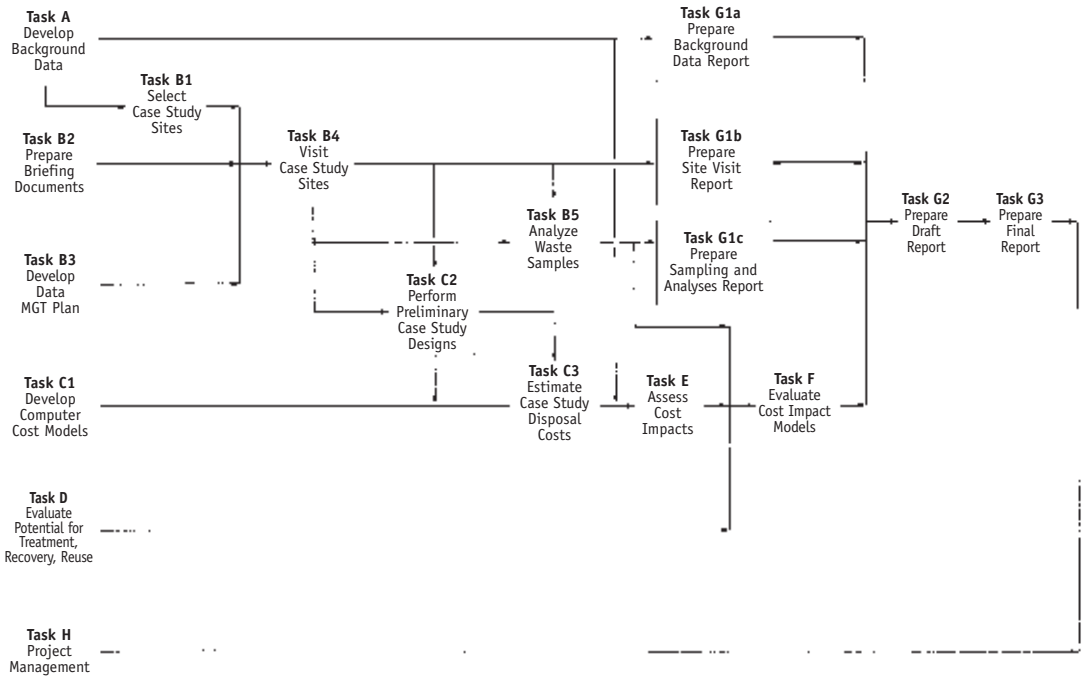
An example of the third case would be:

Task A = prepare piping drawings
Task B = prepare piping specifications

The specifications for common elements (including pipe supports, installation, and testing) can begin as soon as the project is reasonably well defined. However, the specifications cannot be completed until all the drawings are completed, so that all piping materials, valve types and so forth can be selected, identified, and tabulated.

Illustration A-1 shows how these interrelationships can be represented for a complete task outline. Study this diagram to see which of the three types of interrelationships exist between each pair of tasks. Note also that in this example, there is more than one type of interrelationship between two tasks. For example, interrelationship types 2 and 3 exist between tasks C2 and C3. In other words, task C3 (cost estimates) cannot begin until task C2 (preliminary design) is partially completed, and task C3 cannot be completed until task C2 has been completed. This double interface is quite common.

Illustration A-1: Task Interface Diagram



Step 2. Establish Optimum Task Durations. The next step is to establish the optimum duration for each activity on the task outline. This is the length of time (in calendar days) required for the activity to be completed in the most efficient manner possible assuming that all prerequisite tasks have been completed. A typical tabulation of task durations is presented in Illustration A-2 (using the same sample project as in the preceding illustration).

Note that task H, project management, is scheduled to extend 60 days beyond completion of all other tasks. This is typical of most projects performed by design firms. Even if all contractual responsibilities are completed by the contract due date, activities tend to continue beyond that date, such as printing of additional copies of drawings, answering questions from contractors or equipment vendors, organizing project files, or appearing at City Council meetings. Even if all contractual obligations have been met, these residual activities are part of the project management task and should be scheduled as such.

Step 3. Prepare Project Schedule. Having completed the basic task interface diagram and established optimum task durations, you may use these results to prepare a project schedule. Do this either in bar chart format or CPM format, in which the schedule is drawn as a network. The network schedule is best explained by using the same examples of simple two-task projects.

Let us say that the first sample project contains the following tasks and durations:

Task A = determine heat loads (five days' duration)
Task B = select air conditioning unit (four days' duration; cannot start until task A is completed)

Illustration A-2: Task Duration

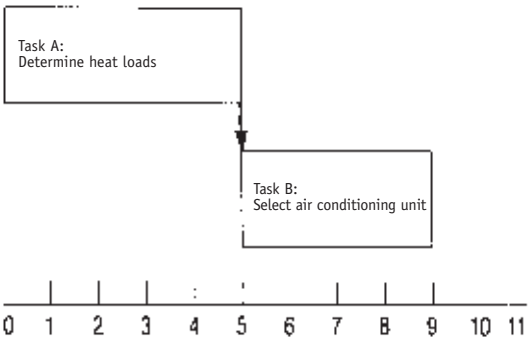
Activity Description	Calendar Days
A. Develop background data	180
B1. Select case study sites	30
B2. Prepare briefing documents	30
B3. Develop data management plan	90
B4. Visit case study sites	180
B5. Analyze waste samples	105
C1. Develop computer cost models	90
C2. Perform preliminary case study site designs	135
C3. Estimate case study disposal costs	30
D. Evaluate treatment, recovery, reuse	90
E. Assess cost impacts	60
F. Evaluate cost impact models	30
G1a. Prepare background data report	60
G1b. Prepare site visit report	60
G1c. Prepare sampling and analysis report	60
G2. Prepare draft report	60
G3. Prepare final report	60
H. Project management	*

* Task H should be completed 60 days after completion of all other activities.

The task interface diagram for this project will be:



This interface diagram can be converted to the network schedule shown below based on the defined task durations:

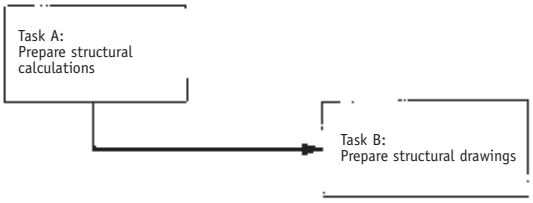


The vertical arrow in the network schedule serves the same purpose as the horizontal arrow in the interface diagram: to show that task B cannot begin until task A is completed. The arrow for the network schedule must be vertical to show that no time should elapse between completion of task A and start of task B. These vertical arrows are known as "dummy activities."

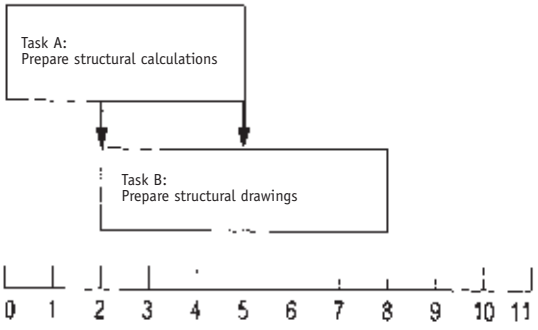
The second example contains the following tasks and durations:

Task A = prepare structural calculations (five days' duration)
Task B = prepare structural drawings (six days' duration; can begin after two days' work on task A)

The task interface diagram:



This diagram can be developed into the following network schedule:

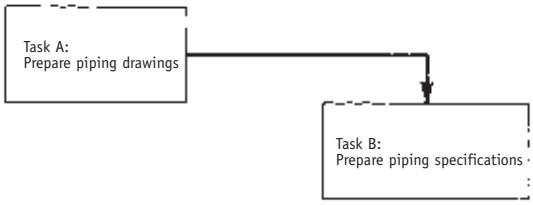


Note that the above schedule presumes that sufficient progress can be made by working on task A for two days in order to permit task B to be started. Again, the vertical arrow in the network schedule identifies the interrelationship between tasks A and B.

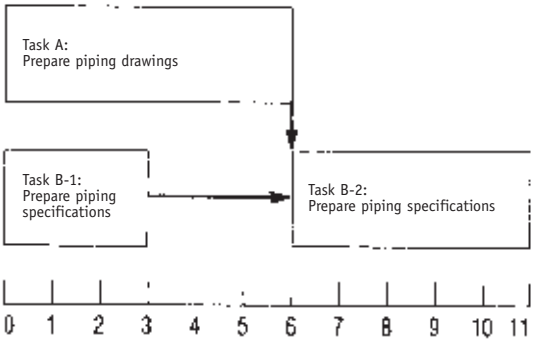
The third example defines the tasks and their durations as follows:

Task A = prepare piping drawings (six days' duration)
Task B = prepare piping specifications (eight days' duration; can start concurrently with task A, but three days' work remains after task A is completed)

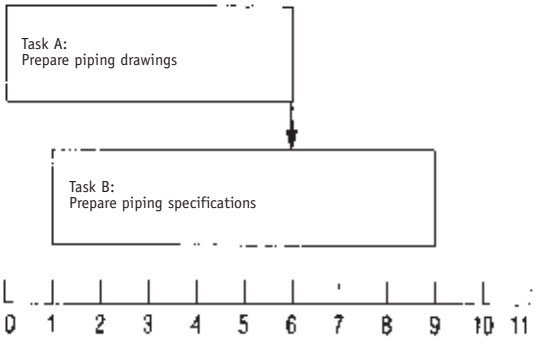
The task interface diagram:



From this interrelationship and durations of tasks, the following network diagram may be drawn:



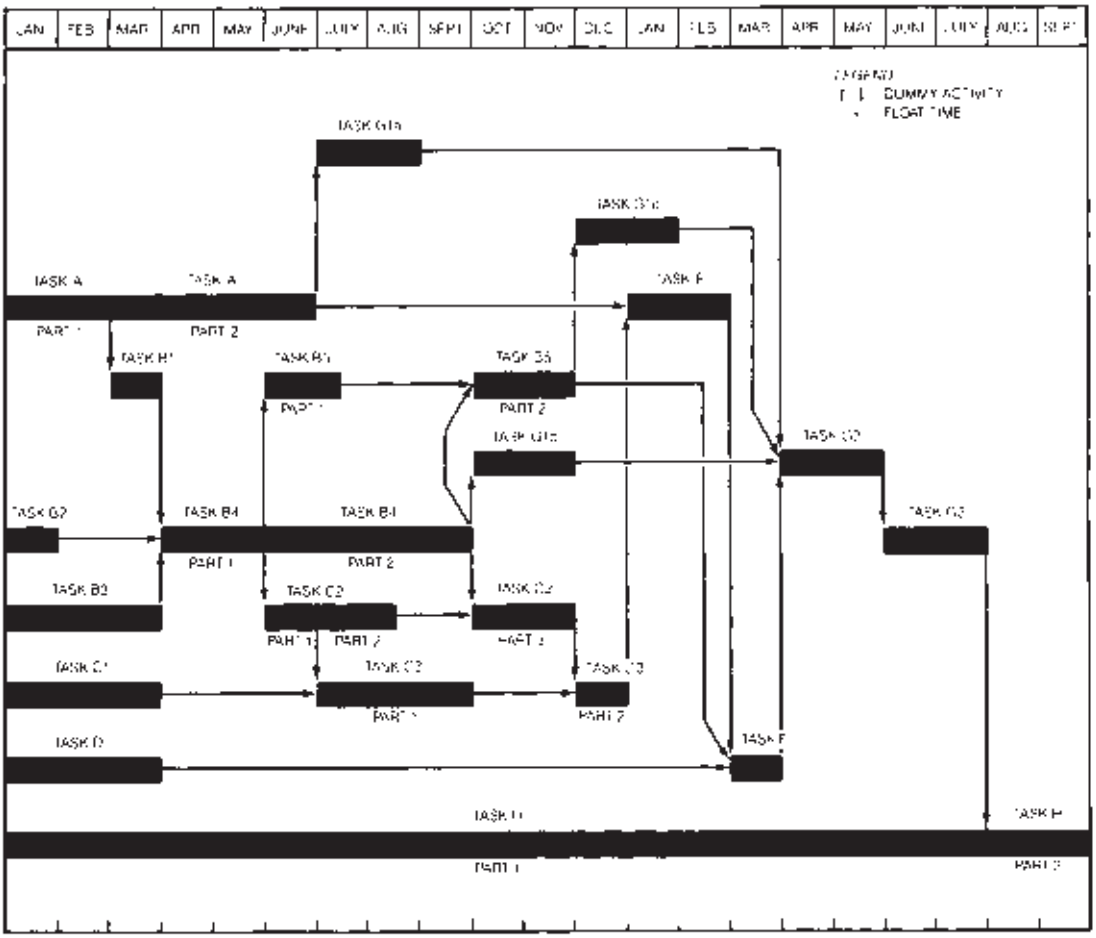
Note that task B can proceed up to a certain point, at which time you will need input from task A. If you had found that only three days of productive work could be done on task B prior to completion of task A, the schedule for the project above would have been:



Although the optimum duration of task B had been established as eight days, eleven days will actually be required to complete this activity. The additional three days are spent waiting for task A to be completed before the second part of task B can be started. This delay is shown by the horizontal arrow connecting parts one and two of task B. These horizontal arrows are referred to as float time.

The methods shown in the above examples may be used to develop a network schedule such as the one shown in Illustration A-3.

Illustration A-3: Time-Based Task Interface Diagram



Step 4. Determine Critical Paths. The last step in the CPM procedure is to determine which tasks are critical — that is, which tasks will affect the project completion date if any delay occurs. The critical tasks for each of the four two-task project examples are shown in Illustration A-4. For projects with fewer than 100 tasks, the critical tasks may be determined by graphic inspection, with results such as those in Illustration A-5.

Illustration A-4: Critical Tasks for Sample Projects

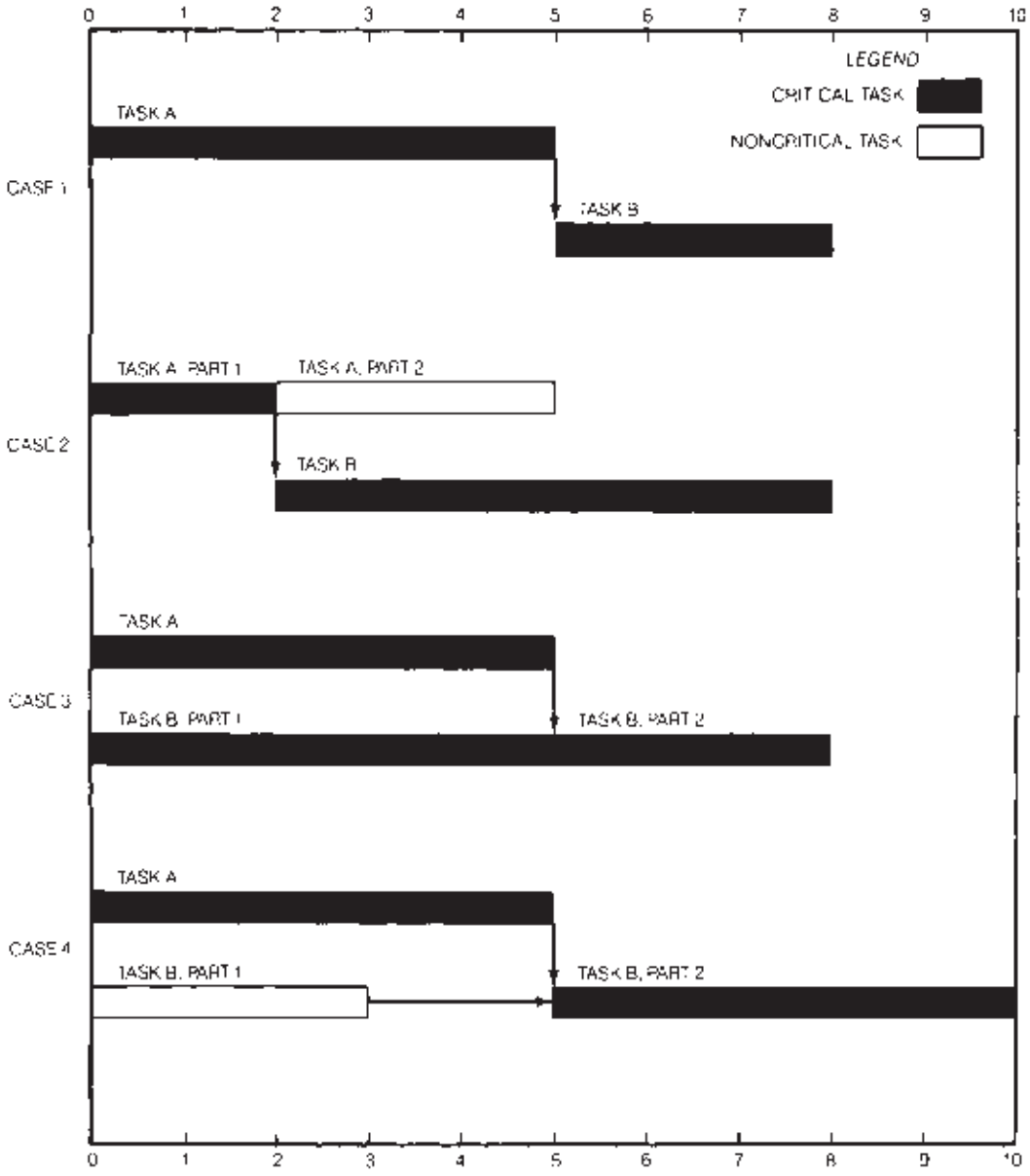
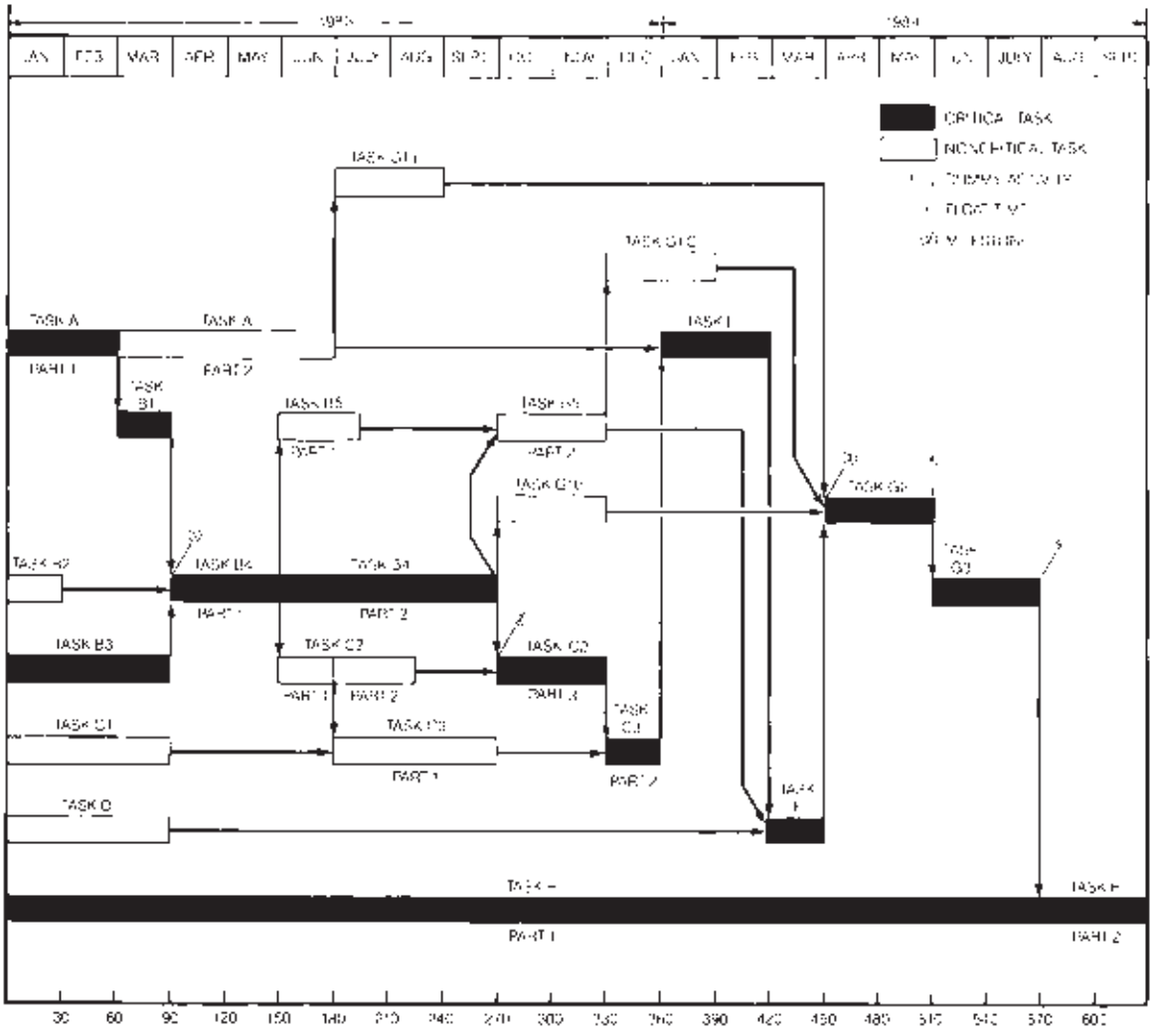


Illustration A-5: Critical Path Diagram



Reprinted with permission from PSMJ Resources, Inc., Newton, MA, U.S.A. 02458, telephone: 1-617-965-0055, www.psmj.com

3. Computer Software for Project Management

A wide variety of software (see examples below) is available for preparing project schedules, monitoring costs, and assigning personnel and resources.

Name of Software	Manufacturer	Website	Application
Allegro	Allegro	www.allegrogroup.com	accounting and cost management for projects
AMS Realtime Projects	Advanced Management Solutions	www.amsusa.com	bar chart scheduling, CPM, time and resource management
Artemis	Artemis Management Systems Inc.	www.artemispm.com	comprehensive project planning using Gantt and CPM charts and a variety of graphics
Corel Presentation	Corel	www.corel.com/products/wordperfect/cwps731/cp.htm	simple bar charts
Corel Timeline	Corel	www.corel.com/products/wordperfect/cwps731/timeline.htm	Gantt charts and PERT
Microsoft Project	Microsoft	www.microsoft.com/products	full project planning with Gantt, CPM, and PERT analysis
Microsoft Office (Powerpoint)	Microsoft	www.microsoft.com/office	simple bar charts
Open Plan	Welcom Software Technology	www.wst.com	schedules and multi-project analysis with various graphic outputs
Planview	Planview Inc.	www.planview.com	resource management of workflows within an organization
Primavera Project Planner	Primavera	www.primavera.com	multi-user/multi-project software using PERT diagrams, CPM, bar charts, and time-scaled logic diagrams
Trakker	Dekker, Ltd	www.dtrakker.com	activity and cost planning software providing network diagrams, Gantt charts, and linked bar charts

Chart: Standard Forms of Construction Contract and their Application

Type Of Construction Project Delivery	Contract Form
"Design-Bid-Build"	**CCDC 2** *Stipulated Price Contract*
"Time and Materials"	**CCDC 3** *Cost Plus Contract (percentage or fixed fee)*
"Maximum Upset Price"	**CCDC 3** *Cost Plus Contract (guaranteed maximum price)*
Unit Rates	**CCDC 4** *Unit Price Contract*
Construction Management	**CCA 5** *Canadian Standard Construction Management Contract Form between Owner and Construction Manager*
Design-Build	**Document 14** *Design-Build Stipulated Price Contract*
Project Management	n/a

Note: This is a very simplified representation of various types of construction project delivery as well as different pricing mechanisms and contract forms.

Cost Planning and Control

Introduction

Every architectural project has three components: function, aesthetics, and economics. The economics of the project are generally established by the client during the pre-design phase, expressed in terms of a construction budget corresponding to the relative size of the building.

The importance of cost planning and control in the delivery of professional architectural services cannot be overemphasized. Clients are unlikely to allow their architect to proceed unless the architect first predicts the total cost of a venture and then monitors the process. Cost management is more common today because of increased expertise in this field and the availability of sophisticated analytical tools.

Providing Advice on Costs

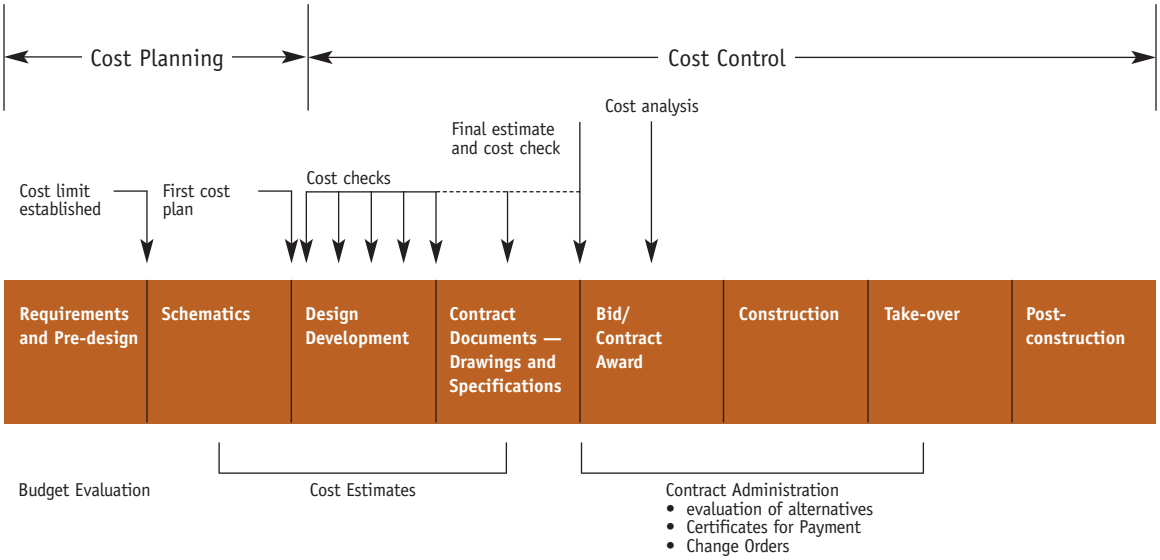
Cost information should only be provided if the architect has the knowledge and systems to provide the service in-house, or has access to qualified advice.

To ensure that the project will be well-defined and realized within a predicted cost limit, cost planning (also known as cost control, cost analysis, or cost management) requires:

- effective cost estimating;
- financial analysis of various components;
- management of the design.

Cost planning (or the preparation of construction cost estimates) is done in the early design stages, whereas cost control (or the monitoring of construction costs) is done at the later stages. Refer to Illustration 1.

Illustration 1: Cost Planning and Control by Project Stages



Prior to delivering cost advice on a regular basis, the architect should:

- make the provision of cost advice and project cost management a priority;
- make specific efforts to become knowledgeable;
- develop in-house experience and skills;
- maintain up-to-date records of historic cost data;
- emphasize to clients the importance of cost estimating and related services.

To ensure effective cost management, every team member must be vigilant about the effect that all design, detailing or specification decisions could have on the cost of individual components of the project, estimated during the initial budget preparation. The project leader will:

- initiate and control the preparation of cost information;
- manage team members to ensure that the work stays within the agreed-upon budget;
- set or adjust limits;
- exercise maximum influence on decisions affecting costs.

Whenever suitably experienced personnel are not available in-house, architects should hire the best available cost consultants. If preferred, they should form an alliance with business associates who are contractors or in the development industry, or they should establish an ongoing relationship with a quantity surveyor.

Once equipped with access to reliable and current cost information available at all stages of a project, architects should **always**:

- use this resource with confidence;
- express information in standard formats;
- be consistent and methodical;
- avoid ambiguity;
- list all assumptions clearly whenever cost information is published;
- promptly confirm in writing any cost information provided verbally;
- provide references and comparable projects when issuing information;
- start a cost information file for each project and keep it updated;
- analyze each project on completion (refer to Chapter 2.3.1, *Management of the Project*);
- maintain files containing reliable historic cost data with as much supporting and peripheral detail as possible;
- check historic cost data in detail to ensure comparability with the current project.

Liability of the Architect

In an architectural practice, liability for incorrect cost estimates cannot be avoided, whether or not the architect is acting as the project leader or is providing limited services with no management responsibilities.

In most client-architect agreements, the architect must prepare a *construction cost estimate*. This estimate is **neither a quotation nor a guarantee**. Because the law does not and cannot expect perfection from a professional, the architect should never guarantee or warrant a construction cost estimate. In fact, such a warranty could void any professional liability insurance policy. Nevertheless, the architect is expected to deliver the normal, professional standard of care in preparing cost estimates and providing cost advice.

Methods of Preparing Cost Estimates

General

Cost forecasting can be a time-consuming activity. All cost estimates:

- work on the principle of forecasting based on **historic** data;
- require that the original data be selected, carefully and methodically, by experienced personnel.

The success of any method depends on:

- the **reliability** of the raw historic data:
- the ability to **adjust** the data to suit the characteristics of the new project and to market conditions;
- the **similarity** of the new project in as many ways as possible to the examples from which data are available;
- the extent to which the analysis is broken down into a large number of **small components**, instead of a few large unit headings.

Therefore, historic data must contain as much descriptive detail as possible, so that differences may be identified and precise adjustments made.

Formats for the Presentation of Cost Information

The client usually summarizes overall project costs in a "Global" or Project Budget which:

- lists all expenditures needed to complete every aspect of the venture;
- incorporates information provided by the architect for the construction component of the budget with a detailed breakdown.

Refer to Illustration 2 which suggests some of the "global" and "soft" costs that must be considered.

Level 1, 2, and 3 Cost Estimates

Government and institutional clients commonly use this method, and usually refer to these estimates as Class "C" Estimate, Class "B" Estimate, etc. Refer to "Appendix — Description of the Classes of Estimates used by PWGSC for Construction Costing of Building Projects" at the end of this chapter. From the outset of the project, cost information is arranged under the standard 16 Division **MasterFormat**™, which uses the typical trade and supplier headings that will eventually be used during construction. This same format is usually used by contractors for preparing tenders and for the preparation of applications for payment. The data in this format simplify retrieval (from files or electronic sources) for calculating detailed budgets for the next project.

The following is a description of each level:

Level 1 Cost Estimate (Class C):
Schematic Design

- prepared at an early stage in the project, when drawings are preliminary in nature;
- based on:
  - type of construction;
  - quantities of materials;
- includes all assumptions or qualifications to the estimate;
- includes a relatively large contingency allowance which is used to provide for changes in scope and because information is more limited.

Level 2 Cost Estimate (Class B):
Design Development

- the estimating process is repeated when additional specification and drawing information becomes available, using an expanded format under the original headings;
- the reduction in uncertainty made possible by better information from the design team allows for a reduced contingency allowance.

Level 3 Cost Estimate (Class A):
Construction Development

- as the construction documents become more complete, the process continues and the contingency allowance is reduced further.

Advantages:
- the most reliable method if undertaken carefully from the start;
- well-suited when cost advice is being supplied to the architect by contractor/construction managers and suppliers;
- the information stays current and relevant throughout pre-construction;
- project leaders can build up a history of, and the knowledge and skills for, cost estimating — especially if building projects are similar within the architectural practice.

Disadvantages:
- requires an estimator with both design and construction experience;
- requires the ability to foresee all the typical trades needed to complete the building;
- may not be widely used by consultants.

Refer to Illustration 3 for an application of this estimating method.

Elemental Costs

Quantity surveyors often use the elemental cost method as the standard format for presenting cost information. This method:

- divides the building into major elements such as structure, exterior closure;
- uses these elements to provide a cost framework which is useful throughout the life of the project;
- is applicable to new or existing buildings;
- uses these elements to form the basis for applying relevant cost information from similar projects.

Illustration 2: Project Budget

Typical Industrial Manufacturing Building	Original Budget	Variance	Last Budget	Variance	Current Reporting Budget	Notes
Land						
Land purchase price	$ -	0	$ -	0	$ -	
Land transfer tax	$ -	0	$ -	0	$ -	
Legal fees	$ -	0	$ -	0	$ -	
Construction						
Building	$ -	0	$ -	0	$ -	
Contingency	$ -	0	$ -	0	$ -	
Equipment	$ -	0	$ -	0	$ -	
Racking	$ -	0	$ -	0	$ -	
Permit	$ -	0	$ -	0	$ -	
Insurance	$ -	0	$ -	0	$ -	
Parkland dedication	$ -	0	$ -	0	$ -	
Development charges	$ -	0	$ -	0	$ -	
Sewer impost levy	$ -	0	$ -	0	$ -	
Service connections	$ -	0	$ -	0	$ -	
Owners FF&E	$ -	0	$ -	0	$ -	
General contractors bonding	$ -	0	$ -	0	$ -	
Design						
Architect	$ -	0	$ -	0	$ -	
Structural Engineer	$ -	0	$ -	0	$ -	
Mechanical Engineer	$ -	0	$ -	0	$ -	
Electrical Engineer	$ -	0	$ -	0	$ -	
Soils Test/Environmental	$ -	0	$ -	0	$ -	
Landscape Consultant	$ -	0	$ -	0	$ -	
Equipment Engineer	$ -	0	$ -	0	$ -	
Cost Planning	$ -	0	$ -	0	$ -	
Surveyor	$ -	0	$ -	0	$ -	
Misc. fees	$ -	0	$ -	0	$ -	
Legal & Administration						
Legal fees	$ -	0	$ -	0	$ -	
Development Management	$ -	0	$ -	0	$ -	
Project Management	$ -	0	$ -	0	$ -	
Realty Taxes	$ -	0	$ -	0	$ -	
Site Plan & Misc. costs	$ -	0	$ -	0	$ -	
Marketing/Pre-opening/ Commissions						
Marketing/sales/ leasing commissions	$ -	0	$ -	0	$ -	
Utilities prior to opening	$ -	0	$ -	0	$ -	
Commissions	$ -	0	$ -	0	$ -	
Finance						
Commitment fees	$ -	0	$ -	0	$ -	
L.C. fees	$ -	0	$ -	0	$ -	
Project Manager	$ -	0	$ -	0	$ -	
Interim finance	$ -	0	$ -	0	$ -	
Appraisal	$ -	0	$ -	0	$ -	
Contingency						
	$ -	0	$ -	0	$ -	
Government Taxes						
GST on monthly payments		0		0		
GST monthly input credits		0		0		
Project Total	$ -	0	$ -	0	$ -	

Illustration 3: Level 1, 2, 3 Estimates

Summary Page Refer to Divisions 1 to 16 for more info Budget Status	Schematic Design Level 1 Budget	Contingency	Variance %	Design Developmt Level 2 Budget	Contingency	Variance %	Construction Documents Level 3 Budget	Contingency
1. General requirements	$ -	$ -	0%	$ -		0%	$ -	
2. Site Work	$ -		0%	$ -		0%	$ -	
3. Concrete	$ 65,000	$ 15,000	115%	$ 75,000	$ 7,500	107%	$ 80,000	$ 4,000
4. Masonry	$ -		0%	$ -		0%	$ -	
5. Metals	$ -		0%	$ -		0%	$ -	
6. Wood and Plastics	$ -		0%	$ -		0%	$ -	
7. Thermal and Moisture Protection	$ -		0%	$ -		0%	$ -	
8. Doors and Windows	$ -		0%	$ -		0%	$ -	
9. Finishes	$ -		0%	$ -		0%	$ -	
10. Specialties	$ -		0%	$ -		0%	$ -	
11. Equipment	$ -		0%	$ -		0%	$ -	
12. Furnishings	$ -		0%	$ -		0%	$ -	
13. Special Construction	$ -		0%	$ -		0%	$ -	
14. Conveying	$ -		0%	$ -		0%	$ -	
15. Mechanical	$ -		0%	$ -		0%	$ -	
16. Electrical	$ -		0%	$ -		0%	$ -	
Total Contingency %	$ -		0%	$ -		0%	$ -	
Total Construction	**$ -**		**0%**	**$ -**		**0%**	**$ -**	

3 Concrete Budget Status	Schematic Design Level 1 Budget	Contingency	Variance %	Design Developmt Level 2 Budget	Contingency	Variance %	Construction Documents Level 3 Budget	Contingency
STRUCTURAL CAST-IN-PLACE FORMWORK				$ 20,000				
Accessories							$ 1,500	$ 75
Expansion joints							$ 1,000	$ 50
Elevated slabs							$ 10,000	$ 500
Footing							$ 2,000	$ 100
Slab on Grade							$ 2,000	$ 100
Walls							$ 2,500	$ 125
Stairs							$ 4,000	$ 200
CONCRETE REINFORCEMENT				$ 10,000				
Reinforcing steel							$ 9,000	$ 450
W.W. Fabric							$ 3,000	$ 150
CAST-IN-PLACE CONCRETE				$ 35,000				
Admixtures							$ 1,000	$ 50
Ready Mix							$ 17,000	$ 850
Elevated slabs							$ 7,000	$ 350
Footings							$ 2,000	$ 100
Slab on Grade							$ 5,000	$ 250
Walls							$ 2,000	$ 100
Stairs							$ 3,000	$ 150
CONCRETE FINISHING				$ 10,000				
Floors							$ 6,000	$ 300
Walls							$ 2,000	$ 100
TOTAL DIVISION 3 — CONCRETE	**$ 65,000**	**$ 15,000**		**$ 75,000**	**$ 7,500**		**$ 80,000**	**$ 4,000**

Advantages:
- the process assumes that the approximate size of a building is known;
- the process can proceed without construction drawings and specifications;
- data may be available from a variety of different projects that do not have to be the same building type as the current project;
- particularly useful for architects during design development, when trade-offs between elements can be considered to improve the quality of the project without compromising the total budget;
- CAD programs, commonly used by architects, can make area calculations and measure quantities.

Disadvantages:
- cuts across the traditional construction trade areas (refer to "Level 1, 2, and 3 Cost Estimates" section above);
- can be difficult to double-check information from real project data without complex, time-consuming analysis;
- is not easy to incorporate "reality checks" using industry costs.

The elemental cost method is best left to quantity surveyors or those experienced in the calculation of building costs, unless the architect has extensive in-house records which have been analyzed and are easily accessible.

Refer to Illustration 4 for a typical elemental cost forecast.

Area
(Cost per m^2/per ft^2)

The terms "cost per square metre/per square foot" are used throughout the development and construction industries, and are recognized by public and private institutions and the public at large. Despite metrification, the imperial system continues to be used — by most financial institutions, the development and real estate industries, and a large proportion of contractors and construction consultants — for all negotiations and final calculations regarding project costs.

Extensive floor area cost data are available from a number of sources as a basis for interpolation and use in forecasting. These should be used when providing general cost advice and for the calculation of overall project costs. Other forms of detailed cost estimating, such as the elemental cost method, also use "cost per m^2/per ft^2" for each of the elements.

Advantages:
- the concept of "floor area" is easily understood and applicable to all buildings;
- costs for an individual component or element of a building, or for the entire structure, are straightforward to calculate;
- very simplified historic cost information, expressed as costs per m^2/per ft^2 for completed projects, is available for many different building types.

Disadvantages:
- does not account for unique conditions or special construction;
- is simplistic and can be misinterpreted.

The architect should limit the use of this basic information by using it only as a general guide at the pre-design stage.

Refer to Illustration 5 for typical data provided for preparing a construction cost estimate based on area.

Volume
(Cost per m^3/per ft^3)

This method is not widely used, except:

- for certain specialized building types such as warehousing (particularly freezer buildings);
- for multi-storey buildings where the floor area method might not adequately reflect the true costs;
- as a double-check on the other methods being used.

Architects should use the volume method in addition to other methods and make sure that historic data are comparable.

Illustration 4: Elemental Cost Forecast

	Typical Example of Elemental Format using Canadian Institute of Quantity Surveyors Measurement and Pricing Method	Elemental Quantity SF	Elemental Unit Rate $/SF	Elemental Amount	Cost/SF $/SF	Total $	%
A	**SHELL**						
	A1 SUBSTRUCTURE						
	A11 Foundation	252,800	$ 3.75	$ 948,000	$ 3.39	$ 948,000	3.96%
	A12 Basement Excavation	0	$ -				
	A2 STRUCTURE						
	A21 Lowest floor construction	252,800	$ 10.00	$ 2,528,000	$ 9.03		
	A22 Upper floor construction	27,205	$ 11.98	$ 325,916	$ 1.16		
	A23 Roof construction	252,800	$ 12.00	$ 3,033,600	$ 10.83	$ 5,887,516	24.61%
	A3 EXTERIOR ENCLOSURE						
	A31 Walls below grade	0	$ -	$ -	$ -		
	A32 Walls above grade	64,800	$ 7.99	$ 517,752	$ 1.85		
	A33 Windows & Entrance	1,656	$ 50.12	$ 82,999	$ 0.30		
	A34 Roof coverings	252,800	$ 4.00	$ 1,011,200	$ 3.61		
	A35 Projections	64,800	$ 0.77	$ 49,896	$ 0.18	$ 1,661,847	6.95%
B	**INTERIORS**						
	B1 PARTITIONS						
	B11 Partitions	179,915	$ 7.19	$ 1,293,589	$ 4.62	$ 1,525,589	6.38%
	B12 Doors	232 no	$ 1,000.00 ea	$ 232,000			
	B2 FINISHES						
	B21 Floor Finishes	266,005	$ 2.00	$ 532,010	$ 1.90	$ 747,742	3.13%
	B22 Ceiling Finishes	266,005	$ 0.38	$ 101,082	$ 0.36		
	B23 Wall Finishes	424,630	$ 0.27	$ 114,650	$ 0.41		
	B3 FITTING & EQUIPMENT						
	B31 Fitting & Fixtures	280,005	$ 0.18	$ 50,401	$ 0.18		
	B32 Equipment	280,005	$ 0.45	$ 126,002	$ 0.45		
	B33 Conveying Systems	0	$ -	$ 50,000	$ 0.18	$ 226,403	0.95%
C	**SERVICES**						
	C1 MECHANICAL	280,005	$ 22.50	$ 6,300,113	$ 22.50	$ 6,300,113	26.33%
	C11 Plumbing & Drainage						
	C12 Fire Protection						
	C13 HVAC						
	C14 Controls						
	C2 ELECTRICAL	280,005	$ 6.00	$ 1,680,030	$ 6.00	$ 1,680,030	7.02%
	C21 Service & Distribution						
	C22 Lighting, Devices & Heating						
	C23 Systems & Ancillaries						
NET BUILDING COST excluding site					**$ 67.78**	**$ 18,977,239**	**79.31%**
D	**SITE**						
	D1 SITE WORK			$ 1,300,000	$ 4.64	$ 1,300,000	5.43%
	D11 Site Development			$ 1,000,000	$ 3.57		
	D12 Mechanical Site services			$ 200,000	$ 0.71		
	D13 Electrical Site services			$ 100,000	$ 0.36		
	D2 ANCILLARY WORK				$ -	$ -	
	D21 Demolition			$ -	$ -		
	D22 Alterations			$ -	$ -		
NET BUILDING COST including site					**$ 72.42**	**$ 20,277,239**	**84.75%**
Z	MARK UPS						
	Z1 GENERAL REQUIREMENTS						
	Z11 General requirements	7%		$ 1,419,406.74	5.06930978	$ 1,419,407	5.93%
TOTAL CONSTRUCTION ESTIMATE excluding contingency							
	Z2 CONTINGENCIES	11%		2,230,496.303	$7.97	$ 2,230,496	9.32%
	Z21 Design contingency	0%					
	Z22 Escalation contingency	6%		1,216,634.347	$ 4.35		
	Z23 Construction contingency	5%		1,013,861.956	$ 3.62		
GOODS AND SERVICES TAX		EXCLUDED				$ -	
TOTAL CONSTRUCTION ESTIMATE including Allowances					**$ 85.45**	**$ 23,927,142**	**100.00%**
Gross Floor Area 280 000 sf							

Unit Use

(Cost per bed, cost per seat, etc.)

This method uses very simplified historic data as a basis for calculating cost. It is brief, to the point, and relatively reliable — provided that the historic data on projects are comparable. This method is useful for preliminary budgeting because the result is general in nature and more obviously "approximate."

Advantages:

- provides a quick reference or check at the early design stages.

Disadvantages:

- projects are rarely identical, so careful adjustment must be made for differences;
- the circumstances, location, and date of construction may render the historic information of questionable value, even though the projects may be very similar in physical form;
- the calculation of differences may require extensive analysis of the information using some of the other methods referred to above (sometimes, this is best done by quantity surveyors).

Architects should:

- use this method with caution, for preliminary advice only, and as a convenient double-check for comparison purposes;
- spell out clearly all qualifications and assumptions when the information is released.

Do not confuse *unit use* with the term *unit cost* which can be expressed in a number of different numerical unit forms and is a technique used for calculating building and component costs:

Unit Cost	e.g., Concrete curbs:	$13 lf (linear foot)
	Lavatory — wall hung	$1,090 ea (each)
Unit Use	e.g., 2,000 seat cinema	@ $1,500 per seat
	60-room motel	@ $125,000 per room

Illustration 5: Typical Data used in the Area Method Cost Forecast

Typical Page From Toronto Real Estate Board Schedule of Unit Costs' price $ 10.00		Jan-97 per/SF	Jan-97 per/SM	Jan-96 per/SF	Jan-96 per/SM	Jan-95 per/SF	Jan-95 per/SM	Jan-94 per/SF	Jan-94 per/SM
1 INDUSTRIAL BUILDING									
16 ft clear height	Under 10 000 sf	**$ 55.51**	$ 597.29	**$ 55.01**	$ 591.91	**$ 53.93**	$ 580.29	**$ 51.03**	$ 549.08
	10 000 - 20 000 sf	**$ 46.11**	$ 496.14	**$ 45.70**	$ 491.73	**$ 44.80**	$ 482.05	**$ 42.39**	$ 456.12
	20 000 - 50 000 sf	**$ 38.31**	$ 412.22	**$ 37.96**	$ 408.45	**$ 37.22**	$ 400.49	**$ 35.22**	$ 378.97
	50 000 - 150 000 sf	**$ 33.24**	$ 357.66	**$ 32.94**	$ 354.43	**$ 32.29**	$ 347.44	**$ 30.56**	$ 328.83
	Over 150 000 sf	**$ 31.31**	$ 336.90	**$ 31.03**	$ 333.88	**$ 30.42**	$ 327.32	**$ 28.78**	$ 309.67
18 ft clear height	Under 10 000 sf	**$ 57.49**	$ 618.59	**$ 56.97**	$ 613.00	**$ 55.85**	$ 600.95	**$ 52.85**	$ 568.67
	10 000 - 20 000 sf	**$ 47.55**	$ 511.64	**$ 47.12**	$ 507.01	**$ 46.20**	$ 497.11	**$ 43.72**	$ 470.43
	20 000 - 50 000 sf	**$ 39.27**	$ 422.55	**$ 38.91**	$ 418.67	**$ 38.15**	$ 410.49	**$ 36.10**	$ 388.44
	50 000 - 150 000 sf	**$ 33.84**	$ 364.12	**$ 33.54**	$ 360.89	**$ 32.88**	$ 353.79	**$ 31.11**	$ 334.74
	Over 150 000 sf	**$ 31.62**	$ 340.23	**$ 31.33**	$ 337.11	**$ 30.72**	$ 330.55	**$ 29.07**	$ 312.79
22 ft clear height	Under 10 000 sf	**$ 58.45**	$ 628.92	**$ 57.92**	$ 623.22	**$ 56.78**	$ 610.95	**$ 53.73**	$ 587.13
	10 000 - 20 000 sf	**$ 48.22**	$ 518.85	**$ 47.79**	$ 514.22	**$ 46.85**	$ 504.11	**$ 44.33**	$ 476.99
	20 000 - 50 000 sf	**$ 40.80**	$ 439.01	**$ 40.43**	$ 435.03	**$ 39.64**	$ 426.53	**$ 37.51**	$ 403.61
	50 000 - 150 000 sf	**$ 34.46**	$ 370.79	**$ 34.15**	$ 367.45	**$ 33.48**	$ 360.24	**$ 31.68**	$ 340.88
	Over 150 000 sf	**$ 32.94**	$ 354.43	**$ 32.64**	$ 351.21	**$ 32.00**	$ 344.32	**$ 30.28**	$ 325.81
25 ft clear height	Under 10 000 sf	**$ 59.00**	$ 634.84	**$ 58.47**	$ 629.14	**$ 57.32**	$ 616.76	**$ 54.24**	$ 583.62
	10 000 - 20 000 sf	**$ 49.67**	$ 534.45	**$ 49.23**	$ 529.71	**$ 48.26**	$ 519.28	**$ 45.67**	$ 491.41
	20 000 - 50 000 sf	**$ 41.11**	$ 442.34	**$ 50.74**	$ 545.96	**$ 39.94**	$ 429.75	**$ 37.79**	$ 406.62
	50 000 - 150 000 sf	**$ 34.48**	$ 371.00	**$ 34.17**	$ 367.67	**$ 33.50**	$ 360.46	**$ 31.70**	$ 341.09
	Over 150 000 sf	**$ 33.22**	$ 357.45	**$ 32.92**	$ 354.22	**$ 32.27**	$ 347.23	**$ 30.54**	$ 328.61

Reprinted with permission from: *Schedule of Unit Costs*, Toronto Real Estate Board.
Additional information contained in *Schedule of Unit Costs* can be obtained through the Toronto Real Estate Board.

Factors Affecting Costs

Economic and Political

Several factors influence the construction industry and affect building costs. These factors include:

- inflation;
- market conditions;
- other economic factors;
- political and social climate.

Inflation
During the 1990s in Canada, inflation was a less critical factor for estimating final project costs than during the 1980s. Nevertheless, because inflation is a factor of the cyclical economic system, especially for construction, architects should:

- always include an allowance for inflation as a line item in the project budget;
- be aware of the trend during the past 12 months as well as predictions for the future;
- seek input from the client.

Market Conditions
Periodically, there is so much demand for construction that it can become almost impossible to obtain competitive tenders for a project. This situation results in inflated costs. At the other extreme, construction costs during recessions — particularly for non-union labour rates — may decrease significantly. Such decreases can be followed by a rapid rise in costs shortly after the end of the recession.

Other Economic Factors
- the use of union or non-union labour;
- interest rates on financing costs;
- exchange rates between nations, for projects with a significant proportion of imported materials and equipment.

Political and Social Climate
In Canada, the political climate (local, provincial, and federal) can affect the timing of a project approval, especially around election time.

Abroad, in countries where democracy and respected institutions are stable, commercial activity can flourish, and competition and true supply and demand will occur. Elsewhere, such as in the developing world — where some or all of these factors may be missing — stability is often lacking and construction prices will tend to be erratic and unpredictable.

Prior to using any raw cost data for estimates, architects should consider all the above factors and make suitable corrections.

Environmental

Construction costs are affected by several environmental factors:

- site characteristics;
- weather, and season of the year;
- location.

Site Characteristics
- challenging topography;
- natural or built features;
- unusual soil or sub-surface conditions;
- existence of hazardous wastes, including asbestos, PCBs;
- contaminated soils requiring removal and/or environmental certification;
- disposal costs of contaminated soils;
- adjacent buildings.

Weather and Season
- cost and construction procedures in Canada are significantly influenced by the weather and season;
- construction activities are cyclical over each 12-month period (reduced activity from December through March for exterior construction and excavation);
- winter protection and provision of temporary heating adds to cost.

Location
- site characteristics (for example, a project in a suburban location will cost less compared to one in the downtown core — where overhead can be much higher because of parking charges, traffic congestion causing loss of time and delivery delays, and the likelihood of more stringent regulatory requirements);
- construction in remote areas where skilled labour is unavailable;
- construction in dense urban areas;
- use of components that are manufactured at some distance from the site;
- travel distance to dump/disposal sites or recycling depots.

Building Type and Design

Building types range from simple wood-framed structures to complex, technically sophisticated buildings such as hospitals and laboratories. Some costing handbooks classify building costs under as many as 46 different types. Construction costs vary considerably ($375-$2,700 per m^2/$35-$250 per ft^2 in 1998 Canadian dollars).

Features affecting cost include:

- compliance with building codes;
- method of construction (for example, wood, reinforced concrete or steel frame);
- building height and number of storeys;
- building form (a compact building is less expensive than one with the same area that is long and narrow);
- type and range of finishes;
- choice and arrangement of structural, mechanical, and electrical systems;
- the planned life of the structure;
- selection of components (standard or off-the-shelf vs. custom-manufactured).

Characteristics of the Owner/Client

Architects need to recognize the impact that the type of owner can have on the cost of a project.

Sophisticated clients, such as commercial and industrial corporations or developers who regularly procure design services and construction, frequently expect the delivery of completed projects at or below target costs.

Other owners, such as certain institutions and government agencies, have entrenched bureaucratic procedures that effectively preclude taking advantage of a competitive system. Some owners are unable or unwilling to avoid certain factors which can contribute significantly to project costs. These factors include:

- over-design (for example, especially long life cycle, redundancies in spaces);
- unnecessarily high standards of quality;
- complex bidding procedures;
- insurance requirements above the norm;
- extensive bonding requirements;
- poorly written, sometimes inequitable, non-standard contract wording;
- long delays in issuing payments to contractors.

The architect should adjust the estimate based on the type of organization the client represents.

Definition of Project Requirements (Functional Program)

(Refer to Chapter 2.3.4, *Pre-design*)

The functional program defines the project. To minimize the possibility of cost overruns resulting from changes in the program, review the functional intent or objectives. Ask the owner to clarify any incomplete or unclear requirements prior to providing any architectural service.

Changes in the scope of a project can occur for many reasons, including:

- a "change of mind" or the development of more specific detailed requirements by the owner;
- external factors such as new technological developments, new legislation or a change in market conditions;
- lack of sufficient detailed information;
- inadequate research prior to developing the program.

Cost escalation due to changes in the program can be significant for the owner and the architect at any time, but especially in the construction documentation stage, when re-design costs and additional consulting fees arise.

The architect should always keep the owner fully advised of the potential cost implications of any changes.

Type of Construction Project Delivery

Contractual relationships between the owner and the contractor can have an impact on the cost of a project. Refer to Chapter 2.3.2, *Types of Construction Project Delivery*.

Owner's Timetable

Sometimes, it is impossible to avoid:

- a project schedule that is accelerated to suit an owner's critical date, such as a school opening or the timing of an event due to market forces;
- late commencement due to reasons beyond the owner's control, for example, winter conditions, resulting in additional construction costs;

- delayed commencement of a project during a time of inflation and currency fluctuations.

Architects should:

- ensure that assumptions attached to any forecasts include reference to specific timing;
- check and make adjustments for specific issues that may influence the cost of the project when using historic cost data.

Other Factors

Regulations:
- onerous bureaucratic requirements, such as planning regulations or site development agreement conditions;
- numerous building code occupancy classifications within one building;
- hazardous demolition, such as removal of asbestos;
- recycling regulations and dumping charges (tipping fees) for demolition or construction debris.

Inconvenient or unusual work arrangements:
- construction must be scheduled around the ongoing activities of occupants in buildings such as hospitals, court houses, shopping malls or restaurants; because these activities bear little relationship to the logic of construction, overtime labour costs often result;
- additional protection and clean-up expenditures beyond normal requirements;
- work adjacent to or within airports may be subject to limitations on scheduling and on the times when equipment, such as cranes, may be used;
- demolition and shoring of existing structures.

When developing the cost plan of a project, establish the basic cost of the building. Identify and pull out unusual or site-specific costs and justify the overall project budget during the forecasting process.

Techniques

Cost Consultants

Unless the architect has developed the knowledge and systems in-house, expert advice should be obtained either from:
- independent professional experts (quantity surveyors); or
- those intimately involved in everyday construction (development/construction experts).

Quantity Surveyors

Quantity surveyors provide professional service at hourly rates, or at a fixed or percentage fee of the construction estimate.

Advantages:
- independent professional status;
- their success is based upon their track record of reliability in forecasting;
- up-to-date archival material that is very extensive for many different building projects and is easily accessible;
- quantity surveyors will usually supply information on comparable projects as a double-check to establish credibility;
- some larger companies publish their own updated forecast information yearly.

Disadvantages:
- unit costs are usually based on detailed analysis of projects after bid closing, or even following completion of construction, making them less current than costs available from contractors;
- detailed cost information may not be available because cost breakdowns are limited to major trade divisions.

Architects should:

- use the services of a quantity surveyor, whenever appropriate, to increase the quality and depth of the architectural service available within the practice;

- monitor every aspect of their work to ensure that the information being prepared is entirely applicable to the current project and that any qualifications or assumptions accompanying the cost information supplied are precisely in accordance with the client's expectations;
- be satisfied that every item of information is relevant before passing on this advice to the client;
- ensure that the architect's fee is sufficient to include the quantity surveyor's fees or cost estimating. [Note: some clients prefer to engage a quantity surveyor directly; in these situations, the architect should allow for fees for coordination.]

Development/Construction Experts

Other sources of expertise directly from the construction industry include construction managers, contractors, design-builders, and developers.

Advantages:

- results are likely to be reliable for calculating costs for Level 1, 2, and 3 Cost Estimates using unit costs assigned to area measurements for spot-checking individual elements of a project where the proposed building is very similar to recently completed projects;
- information will be very current because these sources are involved with construction spending every day and because they have access to trades and suppliers who are also specialists;
- these sources monitor trends and are generally aware of the dynamics affecting construction costs.

Disadvantages:

- unlike a quantity surveyor, who is an independent consultant, the builder may not always find it easy to achieve a comprehensive overview;
- this knowledge is sometimes very specialized and "narrow," and may not always be applicable to new situations;
- certain sources may be less reliable due to possible self-interest or commercial motives.

Architects should:

- develop an alliance with individuals or companies by working together on common projects before using this source for cost information;
- check the relevance of all data supplied, even if they have confidence in the information source;
- pay a fee for all cost information from construction industry sources.

Construction Price Index

Construction price index data are usually published by government agencies and private companies. These publications are:

- useful only as a guide to show trends;
- usually some months out-of-date;
- often presented in graph form for ease of communication.

Publications

Construction cost data are available from government agencies, private interest groups, private companies, and quantity surveyors. The information comes in printed or electronic form, and the cost varies considerably depending on the amount of detail, completeness, and ease of use. Some data from government agencies are more useful for identifying trends and differences in national, regional, and local costs than for calculating the cost of a specific building.

Refer to Illustration 6 for an example of cost information from a typical publication.

Extensive detailed information for most building types can be purchased in hard copy or electronic form. Such publications:

- provide excellent, comprehensive, and reliable data if used with appropriate qualifications or multipliers;
- are assembled from real project data supplied by owners and contractors from the previous year;
- are available for Canada only, or for all of North America (amounts can be adjusted to the individual cities or regions).

Illustration 6: Typical Cost Information

Model costs calculated for a 1-storey building with 10′ storey height and 4,000 square feet of floor area

Restaurant, Fast Food

			Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
1.0 Foundations						
.1	Footings & Foundations	Poured concrete; strip and spread footings and 4' foundation wall	S.F. Ground	4.63	4.63	6.9%
.4	Piles & Caissons	N/A	—	—	—	
.9	Excavation & Backfill	Site preparation for slab and trench for foundation wall and footing	S.F. Ground	1.23	1.23	
2.0 Substructure						
.1	Slab on Grade	4" reinforced concrete with vapour barrier and granular base	S.F. Slab	3.16	3.16	3.7%
.2	Special Substructures	N/A	—	—	—	
3.0 Superstructure						
.1	Columns & Beams	N/A	—	—	—	3.7%
.4	Structural Walls	N/A	—	—	—	
.5	Elevated Floors	N/A	—	—	—	
.7	Roof	Metal deck on open web steel joists	S.F. Roof	3.18	3.18	
.9	Stairs	N/A	—	—	—	
4.0 Exterior Closure						
.1	Walls	Face brick with concrete block backup *70% of wall*	S.F. Wall	16.75	9.03	23.5%
.5	Exterior Wall Finishes	N/A	—	—	—	
.6	Doors	Aluminum and glass	Each	2447	4.90	
.7	Windows & Glazed Walls	Window wall *30% of wall*	S.F. Window	31	6.07	
5.0 Roofing						
.1	Roof Coverings	Built-up tar and gravel with flashing	S.F. Roof	2.86	2.86	5.2%
.7	Insulation	Perlite/EPS composite	S.F. Roof	1.28	1.28	
.8	Openings & Specialties	Gravel stop and hatches	S.F. Roof	.28	.28	
6.0 Interior Construction						
.1	Partitions	Gypsum board *25 S.F. Floor/* on metal studs *L.F. Partition*	S.F. Partition	3.97	1.43	17.7%
.4	Interior Doors	Hollow core wood *1000 S.F. Floor/Door*	Each	349	.35	
.5	Wall Finishes	Paint	S.F. Surface	.53	.38	
.6	Floor Finishes	Quarry tile	S.F. Floor	8.77	8.77	
.7	Ceiling Finishes	Mineral fiber tile on concealed zee bars	S.F. Floor	3.22	3.22	
.9	Interior Surface/Exterior Wall	Paint *70% of wall*	S.F. Wall	2.02	.92	
7.0 Conveying						
.1	Elevators	N/A	—	—	—	0.0%
.2	Special Conveyors	N/A	—	—	—	
8.0 Mechanical						
.1	Plumbing	Kitchen, bathroom and service fixtures, supply and drainage *1 Fixture/ 400 S.F. Floor*	Each	2772	6.93	22.2%
.2	Fire Protection	Sprinklers, light hazard	S.F. Floor	2.08	2.08	
.3	Heating	Included in 8.4	—	—	—	
.4	Cooling	Multizone unit, gas heating, electric cooling	S.F. Floor	9.86	9.86	
.5	Special Systems	N/A	—	—	—	
9.0 Electrical						
.1	Service & Distribution	400 ampere service, panel board and feeders	S.F. Floor	2.77	2.77	12.0%
.2	Lighting & Power	Flourescent fixtures, receptacles, switches, A.C. and misc. power	S.F. Floor	6.84	6.84	
.4	Special Electrical	Alarm systems and emergency lighting	S.F. Floor	.61	.61	
11.0 Special Construction						
.1	Specialties	Walk-in refrigerator	Each	17,340	4.34	5.1%
12.0 Site Work						
.1	Earthwork	N/A	—	—	—	0.0%
.3	Utilities	N/A	—	—	—	
.5	Roads & Parking	N/A	—	—	—	
.7	Site Improvements	N/A	—	—	—	
				Sub Total	85.12	**100%**
	GENERAL CONDITIONS (Overhead & Profit)			15%	12.77	
	ARCHITECT FEES			8%	7.81	
				Total Building Cost	**105.70**	

Reprinted with permission from: *Means Square Foots Costs 1998*
© R.S. Means Co., Inc., Kingston, MA, all rights reserved.

The data may be used for entire buildings or individual components. Note that the data are more reliable for estimating in Canada when obtained from Canadian publications or sources. Data from non-Canadian sources may not be reliable for estimating purposes when the value of the dollar is fluctuating.

Architects should:

- build up forecasts using this data carefully and methodically;
- carefully read the descriptions of the scope and cost allowances to ensure that the proposed building estimate is based on a comprehensive list of items which apply exactly;
- become familiar with the format and methods employed prior to using any information.

Contingencies

Theoretically, every budget estimate should predict the actual (final) cost of the completed project. In practice, this means that contingency allowances of decreasing size must be applied to project and construction budgets as relevant information develops during the design process. Contingencies, which may be as high as 25% at the early stages of a project, will decrease to 2%-5% as the degree of uncertainty is reduced.

Most government agencies involved in construction, as well as private companies, banks, and other financial institutions, expect a single contingency amount to be shown at the bottom of a budget. This figure, giving the full extent of the contingency allowance, can be plainly seen. However, some project managers prefer the contingency to be apportioned for each line item in addition to showing a general contingency at the end.

Professional Service for Each Phase of the Project

Use a checklist such as the "Checklist for the Management of the Architectural Project" (refer to Chapter 2.3.1, *Management of the Project*) to ensure that all cost estimating tasks are attended to at the appropriate time.

The sections below are a commentary on the lists of tasks.

Phase A. Pre-agreement Phase

By listing all cost-related tasks, the architect:

- ensures that every aspect of spending on the project will be reviewed by either the architect, the client or another party;
- can prepare a complete proposal for services.

The purpose is to:

- make the client aware that this service will be required to complete the entire project;
- identify who will be responsible for investigating and supplying the forecasting information.

Phase B. Schematic Design Phase

In this phase, the architect must establish a preliminary design and a construction cost estimate for the project, based on the most reliable information available at the time from consultants and other specialists. The architect must **either**:

- instruct the design team to continue with conceptual work that will meet or satisfy the agreed-upon budget; **or**
- review the scope and cost for some or all of the building elements to re-define the project to fit within a pre-determined cost limit.

Using up-to-date cost forecasting information, as well as carefully defining the project scope and cost limits for the project elements, will minimize the risk of significant re-design and re-definition later.

Phase C. Design Development Phase

In this phase, the architect must:

- provide for review and updating of the construction cost estimate as the reliability of the design and specifications improves;
- undertake additional financial studies and analysis, if necessary, to check the construction cost estimate and its assumptions;
- refine the building's design and details, to ensure they will not exceed the limits of the construction cost budget.

Phase D. Construction Documentation Phase

In this phase, the architect must:

- update the construction cost estimate based on the final construction documents;
- include allowances in the bid documents.

Refer to Chapter 2.3.8, *Construction Documents— Specifications*.

Phase E. Bidding and Negotiation Phase

In preparing the bidding documents, the architect must determine what cost information is needed to decide who is awarded the contract. The architect must consider the following cost information:

- alternative prices;
- separate prices;
- itemized prices;
- unit prices.

Traditionally, the architect analyzes the bids. The various "alternative prices" from each bidder must be evaluated and the best overall value for the client determined. The lowest combination of base bid and acceptable alternative prices is normally the choice.

In addition, comparing the "separate prices" and tabulating a total price for the construction based on each bid for the client is important. Separate prices are for work added to, or deducted from, the base bid. Separate prices are not included in the base bid price.

Itemized prices are costs for a specific item or section of work *for information purposes only*.

Unit prices should only be requested when an estimated quantity is supplied. Unit prices are typically requested for large civil engineering projects; however, certain components (such as site development work, hidden or indeterminate work) within architectural projects may require unit prices.

Refer also to Chapter 2.3.9, *Construction Procurement*.

The *Canadian Standard Form of Agreement Between Client and Architect: Document Six* indicates that if the lowest *bona fide* bid exceeds the construction cost estimate by 15%, the architect shall either:

- obtain approval from the client for an increase in the construction budget;
- re-bid or negotiate;
- modify the construction documents to reduce the construction cost (for no additional fee).

Phase F. Contract Administration Phase

The architect is usually required to determine the amounts owing to the contractor under the contract, based on the architect's observations and evaluation of the progress of the work. The architect then processes the contractor's application for payment and prepares a Certificate for Payment. The elemental cost analysis method is well-suited for use on a comparative basis in assessing the contractor's schedule of values during this certification process.

Another architectural service provided during the Contract Administration Phase is the evaluation of the costs of changes. Having ready access to historic cost data, to ensure that the contractor's quotations are realistic, is very important.

Refer also to Chapter 2.3.10, *Contract Administration — Office Functions*.

The architect should:

- deliver effective cost management service throughout the project;
- provide the owner with regular cost updates and advice (this will occur naturally to some extent during the construction phases when the client receives copies of Proposed Changes, Change Orders, and Certificates for Payment);

- endeavour to maintain the supply of excellent cost advice and well-presented information throughout a project.

Life Cycle Costs

Traditionally, the approach to building cost has been one of "first cost" considerations only. However, high energy and maintenance costs have highlighted the following fact: the "real cost" of a building is not limited to the construction phase. An analysis of life cycle costs is not a basic service but an optional or additional service.

The objective of life cycle costing is to determine the "total cost" of a building over its lifetime. This costing method:

- allows comparisons to be made between alternative components or systems;
- generates an understanding of the design of a project, how it functions, and how costs arise;
- facilitates further development of the design.

Life cycle costing of a building can be expressed as follows:

Total Cost = Capital Cost + Operating Cost + Maintenance Cost

The three types of costs are:

- **capital costs:** the initial cost of constructing the project, including the land, fees, and carrying costs;
- **operating costs:** all expenditures for the servicing of the building during its life period, for example, lighting, energy, management, and insurance;
- **maintenance costs:** those costs associated with repairs and renewals.

The total cost as defined above is relevant to the long-term costs of owning a building and is of special interest to owner-occupiers such as government bodies, condominium corporations, and large institutions.

Before the design development phase begins, the architect should explain the importance of life cycle costs to the client for the following reasons:

- different construction materials, techniques, and systems have different effective life spans;
- considerable expense can arise during the life of a building to maintain a satisfactory level of performance;
- low construction costs may result in higher maintenance costs later in the life of the building.

Using a pre-determined and agreed-upon "design length of life" as a base, the architect must:

- assess the initial, maintenance, and replacement costs for each element of a building (for example, different types of mechanical systems and roof membranes can vary significantly in initial cost and in their anticipated serviceable life);
- compare this information with total costs for alternative selections or designs;
- study different combinations of all major elements to identify the best choices to minimize capital cost;
- determine the most advantageous or lowest life cycle cost for the entire structure;
- incorporate operating costs, including energy consumption, in the study.

Architects can effectively undertake most life cycle cost comparison exercises if they have access to adequate cost and material specification information. A more detailed analysis should be undertaken by qualified specialist consultants.

Value Engineering

Value engineering is a systematic procedure to determine the best or optimum value for investments in a construction project. Value engineering is an analytical approach to modifying features which may add cost to a building but do not contribute to its quality, appearance, useful life or functional performance. Architects must work with cost consultants and value engineers to compare trade-offs between design concepts, arrangements, materials and finishes, systems,

construction techniques as well as capital and life cycle costs. This analysis should begin during the schematic design phase when conceptual drawings and outline specifications are prepared. Ideally, value engineering is planned and scheduled at the outset of a project; however, the architect should be willing to undertake such a study at any stage of the project.

Different owners will apply different criteria for such studies. For example, developers or Design-Builders may plan to dispose of an asset soon after construction, with more interest in reducing capital spending and less interest in life cycle costs. Landlords and building owners may be more concerned about reduced operating and maintenance costs as well as lower replacement costs. Lower capital costs are almost always a significant consideration. The objective should be to minimize construction cost while maintaining quality through the substitution of alternative materials and systems.

The owner may choose to engage an independent reviewer, rather than the architect/engineers of record, in the belief that this will be more likely to achieve the desired results. This approach can sometimes result in the substitution of inferior or inappropriate products, simply because they are cheaper. In these circumstances, the architect must be informed and given the opportunity to advise the owner on the consequences of the proposed changes.

Regardless of the method followed, the architect should document all changes in construction documentation requested by the owner. The architect should provide written comments and recommendations on all changes, and clearly describe the positive and negative aspects of the substitutions.

Embodied Energy Cost Analysis

This type of cost analysis assesses the environmental impacts and energy consumption resulting from the extraction, manufacture, delivery, installation, demolition, and recycling of building materials in buildings.

Increasing emphasis is being placed on the need to conserve natural and manufactured building materials and to reduce the embodied energy contained within all products used in building construction.

Work in this field is frequently undertaken by specialists. Architects are well equipped to develop knowledge and skills in this area of expertise, rather than relinquishing the field to others.

Definitions

Construction Budget: The client's budget for the construction cost, including contingencies for cost increases.

Element: Term used in cost estimating to describe a component of a building, such as *sub-structure* (footings, foundations) or *envelope* (walls and roof).

Estimate: To form and state a general idea of; an opinion or judgement (as to such factors as value, time, size).

Indexing: Applying an index or factor to adjust costs for one geographic region to another. (A typical index might be expressed as a percentage such as 102.7%.)

Project Budget: The client's estimated total expenditure for the entire project. It includes, but is not limited to, the construction budget, professional fees, costs of land, rights of way, and all other costs to the client for the project.

Quantity Survey: A bill of quantities or a detailed listing and quantities of all items of material and equipment necessary to construct a project.

References

American Society for Testing Materials (ASTM). *Standard Classification for Building Elements and Related Sitework*. West Conshohocken, PA: ASTM, 1996.

Canadata. Toronto, Ont.
Canadata Annual Construction Forecast. Published annually.

CanaData Forecaster. Newsletter published six times a year.

Canadian Construction Starts. Published monthly.

Construction Costing. Index published monthly.

Canadian Institute of Quantity Surveyors. *The Construction Economist*. A quarterly journal.

Construction Market Data, Inc. Various daily and weekly print publications as well as disk, E-mail, and on-line electronic products. Norcross, GA: Construction Market Data, Inc.

Dell'Isola, Alphonse. *Value Engineering: Practical Applications... for Design, Construction, Maintenance & Operations*. Kingston, MA: R.S. Means Co., Inc., 1998.

Derman, Asher, Ph.D. "Embodied Energy, Air Pollution, and Materials, Part 1." *AIA Environmental Guide*. Washington, D.C.: The American Institute of Architects Press, January 1993.

Foster, Norman *et al*. *Construction Estimates From Take-Off to Bid*. Third Edition. New York, NY: Hill, 1961.

Helyar & Associates. Chartered Quantity Surveyors. *Construction Cost Guide*. Toronto, Ont. Published annually.

Kirk, Stephen J. and Alphonse Dell'Isola. *Life Cycle Costing for Design Professionals*. Second Edition. New York, NY: McGraw-Hill, 1995.

Marshall & Swift. Los Angeles, CA.
Dodge Unit Cost Book 1998. Published annually.

Marshall Valuation Service. Published annually, with monthly updates.

R.S. Means Co., Inc. Kingston, MA.
Square Foot Costs. 1999.

CostWorks '99. 1999.

Yardsticks for Costing. Published annually.

Toronto Real Estate Board. *Schedule of Unit Costs*. Published annually. Toronto, Ont.

Appendix — Description of the Classes of Estimates used by PWGSC for Construction Costing of Building Projects

Class "D" Estimate

This estimate provides an indication of the total cost of the project, based on the user's functional requirements to the degree known at the time. It is based on historic cost data for similar work, suitably adjusted for such factors as: effect of inflation, location, risk, quality, size, and time. All related factors affecting cost are considered to the extent possible. Such an estimate is strictly an indication (rough order of magnitude) of the project total cost and completion date. This estimate is used to establish the *indicative* estimate required by Treasury Board for Preliminary Project Approval. Expected degree of accuracy: 20%.

Class "C" Estimate

This estimate is prepared at the end of the Design Concept stage and is based on updated user requirements, general description of the end built works, preliminary site information and existing conditions, and production. It takes into consideration construction experience and market conditions as well as basic implementation logistics. The estimate includes costs for design, documentation, and construction supervision. Expected degree of accuracy: 15%.

Class "B" Estimate

This estimate is prepared at the end of the Preliminary Design stage and is based upon data (on cost, time, and construction) of a level of precision as is typically available when the design of the major systems and sub-systems of the facility (including outline specifications and preliminary drawings and models), as well as when the results of all site or installation investigations are completed. This estimate also makes allowance for all costs resulting from the anticipated schedule, expected market conditions, and suitable level of contingencies. This estimate is used to establish the *substantive* estimate required by Treasury Board for Effective Project Approval. Expected degree of accuracy: 10%.

Class "A" Estimate

This estimate is based on the B estimate which has been updated concurrently with the development of Construction Documents and is submitted as a final pre-tender estimate. It requires that project systems be designed and specified to near completion, and is based on a realistic construction schedule as well as accurate labour and material costs. This is the final estimate before tender call or construction start. Typically, the total forecast is presented in elemental format and includes all actual associated fees and costs. Expected degree of accuracy: 5%.

(Source: Public Works and Government Services Canada)

Pre-design

Introduction

By definition, **pre-design** occurs before the commencement of schematic design. Some architects are qualified to provide a range of pre-design services, such as:

- feasibility studies;
- site analysis and selection;
- building surveys, audits, and measured drawings;
- functional programs;
- master plans;
- organizational planning and strategic plans;
- financial and business plans;
- re-zoning;
- organizing an architectural competition;
- arranging for proposal calls.

Some of these services lead to actual design commissions and building projects; others may not. Pre-design work is related to, but goes beyond, traditional **basic services** as defined in the *Canadian Standard Form of Agreement Between Client and Architect: Document Six*. All pre-design activities are **additional services** with the possible exception of basic site analysis.

Refer also to Chapter 2.1.10, *Architectural Services and Fees*.

The Consultant Team

Most pre-design services require special expertise. The challenges for architects in assembling a consultant team include:

- identifying the specialized knowledge and advice required;
- being aware of the full range of their own capabilities as generalists and problem-solvers;
- staying up-to-date in specialized fields.

Most architects are able to:

- provide the broad, detached overview that pre-design involves;
- understand the working environments and requirements of their clients.

On the other hand, providing pre-design services does require some specialization and currency in fields which are different from, but related to, traditional architectural practice. Certain aspects of pre-design may require the skills of specialist consultants. As a result of their training and experience, architects often act as facilitators or leaders of multi-disciplinary teams of consultants providing pre-design services.

Each architectural practice must decide whether it can afford to employ non-architectural expertise in-house, or should offer these services by assembling teams of consultants. Successful pre-design work depends on the selection and management of an appropriate team. In addition to the design professionals, such as engineers and landscape architects, many architects may need to engage outside consultants for some of the following services:

- functional programming;
- urban planning;
- environmental planning;
- geotechnical surveys and analysis;
- historical research;
- space planning;
- cost estimating or quantity surveying;
- real estate appraisal;
- accounting and financial analysis;
- computer systems planning;
- market research;
- management consulting.

Refer also to Chapter 1.2.3, *Consultants*, for a complete list of specialist consultants.

Feasibility Studies

Some architects conduct feasibility studies as part of their services. Feasibility studies often incorporate the following information and analysis:

- functional programs, including general space requirements and functional relationships, to identify the scope of a project;
- studies of regulations to determine code and zoning constraints, urban design objectives, and community issues related to a project;
- identification and evaluation of potential sites;
- environmental impact analysis;
- market studies, which forecast demand and also real estate market value of a completed project;
- demographic studies predicting demand and, possibly, preferences and lifestyle trends;
- financial studies identifying:
  - capital, operating, and maintenance costs;
  - sources of revenues, including funds to offset capital and operating costs;
- valuation of land and sites;
- evaluations of existing facilities, including:
  - building envelope;
  - mechanical, electrical, and structural systems;
  - functional adaptability;
  - code compliance;
- life cycle cost projections;
- studies to determine the compatibility of a functional program for a new facility with an existing or renovated building;
- exploration of alternatives, such as the "best" fit of a functional program with several potential sites;
- schedules for:
  - project development;
  - cash flow planning;
  - project phasing or decanting strategies (that is, maintaining a client's operations during changes to an existing facility).

Designing a project is often a very open and consultative process, involving the architect, the client, and various community stakeholders.

Architects are required to provide pre-design services and undertake feasibility studies to deal with an increasingly complex regulatory environment. Therefore, feasibility studies may examine:

- official plans and community plans;
- zoning and land-use controls;
- designated activity districts within cities;
- transportation issues;
- heritage districts;
- community organizations and concerns;
- civic design panels;
- building codes;
- environmental issues.

For government clients, feasibility studies could include an exploration of economic partnerships with the private sector, because governments are under pressure to reduce capital spending on public projects.

Clients are increasingly interested in renewing buildings and infrastructures rather than replacing them. In such cases, a feasibility study might assess:

- existing structures and their adaptive re-use for the future;
- the value of heritage conservation.

Furthermore, new forms of housing and new types of workplaces are emerging. Any decision to develop new building forms must be clearly supported by market demand.

Functional Programming

A problem well-stated is already half-solved.

This quotation summarizes what an architect does in developing a functional program. Functional programs are also called design briefs, facilities programs, architectural programs, owner's statement of requirements, space needs analyses or, simply, programs.

Time and money can be wasted because of lack of appropriate direction from a client. In fact, a project may even be completed without a full

understanding of the true nature of the client's requirements. A functional program, which is developed jointly by the architect and the client, clearly defines the problem. Good functional programs result in better and more effective design solutions.

A functional program describes the requirements which a building must satisfy in order to support and enhance human activities. The programming process seeks to answer the following questions:

- What is the nature and scope of the problem?
- What information is required to develop a proper architectural solution to the problem?
- How much and what type of space is needed?
- What space will be needed in the next five to ten years to continue to operate efficiently?

In preparing a functional program, the architect's main task is to examine the client's world in detail so as to define the client's needs and objectives. These requirements will establish criteria for evaluating potential design solutions or other strategic alternatives. The architect must understand:

- the impacts of a building's occupants and processes on the built environment;
- the social impacts of its program on the community;
- the planning impacts of its functions on the local infrastructure.

To prepare a functional program, architects should identify, research, and observe:

- the users of the proposed building and their work activities, including:
  - function-by-function, room-by-room, or department-by-department activity plans;
  - staffing plans;
  - storage requirements;
- the volume of activity planned for specific facility components, such as:
  - throughput (amount of material put through a manufacturing process);
  - flow patterns.

With this information, the architect can then develop approximate floor areas and technical requirements for the proposed facility, including:

- details of the space or of the workstation;
- special furniture configurations;
- environmental criteria.

The architect should also advise the client on alternatives, such as the architectural and financial implications of various building options. Functional programs for buildings are future-oriented — alternative scenarios may be based on high-, medium-, and low-growth projections, or on fast, medium or slow roll-outs of anticipated events. The architect should assist the client in assessing the advantages or benefits — and the disadvantages or costs — of each alternative.

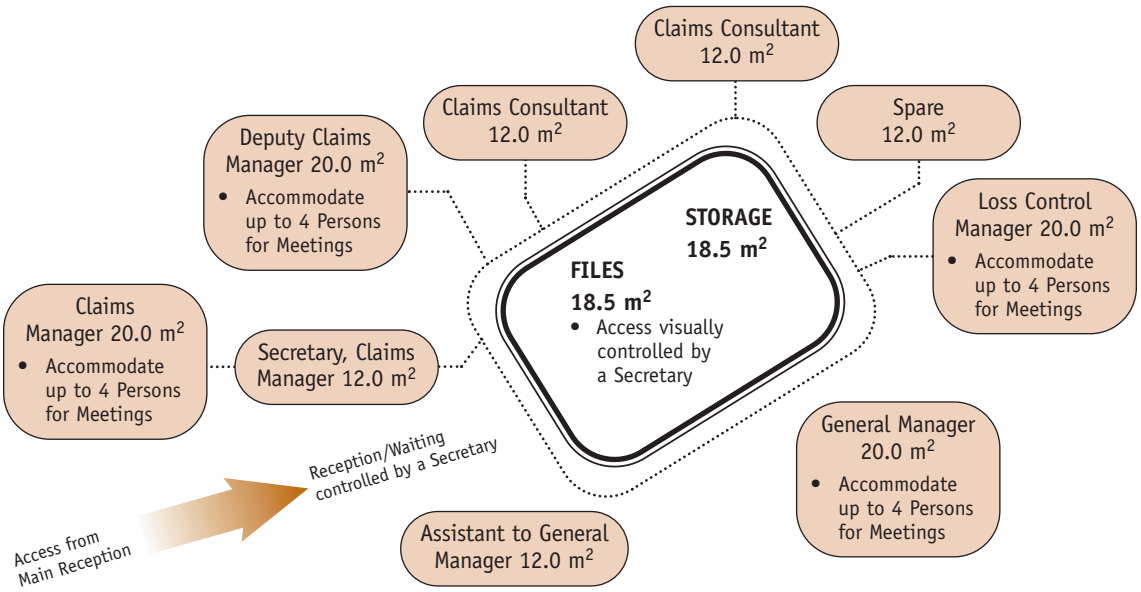
The final functional program is a report which includes some of the following information:

- the client's philosophy, values, goals, and desired "image";
- site requirements, such as parking, circulation, orientation;
- explicit space requirements for the future building, including:
  - definition of the activities which will take place in each space in the building;
  - the functional relationships of the spaces;
  - "bubble" diagrams (see Illustration 1) and flow diagrams;
  - the size of each of the spaces;
  - special technical requirements of each of the spaces and the building systems;
- financial requirements and a preliminary budget;
- scheduling and time frame for the project;
- other requirements including:
  - regulatory issues such as zoning and building code requirements;
  - other requirements from Authorities Having Jurisdiction;
  - community goals and concerns;
  - ecological and environmental concerns;
- a recommended construction project delivery method.

Illustration 2 shows a method of presenting some of the space requirements in a functional program.

Functional programs are often prepared as part of a *design brief* — information to be provided to another architect commissioned to design the building. Sometimes, particularly for simple or small projects, the functional program is prepared as part of the schematic design phase of a project.

Illustration 1: Typical Bubble Diagram (Spatial Relationship Diagram)



All areas are expressed in square metres

Architectural fees for functional programming are additional to the fee for "basic services," and therefore the fees should be increased accordingly.

Programming Skills

Programming requires specific skills. The programmer must develop the ability to understand a client's philosophy, values, and management style in areas such as:

- organizational behaviour;
- decision-making;
- success measurement;
- future objectives;
- social responsibility.

To develop this ability, the architect draws on knowledge and information borrowed from:

- the social sciences;
- management sciences;
- operations research;
- industrial engineering.

In addition to architectural ability, the architect may require such skills as management consulting and development economics to undertake functional programs. And along with research expertise, the architect needs good interpersonal and facilitating skills.

The architect often uses the following techniques:

- literature search and other research;
- observation (of the client's existing site or workplace);
- interviews and direct consultation with end users of the facility;
- public consultation;
- facilitation of focus groups;
- questionnaires and surveys.

Sometimes, stakeholders in a future building project may have conflicting viewpoints. In these cases, the architect must clarify the underlying issues and find the best compromise among conflicting agendas. Typical sources of conflict include:

- competing needs may exist within the client organization (for example, end users — such as tenants, teachers or medical staff — may have very different priorities and needs compared to those of landlords, school boards or regional health authorities);

- the involvement of more than one organization;
- different members within the organization may have different visions for the project.

Data management ties together all the information in a functional program. The architect or the programmer must know how to systematically store and retrieve an enormous amount of detailed information. The architect must also present this data to the client clearly so as to enable the client to make effective decisions.

Quantitative Factors

One purpose of most functional programs is to determine the optimum size of a building.

The amount of space required is ascertained from first principles of architectural design, such as:

- the number of people or pieces of equipment that will occupy the spaces;
- the nature of the activity in the space.

Architects must be familiar with current reference material and standards which relate human activities or technical processes to the amount of space required to support them. The best standards are developed from large amounts of data.

Refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*, for a discussion of standards.

Illustration 2: Unit Space Data

Activity

This area will serve as a utilitarian storage of records from all administrative departments, including all documents which will be archived and not frequently used. This area may be located below grade.

Description of Furnishings and Special Requirements

Note 1. This area requires extensive shelving for non-standard documents and materials, work tables, a reference desk and card catalogues, and 200m of lateral filing cabinets.

Note 2. Environment shall have Temperature set point:
Summer 20 deg C
Winter 20 deg C
Relative Humidity set point:
Summer 50% RH
Winter 50% RH
max. fluctuation ± 3%

Note 3. Floor construction must support adequate loads imposed by lateral filing cabinets.

Room Name: Central Storage Records

Floor Area	430 m^2	
Critical Dimensions	Ceiling height: Length: Width:	4 m — —
Access	Freight and public elevator	
Daylight	No daylight required or desired	
Users	Staff Visitors Others	Yes No No
Time in Use	Office hours Other hours Special	Yes Yes Yes
Furnishings		Note 1
Security	Basic level of protection	
Finishes	durable resilient flooring/ painted gypsum board/ accessible acoustic tile	
Electrical	110v AC utility outlets	
Lighting	General level Task level UV screened	Yes Yes No
HVAC Sytems		Note 2
Plumbing		not required
Fire Suppression	Standard requirements	
Communications	Telephone, data, and intercom	
Floor Loading		Note 3

In pre-design work, an understanding of net and gross floor areas is essential for determining the probable size of a building. Architects working for the commercial sector must be familiar with the floor area measurements used for leasing purposes. The Building Owners and Managers Association (BOMA) publishes the *Standard Method for Measuring Floor Areas in Office Buildings*, a standard known as ANSI/BOMA Z65.1-1996. Other agencies at the federal and provincial level publish floor area standards for other building types.

Site Analysis

Site analysis is an essential pre-design service. It includes evaluation of an existing or potential site in relation to the building program, budget, and construction schedule.

Site analysis is usually an additional service. In certain circumstances, site analysis may be undertaken as part of the schematic design phase of a project and the fee should be adjusted accordingly.

Data Collection

To evaluate the site, the architect must assemble the following information:

- existing conditions which have an impact on the design:
  - climate, including prevailing winds, solar orientation, etc.;
  - topography, including site contours, drainage, water courses, visual characteristics, physical features, vegetation, water bodies, etc.;
  - geotechnical or soil information;
  - environmental hazards;
  - immediate surroundings, including neighbouring structures, shading and solar access, noise, views, and vistas;
- property description:
  - legal description, including boundary survey, easements, rights-of-way, etc.;
  - vehicular and pedestrian access;
  - utilities and services available to the site.

Zoning and Other Regulations

It is important to identify the zoning or land use regulations which apply to the site, including:

- permitted uses;
- minimum area;
- height restrictions;
- setbacks;
- lot coverage:
  - floor area ratio;
  - percentage of coverage;
- open space requirements;
- parking requirements;
- other requirements.

The architect must determine what other regulatory requirements apply to the site and the respective Authority Having Jurisdiction. Refer also to Chapter 1.2.4, *Building Regulations and Authorities Having Jurisdiction*.

After site analysis has been completed, it may be necessary to prepare presentation material to assist in the formal procedures for applications to the Authorities Having Jurisdiction. The architect may also be expected to make presentations to municipal committees or at public meetings during the pre-design stage of a project.

Refer to "Site Evaluation Checklist" at the end of this chapter for a complete list of factors to consider when evaluating a site.

Master Planning

Master plans define long-term development strategies for specific sites, campuses or communities, including considerations related to current and future infrastructure, site development, site circulation, and spatial relationships. A master plan, which may be required following completion of a functional program, establishes the process for the program's staged implementation over time.

Organizational Planning

Organizational change frequently generates the need for new buildings or alterations to existing buildings. Conversely, executives and managers often use the decision to plan and renovate or construct as a catalyst for organizational or administrative change. The architect is likely to become involved in this process and should have a basic knowledge of the culture of organizations and business administration. Information on organizations and management is available through management training courses and in most libraries in the business management sections.

Financial Planning

Financial issues are usually first addressed at the pre-design phase of a project. Data and information about the proposed building at this stage are general in nature; therefore, cost planning will likewise be very general. The programmer must be familiar with the cost information available for early financial planning, for example:

- hospitals use unit-of-service measures to identify "ballpark" costs of proposed development, such as:
  - cost, expressed in $ per bed;
  - the number of beds determined by populations in the hospital catchment area;
- universities use formulae based on the number of full-time-equivalent students to determine:
  - the amount of space at an early stage;
  - the capital cost of projects;
- developers have rules of thumb for determining the likely capital costs of housing, office buildings or shopping centres.

Financial plans are typically presented as a "pro forma" which may include:

- hard development costs (construction and land costs);
- soft development costs (such as professional fees, realtor fees);
- financing costs;
- market revenue analysis;
- rates of return on investment.

The completed financial plan should identify "how much building must be built" (scope of the project) and should establish a preliminary financial analysis indicating capital costs on a unit area basis. Refer also to Chapter 2.3.3, *Cost Planning and Control*.

Definitions

Feasibility Study: A report which outlines the research and subsequent analysis to determine the viability and practicability of a project. A feasibility study analyzes economic, financial, market, regulatory, and technical issues.

Functional Program: A written statement which describes various criteria and data for a building project, including design objectives, site requirements and constraints, spatial requirements and relationships, building systems and equipment, and future expandibility.

Pre-design Services: The architectural services provided prior to the traditional "basic services" outlined in Document Six, which assist the client in establishing a functional program as well as the project scope, including a financial and scheduling plan.

References

Brauer, R.L. *Facilities Planning*. New York, NY: Amacon, 1992.

France, Kenneth and Michelle Kish. *Supportive Interviewing in Human Service Organizations*. Springfield, IL: Charles C. Thomas, 1995.

Herschberger, Robert. *Architectural Programming and Predesign Manager*. New York, NY: The McGraw-Hill Companies, 1999.

Palmer, Mickey A. *The Architect's Guide to Facility Programming*. New York, NY: The American Institute of Architects and Architectural Record Books, 1981.

Peña, William M; Steven A. Parshall; and Kevin A. Kelly. *Problem Seeking: An Architectural Programming Primer*. Third Edition. Houston, TX: CRS, 1987.

R.S. Means Co., Inc. *Yardsticks for Costing*. Published annually. Kingston, MA: R.S. Means Co., Inc.

Site Evaluation Checklist

This is a checklist of the factors that may be involved in evaluating a site. Although lengthy, this list is not all-inclusive; new factors are added from time to time. Information is usually collected only for those items that are pertinent to the project.

PHYSICAL FACTORS

Climate

A. Prevailing winds
   1. Direction
   2. Maximum, minimum, and average velocities
   3. Special forces (e.g., tornadoes, hurricanes)

B. Solar orientation
   1. Sun angles
   2. Days of sunlight
   3. Cloud cover
   4. Shading of (or from) adjacent structures, natural features, and vegetation

C. Temperature
   1. Ranges of variation
   2. Maximums and minimums

D. Humidity
   1. Ranges of variation
   2. Maximums and minimums

E. Precipitation
   1. Peak period totals
   2. Annual and seasonal totals

Topography

A. Legal property description, including limits of property, easement, rights of way, and north indication

B. Topography maps and aerial photos
   1. Contours and spot elevations
   2. Slopes: percentage, aspect, orientation
   3. Escarpment
   4. Erosion channels
   5. Extent, location, and general configuration of rocks, ledges, outcrops, ridges, drainage lines, and other unique features
   6. Visual characteristics
   7. Potential problem areas during construction: siltation, erosion, etc.

C. Analysis of physical features, including major focal and vantage points and their relationships within, into, and out from the site

D. Existing access and circulation
   1. Vehicular
   2. Pedestrian

E. Vegetation

F. Existing water bodies
   1. Location, size, depth, direction of flow
   2. Water quality: clean, polluted, anaerobic conditions, etc.
   3. Use: seasonal, year-round
   4. Wetlands: ecological features
   5. Variations: expected water levels, tides, wave action
   6. Coastal features

G. Drainage canals: rivers, streams, marshes, lakes, ponds, etc.
   1. Natural and built
   2. Alignments and gradients
   3. Pattern and direction

H. Existing waterway easements
   1. Surface
   2. Sub-surface

I. Surface drainage
   1. Patterns on and off the site (location of streams and washes)
   2. Proximity to floodplains
      a. Maximum flood level
      b. Frequently flooded areas
   3. Local watershed areas, amount of runoff collected, and location of outfalls
   4. Swampy and concave areas of land without positive drainage and other obstacles that may interrupt or obstruct natural surface drainage
   5. Potential areas for impoundments, detention/retention ponds

J. Unique site features

Geotechnical/Soils

A. Basic surface soil type: sand, clay, silt, rock, shale, gravel, loam, limestone, etc.

B. Rock and soil type: character/formation and origin
   1. Geologic formation process and parent material
   2. Inclination
   3. Bearing capacity

C. Bedrock
   1. Depth to bedrock
   2. Bedrock classification

D. Seismic conditions

E. Environmental hazards

Utilities

A. Potable water
B. Electricity
C. Gas
D. Telephone
E. Cable television
F. Sanitary sewer service
G. Storm drainage (surface, sub-surface)
H. Fire protection

Immediate Surroundings

A. Neighbourhood structures: buildings, satellite dishes, etc.
B. Shading and solar access
C. Noise from streets, emergency services, aircraft, etc.
D. Odours
E. Views and vistas

General Services

A. Fire and police protection
B. Trash/refuse removal services
C. Snow removal, including on-site storage

CULTURAL FACTORS

Site History

A. Former site uses
   1. Hazardous dumping
   2. Landfill
   3. Old foundations
   4. Archaeological grounds

B. History of existing structures
   1. Historic worth
   2. Affiliations
   3. Outline
   4. Location
   5. Floor elevations
   6. Type
   7. Condition
   8. Use or service

Land Use, Ownership, and Control

A. Present zoning of site and adjacent property

B. Adjacent (surrounding) land uses
   1. Present
   2. Projected
   3. Probable effects on the development of this site

C. Type of land ownership

D. Function and pattern of land use: public domain, farm type, grazing, urbanized
   1. Present
   2. Former

E. Location, type, and size of pertinent community services
   1. Schools and churches
   2. Shopping centres
   3. Parks
   4. Municipal services
   5. Recreational facilities
   6. Bank
   7. Food services
   8. Health services
   9. Access to highways, public transportation

Economic Value

A. Political jurisdictions and land costs

B. Accepted "territories"

C. Future potential

D. Size of surrounding lots and approximate price ranges

REGULATORY FACTORS

Zoning Codes

A. Permitted Uses
   1. By variance
   2. By special use permits
   3. Accessory structures

B. Minimum site area requirements

C. Building height limits

D. Yard (setback) requirements

E. Lot coverage
   1. Floor area ratio (FAR)
   2. Percentage of coverage
   3. Open space requirements

F. Off-street parking requirements

G. Landscaping requirements

H. Sign requirements

Sub-division, Site Plan Review, and Other Local Requirements

A. Lot requirement
   1. Size
   2. Configuration
   3. Setbacks and coverage

B. Street requirements
   1. Widths
   2. Geometry: grades, curves
   3. Curbs and curb cuts
   4. Road construction standards
   5. Placement of utilities
   6. Dead-end streets
   7. Intersection geometry
   8. Sidewalks
   9. Names

C. Drainage requirements
   1. Removal of spring and surface water
   2. Stream courses
   3. Land subject to flooding
   4. Detention/retention ponds

D. Parks
   1. Open space requirements
   2. Park and playground requirements
   3. Screening from adjacent uses

Environmental Regulations

A. Water, sewer, recycling, solid waste disposal

B. Clean air requirements

C. Soil conservation

D. Protected areas, wetlands, floodplains, coastal zones, wild and scenic areas

E. Fish and wildlife protection

F. Protection of archaeological resources

Other Codes and Requirements

A. Historic preservation and landmarks

B. Architectural (design) controls

C. Special districts

D. Miscellaneous, e.g., mobile homes, billboards, noise

E. Site-related items in building codes
   1. Building separation
   2. Parking and access for persons with disabilities
   3. Service and emergency vehicle access and parking

Reprinted with permission of The American Institute of Architects

Schematic Design

Introduction

Schematic design is the phase of the project during which the client's requirements and desires assume architectural form. The term also represents the important conceptual stage where the architect can provide added value by using creativity and ability to synthesize various, and often competing, requirements. At this stage, the architect and the client agree on an architectural concept representing a synthesis of the following elements:

- the nature of the site;
- the space planning requirements described in the client's program;
- the self-image or philosophical objectives of the client;
- the design approach of the architect.

In schematic design, the architect and the client discuss and confirm the key issues of the project and agree on the architectural form to accommodate them. This form should be based on a design brief or functional program developed in discussions between the two parties during pre-design (refer to Chapter 2.3.4, *Pre-design*). The benefits and value of preparing a well-thought-out program cannot be overstated.

Throughout the schematic design phase, the architect tests the client's program by studying various planning and massing relationships, always within the constraints of the project budget. Ideally, schematic design will conclude with a design which is the best possible synthesis of all the factors being considered.

As the design character emerges, the need to change program details may become evident. The schematic design process provides a method for fine-tuning elements of the client's requirements and adjusting spatial relationships before beginning the detailed technical development.

Schematic design is also the stage when the architect assembles the design team, including sub-consultants who:

- become familiar with the opportunities and challenges presented by the building site;
- investigate different types of construction materials, systems, and contractual methods;
- establish the project's technical principles;
- review their proposals with the architect and the client.

Client-Architect Relationship

The most successful projects result when the client participates actively in the development of the design. Throughout schematic design, the architect-client dialogue continues, as proposals for specific responses to the project's requirements are put forward by the architect. It is important for the parties to remain in agreement over the fundamental issues. To facilitate effective client participation and to maintain the trust between the parties, the architect must encourage communication and ensure that all design issues and construction budgets are presented and open to discussion. Minutes of design meetings should be taken and circulated.

Timely client involvement will help resolve difficulties with program elements or highlight the need to modify the program. Budgets must be reviewed to ensure that the proposed solution meets all functional requirements; alternatively, the budget can be adjusted. With a speculative building project, or with alternative construction project delivery systems, the architect may not have access to a community of users. In this instance, the client is considered the user representative. The architect may request that the client formally confirm certain decisions with recognized user groups or associations.

To ensure that projects run smoothly and design time is optimized, the architect should insist that clients provide timely approvals and information on functional requirements.

Information Required at Schematic Design

The client is responsible for providing a design brief or functional program addressing:

- functional requirements and spatial relationships;
- flexibility and provision for expansion;
- special equipment and systems;
- site requirements;
- construction budget;
- time frame or schedule.

In addition to the program, the client is responsible for providing full documentation of site conditions, including:

- legal and physical surveys;
- reports on sub-surface conditions, including the presence of hazardous materials or other pollutants;
- any other professional reports or opinions from specialist consultants that will have an impact on the work.

If the client does not have all this documentation, the architect may help procure it, acting as the client's agent. Alternatively, the architect may insist that the client retain specialists to provide the necessary information, partly because the architect's liability insurance will not cover certain sub-consultants.

If the architect and the client do not yet have a clearly defined understanding of project objectives, schematic design should be delayed until the appropriate information is available and intentions are understood. Assistance with programming and obtaining missing information are considered additional or optional services and, with mutual agreement, should be billed accordingly.

As the schematic design process continues, the architect applies technical and regulatory knowledge by:

- incorporating appropriate construction materials and methods;
- ensuring compliance with building codes;
- dealing with occupational health and safety codes;
- ensuring that local zoning and urban design requirements are met.

Before proceeding to detailed design, architects must fully investigate planning and technical requirements as well as regulations of Authorities Having Jurisdiction (such as environmental impact, site plan control, zoning, parking requirements, and limiting distances). A general overview, rather than a detailed analysis, of building code compliance is necessary at this stage.

Space, Circulation, and Massing Studies

As part of the preliminary analysis of a new commission, the architect will often prepare a series of space diagrams to identify the comparative size and relationships of the functional areas and spaces required. Proportions and volumes can be established and, with the data rationalized to this extent, the preliminary architectural planning and designing can be more realistically undertaken.

In addition, pedestrian and vehicular circulation diagrams — linking the relevant spaces and applicable site constraints — can be undertaken, usually concurrently. Consultant input, especially related to mechanical and electrical space requirements as well as vehicular traffic and vertical transportation systems, may be sought at this stage.

On large and complex projects, the architect should ask the client to approve such diagrams as they are developed.

Having undertaken and established some basic planning relationships in the form of these flow and space diagrams, the architect must then consider the overall form which the project could take.

Using sketches and block models, the architect investigates various forms and relative volumes for the building project. From such massing studies, the architect can:

- establish the sculptural quality of the building;
- visualize the space between buildings (proposed and existing);
- determine the effect of sun, shade, snow, rain, and wind on the project and its surrounding environment.

Engineering Services for Schematic Design

During the schematic design phase, the architect assembles the design team, including structural, mechanical, and electrical engineers. Other specialist sub-consultants may be required, depending on site conditions and programmatic requirements. Engineering sub-consultants help prepare the construction budget submitted at the completion of the schematic design stage (refer to Chapter 2.3.3, *Cost Planning and Control*). The project will progress more smoothly if the consultants become familiar with the site and program requirements early on in the process.

As the general form of the facility emerges from programmatic data, engineers from the various disciplines work with the architect to develop structural, as well as mechanical and electrical, servicing concepts appropriate to the project goals. Early involvement by design engineers is a significant factor in obtaining the synthesis of building elements that can lead to reduced capital costs and improved building performance. Integration at the schematic design stage of appropriate site development, building envelope characteristics, and mechanical and electrical systems optimizes the contribution of each design discipline.

Design Alternatives: Evaluation and Selection

On occasion, the project program may include more than one possible path to follow for planning or for developing architectural concepts. In these circumstances, the architect may prepare design alternatives for the client to consider.

At the schematic design stage, design alternatives should involve quick diagrammatic studies to address issues such as circulation, planning, and volumetric aspects of the project, without developing architectural detail. Some clients may want to review multiple options, thinking that this demonstrates a thoroughness of process. These options should be limited to simple planning diagrams. The architect must strike a balance between providing an appropriate level of basic services and undertaking extensive studies that should be identified (and billed) as optional or additional services.

The study of potential alternatives may indicate unresolved areas in the program that should be addressed by more appropriate means than the preparation of architectural concepts. A good rapport and open lines of communication between architect and client will permit prompt clarification of program elements and avoid unnecessary work.

Design alternatives should be evaluated and selected on the basis of:

- completeness of response to program elements;
- success in resolving functional relationships and adjacency requirements;
- alternative structural, mechanical, and electrical systems;
- comparisons of building efficiencies, including:
  - ratio of net to gross floor areas;
  - ratio between circulation and usable floor areas;
  - wall surface to floor area ratios;
  - capital, operating, and maintenance costs.

Building Cost Analysis

During schematic design, the architect prepares preliminary cost estimates, usually based on the area or volume of the proposed building, multiplied by the appropriate unit costs (refer to Chapter 2.3.3, *Cost Planning and Control*).

Documentation and Presentation

Schematic design documents illustrate the functional relationships of the project elements as well as the project's scale and character, based on the final version of the functional program, the schedule, and the construction budget. The design documents may include:

- a site plan;
- principal floor plans;
- vertical sections;
- building elevations;
- illustrative sketches or perspective renderings, computer-generated or virtual reality presentations;
- massing models.

In addition to design documents, it is often appropriate to prepare a report containing the following:

- design approach or philosophy;
- probable construction cost (with appropriate qualifications — refer to Chapter 2.3.3, *Cost Planning and Control*);
- summary of status of design with respect to applicable environmental, planning, and zoning regulations as well as building codes;
- preliminary schedule for design and construction start and completion;
- description of structural, mechanical, and electrical systems;
- basic area calculations and analyses;
- site data;
- product and material description and sample of key construction materials or finishes.

The architect reviews the documents with the client and should obtain written approval before beginning design development.

Standard Contract Documents and Checklists

A list of the conditions to be satisfied in the schematic design phase is provided in the *Canadian Standard Forms of Agreement Between Client and Architect: Document Six* and *Canadian Standard Forms of Agreement Between Client and Architect — Abbreviated Version: Document Seven*.

A detailed "Checklist for the Management of the Architectural Project," including requirements during the schematic design phase, is available at the end of Chapter 2.3.1, *Management of the Project*.

References

Allen, Edward and Joseph Iano. *The Architect's Studio Companion: Technical Guidelines for Preliminary Design*. Toronto, Ont.: John Wiley & Sons, 1989.

G.F. Shymko and Associates Inc. "C-2000 Design Facilitation, Overview of Facilitation Experiences in the Alice Turner Branch Library." Vancouver, B.C.: May 1998.

Larsson, Nils. "The C-2000 Program: Changing the Design Process." Ottawa, Ont.: Natural Resources Canada, September 1998.

National Practice Program (NPP). Ottawa, Ont.

Canadian Standard Form of Agreement Between Client and Architect: Document Six. 1997.

Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: Document Seven. 1997.

Design Development

Introduction

During the design development phase, the selected scheme — which was prepared during the schematic design phase — is **refined and developed in more detail**. Refer to Chapter 2.3.5, *Schematic Design*, for a discussion of this first phase of the project.

Because it is sometimes difficult to differentiate between when the schematic design phase ends and when the design development phase begins, some architects and most engineers combine these two early phases into a single phase, termed "preliminary design." However, it is advantageous to obtain initial approval of the early concept from the client before proceeding to more specific design details. Engineers frequently use the term "design" to refer to construction documents as well as preliminary design. It is important to have a mutual understanding of each phase and to plan for the appropriate documentation when communicating with engineers.

Once the design is developed and accepted by the client, the project can move into the next phase — construction documentation. Refer to Chapter 2.3.7, *Construction Documents — Drawings*, and Chapter 2.3.8, *Construction Documents — Specifications*, for this stage of a project.

This chapter briefly describes the services of the architect during the design development phase of a project.

Design Development Tasks

Article 2.3 of the *Canadian Standard Form of Agreement Between Client and Architect: Document Six* outlines some of the architect's responsibilities during design development. During this phase, refining the design usually entails the following tasks:

- preparation of all architectural, structural, mechanical, and electrical designs;
- preparation of a comprehensive outline specifications;
- additional review with Authorities Having Jurisdiction;
- preparation of presentation documentation (such as drawings, models, computer renderings, as agreed to in the client-architect agreement);
- update of the construction cost estimate;
- update of the schedules for design, preparation of construction documents, and time frame for construction.

During the design development phase, it is important to resolve and finalize the design of all major components. At this stage, the input and collaboration of the consultants is critical to the success of the project. The failure to achieve a well-integrated design can result in delays and coordination problems during the next phase of the project. Major revisions at a later stage will be costly to the architect and can result in compromises to the architectural design concept.

During design development, the client is responsible for the following:

- reviewing and commenting on the design;
- providing approval of the design and authorizing the preparation of construction documents.

One of the important roles for the architect during design development is to investigate various manufactured products for incorporation into the future building. Usually the functional program will outline the requirements for durability and maintenance of certain products. During design development, the architect should ensure that the maintenance and durability of various materials as well as their cost and performance meet the client's needs.

Prior to making a final recommendation to the client, the architect should review the following factors:

- dependability of the source of supply (such as stability of manufacturer or supplier, types of warranties available);
- availability of technical data, samples, and literature on the product;
- performance criteria (including suitability for application and compatibility with other materials);
- durability and maintenance requirements;
- physical characteristics and availability of various colours, finishes, textures or other features;
- fabrication and installation requirements;
- cost;
- time for delivery;
- past performance;
- comparative analysis with similar products in the marketplace.

Engineering Services for Design Development

As previously indicated, continuing to coordinate the design work at this stage with all engineering disciplines is critical to the success of the project. Collaboration with the engineers should begin in the schematic design phase of the project and continue intensively during design development.

Structural

During the preliminary design stages, the structural engineer usually develops alternative framing plans which indicate basic elements such as typical bays and their spacing together with their associated costs. The design may analyze various framing systems such as concrete, steel, and timber. At this stage, the most economical and functional framing system and appropriate bay size must be selected. This decision is frequently dictated by functional considerations.

To complete design development, the architect should provide the structural engineer with the following information:

- the soils or geotechnical report (usually prepared at pre-design stage);
- the selected schematic design;
- the future expansion and flexibility required for each space;
- restrictions regarding the locations of columns or other structural supports;
- defined areas, including use, size, and finishes;
- fire separations and fire ratings;
- the size and locations of openings;
- construction materials;
- the method of construction project delivery and the expected time frame.

Some of the design issues which must be resolved with the structural engineer include:

- typical bay framing, including typical sizes of beams and columns;
- maximum depths of members and all critical sizes of members;
- size and location of openings through the structure for all work by other disciplines;
- identification of items to be embedded into the structure;
- requirements regarding fire ratings and fire separations;
- provisions for special equipment and typical mechanical equipment, including window washing equipment, mechanical rooftop units, self-leveling docks, chimneys, slab depressions, etc.

Mechanical

The architect must also continue to collaborate with the mechanical engineer. The client's requirements for operation and maintenance (for example, availability of stationary engineers) and the requirement for emergency standby and dual-equipment systems should have been included in the functional program. If these were not part of the program, the architect must determine the client's requirements and ensure that the mechanical design meets these needs.

To complete design development, the mechanical engineer will require various types of information, including:

- the selected schematic design;
- detailed site information, including all services such as water, sewer, gas;
- future expansion and future changes to the building to allow for flexibility of mechanical systems;
- wall and roof construction, window sizes, type of glazing, and type of window coverings;
- hours of use of the building;
- allowable variation in room temperatures and humidity;
- areas requiring special treatment for air conditioning, fire protection, plumbing, noise;
- fire separations;
- requirements for special controls and energy management;
- analysis of water and special waste removal equipment;
- other special equipment, such as lawn sprinklering systems.

The architect or the client may provide some of this information, or the mechanical engineer will obtain some of the information directly from the appropriate authorities.

During the design development phase, the mechanical engineer should select and resolve the following:

- central versus individual heating and cooling plants;
- type and size of air conditioning equipment;
- type and size of heating system;
- special HVAC systems such as heat recovery systems, heat pumps;
- size and location of major ducts and pipes;
- location and approximate size of all mechanical equipment;
- other features, such as noise control, vibration dampers, special controls.

In addition to preparing a set of design development drawings, the mechanical engineer usually develops information on future operating costs for the proposed building. This information should provide the operating costs of mechanical equipment for various options of building materials in order to assist the architect in making a final selection of insulation types and thickness, and of the type of glazing.

Electrical

To complete the design development documents, the electrical engineer requires the following information:

- the selected schematic design;
- information on all areas, including function, size, finish and materials, lighting levels;
- the future expansion and flexibility required for each space;
- the method of construction project delivery and expected time frame.

During the design development phase, the electrical engineer should resolve the following design issues related to the electrical systems:

- the anticipated electrical load and allowances for future expansion;
- requirements of incoming electrical services and any space requirements for a vault or sub-station;
- the distribution of power and utilization voltages;
- locations for electrical closets, communications rooms, bus-duct risers;
- requirements for embedding conduits;
- light fixture selection and requirements for ceiling systems and ceiling space;
- telecommunications and data systems, fire alarm systems, public address systems, intercom, security.

For the lighting design, the architect works with the electrical engineer to develop lighting layouts. This layout is often developed on the architectural reflected ceiling plans with input from the electrical engineer or a specialist lighting consultant.

Other Consultants

In addition to the consultants providing normal engineering services, many other consultants may be involved at the design development stage of a project. Refer to Chapter 1.2.3, *Consultants*, for a list of some of the consultants required for different architectural projects.

It is also necessary at this stage of a project to determine the requirements from certain manufacturers of various building systems such as elevator companies and suppliers of wall cladding systems.

Regulatory Reviews and Approvals

The architect should have commenced the review with Authorities Having Jurisdiction during the schematic design phase of a project; however, it is important to maintain contact with authorities and to review certain details with the appropriate Authority Having Jurisdiction. Written or final approval is usually not obtained until the completion of construction documents; however, if the Authority is aware of the details and content of the project design, approval is facilitated.

Refer also to Chapter 1.2.4, *Building Regulations and Authorities Having Jurisdiction*.

Building Cost Analysis

Preparing an updated construction cost estimate is one of the basic services an architect must provide at the design development phase. Additional design information facilitates the preparation of a more complete and accurate estimate with a reduced contingency allowance. Refer to Chapter 2.3.3, *Cost Planning and Control*, for information on construction cost estimates and the requirements at the design development stage.

Documentation and Presentation

The design development documents are used for a variety of purposes and by several participants in the design process. Some of the uses of these documents include:

- client review and approval;
- reviews with Authorities Having Jurisdiction and public groups;
- consultant input and coordination;
- update of construction cost estimates;
- the basis to prepare the construction documents.

The documents should adequately describe and "finalize" the design for the entire project in order to form the basis for reviews and for the completion of construction documents. For projects of a certain scale, design development documents may include three separate components:

- drawings;
- outline specifications;
- a design report.

Drawings

The drawings produced at the design development stage should provide adequate information to the client, consultants, and Authorities Having Jurisdiction to explain all components of the project. Depending on the size and complexity of the project, the drawings may include the following:

- the site plan (in some jurisdictions, it is necessary to prepare a detailed site plan for site plan approval or the site plan control process at this stage);
- all floor plans and all building elevations;
- sections;
- plans describing the structural, mechanical, and electrical systems;
- details of significant design features and building materials;
- preliminary furniture and equipment layouts;
- presentation drawings which might include computer renderings, colour boards, interior and exterior views.

Outline Specifications

It is important at this stage of the project to present, review, and obtain approval of all building components. This is usually achieved in part through the preparation of a complete outline specification which describes the proposed materials and construction systems in general terms and provides basic information on appearance, texture, operating and performance criteria, etc. This type of specification is described briefly in Chapter 2.3.8, *Construction Documents — Specifications*.

Design Report

For some projects, it is important to document all design decisions and design criteria at the end of design development. This is usually accomplished by means of a "design report."

The design report is an invaluable tool for use by clients. It is also useful for those who may not be familiar with the project, such as:

- staff in the architect's office;
- another architect who may be undertaking construction documentation as part of a joint venture;
- consultants.

It also serves as a record for the project which may require lengthy approval periods or which is subject to delays. The report assists others — such as Authorities Having Jurisdiction, financial institutions, and users — to understand the basis of a project's design.

An analysis of the building with respect to compliance with the building code is often included in the design report. A "Suggested Table of Contents for a Design Report" is provided at the end of this chapter.

Checklists

Refer to the "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, which lists tasks to be undertaken prior to and during the design development phase.

Suggested Table of Contents for a Design Report

1. Introduction and Background to the Project

2. List of Drawings (appended to the Design Report)

3. Design Objectives

4. Description of the Design

4.1 ARCHITECTURAL Design
- 4.1.1 Site Orientation, Landscaping, and Parking
- 4.1.2 Exterior Design
- 4.1.3 Circulation
- 4.1.4 Functional Layout and Interior Features
- 4.1.5 Finishes

4.2 STRUCTURAL Design
- 4.2.1 Foundations
- 4.2.2 Structural System and Framing

4.3 MECHANICAL Design
- 4.3.1 Description of HVAC System
- 4.3.2 HVAC Distribution
- 4.3.3 Sprinkler System
- 4.3.4 Equipment Room
- 4.3.5 Controls
- 4.3.6 Operating Costs and Energy Consumption

4.4 ELECTRICAL Design
- 4.4.1 Description of Electrical System and Schematics
- 4.4.2 Lighting and Light Fixtures
- 4.4.3 Fire Alarm System
- 4.4.4 Communication and Security Systems
- 4.4.5 Controls and other Features

5. Outline Specifications

6. Building Code Analysis

7. Summary of Building Areas

8. Construction Cost Estimate

Construction Documents — Drawings

Introduction

Construction documents include the drawings and specifications. These documents guide and direct the contractor and the sub-contractors in carrying out their work on a project. For this reason, drawings are frequently called "working drawings." As part of the construction contract, the working drawings take on a legal significance for which architects must assume responsibility.

This chapter discusses the production of working drawings. Refer to Chapter 2.3.5, *Schematic Design*, and to Chapter 2.3.6, *Design Development*, for information about preliminary design drawings that are prepared prior to the working drawings. Chapter 2.3.8, *Construction Documents — Specifications*, discusses the specifications that accompany and complement working drawings.

Architects should obtain client approval of the design development documents **before** beginning the construction documents. A formal approval should be received in writing to ensure that the client understands the importance of this decision and the expense of producing the construction documents. The project architect should explain to the client that any changes requested while working drawings are being prepared will entail delays (and costs). An apparently simple change can have a "ripple" effect on a number of different drawings, including engineering working drawings.

Purpose of Drawings

Drawings are a means of communicating information in a two-dimensional format using lines, graphic symbols, and text. Drawings describe the relationships between building components (sometimes referred to as building assemblies) and the following characteristics:

- location of the component;
- name or identification;
- size and dimension;
- shape and form;
- details or diagrams of connections for the building assembly.

Many different individuals and organizations use drawings for a variety of purposes. The primary users are the owner, the architect, and the contractor — the parties that are bound to one another to design and construct a building. Sub-contractors, consultants, and owners' representatives also use the drawings for design and construction. Other users include:

- Authorities Having Jurisdiction;
- product manufacturers and suppliers;
- financial institutions;
- tenants and end users of the building;
- facility managers and maintenance personnel;
- other construction industry professionals.

The working drawings are used by:

- *architects:*
  - to communicate project particulars to clients in order to obtain approval;
  - to prepare cost estimates;
  - to review the work and to determine general conformity with the intent of the construction documents;

- *clients:*
  - to check that the project will meet their requirements;
  - to approve the bid package;
  - to form part of the documents for the contract with the contractor;

- *bidders:*
  - to prepare bids;
  - to obtain bids from their sub-contractors and suppliers;

- *selected contractor(s):*
  - to form part of the documents for a contract with the client;
  - to guide them in carrying out the work;

- *Authorities Having Jurisdiction:*
  - to verify that the project conforms to existing regulations;
  - to plan for the provision of utilities and services.

Planning the Production of Working Drawings

The preparation of working drawings is the project phase that demands the most of the architect's time and resources. It is essential to plan the production to ensure that proper, coordinated documents are produced within the budget allowed for this purpose.

The project architect or project manager is usually the individual responsible for planning the production of working drawings. When scheduling the work, the project architect must consider:

- the available production budget;
- the available human resources;
- the firm's physical resources and computer systems (hardware and software);
- the resources available to the consultants.

The project architect must therefore:

- determine what drawings and information must be produced;
- calculate how much time is needed to produce each drawing;
- assign tasks;
- set the project schedule;
- manage and coordinate the work with all team members.

The project architect in charge of producing the complete set of working drawings must coordinate the work of the design team (engineers and other consultants).

At the start of the construction documents phase, the project architect should meet with the entire consultant team in order to agree on:

- the production schedule;
- standards for preparing and presenting the drawings and plots;
- protocols for the exchange of information or electronic file transfer (if this has not already been agreed upon in a previous phase);
- general coordination methods.

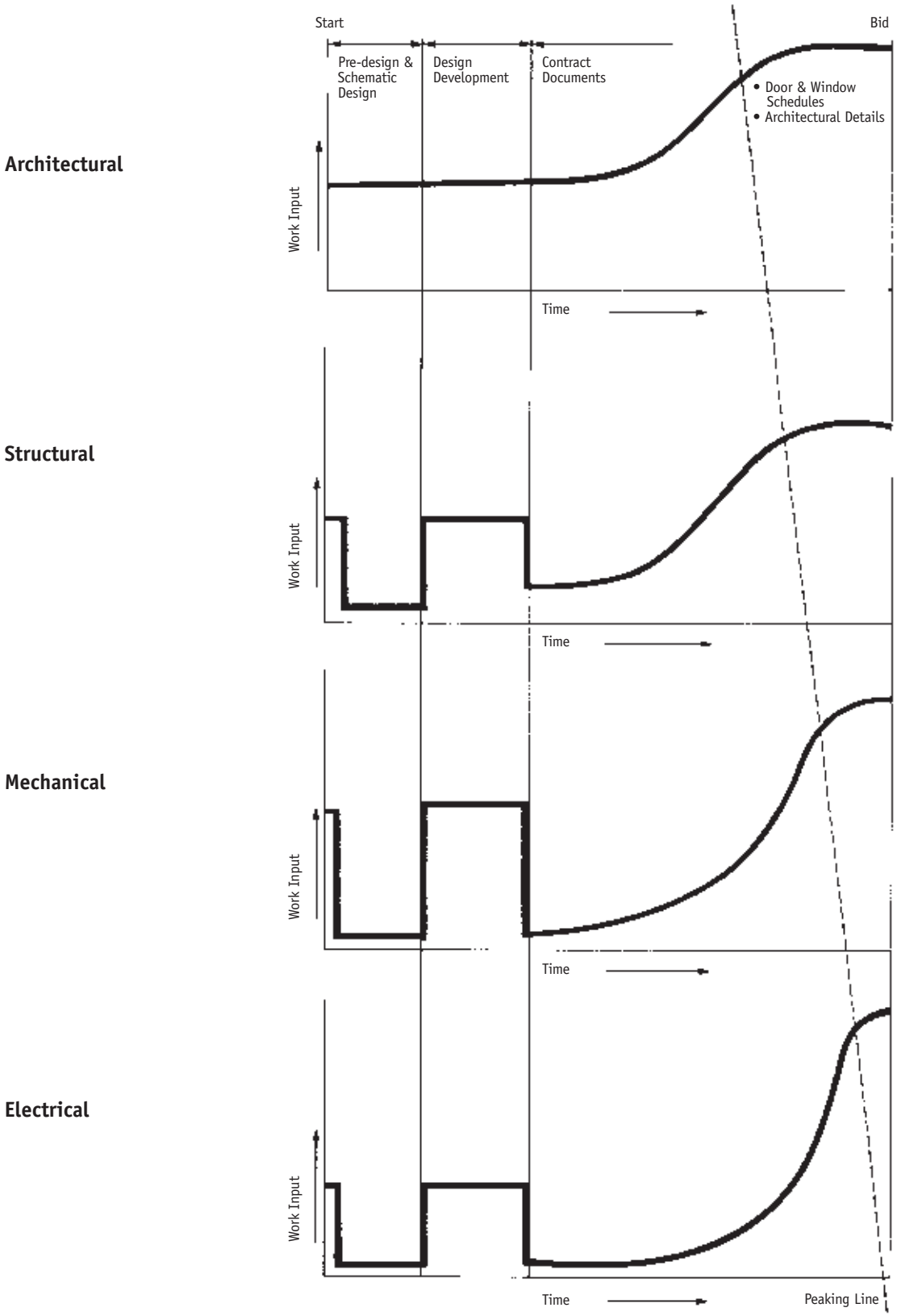
The project architect should provide the team with basic floor plans so that each discipline can develop its own drawings. Engineers should regularly forward their drawings to the project architect to allow time for revision and coordination.

Refer to Illustration 1 for a graphic representation of the work input of each of the four disciplines during the preparation of the drawings.

For smaller projects, the engineers may only produce notes and information which will be included on the architectural drawings. In these circumstances, it is necessary to clearly establish responsibility for the appropriate part of the design and arrange for engineers to append their seal and signature to the drawings.

The "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, can assist in planning the production of working drawings.

Illustration 1: Work Input by Disciplines



CAD

CAD (Computer-Aided Design or Computer-Aided Drawing), sometimes spelled CADD (Computer-Aided Design and Drafting), has replaced manual drafting as the primary method for producing working drawings.

A few architectural practices still prepare some of their working drawings by hand. For small projects that do not have many repetitive elements (such as a house renovation), this technique may be as efficient as CAD. Architects can improve the efficiency of manual drafting by incorporating computer-drawn standard details. Applied photographs of existing conditions or scanned images may also be used as a drawing base, particularly for renovation work, where information may be drawn directly over the photographic image.

However, CAD has many advantages such as:

- clarity and legibility of drawings;
- rapid production of drawings, especially when elements are repeated;
- ease of dimensioning;
- great speed and ease in making changes;
- increased accuracy;
- better and faster coordination.

In addition, some CAD software includes functions which assist in the production of working drawings. These functions include:

- the automatic calculation of surfaces;
- simultaneous preparation of:
  - bills of quantities;
  - tables and lists;
- other applications using “attributes.”

CAD Standards

Production techniques may vary within the same office, depending on the human and physical resources available and the nature of the project. Some clients require that drawings be prepared using certain standards.

Standards define the size and style of fonts, dimensions, lines, and hatching or other ways to represent materials. They also suggest various ways to create borders and title blocks, standard details, symbols, etc.

It is especially important to establish a standard system for naming and giving attributes to layers in order to facilitate the development of working drawings and make them user-friendly for consultants and others. Some clients will require electronic files of the working drawings (or as-built drawings) for the future management of their building. Therefore, architects must often use the client’s layering system or other drawing standards.

Some institutions, such as Public Works and Government Services Canada (PWGSC) and large health and educational institutions, have created their own drawing standards. It is important to obtain these standards at the start of the project.

Procedures for preparing and plotting drawings, archiving documents, and transmitting files to engineers and other consultants are not standard. Each office or team of architects and engineers may have their own unique methods. These are usually determined by the particular needs of the project as well as available equipment and physical resources. For example, when drawings are plotted outside the office, the printer (to which the drawing has been transferred by modem or disk) may require the use of a particular communications software.

It is important, at the start of the project, to establish protocols for the creation and transfer of electronic information.

In Canada, the architectural profession has not yet prepared or endorsed any standards related to the presentation or organization of architectural drawings or working drawings. In the United States, however, The Construction Specifications Institute (CSI) — together with other organizations, including The American Institute of Architects (AIA) — is developing a Uniform Drawing System™ (UDS). The UDS™ will be a guideline which includes the following modules:

- **Drawing Set Organization** (numbering system and sequence for drawings, etc.);
- **Sheet Organization** (system for numbering drawings, details and organizing sheets);
- **Schedules** (format, heading terminology, and organization);

- **Drafting Conventions**;
- **Symbols**;
- **Layers** (see note below);
- **Notations**;
- **Code Conventions** (probably not relevant to Canada).

The CSI claims that these standards will assist in the communication of information among all users of drawings, and will facilitate the use and evolution of drawings throughout the life of a facility and for future projects.

[Note: the Uniform Drawing System™ will adopt the CAD layering guidelines which have been developed by the AIA and published in *CAD Layer Guidelines — Computer-Aided Design Management Techniques for Architecture, Engineering and Facility Management*.]

Drawing Information

The amount and type of information that must be provided on the working drawings are a function of:

- the complexity of the project;
- the type of construction project delivery, including the bid and type of construction contract.

When the project involves restoration, renovation or an addition to an existing building, drawings should clearly indicate the limits of the work, existing elements, and conditions prevailing at the junction of existing and new construction components.

The form of project delivery has an impact on the working drawings.

For projects involving a public bid call or using a project delivery method with a stipulated price contract, drawings should be complete and comprehensively detailed to avoid requests for contract changes by the contractor (whose identity is not known when the drawings are prepared). If, on the other hand, the contractor has already been chosen and has previously worked on similar projects with the architect and the client, the drawings may not have to be so detailed. When a cost-plus contract is used, construction documents may be supplied as the work progresses.

When the project is being carried out as a construction management contract and is divided into separate bid packages, with a bid call for each, there may be several deadlines for the production of working drawings. In such cases, timely and thorough coordination of all documents is essential. Bid packages, including the working drawings, should correspond to clearly defined and self-contained elements, such as:

- Bid Package No. 1 — Demolition;
- Bid Package No. 2 — Excavation, Foundation, and Structural Framing;
- Bid Package No. 3 — Building Envelope and Mechanical and Electrical Services;
- Bid Package No. 4 — Interior Finishes.

On a project involving the use of new or unusual construction procedures, the drawings should furnish the corresponding details.

In all cases, the final set of working drawings, together with the Project Manual (Specifications, Contract Forms and Contract Conditions, and Bidding Information), should provide sufficient information needed to:

- **prepare** bids or accurate construction cost estimates (quantity and type of materials and their application);
- **obtain** the building permit and other approvals from Authorities Having Jurisdiction;
- **construct** the project.

Organization of Drawings

To produce working drawings, one must first create a list of information required, including a preliminary list of drawings. Drawings and documents prepared during the design development phase may be used to determine which construction details must be drawn. This list also enables the project architect to ascertain which elements require additional research or information from the client or

consultants. The format of all drawings, including those of the engineers and consultants, should be consistent.

Refer also to the CSA Standard B78.3-M1977 (R1991), *Building Drawings*, for information on preparing drawings.

Scales

In the past, it was necessary to determine and decide on a scale for each working drawing. Today, most computer software is not scale-dependent; however, it is important to determine the scale for the final plot or hard (paper) copy. Generally speaking, the smallest scale in which information can be clearly presented is chosen. Hard copies that are reduced for distribution must still be legible. A graphic scale should be indicated on these documents.

List of Drawings, Numbering, and Sizes

Each sheet of the working drawings must have a title and a number. The Uniform Drawing System™ provides guidelines for a standard, yet flexible, system of title blocks and sheet numbers.

The range of ISO formats may be used for the sizes of the plotted or printed drawing sheets (refer to Illustration 2). This range offers the following features that are useful when drawings must be reproduced on a larger or smaller scale:

- the surface area of each format is twice that of the preceding format;
- any two consecutive formats have the same height-to-width ratio (that is, the same proportions).

Clients may sometimes have their own format for title block and sheet sizes, and many architectural practices have developed their own specific preferences and designs.

Title Block

The title block should contain the following information:

- project name and address/location;
- project number;
- date;
- drawing title;
- drawing number;
- scale of the plot or paper copy;
- details indicating revisions (such as revision number, date, general description, initials of the originator);
- name and address (including E-mail address, if available) and telephone and fax numbers of the architect's office (and possibly the architect's logo) [Note: in Ontario, the name of the holder of the Certificate of Practice must appear];
- name or initials of the draftsperson and the individual checking the drawing;
- a location for applying the professional seal and signature.
  [Note: refer to the regulations of the provincial associations of architects for regulations on applying the professional seal. See also the chart, "Comparison of Provincial Requirements/Guidelines regarding the Application of Seals," in Chapter 1.1.4, *The Organization of the Profession in Canada*.]

Sometimes, the drawing (either in the title block or elsewhere) includes the following information:

- key plan, indicating the relationship of partial plans to the overall plan, orientation, etc.;
- the electronic file name;
- plotting information;
- dates and stamps indicating the purpose for issuing the drawing (such as "Issued for Bid" and "Not for Construction");
- notice of copyright.

Illustration 2: ISO Formats

Format name	A0	A1	A2	A3	A4	A5	Etc.
Surface area in m^2	1	0.5	0.25	0.125	0.0625	0.03125	Etc.
Dimensions in mm	841 x 1189	594 x 841	420 x 594	297 x 420	210 x 297	149 x 210	Etc.

Refer also to Section 5.2, "Drawing Stamps," in Chapter 2.4, *Standard Forms for the Management of the Project*.

Depending on the type of project and the contractual arrangement with the consultants, as well as the requirements of the professional liability insurer, the title block includes the name, address, telephone, and fax numbers of engineers or other consultants. Also, the architect should confirm the requirements of the provincial association.

Notes, Symbols, and Dimensions

Notes, symbols, abbreviations, dimensions, and references to other drawings should be expressed in the same way on all the drawings, using recognized conventions.

Notes on the drawings should be kept to the minimum necessary to understand the architect's intentions. (References to standards and instructions about the execution of the work should be included in the specifications, not on the drawings.) Standard symbols should be used to show structural grids on the plans, as well as references to elevations, sections, details, and enlarged plans. References to sectional views, windows, and details are usually indicated on the elevations. References to details are usually indicated on the cross-sections and wall sections.

Generally speaking, plans indicate the length and width of buildings as well as the width and thickness of walls, whereas elevations and vertical sections indicate height. Drawings should include all of the plans, elevations, sections, and details necessary to carry out the work.

The method of dimensioning should correspond to the sequence of construction. For example, new elements that are to be added should be identified in relation to previously constructed elements such as the structural system or existing walls.

If the total of a set of dimensions must add up to a given dimension, it may be necessary to give an approximate value for one dimension or even to omit one of the less critical dimensions.

Plans

Site Plan
A site plan typically includes the following information:

- the position of the building on the site (in horizontal and vertical sections);
- elements of existing and/or proposed landscape design and grading, including earthwork as well as existing and proposed levels;
- parking, road, and sidewalk areas;
- reference elevations;
- the system of foundation drainage;
- utilities and other services and connections;
- setbacks, rights of way, easements, etc.;
- bench mark (if appropriate);
- legal description of the property;
- the limits of construction.

Some of this information may be in the survey plan provided by the client. The architect should refer to this data in the site plan not only to respect the surveyor's copyright, but also to avoid taking responsibility for information provided by the surveyor. Some of the site servicing information may be included on the mechanical and electrical drawings, while landscaping or grading information may be on the landscape architectural drawings or civil engineering drawings.

Floor Plans
Basic floor plans should indicate:

- the structural system and related elements;
- an outline of the exterior walls, partitions, etc.;
- the dimensions of the structural grids, walls, and partitions in relation to the structural framework;
- the designation (usually by name and number) of interior spaces.

The plans also include:

- secondary dimensions to locate equipment and furnishings;
- locations of windows, doors, and other openings;
- references to cross-sections and details;
- built-in furniture, millwork, and equipment;
- door numbers and other final notes;
- graphic indication of fire separations.

For renovation projects, demolition plans are frequently prepared for each level. The plans should differentiate between:

- new work;
- renovated work;
- demolished work.

Roof Plan
The roof plan indicates all elements that comprise the roof or sit on the roof, such as:

- type of roofing;
- roof slope;
- roof drains and scuppers;
- parapets and low-rise walls;
- roof access hatches, skylights, vents and vent piping, chimney shafts, roof walkways, mechanical equipment, etc.

Reflected Ceiling Plans
The reflected ceiling plans indicate the ceiling design and the type and level of suspended ceilings. They are also used to coordinate the location of light fixtures, ceiling diffusers, sprinkler heads, and other elements.

Sections

Building sections are usually presented at the same scale as floor plans and elevations. Sections indicate the vertical relationship among elements and are essential to understanding the plans and overall building design. Sections should indicate:

- all the building components that intersect with the section;
- the names or designation of all spaces;
- vertical dimensions of the main elements in relation to a reference elevation or level;
- cross-references to detail drawings;
- graphic indication of fire separations;
- description of typical wall, floor, and roof assemblies.

Elevations

Elevations indicate the materials and dimensions of all exterior features. The elevations should indicate:

- the structural grid;
- all building edges, including openings such as doors and windows;
- exterior construction materials (graphically and with notes);
- floor elevations (levels) together with dimensions of important heights;
- elements that penetrate walls or are attached to the walls, such as light fixtures, outlets, siamese connections, louvres;
- mechanical elements located on the roof which affect the appearance of the building.

Details

Details are vertical and horizontal sections, plotted on a large scale to provide information on the assembly of various materials and components. Details sometimes illustrate typical conditions; at other times, they depict special conditions. Details may also be required of parts of plans and elevations.

The following elements are usually detailed:

- walls, including:
  - intersections with floors and roofs (vertical section);
  - intersections with supporting members, corners, etc. (horizontal section);
- exterior windows and doors;
- interior doors and frames;
- stairs;
- elevators, freight elevators, conveyors, and chutes;
- interior elevations of rooms, including millwork, built-in furniture, glass partitions, and special equipment;
- all washrooms and bathrooms, including millwork, partitions, and accessories;
- construction details of custom components and millwork.

A single numbered legend — which describes the assembly for each detail — is a common method of annotation because it is easy to check, coordinate, and change the notes. On the other hand, it is not as convenient or easy for those reading the drawings because they must constantly refer to the legend.

Schedules

When appropriate, information is presented in a schedule — usually a list or table containing information on similar construction elements. Typical elements prepared in this format are:

- doors and door frames;
- windows;
- hardware;
- room finishes (including walls, floors, and ceilings).

Often, schedules are produced by word processing or spreadsheet software. These schedules are sometimes incorporated into the specifications rather than as part of the drawings. On large projects, schedules may be bound separately from the drawings and specifications.

Coordination of Drawings

The project architect needs to be fully aware of the progress of the drawings. Therefore, at intervals appropriate to the project's complexity, the project architect should:

- arrange internal and external coordination meetings;
- review and revise drawings as they are being developed.

It is particularly important to plan regular meetings and to exchange information with project engineers on an ongoing basis. The project architect should carefully note and document the following:

- decisions;
- suggested changes;
- new requirements from the design team.

Coordination of the drawings with specifications is also necessary. In particular, the drawings and the specifications should use the same generic terms to avoid ambiguity and therefore reduce the risk of disputes during the execution of the work. Standard construction contracts (such as General Conditions 1.1 of CCDC 2) indicate that the specifications govern, or take priority over, the drawings in case of discrepancies between the drawings and specifications.

Client-supplied equipment must also be coordinated. Client demands (changes to the program or modifications to the layout) have far-reaching consequences at this stage. Project architects should ensure that each confirmed change is:

- communicated to the various engineers and consultants;
- integrated into the working drawings and other construction documents.

The best tool is a **checklist** which outlines all the steps in producing and coordinating a complete set of construction documents. Some examples of checklists are found in the following publications:

- *REDICHECK Interdisciplinary Coordination;*
- *Cross Check: Integrating Building Systems and Working Drawings.*

Depending on the scale and complexity of the project, the architect should carry out the following review procedures:

- conduct interim and final reviews before completing the working drawings;
- ensure that the client reviews the drawings and specifications;
- ask a senior architect in the practice who is not associated with the project to check the drawings;
- require different individuals to conduct partial reviews (for example, dimensions, details, notes);
- check all dimensions twice;
- ensure that the specification writer conducts a final review of the working drawings.

Refer also to Chapter 2.1.9, *Risk Management and Professional Liability*, which provides tips for checking drawings.

Revisions to the Drawings

In practice, changes to certain design elements may be necessary as the construction details are reviewed, developed, and coordinated with the details and specifications of engineers and other consultants.

To ensure proper coordination, the project architect should:

- obtain information from the client about special technical needs related to the project (for example, medical equipment);
- inform the client about significant changes (and submit alternative solutions, if possible and appropriate);
- make the client aware of the importance of making decisions and giving approvals quickly.

The engineers and other consultants should also be advised of any modifications or design changes.

To identify revisions, the title block of each revision of the drawings should indicate the date, the reason for the revision, and the nature of the changes.

Engineering Drawings

Structural Drawings

During the preliminary design phases of the project, the architect and the structural engineer should have already determined the structural framing system. During the construction documents phase, the structural engineer prepares:

- detailed calculations of all structural elements;
- plans and details;
- structural sections of the specifications (usually Divisions 3, 5, and 6);
- a final construction cost estimate of the structural components.

Mechanical and Electrical Drawings

Depending on the nature of the project, mechanical drawings are for the trades of heating, ventilation, and air conditioning (HVAC); plumbing and drainage; and specialty trades (such as sprinklers, gas piping). The mechanical engineer usually prepares a separate set of drawings for each trade.

Before revising and coordinating these engineering drawings, the project architect should request the engineering firm to formally confirm that all mechanical drawings have been coordinated with each of the disciplines for which design services have been provided.

If the same engineering firm is preparing electrical design drawings, the project architect should request that the electrical drawings are coordinated with the mechanical drawings before submitting them to the project architect. When different engineering firms are engaged to provide mechanical and electrical design services, the project architect must ensure that drawings provided by all engineering disciplines are fully coordinated.

During the construction documents phase, the mechanical and electrical engineers should prepare:

- detailed calculations;
- plans, details, and schematic diagrams;
- mechanical and electrical sections of the specifications (Divisions 15 and 16);
- a final construction cost estimate of the mechanical and electrical components.

Coordination of Engineering Drawings

One of the architect's most important tasks during the production of the drawings is the coordination of the engineering drawings (and drawings from other specialists). The architect must ensure that all relevant information is on the appropriate drawing and that the design of one discipline includes all the necessary work to accommodate the work designed by another engineer. For example, problems due to the interference of conflicting elements such as ductwork, light fixtures, piping, and the structural framing system must be resolved.

Sharing all necessary information with the engineering consultants as soon as it is available helps to minimize coordination problems. Regular coordination meetings or "interdisciplinary coordination reviews" are also essential for ongoing information exchange. The earlier that these meetings are held during the production of the drawings, the more "willing" each professional is to accept ideas and revisions from other members of the consulting team. Consultants are less willing to make significant changes to the drawings at a later stage in their production. Any design changes, and the reason for the design changes, should be immediately distributed to all engineers. Using a checklist can be helpful in identifying all elements which require coordination.

Frequently, one of the engineering disciplines is required to redesign or relocate an element. The architect must decide how and which discipline will make the necessary adjustments. When coordinating and revising the design of one of the engineers, the architect should consider the following questions:

- Which solution would the client prefer?
- Is the architectural concept and design maintained?
- Which is the most efficient and economical approach?
- Are there other alternatives?

With proper interdisciplinary coordination, all those affected by the construction project benefit as a result of fewer Change Orders, requests for time extensions, and liability claims.

Definitions

Attribute: Data (such as a door number or column) attached to an entity, block or symbol within a CAD drawing.

Construction Documents: The working drawings and the specifications. (When combined with the contract and contract conditions, these documents form the contract documents.)

Drawing: Graphic information, which may also contain text, organized on a two-dimensional surface for the purpose of conveying data about a specific portion of a project.

Layer: A group of functionally similar bits of information that can be manipulated or displayed as a unit and possessing common attributes; a property of a CAD drawing used for classifying information in order to control visibility and manipulation; sometimes called a "level."

Schedule: Tabulated information on a range of similar items, such as a "Door Schedule" or "Room Finish Schedule."

References

The American Institute of Architects (AIA). *Architect's Handbook of Professional Practice*. Washington, D.C.: The AIA Press, 1994.

Association of Consulting Engineers of Quebec (ACEQ). Montréal, QC.
Uniform CADD Layers (ACEQ-9501). 1996.

Uniformisation des couches en CDAQ. Norme AICQ 95-01, 1996.

Canada. Public Works and Government Services Canada (PWGSC). *Instructions to Technical Contractors on Computer-Aided Design and Drafting (CADD)*. Ottawa, Ont.: PWGSC, 1998.

Canadian Standards Association (CSA). Toronto, Ont.
CSA Standard B78.3-M1977(R1991), *Building Drawings*. 1977.

CSA Standard B78.5-93, *Computer-Aided Design Drafting (Buildings)*. 1993.

CSA B78.5 DISK3.5-93, *CADD Symbology Diskette for B78.5-93 (version 12 and 13)*. 1993.

The Construction Specifications Institute (CSI). *The Uniform Drawing System*. Alexandria, VA: CSI, 1997.

Guthrie, Pat. *Cross-Check: Integrating Building Systems and Working Drawings*. New York, NY: McGraw-Hill, 1998.

Nigro, William T. *REDICHECK Interdisciplinary Coordination*. Third Edition. Peachtree City, GA: The REDICHECK Firm, February 1992.

Sanders, Ken. *Digital Architect: A Common-sense Guide to Using Computer Technology in Design Practice*. New York, NY: John Wiley & Sons, Inc., 1996.

Schly, Michael. Editor. *CAD Layer Guidelines — Computer-Aided Design Management Techniques for Architecture, Engineering and Facility Management*. Second Edition. Washington, D.C.: The American Institute of Architects Press, 1997.

Construction Documents — Specifications

Introduction

In the construction industry, the term "specifications" means a clearly written description of the intended work of a project. Specifications are precise descriptions of products, materials, standards, equipment, services, construction systems, construction methods and processes, and workmanship.

The specifications also describe physical and environmental conditions to be created and maintained in the work area, on site, in adjacent areas, or off site. In addition, the document sets out procedures for contract administration required to control and monitor the quality of the work.

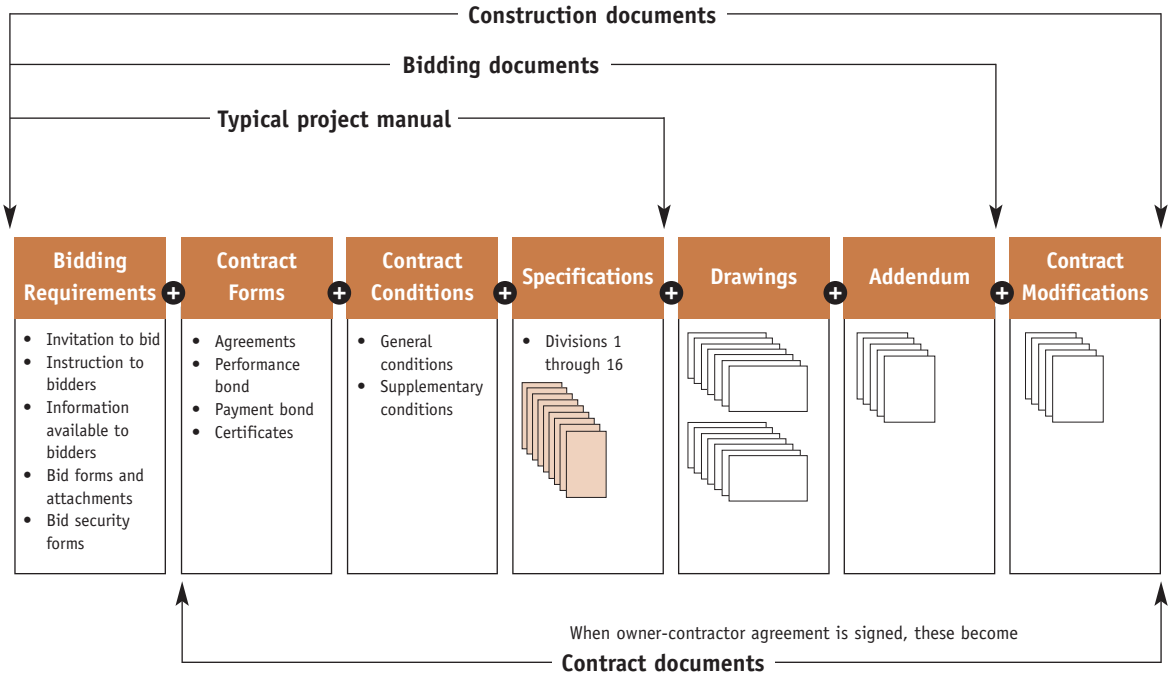
The term "**Project Manual**"— used by The Construction Specifications Institute and by Construction Specifications Canada — refers to the following items, which are bound in book format:

- bidding requirements;
- contract forms;
- contract conditions;
- specifications.

This chapter discusses specifications and — to a certain extent — their relationship to the drawings.

Refer to Chapter 2.3.9, *Construction Procurement*, for information on bidding requirements, contract forms, and contract conditions.

Illustration 1: Format for Construction Documents



Reprinted with permission from The American Institute of Architects

Specifications and Drawings

Specifications must be read and interpreted together with all of the construction documents in combination. The drawings, schedules (which are tables listing components and their locations and properties), and any other graphic representation, supplement the written word.

Refer to Chapter 2.3.7, *Construction Documents — Drawings*, for a description of the drawings.

The General Conditions of CCDC 2 (GC 1.1) state that:

- specifications are part of the contract documents;
- the drawings, together with the specifications, translate the design concept into a detailed description of a building;
- in the event of conflict between the two, the specifications take precedence over the drawings.

The specifications become part of the contract documents and should convey information that is clear, concise, correct, comprehensive, and well-coordinated.

Drawings and specifications present different types of information and are complementary.

Drawings:

- illustrate extent, location, and quantity;
- are graphic or pictorial descriptions.

Specifications:

- reduce the need for notes on the drawings;
- are the only location where brand names of products should appear (generally, brand names should **not** be on the drawings);
- describe workmanship and installation.

Drawings and schedules provide the specification writer with the following information:

- configuration, location, and dimension of each assembly, component or accessory;
- identification of pre-fabricated or pre-assembled components or equipment.

The function of the specifications is to:

- complement and permit simplification of the drawings;
- limit the role of the drawings to address form, shape, dimension, and location;
- describe requirements for quality and workmanship which the drawings may not be able to address;
- address compatibility of materials.

If a material is identified on the drawings by a generally accepted symbol, a defined symbol or a generic name, no further descriptive notes are necessary. Too many notes obscure the drawings, increase search time to find information, and promote inconsistency and duplication. Repetitive items such as doors, windows, and interior finishes should only provide a reference to identify the material or components. Schedules — such as room finish, door, and window schedules — should be used to simplify and clarify repetitive information.

The following basic rule applies to the coordination of the construction documents:

> *Drawings identify a material or product only by a **generic** name, and illustrate its approximate shape, dimensions, and location.*

Types of Specifications

There are a number of types of specifications, including:

- outline or preliminary specifications;
- master specifications;
- mini or model specifications;
- project specifications.

Outline or Preliminary Specifications

This document is prepared during the design stage and describes the project components in general terms — appearance, texture, and other criteria — which affect the image and function of the project. Outline specifications are usually prepared at the design development stage to provide early coordination of terminology between drawings and specifications, and used together with design drawings in making presentations to the client.

Refer also to Chapter 2.3.6, *Design Development*.

Master Specifications

This is a comprehensive text base, containing descriptions of every procedure, product or method likely to be encountered. This collection of specifications can be used in developing a project specification by editing the contents to suit the requirements of the project. The editing is made easy because most of the required text is included in the master document and, to a large extent, one only has to *delete* the unwanted text.

In the case of the National Master Specification (NMS), the text contains and highlights the choices by presenting all of the commonly used alternatives, in square brackets. In other cases, blank spaces — in square brackets — indicate when a decision must be made. The NMS also uses "Spec Notes" to offer guidance and direction.

It must be emphasized that any master specification must be used very carefully. Such a comprehensive document can be very useful as a checklist for making decisions when assembling a project. However, the process — no matter how easy or convenient — does not reduce the knowledge and experience required to produce an effective project specification.

Mini or Model Specifications

This is a specification assembled to suit specific and similar kinds of projects, such as schools or housing, as well as repetitive kinds of projects, such as fast food outlets. Because the technology used to build such projects is common to the building type, such model specifications usually require minimal editing, except for describing site work which is unique to the location.

Project Specifications

Project specifications are usually one-of-a-kind specifications developed for a specific project. Based on the form of construction project delivery, there are usually two different types:

- *Project Specifications for a Stipulated Sum Contract*
  This specification is compiled and written to describe an entire project and is addressed to one general or coordinating contractor.
- *Project Specifications for a Construction Management, Phased, or Design-Build Project*
  This specification is prepared as a number of related but stand-alone modules, each of which has its own "front end" and can form the basis of an individual bid call and contract. The work of each contract is then coordinated into a combined process by a construction manager or Design-Builder to deliver the overall project.

Methods of Specifying

Contemporary construction specifications can be prepared using the following descriptive methods:

- **proprietary** (describes specific products and systems by trade name);
- **prescriptive** (describes the exact means and methods for achieving the desired result);
- **performance** (outlines criteria of a desired result, giving the contractor freedom in choice of materials and method).

These may be used individually or in combination, in outline or in detailed format.

After evaluating the products, systems, and processes for each segment of construction, the architect must decide which specifications method to use. These decisions depend in part on the architect's ability to evaluate specifications, details, and data published or provided by product manufacturers.

Proprietary Method

Proprietary specifications identify products by their trade names and important characteristics, often using catalogue descriptors. Restricting specifications to a single trade name results in the exclusion of others. Naming several acceptable alternatives — such as three or four manufacturers' products — promotes competition, as long as all products or systems listed meet similar criteria.

Example: *Doors (type 5): Flush, Stainless Steel — LS-18 1 by Steelcraft, prepared for glazed opening and louvre as per Door Schedule.*

Note: three or four acceptable alternative products which meet minimum criteria should be listed.

Occasionally, the architect may determine that only one product is appropriate for the project and only that sole product is specified.

Example: Ceramic Wall Tile (type 6) as scheduled: 308 mm x 308 mm beige-brown speckled 'Exemplary Harmony'
By Steenbok Capricorn

No substitutes considered.

The architect may decide to specify one particular product, assembly, equipment or system, as a basis of the specification and invites the contractor to propose an alternative product or system for review. This method may be used, for example, by an engineering consultant, for a complex mechanical or electrical system. This maintains the competitive approach to the bidding process.

Example: The design and specification of the mechanical piping system is based on the use of products by Victaulic. Other acceptable alternative systems will be considered in accordance with procedures established in the Instructions to Bidders.

Prescriptive Method

A prescriptive specification is a detailed statement of products, materials or systems and their installation requirements. It is a generic description of what is required, using no product, trade or manufacturers' names, or any reference to manuals or standards. Products and materials are defined, together with a step-by-step list of operations to produce the desired result. Extensive knowledge and experience do not guarantee that the results of a given combination of materials and specific operations will be satisfactory.

The architect must obtain sufficient information and practical experience to describe all the materials and operations necessary for fully prescriptive specifications. **The architect's potential liability is increased because the architect, rather than the contractor, assumes responsibility for performance, provided the contractor follows the specifications.**

Prescriptive specifications do not recognize that there is often more than one way of carrying out a given operation to achieve the intended result.

The architect should separate those construction components which can be adequately and competently described by prescriptive specifications from those which are best described by performance specifications.

Example: a 26-gauge, pre-finished sheet metal flashing

Performance Method

Performance specifications describe the desired end result of how the materials and systems will perform in the completed building. Extensive reference to material standards establishes the project's performance criteria, such as appearance, strength, and durability. When a detailed description of the product is accompanied by a performance statement, then the contractor is clearly responsible for the end product. To achieve the best results, the architect should remember that performance is the prime factor. Full performance specifications require additional research by the architect.

Example: .1 Windows: to CAN/CSA - A440 [M90]
.1 Type: Projected: top projected with triple glazing
.2 Classification Rating
.1 Air Tightness: A3
.2 Water Tightness: B5
.3 Wind load resistance: C2
.4 Condensation Resistance: Temp Index [ ]

Here, the specifier chooses to describe what is needed to comply with the requirements of the project, rather than describing how it is to be built to ensure its required performance. When a component is required to comply with testing procedures that is, in effect, a performance specification.

Often, performance specifications are used to describe systems such as elevators and mechanical systems where performance and capacities must be determined and maintained.

Example: Electric Elevator:
1.3 Description of System:
Platform: 1500 mm x 2000 mm
Rated Load: 2000 kg
Rated Speed: 10 metres/sec
Travel: from basement to
5th floor — 20000 mm

Reference Standards

Specifications frequently incorporate references to standards published by standards organizations and trade associations. Well-written standards allow some latitude in the means of achieving the desired end result, while establishing industry-accepted standards of practice and performance. Provided they are fully familiar with the latest edition of the standards, architects may choose to incorporate some of them, by reference, into the specifications.

References include standards — such as CSA, CGSB, and ASTM, or appropriate trade manuals — to define common criteria. Such trade manuals are produced by a number of national trade associations, for example:

- the Architectural Woodwork Manufacturers Association of Canada (AWMAC);
- the Canadian Roofing Contractors' Association (CRCA);
- the Terrazzo, Tile and Marble Association of Canada (TTMAC).

The use of such standards and manuals will reduce the volume of the specifications to a considerable degree.

Where a standard is referenced, the architect should verify that the number is correct, together with the date of the latest issue of the standard or code. If the standard has been amended, ensure that the amendments have not changed any significant criteria that would affect the types and uses of the particular product or procedure.

Refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

MasterFormat™

The primary purpose of the MasterFormat™ system is to provide a method to:

- organize information contained in project specifications;
- retrieve all files, costs, product literature, references, and parts of project specifications from a single unified system.

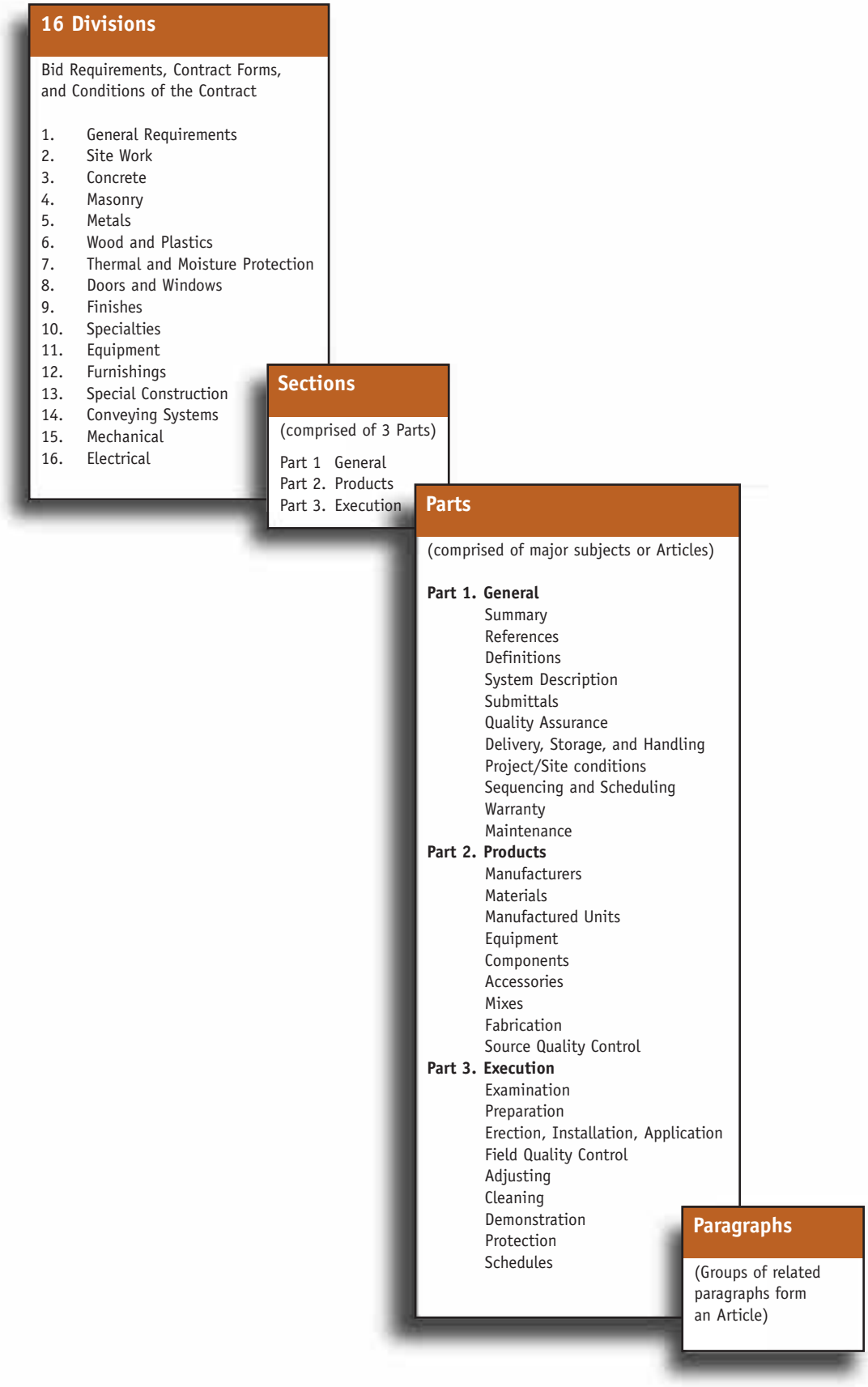
Of the manuals for this purpose, *MasterFormat™ — Master List of Section Titles and Numbers* is one of the most widely used. Since 1978, MasterFormat™ has been produced jointly by The Construction Specifications Institute (U.S.A.) and Construction Specifications Canada. Initially conceived in 1963, it has been almost unanimously accepted by the construction industry in the U.S. and Canada.

MasterFormat™ is a system of numbers and titles for organizing construction information into a regular standard order or sequence (refer to Illustration 2). It is organized in the well-known "16 Division" Specification Format, using a five-digit section numbering system. In addition to the 16 divisions and their groups of sections, MasterFormat™ contains what has come to be known as the Series 0 of Documents. It incorporates an organizational structure for the documentary information by creating four major groupings:

- bidding information and requirements;
- contract forms and bond requirements;
- General and Supplementary Conditions of the contract;
- specifications.

The designation system for the headings for these groupings has been included to standardize the titles, and to allow the storage, search, edit, and retrieval of the various elements. Titles and terminology should be fixed and used in the sequence shown. Any number of additional entries may be inserted by decimal expansion, if required.

Illustration 2: Diagram Illustrating the Framework of the MasterFormat™ System



Note that some titles will be unnecessary under certain methods of construction procurement. For example, bidding information will not be required when the owner is the builder.

The MasterFormat™ system:

- provides a flexible system within a standard framework for fixed sections;
- is adaptable to modern computer word-processing software;
- allows the user to decide whether to use fixed or flexible section titles.

A "Keyword Index" is included in the guide so that a subject or component can be easily located with the designated, five-digit number.

Using standard titles and numbers results in a higher degree of uniformity within construction specifications. The broad scope section titles, given in the keyword index, should be used for either a fixed or a flexible system, using the wording and sequence proposed. Medium-scope section titles are also presented in the MasterFormat™ system, with recommended wording and in recommended sequence.

The 16 divisions are titles only, contain no text, and are listed in the table of contents of the specification as a means to search for information contained in sections which are grouped and listed under the heading of that division.

Example: Division 4. Masonry: Section 04210 — Brick Masonry

Every practising architect should use *MasterFormat*™ for producing project specifications and as a basis for an office technical library, for organizing:

- office files of product literature;
- cost data;
- reference material;
- samples.

SectionFormat

The *Three Part SectionFormat for Construction Specifications* is also produced jointly by The Construction Specifications Institute (U.S.A.) and Construction Specifications Canada. Its primary purpose is to provide a uniform approach for organizing articles and paragraphs within the project specification sections to produce a consistent appearance and completeness, and to facilitate understanding and communication.

Sections, grouped together according to a broad collection of related work under one of the 16 identified divisions, can be combined and written to cover broad-scope or medium-scope subjects, or left as is for narrow-scope subjects, to suit the project for which they are produced.

Each Section is divided into three **parts**:

- **Part 1, General:**
  This part covers those subjects which:
  - relate to the work in general;
  - provide a general description of the system, where applicable;
  - identify references to standards;
  - define the administrative and technical requirements specific to a particular section.

- **Part 2, Products:**
  This part defines the acceptable equipment, materials, fixtures, mixes, and fabrications, that is, "product" items to be incorporated into the work.

- **Part 3, Execution:**
  This part describes the manner in which items covered by Part 2 are to be incorporated into the work.

The architect should use the *Three Part SectionFormat* as a guide in writing specifications sections for *every* project, except for:

- simple outline specifications;
- short specifications for minor projects.

Maintain the established order and sequence of articles even if the three-part format is not used.

Master Specification Systems

Office Master Specification Systems

Many architectural practices use a "master specification" — developed from experience on previous projects — which covers the entire potential scope of building construction, including a large range of options. Computers are widely used for producing specifications and project manuals. Working with the master, the architect or the specifications editor:

- fills in blanks;
- deletes options that do not apply;
- incorporates special requirements not included in the master specification.

Some offices have a specification writer on staff, or engaged on a consulting basis, who takes the contents of the specification, in its raw state as provided by the architect, and edits it into the standard formats and expressions. These specification writers often enter the process during the production of the working documents.

National Master Specification (NMS)

Nationally supported master specifications are widespread in the construction industry. Regardless of the source, the architect assumes responsibility for the specifications issued from the architectural practice.

The NMS is a library of construction specification sections, written in contract specification format. Produced by the federal government in consultation with the private sector, it is the most widely used master specification in Canada. The NMS Secretariat, which is part of Public Works and Government Services Canada (PWGSC), is responsible for the NMS. All data are stored electronically and organized into sections following *MasterFormat*™.

The NMS could be termed a "deletion" master. It allows for the fast deletion of inapplicable portions of the specifications and the reduction of errors and editing time.

The NMS is flexible and suitable for:

- large, medium or small projects;
- new or renovation construction;
- private or public (government) work;
- varying bid or contract arrangements.

It does not restrict the designer from:

- specifying any products;
- using any design concepts;
- employing any construction techniques.

Furthermore, the NMS uses text that is clear, precise, and detailed enough to convey the desired meaning. The NMS also:

- incorporates the accumulated expertise of Canada's foremost authorities on specifications, documents, and construction technology;
- is reviewed by industry to ensure it represents current trade practices and construction technology;
- is regularly updated to incorporate the latest use of recommendations, products, and construction changes, as well as standard and code revisions;
- is undergoing "green" revisions to ensure the incorporation of environmentally sustainable construction practices.

U.S. Master Specification Systems

Masterspec® is the master specification system of The American Institute of Architects (AIA). One of the products of AIA Master Systems used to prepare drawings and specifications, Masterspec® was started in 1972 by Arcom, a division of an architectural firm in Salt Lake City. Working as an editing and distribution service for members of The American Institute of Architects who used mini-computers and now personal computers, *Arcom* developed a series of specification products.

The following are some *Masterspec*® products:

Masterspec®

- provides comprehensive and fully researched specifications that the architect edits to produce project manuals and customized, in-house masters;
- edits sections by deleting non-applicable text to produce full-length, abbreviated, or specialized project specifications.

Masterspec® Small Project Specifications
- a library of short-form specifications derived from the standard *Masterspec®* Libraries;
- small projects typically involve simple residential, commercial retail, institutional, office design, addition, renovation, Design-Build, and interior fit-out work.

Masterspec® Outline Specifications
- derived from standard *Masterspec®*;
- used during the schematic and design development stages of a project;
- provides early coordination of terminology between drawings and specifications and a checklist of products and materials required for any project;
- assists the owner in understanding proposed materials and systems, records product selection decisions, and provides data for cost estimating and time schedules.

Specware
- a family of enhancement software for working with specifications;
- all *Specware* software is written in-house by programmers who specialize in specification software development;
- the *Specware* family of software is designed to take the tedium out of specification work.

Proprietary Systems and Specification Writers

Many independent specification writing firms specialize in the preparation of technical specifications and bidding documents for construction projects, and the preparation of guide specifications for building product manufacturers.

Before selecting one of these firms to provide either a master specification, or a specification developed and written for a single project, the architect should:

- review examples of the work of several firms;
- evaluate the appropriateness of their work for the architect's needs;
- consult references.

Because ownership of the copyright can become an issue, the architect must:

- clarify the client's expectations about ownership of the copyright;
- determine whether the specification consultant expects to retain the copyright of the specification that has been developed and then negotiate an appropriate agreement.

Typically, the copyright of the documents at any stage of their development will be the property of the architect. If an architect chooses to engage an independent specification writer, the architect — as the prime consultant — will be responsible for the specifications but the copyright will rest with the specification writer unless it is assigned to the architect. The architect retains the right to modify the text as provided. In addition to the final hard (paper) copy, an electronic copy should be submitted.

The specification writer or "specifier" should always be well-informed on the progress of the project and current with the production of all documents, including drawings and schedules. This ensures consistency and proper coordination between the specifications and the drawings.

Some specification writers are members of Construction Specifications Canada (CSC). Refer to Chapter 1.2.3, *Consultants*, for a brief description of CSC.

Preparing Specifications

Resources

The maintenance of a comprehensive and effective office library is crucial to preparing specifications. The office library should contain:

- manufacturers' and suppliers' product literature;
- trade association handbooks and design guidelines;
- guides related to contractual and procedural information (such as CCDC Guides);
- research material which provides data on the performance of construction components, assemblies, and systems under various conditions;
- standards (which prescribe the manufacture, performance, and installation of various products);
- national and provincial codes and regulations;
- local bylaws and regulations (such as zoning bylaws).

In cases where a new or unusual product is to be selected, the architect must research the product and its specifications. Note that:

- the specifications can only be drafted after the quality and performance of the new product has been evaluated;
- it may be necessary to obtain samples or to conduct site visits where the product has been installed.

Although most manufacturers' representatives are knowledgeable about their products, the architect should always:

- seek further information;
- review the firm's literature;
- ask for test reports from independent laboratories;
- contact other architects or users who have had experience with the material or product.

Coordination

The architect should be continually acquiring information affecting specifications, and maintaining close coordination among all contributing parties during the process of writing the specifications. These parties include:

- the client representative;
- members of the architect's staff associated with the project;
- structural, mechanical, and electrical engineers;
- specialist consultants;
- technical representatives from materials and equipment manufacturers;
- Authorities Having Jurisdiction;
- testing agencies;
- trade associations;
- the cost consultant.

Set up well-defined lines of communication for sharing information among the client, Authorities Having Jurisdiction, the architect's staff, and consultants.

Assembling Specifications Sections

The specifications can be assembled as the project design is developed and the components of the project are identified.

Architects should follow these steps:

- obtain a copy of the master specifications for the section if one is available (alternatively, if the section is new, have a copy of *Three Part SectionFormat for Construction Specifications* to assist in writing);
- review the minutes from project meetings and identify specification items;
- study the latest drawings and schedules and the use of the materials noted;
- attach a checklist to each section listing:
  - action required;
  - questions to be answered;
  - information to be obtained;
- draft the section, marking items to be resolved on the draft;
- coordinate all references to standards and codes to ensure that they are current and appropriate for the product or system application;
- coordinate with other sections and with drawings, when preparing each draft section;
- finalize the draft;
- edit and proofread the text;
- correct and reprint until a final copy is achieved.

Revisions

As the construction documents develop, the architect must incorporate a number of revisions into the specifications. The final specifications must include:

- design revisions affecting the materials to be used;
- revisions which change the methods by which a material is used;
- changes requested by local Authorities Having Jurisdiction, such as:
  - additional fire-rated protection;
  - the prohibited use of a material in a given situation.

Office Procedures and Standards

Each architectural practice will develop its own standards for formatting, text editing, word-processing, and producing the specification documents. Only the significant points are stated here. Refer to the *CSC Construction Specification Handbook* for a detailed description of office procedures.

SectionFormat
The "section" of a specification is intended to cover a particular subject, component, or unit of work, of the project. The information and instructions contained in the section must be organized in a consistent manner, as recommended in *SectionFormat*.

PageFormat
The practice should develop a standard page format for specifications. Some editing software programs provide options which automatically change the page format.

The office standard should:

- maximize use of text area on the page;
- avoid excessive indenting of paragraphs;
- recognize that some clients may require a style and font that differs from the architect's standard.

The text for the printed page must be easy to read, and quickly and thoroughly understood.

Format:

- use the same layout and typeface (font) throughout the document;
- issue clear instructions on format to:
  - in-house staff;
  - consulting engineers;
  - specification writers.

The choice of font is also important for ease of communication. The base font should be easy to read. Provide variations, such as a small increase in size (for headings, for example), bold face, or italics, to emphasize certain components of the text or to highlight certain kinds of information.

Covers should present the practice's image in a professional manner.

Project identification should:

- include project name and address/location;
- include project number;
- include date:
  - usually selected by the architect as the completion date of all documents;
  - the date must be the same on **all** bid documents and **all** contract documents;
- be identical on all documents including:
  - drawing title blocks;
  - specifications cover;
  - specifications title page (particularly if cover is blank or contains graphics);
  - covers for separate volumes (schedules, standard details, etc.).

Reproduction and binding:

- note that specifications are used extensively at the construction site, often in rough conditions and sometimes wet weather;
- print specifications:
  - on both sides of each page;
  - on good-quality paper with printing methods that ensure the print will not fade or rub off;
- bind securely:
  - use removable fastening to permit insertion of addenda and changes;
  - issue in separate volumes when documents become too bulky to handle easily.

For information on the number of sets to be printed, see Chapter 2.3.9, *Construction Procurement*.

Specification Language

When writing specifications, follow these well-known maxims:

- be brief and clear;
- use imperative style;
- address instructions to the contractor;
- avoid:
  - repetition;
  - specifying anything which is not to be enforced;
  - *or equal* phrases;
  - *scope* or *scope of work* paragraphs;
  - *weasel* paragraphs (see below).

Use technical terms in such a way as to be understood by a non-specialist. Specifications convey a message to the people responsible for building the project.

1. Use a simple imperative style. Avoid verb forms such as: *shall be, will be, to be, is to be, are to be, should, should be,* and *may be*. Do not use the word *must*.

2. Make direct positive statements. Make materials and methods the main subject, not *the Contractor*. Write specifications as if the work will be done by **one** constructor. Do **not** refer to: *Mechanical Contractor, Plumbing Contractor, Sub-contractor, General Contractor, Main Contractor,* etc.

3. Do not use vague or escape phrases, for example: *as specified, as shown on drawings, specified elsewhere, to the satisfaction of Architect, as Architect may direct, acceptable to Architect, in opinion of Architect*.

4. Never use "weasel" paragraphs (such as the following actual examples):

   ~~*The contractor shall furnish and include everything necessary for the full and complete construction of the building whether shown or specified or not shown or specified.*~~

   ~~*Any work which would necessarily be required to properly carry out the plans must be considered as included in these specifications, although the same may not be specifically mentioned.*~~

5. Do not use superfluous words such as: *all, any, which, same, and/or*. Avoid using the definite article "*the*" ***or*** the indefinite articles "a" and "an."

6. Do not use the phrases: *workmanlike, high-class job, first-class job,* etc. Describe the end result in known precise terms. Do not specify anything not intended to be enforced or impossible to enforce. Avoid adverbs such as "carefully" or "neatly."

7. Use numbers for numeric quantities. (When a numeral or letter is used as a descriptor as in a list, add a period to distinguish it from a quantity.)

8. Use abbreviations or acronyms if they are well-known in the industry. (Consider including a glossary that spells out abbreviations or acronyms in full.)

9. Do not use the following phrases: *or equal, approved as equal, equal to,* or *just as good*.

10. Avoid repetition — say it once, in the appropriate place.

11. Do not write *scope, scope of work,* or *work included* paragraphs. There is a time-honoured rule of law which reads: "Expressio Unius est Exclusio Alterius." This means literally: *The express mention of one thing implies the exclusion of another*.

12. Ensure consistency in style and in the use of terms.

Complete sentences are not necessary in specifications. The information can be conveyed by simply naming the product and relating it to a standard or list of criteria.

For example: *.2 Acoustic units: to CAN/CGSB-92.1, 24" x 24", mineral fibre, 3/4" thick*
NRC range .65 -.75, colour white — face cut pattern

or: *.2 Acoustic units: 'Acoustone' Glacier, by CGC — colour white*

The Bid Package

Refer to "List: The Bid Package — A List of Information Required," Chapter 2.3.9, *Construction Procurement*.

Addenda

Addenda are revisions to the specifications and drawings prepared during the bidding period. Refer to Chapter 2.3.9, *Construction Procurement*.

Definitions

Bid Documents or ***Bid Package:*** The compilation of documents, issued by the architect, and used by bidders to prepare an offer to construct a project. The bid package consists of the following:

- bidding requirements (including instructions to bidders);
- contract forms;
- contract conditions;
- specifications;
- drawings (including schedules);
- addenda.

Division: A major element or heading of the specification under which are grouped sections describing similar and related work. The division contains no text except that which is presented in the sections. The MasterFormat™ system has 16 divisions.

Generic: This term means that the product is identified by a common name and, possibly, by general type.

Part: One of three parts in a section which deals with a particular aspect of the work described in the section. These three parts are called General, Products, and Execution.

Product or Products: The material, machinery, equipment, and fixtures forming the work. Does not include machinery and equipment used to prepare, fabricate, convey or erect the work. These elements are referred to as construction machinery and equipment (as defined in CCDC 2, *Stipulated Price Contract*).

Section: An element within a division which describes a particular unit of work.

References

Canadian Construction Documents Committee (CCDC). CCDC 23, *A Guide to Calling Bids and Awarding Contracts*. Ottawa, Ont.: CCDC.

Construction Specifications Canada (CSC). Toronto, Ont.

Construction Canada. A monthly journal.

Construction Specification Handbook. 1996.

Series 0 Introductory Information, Bidding and Contracting Requirements. 1999.

Tek.Aid Division 1, A Guide to Division 1. December 1999.

The Construction Specifications Institute (CSI) and Construction Specifications Canada (CSC). Toronto, Ont.

MasterFormat 1995 — A Master List of Numbers and Titles for the Construction Industry.

SectionFormat 1997 — A Recommended Format for Construction Specifications Sections.

PageFormat 1994 — A Recommended Page Format for Construction Specifications.

Uniformat 1992 — A Uniform Classification of Construction Systems and Assemblies.

First Source for Products. *First Source for Products*. Published annually. Norcross, GA.

Ordre des architectes du Québec (OAQ). *Suggestions de conditions supplementaires à CCDC 2*. Montréal, QC: OAQ, 1998.

Checklist: Assembling and Writing the Specifications

- ❑ Attend all project team meetings, including those with consultants.
- ❑ Obtain and review a set of design development drawings and, if one has been prepared, a set of outline specifications. Obtain and review sets of partially complete working drawings and updates as soon as they are available.
- ❑ Prepare files marked for bidding requirements, contract forms, conditions of the contract, and Divisions 1 to 16.
- ❑ Select appropriate sections from *MasterFormat*™ to be drafted. Prepare preliminary table of contents.
- ❑ Print draft copies of master sections or suitable sections from a previous project.
- ❑ File the draft copies.
- ❑ Mark up or develop a checklist of information required.
- ❑ Draft, print, and distribute preliminary table of contents for review by project team.
- ❑ Draft or assemble specification sections manually, or draft and edit directly using word-processing software.
- ❑ Coordinate each section with other sections as applicable (including sections within Divisions 15 and 16).
- ❑ Submit drafts to clerical personnel for typing and application of text editing software, or print out directly from word-processing software.
- ❑ Proofread printed section(s).
- ❑ Print and distribute copies for review by project team.
- ❑ Review and revise project sections in accordance with:
  - comments from others;
  - latest drawings;
  - latest information received.
- ❑ Update the table of contents to match revisions and additions.
- ❑ Prepare title page which includes:
  - project name and address/location;
  - project number;
  - date.
- ❑ Prepare specifications cover.
- ❑ If required, print preliminary copies for client's review and comments. Revise as necessary.
- ❑ Coordinate printing of specifications. Securely bind specifications, including front and back cover.
- ❑ Assemble bid documents (described in Chapter 2.3.9, *Construction Procurement*).
- ❑ Review the drawings and specifications during bid period. Draft corrections of omissions and clarifications of inconsistencies. Advise other members of project team.
- ❑ Review all architectural items found, or raised as queries, during bid period. Collect structural, mechanical, and electrical items from consultants. Coordinate all items and prepare addenda. Number each addendum consecutively. Issue each addendum. (Refer to Chapter 2.3.9, *Construction Procurement*.)

Construction Procurement

Introduction

This chapter discusses various methods of **selecting** contractors and awarding construction contracts. For a complete guide to the bid process, refer also to CCDC 23, *A Guide to Calling Bids and Awarding Contracts*.

Clients, with the help of architects, **select** a general contractor for construction projects by using one of the following common methods:

- open competitive bids (sometimes called public tender);
- invited competitive bids (sometimes called invited tender);
- direct selection.

In addition to contractor selection, there are a variety of **contracting** methods as well as methods of project delivery. For these various methods, refer to Chapter 2.3.2, *Types of Construction Project Delivery*.

One of the architect's responsibilities under the *Canadian Standard Form of Agreement Between Client and Architect: Document Six*, is to "assist and advise the Client in obtaining bids and negotiated proposals and in awarding and preparing contracts for construction." This service may be extensive. On the other hand, if the client is an expert in construction procurement, this assistance may be limited to only providing information and advice.

Obtaining Bids

At the outset of the project, the architect and the client must determine:

- the form of project delivery;
- the type of construction contract;
- the method for awarding the contract.

These decisions affect:

- the architect's scope of services and fees;
- the project schedule;
- the preparation of construction documents and bid documents;
- the bidding process.

For example, a stipulated price contract, with a single bid call, is much simpler to manage than a contractual arrangement with multiple bid packages at various stages of the project.

To ensure that all contractors are bidding on a comparable finished product, bidding for stipulated price contracts with general contractors occurs *after* all construction documents (including drawings and specifications) have been completed. All criteria for the selection of the successful bidder and award of contract must be included in the bid documents.

Open Competitive Bids (or Public Tender Call)

In this type of tender call, the bidders are not usually "screened" or otherwise pre-qualified, and the capability of the contractor may be uncertain. The contractor may be selected on price alone. This type of tender call is frequently used when the project involves public funds.

A Notice of Tender is often prepared and is advertised in daily newspapers and construction journals. The Notice should contain the following information:

- name and location of project;
- name of the client and the architect;
- size and type of project;
- bid closing date;
- method for obtaining bid documents;
- date and location of pre-bid meeting, if necessary;
- construction start and completion (if relevant);
- form of contract.

The Notice enables contractors to decide whether or not they are interested in the project.

Invited Competitive Bids (or Invited Tender Call)

When inviting bidders, the client may select contractors with whom the architect or the client has had a satisfactory experience; alternatively, the client and the architect may select bidders by pre-qualification. Architects often assist the client in assessing the capacity and record of contractors and sub-trades who might be invited to bid on the work.

At the outset, pre-qualification helps to eliminate candidates who do not demonstrate that they have the necessary financial capacity, relevant experience, and human resources for the project at hand. Refer to CCDC 11, *Contractor's Qualification Statement*. Once pre-qualified, bidders should generally be considered to be equal in competence and the contract should then be awarded to the lowest bidder.

Invited bids are typically used for the following projects:

- projects with private clients who prefer to select from a group of proven contractors;
- specialized projects that require particular expertise;
- small projects that might not attract the attention of contractors if they were advertised publicly.

Direct Selection

It is always possible for clients to negotiate a contract with a single contractor, especially a contractor with whom a relationship of trust has been established over time. Clients and architects (possibly with the assistance of a quantity surveyor) should ensure that detailed construction cost estimates have been prepared as the basis for beginning negotiations. During negotiations, the contractor may propose changes or alternatives which must be evaluated and agreed upon. Negotiated contracts are based on mutual trust and full disclosure of all estimates and quotations. Direct selection and negotiation often lead to the following forms of construction contract:

- stipulated price (such as CCDC 2, *Stipulated Price Contract*);
- cost plus, or cost to a guaranteed maximum price (such as CCDC 3, *Cost Plus Contract)*;
- construction management contracts (such as CCA 5, *Canadian Standard Construction Management Contract Form between Owner and Construction Manager*).

Bonds

In the construction industry, a bond is an instrument which permits a contractor to provide an owner with a guarantee from a bonding company, known as a surety. The guarantee ensures that the contractor satisfactorily performs his/her obligations under a contract. Bonds are a "useful means of ensuring responsible contract performance and financial security and, consequently, are often an essential requirement in construction procurement today" (CCDC 22, *A Guide to Construction Surety Bonds*). A bond is not an insurance policy but instead a three-party undertaking whereby the surety agrees to indemnify the owner against loss arising from the failure of the contractor to perform obligations under contract.

The architect should be familiar with the various types and applications of bonds in the construction industry. Refer to CCDC 22, *A Guide to Construction Surety Bonds*, for further information.

In preparing the bid documents, the architect must advise the client of the type and amount of bonds appropriate for the project. For construction contracts, three bonds are of particular importance:

- bid bond;
- performance bond;
- labour and material payment bond.

Bid Bond

The bid bond submitted by the contractor (bidder) guarantees that if the bid is accepted within the time period stated, the contractor will enter into a formal contract with the owner. If the contractor fails to enter into a contract, the surety will guarantee — up to the amount of the bid bond — to pay the difference in money between the amount of the contractor's bid and the amount for which the owner legally contracts with another contractor for the project. Bid bonds are usually between 5% and 10% of the estimated construction cost; on very large projects, 2½% is considered an appropriate amount.

The architect may wish to consider other forms of bid security:

- certified cheque;
- irrevocable letter of credit from a financial institution;
- negotiable securities (in rare instances).

Frequently, smaller contractors — who do not have the financial capacity to obtain bid bonds — may be appropriately qualified for small or specialized projects. In these cases, other forms of bid security should be considered.

If a bid bond is selected as the appropriate form of bid security, the use of CCDC *Form 220, Bid Bond*, is recommended.

Performance Bond

The function of a performance bond is to indemnify the owner up to the amount of the bond in the event of default (bankruptcy or insolvency) on the part of the contractor. In the event of a contractor's default, the performance bond will cover the costs of completing the contract as well as other costs for which the surety is liable, up to the total amount of the bond. Frequently, the amount of a performance bond is based on a percentage of the contract amount, such as 50% or 100% of the contract amount.

Bid bonds do not ensure that a surety will provide the necessary performance bond once the bid is accepted; therefore, it is prudent to request a separate undertaking signed by a surety company to issue a performance bond if the contractor is awarded the contract. This undertaking is called a "Consent of Surety" or "Agreement to Bond."

A performance bond will not cover payment of labour and material claims.

The use of CCDC *Form 221, Performance Bond*, is recommended for performance bonds; however, many sureties have their own type of documentation.

Labour and Material Payment Bond

A labour and material payment bond guarantees that claimants (sub-contractors, sub-trades, and suppliers who have direct contracts with the contractor) will be paid for labour and materials provided to the contractor for use on the project identified in the bond.

The use of CCDC *Form 222, Labour and Material Payment Bond*, is recommended; however, many sureties have their own type of documentation.

Refer to CCDC 22, *A Guide to Construction Surety Bonds*, for further information.

Preparing the Bid Package

The package sent to bidders to prepare their bids is made up of the components outlined at the end of this chapter. See "List: The Bid Package — A List of Information Required."

In preparing the bid package, the architect should refer to CCDC 23, a *Guide to Calling Bids and Awarding Contracts*. The excessive use of Supplementary General Conditions should be avoided in the preparation and use of CCDC documents. The CCDC will not endorse any Supplementary General Conditions; the modification of CCDC contracts by way of addition, deletion or revision should be kept to a minimum and only considered after thorough review. Users are cautioned to avoid arbitrary revisions which may weaken the documents' provisions and also create serious problems.

Occasionally, special circumstances require special bid packages and additional information for the bidders. Architects may need to provide bidders with information on the details of pre-awards, pre-purchased materials, and the responsibilities which the successful bidder must assume. (Refer to the "Definitions" at the end of this chapter.)

Some examples include:

- the client decides to advance construction by awarding a construction contract(s) for a portion of the work, such as foundations;
- some materials or products or systems are pre-purchased for incorporation into the project;
- pre-award contracts for structural steel or certain mechanical and electrical components;
- some equipment has been purchased directly for future installation in the building (this is typical of for hospital equipment which must be installed under sub-contract to the general contract).

Refer also to Chapter 2.3.8, *Construction Documents — Specifications*.

Privilege Clauses

In the past, it was customary for owners and architects to exercise some control over the tendering process by inserting a "privilege clause" in the bid package. A typical privilege clause read as follows:

The lowest or any tender shall not necessarily be accepted.

It was believed that this clause allowed owners to justify a decision to award a contract to someone other than the lowest bidder. A decision from the Supreme Court of Canada, issued in April 1999, has provided a final interpretation on this part of the law of tendering. Owners are expected to award a contract in accordance with the terms and conditions of the tender call and not to provide an unfair advantage to one bidder. Accepting a qualified or non-conforming bid is considered a breach of the duty of fairness to all other bidders. A privilege clause does not permit the owner to accept a non-compliant bid.

In preparing tender documents, it is essential to indicate the following in the Instructions to Bidders:

- the requirements for a compliant bid;
- whether or not bids may be withdrawn and under what circumstances;
- whether or not, and the extent to which, pre-award negotiations will be permitted;
- all criteria for selection of successful bidder.

It is prudent to look for direction from the provincial associations of architects and from construction lawyers for advice on the preparation of privilege clauses and bid packages.

Distribution of Bid Documents

Usually, the Notice of Tender indicates where, and under what conditions, contractors can obtain the bid documents. The administration and distribution of the bid documents can be a service provided by the architect or alternatively, in the case of an experienced or sophisticated client, it may be the client's responsibility.

Number of Sets of Bid Documents

Clients, consultants, contractors, and sub-contractors all have vested interests in a sufficient number of drawings and specifications being available during the bid period. Too few sets may reduce exposure of documents to sub-trades and suppliers, and perhaps reduce the number of competitive prices.

When determining how many sets to print, architects should consider the following factors:

- requirements of the client and consultants;
- requirements of Authorities Having Jurisdiction;
- sets for construction association plan rooms;
- size and complexity of projects (number of trades involved);
- number of contractors and sub-contractors expected to bid;
- sets required for execution of the contract.

Client-architect agreements should not stipulate the number of sets to be included in the fee. Printing drawings and specifications are reimbursable expenses. If clients insist that a minimum number of sets be included in the fee, the architect must adjust the fee accordingly.

Because it can be difficult and costly to reprint additional sets of bid documents, it is wise to print a few extra sets in the initial run. If reprints are required, they must be identical to those originally issued.

Tracking the distribution of bid documents and addenda is important. A typical "Bid Documents Distribution List" is provided in Chapter 2.4, *Standard Forms for the Management of the Project*.

Deposit

Contractors customarily obtain bid documents by providing a deposit to ensure their safe return. The deposit amount is generally the cost to reproduce a full set of documents plus a nominal handling charge. The deposit is refunded when bid documents are returned within a specified time, provided that the documents are complete and in good condition. Sometimes, documents are provided *at cost* plus an administrative charge to any general contractor, trade contractor, supplier, etc., without the return of any funds.

Construction Associations and Bid Depositories

Access to information is critical and must be easily obtainable to ensure the best bids. A complex or large project may require the distribution of extra or additional sets of bid documents. All bid documents may be provided to construction associations, particularly for large projects and for projects which have significant sub-trade components.

A bid depository is a facility operated by the local construction association to collect and register bids from sub-contractors and suppliers, and then transmit these sub-trade bids to

general contractors. Usually, these quotations for the general contractors' use must be submitted 24 hours (or sometimes 48 hours) before the bid closing. Refer to Chapter 1.2.1, *The Construction Industry*, for a brief summary of the role of bid depositories.

Addenda

A detailed analysis of the documents by contractors, sub-trades, and manufacturers — in preparation of their bid — may reveal omissions or contradictions in the project documents or items which need clarification or correction. The architect and engineers may also discover inconsistencies or omissions. Additional products which are approved as equals or alternatives may have been identified. Moreover, the client may wish to make minor changes to the project. When questioned about the documents, the architect must be careful to issue new information **only in writing** to all bidders and others, including construction associations, bid depositories, the client, consultants, and authorities.

In the cases described above, the architect should prepare "addenda" to the bid documents. The addenda modify or interpret the bid documents. The addenda may include both text and drawings, or text only. Each addendum must be numbered and dated, and becomes part of the contract documents when the construction contract is executed. Engineering addenda should be forwarded to bidders through the architect, and the numbering of these addenda should be integrated with the architect's system. The new information should be set out very precisely so that bidders know exactly what is original and what has been added, deleted or changed. All bidders must base their bid on the same information.

When organizing addenda, architects can assist bidders and contract administrators by following these procedures:

- identify all addenda by project name and project number;
- provide a date of issue for each addendum;
- number addenda consecutively;
- record the information in a logical order (following the sequence established in the drawings and specifications);
- use simple, clear instructions such as:
  - **Delete:**
  - **Add:**
  - **Revise to Read:**
- reference all attachments to the addendum, providing a drawing and detail number as well as the specification section followed by the article and paragraph number;
- refer to the attachment in the addendum.

A sample Addendum is provided in Chapter 2.4, *Standard Forms for the Management of the Project*.

The last opportunity for issuing an addendum should be no later than four working days before bid closing. The same written instructions must be received in a timely manner by all bidders. If this is not possible, the bid period must be extended.

Bid Period and Bid Closing

To ensure that clients receive competitive prices, contractors must have adequate time to review the bid documents and to prepare a bid. The length of the bid period will vary, based on the project size and complexity. A large, complex project "out for Public Tender" may require four to six weeks for bidding, whereas a simple, small project by invited bid may only require two weeks. Market conditions can affect the bid period; for example, several projects being bid at the same time may require a longer bid period.

It is not advisable to receive bids in more than one location. Bids should only be received as a hard (paper) copy because of various problems related to electronic communications and the possibility of one bidder monopolizing a communication system or fax line.

Bids should never close on a Friday or a Monday, nor immediately following a statutory holiday. Usually, the time for closing bids is mid- to late-afternoon. It is important to specify the time as *"before"* the hour, not *"on"* or *"at"* the hour. Here is an example of a well-worded instruction:

> **Bids must be received *before* 3:00 P.M. on Thursday, February 18, 1999.**

The person receiving the bid should time-stamp, date-stamp, and initial the bids on receipt at the designated place of closing. Bids received after the designated bid closing time should be

returned unopened to the bidder indicating that it was a late bid. No reasons for the lateness (such as accident or traffic jam) can be accepted. On the other hand, if an external cause such as a snow storm has prevented the majority of expected bidders from tendering their bids, the closing of the bid call may be postponed, in which case the bids that were received should be returned to their senders unopened.

Ideally, bids should be opened soon after the bid closing time. Frequently, bids for public and for some private projects are opened with the bidders, or their representatives, present. Only the following information should be announced:

- bidder's name;
- the *base bid amount only*;
- the required bid security or bid bond.

Alternative prices and unsolicited prices should not be reported. Alternative prices require analysis; reporting them at this time could mislead bidders.

A form entitled "Summary of Bids" is provided in Chapter 2.4, *Standard Forms for the Management of the Project*. Both the architect and the client will find this form useful for recording bids during the bid opening.

Infrequently, after the bid closing, a bidder may notify the architect or the client that a serious mistake has been made in the bid and this contractor should be permitted to withdraw without penalty. However, the submission of a bid is a legally enforceable contract between the bidder and the owner. Based on the conditions of the "bid contract," bidders are unable to withdraw their bids during the period of irrevocability (usually the period provided for in the bid bond). To do so would permit the forfeiture of the bid deposit or bond. Legal advice is required in such an instance.

If only one bid is submitted, the architect should advise the client to consider returning the bid unopened, or negotiating with the sole bidder.

Refer to CCDC 23, *A Guide to Calling Bids and Awarding Contracts*, for more information on bidding.

Analysis of Bids

After opening the bids, the architect should carefully analyze the bids and report to the client who will select the successful bidder.

The architect must carefully review each bid. Prior to reporting to the client, the architect must analyze and research:

- the completeness of each bid;
- the bid amount and the amount of value-added taxes such as GST, HST or QST;
- the interest rate for unpaid accounts;
- the proposed construction start date and schedule;
- inclusion of all addenda;
- sub-contractors listed, including follow-up of the references;
- manufacturers and suppliers listed with follow-up as required;
- alternatives;
- unit prices;
- separate prices.

If the bid call was open to all contractors without pre-qualification, the architect should determine the experience records of the three lowest bidders and their current workload. It is also helpful to follow up with the architects involved on previous projects given as references by the low bidders. Finally, the architect must carefully review and compare the financial impact of any alternatives or substitutions or unit prices.

The architect should report in writing the findings of the bid analysis, including a comparison of all price and bid information, and recommend a course of action (that is, usually the selection of a contractor) to the client.

Bid Types

Bids are described in the following terms:

- *formal bid* — a bid which has been correctly submitted in all aspects;
- *qualified bid* — a bid which may not be in strict accordance with the "Instructions to Bidders" or the construction documents (usually includes a statement placing conditions on a component of the bid);
- *informal bid* — a bid which is incomplete, late, unsigned or lacks the required documentation or security.

Any bid is considered informal if:

- it does not meet the basic requirements concerning confidentiality (for example, being in a sealed envelope);
- it does not indicate that the correct number of addenda were received and included in the bid amount;
- it is not accompanied by the requested bid bond or bid security;
- it is not properly signed or sealed;
- bonding requirements are not submitted (for example, "Consent of Surety" or "Agreement to Bond").

Refer also to CCDC 22, *A Guide to Construction Surety Bonds*.

Any bid deemed *informal* should be immediately rejected without any further examination. A *qualified* bid should also be rejected unless all the bids contain the same qualification (for example, the unavailability of a certain material or sub-trade).

Refer to "Privilege Clauses" earlier in this chapter.

Over Budget

When the lowest of the formal bids is higher than the most recent construction cost estimates and the client does not wish to revise the budget or abandon the project, there are two possible solutions:

- if the difference is more than 15% of the latest approved construction cost estimate, the *Canadian Standard Form of Agreement Between Client and Architect: Document Six* states that architects must, if requested by the client, revise the construction documents and administer a new tender call, at no additional fee;
- if the difference is less than 15% of the latest approved cost estimate, it is generally possible to propose alternatives and to negotiate an acceptable price with the lowest bidder.

Contract Award

Letter of Acceptance

The award of a contract is usually accomplished by issuing a Letter of Acceptance from the client. This letter allows the contractor to start work immediately while a formal contract is drafted and executed. Bids must be accepted or rejected as submitted. The architect frequently assists the client in the preparation of the Letter of Acceptance; however, it is prudent to advise the client to have the Letter of Acceptance and the subsequent construction contract reviewed by the client's lawyer.

Chapter 2.4, *Standard Forms for the Management of the Project*, provides two sample Letters of Acceptance:

- Sample Letter 1: outlines some of the documentation required before commencing work on the site;
- Sample Letter 2: has some qualifications, notably the acceptance of certain alternative prices.

Some clients request that the architect send a "Letter of Intent" to the contractor to advise the contractor of the intention to award a contract. A Letter of Intent, which is issued with the intention of binding the contractor to the project with no real commitment, can be misleading. Letters of Intent should be avoided in favour of a Letter of Acceptance.

Notification of Unsuccessful Bidders

Unsuccessful bidders should be notified promptly of the contract award; this permits contractors to make arrangements with bonding companies, staff, and sub-contractors to bid on other projects. Any required security deposits should also be promptly returned to all unsuccessful bidders. Bid bonds and Agreements to Bond need only be returned at the request of the bidder because these usually expire at the end of the acceptance period. Typically, the contract amount is included for the future use and information of the unsuccessful bidders; if this differs from the base bid, a brief explanation may be provided.

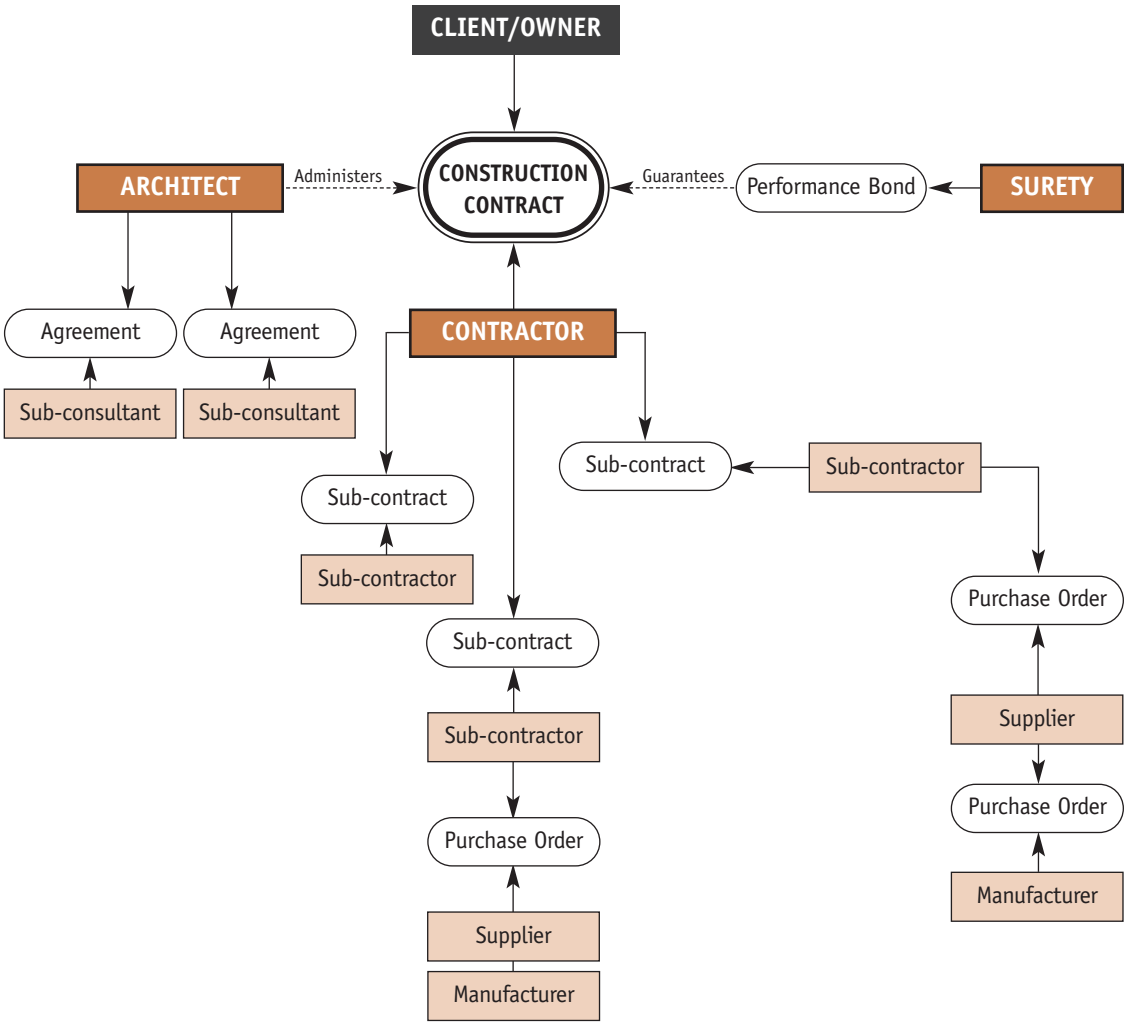
A sample Letter to Unsuccessful Bidders is provided in Chapter 2.4, *Standard Forms for the Management of the Project*.

Preparation of the Construction Contract

The architect usually prepares the construction contract. It is recommended that the standard Canadian Construction Documents Committee (CCDC) forms of construction contract be used. These documents have widespread acceptance in the construction industry, and have been tested and endorsed by all CCDC constituent members.

The Construction Contract

(Relationships in a Stipulated Sum Contract such as CCDC 2)



Refer to Chapter 1.2.1, *The Construction Industry*, for a description of CCDC and "List: Canadian Construction Documents."

The number of copies of the contract to be executed depends on the client and his/her lawyer. A minimum of two original copies should be prepared — one for the client and one for the contractor — as well as one photocopy for the architect. The signatures (and corporate seals) should be applied to both original copies. CCDC 20, *A Guide to the Use of CCDC 2*, describes the method for filling in and completing the agreement form in CCDC 2, *Stipulated Price Contract*.

Some lawyers recommend binding and sealing the documents to make it difficult to remove and replace pages without breaking the seal.

Two sealing methods are:

- a ribbon or cord through each page with a wax seal on the cover;
- wire and lead seal.

Less formal methods may be acceptable for smaller projects.

To execute the contract, both the client and the contractor should sign and seal the covers of the documents including the cover page of the drawings and the specifications. Sometimes, every page of the supplementary conditions and occasionally all the drawings are initialled. A contract set is then provided to the client and to the contractor for their records.

Definitions

Addendum: A change to the bid package (usually a modification of the drawings and specifications) issued during the bid period and before execution of the contract.

Base Bid: The stipulated sum of money *without any adjustment as a result of alternative prices or substitutions, etc.,* for which the bidder offers to perform the work called for in the bid documents.

Bid or ***Tender:*** An offer in response to a bid or tender call; a price and/or time estimate in response to a bid or tender call; the offer forms a "bid contract" until the time period for acceptance is over. "Tender" and "bid" are used interchangeably; however, the CCDC formally abandoned the term "tender" in the early 1980s in favour of the term "bid."

Bond: A financial security for the performance of an obligation; usually a written document supported by a pledge of collateral.

Pre-purchasing: A procedure for purchasing materials, equipment or services by the owner prior to award of the prime contract.

Pre-selecting: A procedure used by an owner to pre-qualify and select a manufacturer or supplier before the tender or award of the total contract.

Pre-tendering: A procedure for calling tenders by the owner prior to the prime contract tender call. The contractor may then be directed to include the amount of this pre-tender in his/her own tender.

Surety: The party (surety company) that issues a bond which guarantees the performance of the person bonded (in construction, the contractor) to fulfil obligations under contract within the financial and time limitations stated in the bond.

References

Canadian Construction Association (CCA). Ottawa, Ont.

CCA 5, *Canadian Standard Construction Management Contract Form between Owner and Construction Manager*. 1988.

CCA 29, *A Guide on Standard Contracting and Bidding Procedures*. 1995.

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.

CCDC 2, *Stipulated Price Contract*.

CCDC 3, *Cost Plus Contract*.

CCDC 10, *Stipulated Price Bid (form)*.

CCDC 11, *Contractor's Qualification Statement*.

CCDC 20, *A Guide to the Use of CCDC 2 — 1994. Stipulated Price Contract*.

CCDC 22, *A Guide to Construction Surety Bonds*.

CCDC 23, *A Guide to Calling Bids and Awarding Contracts*.

CCDC 220, *Bid Bond (form)*.

CCDC 221, *Performance Bond (form)*.

CCDC 222, *Labour and Material Payment Bond (form)*.

Construction Specifications Canada (CSC). *Series 0 Information: Bidding and Contracting Requirements*. Toronto, Ont.: CSC, 1999.

National Practice Program (NPP). *Canadian Standard Form of Agreement Between Client and Architect: Document Six*. Ottawa, Ont.: NPP, 1997.

List: The Bid Package — A List of Information Required

1. Bid Information and Requirements

- Instructions to bidders (see list over)
  - Bid form[1] (CCDC 10)
  - Bid security requirements (bid bond, or other)
  - Undertaking to bond (agreement to bond, consent of surety, bid letter, etc.)
  - Pre-bid information and meeting

2. Contract Forms and Bond Requirements

- Model contract, including general conditions
- Supplementary conditions:
  - Insurance requirements
  - Performance bond, labour and material payment bond requirements, etc.
  - Cash allowances
  - Contingency allowances, if any

3. Specifications

- General requirements (Division 1)
- Technical specifications (Divisions 2 to 16)
- Independent testing and investigations requirements

4. Site Information (as per project requirements)

- Plan of public utilities
- Legal and topographic surveys
- Geotechnical report[2]
- Environmental report(s)

5. Drawings

- Drawings and details
- Schedules, including room finish schedules, door schedules, etc. (these may be bound with the specifications)

6. Construction Scheduling Restrictions and Milestones

- phasing and occupancy requirements

7. Addenda

Footnotes:

1. If **not** using CCDC 10, ensure that the amount of **tax** is clearly included or itemized.
2. Geotechnical and other reports are not generally provided to all bidders but may be consulted at architects' or engineers' offices. Refer to the *Recommended Guidelines for the Provision of Geotechnical Information in Construction Contracts*, published by the Canadian Construction Association and the Association of Consulting Engineers of Canada.

List: Instructions to Bidders — A List of Information to be Provided

(refer also to CCDC 23)

- A copy of the project announcement and the invitation to contractors to submit bids (Notice of Tender)
- Location, date, and time of bid closing
- The legal names, titles, addresses, and contact numbers of the client and the client's representative
- The legal names, titles, addresses, and contact numbers of the architect and the architect's representative
- Location and address of the work
- Precise name of the project and a general description of the scope of the work
- Location where the bid documents may be obtained and the requirements for deposit
- Location where the bid documents may be examined
- Information regarding the use of bid depositories (when applicable)
- Information about the procedures for requesting information and the distribution of addenda
- Details of an information session or site visit, if required
- Details of a public bid opening (when applicable)
- Pre-qualification requirements
- Period of time for acceptance of bid (duration of offer)
- Bid security required (bid bond, certified cheque, letter of credit, or other)
- Other bonding or security requirements (agreement to bond, performance bond, labour and material payment bond)
- Instructions regarding amending the bid prior to bid closing time
- Details for the signature and witnessing, especially if not incorporated
- Identification of bid and security required for the submission (sealed envelope, name of bidder and name of project, etc.)
- Instructions concerning unit prices, alternative prices, itemized prices, and separate prices
- Criteria for the selection of the successful bidder and award of contract (such as price, duration of construction, experience)

Standard Forms for the Management of the Project

Guide to the Use of the Forms

Purpose of the Forms

The forms in this section of the Handbook are provided to assist the architect in managing a project. Standardized forms support effective record-keeping and other functions. As well, many of these forms are needed to fulfil contractual requirements.

Computerized Forms

Readers will also find copies of the project management forms in both WordPerfect and Word software formats on a disk in a plastic sleeve at the end of Volume 2. These forms are *templates* which may be customized by each architectural practice. Refer to the appropriate software application for instructions on the use of templates and on the method for customizing the forms.

The Handbook does NOT duplicate forms which are available from the Canadian Construction Documents Committee (CCDC), such as those in CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*. For a copy of these forms, refer to Volume 3, Chapter 3.2, *Selected Standard Documents of the Canadian Construction Industry*, of this Handbook. The inside back cover of CCDC 24 contains a disk with the forms in computer template format.

Other Forms

This section of the Handbook provides only the basic forms used to manage most architectural projects. Other forms which may be required include:

- **Survey Requirements** (to be provided to land surveyors)
- **Index of Drawings/Sketches**
- **Index of Drawing Revisions**
- **Index of Sub-contractors**
- **Index of Minutes of Meetings**
- **Index of Field Review Reports**
- **Record of Committed Funds** (to track expenditures from a contingency fund)

1. Forms for General Communications

1.1 Memorandum

A memorandum, or memo, is used as a note when a letter or more formal correspondence is not appropriate. When distributed outside the architectural practice, the memo is usually initialed or signed at the bottom of the message or next to the name of the sender. The text should be clear, concise, and correct.

Purpose
A memorandum is used to:

- transfer, confirm, record, and file miscellaneous information both within and outside the office;
- act as a reminder of outstanding business or action required.

Contents
The memo should contain the following information:

- recipient;
- sender;
- date;
- file or project name and number;
- title of the subject matter;
- body of text or information.

1.2 Minutes of Meeting

Minutes of Meetings are used to document meetings, including telephone calls or telephone conferences. This form is sometimes called a Meeting Report or Conference Report.

Purpose
The Minutes are a record of items discussed at meetings. This report should include the purpose of the meeting, a list of attendees, and an action column indicating the name of the individual or firm responsible for follow-up.

Contents
The Minutes should provide the following headings:

- project name and number;
- date;
- location;
- purpose of meeting;
- list of attendees;
- action(s) required.

1.3 Transmittal

A transmittal is a convenient form which records the routing of drawings, specifications, sketches, shop drawings, samples, product literature, and other documents.

Purpose
The transmittal is used to:

- record and document the information transmitted;
- record the date of transmission;
- indicate the action expected upon receipt of the information;
- direct the routing and mode of delivery.

Contents
Transmittals should contain the following:

- date;
- addressee or recipient;
- project name and number;
- method of transmittal;
- action required;
- itemized list of documents or information;
- remarks or additional notes pertaining to the information;
- names of recipients also receiving same items or information.

1.4 Fax Memorandum

A fax memorandum is a memo used exclusively for transmission by fax machine. Its purpose is similar to a regular memorandum; however, it is often used as a transmittal for information forwarded by fax.

Contents
The only additional information required on a fax memorandum is whether or not the original memo or attachments will be forwarded by mail.

1.5 Project Team Directory

This is a complete list of the representatives of the various organizations involved in a project and their addresses and contacts.

Purpose
The directory provides a simple, accessible source of contact information for communication purposes.

Contents
The directory should include:

- name of firm or organization;
- name of individual;
- role and/or title of individual;
- address;
- telephone and fax number (usually business telephone, but sometimes emergency or home telephone numbers are important);
- cellular telephone number;
- E-mail address.

2. Forms for the Bidding Phase of a Project

For a general discussion of this phase of a project and for the application and use of these forms, refer also to Chapter 2.3.9, *Construction Procurement*.

2.1 Bid Documents Distribution List

It is important to track the distribution of documents when a project is "out for tender."

Purpose
The list is used to:

- identify all bidders and other recipients;
- record deposits for documents;
- provide a distribution list for addenda;
- provide a checklist to secure the return of documents after bid closing.

Contents
The Bid Documents Distribution List should include the following information:

- project name and number;
- bid closing time and date;
- name, address, and telephone and fax numbers of all contractors (bidders and other recipients);
- number of sets of documents received;
- date of issue and date of return of sets of documents;
- deposits received and returned;
- number of addenda issued and date of issue.

2.2 Stipulated Price Contract Bid Form

Refer to CCDC 10, *Stipulated Price Bid Form,* for a sample form.

Refer to Chapter 2.3.9, *Construction Procurement,* and to CCDC 23, *A Guide to Calling Bids and Awarding Contracts,* for information on the use and application of this form.

2.3 Addendum

All addenda must be carefully worded and distributed, as they will form part of the construction contract. Addenda may contain revised or additional drawings. They must be distributed to all bidders and others at the same time, in the same manner, and no later than four days prior to bid closing.

Refer to Chapter 2.3.9, *Construction Procurement,* and to CCDC 23, *A Guide to Calling Bids and Awarding Contracts,* for more information on addenda.

Purpose
Addenda are used to:

- provide additional information to be included in the bid documents;
- correct or clarify information in the bid documents;
- identify changes in the instructions to bidders (closing date, time, etc.).

Content
The addendum should include the following information:

- project name and number;
- number and date of the addendum;
- a reference to the appropriate bid document (drawing, specification, instructions to bidders, etc.);
- a detailed description of the new information.

2.4 Contractor's Qualification Statement

Refer to *CCDC Document 11* for a sample form.

Refer to Chapter 2.3.9, *Construction Procurement,* and to CCDC 24, *A Guide to Model Forms and Support Documents,* for information on the use and application of this form.

2.5 Project Financial Information

Refer to CCDC 12, *Project Financial Information,* for a sample form.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for information on the use and application of this form.

2.6 Summary of Bids

This form is both a record of bids and a tool for analyzing them.

Purpose
The summary of bids:

- provides a list for easy comparison and analysis;
- identifies bids which are qualified or informal;
- is useful as a preliminary record during opening of bids.

Contents
The form must contain the following:

- project name and number;
- bid closing time and date;
- list of contractors submitting bids;
- list of bid amounts;
- list of acceptable bid securities (bid bond, certified cheque, etc.);
- identification of informal, incomplete or disqualified bids;
- list of alternatives or proposed substitutions;
- project completion time (if requested in bid documents).

2.7 Letter of Acceptance

Refer to Chapter 2.3.9, *Construction Procurement,* for information on the proper use of this letter. A Letter of Acceptance is normally issued by the client or owner; however, the architect may assist in its preparation.

Purpose
The Letter of Acceptance:

- notifies a successful bidder of the award of contract;
- permits work to start immediately pending the preparation and execution of a formal contract.

Contents
The Letter of Acceptance should include:

- date;
- name and address of successful bidder (contractor);
- project name and number;
- date and amount of the bid;
- directions regarding commencement of the work;
- acceptance of alternatives;
- confirmation of the contract price;
- starting date of commencement of contract.

2.8 Letter to Unsuccessful Bidders

It is both professional and courteous to inform unsuccessful bidders in a timely manner of the award of a contract. The letter can be sent by the architect or the owner.

Purpose
The purpose of this Letter to Unsuccessful Bidders is to:

- notify all bidders of the status of the project;
- permit bidders to make necessary arrangements for bonding and bidding other projects;
- inform bidders of the actual amount of the successful contract.

Contents
The Letter to Unsuccessful Bidders should contain the following information:

- date;
- the name of the successful contractor;
- the contract amount with a brief explanation if this is different from the low bid (acceptance of alternatives, etc.);
- description of the method for returning bid documents and obtaining deposits on these documents;
- indication of the method for return of bid bonds or bid security, if necessary;
- a note of thanks for bidding on the project.

3. Forms for Contract Administration

3.1 Field Review Report

Field Review Reports form a log of observations and actions taken during the construction and post-construction stages of a project. These reports are often supplemented by tape recordings and photographic or video records.

Refer to Chapter 2.3.11, *Contract Administration — Field Functions,* for more information on the preparation of Field Review Reports.

Purpose
Field Review Reports are used to:

- record construction activities summarizing the status of the project at regular intervals;
- communicate with and report to the client, authorities, and the contractor on the status of a project;
- manage information;
- assist in processing the contractor's applications for payment and the preparation of Certificates for Payment;
- create a project history to assist in providing documentation and findings regarding possible future claims.

Content
All Field Review Reports should contain the following information:

- project name and number;
- location of project;
- number of the Field Review Report;
- date of visit;
- name of general contractor;
- weather conditions;
- general observations, including stage of construction;
- description of work in progress;
- action required;
- name and title of person performing the inspection;
- names of organizations and representatives who will receive the report;
- list of attachments;
- comment on previous reports' "action required";
- method of transmission.

3.2 Supplemental Instructions

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use of the Supplemental Instruction Form.

3.3 Proposed Change

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use and application of this form.

3.4 Change Order

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use and application of this form.

3.5 Combined Proposed Change and Change Order

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.6 Change Directive

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use and application of this form.

3.7 Summary of Changes

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.8 Notice

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.9 Warranty Notice

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.10 Product Warranty Notice

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

4. Forms for Certification

4.1 Certificate for Payment

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* for information on the use and application of this form.

4.2 Certificate of Substantial Performance

The requirement for a Certificate of Substantial Performance and the type of form varies in each province and is based on the relevant construction lien legislation. The architect should confirm which form is suitable in the province in which the project is undertaken.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations,* and to Chapter 3.3.1, *A Comparison of Lien Legislation in Canada,* for additional information on substantial performance.

4.3 Statutory Declaration Forms

Refer to *CCDC 9A, 9B,* and *9C* for sample forms.

Refer to *CCDC 24, A Guide to Model Forms and Support Documents,* for information on the use and application of these forms.

4.4 Application for Payment

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* for information on the use and application of this form.

4.5 Schedule of Values and Work Performed

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* for information on the use and application of this form.

4.6 Letters of Assurance

A Letter of Assurance is a requirement in the province of British Columbia. All architects practising in British Columbia should refer to the *Guide to the Letters of Assurance in the British Columbia Building Code*.

Letters of Assurance must be signed, sealed, and dated by registered architects who are practising (principals) in architectural firms or who hold Certificates of Practice in designated engineering firms.

Purpose
The Letters of Assurance are used to provide certification to Authorities Having Jurisdiction at two milestones:

- application for building permit;
- intention to occupy the building.

Content
Always use the standard form of the Letter of Assurance. Refer to the latest edition of the *British Columbia Building Code* or the Vancouver Building Bylaw equivalent for sample letters.

5. Other Forms for Project Management

The architect can use many forms to assist in the management of a project.

5.1 Index of Supplemental Instructions

Refer to CCDC 24, *A Guide to Model Forms and Support Documents*, for a typical Supplemental Instruction Form.

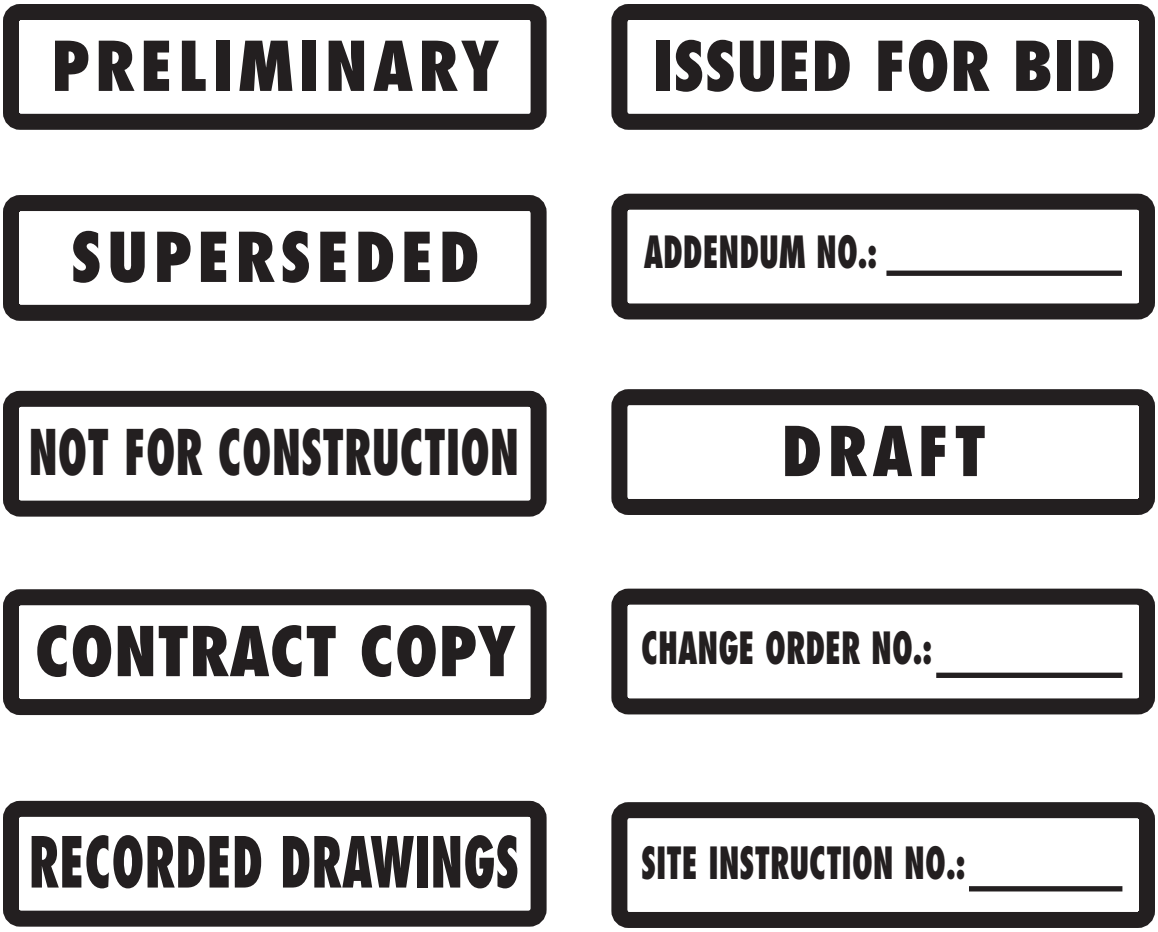
When numerous supplemental instructions are issued to clarify or interpret the contract documents, a reference list is needed to track all instructions issued.

Content
On an Index of Supplemental Instructions, provide the following information:

- project name and number;
- numbers of the Supplemental Instructions (in chronological order);
- descriptive title for each instruction;
- representative who initiated the instruction;
- date of issue of the Supplemental Instruction;
- indication of whether or not a Change Order was required.

5.2 Drawing Stamps

The following common stamps indicate the stage of development of a design or construction document. In addition, the stamp indicates a restriction or clarification for the document's use.



5.3 Shop Drawing Review Stamps

The review of shop drawings and the application of the appropriate stamp have significant implications regarding professional liability and legal responsibility. Refer to Chapter 2.3.10, *Contract Administration — Office Functions*, for the use and application of the shop drawing stamp. Some provincial associations have very specific advice regarding the application of shop drawings. The Ontario Association of Architects advises using four different stamps for four different situations. Refer to OAA Practice Bulletin 7a for a detailed explanation; also, see the stamps at the end of this section.

The following wording is suggested for a shop drawing stamp:

Logo or Name of Architectural Practice

Reviewed ( )
Reviewed as noted ( )

Revise and resubmit ( )
Not reviewed ( )

Date:

Reviewed by:

This review is for the sole purpose of ascertaining conformance with the general design. This review does not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of the responsibility to meet all requirements of the contract documents. The Contractor shall confirm all dimensions and coordinate all construction and the work of all sub-trades.

The following four stamps are suggested by the Ontario Association of Architects:

1. For shop drawings which are not required:

Logo or Name of Architectural Practice

This submission is not required under the contract documents and is being returned with no action taken by the Architect.

2. For shop drawings with engineering content only:

[Note: clarify in the contract documents that shop drawings affixed with the architect's standard received stamp have **not** been reviewed by the architect.]

Logo or Name of Architectural Practice

Date Received:

File or Project No.:

Routing:

Action:

3. For shop drawings to be reviewed only by the architect:

Logo or Name of Architectural Practice

Reviewed ( )
Reviewed as noted ( )

Revise and resubmit ( )
Not reviewed ( )

Date:

Reviewed by:

This review by *[insert name of practice]* is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that *[insert name of practice]* approves the detailed design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of the responsibility for meeting all requirements of the contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all trades.

4. For shop drawings with engineering elements which must also be reviewed by the architect:

Logo or Name of Architectural Practice

Reviewed ( )
Reviewed as noted ( )

Revise and resubmit ( )
Not reviewed ( )

Date:

Reviewed by:

This review by *[insert name of practice]* is for the sole purpose of ascertaining conformance with the general design concept for architectural features only, and does not in any way constitute review of the design of engineering elements which form part of the contract documents prepared by others. This review shall not mean that *[insert name of practice]* approves the detailed design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of the responsibility for meeting all requirements of the contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all trades.

5.4 Log of Shop Drawings and Samples

It is important to ensure the timely review and tracking of all shop drawings and samples, both within the architect's office and by consultants. This log assists in the efficient management and distribution of shop drawings and samples.

Items within the log of shop drawings and samples should be listed or filed using the MasterFormat™ system. A copy of the log should be filed with the project's shop drawings.

Purpose
The shop drawings and samples log:

- provides a list of all required shop drawings and samples;
- identifies shop drawings and samples required but not yet received;
- determines the status of the review and distribution of shop drawings as well as approval of samples;
- provides a checklist for the preparation and review of a manual during "take-over."

Content
The shop drawings and samples log should contain the following:

- title of the drawing;
- drawing number;
- date of preparation;
- MasterFormat™ number for the product or system;
- company or trade responsible for preparing the drawing;
- date received;
- name of consultant to whom the drawing or sample was referred for review;
- date of referral;
- date that the shop drawing or sample is returned;
- date that the shop drawing is forwarded to the general contractor;
- status of the shop drawing or sample (e.g., reviewed, reviewed as noted, or resubmit).

Logo or Name of Architectural Practice

Memorandum

To: Project Architect
From: Job Captain
Subject: ABC Building Renovation
Mechanical Data

Date: September 5, 1999
File/Project No.: 99101

Mechanical Engineer has advised as follows:

1. Mechanical Order of Magnitude Costs

1.1	Ground floor offices	$6,600
1.2	Boardroom	$6,600
1.3	Second floor offices	$11,500
		$24,700

Note: These costs are exclusive of fees or contingencies.

2. Architectural Requirements for Mechanical

2.1 Roof-top AC ducts (3) require holes in roof, roof curbs and enclosures in vertical duct shafts (about 2'-0" x 2'-0")

2.2 Furred-in enclosure for ducts allow 20" extensions, six spots cut and patch for each unit.

3. Electrical Requirements for Mechanical

3.1 2 1/2 H.P. required for each AC unit noted above.

c. Mechanical Engineer
Electrical Engineer

Method of Transmission: by fax only.

Logo or Name of Architectural Practice

Minutes of Meeting No.: 4

Project: ABC Building Renovation

Date: May 18, 1999

Project No.: 99101

Location: Site

The following summarizes all subjects discussed and decisions reached at the above-noted meeting. Please advise Architect of any errors or omissions.

4.1 ATTENDEES

Client: U. Lysses
Contractor: O. Lympus
Architect: P. Thagorus, J. Smith

4.2 GENERAL

.1 Contract — Client is to sign contract and return to Architect at earliest convenience (outstanding 2 weeks).

Action by: Client — U. Lysses

.2 Insurance — Contractor is not prepared to accept $1,000 deductible as noted in his letter to provide same for remainder of project duration by June 1, 1999. Client to review.

Action by: Client — U. Lysses

.3 Cash Flow — Contractor has provided cash flow projections for first three months and is to provide same for remainder of project duration by June 1, 1999.

Action by: Contractor — O. Lympus

.4 Schedule — Copies of garage and tower superstructure bar chart schedules were distributed to Client and Architect for review and comment.

Action by: Architect — P. Thagorus

4.3 ARCHITECTURAL

.1 Samples — Travertine sample to be resubmitted.

Action by: Contractor — O. Lympus

.2 Hoarding Colour & Sign — Client to advise regarding hoarding colour and $600 allowance for sign.

Action by: Client — U. Lysses

.3 Documentation — Contractor advised that they had documented the condition of existing landscaped area by photograph and letter, before erecting temporary offices. A copy of this documentation will be submitted to Architect.

Action by: Contractor — O. Lympus

	Action by
4.4 STRUCTURAL	
.1 Service Tunnels —, Contractor stated that their bid does not include an allowance for tunnels, to connect services. Tunnel work should commence immediately, but the contractor is not prepared to start until this matter is clarified. Architect to review and advise.	Architect P. Thagorus
.2 Garage Alterations — Existing pipe columns are to be inspected by Structural Engineer and reworked. Instructions required (outstanding 1 week).	Structural Engineer
4.5 MECHANICAL	
.1 No pending business.	
4.6 ELECTRICAL	
.1 Electrical Contract Clarification — Decision on the following is still outstanding and is delaying finalization of prime contract and electrical sub-contract: • ABC fixtures in lieu XYZ • Transformer type — dry type vs. oil	
Client reported that while they have been fully briefed on this situation, they will not consider the matter further until Contractor replies to the Architect's letter of 10 April 1999.	Contractor O. Lympus
4.7 STATUS OF SHOP DRAWINGS AND SAMPLES	
.1 Contractor and Architect reported no outstanding items at this time.	
4.8 STATUS OF CHANGES	
.1 Status Proposed Changes issued to date:	
PC 1 Incoming service & power supply	Client signing CO
PC 2 Travertine finish — core walls	Architect checking
PC 3 Mechanical revisions	Architect checking
PC 4 Structural foundation revisions	Architect checking
PC 5 Clarification of parking garage structure	Contractor pricing
PC 6 Sprinkler revisions	Contractor pricing
4.9 DISTRIBUTION — U, Lysses — O, Lympus — Structural Engineer	

Prepared by:
James Smith, Project Architect

Logo or Name of Architectural Practice

Transmittal

Project Name: **Project No.:**

Date:

To:

From:

For your:
- ❑ Approval
- ❑ Distribution
- ❑ Information and use
- ❑ Review and comment

Via:
- ❑ Mail
- ❑ Courier
- ❑ By hand
- ❑ To be picked up
- ❑ Fax
- ❑ E-mail

Quantity: **Description:**

Remarks:

Logo or Name of Architectural Practice

Fax Memorandum

Date:	**File:**
To:	**Project No.:**
From:	**Fax No.:**
Subject:	

Original to follow in mail: ❑ yes ❑ no

No. of pages (including this page):

Logo or Name of Architectural Practice

Project Team Directory

Name of Project:

Project No.:

Date Prepared:

Name of Client:

Name of Client's Representative:

Address:

Telephone:

Fax:

Cellular:

E-mail:

DISCIPLINE	Firm NAME	Representative
Architect		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Structural Engineer		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Mechanical Engineer		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Electrical Engineer		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Other Consultants		
Address		
Telephone		
Fax		
Cellular		
E-mail		

Logo or Name of Architectural Practice

Bid Documents Distribution List

Name of Project:

Project No.:

Name of Client:

Bid closing:

Name of Bidder or Recipient	Address/Telephone/Fax	Number of Sets	Deposit Received (include date and amount)	Deposit Returned (include date and amount)	Addenda Issued (include date)				

Form 2.1

Logo or Name of Architectural Practice

Addendum No._____

page _____ of _____

Project No.:

Date:

Project:

The following information supplements and/or supersedes the bid documents issued on _____.

This Addendum forms part of the contract documents and is to be read, interpreted, and coordinated with all other parts. The cost of all contained herein is to be included in the contract sum. The following revisions supersede the information contained in the original drawings and specifications issued for the above-named project to the extent referenced and shall become part thereof. Acknowledge receipt of this Addendum by inserting its number and date on the Tender Form. Failure to do so may subject bidder to disqualification.

Drawings:

Specifications:

Logo or Name of Architectural Practice

Summary of Bids

Name of Project:

Project No.:

Name of Client:

Bid Closing:

Name of Bidder	Bid Amount	Bid Security (bid bond, certified cheque, etc.)	Agreement to Bond	Informal Bid (specify irregularity)	Proposed Alternatives	Cost Savings or Extras	Proposed Completion Date

Form 2.6

Client's logo

Letter of Acceptance
Sample No. 1

Date: _____

Contractor: _____

Address: _____

Attention: _____

Dear _____ **:**

Re: **Project Title:** _____

Project No.: _____

We thank you for your bid dated _____ in the amount of $_____. We advise that your bid is accepted. This is your authorization to proceed with the work immediately.

Please obtain and submit the following documents as specified in the bid documents as soon as possible and before commencing activities at the site:

1. Workers Compensation Board certificate of good standing,
2. Certificates of insurance,
3. Certified copies of insurance policies, and
4. Performance bond.

We accept the alternative price of $_____ deduction for using _____.

We also accept the proposed saving of $_____ for eliminating in accordance with the bid documents _____.

With these changes, the contract price will be $ _____.

The formal contract documents are being prepared and will be submitted to you shortly for execution.

Yours very truly,

Client

Client's logo

Letter of Acceptance (Qualified) Sample No. 2

Dear _____ **:**

Re: **Project Title:** _____

Project No.: _____

Thank you for your bid for the above-named project, dated_____ in the amount of $_____. We accept your bid subject to the following conditions and qualifications, and authorize you to proceed with the work immediately. We understand that the Architect,_____, has advised you of this acceptance and authorization by telephone on _____ and that you have agreed to begin work at the site on _____.

Your bid is comprised of the basic bid form,____ pages; the Schedule of Alternative Prices,____ pages; your letter of _____ to us care of the Architect explaining certain alternative prices; and your letter of _____ to us care of our Architect extending the time limit for the acceptance of your bid by _____ days.

Your bid included in the Schedule of Alternative Prices, certain alternatives. We accept alternative (a) for the _____ which will reduce your bid sum by $_____, the revised sum being $_____. This acceptance is conditional upon our being shown preliminary shop drawings which will demonstrate to our satisfaction that the alternative _____ will meet the performance requirements of the Specifications. We accept alternative (c) at no charge in price and accept _____ as the control sub-contractor.

We accept your assurance that the letters "N/A" in the blank space in Article 10.1 of your bid means that there is no premium to complete the work specified in Articles 8.1.5 and 8.1.6. However, in recognition of the delay in giving notification to proceed, from _____ to _____, the completion dates are hereby revised to _____ (8.1.5) and _____ (8.1.6).

We ask you to take immediate steps to obtain a letter from the Workers Compensation Board/Workplace Safety and Insurance Board certifying that you are in good standing and to secure and submit to us, via our Architect, a performance bond as set out in Article _____ of the General Conditions as amended by Supplementary Condition_____. Furthermore, we ask that the CCA form of performance bond be further modified as follows:

Instead of saying "Principal has entered into a written contract with Obligee, dated the _____ day of 20____," it shall say "Principal has, by bid dated _____, which was accepted by letter dated _____, entered into an agreement which is subsequently to be replaced and superseded by a formal contract as described in the contract documents."

Please submit the required certificates of insurance and certified copies to us through our Architect before commencing activities at the site.

Our Architect is assisting us in preparing a formal contract and will notify you when it is ready for execution.

Because our acceptance is qualified, it is necessary that you confirm your acceptance of the qualification by signing this letter and affixing your corporate seal in the place we have prepared for that purpose below.

_____ (Client) (Seal)

Accepted: _____ (Contractor) (Seal)

Client's Logo

Letter to Unsuccessful Bidders

Date: _____

Contractor: _____

Address: _____

Attention: _____

Dear _____**:**

Re: **Project Title:** _____
Project No.: _____

Thank you for your bid for the above project. We would like to advise you that the contract has been awarded to _____ (insert name of successful General Contractor) for an amount of $_____. (insert contract amount)

(provide a brief explanation regarding contract amount if different from bid amount).

_____
_____
_____
_____
_____

Could you please return the bid documents to _____ at your earliest convenience.

(insert information regarding return of bid security or bid deposit after execution of contract, if necessary).

_____
_____
_____
_____
_____

Once again, thank you for bidding on this project.

_____(Client)

or

_____(Architect)

Logo or Name of Architectural Practice

Field Review Report 3

Project: ABC Building Renovation
10 Jones Avenue, Toronto

Contractor: Construction Contracting Ltd.

Weather: Sunny, 5° C

Date of Visit(s): October 4, 1999

Project No.: 98101

Building Permit No.: 174/99

GENERAL

1.1 Reviewed work in progress with Client.

WORK IN PROGRESS — OBSERVATIONS

2.1 Demolition of existing building complete. Sub-contractor to remove stockpiled materials at N.W. corner of site.

2.2 Site preparation — Topsoil removed and stockpiled on site. Existing paved surfaces removed. Rough grading complete. Equipment on site — one tractor, vibrator, and compactor.

2.3 Excavation for footings complete — see Structural Engineer's report.

2.4 Footings — Concrete footings poured along gridline A from grids 1 to 8. Forming footings for remainder of gridline A. Four workers plus superintendent. Reinforcing steel for footings delivered.

INFORMATION OR ACTION REQUIRED

3.1 Sketches made of existing 100 x 100 steel column at grid E3 to E9. Contractor to clear away miscellaneous wood to expose connection in order to verify shop drawing details of steel connection to existing.

ITEMS TO BE VERIFIED — None.

Report by: James Smith Title: Project Architect

_____ (Project Architect)
(signature)

Distribution by fax: ABC Corporation — Client Representative
Construction Contracting Limited, Project Manager
Chief Building Official
Architect File

Attachments: Structural Engineer Field Review Report Number 3

Method of transmission:

The Canadian Handbook of Practice for Architects
1999 Edition

National Practice Program for the Profession of Architecture in Canada
The National Practice Program (NPP) is an alliance of the ten provincial associations of architecture and the Royal Architectural Institute of Canada (RAIC). This Handbook has been developed by the NPP on behalf of the architectural profession in Canada, represented by these member associations:

Architectural Institute of British Columbia
Alberta Association of Architects
Saskatchewan Association of Architects
Manitoba Association of Architects
Ontario Association of Architects
Ordre des architectes du Québec
Architects' Association of New Brunswick
Association des architectes du Nouveau-Brunswick
Nova Scotia Association of Architects
Architects Association of Prince Edward Island
Newfoundland Association of Architects
and
The Royal Architectural Institute of Canada

Editorial Board
John Bobaljik, OAA, FRAIC
Pierre Corriveau, OAQ
Michael Kohler, FRAIC
Terry Mager, MAIBC, MRAIC
Robert Ojolick, NSAA, MRAIC
Paul-André Tétreault, OAQ, FRAIC
Andrew Wach, MAA

Editor-in-Chief
Jon Hobbs, OAA, MRAIC

Managing Editor
Jim Young

Senior English Editor
Anthony Butler, OAA, FRAIC

Senior French Editor
Gilbert Paré, OAQ

Graphic Design
Aerographics Creative Services Inc.

Printing
Beauregard Printers

©1999 Members of the National Practice Program:
The Royal Architectural Institute of Canada and the Ten Provincial Associations of Architects
This Handbook may not be copied in whole or in part without the prior written permission of the Royal Architectural Institute of Canada, except for the forms, lists, and checklists which may be copied only by architects who are registered recipients or paid subscribers of the Handbook and who use the copies for the practice of architecture, all of which are subject to the following disclaimer.

Disclaimer
The National Practice Program (NPP) supports the development and maintenance of the *Canadian Handbook of Practice for Architects*; however, neither the NPP nor the Editorial Board, nor the Editors take responsibility for the accuracy or completeness of any information or its fitness for any particular purpose. The Handbook describes procedures for general practice only; there are exceptions and differences for specific circumstances.

Canadian Handbook of Practice for Architects

The National Practice Program gratefully acknowledges the following organizations which supported the development of the *Canadian Handbook of Practice for Architects*:

Sponsors

DPIC Companies
Orion Capital

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

Contributor

ENCON Group Inc.