

# Appendix A

## Architectural Experience Area Description and Required Activities

An Intern must acquire **3720 hours** to satisfy the IAP’s architectural experience requirements. The following chart lists the required architectural experience categories and activities and the required hours for each

<b>CATEGORY A: Design and Construction Documents</b>		<b>Minimum. Hours Required</b>
1	Programming	80
2	Site and Environmental Analysis	80
3	Schematic Design	240
4	Engineering Systems Integration	140
5	Building Cost Analysis*	80
6	Code Research*	120
7	Envelope Detailing	80
8	Design Development	320
9	Construction Documents	760
10	Specifications and Material Research*	120
11	Document Checking and Coordination*	100
12	Energy Literacy/Sustainability	80
<i>*May occur in multiple phases of a project</i>		
<b>Minimum Hours</b>		<b>2200</b>
<b>CATEGORY B: Construction Administration</b>		
13	Procurement and Contract Award	120
14	Construction Phase – Office	200
15	Construction Phase – Site	200
<b>Minimum Hours</b>		<b>520</b>
<b>CATEGORY C: Management</b>		
16	Management of the Project	120
17	Business/Practice Management	120
<b>Minimum Hours</b>		<b>240</b>
<b>Total Hours required in Categories A, B, C:</b>		<b>2960</b>
<b>Remaining Additional Hours</b> (may be gained in experience areas 1-17):		<b>760</b>
<b>TOTAL ARCHITECTURAL EXPERIENCE HOURS REQUIRED:</b>		<b>3720</b>

### 1. Programming

Programming is the process of understanding and setting forth in writing the client's requirements for a given project. Steps in this process include establishing goals, considering a budget, collecting, organizing and analyzing data, identifying and developing concepts, and determining needs. Client-Architect agreements presume that the client will furnish the program. Involvement of the Architect, in writing the program will be a service not covered in the traditional agreement for Design and Construction Administration. However, many clients employ the Architect to assist them in preparing a functional program. The project will also be affected by the mortgage lender; public officials involved in health, welfare and safety; future tenants, and, increasingly, the people who will work in the built environment. Their input at the programming stage is essential to maintain an orderly and productive design process.

*Typical required Intern Activities include the following:*

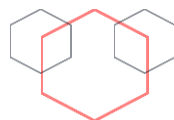
- *Participate in conferences with the clients regarding programming, periodic reviews and formal presentations and assist in preparing minutes or reports for future reference.*
- *Assist with presentations at zoning and variance hearings, and at meetings with the clients and consultants of these projects.*
- *Assist in preparing the summary and evaluation of data and requirements obtained from all sources.*
- *Research current literature pertaining to architectural programming.*

### 2. Site and Environmental Analysis

Site analysis includes land planning, urban design and aspects of environmental evaluation. Land planning and urban design are concerned with relationships to surrounding areas and involve consideration of the physical, economic and social impact of proposed land use on the environment, ecology, traffic and population patterns. Governmental agencies frequently require documentation prepared by specialist consultants on the results that construction will have on the site and on the surrounding lands (i.e. environmental impact studies). Decisions relating to site analysis must involve the selection, organization and evaluation of pertinent data that will lead to a resolution of the client's program while conforming to legal requirements.

*Typical required Intern Activities include the following:*

- *Assist in analyzing several sites to assess the feasibility of their use for a proposed project.*
- *Help analyse the feasibility of using a specific site for a project. Assist in the analysis of specific land use and location for a project. Assist in the formulation of the most appropriate land use strategy to achieve a desired environmental impact.*
- *Research site restrictions such as zoning, easements, utilities, etc. Participate in public hearings about land use issues and prepare reports for future reference.*



### 3. Schematic Design

From the client-approved program and budget (mutually accepted), the Architect develops alternative solutions to satisfy the program, massing, site location and orientation, response to environmental factors regulatory and aesthetic requirements. The preferred scheme(s) is presented to the client for approval.

*Typical required Intern Activities include the following:*

- *Participate in the development and preparation of preliminary design concepts to determine the spatial relationships the best satisfy the client's program.*
- *Participate in the development and coordination of program requirements with the consultants.*
- *Participate in development of a project fire and life safety strategy.*
- *Assist in the preparation of presentation drawings and models.*
- *Assist in the analysis and selection of building and engineering systems.*
- *Research and evaluate building envelope strategy.*
- *Participate in design review and approval meetings with the clients, user groups, authorities having jurisdiction, community.*

### 4. Engineering Systems Integration *(may occur in multiple phases of a project)*

The Architect is usually responsible for the selection, design, and coordination of all building systems, including the engineering systems. The emphasis of this experience requirement is to develop an understanding, under the direct supervision and control of the Architect, of the integrated engineered systems normally designed by the consultants and provided by product suppliers, manufacturers, and fabricators. These traditionally have included structural, mechanical, and electrical systems as well as other technical innovations and special requirements, such as telecommunications and computer applications.

Architects must know how engineering systems work, including system benefits and limitation, availability, cost and space requirements necessary to provide the basis for system design, selection and integration. This knowledge also provides the vital communication links necessary for appropriate interaction with engineering consultants and product suppliers.

*Typical required Intern Activities include the following:*

- *Become familiar with construction methods and performance of different building and engineering systems.*
- *Understand safety requirements and the selection process for building and engineering systems.*
- *Assist in research, analysis and selection of building and engineering systems during the schematic design and development phases.*
- *Help coordinate engineering systems documents provided by the consultants into the construction documents produced by the Architect.*
- *Review consultants' drawings for conceptual understanding of systems, space requirements and possible conflicts or interference of structure, duct work, plumbing lines, electrical fixtures, etc.*
- *Assist in reviewing shop drawings, evaluating samples and maintaining records.*
- *Visit job sites and observe installation and integration of engineering systems, construction details and space requirements.*
- *Attend systems start up, operation and maintenance meetings required for acceptance and use by the client.*
- *Become familiar with relevant codes and regulatory standards applicable to various building and engineering systems.*
- *Check maintenance manuals and warranties submitted by contractors for conformance with contract documents.*

## 5. Building Cost Analysis *(may occur in multiple phases of a project)*

An important responsibility of the Architect is to evaluate the estimated construction cost. Reasonable estimates are crucial to the client. They influence decisions involving basic design, selection of building products and system and construction scheduling. Long-term maintenance, as well as tax impact of material and system selection (value engineering), are additional factors that bear on development of the project. For their own preliminary analysis, most Architects use computations based on area and/or volume. Estimates of construction cost provided later in the design process are frequently made based on labour and material requirements (quantity surveys), a method that requires a more specialized knowledge of construction costs.

**Typical required Intern Activities include the following:**

- Calculate the areas and volumes of a project and its characteristic components.
- Make a simplified quantity takeoff of selected materials and prepare comparative cost analysis.
- Assist in the preparation of cost estimates of each stage of a project.
- Review various references and texts utilized in cost estimating.
- Assist in the preparation of cost analyses for current projects, using a variety of indices.
- Conduct a survey of current costs per square or cubic metre of various types of projects, using local costs data.
- Analyze cost for compliance with various sustainability programs
- Assist in project life cycle costing exercises
- Assist/review costing of scope changes during construction
- Assist in presentation of cost analyses to clients
- Review and analyze cost consultant estimates
- Participate in project value engineering exercises

## 6. Code Research *(may occur in multiple phases of a project)*

Building inspectors as well as officials in zoning, environmental and other agencies relating to the health, welfare and safety of the public, oversee the enforcement of federal, provincial and local regulations related to building construction. The codes promulgated by these various agencies have a direct bearing on the total design process. Knowledge of the applicable project codes and regulations is an integral part of the design of every project and the overall practice of architecture.

**Typical required Intern Activities include the following:**

- Assist in searching and documenting codes, regulations, etc. for two or more specific projects.
- Study procedures necessary to obtain relief or variances from requirements as they relate to a project.
- Calculate certain variables (i.e. numbers and size of exits, stair dimensions, public toilet rooms, ramps) in satisfaction of code requirements.
- Determine a project's allowable land coverage as well as maximum areas in compliance with zoning and any other related ordinances.

## 7. Envelope Detailing

The building envelope is the physical separator between the interior and the exterior environments of a building. It serves as the outer shell to help maintain the indoor environment and facilitate its thermal control. The performance and compatibility of materials, fabrication process and details, their connections and interactions are the main factors that determine the effectiveness, energy efficiency and durability of the building enclosure system. Building envelope design is a critical area of architectural practice that draws from all areas of building science. By understanding the importance of the building envelope and its detailing, architects play a key role in designing projects that are well built and operate well.

**Typical required Intern Activities include the following:**

- Assist in the development of the project building envelope strategy.
- Work in the preparation of building envelope details and wall sections.
- Assist in the preparation of building specifications related to the building envelope.

## 8. Design Development

Based on the client-approved schematic design and estimate of construction cost, the Architect fixes and details for the client's further approval, the size and character of the entire project, including selection of materials and building and engineering systems.

*Typical required Intern Activities include the following:*

- *Participate in the preparation of detailed design development drawings from schematic design documents.*
- *Participate in the preparation of detailed design development drawings for the building envelope. (should be recorded under Envelope Detailing).*
- *Assist in developing various schedules and outline specifications for materials, finishes, fixed equipment, fixtures and updates to project schedule.*
- *Assist in developing various schedules and outline specifications for materials, finishes, fixed equipment, fixtures and updating construction costs. (Record under Building Cost Analysis)*
- *Help coordinate building and engineering systems proposed for the project. (Record under Engineering Systems Coordination)*
- *Review fire and life safety strategy and select fire separation systems.*
- *Participate in design review and approval meetings with clients, user groups, authorities having jurisdiction, community, etc.*

## 9. Construction Documents (Not Including Specifications and Material Research)

Construction documents describe in graphic form, all the essentials of the work to be done, location, size, arrangement, and details of the project. Since the successful and timely execution of these documents can be equated closely with an office's financial success, Architects constantly search for more efficient ways to produce construction documents. Regardless of the method of preparation, it is extremely important that the documents be accurate, consistent, complete and understandable. This requires thorough quality control including constant review and cross-checking of all documents. In addition, effective coordination of consultants' drawings is essential to avoid conflicts and interference in the construction of the Architect's designs.

**Typical required Intern Activities include the following:**

- *Work on the preparation of construction documents. Including but not limited to:*
  - *Site plan*
  - *Fire and life safety plan*
  - *Building plans*
  - *Building elevations*
  - *Building sections*
  - *Exterior wall sections*
  - *Envelope details*
  - *Schedules*
  - *Stair plans, sections, and details*
  - *Interior elevations and details*
- *Develop technical skills in drafting drawings accuracy, completeness, clarity and understanding by others through work in the preparation of detail drawings.*
- *Assist in the coordination of all documents produced by the Architect and the consultants.*
- *Assist in the coordination of all documents produced by the engineering consultants. (Record Under Engineering Systems Coordination)*
- *Develop a knowledge of professional responsibilities and liabilities arising from the issuance of construction documents. Participate in the mechanics of assembling the finished construction documents.*
- *Assist the job captain (or equivalent) in routine administrative/control tasks.*

## **10. Specifications and Materials Research** *(may occur in multiple phases of a project)*

Well-grounded knowledge of specification-writing principles and procedures is essential to the preparation of sound, enforceable specifications. Unless these skills are properly developed, expert knowledge of materials, contracts and construction procedures cannot be communicated successfully. A fundamental principle of specification writing requires the Architect to understand the relationship between drawings and specifications, and to be able to communicate in a logical, orderly sequence, the requirements of the construction process. Many factors must be considered in the selection and evaluation of material or products to be used in a project: appropriateness, durability, aesthetic quality, initial cost, maintenance, etc. To avoid future problems, it is extremely important the Architect recognize the function of each item to be specified. The Architect must carefully assess new materials as well as new or unusual applications of familiar items, regardless of manufacturer representations, to be certain no hidden deficiencies exist that might create problems for the client and expose the Architect to liability.

**Typical required Intern Activities include the following:**

- *Review construction specifications' organization, purpose and format, and assist in writing specifications.*
- *Review and analyze bidding forms, lien provisions, supplementary and special conditions and obtain the client's insurance and bonding requirements.*
- *Research and evaluate data for products to be specified, including information regarding availability, cost, code acceptability and manufacturers' reliability. Attend manufacturers' and suppliers' presentations in connection with this research.*
- *Research industry standards and guidelines for specific classes of products (e.g. curtain walls, aluminum windows) as they affect various manufacturers' products being considered for acceptability on a project.*
- *Research construction techniques and systems and understand workmanship standards such as poured-in-place concrete, masonry construction.*
- *Evaluate the potential for using master specifications in a project specification, including procedures needed to adapt individual sections for this use.*

## 11. Document Checking and Coordination *(occurs in multiple phases of a project)*

Close coordination between drawings and specifications is required when preparing construction documents. The work of each consultant must be reviewed regularly and checked against the architectural drawings as well as the drawings of other consultants to eliminate conflicts. Before final release for construction purposes, the drawings must be checked and cross-checked for accuracy and compatibility. The role of the architect as a coordinating professional is a key responsibility. Thorough project document coordination is crucial and has far-reaching significance during construction.

*Typical required Intern Activities include the following:*

- *Assist in cross-checking products and materials called for in the specifications for consistency with corresponding terminology and descriptions on the drawings.*
- *Check drawings prepared by others for relevance and accuracy of dimensions, notes, abbreviations and indications.*
- *Assist in developing a schedule of lead time required for proper coordination with other disciplines.*
- *Check consultants' drawings with architectural drawings and other consultants' drawings for possible conflicts.*
- *Assist in the final project review for compliance with applicable codes, regulations, etc.*

## 12. Energy Literacy/Sustainability

Energy literacy refers to understanding the nature and role of energy in the world, the economic environment and environmental factors that affect decisions about energy use, and an ability to apply this understanding to solve problems and address related requirements.

*Typical required Intern Activities include the following:*

- *Review principles, terminology and strategies for energy efficiency and environmental impacts.*
- *Assist in calculation of credits in various sustainability programs*
- *Research and apply building code requirements for energy utilization*

## Category B: Construction Administration

### 13. Procurement and Contract Award

There are different routes by which the design and construction of a building can be procured. The selected route should follow a strategy which aligns with the long-term objectives of the client's needs. Depending on the project type, procurement can occur in several different phases of the work. There are a variety of methods for procuring the construction service for a building project. Once the procurement type is established, the associated construction contract and related documents are the formal instruments that bind the major parties together in the construction phase. They detail the desired product and services to be provided in its construction, as well as the consideration to be paid for the product and services under terms and conditions.

*Typical required Intern Activities include the following:*

- *Assist in the pre-qualification of bidders.*
- *Assist in the receipt, analysis and evaluation of bids, including any alternative, discounted or unit prices.*
- *Learn what information and submittals are required prior to issuance of notice to proceed.*
- *Assist in evaluating product considerations in preparing addenda.*
- *Assist in the preparation and negotiation of construction contracts and become familiar with the conditions of the contract for construction in order to identify the rolls of the Architect, contractor, owner, bonding company and insurer in the administration of the construction phase.*

## 14. Construction Phase – Office

During the construction phase there are many related tasks that do not directly involve field observations: processing contractors' applications for payment, preparing change orders, reviewing shop drawings, and evaluating samples, adjudicating disputes, etc. The Architect's handling of these matters will usually have a direct impact on the smooth functioning of the work in the field. For example, prompt processing of the contractor's application for payment, including review of any substantiating data that may be required by the contract documents, helps the contractor, and Architect maintain an even flow of funds and avoid delays and charges. Items such a shop drawings, samples and test reports submitted for the Architect's review must be acted upon promptly to expedite the construction process. Changes in the work that may affect the time of construction or modify the cost are accomplished by change of orders. Interpretations necessary for the proper execution of work must be promptly given in writing even when no change order is required.

*Typical required Intern Activities include the following:*

- *Assist in processing applications for payment and preparing certificates for payment.*
- *Assist in reviewing shop drawings, evaluating samples submitted and maintaining records.*
- *Assist in interpreting documents and preparing supplemental instructions and requests for information.*
- *Assist in evaluating requests for changes and preparing change orders.*
- *Participate in resolution of disputes and interpretation of conflicts relating to the contract documents.*
- *Become familiar with the legal responsibilities of the Client, Contractor and Architect.*
- *Participate in the review of record documents at project completion.*

## 15. Construction Phase – Site

In administrating the construction contract, the Architect's function is to determine if the contractor's work generally conforms to the requirements of the contract documents. To evaluate the quality of material and workmanship, the Architect must be thoroughly familiar with all the provisions of the construction contract. Reports on the stage of completion of scheduled activities are collected and compared to the overall project schedule at job site meetings. These meetings facilitate communication between the contract parties and produce a detailed progress record. The Architect must determine, through observation, the date of substantial completion and receive all data, warranties and releases required by the contract documents prior to final review and final payment. In addition to these construction-related responsibilities, The Architect interprets contract documents when disagreements occur and judges the dispute impartially, even when the owner is involved. Dissatisfaction with the Architect's decision can lead to arbitration or litigation.

*Typical required Intern Activities include the following:*

- *Visit the job site and participate in observation of the work in place and material stored and prepare field reports of such reviews. Review and analyze construction time schedules. Understand the various network methods (e.g. critical path method) potentially available to the contractor.*
- *Develop an awareness of the contractual obligations related to the observation of construction by reviewing contract documents and participating in professional development programs.*
- *Attend job-site construction meetings and assist in recording and documenting all actions taken and agreed to at such meetings.*
- *Participate in the substantial completion review and assist in the deficiency list verification*
- *Participate in the final acceptance review with the client and other involved parties.*



### 16. Management of the Project

The economic and professional health of an architectural practice depends on an orderly, trackable method of project execution. A clearly defined project work plan and the efficient management of project tasks requires participation and input from team members, consultants, client representatives and other key decision-makers (financial experts, developers, lawyers, and contractors). The project manager defines consensus goals, and coordinates tasks and scheduling. Team building depends on clear goals and good communication, with attention to decisions that influence the work of multiple team members.

A project file initiated and maintained by the project manager is the comprehensive record of the project's life and a useful resource for future endeavours and against claims. The work plan must be congruent with all project-related contractual agreements (which are normally maintained in the project file). Scheduled quality control reviews are identified in the work plan; the project manager may request interim reviews in advance of established submittal dates. It is the project manager's responsibility to measure actual schedule/budget progress against the work plan, assess discrepancies and take the corrective actions necessary to maintain project control. The project manager also maintains design quality during bidding, contract negotiation and construction phases through administration of the project file, oversees the architectural practice's construction representative and monitors scheduled on-site quality reviews. Finally, the project manager closes out project records and agreements and sets up future post-occupancy evaluation procedures.

*Typical required Intern Activities include the following: (for a specific project following award of the project to the Architect)*

- *Review the architectural practice's project management manual or all relevant forms, checklists and other practice aids if a manual does not exist.*
- *Understand the procedure for assignment of project management responsibilities and the project manager's role in the acquisition process.*
- *Participate in the development of a project workplan including identifying goals, client requirements, responsibilities, a first-cut schedule and the project record.*
- *Review work plan against all project-related contractual agreements.*
- *Become familiar with team management including role assignments, team communication methods and frequency, and maintaining the project file.*
- *Review design documentation standards and understand expected levels of documentation at each phase of the project.*
- *Attend quality reviews at project development milestones identified in the work plan.*
- *Assist in preparing project status assessments including schedule and scope variances and actions required to maintain project budget control.*
- *Review the project management file for close-out activities such as contractual fulfillments, final fee for services, invoicing and modifications (e.g. change orders)*
- *Attend post-occupancy evaluation trips to completed project sites.*

## 17. Business/Practice Management

Although architecture is a creative profession, current techniques of practice and the need for professional sustainability require that the architectural practice also operate as a successful business enterprise. Steady income must be generated and expenses carefully budgeted and monitored so that economic stability can be maintained. Accurate records must be kept for tax purposes and for use in future work.

Established office requirements and regulations are essential to maintaining a smooth operation; office practice manuals are a typical tool for dissemination of the information. Profitable use of office personnel requires budgeting time and adhering to schedules. The Architect's relationship to the client is established by contractual agreement. A contract establishes the duties and obligations of the parties. For a contract to be enforceable, there must be mutual agreement between competent parties, an acceptable monetary consideration, and it must be for lawful purpose and accomplishable within an estimated time frame.

Effective public relations play an essential role in the creation of the Architect's image. This is important in retaining existing clients, bringing new clients and work into the architectural practice as well as in attracting superior people for the professional staff. The Architect must participate in marketing activities if the practice is to succeed. On the other hand, the Architect's marketing activities (unlike those of merchants, manufacturers and others in commerce) may be subject to certain professional constraints. The Architect must learn marketing techniques that are effective while practising within the rules of professional conduct in his/her jurisdiction.

### *Typical required Intern Activities include the following:*

- *Review the process of internal accounting and cost control systems for operation of the architectural practice. Participate in allocation of time to all elements involved in a total project from preliminary design through construction.*
- *Review professional service contracts for their structure, content, determination of responsibility and enforcement procedures.*
- *Review the compensation structure as related to types of services rendered by the architectural practice.*
- *Exposure to defining the project parameters and scope of services for consultants.*
- *Exposure to the preparation and evaluation of Requests for Qualifications and Requests for Proposals for consultants.*
- *Exposure to the review of fee submissions, negotiations and award of contract to consultants.*
- *Research legal obligations, limitations, and liabilities of professional service contracts.*
- *Review the architectural practice's professional liability insurance policy and develop an awareness of potential practices and procedures that are not covered by the policy.*
- *Assist in developing programs to publicize the architectural practice's professional services and its expertise.*
- *Participate in the architectural practice's program for securing commissions for professional services through assisting in market research, prospect list preparation and information-gathering activities.*
- *Assist in developing the architectural practice's brochures and advertising as elements of promotions.*
- *Assist or accompany principals or marketing staff carrying out business development.*
- *Participate in client request for proposals (RFPs) and presentation to prospective clients and formal selection interviews.*
- *Participate in the architectural practice's internal budgeting (profit planning) process.*