



ARCHITECTURE

How to get it Built

Owners are angry and Contractors are beating their heads against the wall.

Miscommunications, lack of guidance, and loose documentation can send a construction project into meltdown. Understanding the process and knowing where to find help can be the key to successful building projects.

Greg Cornell, Architect

Chapter 1

Not just pretty pictures...

Introduction

Preface – Thinking of building without consulting an Architect? You have probably heard about some of the horror stories from people you know who went through the building process or seen or heard the stories in the media. The problems stem not just from a dishonest or unskilled contractor but many times miscommunication and loose documentation will turn a project upside down. This document will help you navigate the construction process and be able to interface with various organizations that will be needed to get the job done – including Architects.

At sometime in our lives most of us wish we had a good friend or family member that was a doctor or attorney for some free advice. If you are contemplating building your dream home or establishing a home for your business and you don't have family or friends that are architects then read on.

Caution using “Home Plans” books. Although the pre-designed homes found in publications can be beautiful, choosing out of a book may not be as easy as it looks. Many of the designs look good in the book but may need revisions to accommodate restrictions that will be uncovered further into the process. Adapting the design to the lay of the land or setbacks imposed by zoning or homeowners associations and restrictive covenants in a particular area can change the design significantly. Climatic conditions, budgets and building codes can affect the design as well.

As you will see in the following text, an architect can be the one entity that can help you coordinate your entire project. An architect will be the encyclopedia of

information you'll need. They can help navigate the complex process, help avoid major mistakes and will know how solve the problems that inevitably will happen. Problems will happen. Every project is unique. Each project has different priorities, budgets, schedules, land zoning and physical land attributes.

Projects will be in different climate locations with different jurisdictions and this means adhering to Laws of Nature as well as, Rules of Law.

There are always unscrupulous or unskilled characters that may upset a project. Your architect can help sniff them out, help to avoid them or hold them accountable for their actions.

Species of the elusive Architect.

Trying to define the varying species of Architects in a “one size fits all” box is difficult. The image of a person hunched over a drawing board with a pencil behind the ear was probably typical 20 years ago. Today the profession has evolved. This profession has many differing personalities and philosophies. You will find a range from high-power large firms of hundreds of employees to the firm of less than three people. As you will read later, the size of the firm may have some affect on a project but all are equipped to handle a variety of projects.

I believe most people would describe today's architect as a business suit and a tie type. Works in an office building. On the other hand many architects and engineers work out of small offices or even home offices. Both types are equally capable of executing a wide range of projects. The small firm may handle the smallest to large projects where the large firm would best be suited for medium to the largest projects.

About the Author – A registered architect in a number of the United States as well as nationally certified. He has worked in large, medium and small firms and presently owns his own firm. The firm is small. He enjoys the personal interface with the client and the projects are of a size to create variety and exciting new challenges everyday. He is more of blue jeans, roll up the sleeves and climb through the building type rather than a suit and tie, all business type. He may be tired of wearing the tie but is tireless in providing excellent services.

Not just pretty pictures...

A misconception that has stigmatized the profession of architecture has been that of an architect just draws pictures.

Design is 5% to 15% of the process. The design is just the beginning of job. There will be many more decisions to be made and many hurdles to overcome. A truly successful project is not only a beautiful design but also whether the program, schedules and budgets can be met.

Types of drawings

Preliminary designs and sketches start to layout the program requirements of the project. General drawings to get the ideas on paper to show site plans, floor plans, exterior “elevation” drawings and maybe some building sections (a cut through the building to show floor level relationships and maybe some systems integration).

Presentation drawings and models can help those involved to visualize what the completed project will look like. Drawings can be hand sketches, artist

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renderings or computer renders or even animations. Presentation media can help show the relationship of the project to the surrounding area, the project scale to the context in the surrounding area, color effects to light and shadow.

Technical drawings are only a part of the final Construction Documents. They may have many sheets of drawings and details to describe the dimensional aspects of the project. There are also specifications to consider. For example, say you ask for a three-foot by seven-foot door. Specifications will tell the builder what style of hardware and what color stain or paint to use on the door. The specifications will get even more detailed. Now take just the doorknob for example. Do you want a chrome finish or brass? Do you want the metal glossy or brushed finished? Is it an entry lock, privacy lock or passage lock? How many keys do you want? These specifications can be placed on the drawings for small projects or in a book form for the larger or more detailed projects.

New construction, additions, alterations

With new construction you are starting from scratch. This can be good and bad. On one hand, you can design a functional plan specific to the site and the use of the building. On the other hand, how much dirt is going to be moved? Do the utilities need extended to the site? Good site selection is vital.

There are some different tactics when contemplating new construction versus a remodel or addition project. A remodel may see unanticipated costs arise. In a remodel, even though there is something to work from, also, there is always something in the way. Demolition is required for most remodel and addition projects and can impact budgets. However, you do

have something to work with and some sort of utilities is established.

Safety and Code Specialists

There Code and Laws to follow when constructing. They are at every level of government. From Federal and State, to County, Township, City and Home Owners Associations, the rules can be difficult to follow.

Budget and schedule analysis

The size of the project is a major impact on budgets and schedules. However, consider the quality of the materials used and possible future additions. These are all major factors in scheduling and budgeting. Are special systems, equipment, or specific hardware being specified that may impact delivery times and costs? Does the site location have jurisdictional hurdles (i.e. zoning reviews or required variances) or investigative research (i.e. geological impacts – such as water tables, drainage problems, soil bearing pressures, utility conflicts, etc.)?

Problem solver and inventor

Say you run into a snag in the construction. This one is tough. Hopefully, you had an architect with you so far. The architect may have documentation to help out the situation. By having the architect work with you from the beginning they will have the knowledge and documentation of historical events and timelines. This could be advantageous for us solving the problem. We've seen it before. Maybe not this specific snag but so many like it came out of left field and we have the inventiveness to sift through the codes, documentation, other professionals to help synthesize a solution. Even if you haven't had an

architect to this point, “now” is not necessarily too late.

For example, your contactor calls and says he is trenching for plumbing under a floor slab and figures out that a footing will fall directly over one of the pipes. He wants some direction on what to do. He says his plumbing subcontractor has an idea and his supervisor on the job has another idea. “Maybe you should come down here.” he says. If you had architect involved from early in the project, they know so many of the aspects of the whole project they may be able to discern who’s idea is best or may have the solution on his own that nobody could have seen from their perspective. Within this scenario, let’s say the plumbing contractors solution may be the easiest solution for plumbing but would cause major structural changes that could affect the schedule. An architect should be able to assist in getting it figured out.

Advisor and advocate

Architects usually have worked in many different jurisdictions on previous projects. They understand that from place to place the rules change. The architect should work with you and for you to resolve these conflicts. All people make mistakes and sometimes even a City plans reviewer could be requiring some provision be met without the realization of another code provision that could resolve the issue.

The architect then can advise you of the situation and arm you with the pertinent information from which you can make educated decisions. Once you give the architect the approval of a plan of action they will go to the jurisdiction to debate the provisions. If it is not resolved to your benefit, then the architect is prepared

on your direction to initiate a hearing or review process for a formal solution and if still necessary, they will work with your attorney and financial institutions on a variety of matters.

Coordinator and negotiator

In the above example the architect may have to negotiate with the City Official to come to a quick resolution rather than a schedule delay involved in formal hearings. This as with any action should always be with your approval after being informed of alternative and the impacts therewith.

The coordinator is by nature the architect. They can coordinate your project requirements with jurisdictions, utility companies, security companies, technology vendors, engineers and contractors. The architect should be involved in as many facets as possible to be the overseer.

Common Terminology and Definitions

Other definitions not included in this section may be explained under corresponding chapters.

A/E – An acronym for Architecture and Engineering.

Building Elevations – A drawing view of a side of a building or an interior wall usually in a straight on two-dimensional view. Mostly used for technical drawings, the elevation can hint at three-dimensional properties by adding shade and shadows, using different line weights and color.

Building Sections – A drawing view of a slice of a building or portion of a building or through a wall. The sections show the relationships of

construction materials, building systems and building spaces.

Building systems – Various areas beyond the physical structure of the building that may include electrical, communications, plumbing, heating, cooling, ventilation, fire suppression, etc.

Consultant – Wide range of specializations including typical engineering disciplines such as:

Geo-technical – soil borings for structural determination of soil bearing capacity used in foundation and pavement design. Also, may include percolation tests (perc test) for storm water drainage and septic system design.

Civil – site, grading, drainage, storm water management, utilities.

Mechanical – heating, cooling, ventilation, plumbing.

Electrical – power, lighting, communications, alarm systems.

Factory Built Building (FBB) – Also known as modular buildings, mobile homes and includes panelized construction. These buildings can be residential or commercial.

HVAC or HVC – An acronym for Heating, Ventilation and Air-conditioning or Heating, Ventilation and Cooling.

Jurisdiction – General term that may include governments at the city, township, county, state or federal levels including specific departments such as Departments of Environmental Quality (DEQ),

Department of Health, Department of Education, etc.

MEP – An acronym for Mechanical, Electrical and Plumbing (generically may include other building systems but usually does not include site disciplines).

Type of Construction – Building code designations to determine the level of safety and fire resistance.

Use Group – Building code designation for various types of occupancies that may be using the building or portions of the building such as assembly, business (office), educational, industrial, institutional, mercantile, residential, storage, etc.

Residential – In general terms may include one and two family dwellings, apartments, condominiums, townhouses, hotels and motels.

Commercial – In general terms includes all other uses not defined as residential such as assembly, office, educational, industrial, institutional, etc.

First Steps and Considerations

First quick through the building basics... In a land, a long time ago...

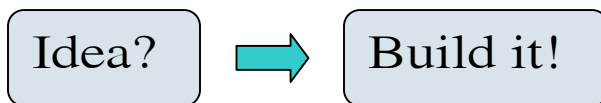


Fig 1.1

Now with zoning ordinances, building codes, complex systems and new technologies we should establish the following as the core process of building.

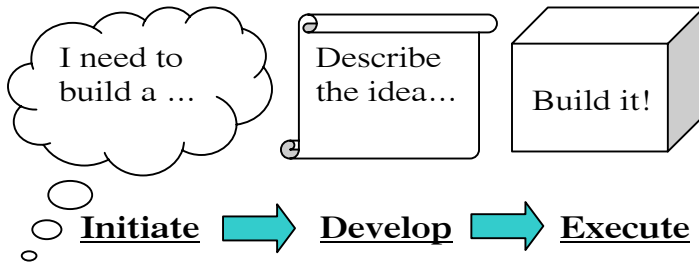


Fig. 1.2

Of course there is more to building than an idea and telling someone about it and have it magically appear. The three main steps of building can be narrowed down further as shown in Fig. 1.3.

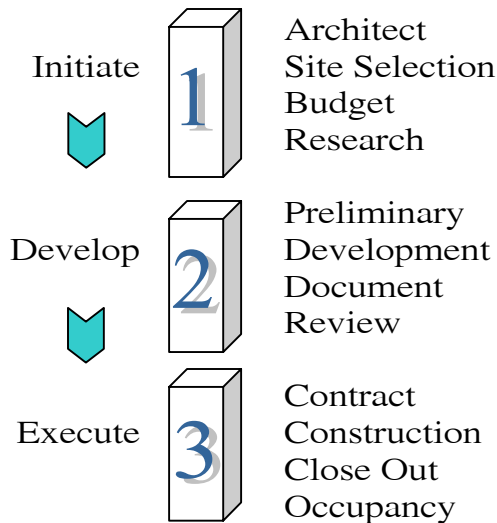


Fig. 1.3

Budgets and Financing

You really cannot hire an architect too soon. The architect can assist you in a variety of ways in those important first steps of the building process. They can help forecast project costs and schedules and assist in gathering other documents the financial institution or your accountant may need.

Also consider the differences between bidding out the project to several or many contractors versus negotiating with a single contractor or somewhere between. Bidding can certainly determine the lowest cost. However, by bidding, your cost is not finally known until all drawings are done and the contractors have time to estimate them and then you collect the estimates to review. Bidding is used extensively in large projects, and also public/civic building.

When negotiating with a contractor, the project gains the benefit of the contractor's expertise in estimating from the start. As the drawings develop there are several opportunities to check the estimate again. By the time the drawings are complete the contractor has a good understanding of the project and is comfortable the job can make a profit. The Owner has time to adjust the scope for budget reasons and the contractor is available to respond with a new estimate. Negotiating may not yield the lowest cost however; the Architect also has the ability to estimate the cost to cross check the contractor's numbers confirming that the deal appears fair.

Budgeting time is as essential as budgeting the finances. Any kind of budget should be realistic. Fig. 1.4 is an example of a project schedule for a medium to large size project.

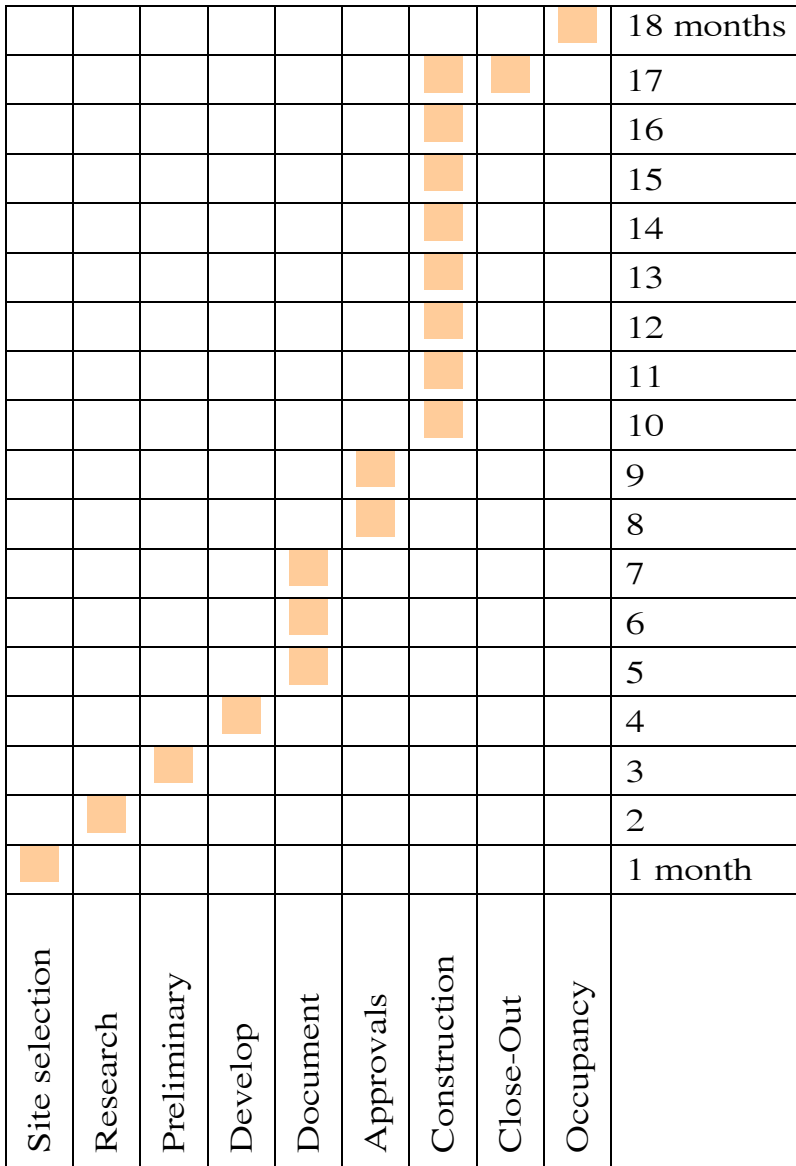


Fig. 1.4

Note in Fig. 1.4 that approximately half of the project time is design and documentation and half of the schedule is construction time. Now compared to Fig. 1.5 for a small to medium project size, the ratio of planning time to construction time is also fifty-fifty.

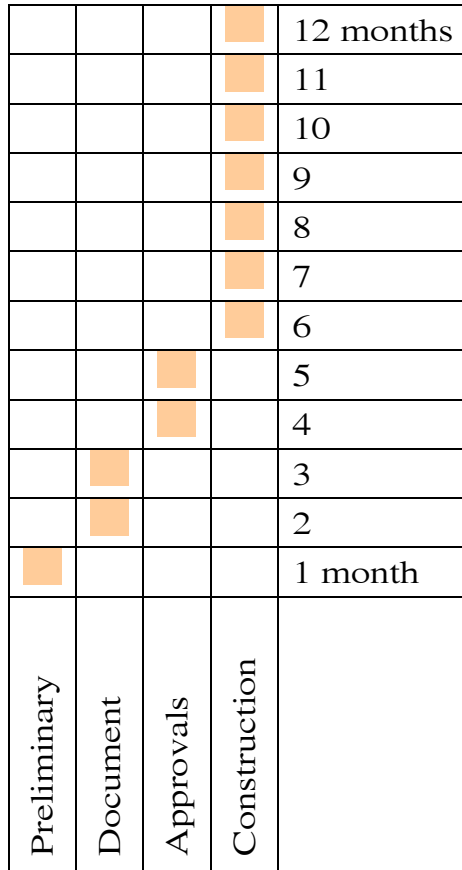


Fig. 1.5

There are exceptions to the above examples. For instance, on very small projects and most residential building this process can be accomplished in less than a year. A site with challenges and a project with political hurdles can expect a longer schedule. A project with political backing (hospitals and business that will employ locally) may get some expedited service from plan review.

Scheduling & Securing the Site

Jurisdiction requirements are again in the forefront here. Choosing a site that fits the use is important. Investigate the zoning requirements. The site may have restrictive setback requirements or additional easements and rights-of-way that could impact the building and site amenities.

Utilities can be straightforward but sometimes can create a hurdle. Even if the utilities seem to go right in front of a property, are they of sufficient size?

The physical nature of the property can dictate the type of structure used, how much soil will need to be moved, imported or exported from the site. Can the construction equipment be accommodated? How much rock will be encountered? Is a well or septic system feasible if there are few utilities?

Planning for future growth is a good practice. This could help the initial budget and also plan for growth in space requirements as the business or family may grow.

Drawing time may equal the building time. Remember we need to tell the contractors everything they need to know to build your building like you want. Just as the contractor will handle every aspect

of constructing the project, the architect must define those aspects. Every one of them. Roughly speaking, it takes about as long to draw it as it does to build it.

Jurisdictional review time is critical. Some projects can get through a review process in 30 to 60 days. Other processes may take four months or more. It depends on the complexity of the project and the jurisdiction in which it will be constructed. An architect can make the initial contacts to investigate the process in a particular area to help construct a schedule.

Long lead item delays can affect a project. It could be a special order countertop to advanced equipment. A long lead item required in the beginning of a project could hold up the progression of trades until after the item is installed.

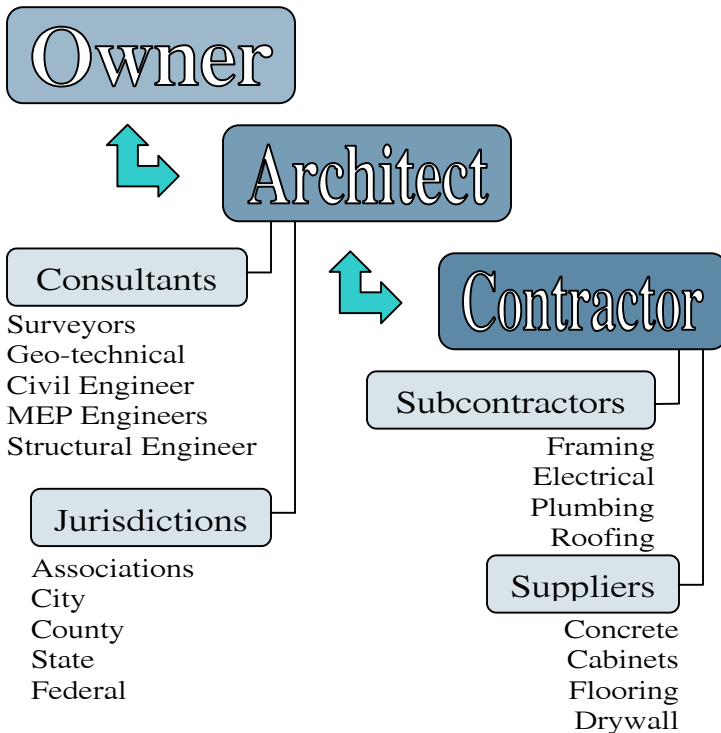
Weather delays are always a concern. Sensitivity to the building seasons and local climatic conditions should be considered for potential impact on scheduling.

Penalty and bonus clauses should work both ways. Typically known as a “damages clause” this contractual provision can motivate the contractor to complete the construction per agreed schedule or face a monetary penalty for each day the schedule is over. The bonus clause can monetarily reward a contractor with being ahead of schedule. Many times the penalty clause is used without a bonus provision. Although it sounds great for the client, the contractor may inflate his bid realizing the “one-way street”.

Primary Partnerships

Fig. 1.6 below represents the traditional arrangement between the three main entities that will execute a

project. Typically the architect is selected first and assists the owner in selecting a contractor. In this scenario, the architect is the owner’s representative in construction (similar to an attorney represents their client in court).



Traditional Arrangement

Fig. 1.6

The traditional arrangement of Fig. 1.6 is used for all public and civic type projects and widely used for large private projects as well. It provides the most efficient clear path of communication to assure the most successful project possible. Along with a fair, competitive bid for construction process, the project success will include lowest price and/or shortest time. All public projects are bid for construction contracts.

As indicated in Fig. 1.6 the architect and the contractor each may have a number of sub-contracts to manage. This generally holds true for most projects. In privately funded projects, the relationships can take some different forms. In Fig. 1.7, the owner will be inherently involved in a project that may be a negotiated construction contract with the architect providing minor assistance during construction.

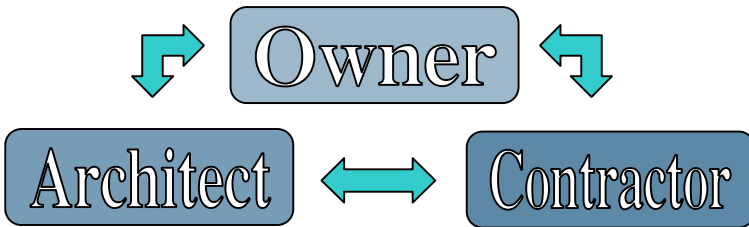


Fig. 1.7

In the following example Fig. 1.8, the owner will manage all aspects of a project. The architect will have little if any communication with the contractor. This arrangement should only be used by owners/developers that are experienced in building design or construction.

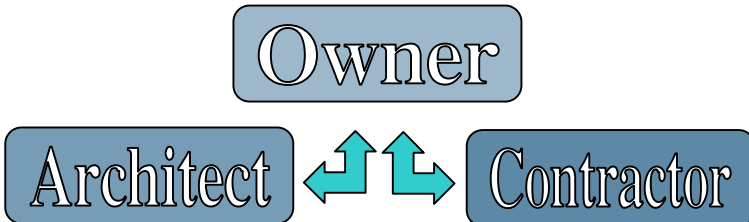


Fig. 1.8

There are other variations like “multiple prime contracts” and “design-build contracts” that also can yield some benefits. When not using the traditional arrangement, always compare the benefits and the risks carefully and consider obtaining an architect’s assistance.



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