

Milestones of a Construction Project:

Expectations in the Major Phases of Facility Planning

By Jesse D. Kamm,
Ph.D., PMP

The design and construction process can be a fun and exciting time, but it can also be an overwhelming endeavor. Some of the most commonly asked questions involve clarification of the design and construction process. A construction project can be broken down into two phases: Design and Construction. Each of those phases can be broken down into smaller sections; in project management terminology, they are referred to as milestones. Think of your project as having a series of gates you must pass through to get to the end. As you pass through each gate, it is important to recognize the end of each milestone and the start of the next. This article will give you a brief overview of what to expect in each phase while working with your design and construction team. See *Figure 1*.

DESIGN PHASE				CONSTRUCTION PHASE	
Conceptual Design	Schematic Design	Design Development (DD)	Construction Documents (CD's)	Construction	Project Closeout
<ul style="list-style-type: none"> • Rough Sketches • Conceptual Budget • NoGo/Go Decision Gate 	<ul style="list-style-type: none"> • Refining project concepts • Review codes & specifics of design • Site plan, floor plan, elevations & roofing plan • Finalize the layout 	<ul style="list-style-type: none"> • Solve the specific technical engineering problems presented 	<ul style="list-style-type: none"> • Design team creates fully detailed working drawings for permitting and construction use • Permit process • Competitive bidding (either subs or GC) 	<ul style="list-style-type: none"> • Building construction in full swing • Owner/architect/contractor meetings • Designated owner's representative 	<ul style="list-style-type: none"> • Operations manuals • Product and installation warranties • Owner training • Facility as-built documents

FIGURE 1: CONCEPTUAL MODEL OF MILESTONES FOR A CONSTRUCTION PROJECT.

Milestone 1 – Conceptual Design

Every project starts with a vision of the future. In the conceptual design phase, the goal is to dream of all the possibilities. You can expect to see very rough designs and ideas; some will be further discussed and others may be thrown away. Architects like to describe the early phases of design as “iterative,” in other words, go round and round in an attempt to sort out the specifics of what is to be built. You might see hand sketches, blocks of color representing building massing, occupant flow or partial computer-generated drawings in rough stages. See *Figure 2*. The timeline for this phase can vary greatly, spanning a few days to many months. Some companies have programs to expedite this phase using different tag names such as a “design charrette,” a “blue sky” session or a “design lab.” Each company’s process may be different but the outcome is the same: to come to a speedy decision on the overall master idea. The end of this phase typically results in a few main documents referred to as “deliverables.” These include: a master site plan,

preliminary floor plan, preliminary building elevations and massing, and possibly a computer-generated, realistic, artistic rendering. These items are crucial to getting leadership and congregational support and is a time to dream. With good guidance and by breaking the dream into bite-sized pieces, you can make your dream a reality.

The concept milestone is a low-investment phase where turning back or changing course is easy. However, once you get into the schematic phase and beyond, people generally experience what behavioral economists refer to as the “sunk cost fallacy” —meaning that one feels emotionally and financially invested and it increasingly becomes harder to abandon the project. This is a key point for eldership and leaders to consider. Ideally, the concept phase should be discussed with financial and fundraising professionals towards its feasibility, health and debt financing.



FIGURE 2: ARCHITECT'S HAND SKETCH OF POSSIBLE RENOVATION AND EXPANSION PROJECT OVER EXISTING BUILDING AND PROPERTY SURVEY. IMAGE COURTESY OF EQUIP STUDIOS

Milestone 2 – Schematic Design

The schematic design phase is not as exciting as the concept phase. In fact, as the facility owner, you may not even know it exists. In this phase the design team is refining the project concepts and is beginning to review the relevant codes and specifics of the design. The team will primarily be concerned with the site plan, floor plan, elevations and maybe the roofing plan. At this point, the design team may even begin some early conversations with your local building authorities to determine any design constraints that may be imposed. The owner's goal is to finalize most, if not all, of the layout, so that the consulting engineers (civil, mechanical, electrical and plumbing) can begin plans for the working systems of the building. Once the consulting engineers begin their work, any further design changes may result in additional design fees.

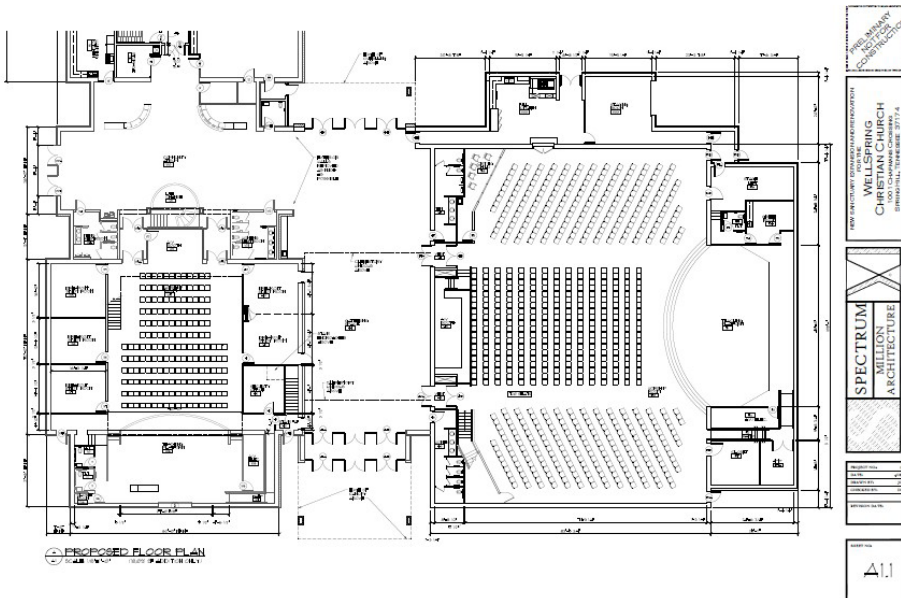


IMAGE COURTESY OF SPECTRUM CONSTRUCTION AND MILLION ARCHITECTURE

Milestone 3 – Design Development (DD)

By the time you enter the design development phase, the designers have already decided the main construction materials and methods and are now deciding particular details. You might hear references to partially completed plans such as “30% CD set” or a “progress set of construction documents.” You should interpret that to mean they are in the DD phase and still working out all the specifics. The DD phase has one main goal: to solve the specific technical engineering problems presented by this particular project. Keep in mind, once you’ve entered this phase, the production of a working set of blueprints is in full swing and any changes will cause the design team to redo the same work. In my experience, this is where designers begin to have less patience and may get annoyed with major changes. The business side of design requires the engineers and architects to price their fee based on their estimate of the time it will take to do the design for your project. From the architect’s perspective, they want the next milestone to be speedy and productive. It is important that you have a good cost estimate and a solid plan for funding the project, because once you’ve entered the next phase, if you decide to cut portions out of the project (“reduce scope” in project management terms) those changes will likely cost you additional design fees which may negate the money saved by cutting the construction costs.



IMAGE COURTESY OF BGW ARCHITECTS

Milestone 4 – Construction Documents (CD)

In this phase, nearly all of the major design decisions have been made and the design team is focused on producing a full and complete set of working construction documents. These documents are for the builder to use; they are commonly referred to as the blueprints (although actual blue-colored prints are a rarity now because the old ammonia-based document reproduction method is largely gone). The design team is working to fulfill detailed requirements for the local building jurisdiction and reducing design liability by showing as

many specific design and installation details as necessary. Any major design changes at this point will cost you additional money, although in most cases, it may be cheaper to make the change in this phase rather than when you are in the construction phase. By this point, the design team is in document production mode, and interestingly, where most designers make their money. This is because designers enjoy design and researching but that process is time-consuming and can drag on. Since they determined their fee based on an estimated set of production hours, the tasks of actual detail drawing for a construction document set largely falls on lower-level draftspersons.

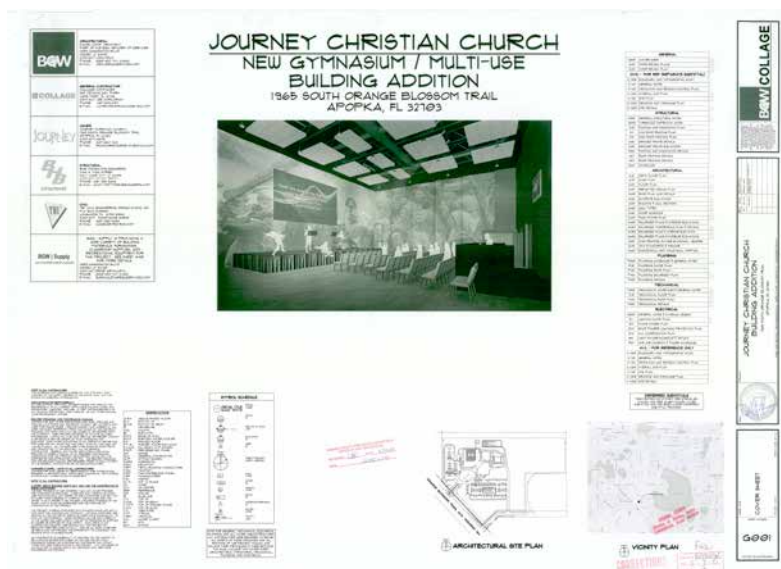


IMAGE COURTESY OF BGW ARCHITECTS AND THE COLLAGE COMPANIES

Milestone 5 – Construction

In the construction phase, you are off to the races and the building process is in full swing. The excitement and the headaches of dealing with construction have begun and you are now in communication with your contractor and tradespeople more often than the design team. There is enough to be said about the construction phase that fall outside of this article. In follow up articles I will explain more about the milestones to look for during the construction process and explain some of the the roles of the individual players. Once you are into construction, know that changes are inevitable, they can be costly, cause irritation and slow down construction progress ... however, this is another exciting phase that should be celebrated with the congregation and leaders.

Milestone 6 – Project Closeout

Project closeout seems trivial but it might be one off the hardest phases to complete in the project. In this phase, you've moved into the building, the builder is sending you final paperwork and billings, and you are moving from a "project" mindset to an "operations" mindset. A follow-up paper will include more details, but in this phase you should expect to receive operations manuals, product and manufacturers warranties, training on maintenance and operations of the facility, and advice on planning for future maintenance.

Dr. Jesse D. Kamm is a licensed class "A" general contractor who has overseen the management of church construction projects since 1998. He has presented original research at national construction and engineering conferences and has been awarded multiple federal grants for his advancements of the industry. Jesse received his PhD in Construction Technology Management from Indiana State University. He is the senior vice president of construction management for Christian Financial Resources.