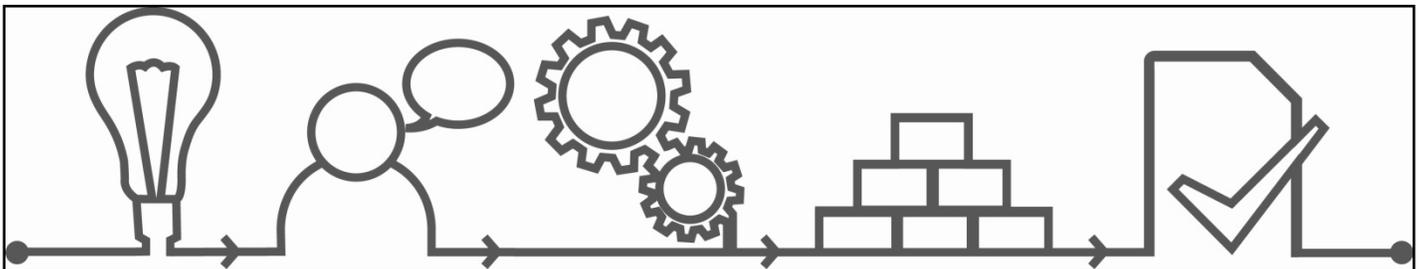




Facility Services

# PROJECT MANAGEMENT METHODOLOGY FRAMEWORK



# Facility Services

## Project Management Methodology Framework

### 1 - Executive Summary

The purpose of this document is to introduce the University community to Facility Services' **Project Management Methodology Summary and Framework**.

Facility Services is responsible for providing design and construction management services across campus.

Project management is a valuable tool that we are pleased to provide to our project sponsors. The implementation of sound project management methodologies will be a driver to set predetermined goals, improve outcomes and strengthen the overall effectiveness of the project delivery process. Moreover, it will ensure that projects of any size or complexity are managed to guarantee success and consistency throughout their life cycle. By ensuring this methodology, our project sponsors can be confident that their project will be delivered on budget, on schedule and to their satisfaction.

Advantages of project management methodologies include:

- a) Improved overall project performance
- b) Increased projects delivered on-time and within budget
- c) Reduced project risk
- d) Enhanced quality
- e) Improved inter- and intra-project communication
- f) Established and consistent standards that everyone can follow
- g) Common project management terminology

Facility Services Project Management Methodology Manual is comprised of three binders:

Binder # 1 contains the **Project Management Manual** that Project Managers use during the life cycle of a project and serves as a "road map" for directions to Binder # 2 and Binder # 3. In-addition, the manual includes all processes and procedures to follow at the different stages and milestones of the project.

Binder # 2 is the **Procurement Manual** which contains all the different standard procurement documents that are used to procure the different design and construction services during the life cycle of the project.

Binder # 3 is the **Reference Document Manual** which contains university policies and construction standards used to manage contracts, design and construction during the life cycle of the project.

Facility Services is pleased to deliver professional design and construction services. We look forward to continuing our work with you now and in the future.

If you have any questions about our Project Management Methodology please feel free to call Vayda Bowes @ ext. 22558 or email to bowesv@mcmaster.ca.

## **2 - Overview of the Project Management Methodology**

In today's institutional setting, two factors have become increasingly common-place: change and complexity. To survive in an ever-evolving workplace, one must be competitive, productive, customer-focused, and cost-effective. Business has also become extremely complicated. This complexity is related to the number of factors involved in the effort, the global scope of markets, and the sheer size of the efforts being undertaken. Even small decisions often involve the interplay of hundreds of variables.

Executing the strategic vision of McMaster is critical to its success. More than ever, institutions are being held accountable for delivering on their strategic promises. The Design and Construction team have responded by implementing a Project Management Methodology (PMM) manual. Project and program management provides the means by which to plan and execute the initiatives that deliver strategic success.

Our department is embracing project management as a leadership discipline and we are providing this tool to guide program and project managers from start to finish through their projects. The processes presented in this guide illustrate the science of project management. Project management is equally divided between the art and science and a successful project manager utilizes and refines both skill sets to effectively manage projects.

This PMM manual was developed as an easy-to-use guide to be used by all program and project managers within the organization. It provides tools and techniques, tailored to our organization, and necessary to successfully manage projects of any size or complexity. The project life cycle consists of eight major phases: Initiation, Planning, Execution, Pre-Construction, Construction, Post Construction, Control, and Project Closure. Documents and templates supporting the project management process have been tailored to meet the need of having a "Basic Toolkit" of pre-designed decision support tools. Hyperlinks are provided to take you directly to the tools if you are using an electronic copy of this manual.

This manual presents a framework for managing projects using basic tools needed for success. The framework should be modified for each individual project as it applies to the given effort. This model provides a methodical approach to conducting projects so that they meet the needs of the project sponsors successfully and consistently.

## **3 - What Is A Project?**

Projects are the temporary assemblage of key personnel designed to accomplish specific institutional objectives with identifiable customers in mind. All projects have a beginning and an end. The end of a project is defined by the successful delivery of the product or service. There are some traits that all projects have in common. The most distinguishing feature is a specific time frame. All projects have a beginning and an end. Projects must have a clear, definitive objective or solution. The solution is made of quantifiable and qualifiable deliverables that are produced by activities or tasks. It is the planning, coordination of the tasks and the resources and execution that is the focus of project management.

Key Characteristics of Projects:

- A project has a unique solution.
- A project has boundaries, so its extent is defined.
- A project is a one-time effort, usually requiring finite resources.
- A project has a committed budget that must be respected.
- There are distinct start and end dates for projects.
- You know when you have reached the end of the project (you have completed the solution)

#### **4 - What Is Project Management?**

Project Management is the process of achieving project objectives (schedule, budget and performance) through a set of activities that start and end at certain points in time and produce quantifiable and qualifiable deliverables.

Successful project management is the art of understanding the requirements of the project, identifying the deliverables that produce the solution, assigning ownership of the deliverables, identifying the tasks to accomplish the deliverables, bringing together the resources and people necessary to accomplish the objectives within the specified time constraints and within budget.

Project Management is the use of knowledge, skills, tools and techniques to project activities in order to better facilitate stakeholder expectations.

#### **5 - Nine Knowledge Areas**

Included in the project phases are nine knowledge areas. The knowledge areas are integrated in all phases throughout the project. These tools enable the Project Manger to ensure all projects are conducted in the most organized, efficient manner. They are:

##### **5.1 Integration Management**

Includes the processes required to ensure that various elements of the project are properly coordinated.

Section 1 Project Management Methodology Overview

## **5.2 Scope Management**

Includes the processes required to ensure that the project includes all the work required, without additional and unnecessary work, to complete the project successfully.

## **5.3 Time Management**

Includes the processes required to ensure timely completion of the project.

## **5.4 Cost Management**

Includes the processes required to ensure that the project is completed within the approved budget.

## **5.5 Quality Management**

Includes the process required to ensure that the project will satisfy the needs for which it was undertaken.

## **5.6 Human Resource Management**

Includes the processes required to make the most effective use of people involved in the project.

## **5.7 Communications Management**

Includes the processes required to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information.

## **5.8 Risk Management**

Is the systematic process of identifying, analyzing, and responding to the project task.

## **5.9 Procurement Management**

Includes the processes required to acquire the goods and services to attain project scope from outside the performing organization.

## **6 - Project Roles and Responsibilities**

In order to have a successful project, all project stakeholders must know and understand their role in the project. It is the project manager's responsibility to communicate these roles to the project stakeholders.

## 6.1 Project Manager

The project manager is responsible for managing the project's scope, schedule, and cost to support the sponsor's expectations for the successful completion of the project. Typical duties include:

- Implementing an infrastructure of sound project management tools and techniques to help ensure success.
- Managing the development of the communications plan, project charter, risk assessment and plans and detailed schedules.
- Providing team leadership for problem resolution by working with the lowest organizational levels possible and escalating, as necessary.
- Monitoring schedule and costs versus project progress to identify problems that could potentially extend the schedule or overrun costs and replanning the project as necessary to get back on track.
- Taking, directing, or recommending corrective action when scope, schedule, or cost variances threaten the project.
- Serving as the central point of contact for the project and communicating project status to the project sponsor and other stakeholders.
- Providing input to the performance reviews of the project team members. Negotiating a resolution to team member resource conflicts with their functional managers.

## 6.2 Stakeholders

Stakeholders are defined as "Individuals and organizations that are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or project completion. They may also exert influence over the project and the results."

In order to accomplish the stakeholders' goals and expectations, projects need a clear definition of the business opportunity with well-defined goals.

## 7 - What Is A Project Management Life Cycle?

All projects follow the same project management lifecycle, from Initiation through Closure. It is during the life cycle of any project that proven and tested project management processes or best practices are applied by successful project managers. The types and extent of processes implemented depends on the nature of the project, i.e. size, probability of failure and consequences of failure to the organization or program that the project is supporting. Effective leaders implement an infrastructure for success...discipline that will help insure that the organization is protected.

Every project follows the same project life cycle:

- Initiation

- Planning
- Execution
- Pre-Construction
- Construction
- Post Construction
- Control
- Closure

## 7.1 Initiation

Project Initiation brings together key, foundational documents to define the project; business concurrence for the project; project sponsorship; and on-going project governance. Project Initiation, by performing several critical steps, ensures a successful project start-up and gives you a solid head start to achieving your project objectives.

The initiation phase basically acknowledges that the project begins. This process group provides required approvals to the university to commit resources required for the execution of the project and, authorizes the Project Manager to start working on it. Initial documents are produced that will serve as reference for future phases of the project.

During the Initiation Phase the following occurs:

- 1) Stakeholder(s) agree(s) to a vision for the project.
- 2) Stakeholder(s) define(s) the major goals & project justification (why do this project).
- 3) The project team and the stakeholder(s) meet to discuss the following:
  - a) Project scope (the sum of the products and services to be provided as a project)
  - b) Funding source(s) (where the monies are coming from to support the project)
  - c) Risk's and potential issues
  - d) Goals and objectives
  - e) Milestones
  - f) Project time line
  - g) Lines of communication between the project team and the stakeholder(s)
- 4) Project team seeks project approval.
- 5) Once the project has been approved the project team proceeds to the planning stage.

The following are control documents used during the **initiation** phase:

- a) Initiation Document FS-DC-06 - Approval Authorities for Construction and Maintenance Projects
- b) Initiation Document FS-DC-07 - Execution of Instruments

## 7.2 Planning

Construction planning is a fundamental and challenging activity in the management and execution of construction projects. It involves the choice of technology, the definition of work tasks, the estimation of the required resources and durations for individual tasks, and the identification of any interactions among the different work tasks. A good construction plan is the basis for developing the budget and the schedule for work. Developing the construction plan is a critical task in the management of construction, even if the plan is not written or otherwise formally recorded. In addition to these technical aspects of construction planning, it may also be necessary to make organizational decisions about the relationships between project participants and even which partners to include in a project.

Essential aspects of construction planning include the *generation* of required activities, *analysis* of the implications of these activities, and *choice* among the various alternative means of performing activities. In developing a construction plan, it is common to adopt a primary emphasis on either cost control or on schedule control. Some projects are primarily divided into expense categories with associated costs. In these cases, construction planning is cost or expense oriented.

Traditional scheduling procedures emphasize the maintenance of task precedence (resulting in critical path scheduling procedures) or efficient use of resources over time (resulting in job shop scheduling procedures). Finally, most complex projects require consideration of both cost, and scheduling over time, so that planning, monitoring and record-keeping must consider both dimensions. In these cases, the integration of schedule and budget information is a major concern

During this phase the project goals and objectives are formulated. A project management plan that will be used to achieve the project goals and objectives is created by analyzing alternative courses of action and selecting the one that will produce the best results for the project. Normally, several iterations of the project management plan take place before the final one is implemented. During this phase risks are identified, budget, project scope and schedule are analyzed and defined. Procurement requirements are also reviewed and incorporated in budgets and schedules.

During the Planning Phase the following occurs:

- 1) Project team members establish and document the roles and responsibilities for the project.
- 2) Project team shall as much as possible, identify the resources needed, the cost estimates, and a broad timeline.
- 3) Project team begins developing the project budget (the amount and distribution of money allocated to a project).
- 4) Project team begin developing the project schedule (planned dates for starting and completing activities and milestones throughout the project).
- 5) Project team performs a risk assessment, analysis, and plan, and if required include

mitigation options as appropriate.

6) Project team determines the plan for project quality management including a strategy, quality assurance, and quality control activities.

7) Project team shall as much as possible describe and document, in sufficient detail, the projects deliverables and the work required to achieving those deliverables.

The following are control documents used during the **planning** phase:

a) Planning Document FS-DC-01 - Capital Project Budget Sheet

b) Planning Document FS-DC-02 - Budget Checklist

c) Planning Document FS-DC-03 - Projected Budget Report

d) Planning Document FS-DC-04 - Project Cash Flow Projection

e) Planning Document FS-DC-06 - Project Schedule

f) Planning Document FS-DC-07 - Purchasing Policy

g) Planning Document FS-DC-08 - Appointment of Architects and Professional Consultants

### **7.3 Execution**

The Project Execution Plan (PEP) is the core document for the management of a project. It is a statement of policies and procedures defined by the project manager for the project sponsor/project director's approval. It sets out in a structured format the project scope, objectives, milestones, communication plan, Project change control procedures and other key project information.

This process involves putting the project management plan into action. The Project Manager will coordinate and direct project resources ensuring that goals and objectives of the project are achieved. During this process approved changes are implemented and the majority of project resources are utilized.

During the execution process our unified Procurement Manual is aligned to the Broader Public Sector Guidelines. The purpose is to ensure that publicly funded construction and consulting services are acquired using a process that is open, fair and transparent.

During the Execution Phase the following occurs:

1) The Project Manager sends out requests for pre-qualified architects to bid on the project work.

2) The Project Manager/Project Director evaluates and scores the bids based on the following criteria:

a) Submission of the required documentation

b) Fees

3) When the evaluation and scoring process is complete, the Project Manager/Project

Director seeks approval to hire the architect.

4) When the approval to hire has been granted, the Project Manager/Project Director awards the contract to the winning bidder.

5) The Project Manager prepares a projected “Cost Estimate” which breaks down the costs associated with resources, services and materials required for the project.

The following are control documents used during the **execution** phase:

- a) Execution Document FS-DC-02 - RFSQ/RFP Process for Architects
- b) Execution Document FS-DC-03 - RFQ Tender Opening Architects
- c) Execution Document FS-DC-04 - Architect Purchase Requisition
- d) Execution Document FS-DC-05 - Ontario Association of Architects Document 600
- e) Execution Document FS-DC-08 - Supplementary Conditions to Document 600
- f) Execution Document FS-DC-10 - Construction Standards
- g) Execution Document FS-DC-13 - Stakeholders Consultation Checklist
- h) Execution Document FS-DC-14 - Cost Estimate Punch List
- i) Execution Document FS-DC-15 - Notice to Proceed Architect

#### **7.4 Pre-Construction**

The key aspects of pre-construction include a detailed design, schedule, and budget. In preparing the design and schedule the main objective is to completely satisfy the stakeholders’ requirements while establishing the greatest value for the University (and other contributors’), both in initial construction and ongoing operating and maintenance costs.

Pre-construction steps include confirming the stakeholder’s requirements, establishing detailed design criteria, conducting/procuring detailed engineering, reviewing the various project components and considering value-added or less expensive options, preparation and submittal of permit drawings, soliciting Requests for Proposals from contractors and equipment vendors, developing a detailed construction schedule and preparing a construction budget.

To assure the project starts off on the right track a thorough review with the users of their future processes and activities in and around the project space is essential. The ease with which all necessary permits can be secured depends heavily on clearly communicating the intent of the work, and on the accuracy of the design presented to permit authorities. While the users are often consulted during the permit application step and other pre-construction activities the capstone for this phase is a detailed review and confirmation of the construction budget, an appropriate construction contingency and the accuracy of estimates to date.

During the Pre-Construction Phase the following occurs:

- 1) The design process begins to be implemented. The architect will submit initial project drawings for review and approval.
- 2) Design reviews are conducted at 30%, 60%, 90% and 100% completion stages of the project, design reviews are used primarily for the purposes of conducting a thorough evaluation of a proposed design in hopes of determining whether or not that current proposed design will in fact meet the project requirements set forth by the stakeholder.
- 3) The Architect shall develop a substantive construction cost estimate (predicting the costs of a project); the estimate shall be updated and submitted at each of the Construction Document deliverable stages (30%, 60%, 90% and 100%). Variances between the costs at each of the stages shall be highlighted and explanation given for the variance.
- 4) The Project Manager in consultation with the architect sends out requests for pre-qualified contractors (a person or organization that undertakes responsibility for the performance of a contract) to bid on the project work.
- 5) The Project Manager/Project Director evaluates and scores the bids based on the following criteria:
  - a) Submission of the required documentation
  - b) Fees
- 6) When the evaluation and scoring process is complete, the Project Manager/Project Director seeks approval to hire the contractor.
- 7) When the approval to hire has been granted, the Project Manager/Project Director awards the contract to the winning bidder.

The following are control documents used during the **pre-construction** phase:

- a) Pre-Construction Document FS-DC-02 - Design Meeting Minutes
- b) Pre-Construction Document FS-DC-03 - Design Review (30% - 60% - 90% - 100%)
- c) Pre-Construction Document FS-DC-04 - Cost Estimate
- d) Pre-Construction Document FS-DC-06 - Project Checklist
- e) Pre-Construction Document FS-DC-07 - Tender Process Flow Chart
- f) Pre-Construction Document FS-DC-12 - RFSQ for General Contractor Pre-Qualification
- g) Pre-Construction Document FS-DC-13 - Contractor Pre Qualification Reference Check
- h) Pre-Construction Document - Contract Documents
- i) Risk Management Manual RMM # 111 - Contracting Work Safety Due Diligence
- j) Risk Management Manual RMM # 401 - Asbestos Management Control Program

- k) Risk Management Manual RMM # 1201 - Fire Safety Plan
- l) Pre-Construction Document FS-DC-34 - Approval Authorities for Construction and Maintenance Projects
- m) Pre-Construction Document FS-DC-35 - Execution of Contract
- n) Pre-Construction Document FS-DC-36 - Notice to Proceed
- o) Pre-Construction Document FS-DC-37 - Purchase Requisition
- p) Pre-Construction Document FS-DC-39 - Addendum
- q) Pre-Construction Document FS-DC-42 - Pre-Construction Meeting Checklist
- r) Pre-Construction Document FS-DC-48 - Post Tender Addendum
- s) Pre-Construction Document FS-DC-49 - Orientation Course for Persons Working at MUMC

## **7.5 Construction**

With a well founded concept, design and budget established, the construction phase commences with the award of construction contracts and ground-breaking. This phase is primarily concerned with the build-out, and with assurance of timeliness, quality and cost control, and safety in every facet of construction. The project manager has broad responsibilities in relation to the delivery of the project and executes many of these responsibilities by employing consultants and contractors.

A consultant will be engaged to act as the University's agent for quality assurance and progress oversight, usually including coordination of required inspections in each step of construction. Often this consultant will be the principal design consultant. This consultant will also normally provide contract related administration services and manage issues such as contractor requests for information (RFI) and change orders (CO).

Likewise a general contractor will be engaged for subcontracting and managing labour and control of the construction works at the site. In addition to constructing, the general contractor is responsible for site safety and security.

During the Construction Phase the following occurs:

In-order to ensure the project is on budget and delivered on time, the Project Manager monitors construction activities to ensure potential problems can be identified quickly and corrective actions taken. To ensure this, the Project Manager oversees the following:

- a) Project safety
- b) Project quality
- c) Project issues and risks
- d) Project budget variances (potential cost increases or decreases)
- e) Project schedule variances (potential project delays)
- f) Project scope variances (change to project costs)
- g) Project procurement

- h) Project invoices
- i) Monthly site meetings with the architect and contractor(s)
- j) Communication with stakeholder(s) (provide project status and updates)

The following are control documents used during the **construction** phase:

- a) Construction Document FS-DC-01 - Purchase Order Log
- b) Construction Document FS-DC-02 - Contact Sheet – Consultants/Contractor
- c) Construction Document FS-DC-03 - Site Instructions
- d) Construction Document FS-DC-04 - Site Instructions Log
- e) Construction Document FS-DC-05 - Construction Site Meeting Minutes
- f) Construction Document FS-DC-06 - Project Communication Plan
- g) Construction Document FS-DC-08 - Contractors Request for Service Interruption Checklist
- h) Construction Document FS-DC-12 - Process for Invoices Flow Chart
- i) Construction Document FS-DC-13 - Certificate of Payment
- j) Construction Document FS-DC-14 - Project Schedule Update(s)
- k) Construction Document FS-DC-15 - Project Budget Update(s)
- l) Construction Document FS-DC-17 - Change Order
- m) Construction Document FS-DC-18 - Change Order Log
- n) Construction Document FS-DC-19 - Change Notice
- o) Construction Document FS-DC-20 - Change Notice Log
- p) Construction Document FS-DC-21 - Request for Information Log
- q) Construction Document FS-DC-22 - Shop Drawing Status Report
- r) Construction Document FS-DC-23 - Consultant Inspection Reports Checklist
- s) Construction Document FS-DC-25 - Monthly Project Safety Inspection Report
- t) Construction Document FS-DC-27 - Key Request Letter

## 7.6 Post Construction

Assuming a well prepared plan is executed well and minimal surprises along the way, the post construction phase will be fairly straightforward. The Post-Construction phase is concerned with facility start-up, verification of all functions of the work through commissioning, and finally, occupancy. Precise planning is essential to ensure that all components and systems of the work, be they structural components or installed equipment, function as designed, and as intended. Most facility start-up plans include a high level of input from equipment providers, operators, maintainers, and users. The facility start-up process includes verifying that detailed systems integration has occurred (building and occupant equipment) through the use of previously prepared systems checkout lists and systems start-up/integration procedures.

Post construction will also see the generation of a certificates enabling occupancy, establishing maintenance routines/spares procedures and furnishing maintainers with copies of all close-out documents such as as-built drawings, warranties, contractors' insurance, and license information and O&M manuals, and training. All building information must also be entered into facility records/asset management systems.

These post construction activities lead to project handover and building occupancy at which point the installation of all equipment requiring calibration and furnishings such as furniture, blinds, desks, etc, takes place. The project manager also turns the space over to the user or their representative with appropriate guidance and direction regarding future maintenance or deficiency issues.

During the Post Construction phase the Project Manager coordinates the following activities and ensures corrective actions are immediately taken to solve any noted deficiencies.

- a) Project Commissioning Report
- b) Project Handover
- c) Project Documentation and Software Handover
- d) Project As Built Drawings and Records Handover
- e) Project Fire Protection Systems Verification Report
- f) Project Architect/Engineering Verification Letters
- g) Project Asset Management Update
- h) Project Hazardous Materials Update
- i) Project Operation Manuals
- j) Required Training
- k) Building Floor Plan Updates

The following are control documents used during the **post - construction** phase:

- a) Post Construction Document FS-DC-02 - Post Construction Checklist

## **7.7 Control**

Project control begins early in the project with planning, and ends late in the project with project closure. Project control specializes in managing total project development for construction projects with three primary goals: time, cost and quality controls.

The traditional view of project control is cost & schedule. We believe an effective project control process can be applied through various sub-disciplines, such as:

- Planning, scheduling & project reporting
- Earned Value management
- Cost Engineering, estimating, cost control and forecasting
- Change order management & controls
- Risk exposure and delay claims

Put simply, Project Controls encompass the people, processes and tools used to plan, manage and mitigate cost and schedule issues and any risk events that may impact a project.

### **Importance of Project Control**

The development of a suitable project control system is an important part of the project management effort. Despite the continuous evolution in the project management field, it appears evident that project controls are important in the achievement of project objectives. Project performance can be improved if dedicated project control systems are in place and are followed. Success factors are based on good project control practices, which result in good cost and schedule outcomes.

When you team up with Facility Services, we become your partner, managing your project from the ground up. We coordinate, manage – on a day to day basis – all phases of your project, from planning to design, to construction and finally to occupancy.

The Project Manager utilizes the tools and techniques in the Project Management Methodology Manual to manage the following:

- a) Changes to the Scope
- b) Budget Updates
- c) Schedule Updates
- d) Communication with Stakeholders
- e) Risk Management
- f) Project Quality
- g) Project Safety

The following are control documents used during the **control** phase:

- a) Control Document FS-DC-01 - Monthly Consultant Inspection Reports
- b) Control Document FS-DC-02 - Budget Management
- c) Control Document FS-DC-03 - Cost Control and Cost Projection at Completion

## **7.8 Project Closure**

Project closure is an important part of project management, sometimes overlooked. A project that is not closed will continue to consume resources. Closing a project means finishing all activities across all process groups, splitting up the project team and signing off the project with the stakeholders.

Closing a project is not as easy as it seems. You need to first ensure that the project closure criteria have been fully satisfied and that there are no outstanding items remaining. You then need to identify the project deliverables, documentation, supplier contracts and resources. Finally, you will want to initiate a communication plan to inform all project stakeholders that the project has now been closed.

Following the closure of any project, you should always review its overall success by undertaking a post implementation review. This review helps you to determine whether the project delivered the business benefits, met the customer's requirements and remained within scope and budget. It will also help you determine whether the project

conformed to the management processes identified, such as change order management and quality management.

Final reporting is not only about describing and listing the various project activities, it is more about summing up your successful achievements, but also failures, experiences and lessons learned, for yourself and others. The information could then be used for any future projects.

Although the project has come to an end, the aim is that the project outputs or results or the cooperation would not come to a stop.

During the Project Closure Phase the following occurs:

- a) Post construction review
- b) Contractor performance review
- c) Architect performance review

In addition to the above, the Project Manager also conducts a project handover with Stakeholder. The project handover consists of the following elements:

- a) Demolished Equipment Listing
- b) New Equipment Listing
- c) Equipment Performance Testing
- d) Operation and Maintenance Manuals
- e) As-Built Drawings
- f) Preliminary Walk Through
- g) Maintenance Training
- h) Safety and Security Testing
- i) Final Walk Through
- j) Punch list (minor tasks needed to be completed)
- k) Occupancy Permit
- l) Sub-Systems Testing (Fire Alarm, Sprinkler, Security)
- m) Integrated Systems Testing (Electrical, Mechanical, Heating Ventilation and Air Conditioning (HVAC))
- n) VOC (Volatile Organic Compound) Sampling/Increased Ventilation Required
- o) VOC's (Volatile Organic Compound) Warranties

The following are control documents used during the **closure** phase:

- a) Closure Document FS-DC-01 - Architects Substantial Performance Letter
- b) Closure Document FS-DC-01A - Certificate of Substantial Performance
- c) Closure Document FS-DC-02 - Project Handover to Occupants
- d) Closure Document FS-DC-03 - In-House Tradesperson/Custodial Orientation and Training Record
- e) Closure Document FS-DC-04 - Post Construction Review (Feedback)
- f) Closure Document FS-DC-05 - Warranty Management List

- g) Closure Document FS-DC-06 - Contractor Performance Review
- h) Closure Document FS-DC-07 - Architect/Consultants Performance Review

### **Conclusion: Elements of Successful Project Management**

There is no single process that makes a project successful. It is the careful orchestration of a number of different elements.

The factors that lead to successful projects include:

- Clearly defined goals and objectives
- A well-defined project management process
- A proven set of project management tools
- A clear understanding of the role of project management.