UNIVERSIDAD PARA LA COOPERACION INTERNACIONAL
(UCI)

PROJECT MANAGEMENT PLAN FOR NEW SEVENTH-DAY ADVENTIST CHURCH BUILDING TO BE BUILT IN ST. KITTS.

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FINAL GRADUATION PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE
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This Final Graduation Project was approved by the University as partial fulfilment of the requirements to opt for the Master in Project Management (MPM) Degree

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DEDICATION

I dedicate this work to God most High, my wife Sasha-Gay and my son Malachi.

I wisdom dwell with prudence, and find out knowledge of witty inventions. Proverbs 8:12 KJV

The fear of the LORD is the beginning of wisdom: a good understanding have all they that do his commandments: his praise endureth forever. Psalm 111:10 KJV

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ABBREVIATIONS AND ACRONYMS

AC	actual cost
ACWP	actual cost of work performed
BAC	budget at completion
CCB	change control board
COQ	cost of quality
CPAF	cost plus award fee
CPFF	cost plus fixed fee
CPI	cost performance index
CPIF	cost plus incentive fee
CPM	critical path method
CV	cost variance
EAC	estimate at completion
EF	early finish date
EMV	expected monetary value
ES	early start date
ETC	estimate to complete
EV	earned value
EVM	earned value management
FF	finish-to-finish
FFP	firm fixed price contract
FMEA	failure mode and effect analysis
FP-EPA	fixed price with economic price adjustment
FPIF	fixed price incentive fee
FS	finish to start
IFB	invitation for bid
LEED	Leadership in Energy and Environmental Design
LF	late finish date
LOE	level of effort

LS	late start date
OBS	organizational breakdown structure
PDM	precedence diagramming method
PMBOK® Guide	Project Management Body of Knowledge Guide
PMI	Project Management Institute
PRiSM®	Projects Integrating Sustainable Methods
P5™	People, Planet, Prosperity, Process and Products
PV	planned value
QFD	quality function deployment
RACI	responsible, accountable, consult, and inform
RAM	responsibility assignment matrix
RBS	risk breakdown structure
RFI	request for information
RFP	request for proposal
RFQ	request for quotation
SDA	Seventh-day Adventist Church
SF	start-to-finish
SOW	statement of work
SPI	schedule performance index
SS	start-to-start
SV	schedule variance
SWOT	strengths, weaknesses, opportunities, and threats
T&M	time and material contract
USGBC	U.S. Green Building Council
VAC	variance at completion
WBS	work breakdown structure

EXECUTIVE SUMMARY (ABSTRACT)

The Seventh-day Adventist Church as a global organization is well organized, and manages large projects remarkably well. However, individual churches are not well organized and do not have access to the professional mechanisms used to manage projects at the global level. This has led to numerous cost overruns and significant construction delays. These buildings are usually built as monies are made available. In some cases and in the case under study, the mission has provided monetary contributions but no mechanism for supervision was identified or defined. As at present the body of believers do not have a church building of their own. However, funds and property have been secured and the blueprints are before the planning authority, awaiting approval or recommendation of further changes. In addition, the completed buildings do not provide evidence of any intentional integration of sustainability.

There is a growing body of knowledge that supports and outlines the benefits to be obtained when construction activities are planned in keeping with sustainable best practices. These should be deliberately integrated into the entire life cycle of the building, which would help to determine how efficient the building be during its utilization phase. Also, as part of a community that is growing more and more concerned about our posterity, we cannot negate our individual corporate and social responsibility to respect the unassailable rights of all to a quality life, free from environmental dilapidation and uncertainty.

There are benefits that may be derived from the integration process. Firstly, the church will be able to create a culture of planning for better accountability, especially at the lowest levels where close supervision and strict accountability are required. The church and other building professionals will also be sensitized to the magnanimous need to think, live and build sustainably.

The general objective was “to develop a Project Management Plan that integrates sustainable principles to optimize the utilization of project resources during the construction of the Faith in Emmanuel Seventh-day Adventist Church, to be built in St. Kitts.” and the specific objectives were; to create a sustainable scope management plan that defines and decomposes the scope into work packages, to create a sustainable time management plan for identifying and decomposing project deliveries into more manageable work packages that can be tracked, to create a sustainable cost management plan for assigning cost to work packages and determination of project budget, to develop a sustainable quality management plan for outlining the minimum stakeholder acceptance criteria, to create a human resource management plan for assigning resources to work packages in a manner that complies with international laws and conventions on labor, to develop a sustainable communications management plan for defining clearly the project communication strategies and line of reporting authority, to create a sustainable risk management plan that identifies risks and risk responses for risk directly

related to the project and those that have sustainability implications, to develop sustainable procurement management plan for identifying and assigning contracts to suppliers who are able to procure sustainable goods and services.to develop a stakeholders management plan that identifies key stakeholders, their level of interests and analyses how their influence might impact the project.

The development of this project relied on case study as the primary research methodology. This methodology was chosen because of its significance and perfect alignment with applied research. The combination of applied and pure research was used because of the practical applicability to the Final Graduation Project (FGP) and its general employment by practitioners such as project managers and construction professionals. Information was obtained from a variety of sources including observations, interviews, meeting proceedings, books, and internet sources. The data was organized using templates.

Having explored the objectives outlined previously, it can be concluded that the need for sustainability in projects are of vital importance if we are to meet our global goals of reducing greenhouse gases and in order to keep the earth's temperature from exceeding more than 2°C. Projects Integrating Sustainable Methods PRISM® may still hold tremendous value for integrating sustainability into projects. This may require skill and time for specific methods of integration to be developed and explored. Integrating sustainability in projects is possible and the benefits to be derived will positively impact people, planet, product, process and profit of participating organizations.

It is highly recommended that the problem of sustainability be further explored and a methodology be developed that makes it easier for the integration of sustainability into construction projects. The region of Latin America and the Caribbean has been slow in keeping pace with the wider world in their efforts to curb and reverse climate change. This lack of initiative not only imperils the earth's ecosystems but also suggests our dereliction of duty, exposes the region to the effects of drastic and consequential international change. Therefore, our region must unite and build sustainable models that fit the unique needs of the region. Only when clear methodologies and processes for specifically integrating sustainability into construction projects are refined, that there will be a propensity toward a sustainable future.

1 INTRODUCTION

1.1. Background

History of the Seventh-day Adventist Church

According to E. Lechleitner, the “Seventh-day Adventist Church (SDA) emerged from religious fervor of the 19th century” when many Americans were expecting the Lord Jesus Christ to retune on October 22, 1844 based on their limited understanding of prophecy. It was William Miller’s devotion and preaching that led many to wait in earnest expectation for the return of the Desire of Ages. However, they were disappointed when the day had passed and the eastern sky remained unfolded. Many abandoned their faith while a faithful few quickly admitted mistake and went back to scripture for further light. Thus, the SDA Church was brought into existence. The church has remained true to call and mission partly owing to the prophetic ministry of E. G. White and early pioneers who by precepts and example pointed the hopeless to the Lamb of God.

The Seventh-day Adventist Church is a worldwide organization with 18,479,257 church members and an organization structure that manages 78,810 Churches and 69,213 companies. This membership under the inspiration of God has returned US $3,276,600,259 in Total Tithe and Offerings in 2014. This has been the primary source of funding for its extremely vast array of missionary and humanitarian activities. The SDA church owns and operates 7,579 schools of which there are 114 Tertiary Institutions, 2,050 Secondary Schools, 5,371 primary Schools, and 44 training institutions. It also owns and operates 173 Hospitals and Sanitariums, 126 Nursing Homes and Retirement Centers, 294 Clinics and Dispensaries, 34 Orphanages and Children’s Homes. According to the 2014 report Outpatient Visits reached 18,052,715. Given the above statistics, it is evident that the SDA Church has grown tremendously since its inception in 1863.

1.2. Statement of the problem

The problem is that, as the Seventh-day Adventist Church experiences growth and seeks to establish new churches, there is no project management methodology to manage its construction endeavors neither is there an intentional integration to make buildings sustainable. Consequently, the period of construction generally spans seven (7) to ten (10) years has been without the proper tracking of resources. This has proven to be a challenge for auditors and members alike. It is hoped that a case can be made to convince the church leaders of the need to take a different approach toward constructing church buildings. This approach should include Project Management Professionals from the earliest stages of the project to coordinate the numerous planning activities necessary to ensure successful project completion

1.3. Purpose

The purpose of this study is to develop a Project Management Plan that integrates sustainable principles in order to effectively carry out project management activities so that the church can complete its building operations within a reasonable time frame, with desirable quality and within budget.

The Seventh-day Adventist Church has assumed its role and commitment to global initiatives and charters on human rights in areas of labor standards and working conditions. It also assumes its primary and natural responsibility of environmental protection as custodian of the earth. The Seventh-day Adventists' statement concerning environment declares that "humankind was created in the image of God, thus representing God as His stewards, to rule the natural environment in a faithful and fruitful way". The statement continues to identify man's greed and "megalomaniacal destruction of the earth's resources" as the cause for, "widespread suffering, environmental disarray, and the threat of climate change". It calls members

to choose a “simple, wholesome lifestyle, where people do not step on the treadmill of unbridled consumerism, goods-getting, and production of waste. We call for respect of creation, restraint in the use of the world's resources, re-evaluation of one's needs, and reaffirmation of the dignity of created life.” It is evident from this organization’s values that sustainable practices are important to its strategic objective. Sustainable Development is defined as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (The World Commission on Environment and Development., 1987). Therefore, it is important that the church deliberately integrates sustainable best practices into all construction activities.

1.4. General objective

To develop a Project Management Plan that integrates sustainable principles to optimize the utilization of project resources during the construction of the Faith in Emmanuel Seventh-day Adventist Church, to be built in St. Kitts.

1.5. Specific objectives

1. To create a sustainable scope management plan, that defines key stakeholders and their unique requirements and expectations.
2. To create a sustainable time management plan for assigning duration to work packages that can be tracked.
3. To create a sustainable cost management plan for assigning cost to work packages.
4. To develop a sustainable quality management plan for outlining the minimum stakeholder acceptance criterion.

5. To create a human resource management plan for assigning resources to work packages in a manner that complies with international laws and conventions on labor.
6. To develop a sustainable communications management plan for defining clearly the project communication strategies and line of reporting authority.
7. To create a sustainable risk management plan that identifies risks and risk responses for risk directly related to the project and those that have sustainability implications.
8. To develop sustainable procurement management plan for identifying and assigning contracts to suppliers who are able to procure sustainable goods and services.
9. To develop a stakeholder's management plan that identifies key stakeholders, their level of interests and analyses how their influence might impact the project.

2 THEORETICAL FRAMEWORK

2.1. Company/Enterprise framework

2.1.1 Organization background

The Faith in Emanuel (FIE) Seventh-day Adventist Church is a company of Christians and part of the wider Seventh-day Adventist Church. It has just over 130 members. The company of believers were formed in 1996 in response to an invitation to accept Christ as Lord and Savior. Ever since, they have played a tremendous role in the community development with particular interest in seeking out the poor and destitute. However, the success of their mission has caused them to outgrow the small rented building that they now occupy.

In 2010 and with support from the mission they secured a parcel of land on which they intended to construct a new church building.

2.1.1.1 Mission Statement

The Seventh-day Adventist Church's mission is based on Revelation chapter 14 and verses 6-12. There, God's end time people are called "to proclaim to all peoples the everlasting gospel". This mandated that the church to reach every nation and preach the gospel of salvation to all nations.

The church recognizes that to prepare people for Jesus' imminent return, people's lives must be touched spiritually while providing relief to the social misery that the greater majority of humanity has to endure. While spreading the gospel it is strategic to provide permanent facilities to cater for the diverse needs that are brought to light. This same mission has resulted in a congregation now referred to as Faith in Emmanuel (FIE).

According to (adventist.org, 2017), the following six initiatives are used to implement its mission:

1. *Christ-Like Living*—Illustrating the lordship of Jesus in our lives by moral, ethical, and social behaviors that are consistent with the teachings and example of Jesus.

2. *Christ-Like Communicating*—Realizing that all are called to active witness, we share through personal conversation, preaching, publishing, and the arts, the Bible's message about God and the hope and salvation offered through the life, ministry, atoning death, resurrection, and high priestly ministry of Jesus Christ.
3. *Christ-Like Discipling*—Affirming the vital importance of continued spiritual growth and development among all who accept Jesus as Lord and Savior, we nurture and instruct each other in righteous living, provide training for effective witness, and encourage responsive obedience to God's will.
4. *Christ-Like Teaching*—Acknowledging that development of mind and character is essential to God's redemptive plan, we promote the growth of a mature understanding of and relationship to God, His Word, and the created universe.
5. *Christ-Like Healing*—Affirming the biblical principles of the well-being of the whole person, we make healthful living and the healing of the sick a priority and through our ministry to the poor and oppressed, cooperate with the Creator in His compassionate work of restoration.
6. *Christ-Like Serving*—Following the example of Jesus we commit ourselves to humble service, ministering to individuals and populations most affected by poverty, tragedy, hopelessness, and disease.

2.1.1.2 Vision Statement

The vision statement of the SDA Church is one where the church envisions the restoration of the earth to its original glory as the climax and end of sin, suffering and man's abuse of the earth resources in selfish indifference to the needs of future generations. This new earth will provide habitable dwelling for those who are prepared to live there. The SDA Church sees itself as responsible for advancing the knowledge of God, the creator and restorer of the earth. The SDA Church teaches that all life is valuable and that God has created all humans in His image

and therefore, should be cared for and treated with dignity and respect. Because the restoration of all things will result in joy and happiness to all who accept God's grace, it makes sense that the saved live a simple but wholesome life now in preparation for the life to come.

2.1.1.3 Organizational structure

The Seventh-day Adventist Church owes its success to the implementation of a sound organizational structure. In 1863, the SDA Church organized itself into thirteen (13) world divisions. The division to which the Project is attached is the Inter-American division. According the Adventist.org "The Inter-American Division (IAD) is comprised of Mexico, the Caribbean, Central America and the five northernmost countries in South America" This division has more than 3.5 million members, and is the "church's most populous region". Divisions are further divided into missions and conferences. It is in the South Leeward Mission in the Eastern Caribbean Island of St. Kitts, that the building is to be constructed. The brief historical background of the SDA Church makes it very evident that this is a sector that must be targeted and explored for Project Management activities.

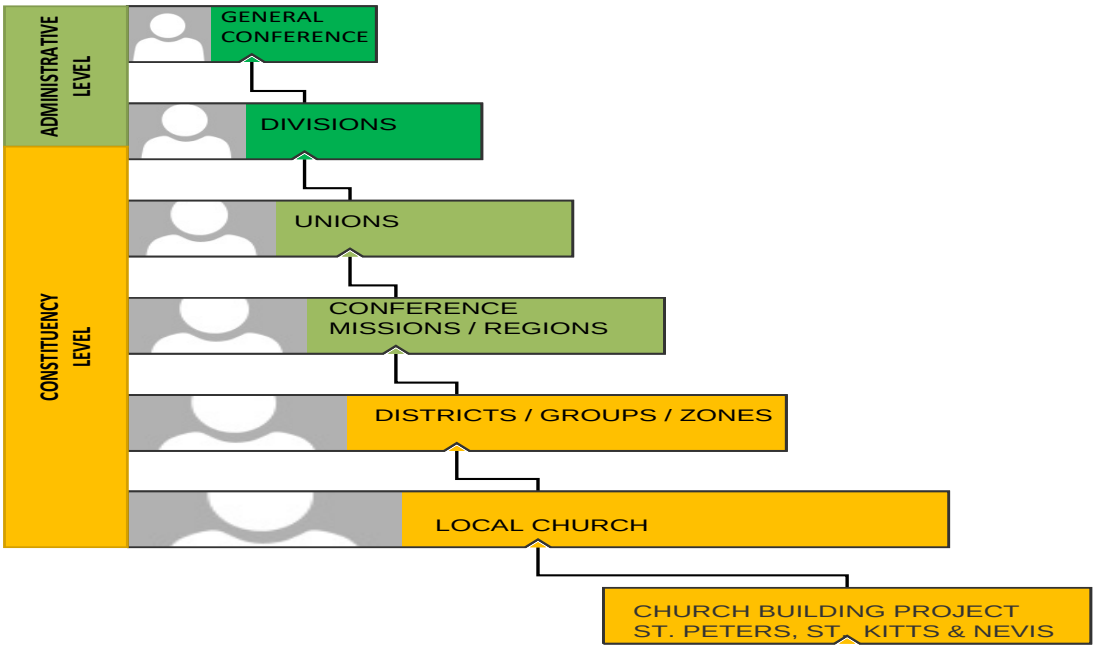

Figure 2.1 Organizational Structure of the SDA Church (source: compiled by Author)

2.1.1.4 Products offered

The Seventh-day Adventist Church is a service oriented non-profit organization whose primary role is to spread the good news of Christ soon and imminent return. To support or compliment this role the church owns and operates numerous food industries, healthcare facilities, schools, universities, and media centers. Its primary humanitarian outreach is through Adventist Development and Relief Agency (ADRA).

2.2. Project Management Concepts

2.2.1 Project

The *PMBOK® Guide* has defined a project as “A temporary endeavor undertaken to create a unique product, service, or result” (Project Management Institute, 2013, p.31)

2.2.2 Project Management

According to the *PMBOK® Guide* Project Management is the “application of knowledge, skills, tools, and techniques to project activities to meet the project requirements”, and realized through meticulous application and incorporation of “47 logically grouped project management processes, which are categorized into five Process Groups.” (Project Management Institute, 2013, p, 5).

Project Management Methodology especially as espoused by the Project Management Institute (PMI) and the Guide to the Project Management Body of Knowledge (*PMBOK® Guide*) certainly serves as an indispensable reference. This Methodology focuses on the Processes that a project goes through namely initiation, planning, executing, monitoring and controlling, and closing. All projects from the least to the most complex can be broken down into smaller more manageable work packages which, when initiated and implemented can be easily monitored and controlled to obtained the desired results within the constraints of Scope, Quality, Schedule, Budget, Resources, and Risks. With this in mind, building and in particular the one mentioned in this document may be constructed within the “triple constraints” of time, cost and quality.

2.2.3 Project life cycle

The *PMBOK® Guide* identifies fives process groups, they are: Initiating, Planning, Executing, Monitoring and Controlling, and Closing. These five groups represent the processes that a typical project will pass through. Project management is done by grouping project activities into groups while project work is done in phases that are usually time bound.

The initiation phase is where project requirement and scope is studied and documented and a Project Charter is created. This charter is used as basis for the authorization of project. Having obtained project approval, the project then enters into its second phase, Planning. It is at the Planning stage that the project is decomposed into “bit-size pieces” or work packages to which resources and responsibilities are assigned. The planning stages are very important to ensure project success and clear guidelines for project execution. Planning is also important for setting baselines from which the project will be monitored and controlled. When planning is satisfactorily done, the tasks are then carried out in the process called execution. While the project tasks are performed and resources are consumed the project must be monitored for variances in schedule and cost. If variances are observed, they may provide valuable information about the likelihood of success. Project variances may be adjusted by simply assigning more resources to fast track a task and in extreme situations, variances provide basis for premature project termination. The last of the process groups is the closing phase. This is where formal project termination is done. If all requirements are met for a particular delivery then the delivery is accepted. The process groups interact over the project life cycle as is illustrated by the Figure 2.2.

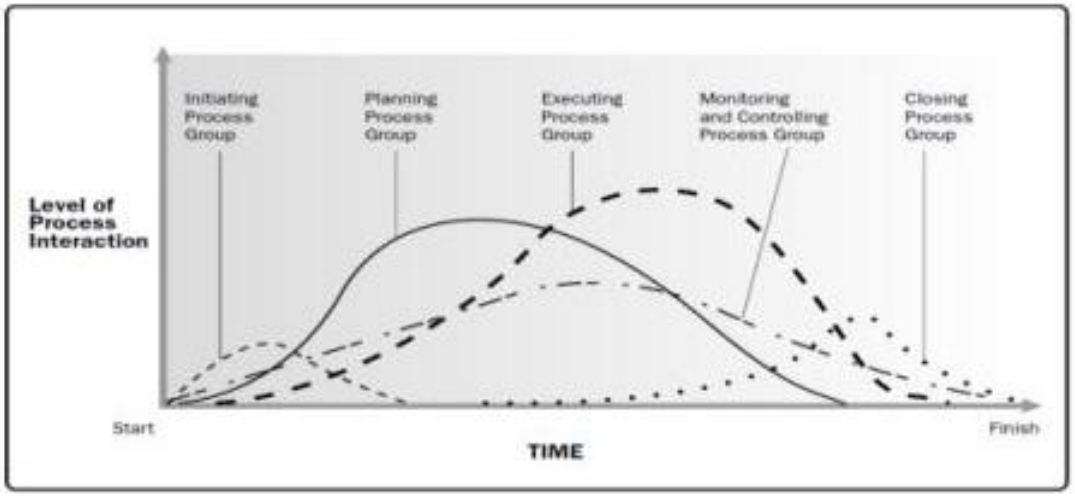

Figure 2.2 Interaction of Process Groups at different Phases (source: PMI, 2013)

Project Management Knowledge Areas

A Knowledge Area represents a complete set of concepts, terms, and activities that make up a professional field, project management field, or area of specialization. (Project Management Institute, 2013, p.59). There are ten knowledge areas, which are ten broad heading under which the 47 project management processes are subsets. Processes under each knowledge areas are iterative and may “overlap and interact”.

While the *PMBOK® Guide* fifth edition identified ten knowledge areas the Construction Extension to The *PMBOK® Guide* Third Edition, Second Edition, identified four additional Knowledge Areas, which have specific application to Construction Project Management. The additional knowledge areas that are unique to Construction Project Management are represented in Figure 2.3.

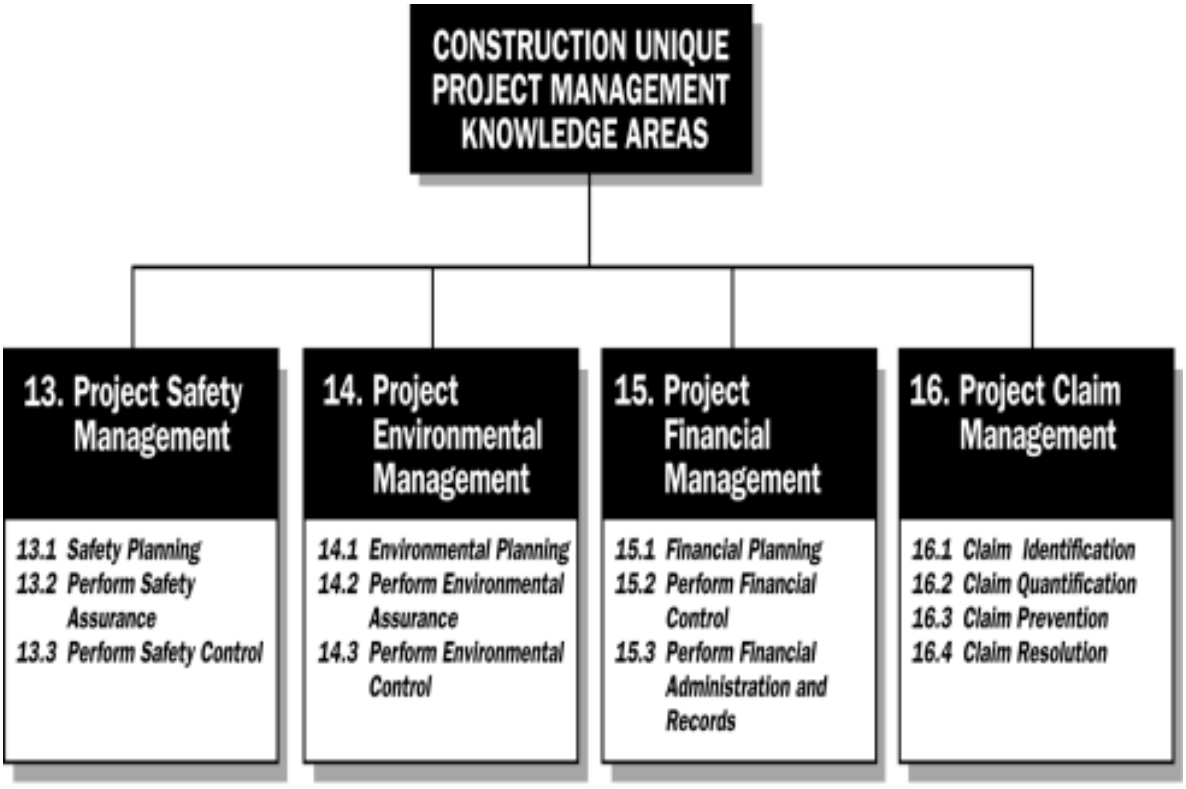

Figure 2.3 Additional Knowledge Areas (Source: PMI 2007)

2.2.4 Construction Project Management

Construction Project Management is a unique subset of project management because there are far more conditions that provide unique challenges and opportunities. Challenges are risks and these risks are dynamic and many. Construction Project Management in the context of this project is concerned with buildings. All buildings, even those that are modular, present unique geographical and environmental challenge and opportunities. Therefore, it is impossible to construct a building with the same results. The Project Management processes of each must be considered separately and risks and opportunities fully explored on a project by project basis. Construction project usually requires trained and certified professionals to manage project activities. These activities often utilize large quantities of material, tools and equipment and skilled and unskilled labor.

There are lots of opportunities to be explored due to the environmental, social and economic influence that construction activities place on local surrounding.

2.2.5 Project Integration Management

According to (Project Management Institute, 2013)‘‘The Project Integration Management Knowledge Area includes the processes and activities needed to identify, define, combine, unify, and coordinate the various processes and activities of project management within the Project Process Groups.’’ (P.63). Processes that are pertinent to this knowledge area are: Develop Project Charter, Develop Project Management Plan, Direct and Manage Project Work, Monitor and Control Project Work, Perform Integrated Change Control, and Close Project or Phase. Of these processes this paper will focus on the first two: Develop Project Charter and Develop Project Management Plan.

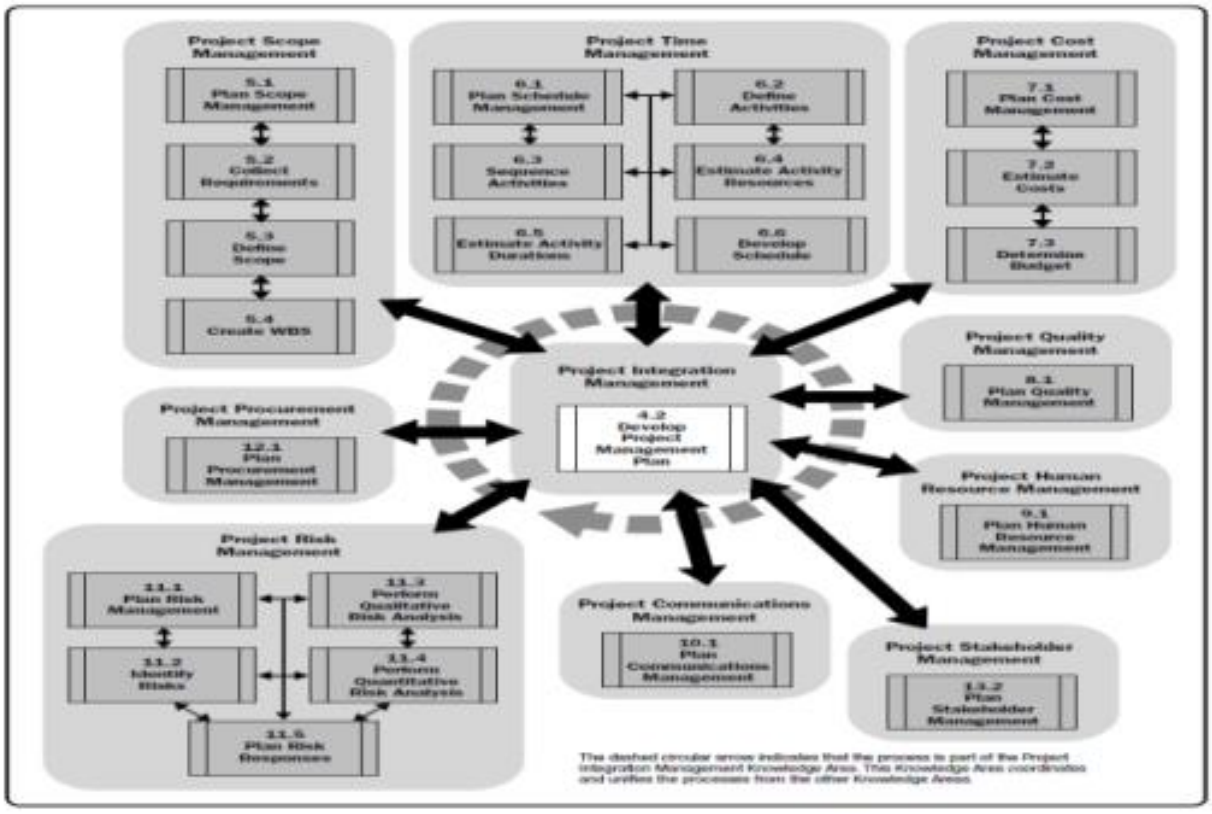

Figure 2.4 Shows integration of Knowledge Areas into the Project Management Plan (Source: PMI 2013)

2.2.6 Develop Project Charter

As described in by (Project Management Institute, 2013, (p.66) "Develop Project Charter is the process of developing a document that "formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities." (p.66) As **Figure 2.5** shows, the Project Charter is the result or "output" of applying various tools and techniques to incorporate inputs.

Figure 2.5 Inputs, Tools and Techniques to the Project Charter (Source: PMI 2013

2.2.7 Develop Project Management Plan

The process of defining, preparing, and coordinating all subsidiary plans and integrating them into a comprehensive project management plan. The project's integrated baselines and subsidiary plans may be included within the project management plan.

2.2.8 Project Scope Management

Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully (Project Management Institute, 2013, p.105). This means the project manager and his team must determine what is to be included or excluded from the scope. A clearly defined scope may help the prevent scope creep from taking place later during the execution phase. The following are scope management processes identified in the *PMBOK® Guide* by (Project Management Institute, 2013):

> **Plan Scope Management**: the process of creating a scope management plan that documents how the project scope will be defined, validated, and controlled.
> **Collect Requirements: t**he process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives.
> **Define Scope**: the process of developing a detailed description of the project and product.
> **Create WBS**: the process of subdividing project deliverables and project work into smaller, more manageable components.
> **Validate Scope**: the process of formalizing acceptance of the completed project deliverables.
> **Control Scope**: the process of monitoring the status of the project and product scope and managing changes to the scope baseline. (p. 105)

2.2.9 Plan Scope Management

According to (Project Management Institute, 2013, p.107) Plan Scope Management is the “process of creating a scope management plan that documents how the project scope will be defined, validated, and controlled”

Figure 2.6 Plan Scope Management: Inputs, Tools & Techniques, and Outputs (Source; PMI 2013)

2.2.10 Project Time Management

Project Time Management is an iterative series of activities in which all the processes required to manage the project timely completion are identified and integrated into the Project Management Plan. Processes include plan schedule management, defining activities, arranging activities in sequence, estimating activity resources, estimating activity durations and developing schedule control.

Plan Schedule Management Process is an important part of the Time Management Plan and is used for “establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule” (Project Management Institute, 2013, p. 145). The key benefit of this process is that is provides guidance for schedule management as the project is undertaken.

Input: any source that contains vital information that is needed to produce the intended “output”

There are four key inputs to the plan schedule management process:

- Project Management Plan
- Project Charter
- Enterprise Environmental Factors
- Organizational Process Assets

Tools and Techniques:

Expert Judgment

Analytical Techniques

Meetings

Outputs-

Figure 2.7 Tools and Techniques to the Schedule (Source: PMI 2013)

2.2.11 Project Cost Management

One of the most important knowledge areas is the Project Cost Management. Cost management includes processes that will enable the development of method for "planning, estimating, budgeting, financing, funding, managing, and controlling costs" (Project Management Institute, 2013, p. 193). These activities are necessary for the approved budget to be track, monitor and controlled. The main aim of the cost management activities is to ensure that the project cost, which may include debt can be accepted and cost associated risk or and all other project costs are planned and a management strategy is developed and approved.

There are four main processes associated with Project Cost Management. The (Project Management Institute, 2013, p. 193) list these processes as follows: plan cost management, estimate cost, determine budget and control cost.

The cost of a project is iteratively developed through progressive elaboration because even with the best estimates, most project experience significant cost overruns. This may be due to insufficient scope definition, market fluctuations, scope change or creep, the realization or occurrence of risks or of factors directly or indirectly associated with the project.

“Project estimates should be refined as information becomes available, making project estimating an iterative and evolving process, aligned with the concepts of progressive elaboration” (Project Management Institute, 2011a, p.12)

Plan Cost Management is the process that establishes the policies and procedure for managing costs relating to the project. It relies on the established tools and techniques available to the project management team from the performing organization.

Estimate Cost includes those activities necessary to develop and approximation of how much money it will take to perform the project work.

A number of estimating techniques are available and may be use singly or in combination. Some of these are Parametric Estimating, Analogous Estimating, Bottom-Up Estimating, Three-Point Estimating, Reserve Analysis, Cost of Quality (COQ), Project Management Software, Vendor Bid Analysis, Group Decision-Making Techniques and expert judgment. The specific technique may be proprietary to the preforming organization and may include additional techniques. **Figure 2.8** shows how different techniques may be use different levels of a decomposing WBS.

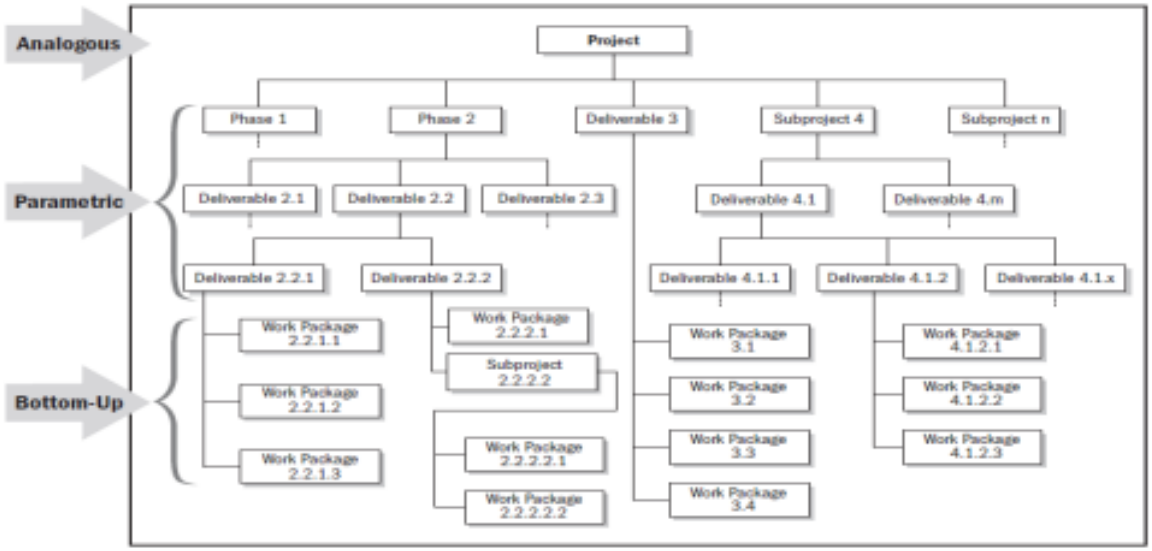

Figure 2.8 Use of Estimating Techniques with A WBS (source: (Project Management Institute, 2011a, p. 28)

2.2.12 Project Quality Management

In order for the needs of customers and business associates to be satisfied, the process of quality management must be at the forefront of project thinking. (Project Management Institute, 2013, p.277) defines quality management as the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken". Quality management depends on the use of existing policies and procedures that forms part of the performing organization's process assets. In the absence of these the performing organization might find it difficult to plan, implement and verify the quality standards have been achieved. Quality management can be applied to all project deliverables regardless of type, complexity, or scope. Failure to plan for and meet quality standards may result in a dissatisfied customer, increased cost for rework, increased attrition rate of workers, and even the cost that is not usually measured as outlined by Dr. Deming as potential business lost due to a dissatisfied customer branding the performing organization as a poor quality performer.

To ensure that quality is achieved the performing organization must use standards that are acceptable and usually verified outside of its own walls. The International Institute for Standards and Technology (IIST), the International Organization for Standardization (ISO), International Building Code, ASTM, IRC, and local building codes have pertinent standards that when applied may help organization meet their quality objectives.

The following approaches were outlined by (Project Management Institute, 2013, p.229) as approaches that may ensure compatibility with ISO standards for quality management. These are:

Customer satisfaction: this is translating project requirements into a deliverable that both conforms to requirements and is fit for use.

Prevention over inspection: prevention is better than cure and I might add that it is cheaper as well. Prevention is intentionally taking steps to ensure that quality objects are reached and or exceeded. This will require some intentional planning or cost for ensuring quality also called "cost of Quality". Inspection is used to see if there are defects. But if steps were not in place to prevent defects, it is highly likely

that defects will show up during inspection. This may lead to rework or discovery of a totally useless deliverable, the cost of which stands significantly higher than the cost of prevention.

Continuous improvement: one very well-known basis of quality improvement is the Plan-Do-Check-Act (PDCA) cycle which was defined by Shewhart and modified by Dr. Deming. The basis of this approach is the planning must be intelligently included into the phases of the deliverable and more so during the construction phase to ensure that the resulting deliverable is of the specified quality. The plan for quality is then executed. After execution or construction, checks are carried out to ensure that there is conformance and a decision is then made to sign off on the deliverable or requirements for rework. Whatever the findings, some form of action is then required. This process may be repeated several times during any phase or throughout the whole life cycle of the deliverable.

Management Responsibility: for a project to meet or exceed its quality goals and objectives, the right personnel with requisite skills must be in place and must be provided with the necessary resources and time needed to ensure the objectives are appropriate and are being implemented. This approach has placed the onus directly on management to ensure that all that is needed to ensure quality is in place.

Cost of quality: according to (Project Management Institute, 2013, p.229) “Cost of quality refers to the total cost of the conformance work and the non-conformance work that should be done as a compensatory effort because, on the first attempt to perform that work, the potential exists that some portion of the required work effort may be done or has been done incorrectly”. The cost of quality can be substantial depending on the type and scope of the project. The cost of quality may continue to affect the project budget for years after the project has been handed over. Post-delivery cost of quality may result from repairs, operational cost, warranty, or litigations. To reduce this potential impact quality must be budgeted for. Figure 2.8 below shows how quality assurance and control quality interact with project management process groups.

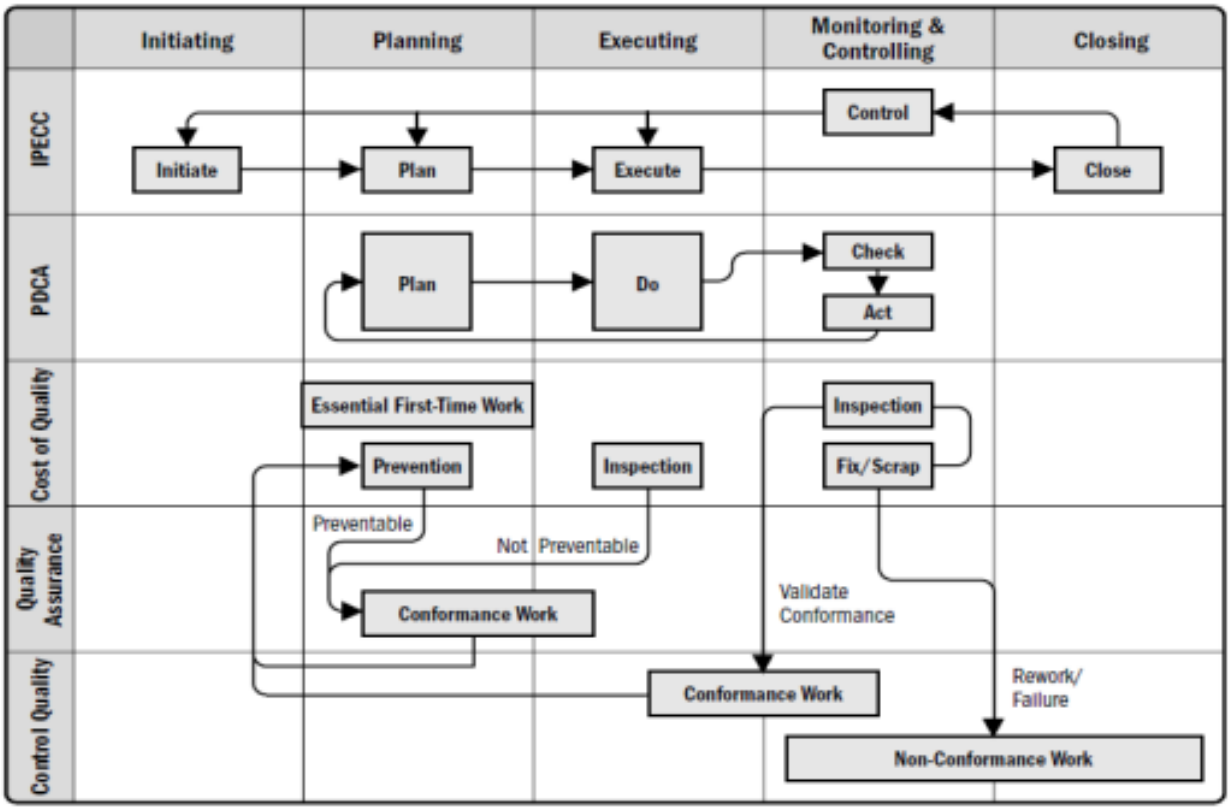

Figure 2.9 Fundamental Relationships of Quality Assurance and Control Quality to the IPECC, PDCA, Cost of Quality Models and Project Management Process Groups (Source: PMI 2013)

Plan Quality Management

"Plan Quality Management is the process of identifying quality requirements and/or standards for the project and its deliverables, and documenting how the project will demonstrate compliance with relevant quality requirements and/or standards" (Project Management Institute, 2013, p.231). At this stage the steps and methods of how quality will be managed are identified and documented.

Figure 2.10 Plan Quality Management Inputs, Tools & Techniques, and Outputs (source: PMI 2013)

2.2.13 Project Human Resource Management

“Project Human Resource Management includes the processes that organize, manage, and lead the project team.” (Project Management Institute, 2013, p.255). For the construction activities to be successfully planned and carried out, the participation of the project team at all stages of the planning process is necessary.

The project management team is a subset of the lager project team. The project management team may consist of team members how operate at the technologist level and may have high level of qualification and or experience than their respective work crew. The project management team are responsible for project planning and or the executive branch on the organizational chart. The project team, on the other hand, comprise of the both people with high and low end qualification and skill set. The size and scope of the project will influence the size of the executive and the general project team. There are four processes in the Project Human Resource Management. They are: (Project Management Institute, 2013)

> **“Plan Human Resource Management**— the process of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan.
>
> **Acquire Project Team—** the process of confirming human resource availability and obtaining the team necessary to complete project activities.
>
> **Develop Project Team—** the process of improving competencies, team member interaction, and overall team environment to enhance project performance.
>
> **Manage Project Team—**the process of tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.” (p. 255.)

2.2.14 Plan Human Resource Management

According to (Project Management Institute, 2013, p. 258) Plan Human Resource Management is the process of “identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan”. This is the stage the following are performed; staffing roles and

responsibilities, project organization charts, and staffing management plan for the accusation and release of staff. Figure 2.8 identifies inputs, tools, techniques, and the output of the Human Resource Management Plan process.

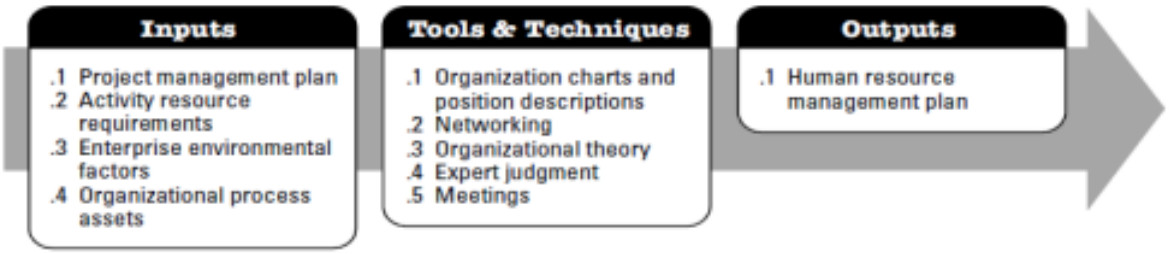

Figure 2.11 Plan Human Resource Management: Inputs, Tools & Techniques, and Outputs (Source: PMI 2013)

Organization Charts and Position Descriptions

Tools used to document team members roles and responsibilities may include;

Hierarchical-type charts: according to (Project Management Institute, 2013)**:**

> Hierarchical-type charts. The traditional organization chart structure can be used to show positions and relationships in a graphical, top-down format. Work Breakdown Structures (WBS) designed to show how project deliverables are broken down into work packages provide a way of showing high-level areas of responsibility. While the WBS shows a breakdown of project deliverables, the Organizational Breakdown Structure (OBS) is arranged according to an organization's existing departments, units, or teams with the project activities or work packages listed under each department." (p.261)

Text-oriented formats: Team member responsibilities that require detailed descriptions can be specified in text-oriented formats. Usually in outline form, the documents provide information such as responsibilities, authority, competencies, and qualifications". (Project Management Institute, 2013, p. 262)

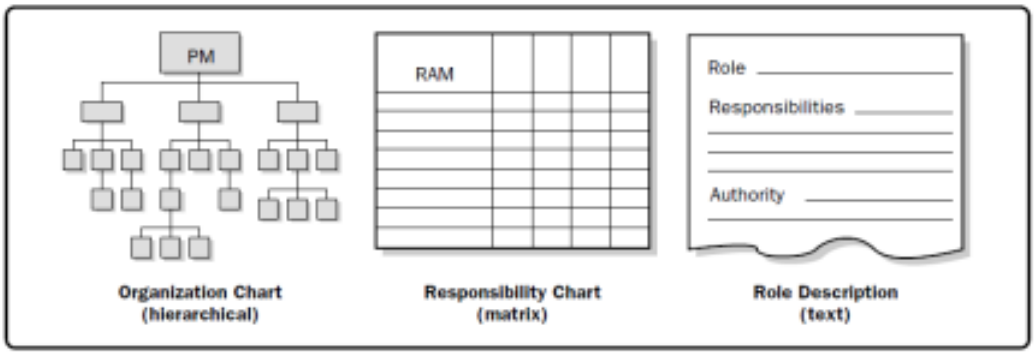

Figure 2.12 Roles and Responsibility Definition Formats (Source: PMI 2013)

Matrix-based charts: "A responsibility assignment matrix (RAM) is a grid that shows the project resources assigned to each work package. It is used to illustrate the connections between work packages or activities and project team members." (Project Management Institute, 2013, p. 262)

RACI Chart	Person				
Activity	Ann	Ben	Carlos	Dina	Ed
Create charter	A	R	I	I	I
Collect requirements	I	A	R	C	C
Submit change request	I	A	R	R	C
Develop test plan	A	C	I	I	R

R = Responsible A = Accountable C = Consult I = Inform

Figure 2.13 RAM is a RACI (responsible, accountable, consult, and inform) chart (Source: PMI 2013)

2.2.15 Project Communication Management

Project Communications Management is defined by (Project Management Institute, 2013, p.287) as an inclusion of those "processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project

information". Communication is one of the activities that project managers spend most of their time doing. There must be an effective strategy for communicating with diverse stakeholders of different abilities both within and external to the project. (Project Management Institute, 2013) identified the following three process for Project Communication Management:

> **Plan Communications Management:** the process of developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements, and available organizational assets.
>
> **Manage Communications:** the process of creating, collecting, distributing, storing, retrieving and the ultimate disposition of project information in accordance with the communications management plan.
>
> **Control Communications:** the process of monitoring and controlling communications throughout the entire project life cycle to ensure the information needs of the project stakeholders are met. (p.287)

Plan Communications Management

Plan Communications Management is the process of developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements, and available organizational assets.

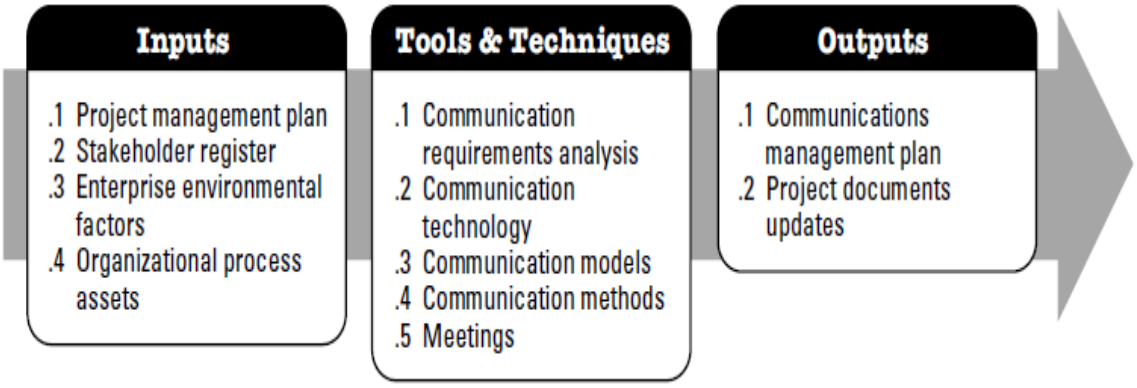

Figure 2.14 Plan Communications Management: Inputs, Tools & Techniques, and Outputs (Source: PMI 2013)

2.2.16 Project Risk Management

All project are expose to risk in one way or the other. Some events are positive and should be explored while negative events are to be prevented or managed if prevention is not possible. According to (Project Management Institute, 2013, p. 309) “Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, and controlling risk on a project”. The following six Project Risk Management processes have been identified by (Project Management Institute, 2013):

> **Plan Risk Management**: the process of defining how to conduct risk management activities for a project.
>
> **Identify Risks**: the process of determining which risks may affect the project and documenting their characteristics.
>
> **Perform Qualitative Risk Analysis**: the process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact.
>
> **Perform Quantitative Risk Analysis**: the process of numerically analyzing the effect of identified risks on overall project objectives.
>
> **Plan Risk Responses**: the process of developing options and actions to enhance opportunities and to reduce threats to project objectives.
>
> **Control Risk**: the process of implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating risk process effectiveness throughout the project. (p. 309)

Plan Risk Management

Plan Risk Management is the process of defining how to conduct risk management activities for a project. (Project Management Institute, 2013, p.313). The main benefit of this process is to align the risk with the importance of the project to the organization. The inputs, tools and techniques, and outputs of the Plan Risk Management this process is identified in Figure 2.12 below.

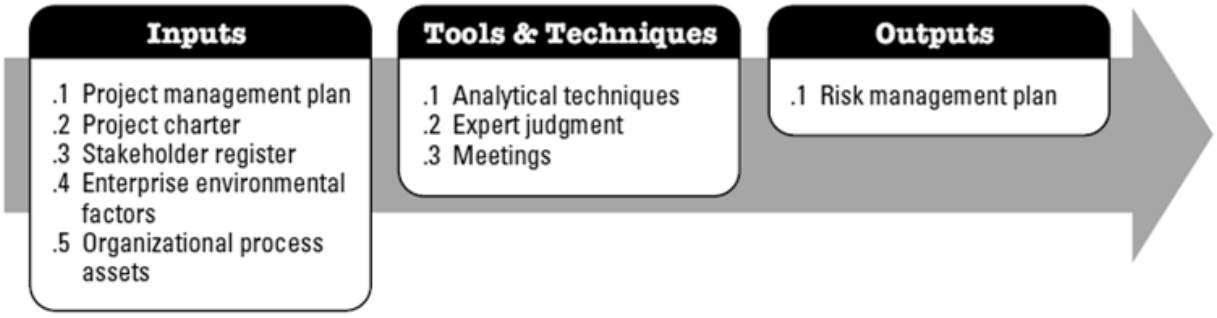

Figure 2.15 Plan Risk Management: Inputs, Tools & Techniques, and Outputs (Source: PMI 2013)

2.2.17 Project Stakeholder Management

Project stakeholder management involves steps taken to identify the people, groups, or organizations that may influence the project positively or negatively and also those who might be affected by the project. Once stakeholders are identified, they are then analyzed to determine their level of impact or influence on the project in order to effectively manage and communicate with them. According to (Project Management Institute, 2013) “Project stakeholders are individuals, groups, or organizations who may affect, be affected by, or perceive themselves to be affected by a decision, activity, or outcome of a project.”

The **(**Project Management Institute, 2013, p.394) identified the following processes that are crucial for effective Project Stakeholder Management:

Identify Stakeholders: the process of identifying the people, groups, or organizations that could impact or be impacted by a decision, activity, or outcome of the project; and analyzing and documenting relevant information regarding their interests, involvement, interdependencies, influence, and potential impact on project success.

Plan Stakeholder Management: the process of developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle, based on the analysis of their needs, interests, and potential impact on project success.

Manage Stakeholder Engagement: the process of communicating and working with stakeholders to meet their needs/expectations, address issues as they occur, and foster appropriate stakeholder engagement in project activities throughout the project life cycle.

Control Stakeholder Engagement: the process of monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders. (p.391)

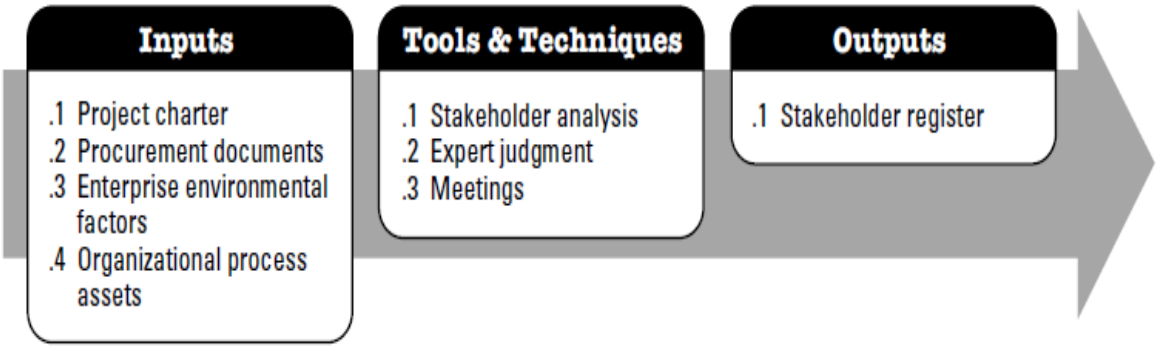

Figure 2.16 Identify Stakeholders: Inputs, Tools & Techniques, and Outputs (Source: PMI 2013)

2.2.18 Project Management Plan

According to (Project Management Institute, 2015) a Project Management Plan is **"t**he document that describes how the project will be executed, monitored and controlled, and closed" p. 9. A project management plan contains all the Subsidiary Plans, which are based on the Knowledge Areas. These subsidiary plans ensure that the resources of both human (labor) and machines are properly allocated for best utilization. The Project Management Plan also contains information about how the project would be financed and who will be paid and when those payments are expected to be made. A key part of the project management plan details how customers, stakeholders, and the surrounding environment will be protected from adverse project activities.

The Project Management Plan also contains information about how the project will be monitored and controlled during the project execution phase. Monitoring is done to check to see if the project is achieving its objectives, within budget, on schedule, and achieving the desired quality and how scope is impacted. Controlling is done to realign the project so that its objectives are met. However, sometimes it is necessary to redefine the baseline after monitoring and controlling activities because the initial estimates are proven unreliable.

Once the project is executed, the project is formerly handed over and based on predefined acceptance criterion rejected or accepted. Project management plans also contain information about how the project or phase will be formerly accepted or rejected.

2.2.19 Project Phases

A project may be divided into any number of phases in order to logically group related project activities. Activities are generally grouped sequentially in the order in which work is to be performed and to meet stakeholder demand for project deliverables. While project phases are typically completed sequentially, project phases may overlap in some situations. In the case of construction work an overlapping relationship may be developed. An overlapping relationship, phase work starts before the predecessor phase is finished. This may result in schedule compression requiring additional resources and increasing the likelihood of risk, particularly rework. (Project Management Institute, 2013, p.43)

According to (Project Management Institute, 2007, p.14) most construction projects may have five and sometimes shortened to four phases. “These phases are concept, planning (and development), detailed design, construction, and start-up and turnover.”

2.2.20 Rolling wave planning

Rolling Wave Planning is **"**An iterative planning technique in which the work to be accomplished in the near term is planned in detail, while the work in the future is planned at a higher level". (Project Management Institute, 2015, p.11) when these techniques are used, the project team usually has accurate information about activities that are to be performed in the near further. The other high level activities are listed as in the baseline schedule as "planning activities" and constraints much less details including duration and cost. These activities are then replaced in the schedule after detailed planning takes place. "An important principle for rolling wave planning is to perform the detailed planning at regular intervals. The detailed planning for the next interval needs to be completed well in advance of the start of the next wave's execution." (Project Management Institute, 2011b, p.15)

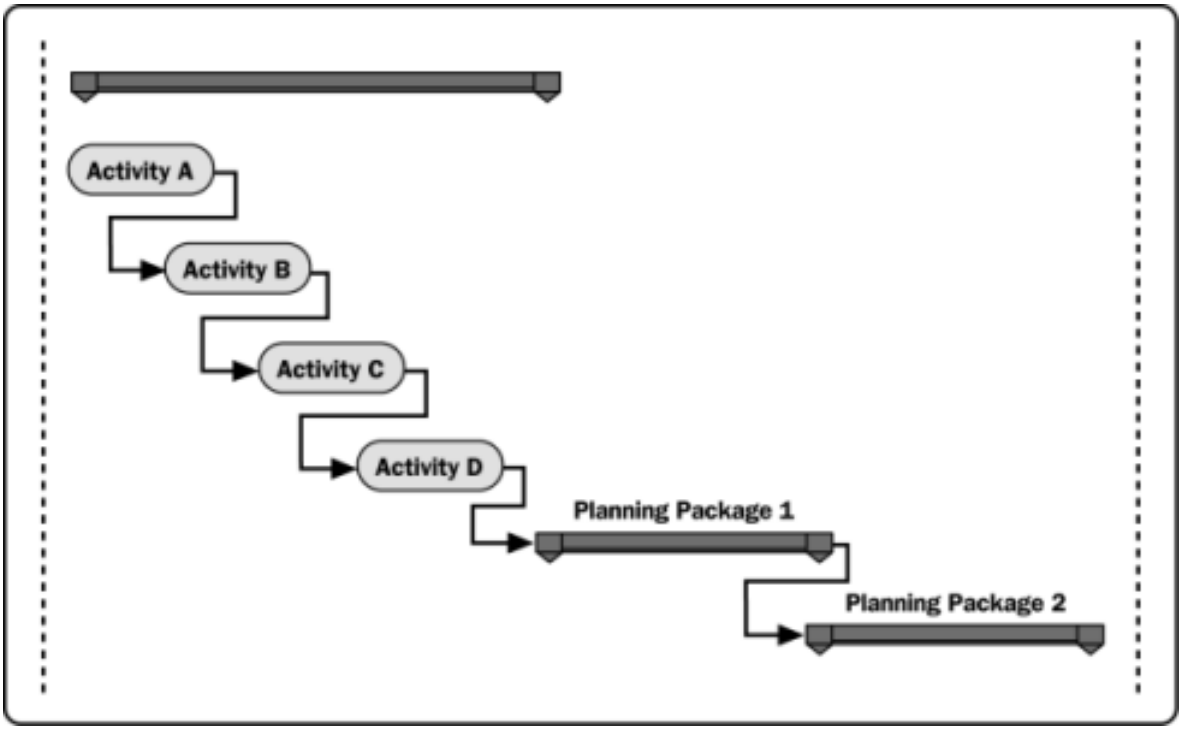

Figure 2.17 Rolling wave planning (Source: PMI 2013)

2.2.21 Progressive Elaboration

(Project Management Institute, 2015, p. 8) defines Progressive Elaboration as “the iterative process of increasing the level of detail in a project management plan as greater amounts of information and more accurate estimates become available.”

2.2.22 Iterative Life Cycle

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As a Project is planned for, details of estimates of time and cost may be incrementally improved through an iterative life cycle as more information is obtained. Each iteration will improve the accuracy of the project estimates. The project scope is generally determined early in the project life cycle, but time and cost estimates are routinely modified as the project team’s understanding of the product increases. Iterations develop the product through a series of repeated cycles, while increments successively add to the functionality of the product.

2.2.23 Input

(Project Management Institute, 2013, p.543) defines input as “any item, whether internal or external to the project that is required by a process before that process proceeds. May be an output from a predecessor process.”

2.2.24 Output

(Project Management Institute, 2013, p. 548) defines output as a product, result, or service generated by a process. May be an input to a successor process.

2.2.25 Technique

Technique is defined by (Project Management Institute, 2013, p.564) as a defined systematic procedure employed by a human resource to perform an activity to produce a product or result or deliver a service, and that may employ one or more tools.

2.2.26 Tools

Tools are described by (Project Management Institute, 2013, p.565) as “something tangible, such as a template or software program, used in performing an activity to produce a product or result.”

2.2.27 Work Breakdown Structure (WBS)

Work Breakdown Structure (WBS) is defined as “A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables.” (Project Management Institute, 2015, p.14). WBS is one of the most useful project management tools for “organizing the scope of the project” (Project Management Institute, 2006, p.15). The use of WBS has made it possible for complex projects scope to be decomposed (subdivided) into smaller and more manageable sections.

Primary to the WBS technique is the use of levels. Level 1 is the total scope and describes 100% (100% rule) of what the project will achieve. The next level (Level 2) is a high-level breakdown of the project scope. All sections, at this level, when considered together must amount to 100% of the previous level (or summary task). These sections may be subdivided into more manageable units or work packages, depending on the complexity and size of the scope. The project team is required to provide input and for a high quality WBS, Subject Matter Experts (SME) should be consulted.

There are a number of project management tools that use the WBS as inputs such as; The Charter, Project scope Statement, Resource Breakdown Structure (RBS), Organizational Breakdown Structure (OBS), WBS Dictionary, Project Schedule Network Diagram and Project Schedule.

Because the WBS may be iteratively developed as the project scope is progressively elaborated, the initial WBS may not represent the final extent of the decomposition. At least not until the scope is fully baselined.

Figure 2.18 WBS Usage Continuum (Source: PMI 2006)

2.3. Other applicable theory/concepts related to the project topic and context

2.3.1 Sustainability

Sustainability is ensuring that our present needs are met by consuming resources in a responsible way, while all the time endeavoring to avoid precluding future posterity of their ability to meet their own needs. (Mineral Products Association (MPA), 2016)

2.3.2 Triple Bottom Line

The triple bottom line was coined by John Elkington in 1994. According to John an organization should not just report on or evaluate its bottom line (financial statements) but that it should also think of the social impact as well as the environmental impact. The triple bottom line allows us to think of the total cost of doing business.

2.3.3 Sustainable Construction

What is Sustainability in the context of Building Construction? Sustainable Building Construction means using natural resources such as building materials, more efficiently, making processes more efficient, reducing pollution and minimizing or eliminating waste. (Mineral Products Association (MPA), 2016)

2.3.4 Goals of Sustainable Construction

Robichaud & Anantatmula (2011) cited Kibert (2005), quoting the Conseil International du Batiment CIB, Sustainable Construction: Green Building Delivery and Design, described the goal of sustainable construction as:

> The goal of sustainable construction is to create and operate a healthy built environment based on resource efficiency and ecological design with an emphasis on seven core principles across the building's life cycle: reducing resource consumption, reusing resources, using recyclable resources, protecting nature, eliminating toxics/toxins, applying life cycle costing, and focusing on quality. (p 49)

Robichaud and Anantatmula (2011) further stated that:

> Research in the design and execution of construction projects has focused on how sustainable practices can reverse the impacts of global warming. According to the United Nations Environment Programme (UNEP) 2007, the construction industry has the greatest opportunity to affect environmental issues due to the built environment's major share in energy consumption and contribution to global warming. Research shows sustainable building

> practices can considerably reduce the built environment's role in energy consumption. A survey of 99 green buildings in the United States showed they use an average of 30% less energy than conventional buildings, The Economist 2004. Other case studies show that energy-efficient design can reduce a building's energy consumption by as much as 50% The Economist 2004. (p. 49)

2.2.5 Environment and Climate Change

We live and work within the confines of a global environment. This environment is divided into different territories with different laws that govern manufacturing, economic, local environment, acceptable living conditions and so forth. This diversity of laws has led to an imbalance in laws that govern the activities that both negatively and positively impact the global environment. This has caused two main situations to develop; firstly environmental conditions in most developed cities are increasingly getting worst and economic complexities seems to be shackling the hands of those who would do something to mitigate the negative impacts of our actions. This global diversity has caused stalemate at the highest levels of governance. In reference to the Parris Agreement on Climate Change, Maljean-Dubois & Wemaëre (2016, January) said that "the Agreement better takes into account diverse national circumstances, capabilities and vulnerabilities, resulting not in less but in more differentiation" (p.2). In an effort to gain consensus towards the fight on climate change which would keep "global temperatures below 2°C as compared to pre-industrial levels" territories are contracted to make Nationally Determined Contributions (NDCs) every five years according to national conditions. Consensus has been achieved and now it's time for action. It's time for a new era. An era in which action takes precedence over talks.

Maljean-Dubois & (2016, January) remarked that:

> The Paris Agreement marks the end-point of a long process of climate talks which actually started in Bali in 2007, but it is also a starting point of a new era of climate action at all levels: from global cooperation to local action on

> the ground, involving citizens and consumers, in a way that can link intergovernmental decision-making and mobilisation of non-state actors to support and enhance the ambition embodied in NDCs. (p.4)

O'Donnell, Pfahl, Mehling, & Gabriel, (2016) acknowledged that because this generation of young people may “endure the consequences of this change in the climate more than any generation in the past, it is fitting to inform them early of the risks that modern lifestyles entail and the challenges to bringing about a more sustainable future” (p.944). Where does this leave the Project Managers? Project Management must also walk the talk.

2.3.6 Embodied Energy

Embodied energy is an eco-scorecard for comparing the energy used in producing building materials and components. It is a none-physical property of a building material that takes into account the energy used to extract or harvest, manufacture, transport, construction, maintenance and demolition. Material may be assessed for embodied CO_2 and embodied Water.

According to the Fact sheet: Global environmental issues. (1993), in 1978 the United States banned the use of chlorofluorocarbons (CFCs) in nonessential aerosols because scientific evidence pointing to depletion of the ozone layer. Because the United States coexists in the global environment, they sought international consensus to phase out the use and production of CFC. This lead to international agreement such as the 1985 Vienna Convention and the 1987 Montreal Protocol. By 1992, approximately 12 years from the 1978 ban in the use there was international agreement to ban CFCs completely by the end of 1996. Hydro fluorocarbon (HFC) was promoted as the alternative to CFCs. Sadly, HFCs turned out to be a potent Green House Gas (GHG).Yet according to UN.org “Global emissions of carbon dioxide (CO2) have increased by almost 50 per cent since 1990”. Consequently, average global temperature increased by 0.85^0C. For each 1 degrees of temperature increase, grain yields declined by 5%.

On December 2, 2015, 196 countries adopted the Paris Agreement, which called for counties to take actions to limit the rise of global temperature to below 2 degrees Celsius and to strive for 1.5 degrees Celsius. By April 22, 2016, 175 countries signed the agreement on climate change with 188 countries which represented about 100% of global emissions, submitted their Intended Nationally Determined Contributions (INDC).

In 2016 a deal was reached to phase out the use of HFCs which according to John Kerry, United States Secretary of States, in a televised address said the monumental deal would prevent an increase in global temperatures by 0.5 degrees Celsius. It is clear that these international efforts by themselves will not stem the tide of what will be unleashed on the world if current trends in climate change continue.

Evidently, the application of Sustainable Project Management Methodology in the construction industry has a significant influence on mitigating environmental decay. Project Management in and of itself is already a powerful tool that can influence change. However, when Project Management is homogeneously fuse with Sustainability, not only do we have a tool that influences change but a tool that ensure that the change is implemented. The question now confronts us; how do we integrate sustainability into Project Management and then apply it to the Construction industry?

For an answer we may first look at the works that have already defined solutions or that promote an integrated approach toward sustainability and construction. One such methodology is called the PRiSM Methodology. PRiSM is an acronym which stands for “Projects integrating Sustainable Methods”. It is an awarding wining: “process-based, structured methodology for managing change. The methodology highlights areas of sustainability and integrates them into the traditional core project phases to reduce negative environmental and social impacts in all project types using the *GPM P5*™ Standard. The PRiSM Methodology is based on six principles that are derived from “UN Global Compact's Ten Principles, Earth Charter, and ISO: 26000 and Guidance on Corporate Social Responsibility” (GPM

Global, 2013) identifies and describes the Six Principles of Sustainable change Delivery as follows:

1. **Commitment & Accountability** - Recognizing the essential rights of all to a healthy, clean and safe environments, equal opportunity, fair remuneration, ethical procurement, and adherence to rule of law

2. **Ethics & Decision Making** - Supporting organizational ethics, decision making with respect for universal principles through identification, mitigation, and the prevention of adverse short and long-term impacts on society and the environment

3. **Integrated & Transparent** - Fostering the interdependence of economic development, social integrity, and environmental protection in all aspects of governance, practice and reporting

4. **Principal & Values Based** - Conserving and enhancing our natural resource base by improving the ways in which we develop and use technologies and resources

5. **Social & Ecological Equity** - Assessing human vulnerability in ecologically sensitive areas and centers of population through demographic dynamics

6. **Economic Prosperity** - Establishing fiscal strategies, objectives, and targets that balance the needs of stakeholders, including immediate needs and those of future generations

Figure 2.0.19 Pre-Project and Initiation phase from PRISM® Methodology (Source: GPM 2013)

A close look at the PRISM workflow Figure 2.16, revealed that there are four main phases, Pre-Project, Project Planning, Project Implementing and Project Closure.

The Project Initiation phase has the most implication for integrating Sustainability into a Project Management Plan. This is where a review of an organization's sustainability goals are done.

2.3.7 Building Lifecycle

Buildings like all other goods and services go through a period spanning from conception through to termination or disposal. This period is called a life cycle. However, buildings are not like other goods or services because of the magnification for all cost and impacts associated with buildings. Buildings require more materials, use more energy, have the greatest environmental impacts, generate more waste but have the greatest potential for fighting climate change. Building also transitioned through a complex group of owners and usage, which often necessitates that requirements for health, safety and environmental impact be dynamic. In fact, buildings are one of the most adaptable of all products. The service life of buildings span half a century with many buildings and structures lasting well over a century and in many cases millennia, as in the case of the great pyramids. It is because of these enormous differences why buildings have a more complex lifecycle. Notwithstanding these obvious complexities, König, H., & Institut für Internationale, A. (2010), manage to identify the following four typical

phases (New build, use, refurbishment and deconstruction) all with increasingly more complex interaction as the building types, usage or requirements change. The New building phase begins with the client and ends with the commissioning or hand over of the building. Of the four phases that have been identified, three of these stages involves Project Management Planning. Project management Methodology has an opportunity to make significant impact on climate change and saving the ozone layer by engaging in thorough environmental assessments which must take into account the whole life cycle of the building, ensuring that there are potential for stakeholder satisfaction and by engaging in responsible sustainable procurement. The true impact of any construction endeavor can only come into perspective if the whole building lifecycle is accounted for and appropriate factorization and contingencies applied to cover the known unknowns.

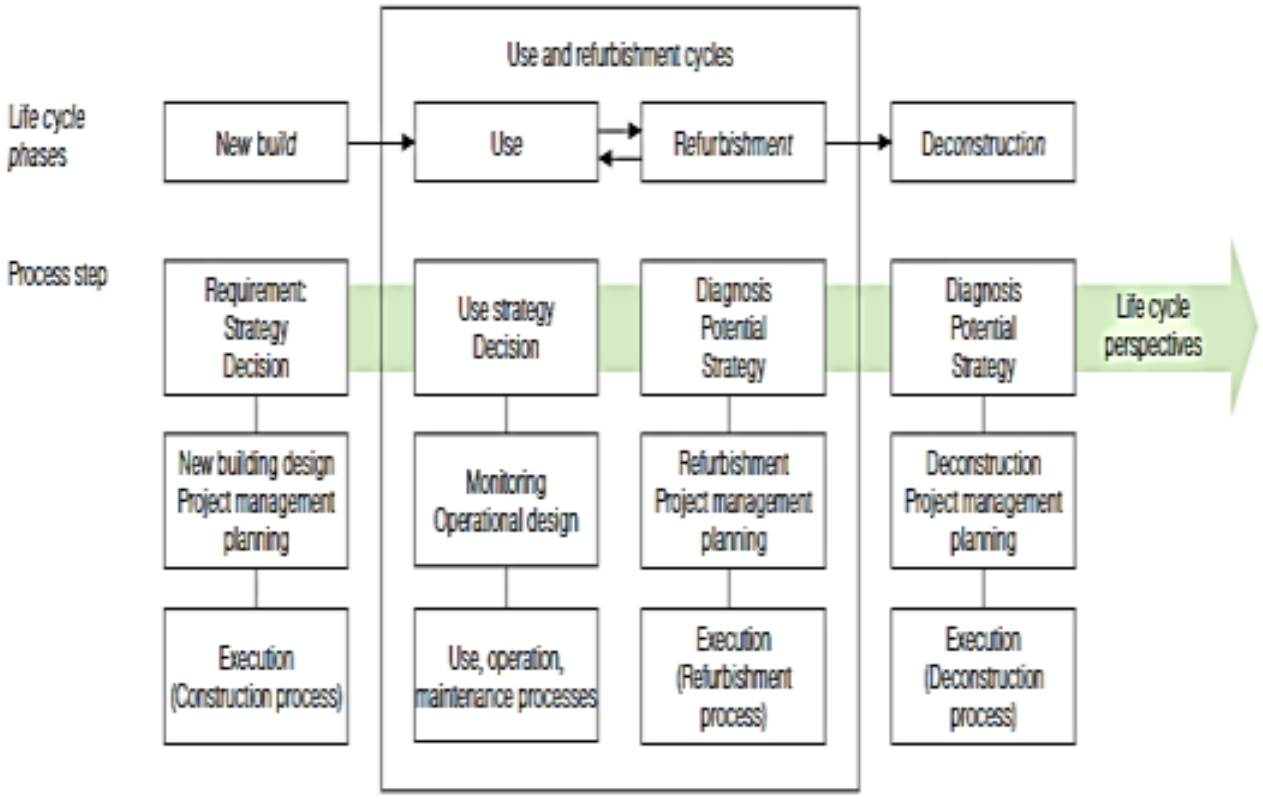


Figure 2.0.20 Whole Building Life Cycle (Source: König, H., & Institut für Internationale, A. (2010)

2.3.8 Modern buildings and their insatiable appetite for energy and resources

According to the United Nation's Environment Programme's Sustainable Building and Climate Initiative (UNEP-SBCI), "Buildings use about 40% of global energy, 25% of global water, 40% of global resources, and they emit approximately 1/3 of GHG emissions" with "a building's operational phase accounting for 80-90% of emissions resulting from energy use mainly for heating, cooling, ventilation, lighting and appliances". (UNEP.org).

While Project Management might not be able to correct all flaws in buildings that are already built, it has the greatest potential to influence the sustainable consumption of energy in buildings that are to be constructed or remodeled. Only when we identify that the root cause of global environmental degradation, which is significantly influenced by human activity, that we may find the appropriate solutions. Certainly, at the very heart is the mistaken assumption that somehow the money that we spend for goods and services reflect the true cost of buying and selling or doing business for a matter of fact. This is a coveted error of ignorance etched in certain culture. The error is called greed. Both rich and poor should be taught to make decisions out of necessity and appreciation for the environment. People must be reminded that only by utilizing fewer resources that we may safeguard future generations. The bulk of the responsibility rest on the end user since buildings are usually designed to satisfy ones need or greed. It will take an educated mind to exercise restraint and acquire less when it is in his power to buy more. Only when end users start to demand less that we may begin to observe the greatest change in the direction toward a truly sustainable future. For the building to be efficient the users must be taught how to utilize passive and active strategies designed into sustainable buildings to make them efficient.

2.3.9 United Nation Global Compact Principles:

July 2000 gave rise to an initiative called the ten Global Compact. These ten principles were developed by 40 companies and other influential organizations including civil society and labor organization. It has grown in popularity since then with more than 140 countries being impacted and is said to be the world largest initiative geared at ensuring Corporate Social Responsibility (CSR). The ten global principles are based on four broad areas; human rights, labor standards, environmental protection, and anti- corruption. Hall, C., & United, N. (2011).

2.3.10 Building codes

There are numerous building codes in use today. Some of international reach such as the International Building Code (IBC) and the International Residential Code (IRC) with British Building Code or British Standard (BS) finding wide acceptance in many Caribbean countries. Small island territories usually develop their own standards or codes by adopting applicable standards from more established ones and integrating them with other standard according to local requirements. These local standards aim to cater for the specific needs of local conditions that may impact the buildings during its operational lifecycle. Whatever the building code used, they aim to ensure that safe and comfortable conditions are provided for occupants.

National and international Building codes are usually intended to provide a wider array of options and are primarily concern with ensuring the structural integrity of buildings, they usually have lower energy standard requirements. Many local Authority Having Jurisdictions (AHJ) recognize that some portions of the national codes may be adjusted to meet stricter energy standard. This was the case in 2011 when the Oregon Building Code Division established a green Code or “Oregon Reach Code (ORC)” as it is called which is based on the “November 2010 International Green Construction Code public version 2.0 with Oregon specific amendments, including provisions from the 2012 International Energy Conservation Code and ASHRAE 90.1.” Contractor Magazine (Aug.2011).

Building Codes Cooper (2015) said “about 15 years ago, **building** requirements appeared on the **code** horizon that were oriented toward energy efficiency, water conservation and health. Energy efficiency was addressed in a separate **code**: the International Energy Conservation **Code** (IECC)”. Hogan, J. (2005) acknowledge the influence of building codes on a building energy consumption when he made reference to “Resolution 30280 (Seattle 2001a)” which directs the Department of Planning and Development (DPD) to include in its review of Energy Code amendments: “options for amending the Seattle Energy Code to achieve energy savings up to 20% beyond the current... ASHRAE/IESNA Standard 90.1, Energy Standard for Buildings except Low-Rise Residential Buildings”.

2.3.11 Material Asessment Checklist

Buildings use a wide variety of materials such as wood stones, metals, concrete, glass and plastic. Each materials have unique properties that makes the particular type of material useful for specific application. All materials will have a negative impact on the environment or local economy when selected as a building material. Before materials are selected for construction the purpose for which the building will be used must be identified and the health and safety of the users/occupants accounted for. A material checklist if properly developed may serve to inform the Sustainable Procurement activities as well as the development of the building conceptual design. There should be a balance between health and safety and or the factors such as aesthetics, environmental impact, energy efficiency and cost. Indoor Air Quality (IAQ) is huge on the global agenda. The IQA may be compromised by materials that are recycled. Some materials give of Volatile Organic Compound (VOC). Glass and concrete are relatively inert (does not react readily with other material under normal use). Wood has a property called the “hygroscopic property”. Because of this property, wood absorbs moisture and chemicals present in the environment until equilibrium is reached between the moisture content in the environment and that of the wood. If contamination occurs in the environment of wood the wood may become contaminated as well which may give rise to poor indoor air quality and ultimately compromising the health and

safety of users/occupants. Recycled materials should be avoided in indoors use unless guaranteed to be absolutely safe and the presence of other material will not magnify the potential for release of VOCs.

Rutland, M. (2010). Argued that according to “Federal Trade Commission guidelines, manufacturers may claim a product is VOC-free if it contains less than 5g/L of VOCs before pigments are added. VOC levels typically increase 10g/L or more upon the addition of colorants. This means that even “VOC-free” paints contain VOCs” p.48

The use of checklist can be a powerful input to many project management processes. In fact many rating agencies use checklist such as “Leadership in Energy and Environmental Design (LEED), the most commonly used rating system for sustainable architecture”. LEED certifications are handed out by the U.S. Green Building Council (USGBC), a Washington, D.C.-based non-profit or the Building Research Establishment Environmental Assessment Method used in the United Kingdom and is said to equates to LEED. These came in response to have a carbon neutral world by 2030. LEED uses checklists “LEED Rating System Checklist, launched in 2000, grades buildings--primarily commercial ones--on the sustainability of their materials, their heating and cooling efficiency, control of storm water runoff, and other criteria.” Brook, (2008). But checklist should not be a one size fit all. The Green Project Management Organization uses a checklists as the backbone of its P5 rating systems.

The Guidance on Social Responsibility ISO 26000

Businesses and firms, whether in the construction industry or the suppliers of goods or services, operate in a closed loop of interwoven relationships in which the impact of the various activities have far reaching consequences. History bears the records, also, etched in the environment are the scares of the impacts of our action. Scares of global warming, child abuse and child labor, dishonesty and bribery, improper disposal of waste, contamination of fresh water supplies, destruction of the natural habitats and ecosystems, these scars are there to remind us that it cannot be business as usual. Yet without proper guidelines cooperate,

societies will not be inclined to act. The ISO has provide a series of guidelines and standards that will provide the basis and impetus that will be at the foundation of appropriate actions towards a more sustainable future. Among the standards set forth by ISO are the following.

ISO 26000:2010 is not intended to be a certifying criteria but a set of guidelines that should complement the organization's policy, goals and objective toward corporate social responsibility. It encourages openness and transparency in business dealings and "promote common understanding in the field of corporate responsibility". Yet, fundamental to the ISO 26000-2010 is the fact that it encourages business to go beyond mere compliance with the laws that govern its operation. While business may operate in vastly different environments these guidelines are tailored for all, they do not provide a basis for legal actions or evidence of international conformity to the world trade organization requirements. (ISO, 2010)

ISO 14000 - Environmental management

The ISO 14000 series of standards provide a practical way for companies and businesses to manage their environmental responsibilities. Unlike ISO 26000, ISO 14000 standards have certification criteria. This ISO 14001:2015 is a revision of the ISO 14000 series. This standard, ISO 14001, is an internationally agreed standard that sets out the requirements for an environmental management system intended to help organizations to improve their environmental management capabilities by better consumption of resources and management of waste. This standard is lifecycle oriented and encourages all employees and leadership to play an important role towards achieving the objectives of the environmental management system. It is also lifecycle oriented and provides guidelines for companies to assess and implement strategies that will consider environmental impacts of products throughout the entire lifecycle. This is of particular importance to the construction industry since the lifecycles of construction products generally last multiple decades with the greatest impact on resources and waste generation. Giving priority to businesses and companies that are ISO 14000:2015 certified will ensure compliance and has been listed as one of the benefits of the standard.

The Energy Management Standards ISO 50001

ISO Energy Management System is based on continuous improvement and if implemented may help to improve the company's effort towards energy efficiency. It is a well-known fact that buildings consume a lot of energy, particularly in their utilization phases. Not only is the efficient use of energy of great importance but the source of this energy. Energy sources that are renewable with little to no negative impact on the environment is most desirable. This standard provides guidelines for companies to develop an energy management system that will be continuously improved towards greater efficiency. While certification is not mandatory it is in the best interest of companies to implement energy management policies, recognizing that there will be positive impacts such as cost savings, and realization of its commitment towards environmental preservation. For continues improvement to be realized the organization must measure and document results or data from energy audits, review, enhance, and then implement recommended improvements. This cycle must be continuously improved to ensure that long term and short term goals are met.

3 METHODOLOGICAL FRAMEWORK

3.0. Information sources

3.1. Primary sources

According to Ithaca College Library (2016) a primary source “provides direct or first-hand evidence” or eyewitness account of an event, object, person, or any subject under investigation. Primary sources may include surveys, interviews, observations, ethnographic research, historical and legal documents, eyewitness accounts, and results of experiments, statistical data, pieces of creative writing, audio and video recordings, speeches, and art objects. Interviews, surveys, fieldwork, and Internet communications via email, blogs, and newsgroups are also primary sources.

3.2. Secondary sources

Secondary source materials, as described on Ithaca College Library (2016) website are sources of information that “describe, discuss, interpret, comment upon, analyze, evaluate, summarize, and process primary sources”. The website continues to identify secondary source materials to include “articles in newspapers or popular magazines, book or movie reviews, or articles found in scholarly journals that discuss or evaluate someone else's original research”.

Chart 3.0.1 Information sources (Source: Compiled by author)

Objectives	**Information sources**	
	Primary	**Secondary**
1. To create a sustainable scope management plan for identification of key	Interviews, communications via email,	*PMBoK® Guide* Architectural Drawing, historical data, The *GPM*

stakeholders and their unique requirements and expectations		*P5™* Standard for Sustainability in Project Management, The GPM® Reference Guide to Sustainability in Project Management
2. To create a sustainable time management plan for the identifying and decomposing project deliveries into more manageable work packages that can be tracked.	Interviews, communications via email	*PMBoK® Guide* Architectural Drawing, historical data, The *GPM P5™* Standard for Sustainability in Project Management, The GPM® Reference Guide to Sustainability in Project Management
3. To create a sustainable cost management plan for assigning cost to work packages and determination of project budget.	Interviews, communications via email	*PMBoK® Guide* Architectural Drawing, historical data, The *GPM P5™* Standard for Sustainability in Project Management, The GPM® Reference Guide to Sustainability in Project Management
4. To develop a sustainable quality management plan for outlining the minimum	Interviews, communications via email	*PMBoK® Guide* Architectural Drawing, historical data, The *GPM*

stakeholder acceptance criterion.		*P5™* Standard for Sustainability in Project Management, The GPM® Reference Guide to Sustainability in Project Management
5. To create a human resource management plan for assigning resources to work packages in a manner that complies with international laws and conventions on labor.	Interviews, communications via email accounts,	*PMBoK® Guide* Architectural Drawing, historical data, The *GPM P5™* Standard for Sustainability in Project Management, The GPM® Reference Guide to Sustainability in Project Management
6. To develop a sustainable communications management plan for defining clearly the project communication strategies and line of reporting authority.	Interviews, communications via email	*PMBoK® Guide* Architectural Drawing, historical data, The *GPM P5™* Standard for Sustainability in Project Management, The GPM® Reference Guide to Sustainability in Project Management
7. To develop a Stakeholders management plan that	Interviews, communications via	*PMBoK® Guide* Architectural Drawing,

identifies key stakeholder and their level of interest and analyses how their influence might impact the project.	email	historical data, The *GPM P5™* Standard for Sustainability in Project Management, The GPM® Reference Guide to Sustainability in Project Management
8. To create a sustainable risk management plan that identifies risks and risk responses for risk directly related to the project and those that have sustainability implications	Interviews, communications via email	*PMBoK® Guide* Architectural Drawing, historical data, The *GPM P5™* Standard for Sustainability in Project Management, The GPM® Reference Guide to Sustainability in Project Management
9. To develop sustainable procurement plan for identifying and assigning contracts to suppliers who are able to procure sustainable goods and services.	Interviews, communications via email	*PMBoK® Guide* Architectural Drawing, historical data, The *GPM P5™* Standard for Sustainability in Project Management, The GPM® Reference Guide to Sustainability in Project Management

3.3. Research methods

Fellows & Liu (2008) define methodology as the “principles of the methods by which the research can be carried out”. Methods are operational approaches and techniques that are selected and used to source data, to collect data and to analyze the data collected.

This project has been undertaken to confirm the importance of planning in everyday activities as a tool that will investigate, identify and analyse alternate paths toward project goal. The most viable path is chosen based on the current best practices (knowledge or theory) with empirical support. This project is done in the context of Project Management with the area of focus being construction and therefore uses case study as the primary methodology.

Case Study method

Fellows & Liu (2008) defined case study as a “detailed study of a single individual, group/organization, or event/project”. Since this is a project, a case study is used. “Case studies operate through theoretical generalization, as for experiments, rather than empirical/statistical generalization (as is the approach via surveys, which employ samples designed to be representative of the population).”

Fellows & Liu (2008) suggests that

> The data for case studies can come from a variety of sources, including observation, interviews, questionnaires, reports and archival records (such as minutes of meetings). The case study approach has at least four uses in construction management research:
>
> (1) as a source of insights and ideas (2) to describe phenomena (3) project-biography (4) illustrative anecdotes.

> One important use of case studies is to provide a source of insights and ideas in the early stages of investigating a topic, e.g. studying a few key project participants in detail can provide a wealth of ideas for future investigation. Some phenomena do not occur frequently enough for the researcher to obtain a large number of participants displaying the phenomenon for study, e.g. specific types of construction accidents. Project-biography involves applying concepts and theories in an effort to understand the management of the project. Project biography necessarily involves post-hoc explanations, e.g. project success factors. Even though interpretations of case study evidence are always open to debate, the systematic study of past projects adds a new dimension to knowledge. Researchers often use case studies as illustrative anecdotes to illustrate general principles to other researchers and to students. Supplementing hard empirical data with illustrative case studies may be valuable as they provide concrete, easy to remember examples of abstract concepts and processes. (P.76-87)

Fellows & Liu (2008) identified two types of research; applied and pure. Academics tend towards the ‘pure’ research. However, practitioners often tend undertake “development work and applications”. Projects are of an applied nature and are generally done with the guidance of practitioners such as Project Managers. Fellows & Liu (2008) noted that in “contexts like construction, the vast majority of research is a combination of ‘pure’ and ‘applied’ research – of theory and applications.

Chart 3.0.2 Research methods (Source Complied by Author)

Objectives	Methodology
	Interviews
1. To create a sustainable scope management plan for identification of key stakeholders and their unique requirements and expectations	To obtain information that will inform the scope interviews will be conducted with the known stakeholders.
2. To create a sustainable time management plan for the identifying and decomposing project deliveries into more manageable work packages that can be tracked.	A schedule will be developed from data observed from drawings and other construction documents as well as interviews with experts and stakeholders.
3. To create a sustainable cost management plan for assigning cost to work packages and determination of project budget.	A budget will be developed from data observed from construction documents as well as interviews with experts and stakeholders.
4. To develop a sustainable quality management plan for outlining the minimum stakeholder acceptance criterion.	A Quality Management Plan will be developed from data observed from construction documents as well as interviews with experts and stakeholders.
5. To create a human resource	A Human Resource Plan will

management plan for assigning resources to work packages in a manner that complies with international laws and conventions on labour.	be developed from data observed from construction documents as well as interviews with experts and stakeholders.
6. To develop a sustainable communications management plan for defining clearly the project communication strategies and line of reporting authority.	A Communication Plan will be developed from data observed from construction documents as well as interviews with experts and stakeholders.
7. To develop a Stakeholders management plan that identifies key stakeholders and their level of interest and analyses how their influence might influence the project.	A Stakeholder Management Plan will be developed from data observed from construction documents as well as interviews with experts and stakeholders.
8. To create a sustainable risk management plan that identify risks and risk responses for risk directly related to the project and those that have sustainability implications	A Risk Management Plan will be developed from data observed from construction documents as well as interviews with experts and stakeholders.
9. To develop sustainable procurement plan for identifying and assigning	A Procurement Plan will be developed from data observed from construction

contracts to suppliers who are able to procure sustainable goods and services.	documents as well as interviews with experts and stakeholders.

3.4. Tools

The ***PMBOK® Guide*** (2013) defines tools as something "tangible, such as a template or software program, used in performing an activity to produce a product or result.

Chart 3.0.3 Tools (Source *PMBOK® GUIDE* (2013)

Objectives	**Tools**
1. To create a Sustainable Project Management Plan that Integrates planning among the knowledge areas identified by PMI and outlined in the *PMBOK® Guide*	Expert judgment Facilitation techniques Project Life cycle Project Proposal Work Breakdown Structure
2. To create a Sustainable Scope Management Plan for identification of key stakeholders and their unique requirements and expectations	Interviews Focus groups Facilitated workshops Group creativity techniques Group decision-making techniques Questionnaires and surveys Observations Prototypes

	Benchmarking Context diagrams Document analysis
3. To create a Sustainable Time Management Plan for the identifying and decomposing project deliveries into more manageable work packages that can be tracked.	Gantt Chart PERT Critical Path Method Critical Chain Method
4. To create a Sustainable Cost Management Plan for assigning cost to work packages and determination of project budget.	Expert judgment Analogous estimating Parametric estimating Bottom-up estimating Three-point estimating Reserve analysis Cost of quality Project management software Vendor bid analysis 10 Group decision-making Techniques
5. To develop a Sustainable Quality Management Plan for outlining the minimum stakeholder acceptance criterion.	Cost-benefit analysis Cost of quality Seven basic quality tools Benchmarking Design of experiments Statistical sampling Additional quality planning tools Meetings
6. To create a Human Resource	Pre-assignment

Management Plan for assigning resources to work packages in a manner that complies with international laws and conventions on labour.	Negotiation Acquisition Virtual teams Multi-criteria
7. To develop a Sustainable Communications Management Plan for defining clearly the project communication strategies and line of reporting authority.	Communication technology Communication models Communication methods Information management systems Performance reporting
8. To develop a Stakeholders Management Plan that identifies key stakeholders and their level of interest and analyse how their influence might influence the project.	Power and interest Power and influence Influence and impact Power, urgency and legitimacy
9. To create a Sustainable Risk Management Plan that identify risks and risk responses for risk directly related to the project and those that have sustainability implications	Risk Management Planning Risk Identification Qualitative Risk Analysis Quantitative Risk analysis Risk response Planning Risk Monitoring and Control Expert judgment Documentation reviews Information gathering techniques Checklist analysis Assumptions analysis Diagramming techniques SWOT analysis

10. To develop Sustainable Procurement Plan for identifying and assigning contracts to suppliers who are able to procure sustainable goods and services.	Make-or-buy analysis Expert judgment Market research Meetings

3.5. Assumptions and constraints

According to Study Circle (2016) “assumption is a belief of what you assume to be true in the future” and that assumptions are made based on your “knowledge, experience or the information available on hand” and are anticipated events or circumstances that are expected to happen during your project’s life cycle.

Constraints are defined as “limitations imposed on the project, such as the limitation of cost, schedule, or resources, and you have to work within the boundaries restricted by these constraints” and that all “projects have constraints, which are defined at the beginning of the project”. Study Circle (2016)

The *PMBOK® Guide* identifies six project constraints: scope, quality, schedule, budget, resource and risk. However, three of these scope, schedule, and budget are commonly referred to as the triple constraints.

Chart 3.0.4 Assumptions and constraints (Source: *PMBOK® GUIDE* (2013)

Objectives	Assumptions	Constraints
1. To create a Sustainable Project Management Plan that integrates planning among the knowledge areas identified by PMI and outlined in the *PMBOK® Guide.*	A fully integrated project plan will be developed.	Some project phases may not be completed on time.
2. To create a sustainable scope management plan for identification of key stakeholders and their unique requirements and expectations.	The project scope will be defined.	The scope may change as the project progresses.
3. To create a sustainable time management plan for the identifying and decomposing project deliveries into more manageable work packages that can be tracked.	A realistic time management plan will be developed.	Not enough expert judgment available to provide expert guidance.
4. To create a sustainable cost management plan for assigning cost to work packages and determination of project budget.	A detail budget will be developed.	Not enough time and resources available to complete a detailed budget.
5. To develop a sustainable quality management plan for outlining the minimum stakeholder acceptance criterion.	All stakeholder requirements will be collected and analyzed.	Stakeholders' requirements may change as well as their level of interest.
6. To create a human resource management plan for assigning resources to work packages in a manner that complies with	All roles and responsibilities will be identified and	Some resources may not be available.

Objectives	Assumptions	Constraints
international laws and conventions on labour.	someone will be assigned to own those roles and responsibilities.	
7. To develop a sustainable communications management plan for defining clearly the project communication strategies and line of reporting authority.	All line of command and authority will be documented.	Some communication methods may not be available.
8. To develop a Stakeholders management plan that identifies key stakeholders and their level of interest and analyses how their influence might influence the project.	All stakeholder requirements will be identified along with their level of interest.	Stakeholder requirements and level of interest may change during the project.
9. To create a sustainable risk management plan that identify risks and risk responses for risk directly related to the project and those that have sustainability implications	All risk will be appropriately budgeted for.	Some risk may occur because of other constraints.
10. To develop sustainable procurement plan for identifying and assigning contracts to suppliers who are able to procure sustainable goods and services.	All good and services will be procured locally.	Some suppliers may not have the required goods available locally.

3.6. Deliverables

The *(*Project Management Institute, 2013) defines deliverable as any “unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project”.

Chart 3.0.5 Deliverables (Source: (Project Management Institute, 2013)

Objectives	Deliverables
1. To create a sustainable scope management plan for identification of key stakeholders and their unique requirements and expectations	Sustainable Scope Management Plan
2. To create a sustainable time management plan for the identifying and decomposing project deliveries into more manageable work packages that can be tracked.	Sustainable Time Management Plan
3. To create a sustainable cost management plan for assigning cost to work packages and determination of project budget.	Sustainable Cost Management Plan
4. To develop a sustainable quality management plan for outlining the minimum stakeholder acceptance criterion.	Sustainable Quality Management Plan
5. To create a human resource management plan for assigning resources to work packages in a manner that complies with international laws and conventions on labour.	Sustainable Human Resource Plan
6. To develop a sustainable communications management plan for defining clearly the project communication strategies and line of reporting authority.	Sustainable Communication Plan
7. To develop a Stakeholders management plan that identifies key stakeholders and their level of interest and analyses how their influence might influence the project.	Sustainable Stakeholder Management Plan
8. To create a sustainable risk management plan that identify risks and risk responses for risk directly	Sustainable Risk Management Plan

related to the project and those that have sustainability implications	
9. To develop sustainable procurement plan for identifying and assigning contracts to suppliers who are able to procure sustainable goods and services.	Sustainable Procurement Management Plan

4 RESULTS

4.1. INTEGRATION OF SUSTAINABILITY IN PROJECT MANAGEMENT

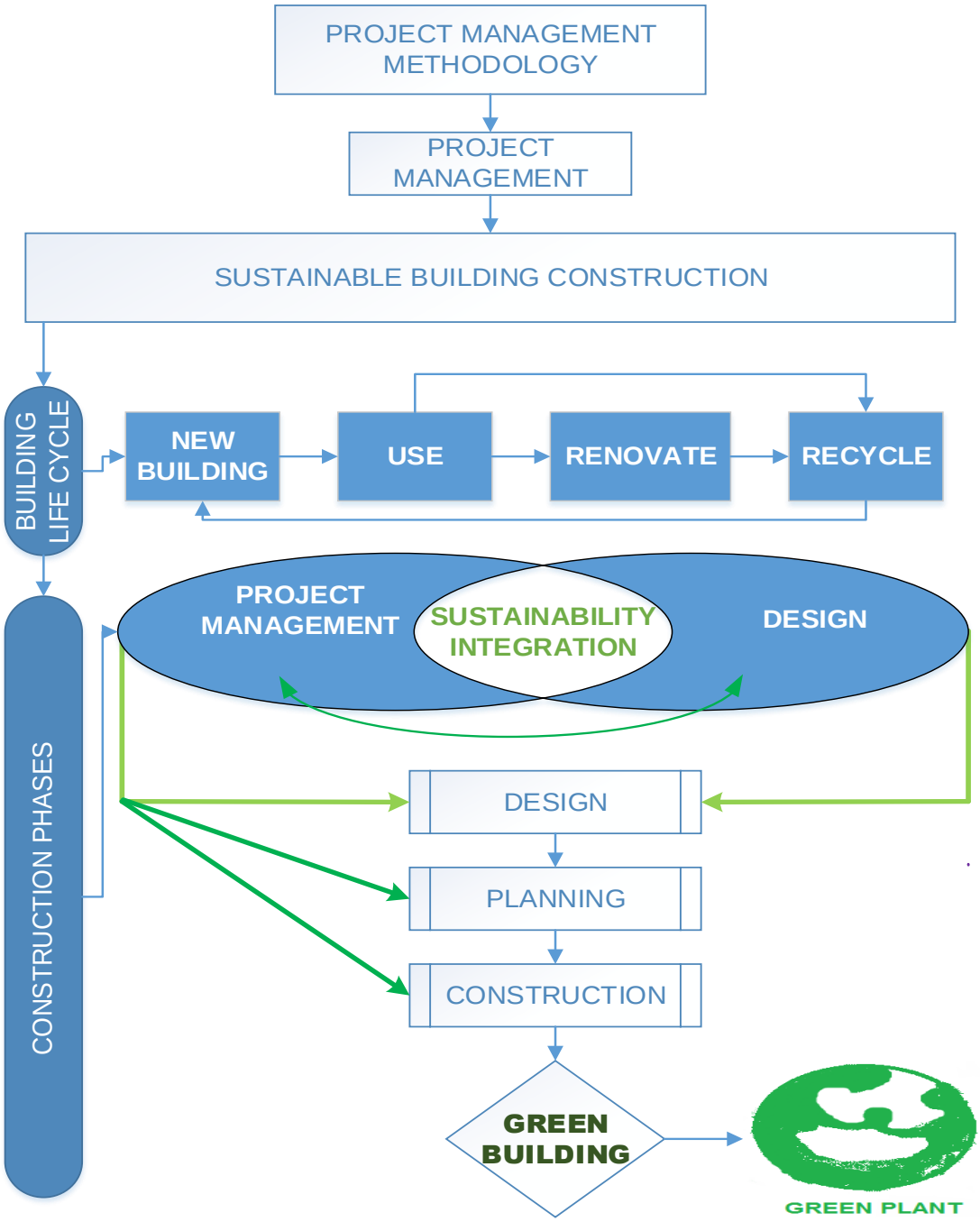


Figure 4.0.1 Integrating Sustainability into Project Management (Source: Compiled by Author)

Having explored the objective to integrate sustainability into the Construction Project Management Plan, I became clear that a process should be defined as it relates to construction application. Because of the difficulty in integrating sustainability into the project under study if became necessary to identify the phases that are most important for the greatest impact of sustainability integration. The phase with the greatest impact is the conceptual phase for a new building. Figure 4.1 above shows that the following processes may help to make the integration successful.

1. The client should be sensitized to the incontrovertible responsibility of taking care of the earth and how understanding the whole lifecycle of the building may help. The client should be made aware that the application of Project Management Methodology in parallel with designers at the conceptual phase is important for the sustainable objectives to be defined and integrated into the function of the building.

2. The building life cycle is one where there is full integration of selection and use of recyclable materials and building components in order to minimize or eliminate waste. Most resources (water and energy) are used at the utilization stage, which if done without the integration of sustainable principle, may result in an energy intensive and inefficient building.

3. Sustainable construction phases are there to ensure that sustainability is introduced at the highest level and continue throughout all phases. This will reduce or eliminate redesign cost and allowing the client’s timing to be a

controlling factor instead of the designers. With the case under study, redesign has caused more than a year of delays. This could have been prevented or substantially reduced if project management principles were used at the conceptual stage.

4. The result of a green building will make the earth a greener place. One where client spends less for maintenance, and renovation, one where people planet, profit, will be the focus of construction activities.

4.2. Sustainable Scope Management Plan

Project Requirements

Requirements are determined, documented and used as a basis for ensuring that stakeholder needs are met. At this stage the full requirement is not known because the **blue print** or **architectural drawings** have been delayed due to government regulations requiring a change in the design. However, a preliminary statement from the client has provided insight into the scope and initial extent of the project.

Scope Definition

The scope definition is a detailed description of the project. Below is a description of the initial scope definition provided by the client via email. The dates that have been provided and the scope need revision because the planning authority has recommended that a new design be produced. This has prevented additional planning.

The initial scope is as follows:

- Proposed location of New Building
    - The church presently owns land at the St. Peters Commercial Development site 0.34 acres

- Description of the project (building size, facilities)
    - Size – (39’-0”x80’-0”) + (39’-00” X 64’-00”) = 5424 square feet
    - Facilities – children’s division, kitchen, prayer room, pastor’s room, vestry, restrooms, storeroom, audio-visual room, sanctuary, mother’s room.

- Proposed date and duration of construction/ Stages

- Start Date – June 5th 2016
- Duration of Construction – June 2016 – March 2017

Foundation $ 114, 600, 00

Main floor $ 320,000.00

Roof $ 65,400.00

Total $ 500,000.00

The construction/building plan (approved by the local building board)

The project will be supervised by the island building board

- The building estimates from qualified contractor; and sub-contractors where applicable
  - Contractor – Bro. Myron Percival
- Main contractors
  - Myron Percival, Anthony Valcin, Ellis John, Delroy Liburd
  - Competencies – Experienced, building supervisor
    - Under their direction they will appoint individuals with the following competencies masonry, carpentry, electrician, plumbing

Furnishing and Equipment

- Chairs/pews – 250 varying sizes
- Ceiling Fans
- Audio Visual Equipment
- Musical Instruments
- Pulpit
- Communion Table and Utensils
- Drapes
- Mommy Room Equipment
- Tables
- Stove
- Refrigerator
- Filing cabinets
- Carpeting

TOTAL PROJECT COST : $ 500.000

Activity List

Chart 4.0.1 Activity List (Source: Compiled by Author)

SDA CHURCH BUILDING, ST. PETERS, ST. KITTS, ST. KITTS & NEVIS (LEVEL 1)		
WBS ID	**Activity (Level 2)**	**Activity (Level 3)**
1	Preliminary	1.1 Receive notice to proceed and sign contract 1.2 Submit bond and insurance documents 1.3 Prepare and submit project schedule 1.4 Prepare and submit schedule of cost 1.5 Obtain building permits 1.6 Submit monthly requests for payment
2	Long Lead Procurement	2.1 Order long lead items - Roofing 2.2 Order long lead items - Seating 2.3 Order long lead items - plumbing 2.4 Order long lead items – electric
3	Temporary facilities & Services	3.1 Install temporary services 3.2 Set up site office 3.3 Setup Temporary Shelters 3.4 Prepare site - lay down yard and temporary fencing 3.5 Clear and grub site 3.6 Stone site access and temporary parking area 3.7 Rough grade site (cut and fill) 3.8 Install storm drainage 3.9 Erect building batter boards and layout building
4	Foundation and Ground Floor	4.1 Excavate foundations Trenches

		4.2 Install waterproofing, Drains, Reinforcement, and Services 4.3 Pour column and foundations 4.4 Cure foundations 4.5 Strip column and foundation forms
5	Ground Floor Walls and Openings	5.1 Erect rebars for block work 5.2 Lay Blocks with opening for walls 5.3 Fabricate and erect rebars for columns and beam 5.4 Form and pour Columns & beams 5.5 Cure Columns & Beams 5.6 Strip forms from Column & Beams
6	Form and Pour Concrete 1st Floor	6.1 Form 1st floor 6.2 Install electrical underground 6.3 Install plumbing underground 6.4 Install rebar and in-floor utilities 6.5 Pour 1st floor slab 6.6 Cure 1st floor slab 6.7 Strip forms from 1st floor slab
7	First Floor Walls and Openings	7.1 Erect rebars & lay Block with openings 7.2 Form and pour Columns & beams with rebars 7.3 Cure and strip columns and Beams
8	Masonry Work	8.1 Install exterior masonry stone work 8.2 Construct Manholes, septic tanks and waste chambers 8.3 Rough-in Plumbing in toilet and Kitchen 8.4 Lay and clean tiles in Bathrooms and Kitchen
9	Roofing	9.1 Install roofing structure, finishing and flashing at parapet walls 9.2 Install roof drains and guttering
10	Window and Doors	10.1 Install windows and Hardware 10.2 Install interior doors and hardware

11	Building Finishes	11.1 Plastering of walls 11.2 Paint walls and woodwork 11.3 Install conduit at ceiling space 11.4 Install ceiling grid 11.5 Install ceiling tile 11.6 Install Cabinets in Kitchen and bathrooms 11.7 Install hardware and accessories 11.8 Complete interior and exterior plantings 11.9 Pave, curb, and stripe parking lot
12	Plumbing	12.1 Rough-in plumbing in block walls 12.2 Sitting of external Waste pipes 12.3 Set plumbing fixtures and trim 12.4 Flush, test, and clean piping and fixtures
13	Electrical	13.1 Rough-in electrical in masonry walls 13.2 Pull wire in conduit and set area transformers 13.3 Install and terminate electrical devices 13.4 Install light fixtures - test and clean
14	Final Clean-up and Occupancy	14.1 Install non-slip Ceramic tile flooring in main areas 14.2 Clean tile floors 14.3 Remove debris from building and do final clean-up 14.4 Substantial completion date
15	Complete Final Inspections	15.1 Complete punch list items from all inspections 15.2 Obtain certificate of occupancy 15.3 Issue final completion documents including warranties 15.4 Issue final request for payment

Work Breakdown Structure.

The work breakdown structure has been created to decompose the project deliverable into manageable units that will help to determine what aspects of the work will be subcontracted. It provides a graphical view or the project and helps the project team organize the work. Elements at different levels are not necessarily in the order in which work will be done. Sequencing is done at a later stage.

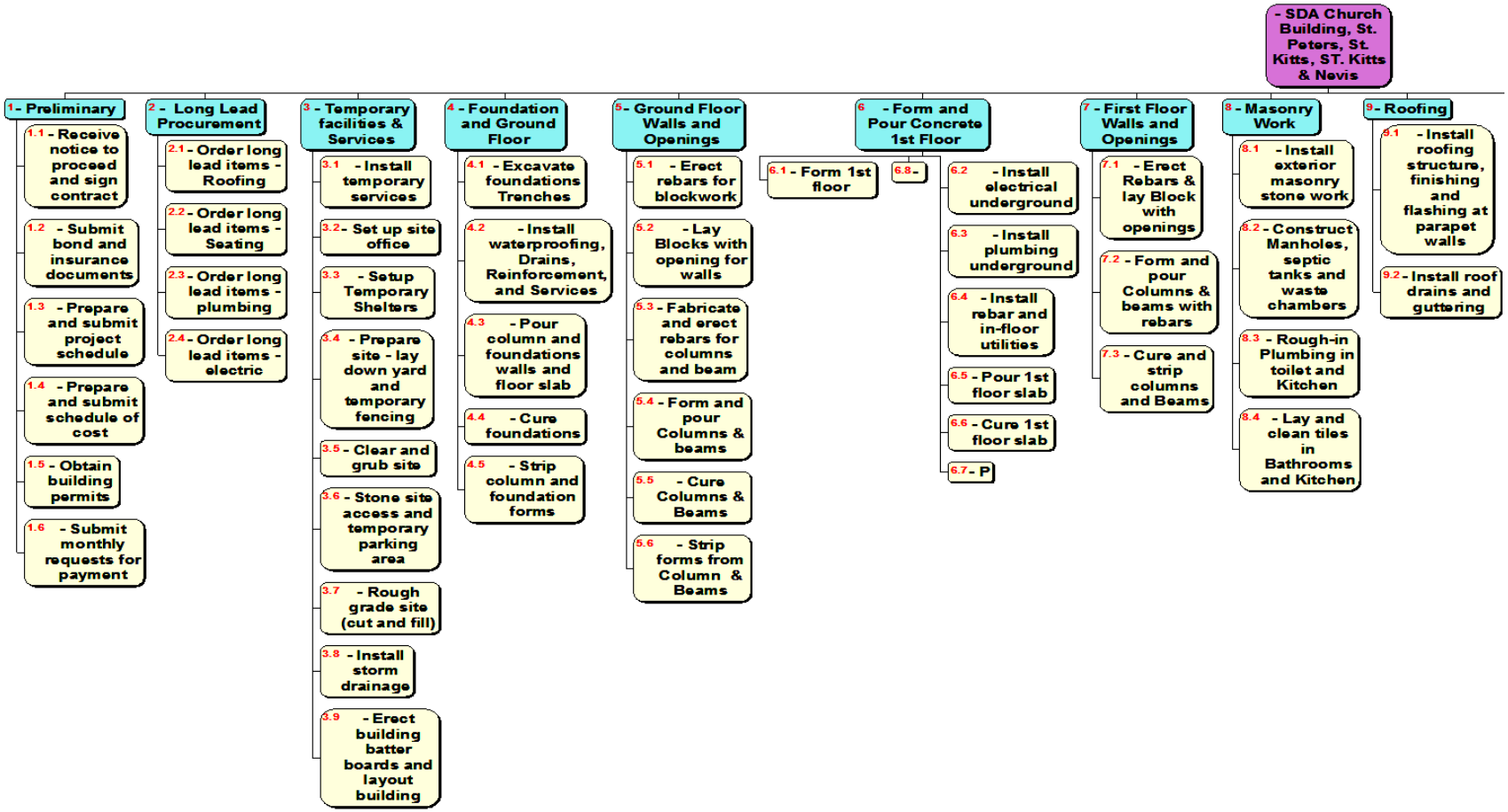
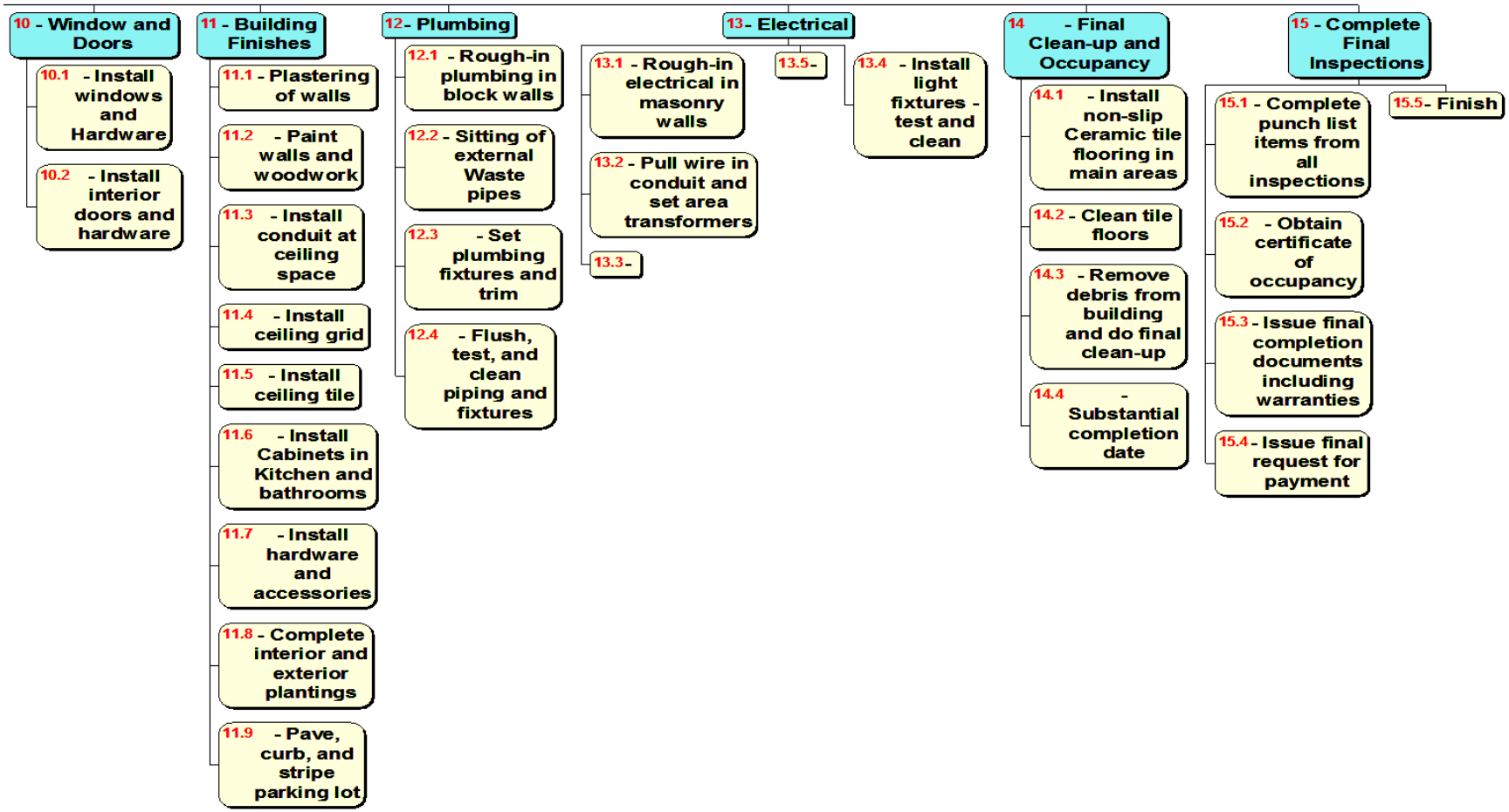


Figure 4.0.2 Work Breakdown Structure Source (Compiled by Author)


10 - Window and Doors
10.1 - Install windows and Hardware
10.2 - Install interior doors and hardware
11 - Building Finishes
11.1 - Plastering of walls
11.2 - Paint walls and woodwork
11.3 - Install conduit at ceiling space
11.4 - Install ceiling grid
11.5 - Install ceiling tile
11.6 - Install Cabinets in Kitchen and bathrooms
11.7 - Install hardware and accessories
11.8 - Complete interior and exterior plantings
11.9 - Pave, curb, and stripe parking lot
12 - Plumbing
12.1 - Rough-in plumbing in block walls
12.2 - Sitting of external Waste pipes
12.3 - Set plumbing fixtures and trim
12.4 - Flush, test, and clean piping and fixtures
13 - Electrical
13.1 - Rough-in electrical in masonry walls
13.2 - Pull wire in conduit and set area transformers
13.3 -
13.5 -
13.4 - Install light fixtures - test and clean
14 - Final Clean-up and Occupancy
14.1 - Install non-slip Ceramic tile flooring in main areas
14.2 - Clean tile floors
14.3 - Remove debris from building and do final clean-up
14.4 - Substantial completion date
15 - Complete Final Inspections
15.1 - Complete punch list items from all inspections
15.2 - Obtain certificate of occupancy
15.3 - Issue final completion documents including warranties
15.4 - Issue final request for payment
15.5 - Finish

Work Breakdown Structure Dictionary

The work breakdown structure dictionary is a document that provides detailed information about a work package (work at the lowest level in a work breakdown structure). Such information includes a unique number or WBS code of account, cost, duration, quality requirements, and who is responsible for carrying out the work. Below is the template that will be used for assigning work packages to human resources.

Chart 4.0.2 Work Breakdown Structure Dictionary (Source: Compiled by Author)

<table>
<tr><td colspan="5">Work Package Name:</td><td colspan="5">Code of Account:</td></tr>
<tr><td colspan="10">Description of Work:</td></tr>
<tr><td colspan="10">Assumptions:</td></tr>
<tr><td colspan="10">Constraints:</td></tr>
<tr><td colspan="5">Scheduled Milestones:
1.
2.
3.</td><td colspan="5">Due Dates:</td></tr>
<tr><td colspan="10">Responsible organization:</td></tr>
<tr><td rowspan="2">ID</td><td rowspan="2">Activity</td><td rowspan="2">Resource</td><td colspan="3">Labour</td><td colspan="3">Material</td><td rowspan="2">Total Cost</td></tr>
<tr><td>Hours</td><td>Rate</td><td>Total</td><td>Units</td><td>Cost</td><td>Total</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="10">Quality Requirements:</td></tr>
<tr><td colspan="10">Acceptance Criteria:</td></tr>
<tr><td colspan="10">Technical References:</td></tr>
<tr><td colspan="10">Agreement Information:</td></tr>
</table>

4.3 Sustainable Time Management Plan

Sequence Activities

Activities for the FIE Church Building Project were sequenced using SMART relationships and schedule compression technique. Leads ("The amount of time whereby a successor activity can be advanced with respect to a predecessor activity. (Project Management Institute, 2013, p.544) and lags (The amount of time whereby a successor activity is required to be delayed with respect to a predecessor activity. (Project Management Institute, 2013, p.544) were added for two main reasons, schedule compression ("Techniques used to shorten the schedule duration without reducing the project scope." (Project Management Institute, 2013, p. 561) and to ensure that a logical relationship is maintained among dependencies.

Project Calendar

Chart 4.0.3 Project Calendar (Source: Compiled By Author)

PROJECT CALENDAR				
Project Name: Project Management Plan For New Seventh-day Adventist Church Building To Be Built In St. Kitts.				
PROJECT PARTICULARS				**Notes**
Project code / # : FGP 1	**Project Manager:** Dennis McDermott	**Project Start:** **Tue 06 June 2017**	**Standard:** Y☑ N☐ **Shift:** Y☐ N☐ **Overtime:** Y☐ N☐	
Country: St. Kitts	**Project Sponsor:** Faith in Emmanuel SDA Church	**Project Finish:** **Mon 29 Jul 2019**	**UNITS** Work: Hour Duration: Day	
Days per month: 20	**Work Week**			

Hours per day: 9	SUN☐	MON☑	TUE☑	WED☑	THU☑	FRI☑	SAT☐	
Lunch Time: 1 Hour per day	Work Hours: 8:00am – 12:00pm 1:00pm – 5:00pm							
Date Format: DD/MM/YYYY			Time Format: 12☑ 12☐			Time Zone:		
NONE WORKING TIMES AND HOLIDAY								
Descriptions:			**Start:**			**End:**		
Good Friday and Easter Monday			14-04-2017			17-04-2017		
Labor Day			01-05-2017			01-05-2017		
Whit Monday			05-06-2017			05-06-2017		
Emancipation Day			07-08-2017			07-08-2017		
Culturama Day			08-08-2017			08-08-2017		
National Heroes Day			16-09-2017			16-09-2017		
Christmas-New Year 2018			22-12-2017			07-01-2018		
Christmas-New Year 2019			22-12-2018			06-01-2019		

Chart 4.0.4 Sequence Activities (Source: Compiled by Author)

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
	SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis	437 days		Tue 06 Jun '17	Mon 11 Mar '19	
1	Preliminary	11 days		Tue 06 Jun '17	Tue 20 Jun '17	
1.1	Receive notice to	3 days		Tue 06	Thu 08	

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
	proceed and sign contract			Jun '17	Jun '17	
1.2	Submit bond and insurance documents	2 days	2	Fri 09 Jun '17	Mon 12 Jun '17	
1.3	Prepare and submit project schedule	2 days	3	Tue 13 Jun '17	Wed 14 Jun '17	
1.4	Prepare and submit schedule of cost	2 days	4SS	Tue 13 Jun '17	Wed 14 Jun '17	
1.5	Obtain building permits	4 days	5	Thu 15 Jun '17	Tue 20 Jun '17	
1.6	Submit monthly requests for payment	1 day	6SS	Thu 15 Jun '17	Thu 15 Jun '17	
2	Long Lead Procurement	7 days	5	Wed 14 Jun '17	Thu 22 Jun '17	
2.1	Order long lead items - Roofing	7 days	5SS	Wed 14 Jun '17	Thu 22 Jun '17	
2.2	Order long lead items - Seating	7 days	5SS	Wed 14 Jun '17	Thu 22 Jun '17	
2.3	Order long lead items - plumbing	7 days	5SS	Wed 14 Jun '17	Thu 22 Jun '17	
2.4	Order long lead items - electric	7 days	5SS	Wed 14 Jun '17	Thu 22 Jun '17	

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
3	Temporary facilities & Services	18 days	8	Thu 22 Jun '17	Tue 18 Jul '17	
3.1	Install temporary services	2 days	12	Fri 23 Jun '17	Mon 26 Jun '17	
3.2	Set up site office	2 days	17SS	Fri 23 Jun '17	Mon 26 Jun '17	
3.3	Setup Temporary Shelters	2 days	17SS	Fri 23 Jun '17	Mon 26 Jun '17	
3.4	Prepare site - lay down yard and temporary fencing	2 days	12	Fri 23 Jun '17	Mon 26 Jun '17	
3.5	Clear and grub site	3 days	12	Fri 23 Jun '17	Tue 27 Jun '17	
3.6	Stone site access and temporary parking area	1 day	20	Wed 05 Jul '17	Wed 05 Jul '17	
3.7	Rough grade site (cut and fill)	5 days	18	Wed 28 Jun '17	Tue 04 Jul '17	
3.8	Install storm drainage	10 days	20,18	Wed 05 Jul '17	Tue 18 Jul '17	
3.9	Erect building batter boards and layout building	3 days	17	Tue 27 Jun '17	Thu 29 Jun '17	
3.10	Site facilities are in	0 days		Thu 22 Jun '17	Thu 22 Jun '17	

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
	place					
4	Foundation and Ground Floor	27 days	13	Wed 19 Jul '17	Mon 28 Aug '17	
4.1	Excavate foundations Trenches	10 days	22	Wed 19 Jul '17	Tue 01 Aug '17	
4.2	Install waterproofing, Drains, Reinforcement, and Services	4 days	25	Wed 02 Aug '17	Wed 09 Aug '17	
4.3	Pour column and foundations walls and floor slab	5 days	26	Thu 10 Aug '17	Wed 16 Aug '17	
4.4	Cure foundations	7 days	27	Thu 17 Aug '17	Fri 25 Aug '17	
4.5	Strip column and foundation forms	1 day	28	Mon 28 Aug '17	Mon 28 Aug '17	
5	Ground Floor Walls and Openings	36 days	24	Tue 29 Aug '17	Tue 17 Oct '17	
5.1	Erect rebar for block work	1 day	29	Tue 29 Aug '17	Tue 29 Aug '17	
5.2	Lay Blocks with opening for walls	35 days	31	Wed 30 Aug '17	Tue 17 Oct '17	
5.3	Fabricate and erect rebar for columns and	10 days	29SS	Tue 29 Aug '17	Mon 11 Sep '17	

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
	beam					
5.4	Form and pour Columns & beams	10 days	33SS	Tue 29 Aug '17	Mon 11 Sep '17	
5.5	Cure Columns & Beams	7 days	34SS	Tue 29 Aug '17	Wed 06 Sep '17	
5.6	Strip forms from Column & Beams	2 days	35SS	Tue 29 Aug '17	Wed 30 Aug '17	
6	Form and Pour Concrete 1st Floor	21 days	30	Wed 18 Oct '17	Wed 15 Nov '17	
6.1	Form 1st floor	4 days	34SS	Wed 18 Oct '17	Mon 23 Oct '17	
6.2	Install electrical underground	5 days	38	Tue 24 Oct '17	Mon 30 Oct '17	
6.3	Install plumbing underground	5 days	38	Tue 24 Oct '17	Mon 30 Oct '17	
6.4	Install rebar and in-floor utilities	4 days	38	Tue 24 Oct '17	Fri 27 Oct '17	
6.5	Pour 1st floor slab	4 days	41	Mon 30 Oct '17	Thu 02 Nov '17	
6.6	Cure 1st floor slab	7 days	42	Fri 03 Nov '17	Mon 13 Nov '17	
6.7	Strip forms from 1st	2 days	43	Tue 14 Nov '17	Wed 15 Nov '17	

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
	floor slab					
7	First Floor Walls and Openings	75 days	37	Thu 16 Nov '17	Thu 15 Mar '18	
7.1	Erect Rebar & lay Block with openings	55 days	44	Thu 16 Nov '17	Thu 15 Feb '18	
7.2	Form and pour Columns & beams with rebar	10 days	46	Fri 16 Feb '18	Thu 01 Mar '18	
7.3	Cure and strip columns and Beams	10 days	47	Fri 02 Mar '18	Thu 15 Mar '18	
8	Masonry Work	146 days	45	Fri 16 Mar '18	Fri 05 Oct '18	
8.1	Install exterior masonry stone work	14 days	48	Fri 16 Mar '18	Fri 05 Oct '18	
8.2	Construct Manholes, septic tanks and waste chambers	10 days	48	Fri 16 Mar '18	Thu 29 Mar '18	
8.3	Rough-in Plumbing in toilet and Kitchen	5 days	48	Fri 16 Mar '18	Thu 22 Mar '18	
8.4	Lay and clean tiles in Bathrooms and Kitchen	20 days	48FS+30 days	Fri 27 Apr '18	Thu 24 May '18	
9	Roofing	40 days	49	Mon 08 Oct '18	Fri 30 Nov '18	

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
9.1	Install roofing structure, finishing and flashing at parapet walls	30 days	48	Mon 08 Oct '18	Fri 16 Nov '18	
9.2	Install roof drains and guttering	10 days	55	Mon 19 Nov '18	Fri 30 Nov '18	
10	Window and Doors	5 days	54	Mon 03 Dec '18	Fri 07 Dec '18	
10.1	Install windows and Hardware	5 days	56	Mon 03 Dec '18	Fri 07 Dec '18	
10.2	Install interior doors and hardware	5 days	56,58SS	Mon 03 Dec '18	Fri 07 Dec '18	
11	Building Finishes	206 days	45	Fri 16 Mar '18	Fri 11 Jan '19	
11.1	Plastering of walls	45 days	46	Fri 16 Mar '18	Thu 17 May '18	
11.2	Paint walls and woodwork	25 days	61	Fri 18 May '18	Thu 21 Jun '18	
11.3	Install conduit at ceiling space	15 days	55	Mon 19 Nov '18	Fri 07 Dec '18	
11.4	Install ceiling grid	10 days	55	Mon 19 Nov '18	Fri 30 Nov '18	
11.5	Install ceiling tile	10 days	64	Mon 03 Dec '18	Fri 14 Dec '18	
11.6	Install Cabinets in	5 days	55	Mon 19	Fri 23 Nov	

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
	Kitchen and bathrooms			Nov '18	'18	
11.7	Install hardware and accessories	3 days	66	Mon 26 Nov '18	Wed 28 Nov '18	
11.8	Complete interior and exterior plantings	10 days	51,56	Mon 03 Dec '18	Fri 14 Dec '18	
11.9	Pave, curb, and stripe parking lot	10 days	68	Mon 17 Dec '18	Fri 11 Jan '19	
12	Plumbing	45 days	45	Mon 26 Nov '18	Fri 08 Feb '19	
12.1	Rough-in plumbing in block walls	20 days	66	Mon 26 Nov '18	Fri 21 Dec '18	
12.2	Sitting of external Waste pipes	1 day	51,56	Mon 03 Dec '18	Mon 03 Dec '18	
12.3	Set plumbing fixtures and trim	15 days	66,71	Mon 07 Jan '19	Fri 25 Jan '19	
12.4	Flush, test, and clean piping and fixtures	10 days	73	Mon 28 Jan '19	Fri 08 Feb '19	
13	Electrical	30 days	45	Mon 03 Dec '18	Fri 25 Jan '19	
13.1	Rough-in electrical in masonry walls	20 days	56	Mon 03 Dec '18	Fri 11 Jan '19	
13.2	Pull wire in conduit and	15 days	59,76SS	Mon 10	Fri 11 Jan	

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
	set area transformers			Dec '18	'19	
13.3	Install and terminate electrical devices	15 days	62,77SS	Mon 10 Dec '18	Fri 11 Jan '19	
13.4	Install light fixtures - test and clean	10 days	78	Mon 14 Jan '19	Fri 25 Jan '19	
14	Final Clean-up and Occupancy	25 days	75	Mon 28 Jan '19	Fri 01 Mar '19	
14.1	Install non-slip Ceramic tile flooring in main areas	25 days	78	Mon 28 Jan '19	Fri 01 Mar '19	
14.2	Clean tile floors	4 days	81SS	Mon 28 Jan '19	Thu 31 Jan '19	
14.3	Remove debris from building and do final clean-up	4 days	82	Fri 01 Feb '19	Wed 06 Feb '19	
14.4	Substantial completion date	1 day	83	Thu 07 Feb '19	Thu 07 Feb '19	
15	Complete Final Inspections	6 days	80	Mon 04 Mar '19	Mon 11 Mar '19	
15.1	Complete punch list items from all inspections	2 days	83	Mon 04 Mar '19	Tue 05 Mar '19	
15.2	Obtain certificate of	2 days	86	Wed 06	Thu 07	

PROJECT SCHEDULE WITH SMART RELATIONSHIPS						
WBS	Task Name	Duration	Predecessors	Start	Finish	Notes
	occupancy			Mar '19	Mar '19	
15.3	Issue final completion documents including warranties	1 day	87	Fri 08 Mar '19	Fri 08 Mar '19	
15.4	Issue final request for payment	1 day	88	Mon 11 Mar '19	Mon 11 Mar '19	

Estimate Activity Resources

Activity resources are estimated using the WBS as input and bottom-up technique along with Three-Point Estimating in which the Programme Evaluation Review Technique (PERT) is used to roll up the estimate. (Project Management Institute, 2011a, p. 30) described three-point estimate as" more sophisticated form of the range-estimating technique, in which three separate values for the cost (or duration) of the project or the cost of individual elements of the project are provided: optimistic, pessimistic, and most likely". PERT is used to determine the duration of activities. PERT formula is as follows:

PERT = **(O + 4ML+P) ÷ 6**

Where: **O** is the **OPTIMISTIC**

ML is the **MOST LIKELY** duration

P is the **PESSIMISTIC** value

According to (Project Management Institute, 2011a,):

> The premise is that all estimates are forecasted with some uncertainty. A weighted average of the expected range of durations, work, or costs is a better predictor than a single most likely estimate. Project estimators tend to be overly optimistic. Using the PERT formula, the calculation may provide a result that is statistically more accurate. (p.30)

Estimate Activity Durations

Chart 4.0.5 Estimate Activity Durations Template (Source: (Snyder, 2013))

Three Point Estimates (Duration)					
WBS ID	**Optimistic**	**Most Likely Cost**	**Pessimistic**	**Weighting Equation**	**Expected Estimate**

Chart 4.0.6 Resource Assignment (Source: Compiled by the Author)

RESOURCE ASSIGNMENT
SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis

	WBS	ID	Name	Dura...	Resource Initials	Resource Names	Milest...	Start	Finish
0		0	**SDA Church Building, St. Peters, St. Kitts, ST Kitts & Nevis**	537c			No	Tue 06 Jun 1	Mon 29 Jul 1
1	1	1	**Preliminary**	40d			No	Tue 06 Jun 17	Mon 31 Jul 17
2	1.1	2	Receive notice to proceed and sign contract	3d	P	Project Manager	No	Tue 06 Jun 17	Thu 08 Jun 17
3	1.2	3	Submit bond and insurance documents	2d	P	Project Manager	No	Fri 09 Jun 17	Mon 12 Jun 17
4	1.3	4	Prepare and submit project schedule	2d	PMT	Project Management Team	No	Tue 13 Jun 17	Wed 14 Jun 17
5	1.4	5	Prepare and submit schedule of cost	2d	PMT	Project Management Team	No	Thu 15 Jun 17	Fri 16 Jun 17
6	1.5	6	Obtain building permits	4d	P	Project Manager	No	Mon 19 Jun 17	Thu 22 Jun 17
7	1.6	7	Submit monthly requests for payment	1d	P	Project Manager	No	Mon 31 Jul 17	Mon 31 Jul 17
8	2	8	**Long Lead Procurement**	7d			No	Wed 14 Jun 17	Thu 22 Jun 17
9	2.1	9	Order long lead items - Roofing	7d	P	Project Manager	No	Thu 15 Jun 17	Thu 29 Jun 17
10	2.2	10	Order long lead items - Seating	7d	P	Project Manager	No	Fri 30 Jun 17	Mon 10 Jul 17
11	2.3	11	Order long lead items - plumbing	7d	P	Project Manager	No	Tue 11 Jul 17	Wed 19 Jul 17
12	2.4	12	Order long lead items - electric	7d	P	Project Manager	No	Thu 20 Jul 17	Fri 28 Jul 17
13	3	13	**Temporary facilities & Services**	26d			Yes	Mon 31 Jul 17	Wed 06 Sep 17
14	3.1	14	Install temporary services	4d	M.C,S.M.	Main Contractor,Site Manager	No	Mon 31 Jul 17	Thu 03 Aug 17
15	3.2	15	Set up site office	2d	M.C	Main Contractor	No	Fri 04 Aug 17	Wed 16 Aug 17
16	3.3	16	Setup Temporary Shelters	2d	M.C	Main Contractor	No	Thu 17 Aug 17	Fri 18 Aug 17
17	3.4	17	Prepare site - lay down yard and temporary fencing	2d	M.C	Main Contractor	No	Mon 31 Jul 17	Tue 01 Aug 17
18	3.5	18	Clear and grub site	5d	MCC	Main Contractor crew	No	Mon 31 Jul 17	Fri 04 Aug 17
19	3.6	19	Stone site access and temporary parking area	1d	S.G.C	Site Grading Contractor	No	Wed 16 Aug 17	Wed 16 Aug 17
20	3.7	20	Rough grade site (cut and fill)	5d	M.C,S.G.C	Main Contractor,Site Grading Contractor	No	Wed 09 Aug 17	Tue 15 Aug 17
21	3.8	21	Install storm drainage	10d	M.C	Main Contractor	No	Thu 24 Aug 17	Wed 06 Sep 17
22	3.9	22	Erect building batter boards and layout	3d	M.C	Main Contractor	No	Mon 21 Aug 17	Wed 23 Aug 17
23	4	23	**Foundation and Ground Floor**	27d			Yes	Thu 07 Sep 17	Fri 13 Oct 17
24	4.1	24	Excavate foundations Trenches	10d	M.C	Main Contractor	No	Thu 07 Sep 17	Wed 20 Sep 17
25	4.2	25	Install waterproofing, Drains, Reinforcement, and Services	4d	E.C.,M.C.,P.C.	Electrical Crew,Masonry Crew,Plumbing Crew	No	Thu 21 Sep 17	Tue 26 Sep 17
26	4.3	26	Pour column and foundations walls and floor slab	5d	M.C,M.C.,S.C.M	Main Contractor,Masonry Crew,Subcontractor (Mason)	No	Wed 27 Sep 17	Tue 03 Oct 17
27	4.4	27	Cure foundations	7d	M.C.	Masonry Crew	No	Wed 04 Oct 17	Thu 12 Oct 17
28	4.5	28	Strip column and foundation forms	1d	M.C.	Masonry Crew	No	Fri 13 Oct 17	Fri 13 Oct 17

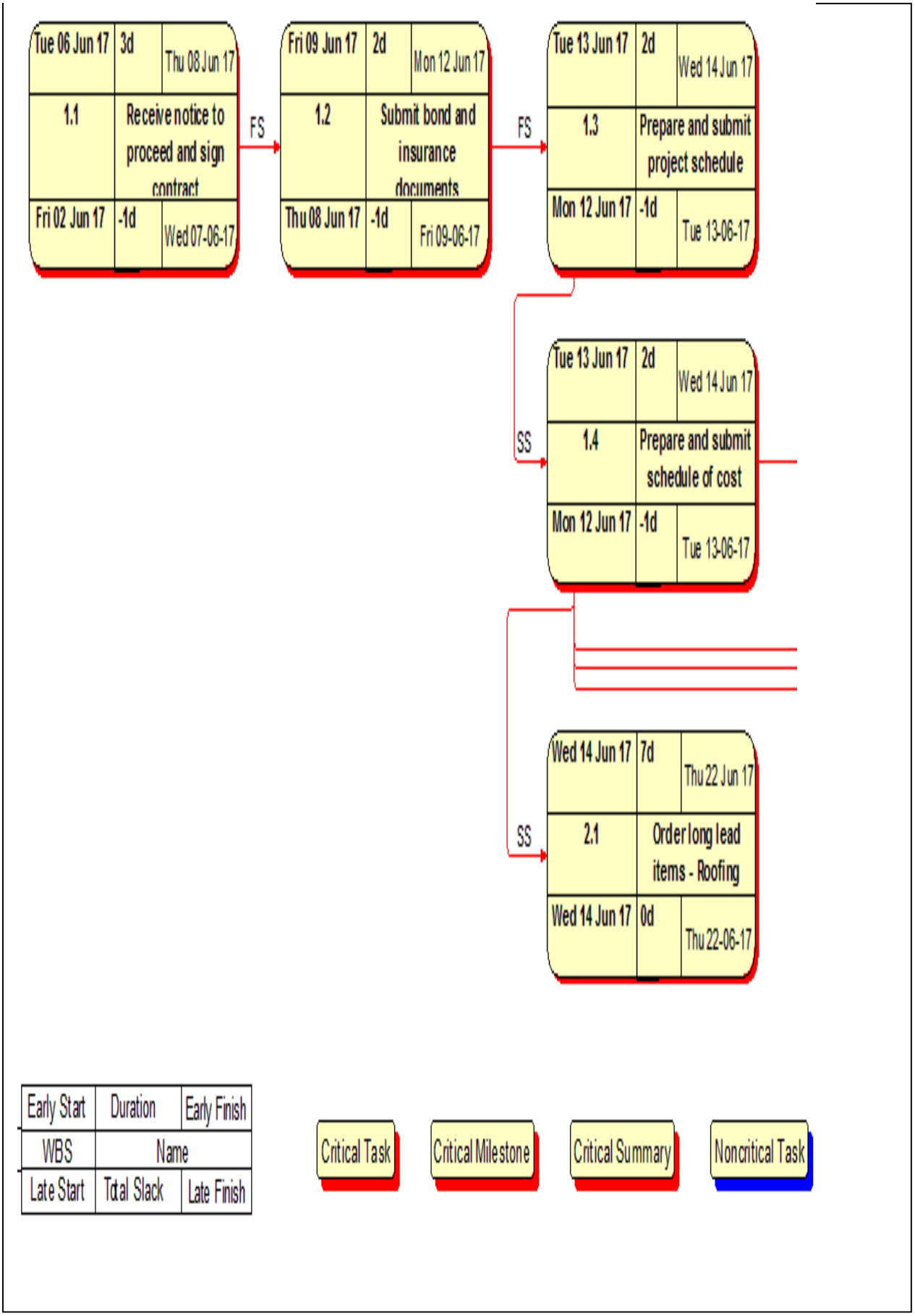
RESOURCE ASSIGNMENT
SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis

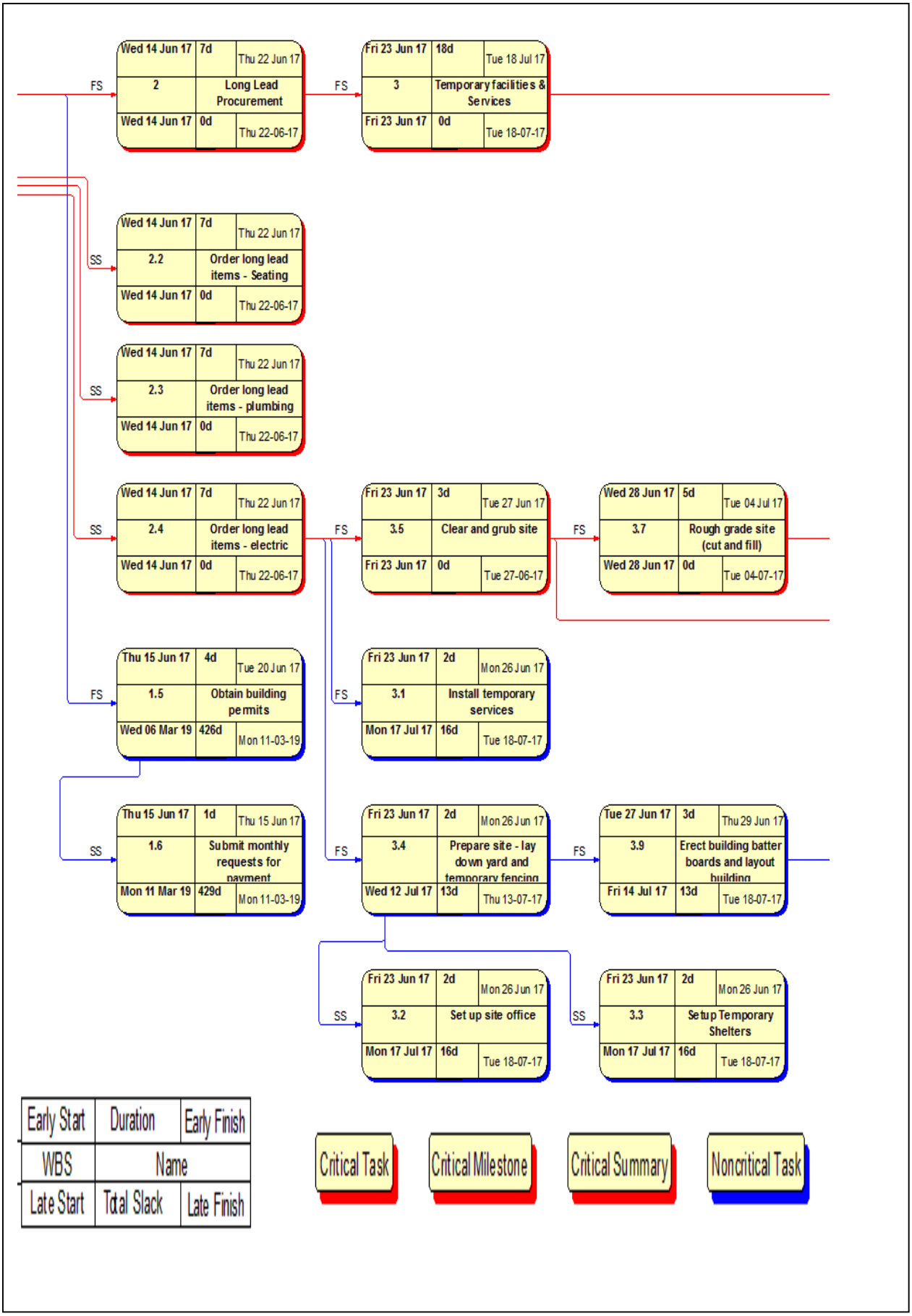
29	**5**	**29**	**Ground Floor Walls and Openings**	**65d**			**Yes**	**Mon 16 Oct 17**	**Mon 29 Jan 18**
30	5.1	30	Erect rebars for blockwork	1d	M.C.	Masonry Crew	No	Mon 13 Nov 17	Mon 13 Nov 17
31	5.2	31	Lay Blocks with opening for walls	35d	M.C.	Masonry Crew	No	Mon 27 Nov 17	Mon 29 Jan 18
32	5.3	32	Fabricate and erect rebars for columns and beam	10d	M.C,M.C.	Main Contractor,Masonry Crew	No	Mon 16 Oct 17	Fri 27 Oct 17
33	5.4	33	Form and pour Columns & beams	10d	M.C.	Masonry Crew	No	Mon 30 Oct 17	Fri 10 Nov 17
34	5.5	34	Cure Columns & Beams	7d	M.C.	Masonry Crew	No	Tue 14 Nov 17	Wed 22 Nov 17
35	5.6	35	Strip forms from Column & Beams	4d	M.C.,T.C.	Masonry Crew,Tiling Crew	No	Tue 14 Nov 17	Fri 24 Nov 17
36	**6**	**36**	**Form and Pour Concrete 1st Floor**	**19d**			**Yes**	**Tue 30 Jan 18**	**Fri 23 Feb 18**
37	6.1	37	Form 1st floor	4d	M.C.,T.C.	Masonry Crew,Tiling Crew	No	Tue 30 Jan 18	Fri 02 Feb 18
38	6.2	38	Install electrical underground	5d	E.C.	Electrical Crew	No	Fri 09 Feb 18	Thu 15 Feb 18
39	6.3	39	Install plumbing underground	5d	P.C.	Plumbing Crew	No	Mon 05 Feb 18	Fri 09 Feb 18
40	6.4	40	Install rebar and in-floor utilities	4d	E.C.,M.C.	Electrical Crew,Masonry Crew	No	Mon 05 Feb 18	Thu 08 Feb 18
41	6.5	41	Pour 1st floor slab	4d	M.C.	Masonry Crew	No	Fri 09 Feb 18	Wed 14 Feb 18
42	6.6	42	Cure 1st floor slab	7d	M.C.	Masonry Crew	No	Thu 15 Feb 18	Fri 23 Feb 18
43	**7**	**43**	**First Floor Walls and Openings**	**75d**			**Yes**	**Mon 26 Feb 18**	**Fri 08 Jun 18**
44	7.1	44	Erect Rebars & lay Block with openings	55d	M.C.	Masonry Crew	No	Mon 26 Feb 18	Fri 11 May 18
45	7.2	45	Form and pour Columns & beams with rebars	10d	M.C.	Masonry Crew	No	Mon 14 May 18	Fri 25 May 18
46	7.3	46	Cure and strip columns and Beams	10d	M.C.	Masonry Crew	No	Mon 28 May 18	Fri 08 Jun 18
47	**8**	**47**	**Masonry Work**	**146d**			**Yes**	**Mon 11 Jun 18**	**Mon 14 Jan 19**
48	8.1	48	Install exterior masonry stone work	14d	M.C.	Masonry Crew	No	Mon 11 Jun 18	Mon 14 Jan 19
49	8.2	49	Construct Manholes, septic tanks and waste chambers	10d	M.C.	Masonry Crew	No	Fri 15 Jun 18	Thu 28 Jun 18
50	8.3	50	Rough-in Plumbing in toilet and Kitchen	5d	P.C.	Plumbing Crew	No	Mon 11 Jun 18	Fri 15 Jun 18
51	8.4	51	Lay and clean tiles in Bathrooms and Kitchen	20d	T.C.	Tiling Crew	No	Mon 23 Jul 18	Fri 17 Aug 18
52	**9**	**52**	**Roofing**	**40d**			**Yes**	**Tue 15 Jan 19**	**Mon 11 Mar 19**
53	9.1	53	Install roofing structure, finishing and flashing at parapet walls	30d	RC	Roofing Crew	No	Tue 15 Jan 19	Mon 25 Feb 19
54	9.2	54	Install roof drains and guttering	10d	P.C.	Plumbing Crew	No	Tue 26 Feb 19	Mon 11 Mar 19
55	**10**	**55**	**Window and Doors**	**15d**			**Yes**	**Tue 12 Mar 19**	**Mon 01 Apr 19**
56	10.1	56	Install windows and Hardware	5d	CC	Carpentry Crew	No	Tue 12 Mar 19	Mon 18 Mar 19
57	10.2	57	Install interior doors and hardware	10d	CC	Carpentry Crew	No	Tue 19 Mar 19	Mon 01 Apr 19
58	**11**	**58**	**Building Finishes**	**237d**			**Yes**	**Fri 29 Jun 18**	**Mon 10 Jun 19**
59	11.1	59	Plastering of walls	45d	M.C.	Masonry Crew	No	Fri 29 Jun 18	Thu 30 Aug 18
60	11.2	60	Paint walls and woodwork	25d	P.C.	Painting Crew	No	Fri 31 Aug 18	Thu 04 Oct 18

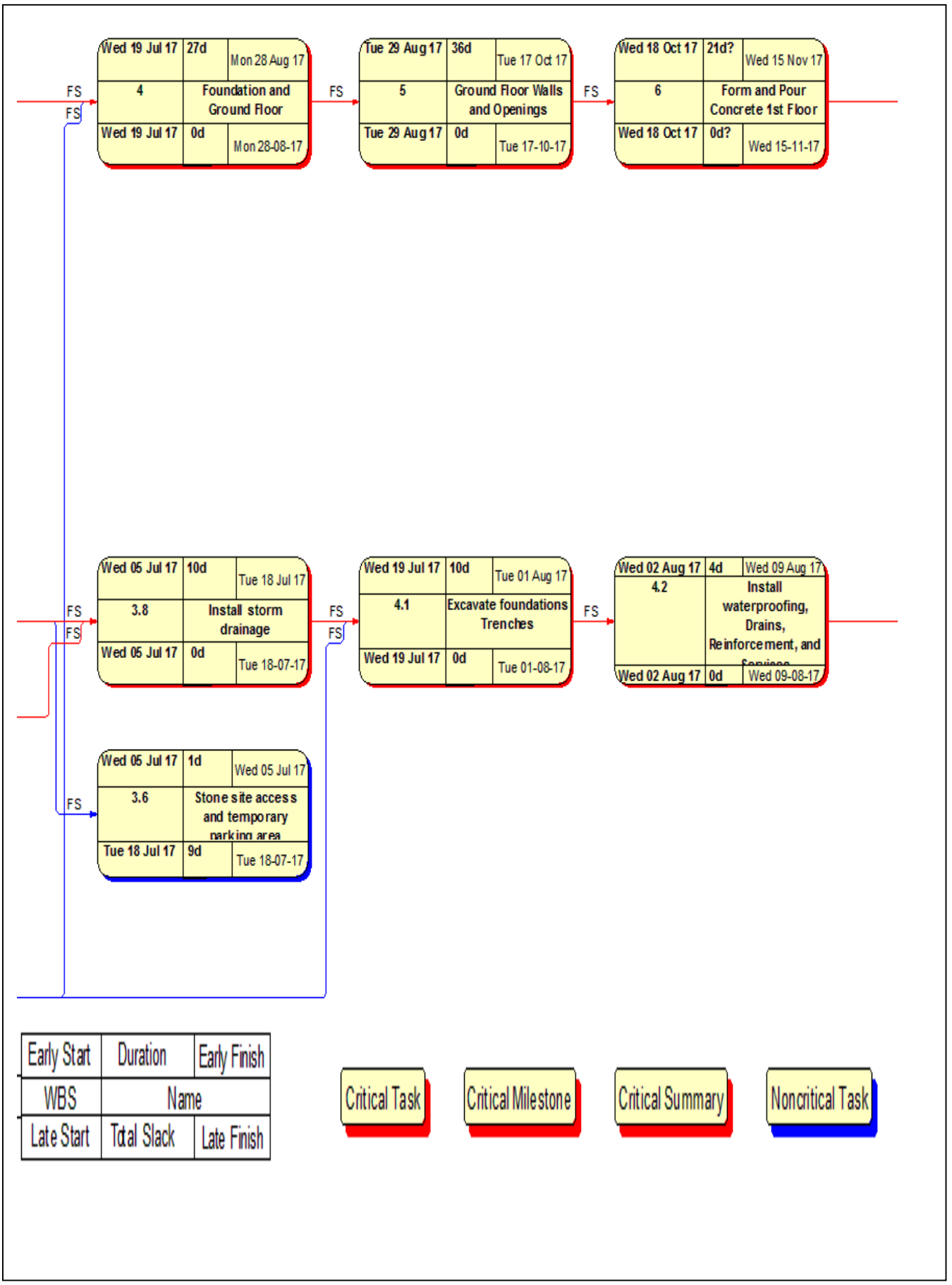
RESOURCE ASSIGNMENT
SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis

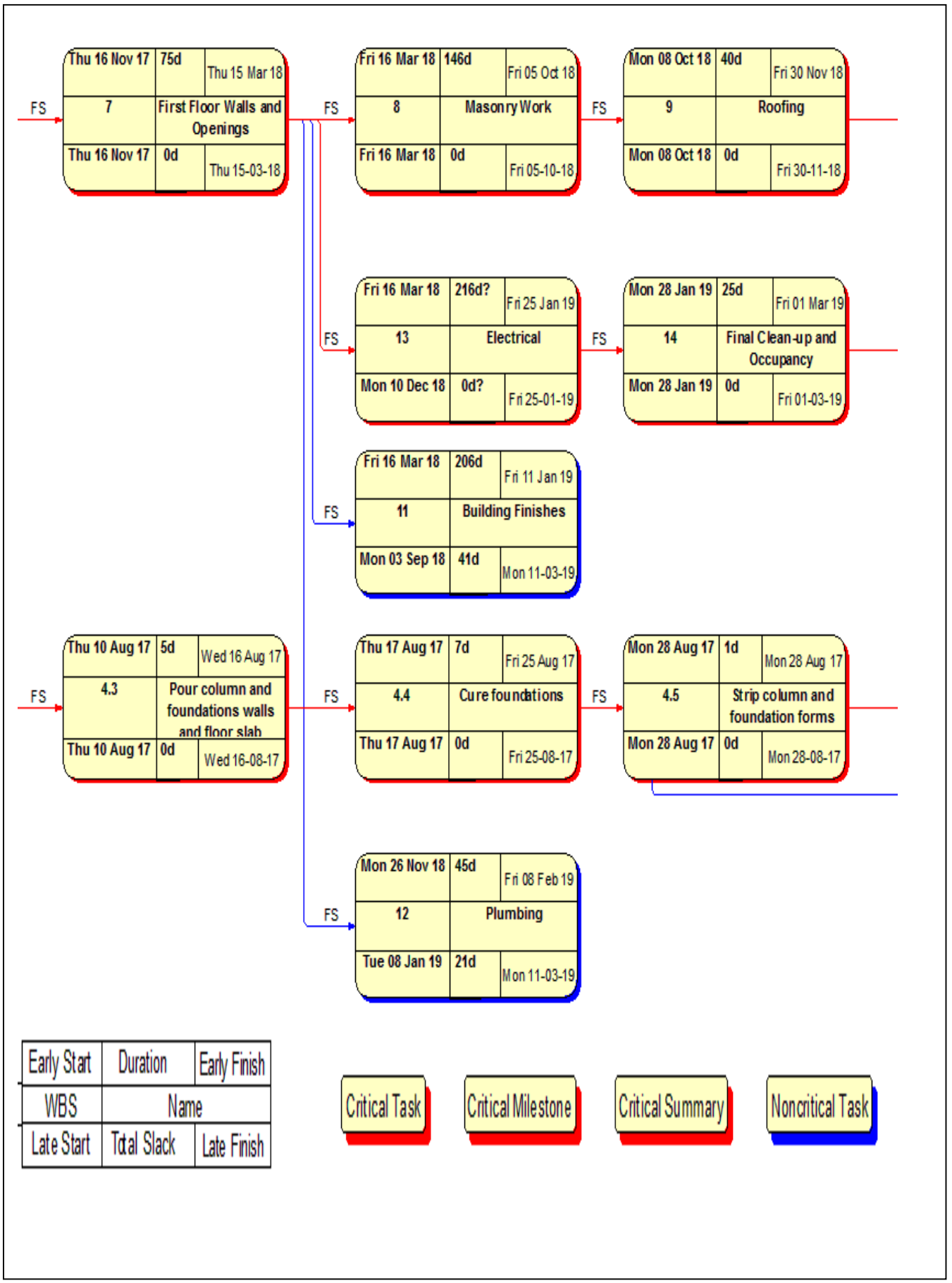
61	11.3	61	Install conduit at ceiling space	15d	E.C.	Electrical Crew	No	Tue 26 Feb 19	Mon 10 Jun 19
62	11.4	62	Install ceiling grid	10d	RC	Roofing Crew	No	Tue 26 Feb 19	Mon 11 Mar 19
63	11.5	63	Install ceiling tile	10d	RC	Roofing Crew	No	Tue 12 Mar 19	Mon 25 Mar 19
64	11.6	64	Install Cabinets in Kitchen and bathrooms	5d	CC	Carpentry Crew	No	Tue 26 Feb 19	Mon 04 Mar 19
65	11.7	65	Install hardware and accessories	3d	CC	Carpentry Crew	No	Tue 05 Mar 19	Thu 07 Mar 19
66	11.8	66	Complete interior and exterior plantings	10d	S.G.C	Site Grading Contractor	No	Tue 12 Mar 19	Mon 25 Mar 19
67	11.9	67	Pave, curb, and stripe parking lot	10d	M.C.	Masonry Crew	No	Tue 26 Mar 19	Mon 08 Apr 19
68	**12**	**68**	**Plumbing**	**46d**			**Yes**	**Tue 12 Mar 19**	**Tue 14 May 19**
69	12.1	69	Rough-in plumbing in block walls	20d	P.C.	Plumbing Crew	No	Tue 12 Mar 19	Mon 08 Apr 19
70	12.2	70	Sitting of external Waste pipes	1d	P.C.	Plumbing Crew	No	Tue 14 May 19	Tue 14 May 19
71	12.3	71	Set plumbing fixtures and trim	15d	P.C.,T.C.	Plumbing Crew,Tiling Crew	No	Tue 09 Apr 19	Mon 29 Apr 19
72	12.4	72	Flush, test, and clean piping and fixtures	10d	P.C.	Plumbing Crew	No	Tue 30 Apr 19	Mon 13 May 19
73	**13**	**73**	**Electrical**	**60d**			**Yes**	**Tue 12 Mar 19**	**Mon 03 Jun 19**
74	13.1	74	Rough-in electrical in masonry walls	20d	E.C.	Electrical Crew	No	Tue 12 Mar 19	Mon 08 Apr 19
75	13.2	75	Pull wire in conduit and set area transformers	15d	E.C.	Electrical Crew	No	Tue 09 Apr 19	Mon 29 Apr 19
76	13.3	76	Install and terminate electrical Devices	15d	E.C.	Electrical Crew	No	Tue 30 Apr 19	Mon 20 May 19
77	13.4	77	Install light fixtures - test and clean	10d	E.C.	Electrical Crew	No	Tue 21 May 19	Mon 03 Jun 19
78	**14**	**78**	**Final Clean-up and Occupancy**	**34d**			**Yes**	**Tue 04 Jun 19**	**Fri 19 Jul 19**
79	14.1	79	Install non-slip Ceramic tile flooring in main areas	25d	T.C.	Tiling Crew	No	Tue 04 Jun 19	Mon 08 Jul 19
80	14.2	80	Clean tile floors	4d	T.C.	Tiling Crew	No	Tue 09 Jul 19	Fri 12 Jul 19
81	14.3	81	Remove debris from building and do final clean-up	4d	R.M.,S.M.	Risk Manager,Site Manager	No	Mon 15 Jul 19	Thu 18 Jul 19
82	14.4	82	Substantial completion date	1d	S.G.C,S.M.,T.C.	Site Grading Contractor,Site Manager,Tiling Crew	No	Fri 19 Jul 19	Fri 19 Jul 19
83	**15**	**83**	**Complete Final Inspections**	**6d**			**Yes**	**Mon 22 Jul 19**	**Mon 29 Jul 19**
84	15.1	84	Complete punch list items from all inspections	2d	M.C,P	Main Contractor,Project Manager	No	Mon 22 Jul 19	Tue 23 Jul 19
85	15.2	85	Obtain certificate of occupancy	2d	P	Project Manager	No	Wed 24 Jul 19	Thu 25 Jul 19
86	15.3	86	Issue final completion documents including warranties	1d	P	Project Manager	No	Fri 26 Jul 19	Fri 26 Jul 19
87	15.4	87	Issue final request for payment	1d	A.,M.C,P	Accountant,Main Contractor,Project Manager	No	Mon 29 Jul 19	Mon 29 Jul 19
88	15.5	88	Finish	0d			Yes	Mon 29 Jul 19	Mon 29 Jul 19

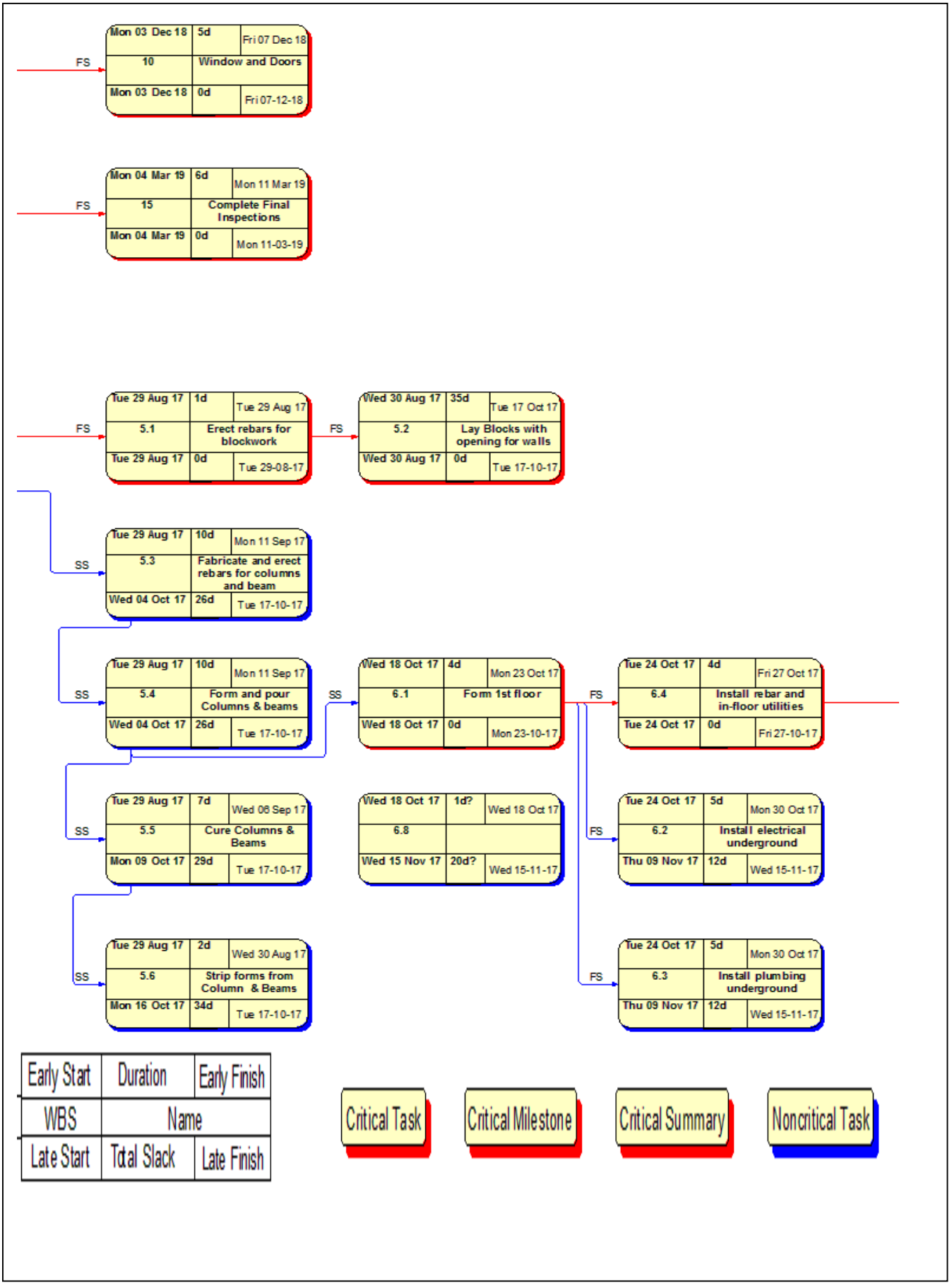
Chart 4.0.7 Network Diagram (Source: Compiled by Author)

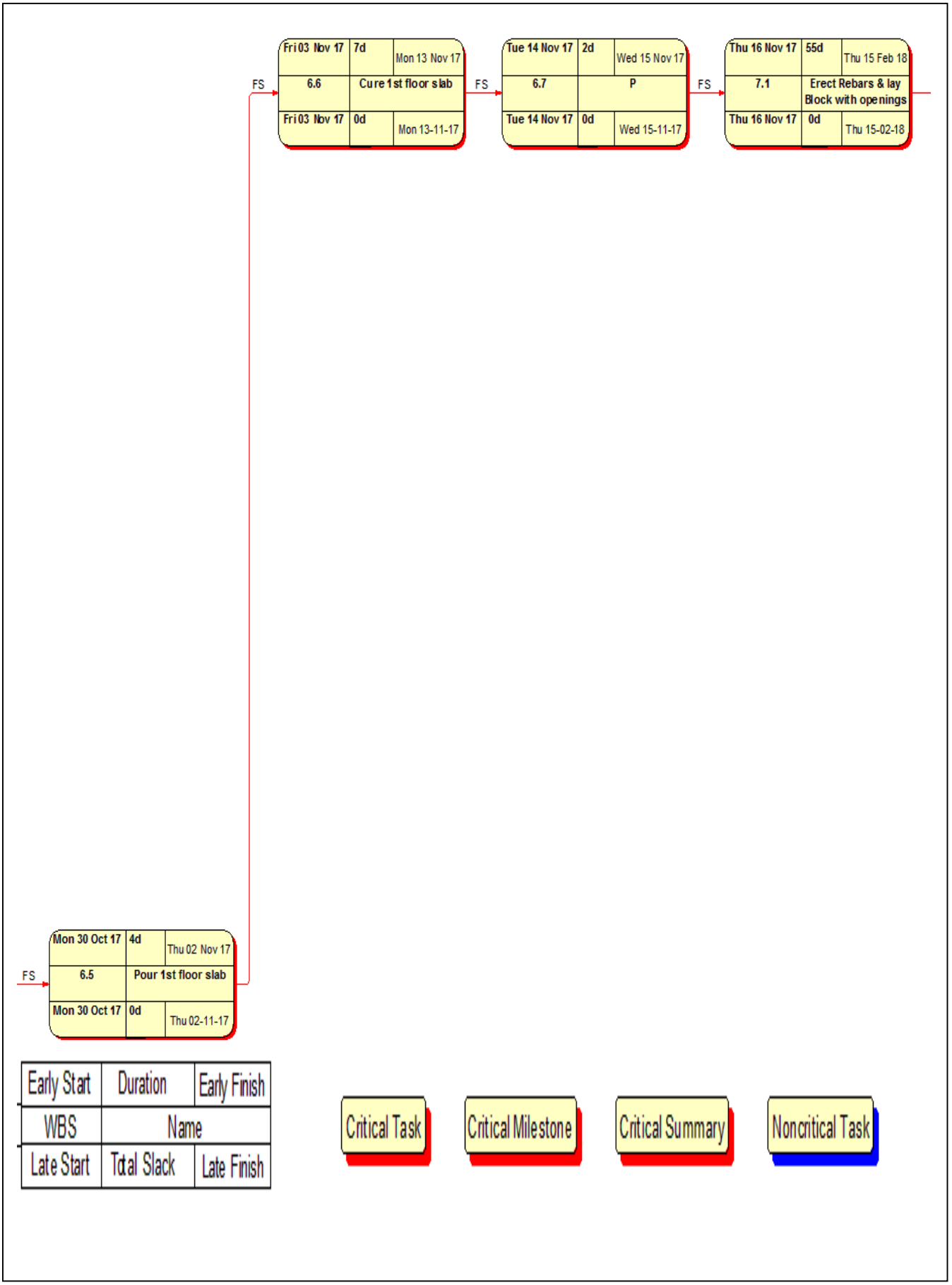


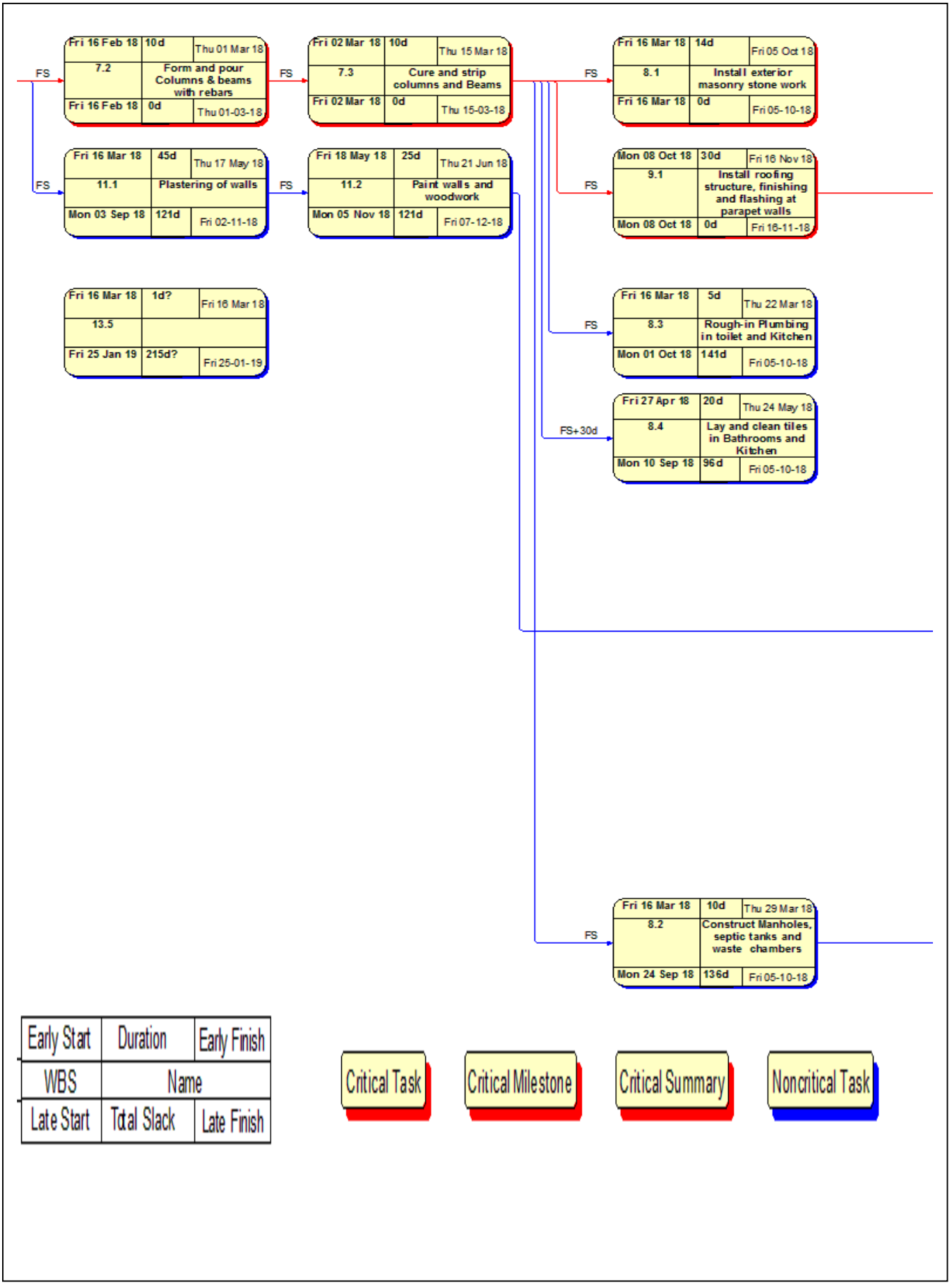

Wed 14 Jun 17 | 7d | Thu 22 Jun 17
2 | Long Lead Procurement
Wed 14 Jun 17 | 0d | Thu 22-06-17
Fri 23 Jun 17 | 18d | Tue 18 Jul 17
3 | Temporary facilities & Services
Fri 23 Jun 17 | 0d | Tue 18-07-17
Wed 14 Jun 17 | 7d | Thu 22 Jun 17
2.2 | Order long lead items - Seating
Wed 14 Jun 17 | 0d | Thu 22-06-17
Wed 14 Jun 17 | 7d | Thu 22 Jun 17
2.3 | Order long lead items - plumbing
Wed 14 Jun 17 | 0d | Thu 22-06-17
Wed 14 Jun 17 | 7d | Thu 22 Jun 17
2.4 | Order long lead items - electric
Wed 14 Jun 17 | 0d | Thu 22-06-17
Fri 23 Jun 17 | 3d | Tue 27 Jun 17
3.5 | Clear and grub site
Fri 23 Jun 17 | 0d | Tue 27-06-17
Wed 28 Jun 17 | 5d | Tue 04 Jul 17
3.7 | Rough grade site (cut and fill)
Wed 28 Jun 17 | 0d | Tue 04-07-17
Thu 15 Jun 17 | 4d | Tue 20 Jun 17
1.5 | Obtain building permits
Wed 06 Mar 19 | 426d | Mon 11-03-19
Fri 23 Jun 17 | 2d | Mon 26 Jun 17
3.1 | Install temporary services
Mon 17 Jul 17 | 16d | Tue 18-07-17
Thu 15 Jun 17 | 1d | Thu 15 Jun 17
1.6 | Submit monthly requests for payment
Mon 11 Mar 19 | 429d | Mon 11-03-19
Fri 23 Jun 17 | 2d | Mon 26 Jun 17
3.4 | Prepare site - lay down yard and temporary fencing
Wed 12 Jul 17 | 13d | Thu 13-07-17
Tue 27 Jun 17 | 3d | Thu 29 Jun 17
3.9 | Erect building batter boards and layout building
Fri 14 Jul 17 | 13d | Tue 18-07-17
Fri 23 Jun 17 | 2d | Mon 26 Jun 17
3.2 | Set up site office
Mon 17 Jul 17 | 16d | Tue 18-07-17
Fri 23 Jun 17 | 2d | Mon 26 Jun 17
3.3 | Setup Temporary Shelters
Mon 17 Jul 17 | 16d | Tue 18-07-17
FS
SS
Early Start | Duration | Early Finish
WBS | Name
Late Start | Total Slack | Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task

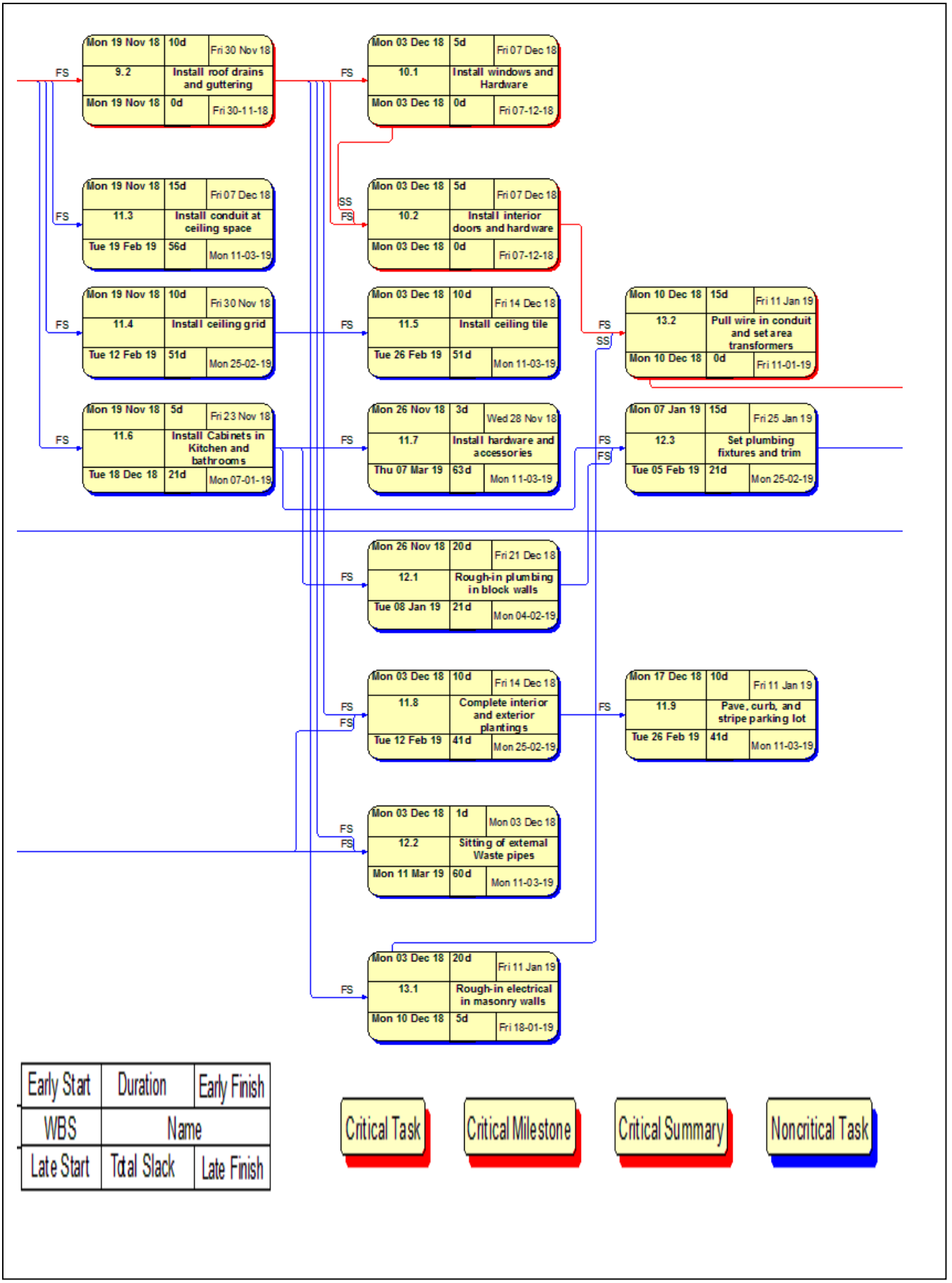

Wed 19 Jul 17
27d
Mon 28 Aug 17
4
Foundation and Ground Floor
Wed 19 Jul 17
0d
Mon 28-08-17
Tue 29 Aug 17
36d
Tue 17 Oct 17
5
Ground Floor Walls and Openings
Tue 29 Aug 17
0d
Tue 17-10-17
Wed 18 Oct 17
21d?
Wed 15 Nov 17
6
Form and Pour Concrete 1st Floor
Wed 18 Oct 17
0d?
Wed 15-11-17
FS
Wed 05 Jul 17
10d
Tue 18 Jul 17
3.8
Install storm drainage
Wed 05 Jul 17
0d
Tue 18-07-17
Wed 19 Jul 17
10d
Tue 01 Aug 17
4.1
Excavate foundations Trenches
Wed 19 Jul 17
0d
Tue 01-08-17
Wed 02 Aug 17
4d
Wed 09 Aug 17
4.2
Install waterproofing, Drains, Reinforcement, and
Wed 02 Aug 17
0d
Wed 09-08-17
Wed 05 Jul 17
1d
Wed 05 Jul 17
3.6
Stone site access and temporary parking area
Tue 18 Jul 17
9d
Tue 18-07-17
Early Start
Duration
Early Finish
WBS
Name
Late Start
Total Slack
Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task

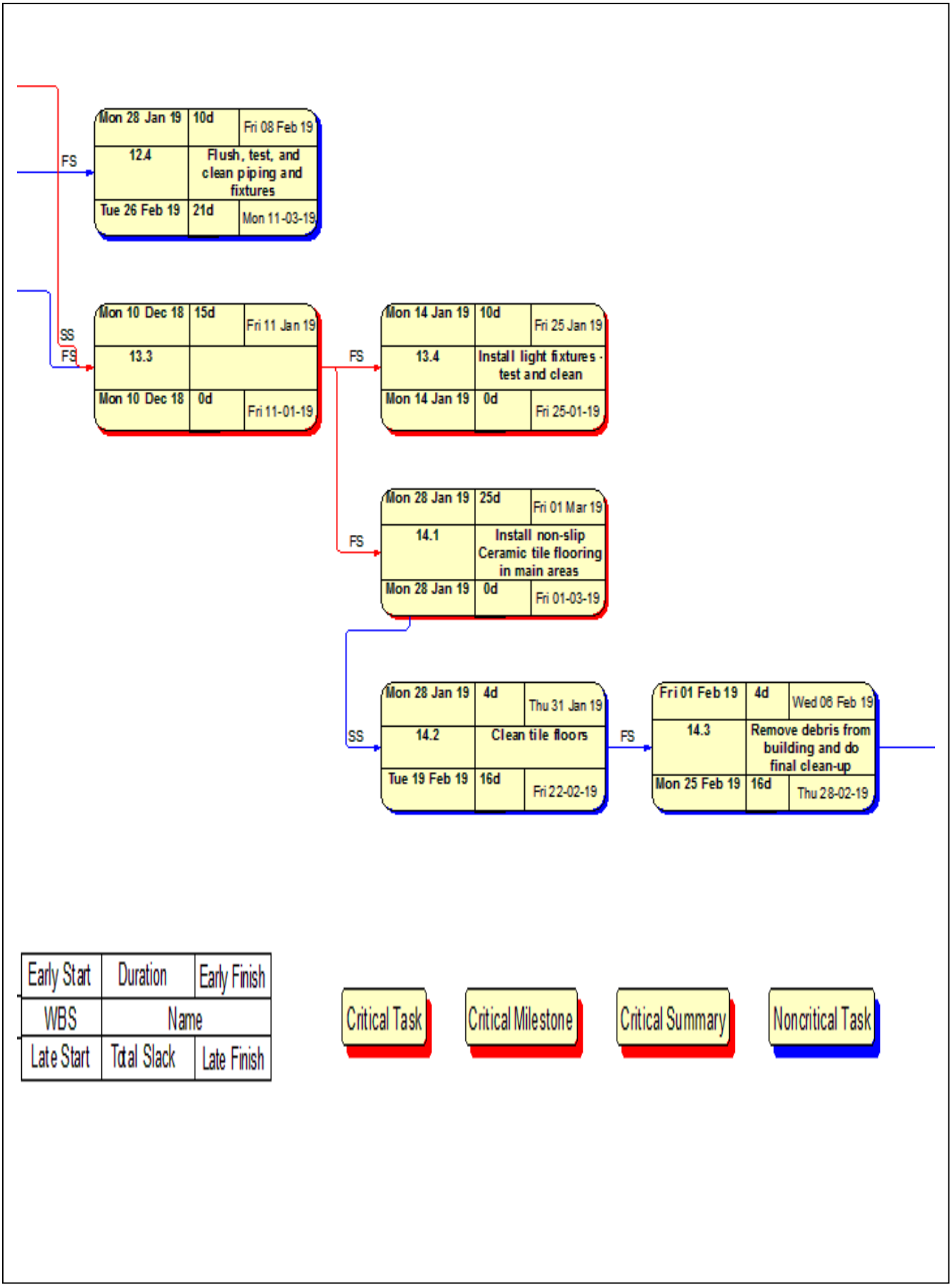

Thu 16 Nov 17 | 75d | Thu 15 Mar 18
7 | First Floor Walls and Openings
Thu 16 Nov 17 | 0d | Thu 15-03-18
FS
Fri 16 Mar 18 | 146d | Fri 05 Oct 18
8 | Masonry Work
Fri 16 Mar 18 | 0d | Fri 05-10-18
Mon 08 Oct 18 | 40d | Fri 30 Nov 18
9 | Roofing
Mon 08 Oct 18 | 0d | Fri 30-11-18
Fri 16 Mar 18 | 216d? | Fri 25 Jan 19
13 | Electrical
Mon 10 Dec 18 | 0d? | Fri 25-01-19
Mon 28 Jan 19 | 25d | Fri 01 Mar 19
14 | Final Clean-up and Occupancy
Mon 28 Jan 19 | 0d | Fri 01-03-19
Fri 16 Mar 18 | 206d | Fri 11 Jan 19
11 | Building Finishes
Mon 03 Sep 18 | 41d | Mon 11-03-19
Thu 10 Aug 17 | 5d | Wed 16 Aug 17
4.3 | Pour column and foundations walls and floor slab
Thu 10 Aug 17 | 0d | Wed 16-08-17
Thu 17 Aug 17 | 7d | Fri 25 Aug 17
4.4 | Cure foundations
Thu 17 Aug 17 | 0d | Fri 25-08-17
Mon 28 Aug 17 | 1d | Mon 28 Aug 17
4.5 | Strip column and foundation forms
Mon 28 Aug 17 | 0d | Mon 28-08-17
Mon 26 Nov 18 | 45d | Fri 08 Feb 19
12 | Plumbing
Tue 08 Jan 19 | 21d | Mon 11-03-19
Early Start | Duration | Early Finish
WBS | Name
Late Start | Total Slack | Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task

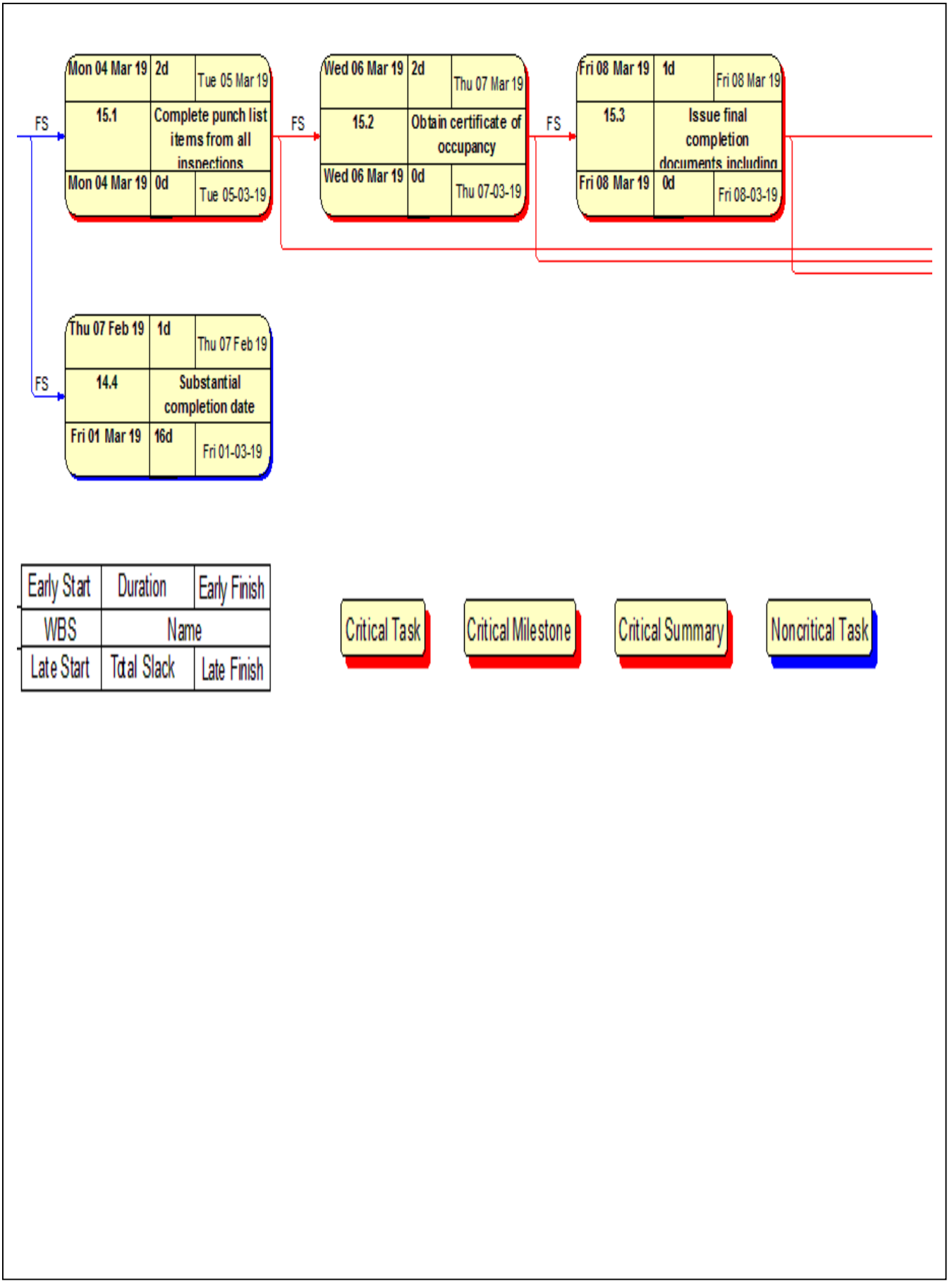

Mon 03 Dec 18
5d
Fri 07 Dec 18
FS
10
Window and Doors
Mon 03 Dec 18
0d
Fri 07-12-18
Mon 04 Mar 19
6d
Mon 11 Mar 19
FS
15
Complete Final Inspections
Mon 04 Mar 19
0d
Mon 11-03-19
Tue 29 Aug 17
1d
Tue 29 Aug 17
FS
5.1
Erect rebars for blockwork
Tue 29 Aug 17
0d
Tue 29-08-17
FS
Wed 30 Aug 17
35d
Tue 17 Oct 17
5.2
Lay Blocks with opening for walls
Wed 30 Aug 17
0d
Tue 17-10-17
Tue 29 Aug 17
10d
Mon 11 Sep 17
SS
5.3
Fabricate and erect rebars for columns and beam
Wed 04 Oct 17
26d
Tue 17-10-17
Tue 29 Aug 17
10d
Mon 11 Sep 17
SS
5.4
Form and pour Columns & beams
Wed 04 Oct 17
26d
Tue 17-10-17
SS
Wed 18 Oct 17
4d
Mon 23 Oct 17
6.1
Form 1st floor
Wed 18 Oct 17
0d
Mon 23-10-17
FS
Tue 24 Oct 17
4d
Fri 27 Oct 17
6.4
Install rebar and in-floor utilities
Tue 24 Oct 17
0d
Fri 27-10-17
Tue 29 Aug 17
7d
Wed 06 Sep 17
SS
5.5
Cure Columns & Beams
Mon 09 Oct 17
29d
Tue 17-10-17
Wed 18 Oct 17
1d?
Wed 18 Oct 17
6.8
Wed 15 Nov 17
20d?
Wed 15-11-17
Tue 24 Oct 17
5d
Mon 30 Oct 17
FS
6.2
Install electrical underground
Thu 09 Nov 17
12d
Wed 15-11-17
Tue 29 Aug 17
2d
Wed 30 Aug 17
SS
5.6
Strip forms from Column & Beams
Mon 16 Oct 17
34d
Tue 17-10-17
Tue 24 Oct 17
5d
Mon 30 Oct 17
FS
6.3
Install plumbing underground
Thu 09 Nov 17
12d
Wed 15-11-17
Early Start
Duration
Early Finish
WBS
Name
Late Start
Total Slack
Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task


Fri 03 Nov 17
7d
Mon 13 Nov 17
6.6
Cure 1st floor slab
Fri 03 Nov 17
0d
Mon 13-11-17
FS
Tue 14 Nov 17
2d
Wed 15 Nov 17
6.7
P
Tue 14 Nov 17
0d
Wed 15-11-17
FS
Thu 16 Nov 17
55d
Thu 15 Feb 18
7.1
Erect Rebars & lay Block with openings
Thu 16 Nov 17
0d
Thu 15-02-18
FS
Mon 30 Oct 17
4d
Thu 02 Nov 17
6.5
Pour 1st floor slab
Mon 30 Oct 17
0d
Thu 02-11-17
FS
Early Start
Duration
Early Finish
WBS
Name
Late Start
Total Slack
Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task


Fri 16 Feb 18 | 10d | Thu 01 Mar 18
7.2 | Form and pour Columns & beams with rebars
Fri 16 Feb 18 | 0d | Thu 01-03-18
Fri 02 Mar 18 | 10d | Thu 15 Mar 18
7.3 | Cure and strip columns and Beams
Fri 02 Mar 18 | 0d | Thu 15-03-18
Fri 16 Mar 18 | 14d | Fri 05 Oct 18
8.1 | Install exterior masonry stone work
Fri 16 Mar 18 | 0d | Fri 05-10-18
Fri 16 Mar 18 | 45d | Thu 17 May 18
11.1 | Plastering of walls
Mon 03 Sep 18 | 121d | Fri 02-11-18
Fri 18 May 18 | 25d | Thu 21 Jun 18
11.2 | Paint walls and woodwork
Mon 05 Nov 18 | 121d | Fri 07-12-18
Mon 08 Oct 18 | 30d | Fri 16 Nov 18
9.1 | Install roofing structure, finishing and flashing at parapet walls
Mon 08 Oct 18 | 0d | Fri 16-11-18
Fri 16 Mar 18 | 1d? | Fri 16 Mar 18
13.5
Fri 25 Jan 19 | 215d? | Fri 25-01-19
Fri 16 Mar 18 | 5d | Thu 22 Mar 18
8.3 | Rough-in Plumbing in toilet and Kitchen
Mon 01 Oct 18 | 141d | Fri 05-10-18
Fri 27 Apr 18 | 20d | Thu 24 May 18
8.4 | Lay and clean tiles in Bathrooms and Kitchen
Mon 10 Sep 18 | 96d | Fri 05-10-18
Fri 16 Mar 18 | 10d | Thu 29 Mar 18
8.2 | Construct Manholes, septic tanks and waste chambers
Mon 24 Sep 18 | 136d | Fri 05-10-18
FS
FS+30d
Early Start | Duration | Early Finish
WBS | Name
Late Start | Total Slack | Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task


Mon 19 Nov 18 | 10d | Fri 30 Nov 18
9.2 | Install roof drains and guttering
Mon 19 Nov 18 | 0d | Fri 30-11-18
Mon 03 Dec 18 | 5d | Fri 07 Dec 18
10.1 | Install windows and Hardware
Mon 03 Dec 18 | 0d | Fri 07-12-18
Mon 19 Nov 18 | 15d | Fri 07 Dec 18
11.3 | Install conduit at ceiling space
Tue 19 Feb 19 | 56d | Mon 11-03-19
Mon 03 Dec 18 | 5d | Fri 07 Dec 18
10.2 | Install interior doors and hardware
Mon 03 Dec 18 | 0d | Fri 07-12-18
Mon 19 Nov 18 | 10d | Fri 30 Nov 18
11.4 | Install ceiling grid
Tue 12 Feb 19 | 51d | Mon 25-02-19
Mon 03 Dec 18 | 10d | Fri 14 Dec 18
11.5 | Install ceiling tile
Tue 26 Feb 19 | 51d | Mon 11-03-19
Mon 10 Dec 18 | 15d | Fri 11 Jan 19
13.2 | Pull wire in conduit and set area transformers
Mon 10 Dec 18 | 0d | Fri 11-01-19
Mon 19 Nov 18 | 5d | Fri 23 Nov 18
11.6 | Install Cabinets in Kitchen and bathrooms
Tue 18 Dec 18 | 21d | Mon 07-01-19
Mon 26 Nov 18 | 3d | Wed 28 Nov 18
11.7 | Install hardware and accessories
Thu 07 Mar 19 | 63d | Mon 11-03-19
Mon 07 Jan 19 | 15d | Fri 25 Jan 19
12.3 | Set plumbing fixtures and trim
Tue 05 Feb 19 | 21d | Mon 25-02-19
Mon 26 Nov 18 | 20d | Fri 21 Dec 18
12.1 | Rough-in plumbing in block walls
Tue 08 Jan 19 | 21d | Mon 04-02-19
Mon 03 Dec 18 | 10d | Fri 14 Dec 18
11.8 | Complete interior and exterior plantings
Tue 12 Feb 19 | 41d | Mon 25-02-19
Mon 17 Dec 18 | 10d | Fri 11 Jan 19
11.9 | Pave, curb, and stripe parking lot
Tue 26 Feb 19 | 41d | Mon 11-03-19
Mon 03 Dec 18 | 1d | Mon 03 Dec 18
12.2 | Sitting of external Waste pipes
Mon 11 Mar 19 | 60d | Mon 11-03-19
Mon 03 Dec 18 | 20d | Fri 11 Jan 19
13.1 | Rough-in electrical in masonry walls
Mon 10 Dec 18 | 5d | Fri 18-01-19
FS
SS
Early Start | Duration | Early Finish
WBS | Name
Late Start | Total Slack | Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task


Mon 28 Jan 19
10d
Fri 08 Feb 19
12.4
Flush, test, and clean piping and fixtures
Tue 26 Feb 19
21d
Mon 11-03-19
FS
Mon 10 Dec 18
15d
Fri 11 Jan 19
13.3
Mon 10 Dec 18
0d
Fri 11-01-19
SS
FS
Mon 14 Jan 19
10d
Fri 25 Jan 19
13.4
Install light fixtures - test and clean
Mon 14 Jan 19
0d
Fri 25-01-19
FS
Mon 28 Jan 19
25d
Fri 01 Mar 19
14.1
Install non-slip Ceramic tile flooring in main areas
Mon 28 Jan 19
0d
Fri 01-03-19
FS
Mon 28 Jan 19
4d
Thu 31 Jan 19
14.2
Clean tile floors
Tue 19 Feb 19
16d
Fri 22-02-19
SS
Fri 01 Feb 19
4d
Wed 06 Feb 19
14.3
Remove debris from building and do final clean-up
Mon 25 Feb 19
16d
Thu 28-02-19
FS
Early Start
Duration
Early Finish
WBS
Name
Late Start
Total Slack
Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task


Mon 04 Mar 19
2d
Tue 05 Mar 19
15.1
Complete punch list items from all inspections
Mon 04 Mar 19
0d
Tue 05-03-19
Wed 06 Mar 19
2d
Thu 07 Mar 19
15.2
Obtain certificate of occupancy
Wed 06 Mar 19
0d
Thu 07-03-19
Fri 08 Mar 19
1d
Fri 08 Mar 19
15.3
Issue final completion documents including
Fri 08 Mar 19
0d
Fri 08-03-19
FS
FS
FS
FS
Thu 07 Feb 19
1d
Thu 07 Feb 19
14.4
Substantial completion date
Fri 01 Mar 19
16d
Fri 01-03-19
Early Start
Duration
Early Finish
WBS
Name
Late Start
Total Slack
Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task

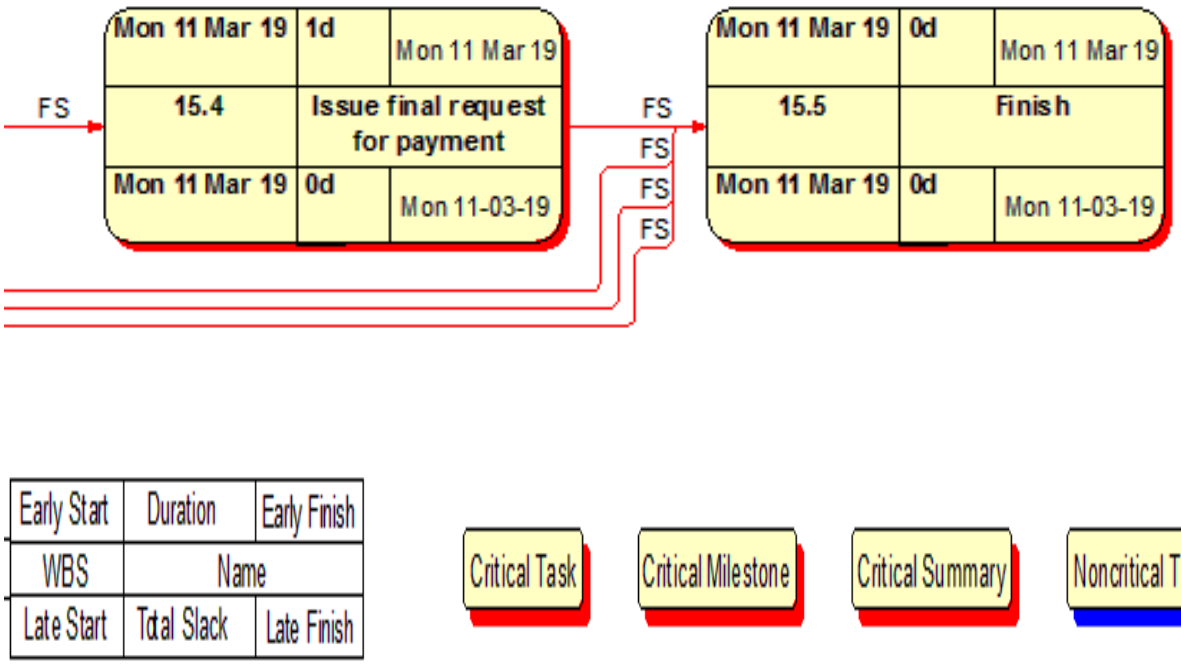
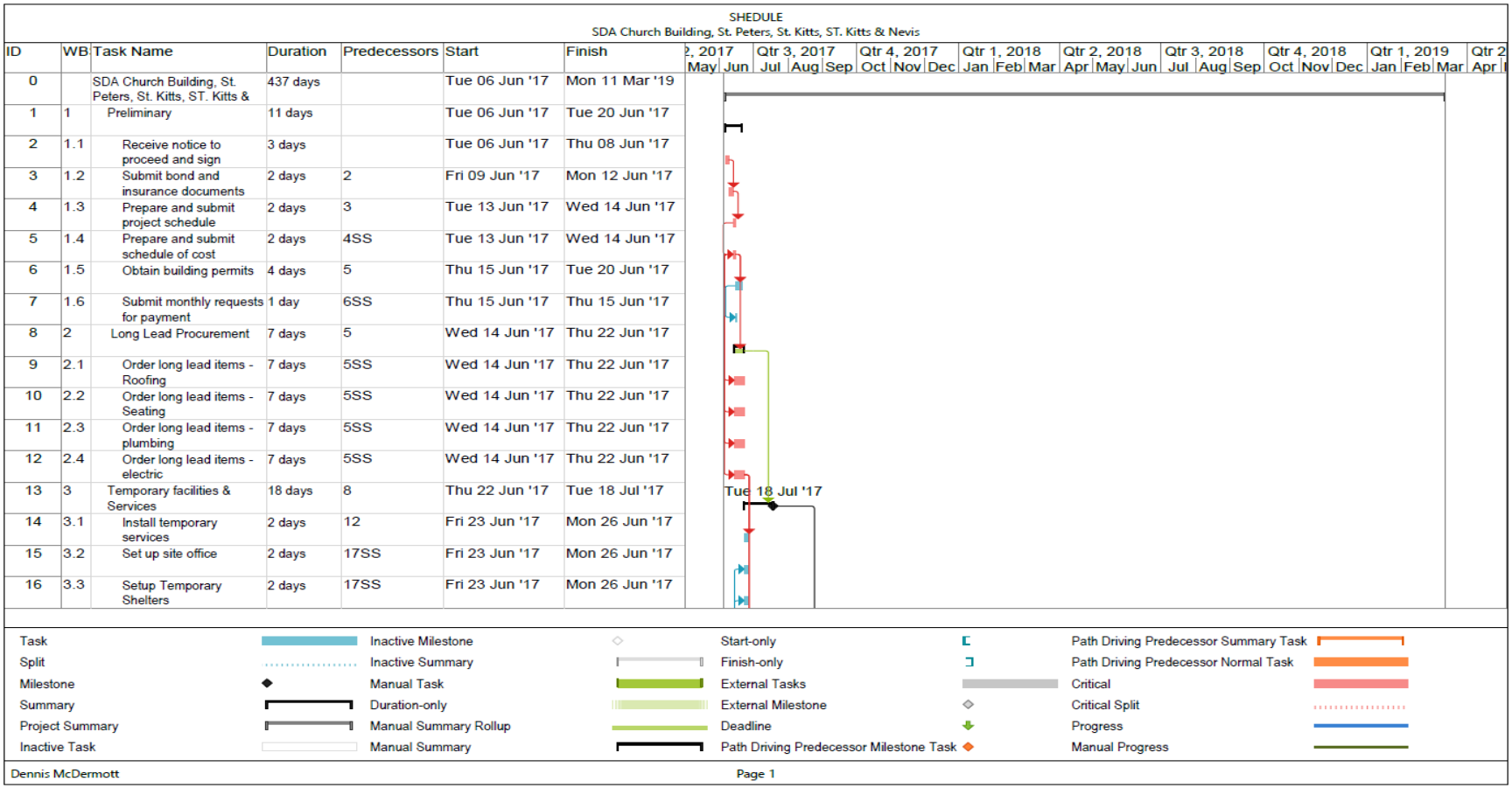

Mon 11 Mar 19
1d
Mon 11 Mar 19
FS
15.4
Issue final request for payment
Mon 11 Mar 19
0d
Mon 11-03-19
FS
FS
FS
FS
Mon 11 Mar 19
0d
Mon 11 Mar 19
15.5
Finish
Mon 11 Mar 19
0d
Mon 11-03-19
Early Start
Duration
Early Finish
WBS
Name
Late Start
Total Slack
Late Finish
Critical Task
Critical Milestone
Critical Summary
Noncritical Task

Chart 4.0.8 Project Schedule (Gantt chart) (compiled by Author)

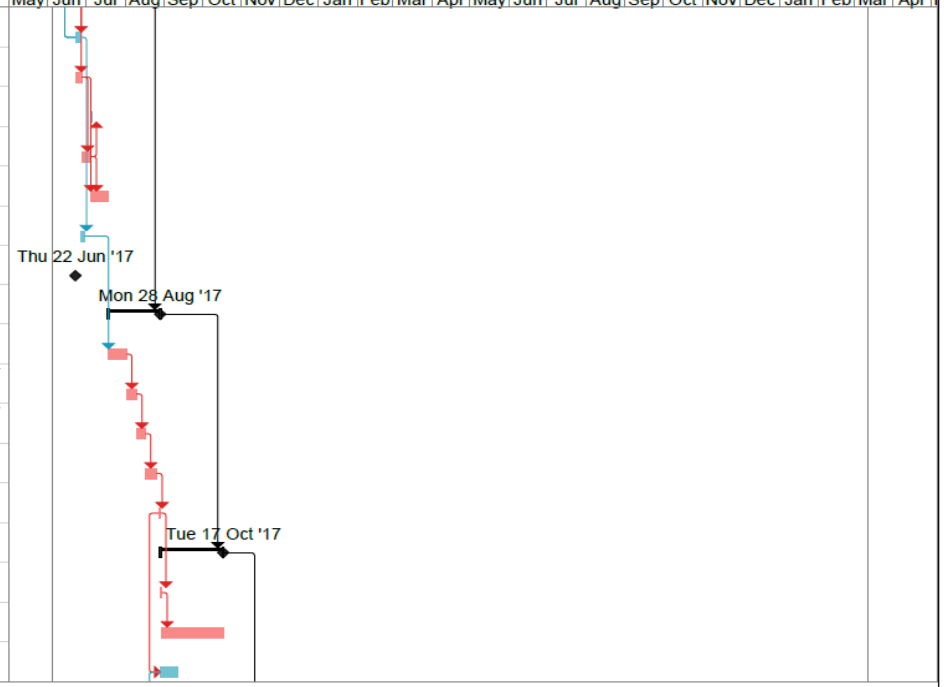


ID	WB	Task Name	Duration	Predecessors	Start	Finish
0		SDA Church Building, St. Peters, St. Kitts, ST. Kitts &	437 days		Tue 06 Jun '17	Mon 11 Mar '19
1	1	Preliminary	11 days		Tue 06 Jun '17	Tue 20 Jun '17
2	1.1	Receive notice to proceed and sign	3 days		Tue 06 Jun '17	Thu 08 Jun '17
3	1.2	Submit bond and insurance documents	2 days	2	Fri 09 Jun '17	Mon 12 Jun '17
4	1.3	Prepare and submit project schedule	2 days	3	Tue 13 Jun '17	Wed 14 Jun '17
5	1.4	Prepare and submit schedule of cost	2 days	4SS	Tue 13 Jun '17	Wed 14 Jun '17
6	1.5	Obtain building permits	4 days	5	Thu 15 Jun '17	Tue 20 Jun '17
7	1.6	Submit monthly requests for payment	1 day	6SS	Thu 15 Jun '17	Thu 15 Jun '17
8	2	Long Lead Procurement	7 days	5	Wed 14 Jun '17	Thu 22 Jun '17
9	2.1	Order long lead items - Roofing	7 days	5SS	Wed 14 Jun '17	Thu 22 Jun '17
10	2.2	Order long lead items - Seating	7 days	5SS	Wed 14 Jun '17	Thu 22 Jun '17
11	2.3	Order long lead items - plumbing	7 days	5SS	Wed 14 Jun '17	Thu 22 Jun '17
12	2.4	Order long lead items - electric	7 days	5SS	Wed 14 Jun '17	Thu 22 Jun '17
13	3	Temporary facilities & Services	18 days	8	Thu 22 Jun '17	Tue 18 Jul '17
14	3.1	Install temporary services	2 days	12	Fri 23 Jun '17	Mon 26 Jun '17
15	3.2	Set up site office	2 days	17SS	Fri 23 Jun '17	Mon 26 Jun '17
16	3.3	Setup Temporary Shelters	2 days	17SS	Fri 23 Jun '17	Mon 26 Jun '17

SHEDULE

SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis

ID	WBS	Task Name	Duration	Predecessors	Start	Finish
17	3.4	Prepare site - lay down yard and temporary	2 days	12	Fri 23 Jun '17	Mon 26 Jun '17
18	3.5	Clear and grub site	3 days	12	Fri 23 Jun '17	Tue 27 Jun '17
19	3.6	Stone site access and temporary parking area	1 day	20	Wed 05 Jul '17	Wed 05 Jul '17
20	3.7	Rough grade site (cut and fill)	5 days	18	Wed 28 Jun '17	Tue 04 Jul '17
21	3.8	Install storm drainage	10 days	20,18	Wed 05 Jul '17	Tue 18 Jul '17
22	3.9	Erect building batter boards and layout	3 days	17	Tue 27 Jun '17	Thu 29 Jun '17
23	3.10	Site facilities are in place	0 days		Thu 22 Jun '17	Thu 22 Jun '17
24	4	Foundation and Ground Floor	27 days	13	Wed 19 Jul '17	Mon 28 Aug '17
25	4.1	Excavate foundations Trenches	10 days	22	Wed 19 Jul '17	Tue 01 Aug '17
26	4.2	Install waterproofing, Drains, Reinforcement,	4 days	25	Wed 02 Aug '17	Wed 09 Aug '17
27	4.3	Pour column and foundations walls and	5 days	26	Thu 10 Aug '17	Wed 16 Aug '17
28	4.4	Cure foundations	7 days	27	Thu 17 Aug '17	Fri 25 Aug '17
29	4.5	Strip column and foundation forms	1 day	28	Mon 28 Aug '17	Mon 28 Aug '17
30	5	Ground Floor Walls and Openings	36 days	24	Tue 29 Aug '17	Tue 17 Oct '17
31	5.1	Erect rebars for blockwork	1 day	29	Tue 29 Aug '17	Tue 29 Aug '17
32	5.2	Lay Blocks with opening for walls	35 days	31	Wed 30 Aug '17	Tue 17 Oct '17
33	5.3	Fabricate and erect rebars for columns and	10 days	29SS	Tue 29 Aug '17	Mon 11 Sep '17

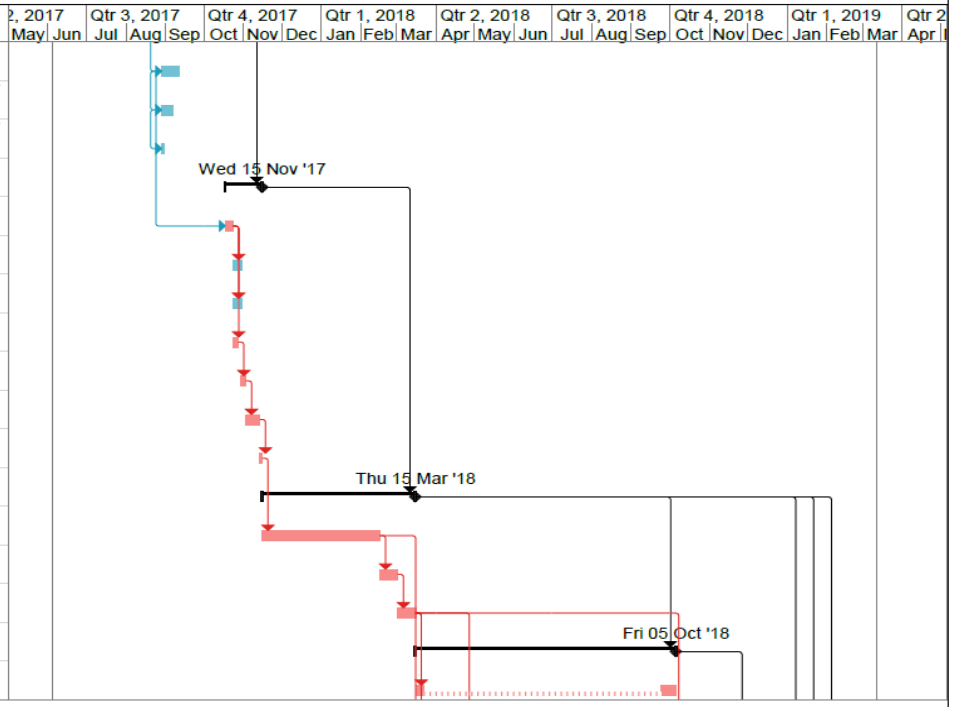


Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Path Driving Predecessor Milestone Task
Path Driving Predecessor Summary Task
Path Driving Predecessor Normal Task
Critical
Critical Split
Progress
Manual Progress

SHEDULE

SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis

ID	WBS	Task Name	Duration	Predecessors	Start	Finish
34	5.4	Form and pour Columns & beams	10 days	33SS	Tue 29 Aug '17	Mon 11 Sep '17
35	5.5	Cure Columns & Beams	7 days	34SS	Tue 29 Aug '17	Wed 06 Sep '17
36	5.6	Strip forms from Column & Beams	2 days	35SS	Tue 29 Aug '17	Wed 30 Aug '17
37	6	Form and Pour Concrete 1st Floor	21 days	30	Wed 18 Oct '17	Wed 15 Nov '17
38	6.1	Form 1st floor	4 days	34SS	Wed 18 Oct '17	Mon 23 Oct '17
39	6.2	Install electrical underground	5 days	38	Tue 24 Oct '17	Mon 30 Oct '17
40	6.3	Install plumbing underground	5 days	38	Tue 24 Oct '17	Mon 30 Oct '17
41	6.4	Install rebar and in-floor utilities	4 days	38	Tue 24 Oct '17	Fri 27 Oct '17
42	6.5	Pour 1st floor slab	4 days	41	Mon 30 Oct '17	Thu 02 Nov '17
43	6.6	Cure 1st floor slab	7 days	42	Fri 03 Nov '17	Mon 13 Nov '17
44	6.7	Strip forms from 1st floor slab	2 days	43	Tue 14 Nov '17	Wed 15 Nov '17
45	7	First Floor Walls and Openings	75 days	37	Thu 16 Nov '17	Thu 15 Mar '18
46	7.1	Erect Rebars & lay Block with openings	55 days	44	Thu 16 Nov '17	Thu 15 Feb '18
47	7.2	Form and pour Columns & beams with rebars	10 days	46	Fri 16 Feb '18	Thu 01 Mar '18
48	7.3	Cure and strip columns and Beams	10 days	47	Fri 02 Mar '18	Thu 15 Mar '18
49	8	Masonry Work	146 days	45	Fri 16 Mar '18	Fri 05 Oct '18
50	8.1	Install exterior masonry stone work	14 days	48	Fri 16 Mar '18	Fri 05 Oct '18



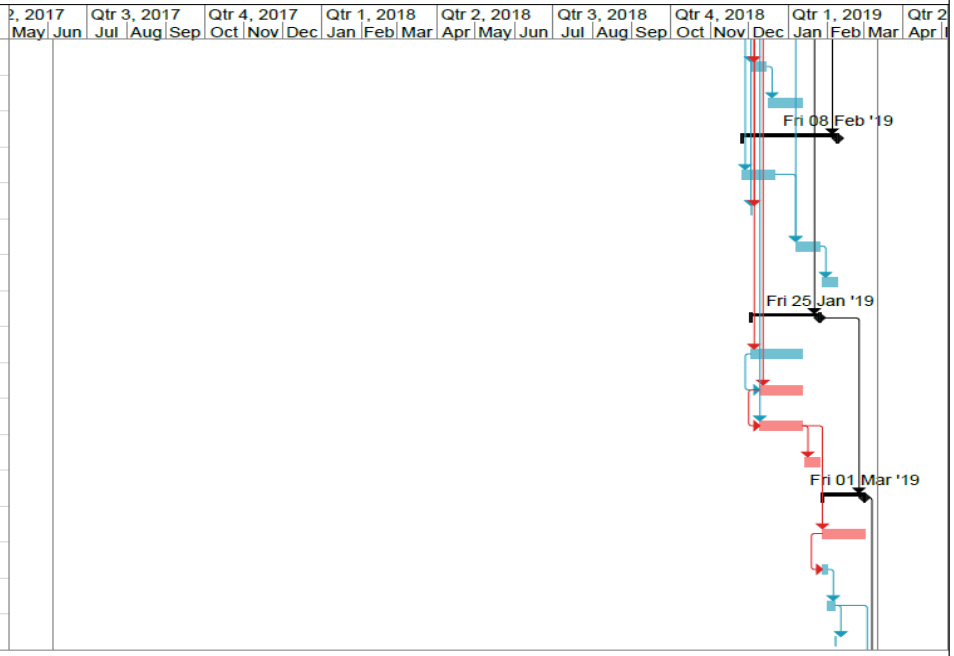
Task	Inactive Milestone	Start-only	Path Driving Predecessor Summary Task
Split	Inactive Summary	Finish-only	Path Driving Predecessor Normal Task
Milestone	Manual Task	External Tasks	Critical
Summary	Duration-only	External Milestone	Critical Split
Project Summary	Manual Summary Rollup	Deadline	Progress
Inactive Task	Manual Summary	Path Driving Predecessor Milestone Task	Manual Progress

Dennis McDermott

Page 3

SHEDULE
SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis

ID	WB	Task Name	Duration	Predecessors	Start	Finish
68	11.8	Complete interior and exterior plantings	10 days	51,56	Mon 03 Dec '18	Fri 14 Dec '18
69	11.9	Pave, curb, and stripe parking lot	10 days	68	Mon 17 Dec '18	Fri 11 Jan '19
70	12	Plumbing	45 days	45	Mon 26 Nov '18	Fri 08 Feb '19
71	12.1	Rough-in plumbing in block walls	20 days	66	Mon 26 Nov '18	Fri 21 Dec '18
72	12.2	Sitting of external Waste pipes	1 day	51,56	Mon 03 Dec '18	Mon 03 Dec '18
73	12.3	Set plumbing fixtures and trim	15 days	66,71	Mon 07 Jan '19	Fri 25 Jan '19
74	12.4	Flush, test, and clean piping and fixtures	10 days	73	Mon 28 Jan '19	Fri 08 Feb '19
75	13	Electrical	30 days	45	Mon 03 Dec '18	Fri 25 Jan '19
76	13.1	Rough-in electrical in masonry walls	20 days	56	Mon 03 Dec '18	Fri 11 Jan '19
77	13.2	Pull wire in conduit and set area transformers	15 days	59,76SS	Mon 10 Dec '18	Fri 11 Jan '19
78	13.3	Install and terminate electrical devices	15 days	62,77SS	Mon 10 Dec '18	Fri 11 Jan '19
79	13.4	Install light fixtures - test and clean	10 days	78	Mon 14 Jan '19	Fri 25 Jan '19
80	14	Final Clean-up and Occupancy	25 days	75	Mon 28 Jan '19	Fri 01 Mar '19
81	14.1	Install non-slip Ceramic tile flooring in main	25 days	78	Mon 28 Jan '19	Fri 01 Mar '19
82	14.2	Clean tile floors	4 days	81SS	Mon 28 Jan '19	Thu 31 Jan '19
83	14.3	Remove debris from building and do final	4 days	82	Fri 01 Feb '19	Wed 06 Feb '19
84	14.4	Substantial completion date	1 day	83	Thu 07 Feb '19	Thu 07 Feb '19

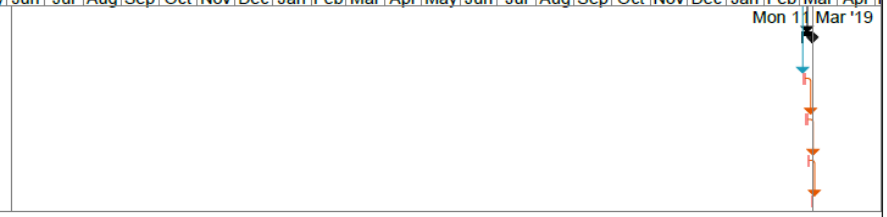


Task	Inactive Milestone	Start-only	Path Driving Predecessor Summary Task
Split	Inactive Summary	Finish-only	Path Driving Predecessor Normal Task
Milestone	Manual Task	External Tasks	Critical
Summary	Duration-only	External Milestone	Critical Split
Project Summary	Manual Summary Rollup	Deadline	Progress
Inactive Task	Manual Summary	Path Driving Predecessor Milestone Task	Manual Progress

SHEDULE

SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis

ID	WBS	Task Name	Duration	Predecessors	Start	Finish
85	15	Complete Final Inspections	6 days	80	Mon 04 Mar '19	Mon 11 Mar '19
86	15.1	Complete punch list items from all	2 days	83	Mon 04 Mar '19	Tue 05 Mar '19
87	15.2	Obtain certificate of occupancy	2 days	86	Wed 06 Mar '19	Thu 07 Mar '19
88	15.3	Issue final completion documents including	1 day	87	Fri 08 Mar '19	Fri 08 Mar '19
89	15.4	Issue final request for payment	1 day	88	Mon 11 Mar '19	Mon 11 Mar '19



Task	Inactive Milestone	Start-only	Path Driving Predecessor Summary Task
Split	Inactive Summary	Finish-only	Path Driving Predecessor Normal Task
Milestone	Manual Task	External Tasks	Critical
Summary	Duration-only	External Milestone	Critical Split
Project Summary	Manual Summary Rollup	Deadline	Progress
Inactive Task	Manual Summary	Path Driving Predecessor Milestone Task	Manual Progress

4.5 Sustainable Project Cost Management Plan

Estimate Costs

Chart 4.0.9 Cost Estimate Work Sheet (source: Compiled by the author)

COST ESTIMATE WORK SHEET						
Analogous Estimates (Activity cost estimate)(EC$)						
Project # FGP 1		**Size of Previous Activities**	**Cost of Previous Activities**	**Size of current Activity**	**Cost per square foot of previous activities**	**Cost estimate of current Activities**
1 (2017 projection)	First floor	876 Square Feet	150000	3120	171+ 29=200	624,000.00
	Ground Floor	876 Square Feet	150000	2496	171	426,816.00
	Estimate TOTAL					1,050,816.00
2(2016 completed)		5400 Square Feet	1,215,000.00	5424	225	1,220,400.00
3 (2016 completed)		3050 Square Feet	610,000.00	5424	EC$ 200.00 /Sq.Ft)	1,084,800.00
Three-Point Estimate						
FORMULA:		**Triangular Distribution.** E = (O + ML + P) / 3 **Beta Distribution** (PERT) E = (O + 4ML +P)/6 Where: E = effort, O = optimistic, ML = Most Likely, and P = pessimistic, respectively.				

VALUES: (cost per square foot)	Optimistic (O) 171.00	Most likely. (171+200+ 200+225)= EC$199.00	Pessimi stic(P) = EC$250 .00		
CALCULATIONS: Beta Distribution (PERT)	(171+(4×199)+250)÷ 6= 203				
	Activity cost estimate		203 X 5424= **EC$ 1,101,072.00**		

Chart 4.0.10 Project Budget (Source: Compile by Author)

PROJECT BUDGET				
COST ESTIMATION				
Project Management Plan For New Seventh-day Adventist Church Building To Be Built In St. Kitts.				
Project code / # : FGP 1	Project Manager: Dennis McDermott	Project Start: Tue 06 June 2017	Standard: Y☑ N☐ Shift: Y☐ N☐ Overtime: Y☐ N☐	Estimation Techniques ☐Parametric ☑Analogous ☐Ratio Estimating ☐Power-Series Estimating ☑Range Estimating ☑Three-Point Estimating ☐Bottom-Up Techniques
Country: St. Kitts	Project Sponsor: Faith in Emmanuel SDA Church	Project Finish: Mon 29 Jul 2019	UNITS: Work: Hour Duration: Day **Cost:** Currency: EC$ Accuracy: Nearest dollar	
Days per month: 20	Hours per day: 9	Measurement: Imperial		
Budget Estimate			Basis of Estimate	
Budget Compo	Activity cost estimate	**EC$1,101,072.00**	Using **Analogous Technique**, three similar but not identical projects were identified and each cost per square foot was	
	Activity Contingency	EC$ 1,101,072.00 X .15 =		

	Reserve	**EC$162720.00**	extrapolated. Each cost per square foot was then multiplied by the square feet of the new building to get a range of estimates. **Three-Point Estimate** was then used to determine an average estimate of the cost per square foot. Expert judgment also indicated that the cost may reach 250.00 per square foot at the most. Assumptions: The Pessimistic cost per SQ. FT. is the lowest cost per foot from the three The Most likely cost per SQ. FT. is the average of all three cost. The pessimistic cost per square foot is derived from expert judgment.
	Work package cost estimate	EC$1,101,072.00 + EC$**162720.00** = **EC$1263,792.00**	
	Contingency Reserve	EC$1263,792.00 X .15 = **EC$189,568.00**	
	Control of accounts / cost Baseline	EC$1263,792.00 + EC$189,568.00 = **EC$1,453,360.00**	
	Management Reserve	EC$1,453,360.00 X .15 = **EC$ 218,004.00**	
	Project Budget	EC$1,453,360.00 + EC$ **218,004.00** = **EC$ 1,671,364.00**	
Degree of confidence		90 % confident that the budget will not be exceeded Provided that the project is finished within two years.	

Chart 4.0.11 Budget Breakdown and Control (Source: Compiled by Author)

SDA CHURCH BUILDING, ST. PETERS, ST. KITTS, ST. KITTS & NEVIS (LEVEL 1)										
Level 1 Activities		Schedule			Cost= 80%				**Control Dates**	**Methods**
WBS		Schedule (days)	Schedule (hours)	%	%	Work Package	Labor (40%)	Material (60%)	Milestones	
1	Preliminary	11	88	2					Mon 31 Jul 17	
2	Long Lead Procurement	7	56	1					Thu 22 Jun 17	
3	Temporary facilities & Services	20	160	4	5	EC$44,043	EC$26,426	EC$17,617	Wed 06 Sep 17	Earn Value analysis
4	Foundation and Ground Floor	27	216	5	15	EC$132,129	EC$79,277	EC$52,851	Fri 13 Oct 17	Earn Value

										analysis
5	Ground Floor Walls and Openings	35	280	7	8	EC$70,469	EC$42,281	EC$28,187	Mon 29 Jan 18	Earn Value analysis
6	Form and Pour Concrete 1st Floor	19	152	4	10	EC$88,086	EC$52,851	EC$35,234	Fri 23 Feb 18	Earn Value analysis
7	First Floor Walls and Openings	75	600	15	9	EC$79,277	EC$47,566	EC$31,711	Fri 08 Jun 18	Earn Value analysis
8	Masonry Work	50	400	10	7	EC$61,660	EC$36,996	EC$24,664	Mon 14 Jan 19	Earn Value analysis
9	Roofing	40	320	8	10	EC$88,086	EC$52,851	EC$35,234	Mon 11 Mar 19	Earn Value analysis
10	Window and Doors	10	80	2	6	EC$52,851	EC$31,711	EC$21,141	Mon 01 Apr 19	Earn Value analysis
11	Building Finishes	110	880	21	14	EC$123,320	EC$73,992	EC$49,328	Mon 10 Jun 19	Earn Value analysis

12	Plumbing	45	360	9	6	EC$52,851	EC$31,711	EC$21,141	Tue 14 May 19	Earn Value analysis
13	Electrical	35	280	7	8	EC$70,469	EC$42,281	EC$28,187	Mon 03 Jun 19	Earn Value analysis
14	Final Clean-up and Occupancy	25	200	5	2	EC$17,617.	EC$10,570	EC$7,047	Fri 19 Jul 19	Earn Value analysis
15	Complete Final Inspections	6	48	1					Mon 29 Jul 19	Earn Value analysis
Subtotal		**515**	**4120**	**100**	**100**	**EC$880,858.000**	**EC$528,515**	**EC$352,343**		
Administrative cost. 20%						**EC$ 220214.00**	Activity contingency		Work package cost estimate	
Total Activity cost less contingency						**5,221.00**	**EC$140,283.00**		**EC$1,075,504.00**	

Control of Accounts

In order to monitor and control the cost, schedule and quality of all activities the following analysis will be performed for the millstones dates listed.

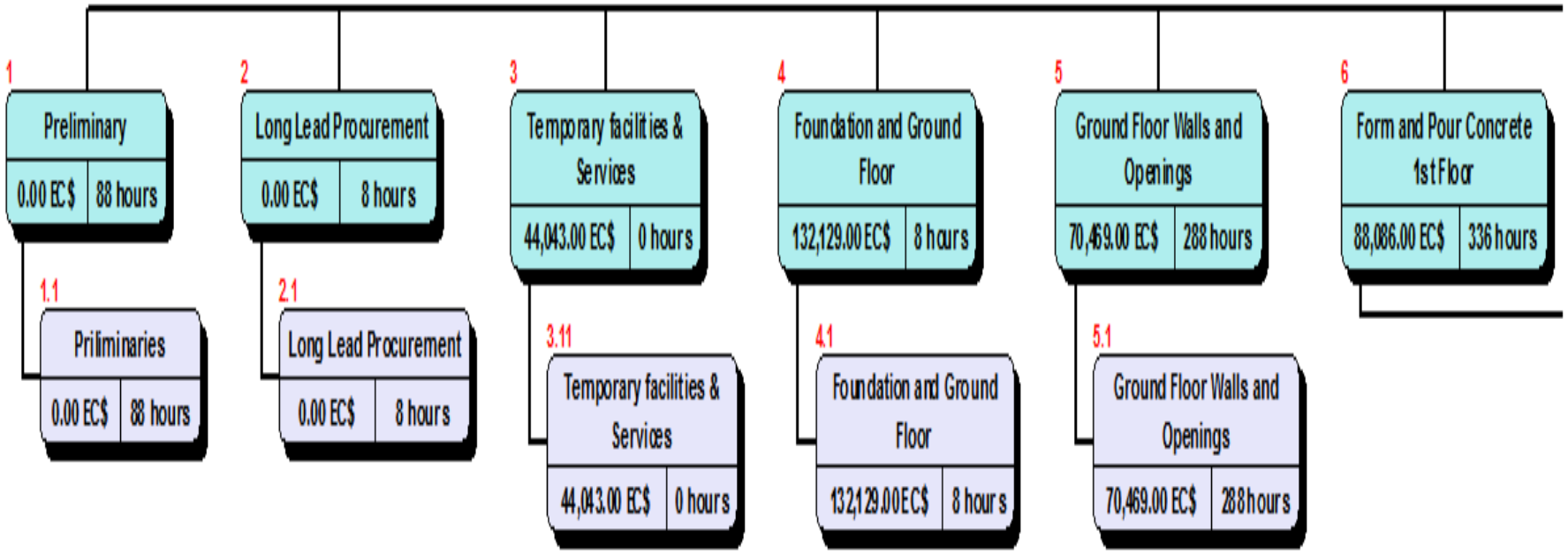
- Earned value performance
- Trend analysis
- Variance analysis
- Root cause analysis
- Risk analysis

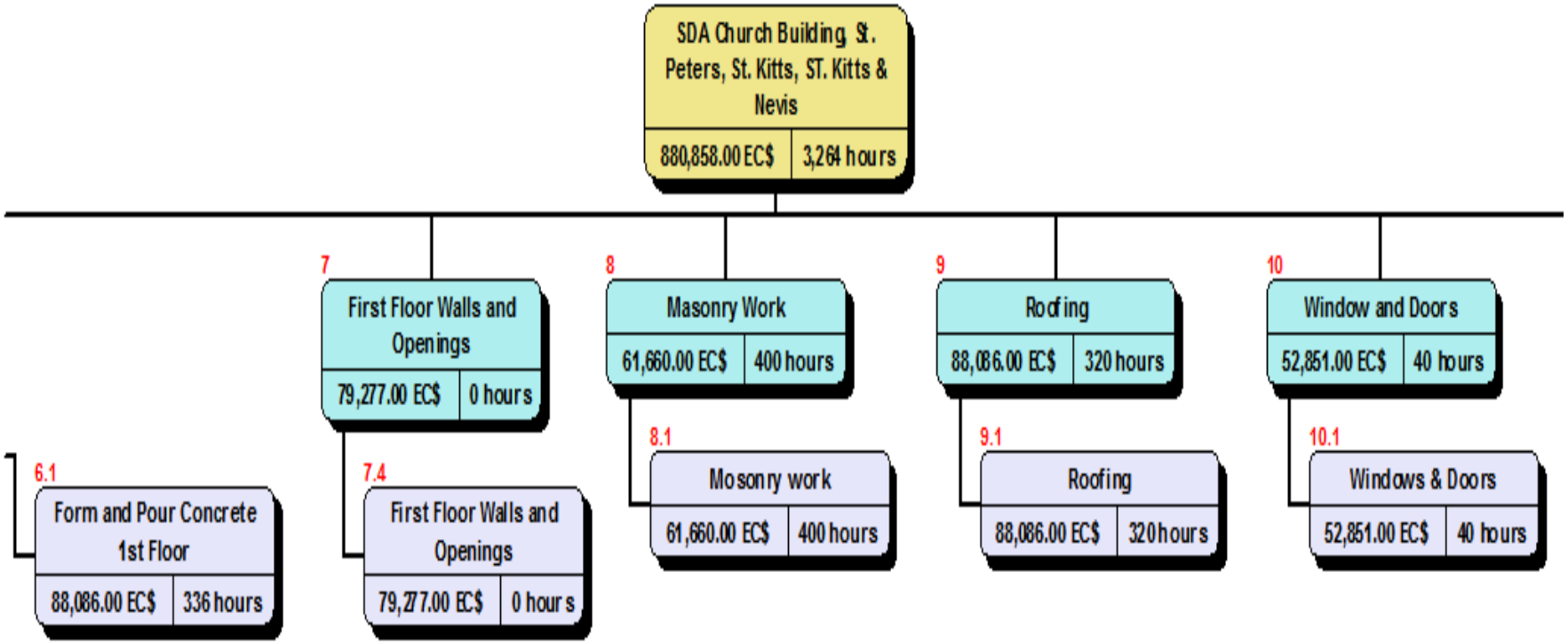
Contingencies:

All contingencies will be managed by the project manager and only will be spent after a cost justification.

The project team will meet to decide on thresholds, triggers, and response strategies.

Chart 4.0.12 Cost Breakdown Structure (Source: Compiled by Author)




SDA Church Building St. Peters, St. Kitts, ST. Kitts & Nevis
880,858.00 EC$
3,264 hours
6.1
Form and Pour Concrete 1st Floor
88,086.00 EC$
336 hours
7
First Floor Walls and Openings
79,277.00 EC$
0 hours
7.4
First Floor Walls and Openings
79,277.00 EC$
0 hours
8
Masonry Work
61,660.00 EC$
400 hours
8.1
Mosonry work
61,660.00 EC$
400 hours
9
Roofing
88,086.00 EC$
320 hours
9.1
Roofing
88,086.00 EC$
320 hours
10
Window and Doors
52,851.00 EC$
40 hours
10.1
Windows & Doors
52,851.00 EC$
40 hours

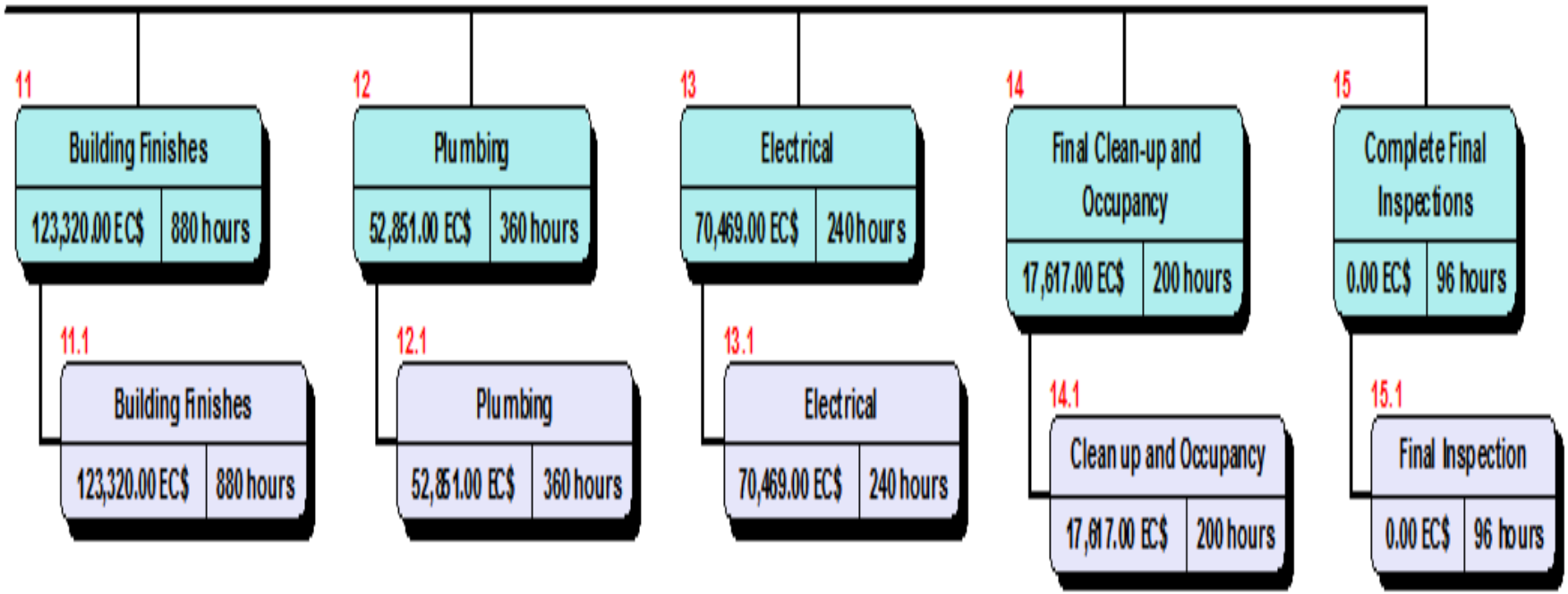
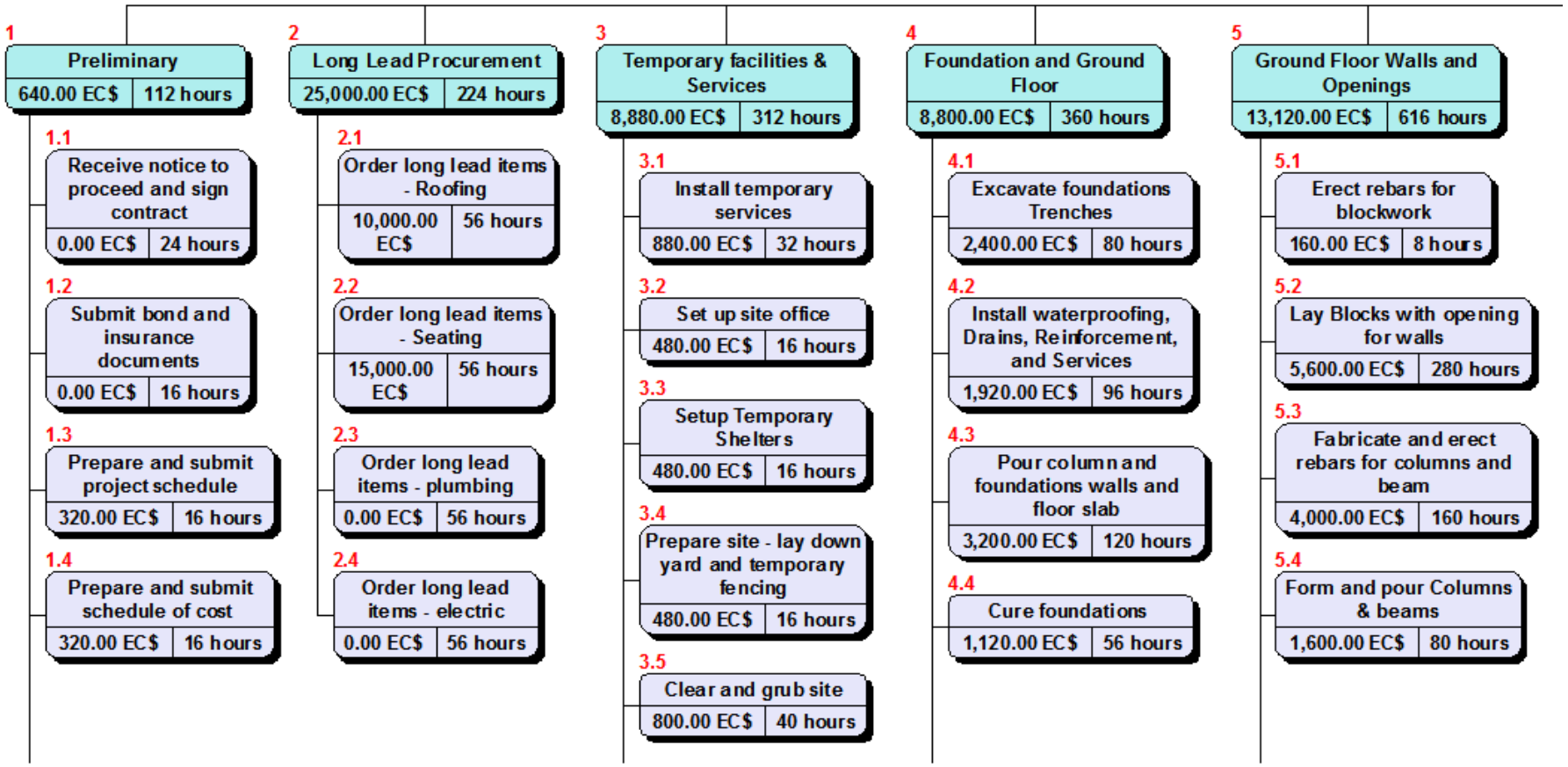
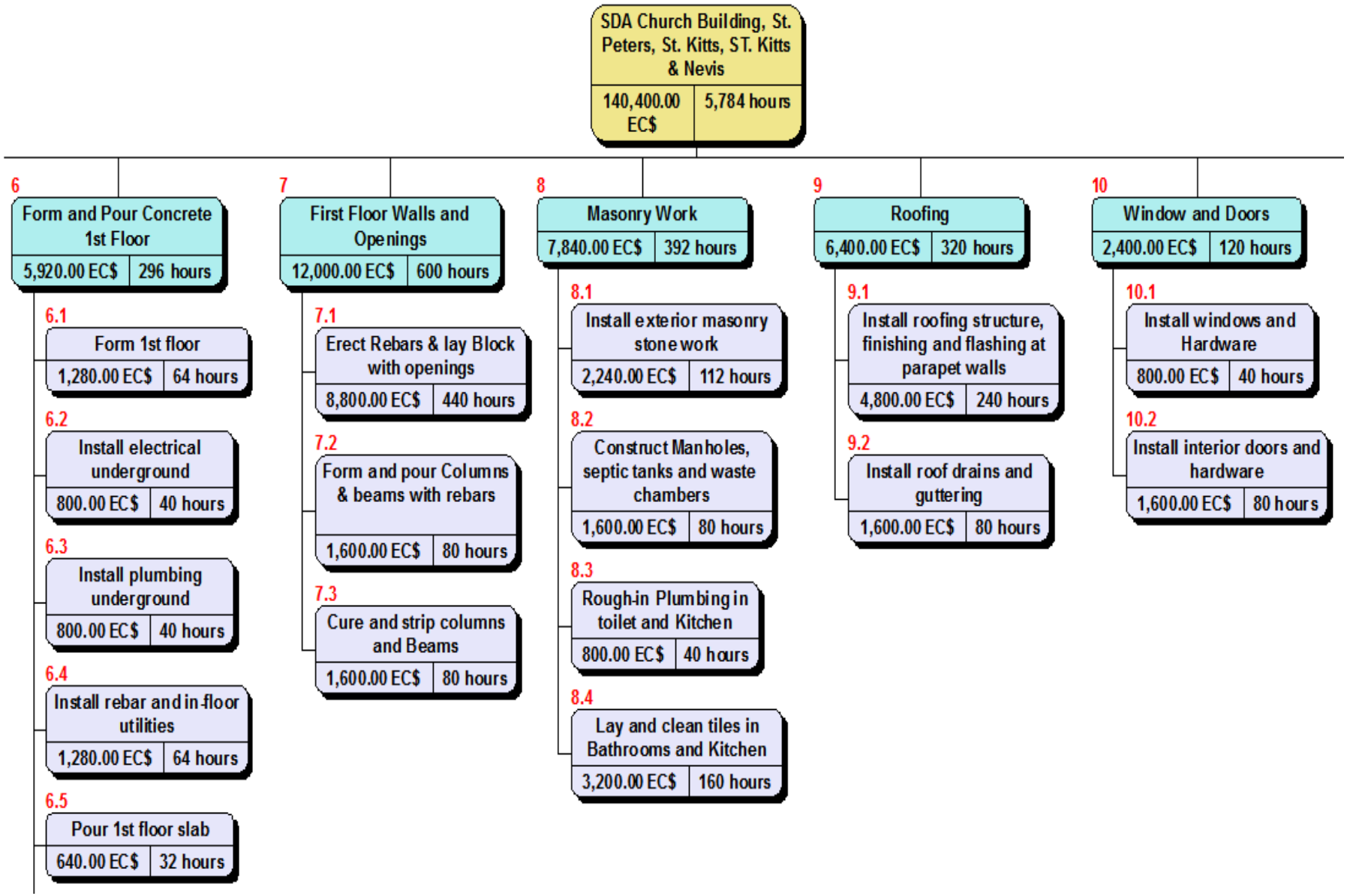
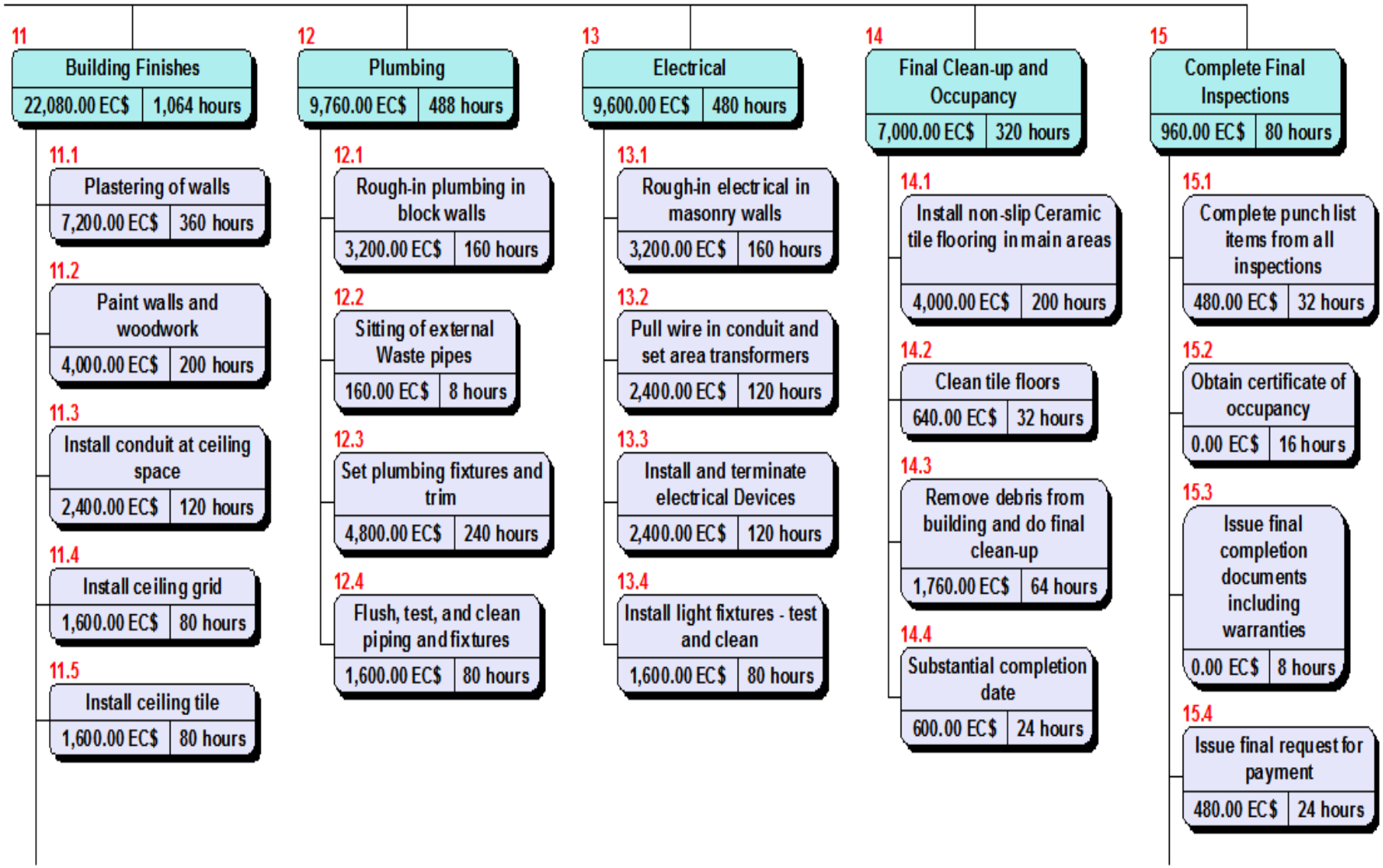
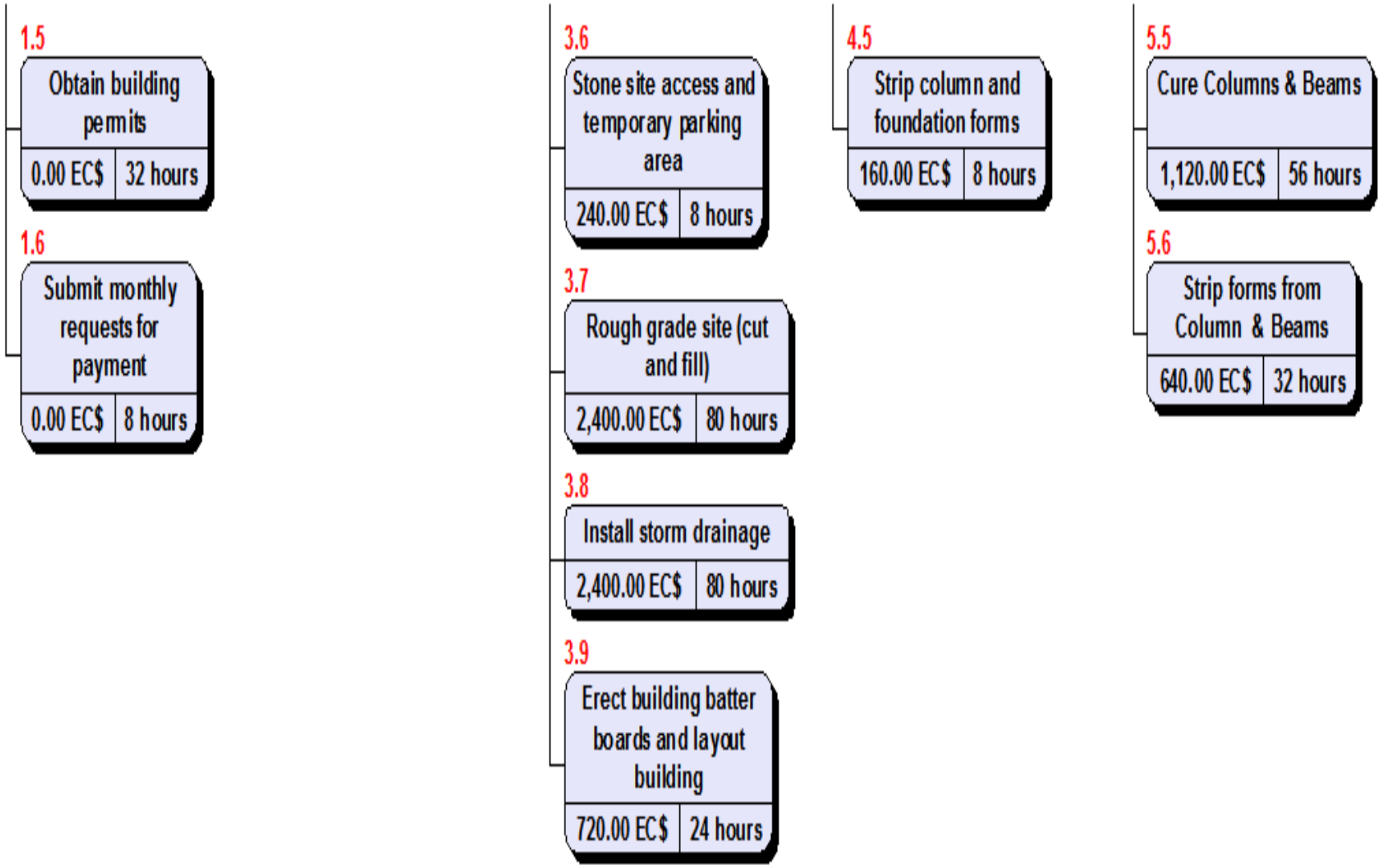

11
Building Finishes
123,320.00 EC$
880 hours
11.1
Building Finishes
123,320.00 EC$
880 hours
12
Plumbing
52,851.00 EC$
360 hours
12.1
Plumbing
52,851.00 EC$
360 hours
13
Electrical
70,469.00 EC$
240 hours
13.1
Electrical
70,469.00 EC$
240 hours
14
Final Clean-up and Occupancy
17,617.00 EC$
200 hours
14.1
Clean up and Occupancy
17,617.00 EC$
200 hours
15
Complete Final Inspections
0.00 EC$
96 hours
15.1
Final Inspection
0.00 EC$
96 hours

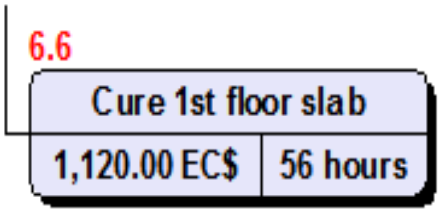
Chart 4.0.13 Labour Cost Work Breakdown Structure (Source: Compiled by Author)

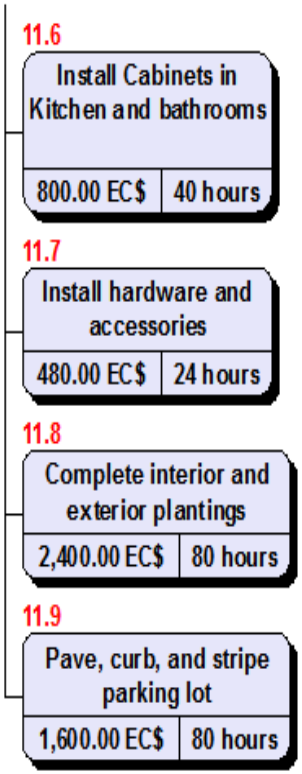



SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis
140,400.00 EC$
5,784 hours
6
Form and Pour Concrete 1st Floor
5,920.00 EC$
296 hours
6.1
Form 1st floor
1,280.00 EC$
64 hours
6.2
Install electrical underground
800.00 EC$
40 hours
6.3
Install plumbing underground
800.00 EC$
40 hours
6.4
Install rebar and in-floor utilities
1,280.00 EC$
64 hours
6.5
Pour 1st floor slab
640.00 EC$
32 hours
7
First Floor Walls and Openings
12,000.00 EC$
600 hours
7.1
Erect Rebars & lay Block with openings
8,800.00 EC$
440 hours
7.2
Form and pour Columns & beams with rebars
1,600.00 EC$
80 hours
7.3
Cure and strip columns and Beams
1,600.00 EC$
80 hours
8
Masonry Work
7,840.00 EC$
392 hours
8.1
Install exterior masonry stone work
2,240.00 EC$
112 hours
8.2
Construct Manholes, septic tanks and waste chambers
1,600.00 EC$
80 hours
8.3
Rough-in Plumbing in toilet and Kitchen
800.00 EC$
40 hours
8.4
Lay and clean tiles in Bathrooms and Kitchen
3,200.00 EC$
160 hours
9
Roofing
6,400.00 EC$
320 hours
9.1
Install roofing structure, finishing and flashing at parapet walls
4,800.00 EC$
240 hours
9.2
Install roof drains and guttering
1,600.00 EC$
80 hours
10
Window and Doors
2,400.00 EC$
120 hours
10.1
Install windows and Hardware
800.00 EC$
40 hours
10.2
Install interior doors and hardware
1,600.00 EC$
80 hours


11
Building Finishes
22,080.00 EC$
1,064 hours
11.1
Plastering of walls
7,200.00 EC$
360 hours
11.2
Paint walls and woodwork
4,000.00 EC$
200 hours
11.3
Install conduit at ceiling space
2,400.00 EC$
120 hours
11.4
Install ceiling grid
1,600.00 EC$
80 hours
11.5
Install ceiling tile
1,600.00 EC$
80 hours
12
Plumbing
9,760.00 EC$
488 hours
12.1
Rough-in plumbing in block walls
3,200.00 EC$
160 hours
12.2
Sitting of external Waste pipes
160.00 EC$
8 hours
12.3
Set plumbing fixtures and trim
4,800.00 EC$
240 hours
12.4
Flush, test, and clean piping and fixtures
1,600.00 EC$
80 hours
13
Electrical
9,600.00 EC$
480 hours
13.1
Rough-in electrical in masonry walls
3,200.00 EC$
160 hours
13.2
Pull wire in conduit and set area transformers
2,400.00 EC$
120 hours
13.3
Install and terminate electrical Devices
2,400.00 EC$
120 hours
13.4
Install light fixtures - test and clean
1,600.00 EC$
80 hours
14
Final Clean-up and Occupancy
7,000.00 EC$
320 hours
14.1
Install non-slip Ceramic tile flooring in main areas
4,000.00 EC$
200 hours
14.2
Clean tile floors
640.00 EC$
32 hours
14.3
Remove debris from building and do final clean-up
1,760.00 EC$
64 hours
14.4
Substantial completion date
600.00 EC$
24 hours
15
Complete Final Inspections
960.00 EC$
80 hours
15.1
Complete punch list items from all inspections
480.00 EC$
32 hours
15.2
Obtain certificate of occupancy
0.00 EC$
16 hours
15.3
Issue final completion documents including warranties
0.00 EC$
8 hours
15.4
Issue final request for payment
480.00 EC$
24 hours


1.5
Obtain building permits
0.00 EC$
32 hours
1.6
Submit monthly requests for payment
0.00 EC$
8 hours
3.6
Stone site access and temporary parking area
240.00 EC$
8 hours
3.7
Rough grade site (cut and fill)
2,400.00 EC$
80 hours
3.8
Install storm drainage
2,400.00 EC$
80 hours
3.9
Erect building batter boards and layout building
720.00 EC$
24 hours
4.5
Strip column and foundation forms
160.00 EC$
8 hours
5.5
Cure Columns & Beams
1,120.00 EC$
56 hours
5.6
Strip forms from Column & Beams
640.00 EC$
32 hours


6.6
Cure 1st floor slab
1,120.00 EC$
56 hours


11.6
Install Cabinets in Kitchen and bathrooms
800.00 EC$
40 hours
11.7
Install hardware and accessories
480.00 EC$
24 hours
11.8
Complete interior and exterior plantings
2,400.00 EC$
80 hours
11.9
Pave, curb, and stripe parking lot
1,600.00 EC$
80 hours

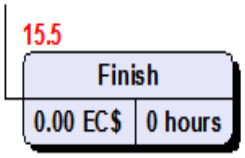

15.5
Finish
0.00 EC$
0 hours

Chart 4.0.14 Resource Baseline Cost (Source: Compiled by Author)

RESOURCE BASELINE COST
SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis

	WBS	Name	Durat...	Start	Finish	Cost	Work	Baseline Duration	Baseline Start	Baseline Finish	Baseline Cost	Baseline Work	Duration Varian...	Start Variance	Finish Variance	Cost Variance	Work Variance
0		**SDA Church Building, St. Peters, St. Kitts, ST. Kitts & Nevis**	**537d**	**06-06-2017**	**29-07-2019**	**140,400.00**	**5,784h**	**537d**	**06-06-2017**	**29-07-2019**	**140,400.00 EC$**	**5,784h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
1	**1**	**Preliminary**	**40d**	**06-06-2017**	**31-07-2017**	**640.00 EC**	**112h**	**40d**	**06-06-2017**	**31-07-2017**	**640.00 EC$**	**112h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
2	1.1	Receive notice to proceed and sign contract	3d	06-06-2017	08-06-2017	0.00 EC$	24h	3d	06-06-2017	08-06-2017	0.00 EC$	24h	0d	0d	0d	0.00 EC$	0h
3	1.2	Submit bond and insurance documents	2d	09-06-2017	12-06-2017	0.00 EC$	16h	2d	09-06-2017	12-06-2017	0.00 EC$	16h	0d	0d	0d	0.00 EC$	0h
4	1.3	Prepare and submit project schedule	2d	13-06-2017	14-06-2017	320.00 EC	16h	2d	13-06-2017	14-06-2017	320.00 EC$	16h	0d	0d	0d	0.00 EC$	0h
5	1.4	Prepare and submit schedule of cost	2d	15-06-2017	16-06-2017	320.00 EC	16h	2d	15-06-2017	16-06-2017	320.00 EC$	16h	0d	0d	0d	0.00 EC$	0h
6	1.5	Obtain building permits	4d	19-06-2017	22-06-2017	0.00 EC$	32h	4d	19-06-2017	22-06-2017	0.00 EC$	32h	0d	0d	0d	0.00 EC$	0h
7	1.6	Submit monthly requests for payment	1d	31-07-2017	31-07-2017	0.00 EC$	8h	1d	31-07-2017	31-07-2017	0.00 EC$	8h	0d	0d	0d	0.00 EC$	0h
8	**2**	**Long Lead Procurement**	**7d**	**14-06-2017**	**22-06-2017**	**25,000.00**	**224h**	**7d**	**14-06-2017**	**22-06-2017**	**25,000.00 EC$**	**224h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
9	2.1	Order long lead items - Roofing	7d	15-06-2017	29-06-2017	10,000.00	56h	7d	15-06-2017	29-06-2017	10,000.00 EC$	56h	0d	0d	0d	0.00 EC$	0h
10	2.2	Order long lead items - Seating	7d	30-06-2017	10-07-2017	15,000.00	56h	7d	30-06-2017	10-07-2017	15,000.00 EC$	56h	0d	0d	0d	0.00 EC$	0h
11	2.3	Order long lead items - plumbing	7d	11-07-2017	19-07-2017	0.00 EC$	56h	7d	11-07-2017	19-07-2017	0.00 EC$	56h	0d	0d	0d	0.00 EC$	0h
12	2.4	Order long lead items - electric	7d	20-07-2017	28-07-2017	0.00 EC$	56h	7d	20-07-2017	28-07-2017	0.00 EC$	56h	0d	0d	0d	0.00 EC$	0h
13	**3**	**Temporary facilities & Services**	**26d**	**31-07-2017**	**06-09-2017**	**8,880.00 E**	**312h**	**26d**	**31-07-2017**	**06-09-2017**	**8,880.00 EC$**	**312h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
14	3.1	Install temporary services	4d	31-07-2017	03-08-2017	880.00 EC	32h	4d	31-07-2017	03-08-2017	880.00 EC$	32h	0d	0d	0d	0.00 EC$	0h
15	3.2	Set up site office	2d	04-08-2017	16-08-2017	480.00 EC	16h	2d	04-08-2017	16-08-2017	480.00 EC$	16h	0d	0d	0d	0.00 EC$	0h
16	3.3	Setup Temporary Shelters	2d	17-08-2017	18-08-2017	480.00 EC	16h	2d	17-08-2017	18-08-2017	480.00 EC$	16h	0d	0d	0d	0.00 EC$	0h
17	3.4	Prepare site - lay down yard and temporary fencing	2d	31-07-2017	01-08-2017	480.00 EC	16h	2d	31-07-2017	01-08-2017	480.00 EC$	16h	0d	0d	0d	0.00 EC$	0h
18	3.5	Clear and grub site	5d	31-07-2017	04-08-2017	800.00 EC	40h	5d	31-07-2017	04-08-2017	800.00 EC$	40h	0d	0d	0d	0.00 EC$	0h
19	3.6	Stone site access and	1d	16-08-2017	16-08-2017	240.00 EC	8h	1d	16-08-2017	16-08-2017	240.00 EC$	8h	0d	0d	0d	0.00 EC$	0h

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		temporary parking area															
20	3.7	Rough grade site (cut and fill)	5d	09-08-2017	15-08-2017	2,400.00 E	80h	5d	09-08-2017	15-08-2017	2,400.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
21	3.8	Install storm drainage	10d	24-08-2017	06-09-2017	2,400.00 E	80h	10d	24-08-2017	06-09-2017	2,400.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
22	3.9	Erect building batter boards and layout building	3d	21-08-2017	23-08-2017	720.00 EC	24h	3d	21-08-2017	23-08-2017	720.00 EC$	24h	0d	0d	0d	0.00 EC$	0h
23	**4**	**Foundation and Ground Floor**	**27d**	**07-09-2017**	**13-10-2017**	**8,800.00 E**	**360h**	**27d**	**07-09-2017**	**13-10-2017**	**8,800.00 EC$**	**360h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
24	4.1	Excavate foundations Trenches	10d	07-09-2017	20-09-2017	2,400.00 E	80h	10d	07-09-2017	20-09-2017	2,400.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
25	4.2	Install waterproofing, Drains, Reinforcement, and Services	4d	21-09-2017	26-09-2017	1,920.00 E	96h	4d	21-09-2017	26-09-2017	1,920.00 EC$	96h	0d	0d	0d	0.00 EC$	0h
26	4.3	Pour column and foundations walls and floor slab	5d	27-09-2017	03-10-2017	3,200.00 E	120h	5d	27-09-2017	03-10-2017	3,200.00 EC$	120h	0d	0d	0d	0.00 EC$	0h
27	4.4	Cure foundations	7d	04-10-2017	12-10-2017	1,120.00 E	56h	7d	04-10-2017	12-10-2017	1,120.00 EC$	56h	0d	0d	0d	0.00 EC$	0h
28	4.5	Strip column and foundation forms	1d	13-10-2017	13-10-2017	160.00 EC	8h	1d	13-10-2017	13-10-2017	160.00 EC$	8h	0d	0d	0d	0.00 EC$	0h
29	**5**	**Ground Floor Walls and Openings**	**65d**	**16-10-2017**	**29-01-2018**	**13,120.00 I**	**616h**	**65d**	**16-10-2017**	**29-01-2018**	**13,120.00 EC$**	**616h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
30	5.1	Erect rebars for blockwork	1d	13-11-2017	13-11-2017	160.00 EC	8h	1d	13-11-2017	13-11-2017	160.00 EC$	8h	0d	0d	0d	0.00 EC$	0h
31	5.2	Lay Blocks with opening for walls	35d	27-11-2017	29-01-2018	5,600.00 E	280h	35d	27-11-2017	29-01-2018	5,600.00 EC$	280h	0d	0d	0d	0.00 EC$	0h
32	5.3	Fabricate and erect rebars for columns and beam	10d	16-10-2017	27-10-2017	4,000.00 E	160h	10d	16-10-2017	27-10-2017	4,000.00 EC$	160h	0d	0d	0d	0.00 EC$	0h
33	5.4	Form and pour Columns & beams	10d	30-10-2017	10-11-2017	1,600.00 E	80h	10d	30-10-2017	10-11-2017	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
34	5.5	Cure Columns & Beams	7d	14-11-2017	22-11-2017	1,120.00 E	56h	7d	14-11-2017	22-11-2017	1,120.00 EC$	56h	0d	0d	0d	0.00 EC$	0h
35	5.6	Strip forms from Column & Beams	4d	14-11-2017	24-11-2017	640.00 EC	32h	4d	14-11-2017	24-11-2017	640.00 EC$	32h	0d	0d	0d	0.00 EC$	0h
36	**6**	**Form and Pour Concrete 1st Floor**	**19d**	**30-01-2018**	**23-02-2018**	**5,920.00 E**	**296h**	**19d**	**30-01-2018**	**23-02-2018**	**5,920.00 EC$**	**296h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
37	6.1	Form 1st floor	4d	30-01-2018	02-02-2018	1,280.00 E	64h	4d	30-01-2018	02-02-2018	1,280.00 EC$	64h	0d	0d	0d	0.00 EC$	0h
38	6.2	Install electrical underground	5d	09-02-2018	15-02-2018	800.00 EC	40h	5d	09-02-2018	15-02-2018	800.00 EC$	40h	0d	0d	0d	0.00 EC$	0h

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39	6.3	Install plumbing underground	5d	05-02-2018	09-02-2018	800.00 EC	40h	5d	05-02-2018	09-02-2018	800.00 EC$	40h	0d	0d	0d	0.00 EC$	0h
40	6.4	Install rebar and in-floor utilities	4d	05-02-2018	08-02-2018	1,280.00 E	64h	4d	05-02-2018	08-02-2018	1,280.00 EC$	64h	0d	0d	0d	0.00 EC$	0h
41	6.5	Pour 1st floor slab	4d	09-02-2018	14-02-2018	640.00 EC	32h	4d	09-02-2018	14-02-2018	640.00 EC$	32h	0d	0d	0d	0.00 EC$	0h
42	6.6	Cure 1st floor slab	7d	15-02-2018	23-02-2018	1,120.00 E	56h	7d	15-02-2018	23-02-2018	1,120.00 EC$	56h	0d	0d	0d	0.00 EC$	0h
43	**7**	**First Floor Walls and Openings**	**75d**	**26-02-2018**	**08-06-2018**	**12,000.00 I**	**600h**	**75d**	**26-02-2018**	**08-06-2018**	**12,000.00 EC$**	**600h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
44	7.1	Erect Rebars & lay Block with openings	55d	26-02-2018	11-05-2018	8,800.00 E	440h	55d	26-02-2018	11-05-2018	8,800.00 EC$	440h	0d	0d	0d	0.00 EC$	0h
45	7.2	Form and pour Columns & beams with rebars	10d	14-05-2018	25-05-2018	1,600.00 E	80h	10d	14-05-2018	25-05-2018	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
46	7.3	Cure and strip columns and Beams	10d	28-05-2018	08-06-2018	1,600.00 E	80h	10d	28-05-2018	08-06-2018	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
47	**8**	**Masonry Work**	**146d**	**11-06-2018**	**14-01-2019**	**7,840.00 E**	**392h**	**146d**	**11-06-2018**	**14-01-2019**	**7,840.00 EC$**	**392h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
48	8.1	Install exterior masonry stone work	14d	11-06-2018	14-01-2019	2,240.00 E	112h	14d	11-06-2018	14-01-2019	2,240.00 EC$	112h	0d	0d	0d	0.00 EC$	0h
49	8.2	Construct Manholes, septic tanks and waste chambers	10d	15-06-2018	28-06-2018	1,600.00 E	80h	10d	15-06-2018	28-06-2018	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
50	8.3	Rough-in Plumbing in toilet and Kitchen	5d	11-06-2018	15-06-2018	800.00 EC	40h	5d	11-06-2018	15-06-2018	800.00 EC$	40h	0d	0d	0d	0.00 EC$	0h
51	8.4	Lay and clean tiles in Bathrooms and Kitchen	20d	23-07-2018	17-08-2018	3,200.00 E	160h	20d	23-07-2018	17-08-2018	3,200.00 EC$	160h	0d	0d	0d	0.00 EC$	0h
52	**9**	**Roofing**	**40d**	**15-01-2019**	**11-03-2019**	**6,400.00 E**	**320h**	**40d**	**15-01-2019**	**11-03-2019**	**6,400.00 EC$**	**320h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
53	9.1	Install roofing structure, finishing and flashing at parapet walls	30d	15-01-2019	25-02-2019	4,800.00 E	240h	30d	15-01-2019	25-02-2019	4,800.00 EC$	240h	0d	0d	0d	0.00 EC$	0h
54	9.2	Install roof drains and guttering	10d	26-02-2019	11-03-2019	1,600.00 E	80h	10d	26-02-2019	11-03-2019	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
55	**10**	**Window and Doors**	**15d**	**12-03-2019**	**01-04-2019**	**2,400.00 E**	**120h**	**15d**	**12-03-2019**	**01-04-2019**	**2,400.00 EC$**	**120h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
56	10.1	Install windows and Hardware	5d	12-03-2019	18-03-2019	800.00 EC	40h	5d	12-03-2019	18-03-2019	800.00 EC$	40h	0d	0d	0d	0.00 EC$	0h
57	10.2	Install interior doors and hardware	10d	19-03-2019	01-04-2019	1,600.00 E	80h	10d	19-03-2019	01-04-2019	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
58	**11**	**Building Finishes**	**237d**	**29-06-2018**	**10-06-2019**	**22,080.00 I**	**1,064h**	**237d**	**29-06-2018**	**10-06-2019**	**22,080.00 EC$**	**1,064h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
59	11.1	Plastering of walls	45d	29-06-2018	30-08-2018	7,200.00 E	360h	45d	29-06-2018	30-08-2018	7,200.00 EC$	360h	0d	0d	0d	0.00 EC$	0h

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60	11.2	Paint walls and woodwork	25d	31-08-2018	04-10-2018	4,000.00 E	200h	25d	31-08-2018	04-10-2018	4,000.00 EC$	200h	0d	0d	0d	0.00 EC$	0h
61	11.3	Install conduit at ceiling space	15d	26-02-2019	10-06-2019	2,400.00 E	120h	15d	26-02-2019	10-06-2019	2,400.00 EC$	120h	0d	0d	0d	0.00 EC$	0h
62	11.4	Install ceiling grid	10d	26-02-2019	11-03-2019	1,600.00 E	80h	10d	26-02-2019	11-03-2019	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
63	11.5	Install ceiling tile	10d	12-03-2019	25-03-2019	1,600.00 E	80h	10d	12-03-2019	25-03-2019	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
64	11.6	Install Cabinets in Kitchen and bathrooms	5d	26-02-2019	04-03-2019	800.00 EC	40h	5d	26-02-2019	04-03-2019	800.00 EC$	40h	0d	0d	0d	0.00 EC$	0h
65	11.7	Install hardware and accessories	3d	05-03-2019	07-03-2019	480.00 EC	24h	3d	05-03-2019	07-03-2019	480.00 EC$	24h	0d	0d	0d	0.00 EC$	0h
66	11.8	Complete interior and exterior plantings	10d	12-03-2019	25-03-2019	2,400.00 E	80h	10d	12-03-2019	25-03-2019	2,400.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
67	11.9	Pave, curb, and stripe parking lot	10d	26-03-2019	08-04-2019	1,600.00 E	80h	10d	26-03-2019	08-04-2019	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
68	**12**	**Plumbing**	**46d**	**12-03-2019**	**14-05-2019**	**9,760.00 E**	**488h**	**46d**	**12-03-2019**	**14-05-2019**	**9,760.00 EC$**	**488h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
69	12.1	Rough-in plumbing in block walls	20d	12-03-2019	08-04-2019	3,200.00 E	160h	20d	12-03-2019	08-04-2019	3,200.00 EC$	160h	0d	0d	0d	0.00 EC$	0h
70	12.2	Sitting of external Waste pipes	1d	14-05-2019	14-05-2019	160.00 EC	8h	1d	14-05-2019	14-05-2019	160.00 EC$	8h	0d	0d	0d	0.00 EC$	0h
71	12.3	Set plumbing fixtures and trim	15d	09-04-2019	29-04-2019	4,800.00 E	240h	15d	09-04-2019	29-04-2019	4,800.00 EC$	240h	0d	0d	0d	0.00 EC$	0h
72	12.4	Flush, test, and clean piping and fixtures	10d	30-04-2019	13-05-2019	1,600.00 E	80h	10d	30-04-2019	13-05-2019	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
73	**13**	**Electrical**	**60d**	**12-03-2019**	**03-06-2019**	**9,600.00 E**	**480h**	**60d**	**12-03-2019**	**03-06-2019**	**9,600.00 EC$**	**480h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
74	13.1	Rough-in electrical in masonry walls	20d	12-03-2019	08-04-2019	3,200.00 E	160h	20d	12-03-2019	08-04-2019	3,200.00 EC$	160h	0d	0d	0d	0.00 EC$	0h
75	13.2	Pull wire in conduit and set area transformers	15d	09-04-2019	29-04-2019	2,400.00 E	120h	15d	09-04-2019	29-04-2019	2,400.00 EC$	120h	0d	0d	0d	0.00 EC$	0h
76	13.3	Install and terminate electrical Devices	15d	30-04-2019	20-05-2019	2,400.00 E	120h	15d	30-04-2019	20-05-2019	2,400.00 EC$	120h	0d	0d	0d	0.00 EC$	0h
77	13.4	Install light fixtures - test and clean	10d	21-05-2019	03-06-2019	1,600.00 E	80h	10d	21-05-2019	03-06-2019	1,600.00 EC$	80h	0d	0d	0d	0.00 EC$	0h
78	**14**	**Final Clean-up and Occupancy**	**34d**	**04-06-2019**	**19-07-2019**	**7,000.00 E**	**320h**	**34d**	**04-06-2019**	**19-07-2019**	**7,000.00 EC$**	**320h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
79	14.1	Install non-slip Ceramic tile flooring in main areas	25d	04-06-2019	08-07-2019	4,000.00 E	200h	25d	04-06-2019	08-07-2019	4,000.00 EC$	200h	0d	0d	0d	0.00 EC$	0h
80	14.2	Clean tile floors	4d	09-07-2019	12-07-2019	640.00 EC	32h	4d	09-07-2019	12-07-2019	640.00 EC$	32h	0d	0d	0d	0.00 EC$	0h

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81	14.3	Remove debris from building and do final clean-up	4d	15-07-2019	18-07-2019	1,760.00 E	64h	4d	15-07-2019	18-07-2019	1,760.00 EC$	64h	0d	0d	0d	0.00 EC$	0h
82	14.4	Substantial completion date	1d	19-07-2019	19-07-2019	600.00 EC	24h	1d	19-07-2019	19-07-2019	600.00 EC$	24h	0d	0d	0d	0.00 EC$	0h
83	**15**	**Complete Final Inspections**	**6d**	**22-07-2019**	**29-07-2019**	**960.00 EC**	**80h**	**6d**	**22-07-2019**	**29-07-2019**	**960.00 EC$**	**80h**	**0d**	**0d**	**0d**	**0.00 EC$**	**0h**
84	15.1	Complete punch list items from all inspections	2d	22-07-2019	23-07-2019	480.00 EC	32h	2d	22-07-2019	23-07-2019	480.00 EC$	32h	0d	0d	0d	0.00 EC$	0h
85	15.2	Obtain certificate of occupancy	2d	24-07-2019	25-07-2019	0.00 EC$	16h	2d	24-07-2019	25-07-2019	0.00 EC$	16h	0d	0d	0d	0.00 EC$	0h
86	15.3	Issue final completion documents including warranties	1d	26-07-2019	26-07-2019	0.00 EC$	8h	1d	26-07-2019	26-07-2019	0.00 EC$	8h	0d	0d	0d	0.00 EC$	0h
87	15.4	Issue final request for payment	1d	29-07-2019	29-07-2019	480.00 EC	24h	1d	29-07-2019	29-07-2019	480.00 EC$	24h	0d	0d	0d	0.00 EC$	0h
88	15.5	Finish	0d	29-07-2019	29-07-2019	0.00 EC$	0h	0d	29-07-2019	29-07-2019	0.00 EC$	0h	0d	0d	0d	0.00 EC$	0h

4.6 Sustainable Project Quality Management Plan

Quality Roles and Responsibilities

In order to ensure that the project quality objectives are met the project team members with quality responsibilities are outlined in the Quality Management Plan.

Project Manager

1. Oversight of Quality Management Plan.
2. Outline quality requirements.
3. Ensure that quality audits are performed.
4. Review contractors performance
5. Schedule meetings for the project team to meet and review the project quality approach.
6. Appoint someone to manage the project quality.

Main Contractor

1. Manage subcontractors
2. Conduct and review quality inspections
3. Develop a process for ensuring quality
4. Ensure that the drawing specifications are followed
5. Ensure that each phase is sufficiently planed for.
6. Assess suppliers performance.

Site Manager

1. Inspect all supplies
2. Ensure that supplies are properly stored.
3. Ensure that storage facilities are maintained in good working order
4. Monitor inventory to ensure that supplies are of the desired quality
5. Document all reviews and audits performed
6. Provide feedback to the project manager on a regular basis or on demand

Quality Planning Approach

The FIE Church building shall be constructed to the highest standards of quality to ensure that the client is satisfied and work performed is accepted by emphasizing quality planning for prevention over using inspection as a primary quality tool. To achieve a high standard all person must develop a culture of quality and strive to achieve the highest standard and approval the first time work is performed. Quality is the responsibility of all.

In order to satisfy the client and provided work of the highest quality, the client requirement will be gathered and analyzed and planned for.

In addition, to ensure that quality is planned for, implemented and controlled, the St. Kitts and Nevis Building Code shall take precedence over every other applicable codes since the Federation of St. Kitts and Nevis is the local Authority Having jurisdictions (AHJ). The following codes are codes identified by the local authorities as applicable or reference in the code.

The following are processes and procedures that are to be followed:

1. Before the start of each phase of work, the contractor with direct responsibility shall provide a method statement that shall detail the following:
    A. Demographics of the contractor
    B. Schedule of all activities to be undertaken as part of the contract
    C. A list of milestone shall be provided for carrying out periodic quality inspections
    D. List of all risk tied into the schedule and a plan to mitigate the risk
    E. List of communication details of other contractors that may work concurrently or whose contract is a direct successor or predecessor to the contractor’s activities. The main contractor and risk manager shall be made available to provide assistance where possible.
    F. List of all tool and equipment necessary for completion of work and the source of the same.
    G. Comprehensive list of all materials, source, cost, and shall be tied into the contractor’s own schedule.

H. A list of names of all workers and labourers along with evidence of competence and experience as detailed in a Curriculum Vitae
I. Demonstration that all activities are planned in to comply with the SKN Building Code and specification of the Architectural Drawings. All relevant subsection of applicable codes shall be documented.
J. Where specialized training is required it shall be noted by the contractor
K. All labourer shall be properly inducted and sign an agreement to abide by the site rule

2. The project management team shall meet to discuss individual method statements to ensure proper understanding, integration into subsidiary project plans and shall may recommendation for further development or approval.
3. If the method statement is accepted the signature or the subcontractor, the main contractor, risk manager, and the project manager shall be affixed and dated in the order in which names are here listed, and two signed copies shall be provided to for the Project management office.
4. Material that are damaged in any way upon arrival shall not be accept. All materials shall be thoroughly inspected by the site manager and signed of and dated.
5. Materials shall be stored in such a way that will not cause damage, unnecessary stress, theft.
6. Upon reaching a milestone, the sub-contractor shall notify the main contractor and then a quality inspection shall be carried out. Upon approval, the work may progress to the next milestone.
7. Upon the completion and after an internal quality checks with the signed approval, the building inspector or special inspector assigned to the project by the local authorities shall be notified and a response shall be expected in accordance with the requirements of the inspector as outlines in the SKN Building code within 48 hours excluding weekends and public holidays.

8. If a defect is found and corrective actions require a change in the project scope, a written request shall be presented. In all cases, a written request along with clear justification and potential impact on project time and cost must be presented in accordance with the project change control process. Approval for such change must be signed by the project manager before any change to the project scope is made.
9. All quality inspections shall be properly signed and records preserved.
10. Before the handover of the project to the client, the Local Planning Authority shall issue a certificate of compliance and occupancy.
11. Where special training for facility is required, such training shall be done before the project is closed.

Quality Assurance Approach

Chart 4.0.15 Quality Assurance Approach (source: compiled by author)

ITEM	**QUALITY APPROACH**	**SPECIFICATION / REQUIREMENTS**	**QUALITY CONTROL**	**FREQUENCY**	**Quality Inspectors**
All items identified and pertinent to quality assurances and may include materials, processes,	All materials must conform to applicable codes and standards.	All items associated with the construction of the building shall conform to the specification of the approved	Verifications must be carried out to ensure conformity to specifications.	In order to prevent defects and to inspect for defect regular and schedule checks will be made.	The following persons shall affix their signature and the date of the same, in acknowledgment of the outcome of activities

ITEM	**QUALITY APPROACH**	**SPECIFICATION / REQUIREMENTS**	**QUALITY CONTROL**	**FREQUENCY**	**Quality Inspectors**
personnel's, equipment, or building components,		architectural drawings and the SKN Building Code.			undertaken to prevent or detect defects.
Cement	SKN Building Code or other applicable codes	Approved drawing specifications.	Inspection by site Manager	Contactor's Method Statement Material supply schedule and Project Schedule	Subcontractors, Main Contractor, Risk Manager, Project Manager
Wood	ditto	ditto	ditto	ditto	
water	ditto	ditto	ditto	ditto	
Steel	ditto	ditto	ditto	ditto	
Concrete blocks	ditto	ditto	ditto	ditto	
Ironmongery	ditto	ditto	ditto	ditto	
Equipment	ditto	ditto	ditto	ditto	
	ditto	ditto	ditto		
	ditto	ditto	ditto		
materials					

ITEM	**QUALITY APPROACH**	**SPECIFICATION / REQUIREMENTS**	**QUALITY CONTROL**	**FREQUENCY**	**Quality Inspectors**
Setting out	ditto	ditto	Internal inspection, Building inspector	Contactor's Method Statement and Project Schedule	Subcontractors, Main Contractor, Risk Manager, Project Manager
Excavation	ditto	ditto	ditto	ditto	
foundation reinforcement	ditto	ditto	ditto	ditto	
Footing slab before concreting	ditto	ditto	ditto	ditto	
Ring beam casting and reinforcement	ditto	ditto	ditto	ditto	
Plumbing and drains	ditto	ditto	ditto	ditto	
Electrical works	ditto	ditto	ditto	ditto	
Mechanica	ditto	ditto	ditto	ditto	

ITEM	**QUALITY APPROACH**	**SPECIFICATION / REQUIREMENTS**	**QUALITY CONTROL**	**FREQUENCY**	**Quality Inspectors**
l works					
Walls and reinforcement	ditto	ditto	ditto	ditto	
Structural connections of roof	ditto	ditto	ditto	ditto	
Tiles	ditto	ditto	ditto	ditto	
Staircase	ditto	ditto	ditto	ditto	
Kitchen cabinets	ditto	ditto	ditto	ditto	
Wall finishing	ditto	ditto	ditto	ditto	
Doors and windows	ditto	ditto	ditto	ditto	
Landscaping	ditto	ditto	ditto	ditto	

The following are applicable codes and standard referenced by or acknowledged by the St. Kitts Building Code and the Local Planning Authority. Theses codes are to be referenced and set forth minimum standards for workmanship.

The code following are mainly British Standards (BS) various American Standard and Codes. Other codes are also mentioned such as the Caribbean Uniform Building Code (CUBiC). Whenever quality planning or audits are performed, these codes should be referenced with the aim of strict compliance to them.

BRITISH STANDARDS AND CODES APPLICABLE

CODE NO.	DESCRIPTION
BS 144	Wood preservation using coal tar creosotes
BS 373	Testing small clear specimens of timber
BS 405	Expanded metal (steel) for general purposes
BS 497	Manhole covers, road gully gratings and frames for drainage purposes
BS 5911	Precast concrete pipes, fittings and ancillary products
BS 648	Schedule of weights of building materials
BS 8004:1986	Code of practice for foundations
BS 915	High alumina cement
BS 6925	Mastic asphalt (limestone aggregate)
BS 1200	Sands for mortar for plain and reinforced brickwork, block walling and masonry
BS 1370	Low heat Portland cement
BS 1579	Timber connectors
BS 6323	Seamless and welded steel tubes
BS 1876	Automatic flushing for urinals
BS 1881	Methods of testing concrete
BS 5135	Arc welding of steels
BS 2994	Cold rolled steel sections
BS 3284	Polythene pipe (type 50) for cold water services
BS 4360	Specification for weldable structural steels
BS 4482	Hard drawn steel wire for the reinforcement of concrete
BS 4483	Steel fabric for the reinforcement of concrete
BS 8000	Part 3 Code of practice for masonry

BS 5268	Structural use of timber
BS 5628	Structural recommendations for load bearing walls
BS 5655	Lifts and service lifts
BS 5950	Structural use of steelwork in building
BS 8110	The structural use of concrete in buildings
BS 8214:1990	Code of practice for fire door assemblies with non-metallic leaves
BS 6399 Part 1	Dead and imposed loads
BS 8000 Part 3	Code of practice for masonry
BS 8000 Part 2	Code of practice for concrete work
BS 8005 Part 1: 1987	Guide to new sewerage construction

U.S. AGENCIES

DESIGNATION	**INSTITUTION**
ACI:	American Concrete Institute,
AITC:	American Institute of Timber Construction Inc.
AISC:	American Institute of Steel Construction Inc.
ANSI:	American National Standards Institute
AISI:	American Iron and Steel Institute
APA:	American Plywood Association
ASTM:	American Society for Testing and Materials
AWS:	American Welding Society, Inc.
NBS:	National Bureau of Standards
NFiPA:	National Fire Protection Association
NPA:	National Particleboard Association
SJI:	Steel Joist Institute
TPI:	Truss Plate Institute
AWPB:	American Wood Preservers Bureau

U.S. STANDARDS AND CODES QUOTED

ICode No.	Description
ACI 318	Building code requirements for reinforced concrete
ACI 315	Manual of standard practice for detailing reinforced concrete structures
ACI 530-92	Building code requirements for concrete masonry structures
ASTM C90	Specifications for hollow load-bearing concrete masonry units
ANSI A41.1	Standard requirements for reinforced masonry
AITC 101 to 115	Timber construction standards
NLMA	National design specification for stress grade lumber and its fastenings
NBS R 16	American lumber standards for softwood lumber
NBS-CS	Douglas fir plywood, commercial standard
AISC-SJI	Standard specification for open web long span steel joist construction
AISC	Specifications for design, fabrication and erection of structural steel for buildings
ANSI A59.1	Specifications for reinforced gypsum concrete
AISC	Specifications and load tables for J series and H series joists
AWS D1.1	Structural Welding Code
AWS D1.3 78	Specifications for Welding Sheet Steel in Buildings
AISC	Specifications for Structural Joints using ASTM A325 or ASTM A490 Bolts
ANSI/ASTM A6	Standard Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
AISI	Specification for the Design of Cold-Formed Stainless Steel Members
AISI A151	Structural Specifications for the Design of Light Gauge Structural Members
TPI. 1978	Design Specifications for Light Metal Plate Connected Wood Trusses

OTHER CODES

Caribbean Uniform Building Code (CUBiC)	Caricom Community Secretariat, Georgetown, Guyana
National Building Code of Jamaica	Ministry of Finance and Planning, Kingston, Jamaica
Standard Building Code	Southern Building Code Congress International Birmingham, Alabama, USA.
South Florida Building Code	Board of County Commissioners, Metropolitan Dade County, Florida, USA.
Bahamas Building Code	Ministry of Works, Nassau, Bahamas
National Building Code of Canada	National Research Council of Canada, Montreal, Ottawa, Ontario, Canada

Chart 4.0.16 Construction Punch List Source: (MSDGC, 2017)

Construction Punch List			
Project Name:			Project Number:
Structural ☐	Mechanical ☐	Electrical ☐	Civil ☐
Inspected By:		Date:	Page: ___ of ___
Item No.	Description	Completed by Construction (Sign/Date)	Accepted by Quality Control (Sign/Date)

Quality Control Approach

To ensure that quality is controlled the project team shall use the following templates to document project activities.

Chart 4.0.17 Contractor's Quality Control Report (CQCR) Log (Source: (MSDGC, 2017)

CONTRACTOR'S QUALITY CONTROL REPORT (CQCR) WEEKLY LOG OF CONSTRUCTION	**Report Number: Page 2 of 2**
	Date:

Project Name:	**Project Number:**
Activity Start/Finish:	
QC Requirements:	
QA/QC Punch List:	
Contractors/Visitors on Site:	
Equipment Hours (Total Operating Hours to Date):	
Accident Reporting (Describe Accident):	

Contractor Certification	On behalf of the contractor, I certify that this report is complete and correct and all equipment and material used and work performed during this reporting period are in compliance with the contract, plans and specifications, to the best of my knowledge, except as noted above.

Chart 4. 0.18 Initial Inspection Checklist (Source: (MSDGC, 2017)

Initial Inspection Checklist			
Project Name:			Project Number:
DFOW:			
Date:	Sheet:	Spec. Section:	Page: ___ of ___

No.	Item	Yes	No	N/A
1	Was the production foreman present?			
2	Material			
a)	Were materials inspected for compliance?			
b)	Were corrective actions taken for defective material?			
c)	Were corrective actions appropriate?			
d)	Were any deviations accepted?			
3	Installation Requirements			
a)	Did work comply with specifications or plans?			
b)	Was workmanship satisfactory?			
c)	Were corrective actions appropriate?			
d)	Were any deviations accepted?			
4	Tests			
a)	Were tests being performed?			
b)	Was testing frequency satisfactory?			
c)	Were test samples or locations appropriate?			
d)	Was testing quality coordinated with Mechanical/Electrical			
5	Inspections			
a)	Was inspection done by the QC Inspector in the Prep.			
b)	Was the inspection frequency as established in the Prep.			
c)	Were critical inspections satisfactory?			
d)	Was the inspection satisfactory?			
6	Safety			
a)	Was the safety officer present?			
b)	Were the safety requirements followed?			
c)	Were the safety requirements modified?			
Remarks (explanations required for “No” responses and if deviations were accepted):				

Reported By: (Quality Control Inspector)	Reviewed By: (Quality Control Manager)	Reviewed By: (Quality Assurance Representative)

Chart 4.0.19 Receiving Materials Inspection Report (source: MSDGC, 2017)

Receiving Material Inspection Report			
Project Name:			Project Number:
DFOW:			
Date Received:	Order Number:	Date Inspected:	Inspected By:

Ref No.	Item Description	Quantity	Partial or Full?	Okay or Damage	Special Storage?

Receiving Material Inspection Report					
Remarks (explanations required for partial and damaged material):					

Non-Conformance Report			
<Project Name>			<Project Number>
Structural ☐	Mechanical ☐	Electrical ☐	Civil ☐
Date:	Location:	Spec. Section:	Spec. Paragraph:
Non-Conforming Condition:			
Reported By (Quality Control Representative):			Date:
Disposition:			

Receiving Material Inspection Report	
Verified By (Project Manager):	Date:
Re-Inspected By (Quality Control Representative):	Date:
Accepted By (Quality Control Manager):	Date:

4.7 Sustainable Project Human Resource Management Plan

Organizational structure

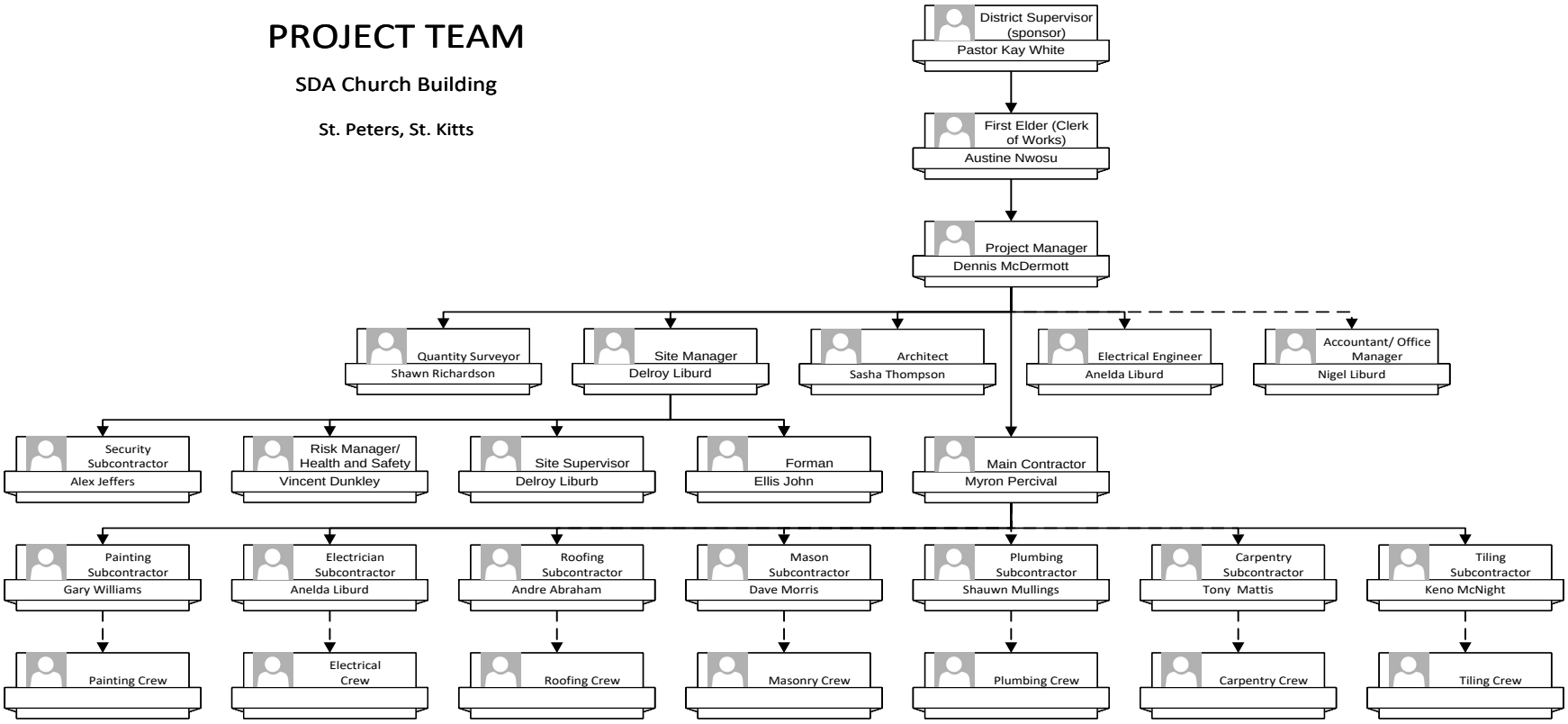


Figure 4.3 Organizational structure (Source; Compiled by Author)

Staff acquisition and release

Staff will be acquired on an as-needs-basis. The Schedule will drive the acquisition process.

Training Requirements:

All subcontractors are required to indicate specific training needs of crew when submitting their method statement. However, all subcontractors are responsible for their crew and their crew training needs. A CV and relevant testimonials required from all workers will employ only skilled and proficient personals as evident.

Rewards and recognition:

Workers who demonstrate a positive attitude towards risk prevention, safety, and respect for authority will be identified at monthly meetings. Their names will be entered into a raffle and the first five will be given EC$ 500.00 and a certificate of recognition.

Additionally, workers without certificates of competency will be provided an opportunity to get National Vocational Qualification (NVQ) certificates as an incentive to perform at the highest standard.

Regulations, Standards, and Policy Compliance:

All human resource acquisition and release and any other human resource activities shall be handled in such a way that ensures conformity to established local, regional, and international Rules and regulations that govern employment such as the International Labour organization (ILO) and the UN Charter on human Rights.

Safety:

To ensure that workers and equipment are protected from harm, mandatory safety training will be conducted the site risk manager as is necessary with the use of an Induction plan. The induction shall be required of all person upon entering the site for the first time.

4.8 SUSTAINABLE PROJECT COMMUNICATION MANAGEMENT PLAN

Plan Communications Management

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
COUNT	INITIAL / ID	NAME	POSITION	ROLE	CONTACT INFORMATION	REASONS	METHODS AVAILABLE	SENDER INITIALS	INFORMATION	METHOD USED	DATE DELIVERED	EXPECTED RESPONSE	RESPONSE DATE
1	CM	Church Members	Owner	Financing	fie_church@gmail.com	Status Reports, funding	Via Pastor						
2	KW	Kay White	Pastor	Supervises Church Activities	fie_kay@gamil.com	Status Reports, funding, site meeting, phase	Email, text messaging, fax,						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
						planning, risk planning,	face to fax, Phone call, Skype, WhatsApp.						
3	AN	Austine Nwosu	Clerk Of Works	Church Board Representative	Fie_austine @gamil.com	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						
4	DM1	Dennis McDermo	PROJECT	Plan Project	Fie_Dennis @gmail.com	Status Reports, funding, site	Email, text messagin						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
		tt	MANAGER	Activities	661-4372	meeting, phase planning, risk planning	g, fax, face to fax, Phone call, Skype, WhatsApp						
5	ML	Myron Liburd	Main Subcontractor	Manages Subcontractors, Project Planning	Fie_myron@gmail.com	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						
6	AL	Anelda Liburd	Subcontractor	Consultant	Fie_anelda@gmail.com	Status Reports, funding, site	Email, text messagin						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
			(Electrical)			meeting, phase planning, risk planning	g, fax, face to fax, Phone call, Skype, WhatsApp						
7	SM	Shauwn Mullings	Subcontractor (Plumbing)	Plumbing	Fie_shauwn@gmail.com	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						
8	DM2	Dave Morris	Subcontractor	Mason	Fie_dave@gmail.com	Status Reports, funding, site	Email, text messagin						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
			(Mason)			meeting, phase planning, risk planning	g, fax, face to fax, Phone call, Skype, WhatsApp						
9	KM	Keno Mcnight	Subcontractor (Tiling)	Tiling	fie_keno@gmail.com	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						
10	TM	Tony Mattis	Subcontractor	Carpenter	fie_tony@gmail.com	Status Reports, funding, site	Email, text messagin						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
			(Carpentry & Joinery			meeting, phase planning, risk planning	g, fax, face to fax, Phone call, Skype, WhatsApp						
11	GW	Gary Williams	Subcontractor (Painting)	Painter	Fie_gary@gmail.com	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						
12	AA	Andre Abraham	Subcontractor	Roofing	Fie_andre@gmail.com	Status Reports, funding, site	Email, text messagin						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
			(Roofing)			meeting, phase planning, risk planning	g, fax, face to fax, Phone call, Skype, WhatsApp						
13	EJ	Ellis John	Foreman	Works	Fie_ellis@gmail.com	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						
14	SR	Shawn Richards	Quantity	Develop Bill Of	Fie_shawn@gmail.com	Status Reports, funding, site	messagin						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
		on	Surveyor	Quantities		meeting, phase planning, risk planning	g, fax, face to fax, Phone call, Skype, WhatsApp						
15	DL	Delroy Liburd	Site Manager	Control Site Activities	Fie_delroy@gamil.com	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						
16	ST	Sasha Thompso	Architect Or	Designs	Fie_sasha@gmail.com	Design and scope changes.	Email, text messagin						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						**INFORMATION**						**RESPONSE**	
		n	Clerk Of Works				g, fax, face to fax, Phone call, Skype, WhatsApp						
17	NL	Nigel Liburd	Accountant	Procurement	fie_nigel@gmail.com	Status Reports, site meeting, phase planning, risk planning, Pay role, Procurement	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						
18	VD	Vincent Dunkley	Risk / Health	Risk Monitoring	Fie_vincent @gmail.com	Status Reports, site meeting, phase	Email, text messagin						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
			And Safety Supervisor			planning, risk planning	g, fax, face to fax, Phone call, Skype, WhatsApp						
19	AJ	Alex Jeffers	Security Subcontractor	Site Security	Fie_alex@gmail.com		Phone, Email, Skype, text messaging,						
20	SJ	Shirna Johnson	Administrative Staff	Data Entry	Fie_shirna@gmail.com	Status Reports, site meeting, phase planning, risk planning	Email, text messaging, fax, face to						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
							fax, Phone call, Skype, WhatsApp						
21	PA	Planning Authority			665-2509	Design and phase checks	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						
22	C	Community				Environmental issues	Town hall, Face to face.						

COMMUNICATION MANAGEMENT PLAN													
STAKEHOLDER INFORMATION						INFORMATION						RESPONSE	
23	SWA	Solid Waste Authority				Environmental issues	Email, text messaging, fax, face to fax, Phone call, Skype, WhatsApp						

4.9 Sustainable Project Risk Management Plan (SRMP)

Methodology

This Risk Management Plan defines the initial management approach that will be taken to address the various risks that are likely to affect the project (SDA Church Building, St. Peter's St. Kitts).

A risk is any uncertain event that may be anticipated or may show up as a surprise during the life of the project. All risks have a probability of occurrence and may present opportunities or negative impacts with varying degrees of severity. The degree of severity is determined mathematically as follows: severity = probability x impact.

The main objective of this SRMP is to increase the chance of this project success. The Project Team intended to achieve success by progressive elaboration and continuously assessing the potential of risk occurrence and the severity of impacts whether negative or positive.

To ensure that the SRMP captures and analyze as many risks as is possible and realistic to the project, information gathering techniques such as brainstorming, Delphi Technique(to be used to obtain consensus among experts), interviewing and root cause analysis will be used. SWOT analysis will be used to explore treats as well as opportunities. Once all risks have been identified to a reasonable extent a risk register will be created. All risk is then quantified to determine their likelihood of occurrence and the impact they might have on project objectives. A risk response strategy is then developed to eliminate or reduce the impact of risk. Then

each risk is assigned to a person on the project team that is responsible for managing the category of risk.

Roles and Responsibilities

In order to ensure that the Project Risk Management Processes are followed, the following are specific roles and responsibilities that are related to the FIE church building project, St, Peters, St. Kitts.

Project Manager:

1. Manage Budget and Scheduled Contingencies for the duration of the Project
2. Ensure that Change Control Processes are followed.
3. Ensure that a Risk Register is prepared and made available.
4. Conduct regular risk identification and assessment with Project Team
5. Ensure that risk management meetings are conducted at least every month with Work Crew.
6. Ensure that all subcontractors prepare, signed and submit a Risk Management Plan Schedule before work Commences.
7. Report to the project sponsor, any risks that are beyond the threshold of those set by the project sponsor.

Risk Manager/ Health and Safety Supervisor (RMHSS):

The RMHSS is responsible for the implementation of the project's Risk Management Plan. The following are some specific duties (not meant to be exhaustive):

1. Sign of a Subcontractors Risk Management Schedule.

2. Conduct meetings with Subcontractors to promote risk identification and recording the same in the risk register.
3. Perform risk analysis and report the finding to the project manager.
4. Identify and implement Risk Mitigation Strategies.
5. Monitoring the effectiveness of Risk Counter Measures.
6. Keep Project Manager up to date with Risk Management strategy implementation.

Risk Categories

The FIE Church Building Project Team has identified risks under the following Risk Categories: Environmental Risks, Financial Risk, People, Design, Construction, Project Management, Organizational, and External. The Risk Categories and major risks are shown below:

1. Financial Risk:
2. People
3. Design
4. Construction:
5. Project Management
6. Organizational:
7. External.

A Risk Breakdown Structure with major risk is shown below. It is not meant to be exhaustive. For more details, see the Risk Register.

Identify Risks

Chart 4.0.20 Risk Register (Source: Compiled by Author)

RISK REGISTER								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
	ENVIRONMENTAL RISKS	**FINANCIAL RISK**	**PEOPLE**	**DESIGN RISKS**	**CONSTRUCTION RISKS**	**PROJECT MANAGEMENT RISKS**	**ORGANIZATIONAL RISKS**	**EXTERNAL RISKS**
1	**TRANSPORTATION** Local Procurement Digital Communication Traveling Transport	In correct budget	**Labour Practices and Decent** Work Health and safety Training/ induction Diversity and equal opportunity	Design incomplete	Inaccurate contract time estimates	Project purpose and need is not well-defined	Inexperienced staff assigned	Landowners unwilling to sell

RISK REGISTER								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
2	**Energy** Material Use Emissions from energy used Clean Energy	Contract Risk	**Society** Community support Job Customer health and safety Cultural impact	Unexpected geotechnical or groundwater issues	Tools and Machinery	Project scope definition is incomplete	Losing critical staff at crucial point of the project	Local communities pose objections
3	**Water** Water Quality Water Consumption Water Displacement	Supplier Financial Risk	**Human rights** Non-discrimination Freedom of Association Child Labour Forced or Compulsory labour	Inaccurate assumptions on technical issues in planning stage	Change requests due to differing site conditions	Project scope, schedule, objectives, cost, and deliverables are not clearly defined or understood	Insufficient time to plan	Unreasonably high expectations from stakeholders
4	**Waste** Recycling Disposal Reusability Incorporated Energy	Legal fees	**Ethical Behaviour** Investment and Procurement Practices Bribery and corruption	Survey incomplete	Temporary excavation and shoring system design is	No control over staff priorities	Unanticipated project manager workload	Political factors or support for project changes

RISK REGISTER								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
	Waste		Anti-competitive Behaviour		not adequate			
5	Impact on Wild Life	Cash flow	Permit work window time is insufficient	Changes to materials/geotechnical/foundation	False work design is not adequate	Consultant or contractor delays	Internal “red tape” causes delay getting approvals, decisions	Stakeholders request late changes
6		Regulatory Requirements	Workers insured	Bridge site data incomplete to DES	Unidentified utilities	Estimating and/or scheduling errors	Functional units not available, overloaded	New stakeholders emerge and request changes
7		Tax / duties	Social security Benefits	Hazardous waste site analysis incomplete	Dewatering is required due to change in water table	Unplanned work that must be accommodated	Lack of understanding of complex internal funding procedures	Threat of lawsuits

RISK REGISTER								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
8		Embezzlement of funds	Hand-arm vibration.	Unforeseen design exceptions required	Temporary construction easements expire	Lack of coordination/communication	Priorities change on existing program	Increase in material cost due to market forces
9		Fraud	Electricity and other services	Consultant design not up to Department standards	Electrical power lines not seen and in conflict with construction	Underestimated support resources or overly optimistic delivery schedule	Inconsistent cost, time, scope and quality objectives	Water quality regulations change
10			Working From Height	Unable to meet Americans with Disabilities Act requirements	Street or ramp closures not coordinated with local community	Scope creep	Overlapping of one or more project limits, scope of work or schedule	New permits or additional information required
11			Manual handling	Project in a critical water shortage	Insufficient or limited construction or	Unresolved project conflicts not	Funding changes for fiscal year	Reviewing agency requires longer

RISK REGISTER								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
				area and a water source agreement required	staging areas	escalated in a timely manner		than expected review time
12				Incomplete quantity estimates	Changes during construction require additional coordination with planning agencies	Unanticipated escalation in right of way values or construction cost	Lack of specialized staff (biology, anthropology, geotechnical, archeology, etc.)	Changes to storm-water requirements
13				Unforeseen construction window and/or rainy season requirements	Delay in demolition due to sensitive habitat requirements or other reasons	Delay in earlier project phases jeopardizes ability to meet programmed delivery	Capital funding unavailable for right of way or construction	Permits or agency actions delayed or take longer than expected

RISK REGISTER								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
						commitment		
14				New or revised design standard	Long lead time for utilities caused by design and manufacture of special components (steel towers or special pipe)	Added workload or time requirements because of new direction, policy, or statute		New information required for permits
15						Local agency support not attained		Environmental regulations change

RISK REGISTER								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
16						Public awarenes s/campaig n not planned		Controver sy on environme ntal grounds expected
17						Unforesee n agreemen ts required		Pressure to deliver project on an accelerate d schedule
18						Priorities change on existing program		Labor shortage or strike
19						Inconsiste nt cost, time, scope, and quality objectives		

RISK REGISTER								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
20						Project purpose and need are not well-defined		
21						Project scope definition is incomplete		

Chart 4.0.21 Impact, Probability And Severity Risk Ranking (Source: Compiled by Author)

IMPACT, PROBABILITY AND SEVERITY RISK RANKING																	
RISK CATEGORY	PROBABILITY		TREATS						OPPORTUNITIES							PROBABILITY	
FINANCIAL	5	VHI	L=5	M=10	M=15	H=20	H=25	H	H	H=25	H=20	M=15	M=10	L=5	VHI	-5
	4	HI	L=4	L=8	M=12	H=16	H=20	MH	MH	H=20	H=16	M=12	L=8	L=4	HI	-4
	3	MOD	L=3	L=6	M=9	H=12	H=15	M	M	H=15	H=12	M=9	L=6	L=3	MOD	-3
	2	LOW	L=2	L=4	L=6	M=8	H=10	ML	ML	H=10	M=8	L=6	L=4	L=2	LOW	-2
	1	VLOW	L=1	L=2	L=3	L=4	M=5	L	L	M=5	L=4	L=3	L=2	L=1	VLOW	-1
			VLOW	LOW	MOD	HI	VHI			VHI	HI	MOD	LOW	VLOW		
	VALUES		1	2	3	4	5			-5	-4	-3	-2	-1	VALUES	
			IMPACT (TREATS)					SEVERITY	SEVERITY	IMPACT (OPPORTUNITIES)						

Chart 4.0.22 Definition of Impact Scales for Five Project Objectives (source: Compiled by the Author)

Definition of Impact Scales for Five Project Objectives					
Description of impact on project objectives based on level of severity.					
Severity level / Project Objectives	H16 - H25	M10-M15 & H10-H15	M5 –M9	L5-L8	L1-L4
Scope	Significant Scope Increase	Medium High scope increase	Medium Low scope increase	Low Scope increase	Negligible scope increase
Time	Delay milestones by more than 4 ½ months	Delay Millstones between 3 ½ -4 ½ months	Delay milestones between 2 -3 ½ months	Delay Milestones between ½ -2 months	Delay milestones by less than ½ month
Cost	≥ EC$150K	≤EC$100K	≤EC$50	≤EC$10K	≤EC$5K
Quality	Building is useless	Major Defects	Minor defects	Very little Defects	No Defects
Sustainability	All sustainable objectives are met	More than half of Sustainability objectives are met	Half of the sustainable objectives are met	Less than half of sustainable objectives are met	No sustainable objectives are met

Chart 4.0.23 Impact and Probability Levels (Source: Compiled by Author)

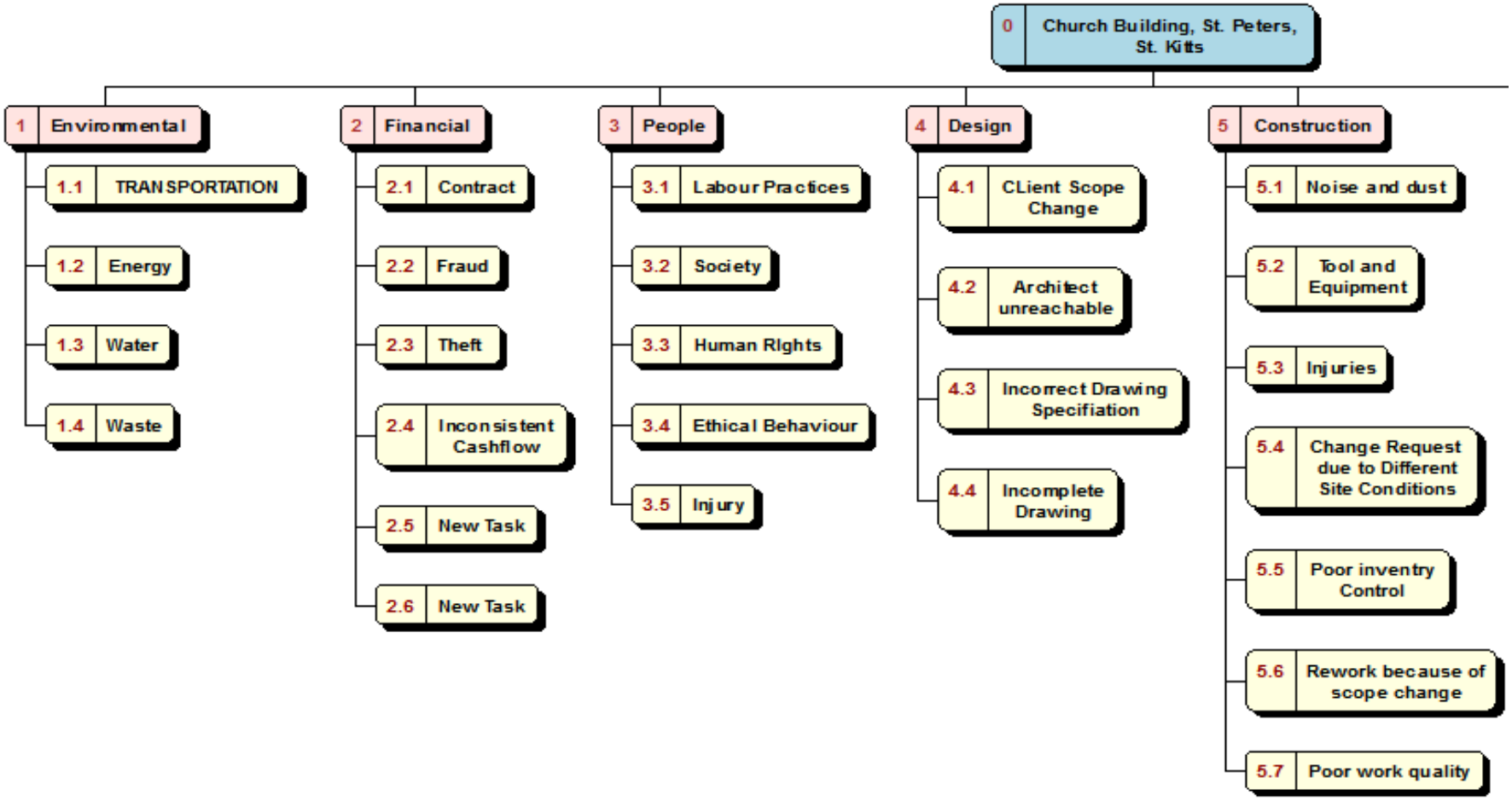
Impact and Probability Levels					
Treats			Opportunities		
Description	Value	value	Level	Value	Description
More than 80% likelihood is not a Treat but a problem	5	Very High	Very High	-5	80-100% Likelihood of impact
40-79% Likelihood of impact	4	High	High	-4	40-79% Likelihood of impact
20-39% likelihood of impact	3	Medium	Medium	-3	20-39% likelihood of impact
10-19% likelihood of impact	2	Low	Low	-2	10-19% likelihood of impact
Less than 1-9% likelihood impact	1	Very Low	Very Low	-1	Less than 1-9% likelihood impact

Chart 4.0.24 Risk Control Table (Source: Compiled By Author)

Risk Control Table											
TREATS						OPPORTUNITIES					
STRATEGY	SEVERITY VALUE	IMPACT ON PROJECT OBJECTIVES	DESCRIPTION	VALUE	VALUE	LEVEL	VALUE	DESCRIPTION	IMPACT ON PROJECT OBJECTIVES	SEVERITY VALUE	STRATEGY
Avoid	H16-H25	80-100% Likelihood of impact	More than 80% likelihood is not a Treat but a problem	5	Very High	Very High	-5	80-100% Likelihood of occurrence	80-100% Likelihood of impact	H16 - H25	Exploit
Transfer	M10-M15 & H10-H15	40-79% Likelihood of impact	40-79% Likelihood of impact	4	High	High	-4	40-79% Likelihood of	40-79% Likelihood of impact	M10-M15 &	Enhance and share

								occurrence		H10-H15	
Mitigate	M5 –M9	20-40% likelihood of impact	20-40% likelihood of impact	3	Medium	Medium	-3	20-40% likelihood of occurrence	20-40% likelihood of impact	M5 – M9	share
Accept	L5-L8	10-19% likelihood of impact	10-19% likelihood of impact	2	Low	Low	-2	10-19% likelihood of occurrence	10-19% likelihood of impact	L5-L8	Accept
Accept	L1-L4	Less than 1-9% likelihood impact	Less than 1-9% likelihood impact	1	Very Low	Very Low	-1	Less than 1-9% likelihood occurrence	Less than 1-9% likelihood impact	L1-L4	accept

Chart 4.0.25 Risk Breakdown Structure (Source: Compiled By Author)



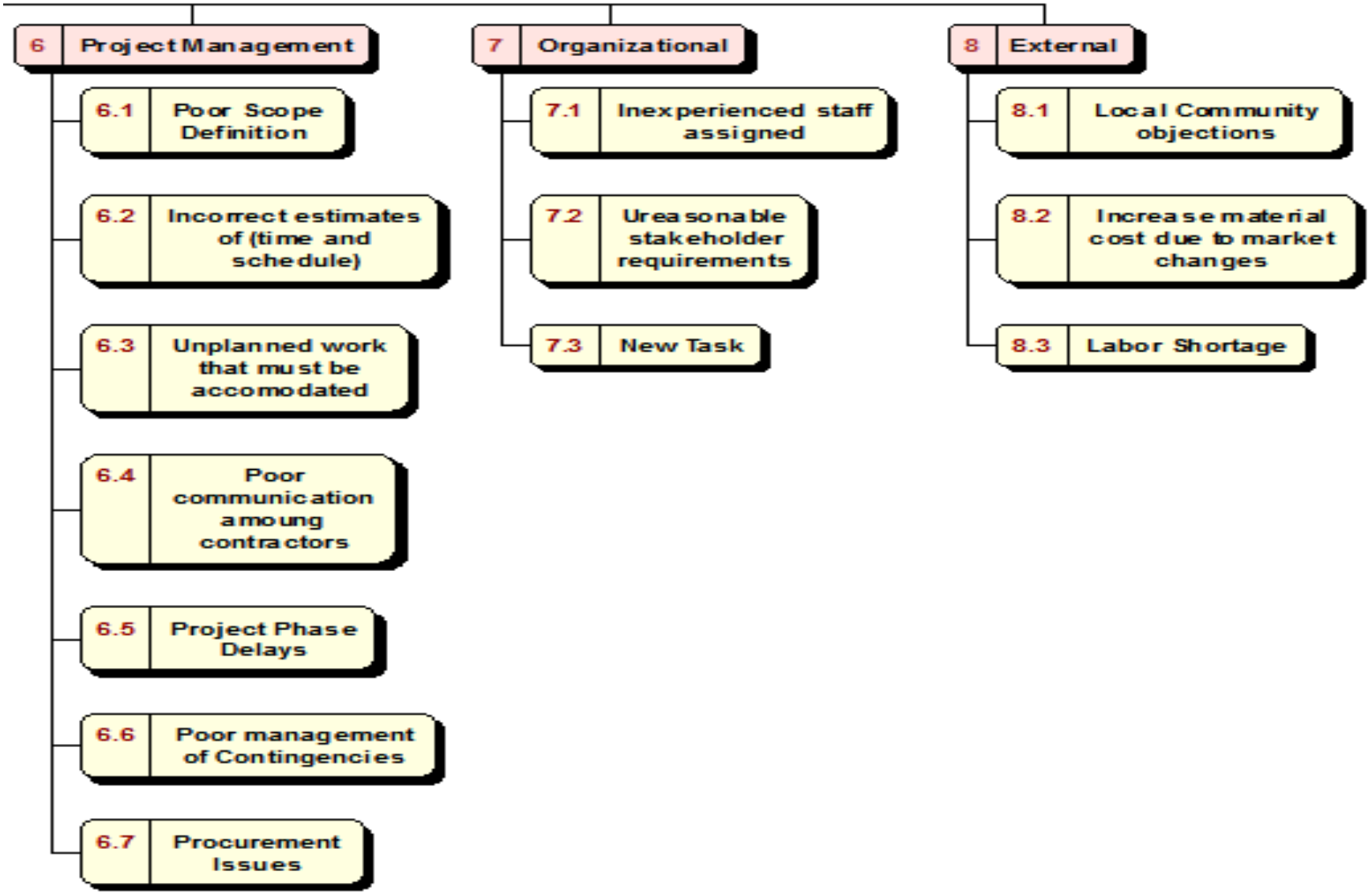
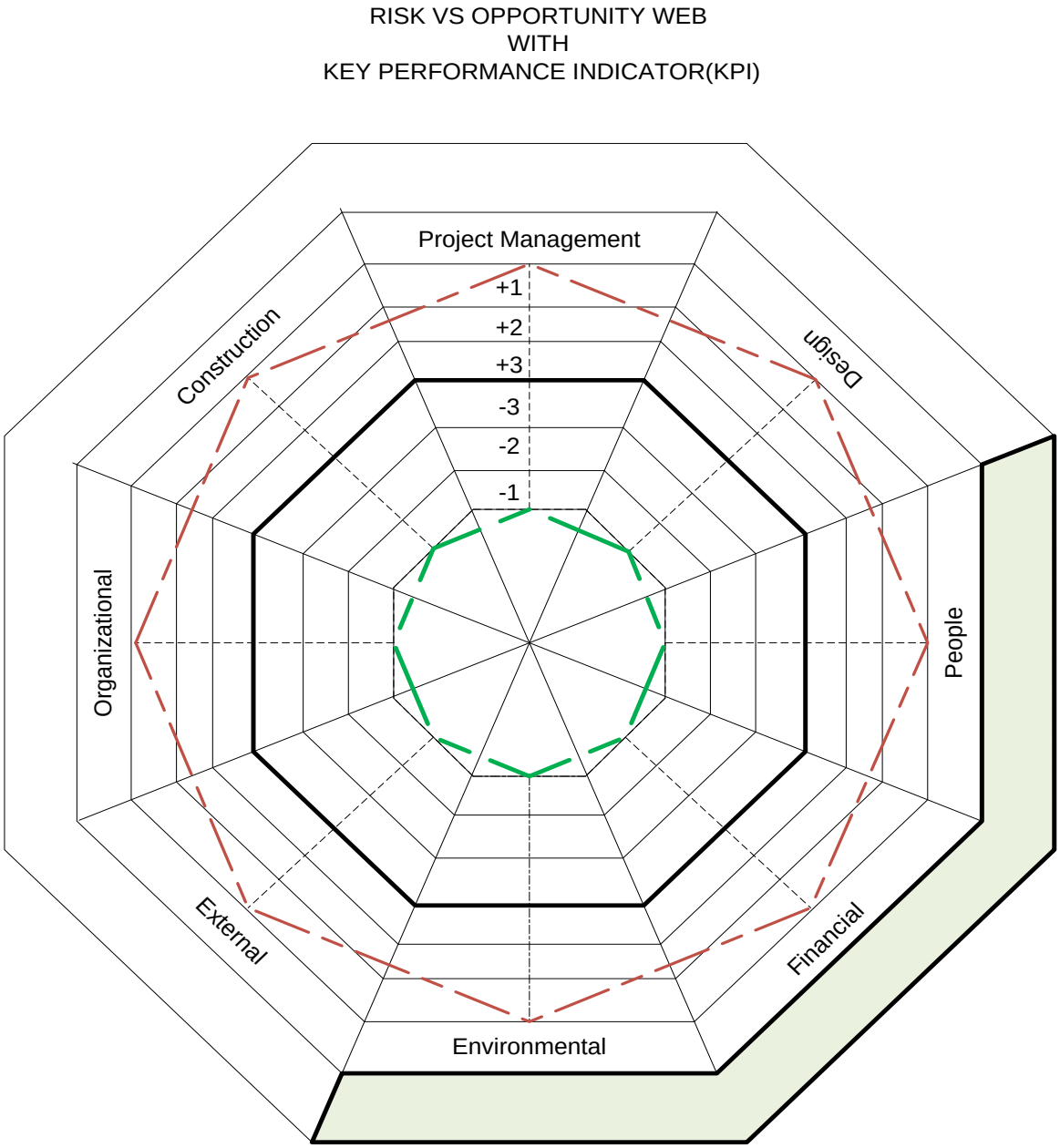

6 Project Management
6.1 Poor Scope Definition
6.2 Incorrect estimates of (time and schedule)
6.3 Unplanned work that must be accomodated
6.4 Poor communication amoung contractors
6.5 Project Phase Delays
6.6 Poor management of Contingencies
6.7 Procurement Issues
7 Organizational
7.1 Inexperienced staff assigned
7.2 Ureasonable stakeholder requirements
7.3 New Task
8 External
8.1 Local Community objections
8.2 Increase material cost due to market changes
8.3 Labor Shortage

Chart 4.0.26The Risk vs. Opportunity Web with Key Performance Index (KPI) (Source: Compiled by Author)



RISK CATEGORIES WITH SUSTAINABILITY IMPLICATIONS

- Environmental
- Financial
- People

KEY

+1 represents High Risks
+3 represents low risks
-1 Represents high opportunities
-3 represents Low opportunities

The Risk vs. Opportunity Web with Key Performance Index (KPI)

The risk vs. opportunity web is a tool that is developed for providing a graphical representation of the results that are obtained after using the PRiSM™ methodology to analyze the sustainable objectives of a project. It is versatile enough to be used to compare the status of the Key Performance Indicators of a Project.

Description and use:

In this instance, an octagonal web is used because there are eight risk categories identified for the Project Management Plan for new Seventh-day Adventist Church building to be built in St. Kitts.

It has a rating scale ranging from +1 to -1 (which can be adjusted base one the rating scale used) +1 to +3 represent risks with +3 being low risk and -1 being high risk. This rating scale is used for each of the eight categories of risk.

Once each item under a category is rated, an average is then found for that risk category. This procedure is then repeated for the other categories. The average value is then plotted on the web using a straight line to connect the points at the centers as indicated by the thick red line. Once all the points have been plotted, a count is made to determine the number of straight lines closest to the red line and those closest to the green line. If more lines are closest to the green lines then it is a high opportunity project. However, if more are closest to the red line then the project is a high-risk project and an appropriate risk response strategy must be developed. This when used early in the project will help the Project team determine where their sustainable focus should be. Lines closest to the center +3 and -3

indicates that the project has equal risks and opportunities or low risks and low opportunities.

Budget and Schedule Contingency Procedure

1. Identify risk under each category.
2. Do a qualitative analysis to determine the likelihood and potential impact of the risk.
3. Determine schedule consequence of risk.
4. Determine cost consequence level of risk.
5. Determine scope consequence of risk.
6. Determine quality consequence of risk.
7. Determine an overall consequence score. This is determined by selecting the highest score the consequence level of scope, cost, quality and schedule.
8. Do a quantitative analysis to determine the severity level of the risks on project scope, cost, and schedule.
9. Determine risk response strategy
10. Assign the risk to an owner.

Control risk

The project manager is directly responsible for ensuring that a risk assessment is done prior to each project phase and the appropriate signatures are affixed to the method statement before any work begins. The Risk manager shall require of all contactors a detailed method statement that clearly identifies when in the phase a risk might occur, who are most at risk of injury or area of project objective that is most likely to be affected and the probability, impact and severity of those risks.

The contractor for that phase shall identify and detail all measures to be taken in order to reduce or eliminate the severity of each risk identified. The risk manager shall cheer a segment of each monthly meeting in order to engage the project team in risk planning. During the monthly risk planning the risk manager shall conduct the following risk control activities with the aid of the project team:

Risk audits- to determine the effectiveness of risk response strategies at controlling or eliminating risk. The root cause of all risks shall be determined and the results of the audit documented.

Variance analysis- to compare planned and actual results to determine if the project is proceeding alone the planned baseline.

Reserve Analysis- comparing the amount of contingency reserves remaining and the amount of risk remaining to determine if the remaining reserves are sufficient for coving remaining risks.

Risk Assessments- to identify new risk, the root cause of potential and past risks in order to eliminate the root cause and prevent the risk from occurring to the extent prevention is possible or find an appropriate response.

4.10 Sustainable Project Procurement Management Plan

Plan Procurement Management

Introduction

The purpose of this Procurement Management Plan is to outline and define the procurement activities necessary for acquiring the materials, labor, and services for successful completion of the project objectives. This plan outlines the activities that forms part of the procurement process, contract types, seller selection criteria, contract process, awarding of contracts and method of controls to be employed throughout the life of the project. It also outlines how contracts will be closed. It identifies the persons who will be responsible for managing the procurement activities and their level of authority.

Roles and Responsibility

The project manager has direct responsibility to ensure that all project objectives are met including procurement activities. Specific roles and responsibilities of members of the project team with procurement responsibilities are identified in the following table.

Roles and Responsibility			
Name	Roles	Responsibility	Spending Level and Authority.
Dennis McDermott	Project Manager	Preparing bid proposals, Identifying seller section criteria, approving purchases. Identifying Procurement Risk, assigning and managing procurement reserves. Ensuring that the contractor's method statement fits into the	Preapproved EC$25000.00 for purchases. The contracts review board must make additional preapprovals. The review board shall be comprised of the project

		project baseline. Seller selection and awarding contracts. Set quality objectives to monitor seller quality.	manager, main contractor, accountant, and risk manager.
Nigel Liburd	Accountant	Advertising contract, interviewing, preparing and monitoring payroll, Maintaining Payment for services and goods procured, collect and document all receipts for spending. Maintaining and reporting accurate monthly actual costs.	None. Secondary signatory to approved purchases.
Myron Liburd	Main Contractor	Purchasing materials approved by the project manager and the accounts department. Selection of subcontractors. Monitoring subcontractor's performance in achieving the projects objectives.	EC$2000.00
	Subcontractors	Obtaining the necessary permission for purchasing of goods.	Seek prior approval.

Chart 4.0.27 Procurement Plan template (source (Snyder, 2013))

Procurement Authority

Roles and Responsibilities:

Project Manager	Procurement Department
1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Standard Procurement Documents

1. 2. 3. 4. 5.

Contract Type

Contract Types

Bonding and Insurance Requirements

Selection Criteria

Weight	Criteria
Sustainability	

Procurement Assumptions and Constraints

PROCUREMENT MANAGEMENT PLAN

Integration Requirements

WBS	
Schedule	
Documentation	
Risk	
Performance Reporting	

Performance Metrics

Domain	Metric Measurement

SOURCE SELECTION CRITERIA

Project Title: _____ Date Prepared: _____

	1	2	3	4	5
Criteria 1					
Criteria 2					
Criteria 3					
Criteria 4					
Criteria 5					

	Weight	Candidate 1 Rating	Candidate 1 Score	Candidate 2 Rating	Candidate 2 Score	Candidate 3 Rating	Candidate 3 Score
Criteria 1							
Criteria 2							
Criteria 3							
Criteria 4							
Criteria 5							
Totals							

4.11 Sustainable Project Stakeholder Management Plan

Chart 4.0.28 Stakeholder Register (Source: Compiled by Author)

STAKEHOLDER REGISTER														
IDENTIFICATION INFORMATION							COMMUNICATION		ASSESSMENT INFORMATION			STAKEHOLDER CLASSIFICATION		
Count	Initial / ID	NAME	POSITION	ROLE	CONTACT INFORMATION	LOCATION	REASON	METHODS AVAILABLE	REQUIREMENTS	OUTLOOK ON PROJECT	INFLUENCE	IMPACT (H, M, L)	FRIEND, NEUTRAL OR FOE	INTERNAL/ EXTERNAL

STAKEHOLDER REGISTER														
1	CM	Church Members	Owner	Financing	fie_church@gmail.com	Basseterre	Status Reports, funding	Via Pastor	H	Positive	H	H	F	Internal
2	KW	Kay White	Pastor	Supervises Church Activities	fie_kay@gamil.com	Basseterre	Status Reports, funding, site meeting, phase planning, risk planning,	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App.	H	Positive	H	H	F	Internal
3	AN	Austine Nwosu	Clerk Of Works	Church Board Representative	Fie_austine@gamil.com	Basseterre	Status Reports, funding, site meeting,	Email, text messaging, fax,	H	Positive	H	H	F	Internal

STAKEHOLDER REGISTER														
							phase planning, risk planning	face to fax, Phone call, Skype, Whats App						
4	DM1	Dennis McDermott	PROJECT MANAGER	Plan Project Activities	Fie_Dennis@gmail.com 661-4372	Basseterre	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App	H	Positive	H	H	F	Internal

STAKEHOLDER REGISTER														
5	ML	Myron Liburd	Main Subcontractor	Manages Subcontractors, Project Planning	Fie_myron@gmail.com	St. Peters	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App	H	Positive	H	H	F	Internal
6	AL	Anelda Liburd	Subcontractor (Electrical)	Consultant	Fie_anelda@gmail.com	St. Peters	Status Reports, funding, site meeting, phase planning, risk	Email, text messaging, fax, face to fax, Phone	H	Positive	M	H	F	Internal

STAKEHOLDER REGISTER														
							planning	call, Skype, Whats App						
7	SM	Shauwn Mullings	Subcontractor (Plumbing)	Plumbing	Fie_shauwn@gmail.com	Basseterre	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App	H	Positive	M	H	F	Internal
8	DM2	Dave Morris	Subcontractor (Mason)	Mason	Fie_dave@gmail.com	Basseterre	Status Reports, funding, site	Email, text messaging,	H	Positive	M	H	F	Internal

STAKEHOLDER REGISTER														
							meeting, phase planning, risk planning	fax, face to fax, Phone call, Skype, Whats App						
9	KM	Keno Mcnight	Subcontractor (Tiling)	Tiling	fie_keno@gmail.com	St. Peters	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App	H	Positive	M	H	F	Internal

STAKEHOLDER REGISTER														
10	TM	Tony Mattis	Subcontractor (Carpentry & Joinery	Carpenter	fie_tony@gmail.com	St. Peters	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App	H	Positive	M	H	F	Internal
11	GW	Gary Williams	Subcontractor (Painting)	Painter	Fie_gary@gmail.com	St. Peter	Status Reports, funding, site meeting, phase planning, risk	Email, text messaging, fax, face to fax, Phone	M	Positive	M	M	F	Internal

STAKEHOLDER REGISTER														
							planning	call, Skype, Whats App						
12	AA	Andre Abraham	Subcontractor (Roofing)	Roofing	Fie_andre@gmail.com	St. Peters	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App	H	Positive	M	M	F	Internal
13	EJ	Ellis John	Foreman	Works	Fie_ellis@gmail.com	Basseterre	Status Reports, funding, site	Email, text messaging,	H	Positive	M	M	F	Internal

STAKEHOLDER REGISTER														
							meeting, phase planning, risk planning	fax, face to fax, Phone call, Skype, Whats App						
14	SR	Shawn Richardson	Quantity Surveyor	Develop Bill Of Quantities	Fie_shawn@gmail.com	Basseterre	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App		Positive	M	M	F	Internal

STAKEHOLDER REGISTER														
15	DL	Delroy Liburd	Site Manager	Control Site Activities	Fie_delroy@gamil.com	Basseterre	Status Reports, funding, site meeting, phase planning, risk planning	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App		Positive	M	M	F	Internal
16	ST	Sasha Thompson	Architect Or Clerk Of Works	Designs	Fie_sasha@gmail.com	Basseterre	Design and scope changes.	Email, text messaging, fax, face to fax, Phone	H	Positive	M	M	F	Internal

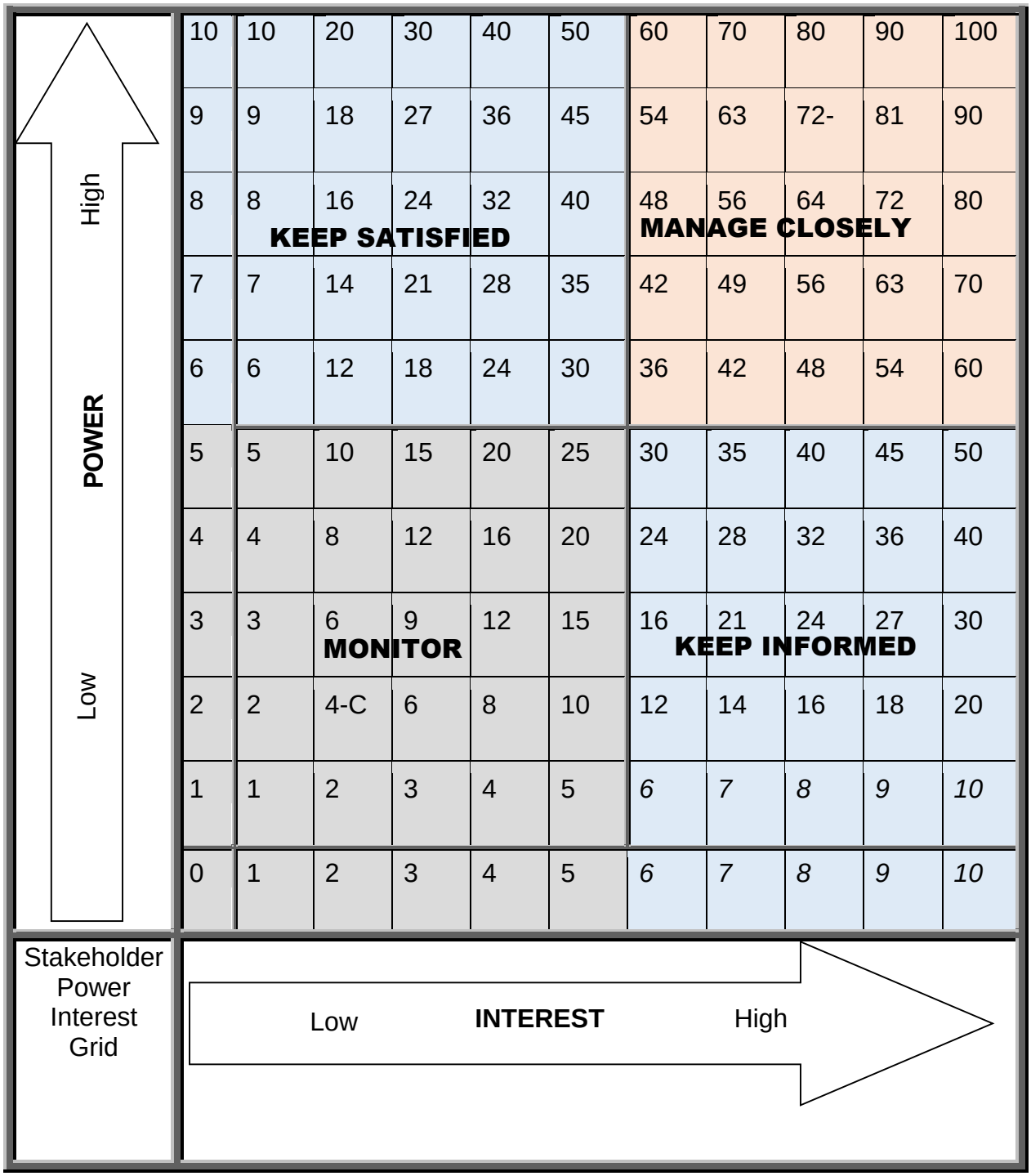
STAKEHOLDER REGISTER														
								call, Skype, Whats App						
17	NL	Nigel Liburd	Accountant	Procurement	fie_nigel@gmail.com	St. Peters	Status Reports, site meeting, phase planning, risk planning, Pay role, Procurement	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App	H	Positive	M	M	F	Internal
18	VD	Vincent Dunkley	Risk / Health And Safety	Risk Monitoring	Fie_vincent@gmail.com	St. Peters	Status Reports, site meeting,	Email, text messaging,	H	Positive	H	M	F	Internal

STAKEHOLDER REGISTER														
			Supervisor				phase planning, risk planning	fax, face to fax, Phone call, Skype, Whats App						
19	AJ	Alex Jeffers	Security Subcontractor	Site Security	Fie_alex@gmail.com	St. Peters		Phone, Email, Skype, text messaging,	H	Positive	M	H	N	External
20	SJ	Shirna Johnson	Administrative Staff	Data Entry	Fie_shirna@gmail.com	St. Peters	Status Reports, site meeting, phase planning	Email, text messaging, fax, face to	H	Positive	L	M	F	Internal

STAKEHOLDER REGISTER														
							, risk planning	fax, Phone call, Skype, Whats App						
21	PA	Planning Authority			665-2509	Basseterre	Design and phase checks	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App	H	Neutral	L	M	F	Internal
22	C	Community				St. Peters	Environmental	Town hall,	H	Neutral	L	M	F	Internal

STAKEHOLDER REGISTER														
							issues	Face to face.						
23	SWA	Solid Waste Authority				Basseterre	Environmental issues	Email, text messaging, fax, face to fax, Phone call, Skype, Whats App	H	Neutral	L	M	F	Internal

Chart 4.0.29Stakeholder Power/ Interest Grid (Source: Compiled By Author)



5 CONCLUSIONS

The integration of sustainability into project planning is difficult without a clear and defined process and methodology. Project managers or Project Management Methodologies cannot influence the sort of change that is urgently needed if project management is relegated to any phase other than the first phase of construction activities. If designers are allowed to determine the sustainability extent of construction projects then, the future may be one of uncertainty. However, if sustainability is to be promoted to a status of urgent importance project managers must work in parallel with designers as the client's needs are interpreted and sustainable objectives are defined. In fact, the client must be made aware of the potential impacts of his undertaking and be guided towards sustainability. This is why I proposed promoting project management to a status of pre-eminence in the life cycle of construction activities.

1. Scope management is an area of project management where project requirements are defined. It is also an area where sustainable objectives can be infused into the general project objectives by sensitizing clients of their need to ensure that by stating clearly their sustainable requirements. The need to abide by international convention on labor practices and human rights, water conservation strategies such as collection and use of rain water, the treatment and use of grey water in reed beds for irrigation, the elimination of greenhouse gases by utilization of materials that stores or converts the sun's energy, responsible waste management. The possibilities are endless. Nevertheless, the extent of the impact is commensurate with the phase in the construction life cycle, where sustainable objectives are integrated. For optimum impact the FIE Church building would need to have under gone a scope change and a radically new design to take advantage of the tremendous potential that the site inherently offers.

2. Time management is another area where sustainability is integrated in the project. Time management is primarily concerned with management and coordination of project activities. Sustainable building construction, on the other hand, is primarily concerned with using resources efficiently while making processes more efficient in an attempt to reduce or eliminate waste and pollution. The FIE Church building will seek to ensure that building processes are planned and timed in such a way that waste generated by rework is eliminated. By ensuring that activities are sequenced, the project is likely to be completed on time. The schedule presented in this project needs further elaboration to arrive at a suitable baseline.

3. Cost management is an area of project management where an intentional integration of sustainability into the project is of particular importance. As good corporate citizens that are socially responsible, the elimination of bribe, fraud, and money laundering must be high on the list of activities that will be engaged in during all construction processes of FIE Church building. To ensure that these noble objectives are achieved, a qualified accountant will be employed and strict accountability of project financials will be demanded. To ensure that sustainability is integrated into the Cost Management, employment that will stimulate economic activities will be performed without discrimination on basis or race, sexuality, religion or other factors that are in contravention of local or international laws.

4. Quality Management Plan is an important area in which sustainable principles are incorporated into the planning of construction activities. Quatity is crucial for project success and accecptance. Quality may also be costly but this cost may be kept to a minimum is proper planning is undertaken and integrated into the whole life cycle of buildings. To ensure that quality was integrated into the Project management Plan, customer expectations were clearly documented and incorporated as input to the Quality Management Plan. The Quality Management Plan approached

sustainability by focusing on three key questions; what does quality mean to the customer? What are the specific areas of quality that must be developed in the Project Management Plan? What is the difference between a Quality Management Plan and one that is sustainable? The answer to these questions came about by focusing on the whole life cycle of the building and focusing on the capability, capacity, knowledge, unique requirements, cost to benefit of sustainable quality in relation to customer or end-user, suppliers, materials, construction processes, environment, global trends toward sustainability, and market conditions.

5. Communication Management is another area that is crucial for project success and integration of sustainable principles. While further work must be done to clearly define the process that will best integrate sustainability into project management, it is clear that communication with stakeholders is important for ensuring that correct and timely information is disseminated at the right time and through the right channels. To ensure clear lines of authority and reporting, an organizational chart was developed for this project. Paper has become one of the biggest sources of waste in many cities. Not only is paper use a major source of waste but wasteful consumption of paper products is linked to deforestation with direct consequences for global warming. Electronic documentation and storage of project information and the use of electronic communication technologies were selected to help reduce the paper waste problem and ensure a more sustainable future.

6. Risk Management is one of the areas of unique potential for sustainability, especially because it allows a broad range of risks to be considered. The Risk Management Plan allows integration of the P5 or *PRiSM*® Methodology to be integrated into a general Risk Breakdown Structure (RBS). Categories of Society (People), Environment (Planet) and economic (Prosperity) along with process and product can be assessed to determine if

a risk is present or an opportunity is there to be explored. All risks have a degree of probability of occurrence and are likely to have an impact on one or more project objectives. The severity of the impact will determine the type of risk strategies to be employed and the level of contingencies to add to the project budget.

7. Human Resource Management Plan set the requirement for how human resources will be assigned and managed throughout the project. Humans are people and must be assigned task and reworded for their efforts. But this is an area where opportunities for ensuring that labor practices are managed in such a way that prevents breaching of international human right and labor standard. For the Human Resource Management Plan to be Sustainable, employment practices will exclude race, religion and sex from selection procedures. Rule of law and respect will be promoted, and training opportunities will be established. A Sustainable Human Resource Plan is one that adheres to local and international laws in such a way that people and the community can experience social and economic prosperity without endangering the environment or the profit/ benefit of the performing organization.

8. The Sustainable Procurement Management Plan was not developed as part of this FGP due to stakeholder constraints. However, sustainable or Green procurement is an area of the Project Management Plan where sustainable criterion can be defined and integrated into the Project Management Plan. Green seller selection checklist or assessment can be used to ensure that suppliers of goods and services abide by international laws especially in relation to the environment and climate change. By doing business with a green supplier, others will be inclined to follow in the path of sustainability. Many suppliers do not want to go green dreading it will affect profit not realizing that the benefits far outweigh any upfront costs. After all, the cost of doing business is not only measured in dollars and cents but must account for environmental and social impacts as well.

9. Stakeholder Management Plan is important to ensure that anyone who can influence or who will be affected by the project is identified and managed in a way that is in line with sustainable best practices. Stakeholders were assessed to see who are most likely to support the integration of sustainability into the project, according to their level of interest, ability to make changes to the scope and those that can be easily influenced. As more information becomes available, the stakeholder management plan will be further developed to reflect project specific situations.

6 RECOMMENDATIONS

1. The Government of St. Kitts should do more to outline before the citizenry what is it's intended national contribution towards sustainability in order to reach the objectives outlined in the Paris Agreement to which it is a signatory.
2. More effort should be made to promote the integration of sustainable principles.
3. There should be further research into the cost of integrating sustainability into the design.

4. The University for International Cooperation (UCI) needs to define a clear process for sustainability integration into specific application areas including construction.

5. Sustainability needs to be integrated in a practical and meaningful way into different knowledge.

6. UCI should lead the region in developing a database of comparative studies for measurements of CO_2 emissions for different types of building and sectors.

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APPENDICES

Appendix 1: FGP Charter

PROJECT CHARTER Formalizes the project start and confers the project manager with the authority to assign company resources to the project activities. Benefits: it provides a clear start and well defined project boundaries.	
Date	**Project Name:**
August 22nd, 2016	Project Management Plan For New Seventh-Day Adventist Church Building To Be Built In St. Kitts.
Knowledge Areas / Processes	**Application Area (Sector / Activity)**
Knowledge areas: Integration, Scope, Time, Cost, Quality, Human Resources, Communication, Risk, Procurement and Stakeholders **Process groups:** Initiation, Planning, Executing, Monitoring and Controlling, closing	construction
Start date	**Finish date**
Is the same as the issue date	Corresponds to the date when the project is scheduled to be finished
Project Objectives (general and specific)	
General objective: To develop a Project Management Plan that integrates sustainable principles to optimize the utilization of project resources during the construction of the Faith in Emmanuel Seventh-day Adventist Church, to be built in St. Kitts.	

Specific objectives:

1. To create a sustainable scope management plan, that defines key stakeholders and their unique requirements and expectations
2. To create a sustainable time management plan for assigning duration to work packages that can be tracked.
3. To create a sustainable cost management plan for assigning cost to work packages.
4. To develop a sustainable quality management plan for outlining the minimum stakeholder acceptance criterion.
5. To create a human resource management plan for assigning resources to work packages in a manner that complies with international laws and conventions on labor.
6. To develop a sustainable communications management plan for defining clearly the project communication strategies and line of reporting authority.
7. To create a sustainable risk management plan that identifies risks and risk responses for risk directly related to the project and those that have sustainability implications.
8. To develop sustainable procurement management plan for identifying and assigning contracts to suppliers who are able to procure sustainable goods and services.
9. To develop a Stakeholders management plan that identifies key stakeholders, their level of interests and analyses how their influence might impact the project.

Project purpose or justification (merit and expected results)

The study will seek to establish the extent to which the development and implementation of a Project Management Plan will help the church complete its building operations within a reasonable time frame and quality according to detailed time management plan. It will also seek to identify the cost saving that may be achieved by proper cost estimates prepared and monitored and controlled by qualified Project Managers.

The SDA Church is always seeking new opportunities for growth and expansion with

churches being constructed over and average of 7 to 10 year without proper tracking of resources. This has been a pain for auditors and members in general. The main reason for this lack of projecting tracking and cost control is mostly due to the church failing to employ qualified Project Managers. It is hope that a case can be made to convince the church leaders of the need to take a different approach toward constructing church buildings. This approach should include Project Management Professionals at the earliest stages of the project to coordinate the numerous planning activities necessary to ensure successful project completion within the constraints of a typical project.

As a global organization the SDA Church has assumed its role and commitment to global initiatives and charters on human rights in areas of labour standards and working conditions. It also assumes its primary and natural responsibility of environmental protection as custodian of the earth. Seventh-day Adventists statement on the environment says that “humankind was created in the image of God, thus representing God as His stewards, to rule the natural environment in a faithful and fruitful way”. The statement continues to identify mans greed and “megalomaniacal destruction of the earth's resources” as the cause for, “widespread suffering, environmental disarray, and the threat of climate change”. And called it Members to choose a “simple, wholesome lifestyle, where people do not step on the treadmill of unbridled consumerism, goods-getting, and production of waste. We call for respect of creation, restraint in the use of the world's resources, re-evaluation of one's needs, and reaffirmation of the dignity of created life.” It is evident from this organization’s values that sustainable practices are important to its strategic objective. Sustainable Development is defined as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." — from the World Commission on Environment and Development's. (the Brundtland Commission) report Our Common Future. (Oxford: Oxford University Press, 1987) It make sense to plan its construction activities in such a way that sustainable best practices are deliberately integrated into plans for construction of church buildings.

I believe that the following benefits may be derived

1. The church will be able to create a culture of planning for better accountability, especially at the lowest levels

2. Resources will be closely managed and tracked.
3. Project will be completed within the planned timeframe.
4. Better utilization of the churches finances and human resources.
5. Integration of the United Nations charter on human rights and the ten global compact principles.
6. Close integration of sustainable actions and decisions that are aligned with its policies on environmental stewardship such as energy efficient buildings.
7. Foster an atmosphere where members, contractors and suppliers of goods and services are reminded of the need to do business with those who has respect for the earth and engage in sustainable practices.

Description of Product or Service to be generated by the Project – Project final deliverables

Project Management Plan

Assumptions

Scope:

The project can be completed with the 5 months allotted and can be done by one Project Manager

There is Expert judgment to guide the Project

The Project is not costly to Plan

Constraints

Uncertainty regarding whether the scope is beyond the time allocated due to individual planning.

Preliminary risks

CAUSE	Effect	IMPACT
Failing to identify all project requirements.	Delay in submitting Deliveries and development of WBS, WBSD and work Schedule	Scope, time, quality
Failing to identify and manage stakeholders	Misunderstanding the complete requirements of	Scope, time, quality

	stakeholders	
Communication	Inadequate time to honour change request to meet planned deadlines	Scope, time, quality
Underestimating the complexity of the project scope and requirements	Incomplete Project Deliveries	Scope, time, quality
Failing to make adjustments on time	Delay in handing over deliveries	scope, time, cost, quality
Inadequate approval of deliveries	Incomplete changes	Scope, time, quality
Under developed schedule	Poor dependencies among deliveries	Scope, time, quality
Inadequate Technologies	Loss of data and delayed deliveries	scope, time, cost, quality
Insufficient milestones	Poor project tracking	Scope, time, quality
Inadequate access to information	Referencing unapproved sources	scope, time, cost, quality

Budget

$500,000.00 EXD (break down specific project deliveries are not yet available)

Milestones and dates

Milestone	Start date	End date
FGP Seminar	August 22nd, 2016	September 23rd, 2016
Tutoring	October10th, 2016	March 6th, 2017
Reading By Reviewers	March 7th, 2017	March 27th, 2017
Adjustment	March 28th, 2017	April 24th , 2017
Presentation to the Board of Examiners	April 25th , 2017	May 1st 2017

Relevant historical information

According to E. Lechleitner, the “Seventh-day Adventist Church (SDA) emerged from

religious fervor of 19th century" when many Americans were expecting the Lord Jesus Christ to retuned on October 22, 1844 base on their limited understanding of prophecy. It was William miller's devotion and preaching that led many to wait in Ernest expectation for the return of the desire of ages. But they were disappointed when the day had passed and the eastern sky remained unfolded. Many abandoned their faith while a faithful few quickly admit mistake and went back to scripture for further light. Thus, the SDA Church was brought into existence. The church has remained true to call and mission partly owing to the prophetic ministry of E. G. White and early pioneers who by precepts and example pointed the hopeless to the Lamb of God that takes away the sins of the world. E.G. White writings has seen her as the most prolific woman author and the most translated author of all times. It is in her guidance that SDAs find inspiration for such vast missionary foot print, while using the Bible as their rule of faith and practice.

Stakeholders

Direct stakeholders:

South Leeward Mission of Seventh Day Adventists

St. Peters Community, St. Kitts

Members of the Faith in Emmanuel SDA Congregation

Dennis McDermott- Project Manager

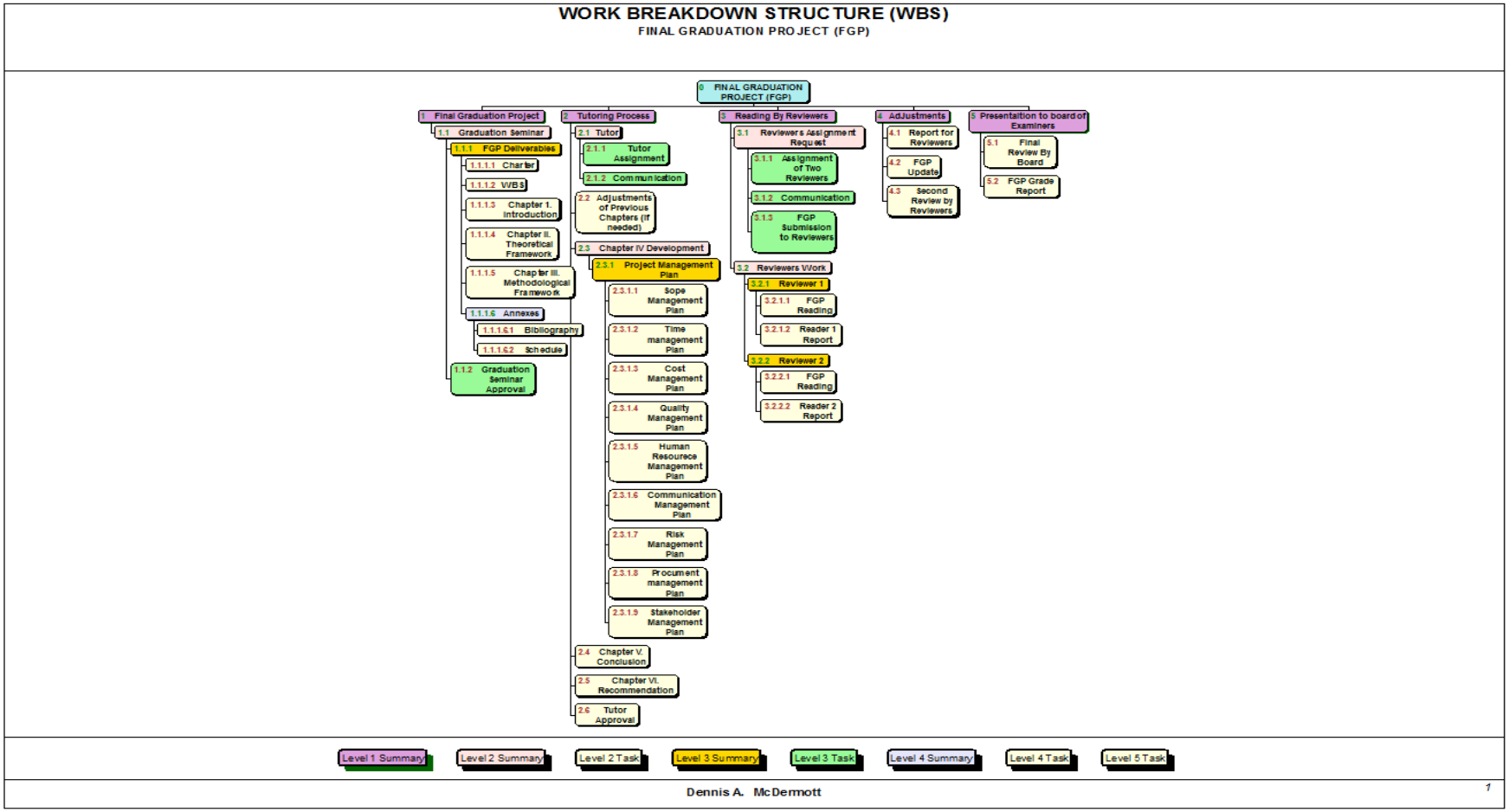
Architect

Indirect stakeholders:

Government of St. Kitts

Project Manager: Dennis McDermott	**Signature:** 
Authorized by: Mónica González	**Signature:** 

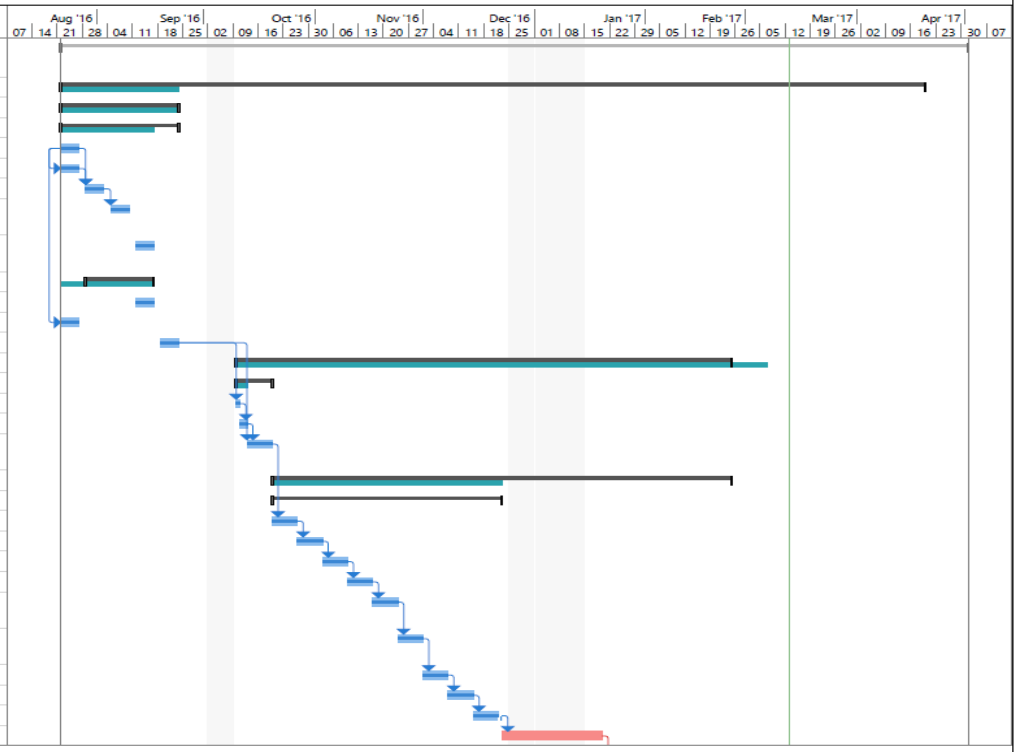
Appendix 2: FGP WBS



Appendix 3: FGP Schedule

FINAL GRADUATION PROJECT SCHEDULE
FINAL GRADUATION PROJECT (FGP)

ID	Task Name	Duration	Start	Finish	Predecessors
0	**FINAL GRADUATION PROJECT (FGP)**	**160 days**	**Mon 22 Aug '16**	**Mon 01 May '17**	
1	**Final Graduation Project**	**152 days**	**Mon 22 Aug '16**	**Wed 19 Apr '17**	
2	**Graduation Seminar**	**25 days**	**Mon 22 Aug '16**	**Fri 23 Sep '16**	
3	**FGP Deliverables**	**25 days**	**Mon 22 Aug '16**	**Fri 23 Sep '16**	
4	Charter	5 days	Mon 22 Aug '16	Fri 26 Aug '16	
5	WBS	5 days	Mon 22 Aug '16	Fri 26 Aug '16	4SS
6	Chapter 1. Introduction	5 days	Mon 29 Aug '16	Fri 02 Sep '16	4,5
7	Chapter II. Theoretical Framework	5 days	Mon 05 Sep '16	Fri 09 Sep '16	6
8	Chapter III. Methodological Framework	5 days	Mon 12 Sep '16	Fri 16 Sep '16	
9	**Annexes**	**15 days**	**Mon 29 Aug '16**	**Fri 16 Sep '16**	
10	Bibliography	5 days	Mon 12 Sep '16	Fri 16 Sep '16	
11	Schedule	5 days	Mon 22 Aug '16	Fri 26 Aug '16	4SS
12	Graduation Seminar Approval	5 days	Mon 19 Sep '16	Fri 23 Sep '16	
13	**Tutoring Process**	**85 days**	**Mon 10 Oct '16**	**Fri 24 Feb '17**	
14	**Tutor**	**8 days**	**Mon 10 Oct '16**	**Wed 19 Oct '16**	
15	Tutor Assignment	1 day	Mon 10 Oct '16	Mon 10 Oct '16	12
16	Communication	2 days	Tue 11 Oct '16	Wed 12 Oct '16	15
17	Adjustments of Previous Chapters (if needed)	5 days	Thu 13 Oct '16	Wed 19 Oct '16	16,12
18	**Chapter IV Development**	**77 days**	**Thu 20 Oct '16**	**Fri 24 Feb '17**	
19	**Project Management Plan**	**46 days**	**Thu 20 Oct '16**	**Thu 22 Dec '16**	
20	Sope Management Plan	5 days	Thu 20 Oct '16	Wed 26 Oct '16	17
21	Time management Plan	5 days	Thu 27 Oct '16	Wed 02 Nov '16	20
22	Cost Management Plan	5 days	Thu 03 Nov '16	Wed 09 Nov '16	21
23	Quality Management Plan	5 days	Thu 10 Nov '16	Wed 16 Nov '16	22
24	Human Resouerce Management Plan	5 days	Thu 17 Nov '16	Wed 23 Nov '16	23
25	Communication Management Plan	5 days	Thu 24 Nov '16	Wed 30 Nov '16	24
26	Risk Management Plan	5 days	Thu 01 Dec '16	Wed 07 Dec '16	25
27	Procument management Pla	5 days	Thu 08 Dec '16	Wed 14 Dec '16	26
28	Stakeholder Management Pl	5 days	Thu 15 Dec '16	Thu 22 Dec '16	27
29	Chapter V. Conclusion	5 days	Fri 23 Dec '16	Thu 19 Jan '17	28



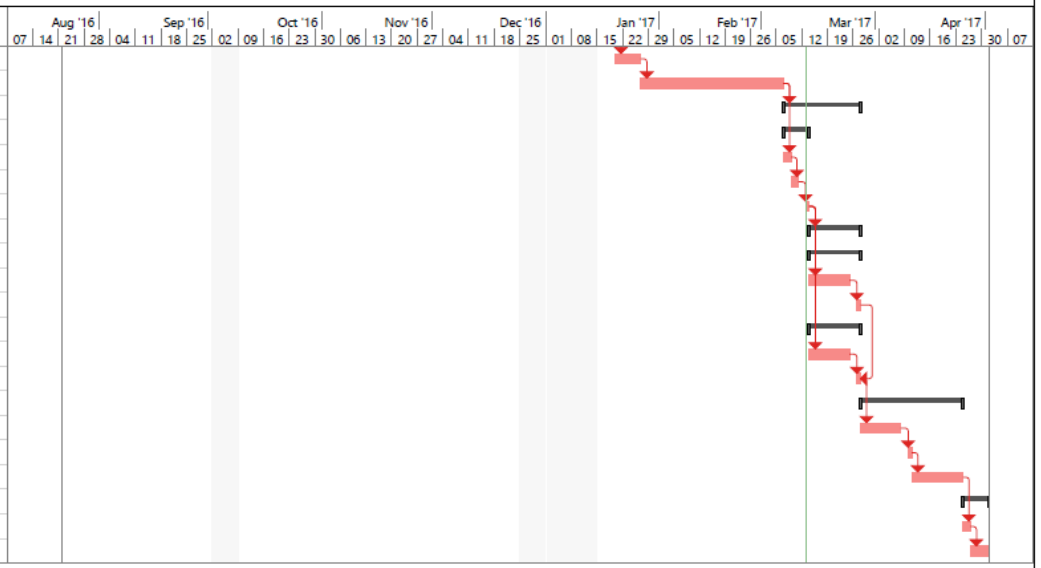
Task — Milestone — Project Summary — Finish-only — Critical — Manual Progress
Split — Summary — Manual Task — Deadline — Progress

NAME: Dennis A. McDermott
PAGE: 1

PROJECT START DATE: Mon 22 Aug '16
PROJECT FINISH DATE: Mon 01 May '17

FINAL GRADUATION PROJECT SCHEDULE
FINAL GRADUATION PROJECT (FGP)

ID	Task Name	Duration	Start	Finish	Predecessors
30	Chapter VI. Recommendation	5 days	Fri 20 Jan '17	Thu 26 Jan '17	29
31	Tutor Approval	27 days	Fri 27 Jan '17	Mon 06 Mar '17	30
32	**Reading By Reviewers**	**15 days**	**Tue 07 Mar '17**	**Mon 27 Mar '17**	**31**
33	**Reviewers Assignment Request**	**5 days**	**Tue 07 Mar '17**	**Mon 13 Mar '17**	
34	Assignment of Two Reviewers	2 days	Tue 07 Mar '17	Wed 08 Mar '17	31
35	Communication	2 days	Thu 09 Mar '17	Fri 10 Mar '17	34
36	FGP Submission to Reviewers	1 day	Mon 13 Mar '17	Mon 13 Mar '17	35
37	**Reviewers Work**	**10 days**	**Tue 14 Mar '17**	**Mon 27 Mar '17**	**36**
38	**Reviewer 1**	**10 days**	**Tue 14 Mar '17**	**Mon 27 Mar '17**	
39	FGP Reading	9 days	Tue 14 Mar '17	Fri 24 Mar '17	36
40	Reader 1 Report	1 day	Mon 27 Mar '17	Mon 27 Mar '17	39
41	**Reviewer 2**	**10 days**	**Tue 14 Mar '17**	**Mon 27 Mar '17**	
42	FGP Reading	9 days	Tue 14 Mar '17	Fri 24 Mar '17	36
43	Reader 2 Report	1 day	Mon 27 Mar '17	Mon 27 Mar '17	42,40FF
44	**AdJustments**	**20 days**	**Tue 28 Mar '17**	**Mon 24 Apr '17**	
45	Report for Reviewers	9 days	Tue 28 Mar '17	Fri 07 Apr '17	43
46	FGP Update	1 day	Mon 10 Apr '17	Mon 10 Apr '17	45
47	Second Review by Reviewers	10 days	Tue 11 Apr '17	Mon 24 Apr '17	46
48	**Presentaition to board of Examiner**	**5 days**	**Tue 25 Apr '17**	**Mon 01 May '17**	
49	Final Review By Board	2 days	Tue 25 Apr '17	Wed 26 Apr '17	47
50	FGP Grade Report	3 days	Thu 27 Apr '17	Mon 01 May '17	49



Task Milestone Project Summary Finish-only Critical Manual Progress
Split Summary Manual Task Deadline Progress

NAME: Dennis A. McDermott
PAGE: 2

PROJECT START DATE: Mon 22 Aug '16
PROJECT FINISH DATE: Mon 01 May '17

Appendix 4: Other relevant information

Appendix 5: Dictum and proof of Philological corrections.

Hardtimes

Gingerland

Nevis

March 4th, 2017

To Whom It May Concern

I am a trained language teacher who have been instructing students at the High School and College level since 1992.

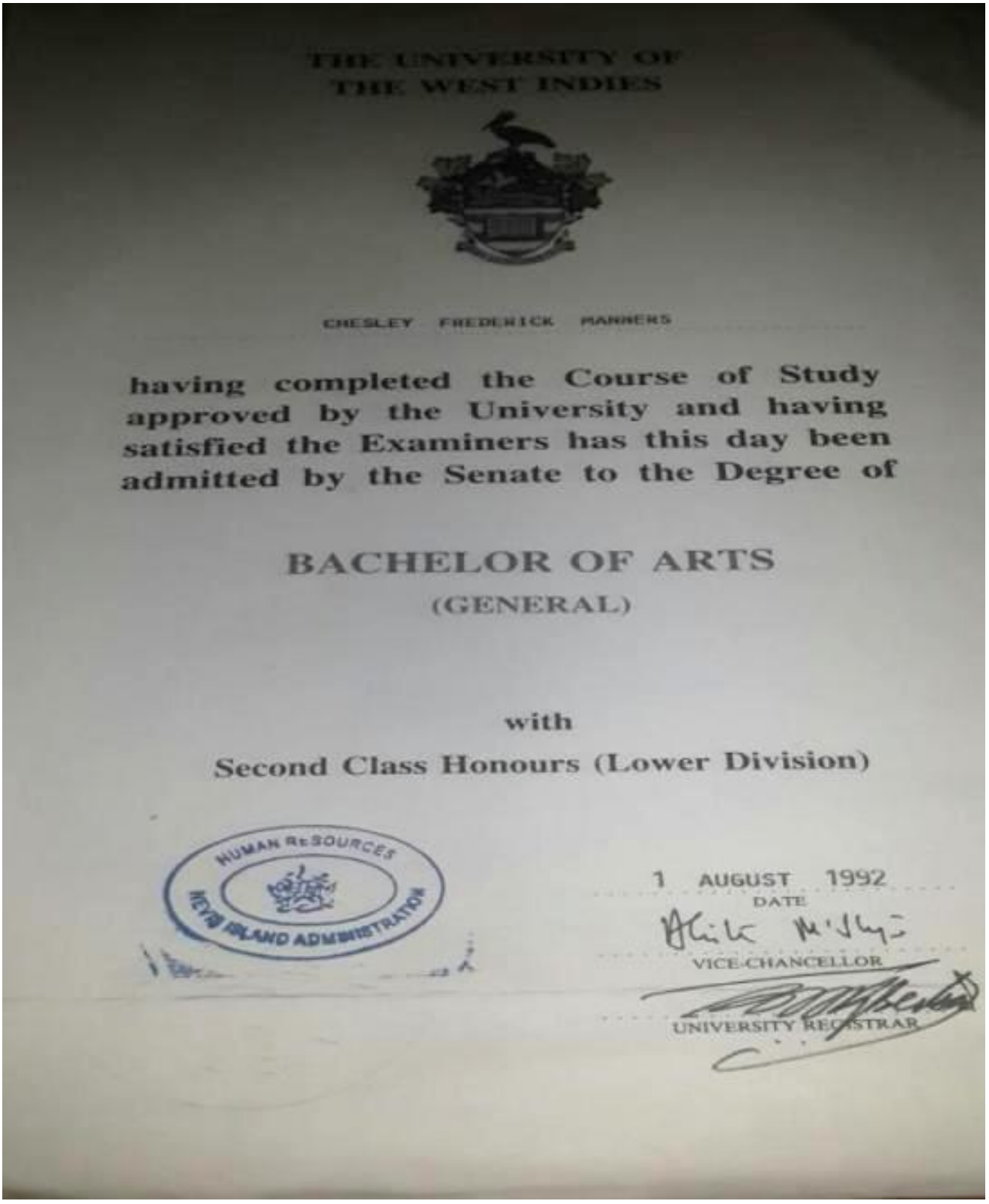
I have been reviewing Mr. McDermott's Final Graduation Project, making structural and grammatical corrections where necessary.

I have a Bachelor's Degree in languages from the University of the West Indies, Cave Hill Campus, Barbados. A copy of the same is attached.

Sincerely,

Manners (chesley.manners@hotmail.com)

Chesley Manners



THE UNIVERSITY OF
THE WEST INDIES

CHESLEY FREDERICK MANNERS

having completed the Course of Study approved by the University and having satisfied the Examiners has this day been admitted by the Senate to the Degree of

BACHELOR OF ARTS
(GENERAL)

with
Second Class Honours (Lower Division)

HUMAN RESOURCES
KEYS ISLAND ADMINISTRATION

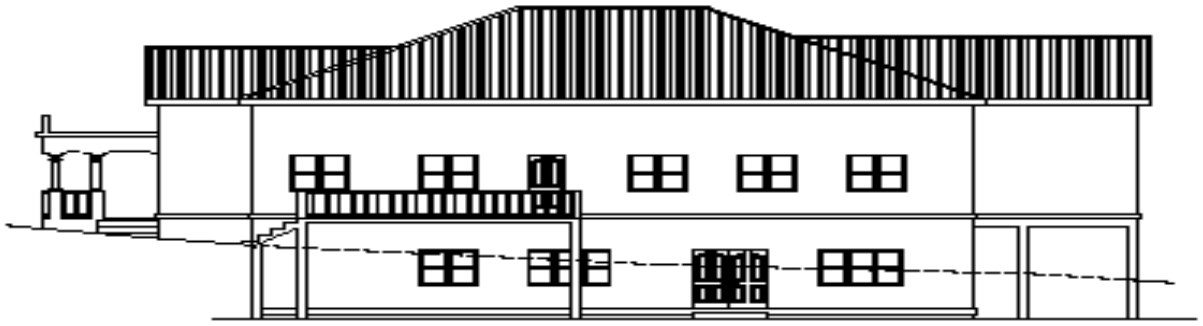
1 AUGUST 1992
DATE

VICE-CHANCELLOR

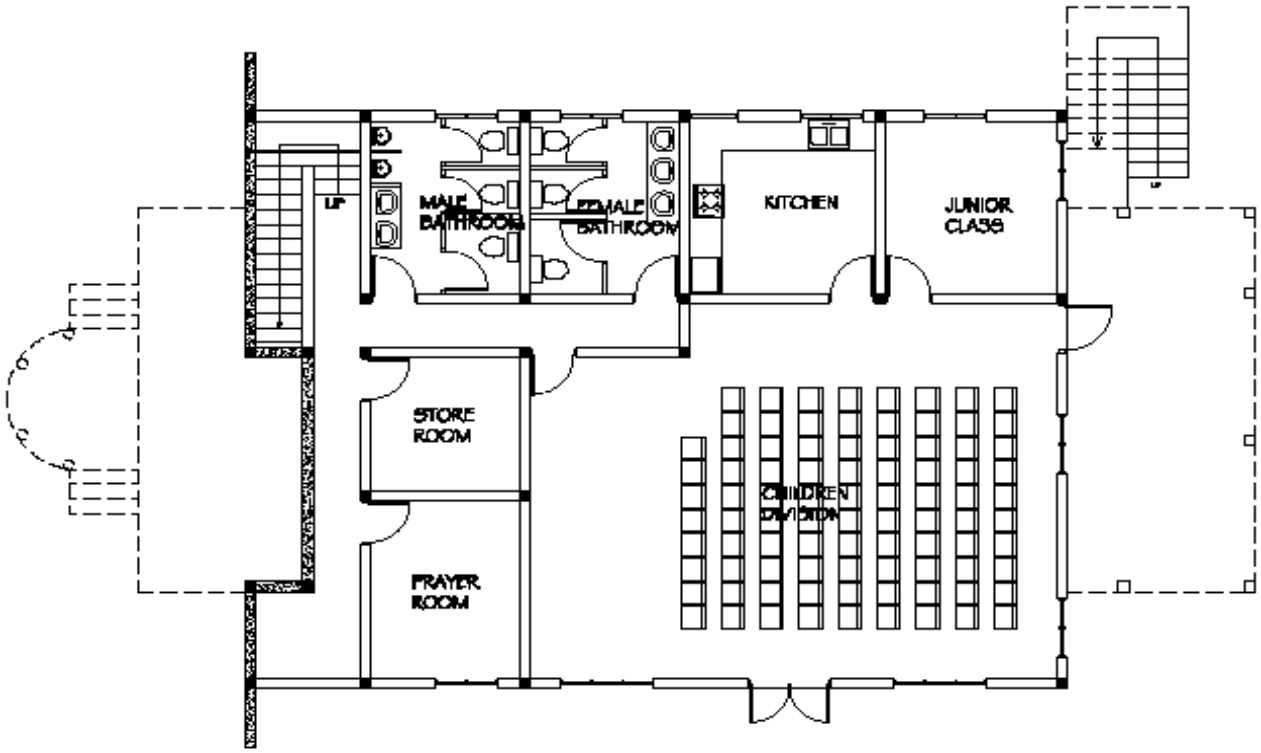
UNIVERSITY REGISTRAR

Appendix 6: Initial Building Plan particulars

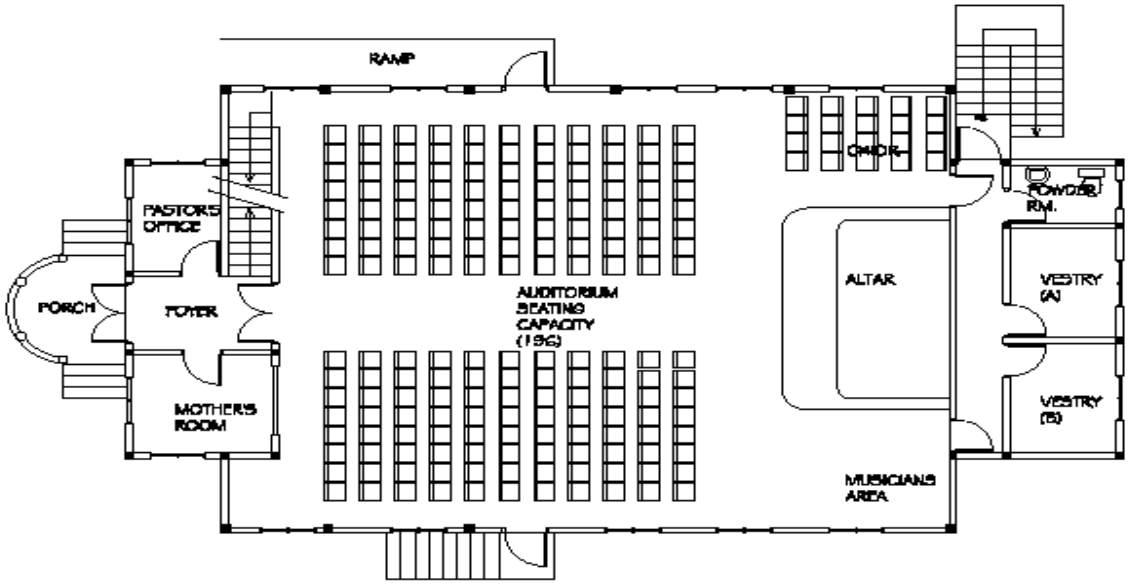
FRONT ELEVATION



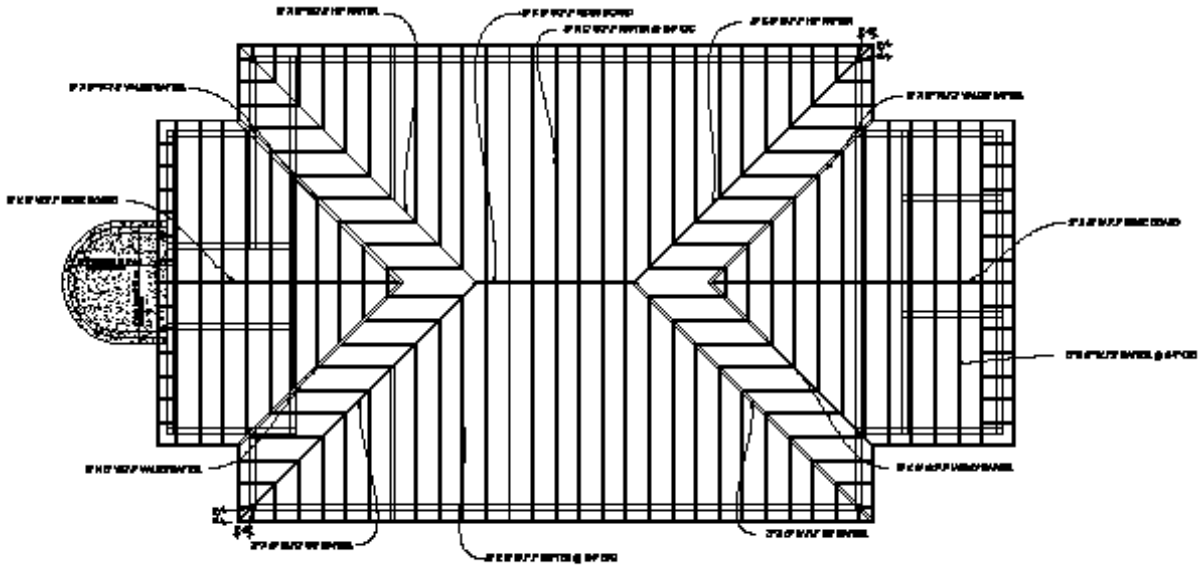
RIGHT SIDE ELEVATION



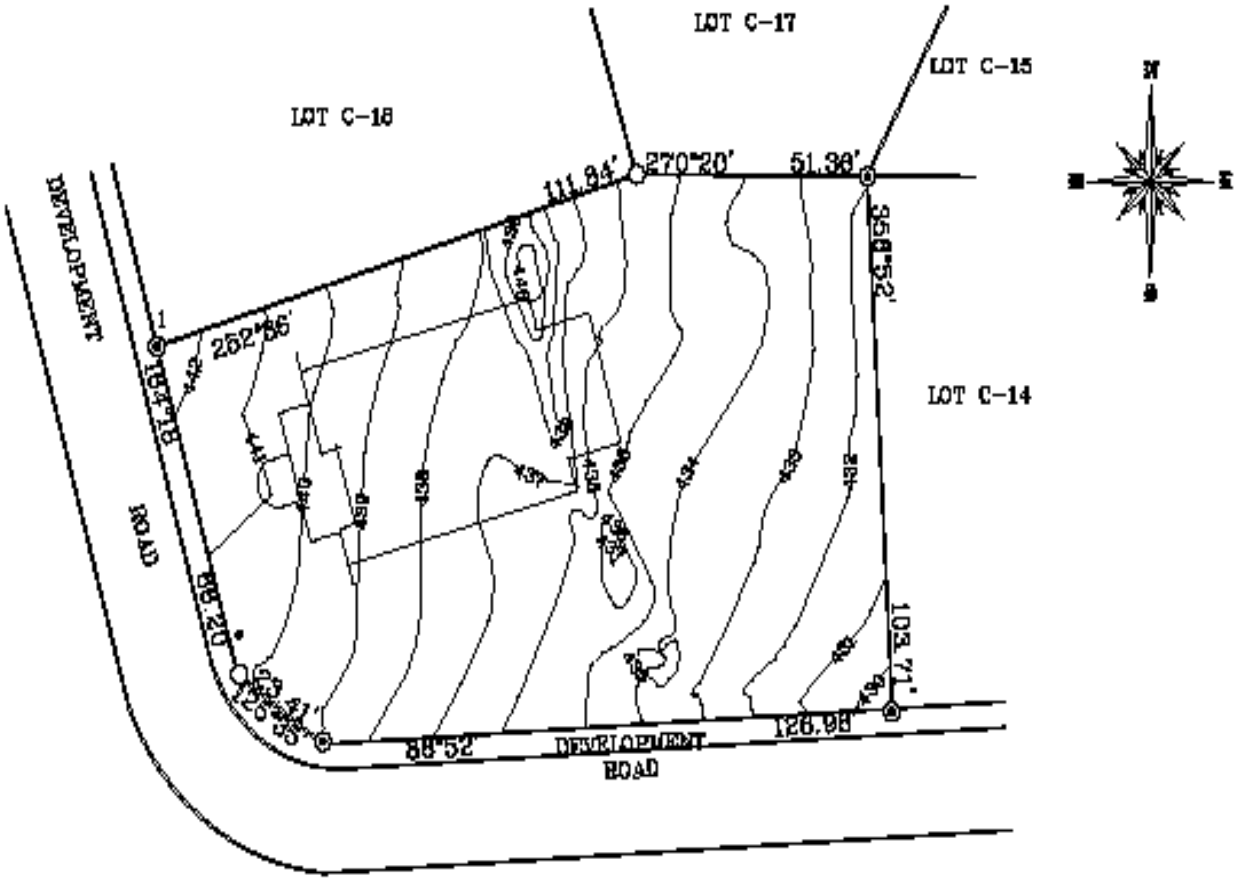
GROUND FLOOR LAYOUT PLAN



MAIN FLOOR LAYOUT PLAN



ROOF FRAMING PLAN


LOT C-17
LOT C-15
LOT C-16
LOT C-14
111.94'
270°20'
51.36'
358°52'
252°55'
198.78'
88.20'
103.71'
88°52'
126.98'
DEVELOPMENT ROAD
DEVELOPMENT ROAD
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