Project Case Study for Applying Key Project Management Processes

Construction of my new single-family home in a suburban area

Business Case:

Problem/Opportunity:

- The need for a new home to accommodate a growing family
- The desire for a modern and energy-efficient home
- The availability of suitable land in a desirable location
- The potential for a good return on investment

Feasibility Study:

- A cost-benefit analysis has been conducted to establish the economic feasibility of the project
- The benefits of building a new home outweigh the costs, including:
  - Increased living space and improved quality of life for the family
  - Increased property value and potential for resale
  - Energy savings and reduced utility costs over the life of the home

Objectives:

- To complete the construction of the house within 12 months
- To ensure that the house meets all safety and quality standards
- To stay within the budget of $500,000
- To achieve a high level of customer satisfaction

Constraints:

- Availability of suitable land in a desirable location
- Budget of $500,000
- Timeframe of 12 months

Assumptions:

- The project team will have the necessary skills and experience to complete the project successfully

- All necessary permits and approvals will be obtained from local authorities

Project Charter:

Project Title: Construction of a New Single-Family Home

Project Manager: [Name]

Project Sponsor: [Name]

Project Start Date: [Date]

Project End Date: [Date]

Project Budget: $500,000

Project Objectives:

To complete the construction of the house within 12 months

- To ensure that the house meets all safety and quality standards
- To stay within the budget of $500,000
- To achieve a high level of customer satisfaction

Project Scope:

- Design and construction of a new single-family home in a suburban area
- Installation of energy-efficient systems
- Landscaping and outdoor living areas

Project Assumptions:

- All necessary permits and approvals will be obtained from local authorities.
- The project team will have the necessary skills and experience to complete the project successfully.

Key Risks:

- Schedule delays due to unforeseen circumstances such as weather, material shortages, or labor issues
- Cost overruns due to changes in project scope or unexpected expenses
- Quality issues due to poor workmanship or use of substandard materials
- Safety risks to workers or occupants of the home
- Environmental risks such as pollution or damage to natural habitats

Key stakeholders

- Project team members such as the project manager, architect, contractor, and construction workers
- Community members who may be impacted by the construction process or the completed home
- Government officials who may need to approve permits or ensure compliance with regulations
- Bank/lender sponsors who may be providing financing for the project
- Business owners who may be impacted by the construction process or the completed home
- Sales and marketing team members who may be involved in selling the completed home
- Current and potential homeowners who may be interested in the completed home or the impact of the construction process on the neighborhood.

Stakholder Register:

Stakeholder Name	Role	Interest/Influence	Communication Needs
[Name]	Project Sponsor	High/High	Regular updates on project progress and budget
[Name]	Project Manager	High/High	Regular updates on project progress and budget
[Name]	Architect	High/Medium	Regular updates on project scope and design
[Name]	Contractor	High/Medium	Regular updates on project progress and budget
[Name]	Community Members	Low/Low	Occasional updates on project progress and potential impacts
[Name]	Government	Low/Medium	Regular updates on project progress and compliance with regulations
[Name]	Bank/Lender Sponsors	High/Medium	Regular updates on project progress and budget
[Name]	Business Owners	Low/Low	Occasional updates on project progress and potential impacts
[Name]	Sales and Marketing Team	Low/Low	Occasional updates on project progress and potential impacts
[Name]	Current Homeowners	Low/Low	Occasional updates on project progress and potential impacts
[Name]	Potential Homeowners	Low/Low	Occasional updates on project progress and potential impacts

Collect Requirements:

Type of Requirement	Requirement
Business Requirements	Completion of the construction within 12 months
	Compliance with all safety and quality standards
	Staying within the budget of $500 000
	High level of customer satisfaction
Technical Solution Requirements	Use of sustainable and eco-friendly materials
	Compliance with local building codes and regulations
	Adequate space for parking and storage
	Energy-efficient design and appliances
	Adequate insulation for energy efficiency
	Use of durable and long-lasting materials
	Adequate ventilation and air quality
	Adequate lighting and electrical outlets
	Adequate plumbing and water supply
	Adequate space for outdoor activities
	Adequate space for indoor activities
	Adequate security measures
	Adequate soundproofing
Transition and Readiness Requirements	Adequate space for pets (if applicable)
	Adequate space for guests (if applicable)
	Adequate space for future expansion (if applicable)

Product Scope Statemement: The product scope includes a completed and fully functional single-family home that meets all safety and quality standards, as well as the requirements of the stakeholders. The home will be designed to be energy-efficient, with sustainable and eco-friendly materials used wherever possible. The home will also be designed to provide adequate space for parking and storage, as well as indoor and outdoor activities.

Acceptance Critera

- The completed home must meet all safety and quality standards as defined by local building codes and regulations.
- The completed home must be constructed within the budget of $500,000.
- The completed home must be completed within the specified timeframe of 12 months.
- The completed home must be designed and constructed using sustainable and eco-friendly materials wherever possible.
- The completed home must meet the requirements and expectations of the stakeholders, including achieving a high level of customer satisfaction.

Deliverables: The deliverables of the project include a completed and fully functional single-family home that meets all safety and quality standards, as well as the requirements of the stakeholders. The deliverables will include all necessary documentation, such as building plans, permits, and inspection reports.

Exclusions:

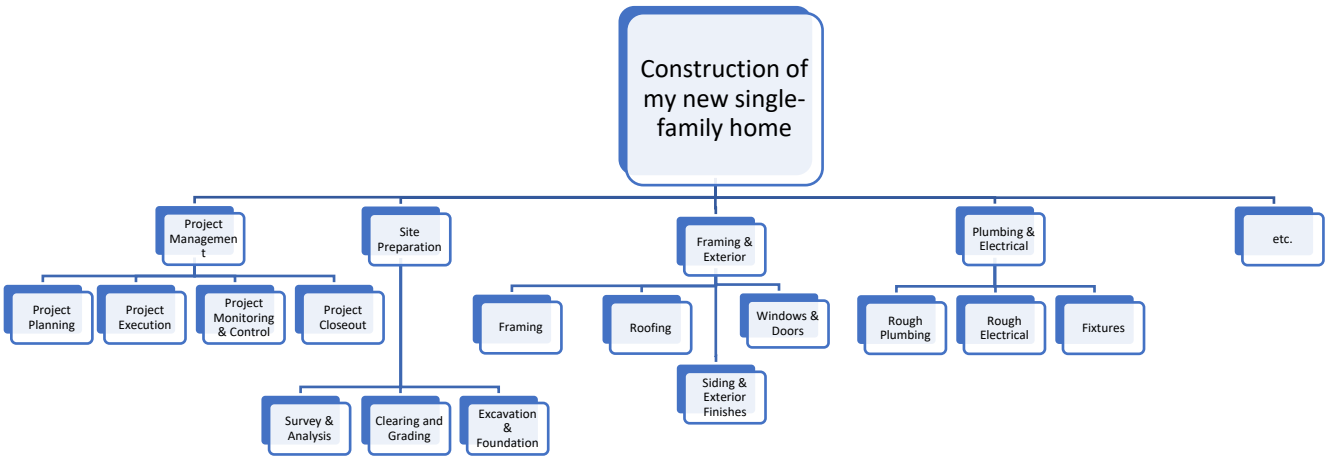
- Landscaping and outdoor hardscaping beyond what is necessary for the construction of the home
- Furniture and decor for the home
- Appliances and electronics for the home
- Maintenance and upkeep of the home after construction is complete.

WBS:

1. Project Management
    - 1.1. Project Planning
    - 1.2. Project Execution
    - 1.3. Project Monitoring and Control
    - 1.4. Project Closeout
2. Site Preparation
    - 2.1. Site Survey and Analysis
    - 2.2. Site Clearing and Grading
    - 2.3. Excavation and Foundation
3. Framing and Exterior
    - 3.1. Framing
    - 3.2. Roofing
    - 3.3. Siding and Exterior Finishes
    - 3.4. Windows and Doors
4. Plumbing and Electrical

4.1. Rough Plumbing
4.2. Rough Electrical
4.3. Plumbing and Electrical Fixtures

5. HVAC and Insulation
   5.1. HVAC (Heating, Ventilation & Air Conditioning) System Installation
   5.2. Insulation Installation
6. Interior Finishes
   6.1. Drywall and Painting
   6.2. Flooring
   6.3. Cabinetry and Countertops
   6.4. Interior Doors and Trim
7. Final Inspection and Cleanup
   7.1. Final Inspection
   7.2. Punch List Completion
   7.3. Final Cleanup



⇒ There are several software applications available to create a WBS, including:

- Microsoft Project: A project management software that includes a WBS feature.
- WBS Schedule Pro: A software specifically designed for creating WBSs.
- MindView: A mind mapping software that can be used to create a WBS.
- Lucidchart: A diagramming software that includes templates for creating a WBS.

⇒ Smartsheet: A project management software that includes a WBS feature.

Activity List:

WBS Code	Activity
1	Project Management
1.1	Develop project plan
1.2	Execute project plan
1.3	Monitor and control project progress
1.4	Close out project
2	Site Preparation
2.1	Conduct site survey and analysis
2.2	Clear and grade site
2.3	Excavate and lay foundation
3	Framing and Exterior
3.1	Frame walls and roof
3.2	Install roofing materials
3.3	Install siding and exterior finishes
3.4	Install windows and doors
4	Plumbing and Electrical
4.1	Rough in plumbing
4.2	Rough in electrical
4.3	Install plumbing and electrical fixtures
5	HVAC and Insulation

WBS Code	Activity
5.1	Install HVAC system
5.2	Install insulation
6	Interior Finishes
6.1	Install drywall and paint
6.2	Install flooring
6.3	Install cabinetry and countertops
6.4	Install interior doors and trim
7	Final Inspection and Cleanup
7.1	Conduct final inspection
7.2	Complete punch list items
7.3	Perform final cleanup

Activity Attributes:

Activity	Activity Code	Pred.	Succes.	Resource Requirements
Develop project plan	1.1	None	Execute project plan	Project manager, project team
Execute project plan	1.2	Develop project plan	Monitor and control project progress	Project manager, project team
Monitor and control project progress	1.3	Execute project plan	Close out project	Project manager, project team

Activity	Activity Code	Pred.	Succes.	Resource Requirements
Clear and grade site	2.2	Conduct site survey and analysis	Excavate and lay foundation	Site manager, excavation equipment
Frame walls and roof	3.1	Excavate and lay foundation	Install roofing materials	Framing contractor, roofing materials

Note: The activity attributes include estimates for duration, cost, lead and lag and associated risks.

Duration and Cost estimates techniques:

- Analogous estimating: A technique for estimating the duration or cost of an activity or a project using historical data from a similar activity or project.
- Parametric estimating: An estimating technique in which an algorithm is used to calculate cost or duration based on historical data and project parameters.
- Three-point estimating: A technique that uses three estimates to represent the optimistic, most likely, and pessimistic scenarios for activity duration or cost.

Risks identification techniques:

- Brainstorming: A technique that involves a group of people generating ideas and potential risks in a structured or unstructured manner. **For example, they may identify the risk of inclement weather delaying the clear and grade site activity.**
- SWOT analysis: A technique that involves analyzing the strengths, weaknesses, opportunities, and threats of a project or activity. **For example, they may identify the weakness of limited resources that could impact the execution of the project plan activity.**
- Checklists: A technique that involves using a predefined list of potential risks to identify risks that may impact the project or activity. **For example, they may use a checklist to identify the risk of equipment failure during the frame walls and roof activity.**
- Assumptions analysis: A technique that involves identifying and analyzing the assumptions made during the planning phase to identify potential risks. **For example, they may identify the risk of delays due to unforeseen site conditions during the clear and grade site activity.**
- Expert judgment: A technique that involves seeking input from subject matter experts to identify potential risks. **For example, they may consult with a framing contractor to identify potential risks that may impact the frame walls and roof activity.**

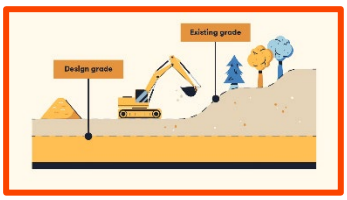
Note: To calculate the risk that may delay one of the above activities, you can use the following formula:

Risk = Probability of Occurrence * Impact

For example of how this formula could be applied to the "Clear and grade site" activity:

- Probability of Occurrence: Let's say there is a **30%** chance of encountering unforeseen site conditions that could delay the activity.
- Impact: Let's say that if the activity is delayed, it would cause a delay of **2 weeks** to the overall project schedule.

⇒ Using the formula, we can calculate the risk as follows:



Risk = 0.3 * 2 weeks = 0.6 weeks

⇒ This means that there is a risk of **0.6 weeks** of delay to the overall project schedule due to unforeseen site conditions during the "Clear and grade site" activity.

In terms of Cost:

⇒ For example, let's say that the project team identified the risk of unforeseen site conditions that could increase the cost of the **Clear and grade site** activity. They estimate the probability of this risk occurring as 30% and the impact as an additional cost of $10,000. Using the formula from earlier, the expected value of this risk would be:

- Expected value = Probability of Occurrence * Impact Expected value = 0.3 * $10,000 Expected value = $3,000

⇒ If the project team identified additional risks with expected values of $2,000 and $4,000, the total expected value would be:

- Total expected value = $3,000 + $2,000 + $4,000 Total expected value = $9,000