Swimming Pool Construction

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Executive Summary

The team intends to build an in-ground concrete swimming pool with a landscape style waterslide and waterfall flowing in front of a grotto. The benefit/opportunity for the project lies in the fact that it will be used for recreation and exercise, and that the pool will also increase the selling price of the home if/when the owners choose to sell the home. The scope of the project is to build the pool and all its features utilizing resources such as a construction team, online purchasing platforms, and input from the project managers and stakeholders (in this case, the project managers and the stakeholders are the same people). The project has a $50,000 budget which accounts for all costs of labor, materials, chemicals for the pool's water, potential risks, plumbing, electricity, etc. The budget does not account for project crashing, as the project's start date is in the fall to provide sufficient time for completion while avoiding additional costs for crashing the project. The timeline of the project reflects the November 1,2023 start date and the January 12, 2024 end date given that all phases of the project are conduction accordingly. As is previously mentioned, the team intends on allocating no further costs to crashing the project, so the January 12th end date is subject to change upon necessity due to occurrence of project risks. However, the team does not anticipate that potential delays will result in any additional costs being incurred regarding the budget. The key deliverables of the project include a high-quality pool foundation that is capable of handling the appropriate mass of water once filled, fully functioning pool features including all electrical components, and a satisfactory cleanup job once the construction of the pool is completed. The risks for the project reflect the potential for delays in project processes affecting the team's ability to complete later phases of the project. These do not incur additional costs, but they do impact the planned schedule of the project. These risks include things like issues with the construction team (call-ins, double booking, etc.), weather issues that are unavoidable, delays in receiving the permit to conduct construction, and delays in receiving parts, components, chemicals, or any other necessary resources for completing phases of the project.

Scope

Scope Description

This project's scope is to design and build a concrete swimming pool with features like custom landscaping, a grotto, and a waterslide. The pool will be built in the backyard of the project team's home which is an existing single-family residence, containing a porch with stairs to the main part of the yard where the pool will be located.

Project Requirements

The construction of the pool will be contingent on the team's needs, state and/or local construction requirements for building and licensing, and neighborhood Homeowners' Association (HOA) guidelines. The cost of constructing the swimming pool and all listed features is to exceed no more than $50,000 and it is to be completed no later than summer of 2024.

Deliverables

The deliverables of this project are the swimming pool and all its features along with a site cleanup after pool construction has been completed.

Exclusions

Exclusions of this project include any additional landscaping desired after the completion of the pool construction as well as any necessary repairs that are not found immediately after installation, which would be consider approximately one month after project is considered complete.

Constraints

Project constraints include the due date of the Summer 2024 season and the $50,000 budget.

Assumptions

The assumptions for this project include the team members not adding any additional features to the swimming pool during construction or altering pre-determined features, unless a safety issue arises that requires making structural or aesthetic changes. The project will also assume that no builder or team member factors will drastically alter the project's ability to complete the project by the agreed-upon due date.

Acceptance Criteria

Acceptance of the project depends upon the pre-determined budget and due date unless approval is obtained from the team members prior to project completion. Further, the project must not pose any unforeseen safety or functional issues to the team members or their property.

Project Charter

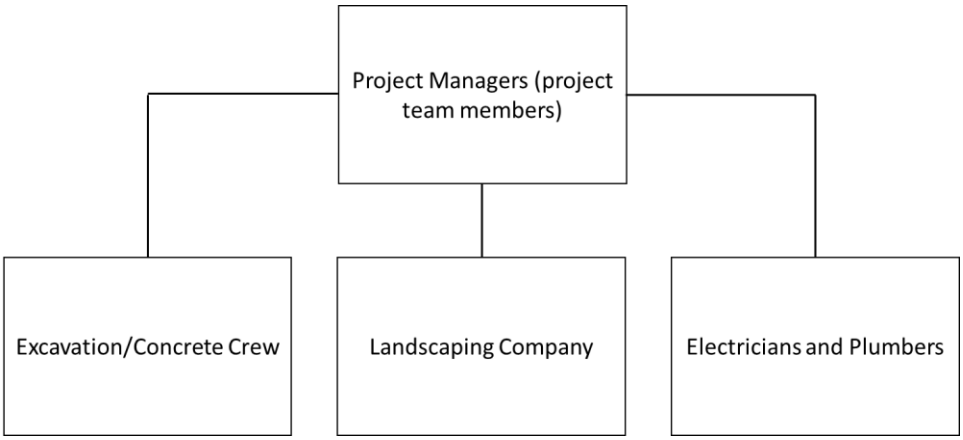

Figure1: Project organization flow chart

R	Responsible
A	Accountable
C	Consulted
I	Informed

Task Name	Project Manager	Excavation/ Concrete Crew	Landscaping Company	Electrications	Plumbers
Obtain Permit	R				
Digging/Dirt Work	C	R			
Electrical	C			R	
Plumbing	C				R
Concrete Pour	I	R			
Concrete Dry	I				
Landscaping	A		R		
Fill Pool	R				
Obtain Chemicals	R				
Pour Chemicals	R				

Figure 2. Responsibility Matrix

Communication and Stakeholder Management Plan

The parties responsible for each aspect of the project are as follows: the concrete and excavation crew will be responsible for completing the digging and concrete pouring part of the pool build. Their other responsibilities include abiding by any mandates in place locally and statewide as well as following all HOA guidelines and any/all guidelines outlined by the project managers/homeowners - this includes minimizing and avoiding destruction or damage to any unnecessary areas of the property. The electricians are responsible for installing proper electrical equipment for the pool including any necessary safety features such as lighting, any additional features outlined in the project scope like a waterfall, waterslide, and grotto lighting. Plumbers will be held responsible for installing a proper drainage system for the pool for cleaning and weather purposes. The landscaping company will be responsible for installing landscaping features such as the grotto and waterslide and ensuring that these features are secure and meet all safety requirements. Parties responsible for tasks are held accountable for any issues with their respective tasks.

When consultation is needed, individual teams working on project tasks will consult the project managers. Any consultation that would typically require consultation from the homeowner will be directed to the project manager as they are the homeowner and main stakeholders in the project.

The appropriate teams should notify their necessary counterparts, when necessary, all teams should keep the project manager informed and the other teams when problems arise that warrant alerting other work crews working on the project.

Work Breakdown Structure (WBS)

Table 1: WBS

WBS	Task Name
1	Obtain Permit
2	Digging/Dirt Work
3	Electrical
4	Plumbing
5	Concrete Pour
6	Concrete Dry
7	Landscaping
8	Fill Pool
9	Obtain Chemicals
10	Pour Chemicals

Schedule

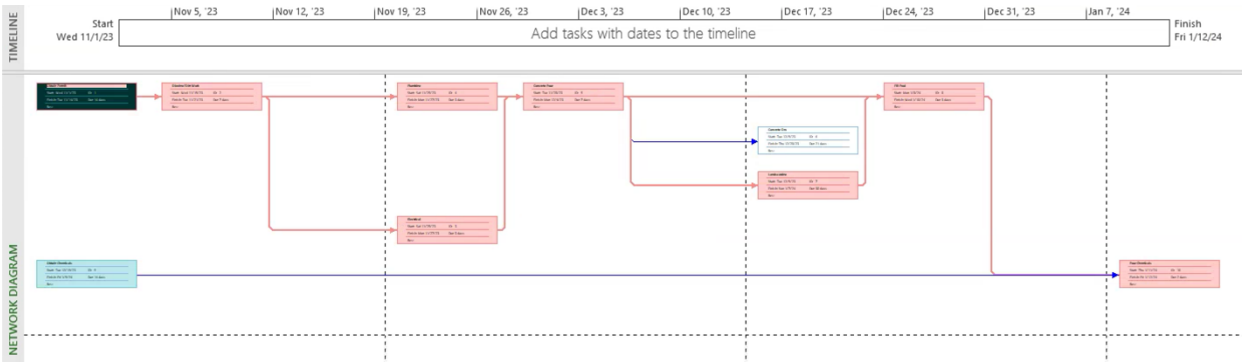

Figure 3: Project Network Diagram

Table 2: Project Schedule

GANTT CHART

	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Cost	Resource Names
1		Obtain Permit	14 days	Wed 11/1/23	Tue 11/14/23		$1,000.00	
2		Digging/Dirt Work	7 days	Wed 11/15/2	Tue 11/21/23	1	$5,000.00	
3		Electrical	3 days	Sat 11/25/23	Mon 11/27/2	2	$4,200.00	
4		Plumbing	3 days	Sat 11/25/23	Mon 11/27/2	2	$4,800.00	
5		Concrete Pour	7 days	Tue 11/28/23	Mon 12/4/23	3,4	$20,000.00	
6		Concrete Dry	21 days	Tue 12/5/23	Thu 12/28/23	5	$0.00	
7		Landscaping	30 days	Tue 12/5/23	Sun 1/7/24	5	$10,000.00	
8		Fill Pool	3 days	Mon 1/8/24	Wed 1/10/24	5,7	$200.00	
9		Obtain Chemicals	14 days	Tue 12/19/23	Fri 1/5/24		$175.00	
10		Pour Chemicals	2 days	Thu 1/11/24	Fri 1/12/24	8,9	$0.00	

Cost Estimate

We used a bottom-up approach for this project. We were able to calculate the estimated total cost by estimating the cost of each task and then summed the tasks. The costs were broken down into three categories for ease of viewing.

Preparation Costs

Preparation costs only include the permit for construction of the pool. The cost being $15 per $1000 for the cost of the project. Our permit is estimated to cost $1000. There are no other preparation costs as the backyard does not need to be cleared of trees/stumps or other debris.

Construction costs

There are five major and two minor costs related to construction with estimated costs of $44,000. Excavation and dirt work is estimated to cost $5000. Plumbing and electrical will cost $4800 and $4200, respectively. The concrete pour, which includes the subbase, concrete form, concrete, and labor, is estimated at $20,000. Last is the landscaping cost, which includes the

design plans, and is estimated to be $10,000. The minor costs are filling the pool using multiple hoses connected to water spickets from the house and obtaining the pool chemicals. They are estimated to be $200 and $175, respectively.

Finishing costs

Finishing costs include cleanup costs to return the property to the state it was in prior to the project start point. This should not incur any additional cost.

Table 3: Cost Breakdown

Task Name	Cost
Obtain Permit	$1,000.00
Digging/Dirt Work	$5,000.00
Electrical	$4,200.00
Plumbing	$4,800.00
Concrete Pour	$20,000.00
Concrete Dry	$0.00
Landscaping	$10,000.00
Fill Pool	$200.00
Obtain Chemicals	$175.00
Pour Chemicals	$0.00

Resource Requirements List

Table 4: Resource List

Type of Resource	Resource Details/Spec	Qty	Location	Source
Machine	Excavator	1	Onsite	Hire
Person	Construction crew (dirt work, concrete pour)	4	Onsite	Contractor
Person	Electriction	1	Onsite	Contractor
Person	Plumber	1	Onsite	Contractor
Person	Landscaping Crew	3	Onsite	Contractor
Water	To fill the pool	10,000	Onsite	Water Department
Chemicles	Pool Chemicals	2	Onsite	Buy

Itemized Time Phased Budget

Table 5: Itemized Time Phase Budget

Schedule Week	Associated Costs	Type of Cost
10/30/2023	$1,000.00	Permit
11/6/2023	$0.00	
11/13/2023	$2,500.00	Digging/Dirt Work
11/20/2023	$7,000.00	Digging/Dirt Work, Plumbing, & Electrical
11/27/2023	$16,300.00	Plumbing, Electrical, & Concrete Pour
12/4/2023	$12,000.00	Concrete Pour & Landscaping
12/11/2023	$2,000.00	Landscaping
12/18/2023	$2,175.00	Landscaping & Pool Chemicals
12/25/2023	$2,000.00	Landscaping
1/1/2023	$2,000.00	Landscaping
1/8/2024	$200.00	Fill Pool

The budget has been broken down by week starting on Monday and running through Sunday. If a task falls on more than one week, the cost has been split evenly between the weeks. This excludes the permit because it is an upfront cost then waiting for it to be processed through the system.

Milestone Schedule

Table 6: Itemized Time Phase Budget

Date	Milestone	Status
11/14/2023	Obtain Permit	Complete
11/21/2023	Dirt Work	Complete
11/27/2023	Electrical	Complete
11/27/2023	Plumbing	Complete
12/4/2023	Councrete Pour	Complete
12/28/2023	Conscete Dry	In Progress
1/6/2023	Landscaping	Not Started
1/10/2024	Fill Pool	Not Started
1/5/2024	Obtain Chemicals	Not Started
1/13/2024	Pour Chemicals	Not Started

Quality Management Plan

The project manager oversees quality assurance by performing walkthroughs of the jobsite, reviewing the tasks as they are being completed, and following the milestone schedule.

Walkthroughs of the jobsite provide a great overview of the current tasks in progress and provide an effective way to get daily status reports. As tasks are being completed and milestones met, the project manager must review the task quality before signing off. If a task is not completed to the baseline standard, then the work must be brought up to par and/or the scope must be redefined.

Finally, the pool must be inspected by the city before the job can be finished.

Table 7: Quality Management Execution

Process	Date	Quality is Correct	Sign Off by PM
Dirt Work	11/12/2023	Yes	PM
Electrical	11/27/2023	Yes	PM
Plumbing	11/27/2023	Yes	PM
Concrete Pour	12/4/2023	Yes	PM
Concrete is Dry			
Landscaping			
Fill Pool			
Pour Chemicals			

Change Order Management Plan

The swimming pool construction plan contract includes the scope statement, the projected completion date, and the budget. These are the project's baseline and changes must be submitted to the project management as a formal written request.

Change Requests

If any of the contractors have a change order to submit, they must submit a formal written request which the project managers have three (3) business days to approve or deny. The request must have all necessary changes, scope, budget, etc. If the request is approved the baseline is updated in accordance with the request. If the request is denied, then the baseline is to be followed. All requests and changes of the baseline will be filed with the project managers.

Risk Management

Risk Breakdown Structure

Table 8: RBS

RISK STATEMENT	PROBABILITY	IMPACT	ACTION
The pool's construction requires outdoor work that could be impacted by severe weather (rain, snow, etc.) which would delay construction.	Low	Medium	Avoid – the pool needs to be completed by Summer of 2024. So, beginning construction in November the schedule has some wiggle room with the final completion date.
The pool requires concrete to be poured and set, which cannot be completed in the rain, delaying construction.	Low	High	Avoid – the schedule has allowed a week for the concrete form construction and pouring, knowing the weather forecast will help to avoid delays due to weather.
If the ordering of the pool chemicals is delayed, they will not arrive in time (i.e., the chemicals are out of stock).	Low	Medium	Avoid – have a backup company to order the chemicals from and investigate express shipping.
The county not approving the construction permit would cause construction delays.	Low	Medium	Accept – other houses in the neighborhood have recently installed pools, and beginning construction in November the schedule has some wiggle room with the final completion date.
Construction workers calling out or unavailable, delays to construction and schedule.	Medium	Medium	Accept – because this job is being completed over the holiday season (Thanksgiving, Christmas, New Year's) those days have been taken off the work schedule to avoid delays.

Risk Management Plan

Table 9: RMP

RISK STATEMENT	MONITOR AND CONTROL	RESPONSE
The pool's construction requires outdoor work that could be impacted by severe weather (rain, snow, etc.) which would delay construction.	There is no way to control the impacts of the weather on the timeline of the project.	Complete tasks that are not dependent on the completion of incomplete tasks that had to be delayed due to weather.
The pool requires concrete to be poured and set, which cannot be completed in the rain, delaying construction.	There is no way to control the impacts of the weather on the timeline of the project.	Complete tasks that are not dependent on the completion of incomplete tasks that had to be delayed due to weather.
If the ordering of the pool chemicals is delayed, they will not arrive in time (i.e., the chemicals are out of stock).	There is no way to control if products are out of stock or unavailable on the desired website to order from.	Find a different website with comparable pricing. This should not add any time to the original timeline.
The county not approving the construction permit would cause construction delays.	There is no way to control if the responsible parties approve the permit request, but the team should ensure that they request the permit by the specified date.	The only possible response to the occurrence of this risk would be to delay the beginning of any construction phases of the project.
Construction workers calling out or unavailable, delays to construction and schedule.	Assuming that no more than 1 or 2 workers must call out on the same given day, the team should have enough people working on the project to not have to account for any drastic delays, but, since this is out of the team's control, it should be considered.	A couple of workers being unavailable should not delay the project longer than a few hours, which the team should round up to a full day. This would simply delay the following phases, and the team should attempt to work on any tasks that do not require completion of the incomplete, delayed tasks.

Project Status Report

The project status report is an overview of the budget, schedule, and potential problems currently happening within the project. This report should be updated weekly, or more often, if necessary, along with the schedule and milestones.

Table 10: Status Report

Component	Status	Owner/Team	Notes
Budget	On Target	PM	Currently on budget
Schedule	On Target	PM	Currently on schedule
Roadblocks	None		Currently there are no roadblocks

Closeout Checklist

The closeout checklist must be completed and signed off by the project manager before the job can be considered complete. This is the ultimate step in the project and is an overall review of the tasks to double check they have been completed to the level required by the scope.

Table 11: Closeout Checklist

Item	Yes/No
Landscaping has been finished?	
Trash has been cleaned up/disposed?	
Pool Chemicals have been poured?	
Final Inspection?	
Have all necessary parties been compensated for labor and materials?	