



Tehran Park Project

Course Title: Project Management

Course Number: EMGT 545

Instructor: Dr. Richard Sperry

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Abstract

The following is a hypothetical project involving the construction of a city park in Tehran, Iran. This document is to act as a proposal document to be presented to the Project Management Office of our hypothetical construction company. The purpose of the proposal is to demonstrate our knowledge of project management practices from planning to implementation to monitoring and control to termination.

PURPOSE

Samco Construction Co. has a unique opportunity to be a part of the Art Block that is set to open by January 1, 2016. As you may be aware, this block in downtown Tehran, Iran will feature a beautiful new art exhibition hall that is getting significant media coverage and has generated quite a buzz in the city. The municipality of Tehran is looking for a capable construction company to build a park surrounding the exhibition hall and they want to include amenities such as a water feature, a playground, a food court for multiple vendors, sport fields, and a walking path.

This project aligns well with our overall strategy to take on construction jobs that utilize many of our different construction functions and our vision to improve the livability of our great city. This project is expected to generate profit margins above our typical hurdle rate of 20% (and certainly our minimum requirement of 15%) as well as provide great visibility for Samco. Budget will be discussed in more detail in the Resources section, but it is worth noting that we believe we can win the competitive bidding process with a total fee of \$1,000,000. Based on a budgeted cost of approximately \$756,000, this would generate a return on our investment of 24.4%. Furthermore, our marketing team believes that the visibility generated by a successful completion of this project could generate millions in new revenue.

OVERVIEW AND OBJECTIVES

To provide further clarity on the scope of the project, this section will detail the four primary aspects of the project and what they will entail: a landscaped green space with a water feature, sport fields with a jogging path surrounding the park, a food court structure with space for ten vendors, and a playground area for children and families to play. The food court *must* be completed by November 15, 2015 so that the city has time to get food vendors up and running by the January 1st, 2016 grand opening of the exhibition hall. We have adopted this November target as an end date to complete all of our work. Which schedule as our priority, we will keep an eye on risks that may delay our progress. Budget will be discussed in more detail in the Resources section, but it is worth noting that we believe we can win the competitive bidding process with a total fee of \$1,000,000. Based on a budgeted cost of approximately \$756,000, this would generate a return on our investment of 24.4%. Furthermore, our marketing team believes that the visibility generated by a successful completion of this project could generate millions in new revenue.

Landscaped green space with a water feature

The available green space on the block is approximately 30% of the block (excluding what will be used for the exhibition hall, playground, sports fields, and food court). We will manage a bidding process with landscape architecture companies to select a design that fits the expectations of the city and our capabilities as a company. After we have a successful design, we will begin the excavation process of clearing and leveling the land as well as preparing ditches for plumbing and electrical installations. The water feature will include some art sculptures that the city is commissioning but we will not be involved

in this selection process. The design of the water feature, however, will include platforms that will be later used to secure the sculptures. There will also be a filtering room constructed which will contain water filtration and electrical controls for the park. We will also be responsible for setting up lighting around the park, installing drinking fountains for the public to use, and planting trees and bushes to beautify the location.

Sport Fields with a jogging path surrounding the park

There is no question that Tehran is wild about its football (soccer to any Americans who may read this). The city is excited about an opportunity to build a small turf field that can be rented out and used by teams or leagues. The actual construction of the sport fields will be done by a third party vendor, but our company will manage the bidding process and oversee the excavation of the area. The sport field company will also be responsible for finishing a walking or jogging path that will encircle the perimeter of the block.

Food court with space for ten vendors

To generate revenue as well as enhance the park and surrounding business areas, the city wants to build a food court that would accommodate ten different food vendors. We will manage the bidding process and work with the selected architecture firm to construct the building up to the point where it is a “warm shell.” This means that each vendor will have all the electrical, plumbing, HVAC, and lighting needs in order to operate their space. This will allow the city to lease out the spaces as soon as possible. The food court will have public restrooms to be shared by all vendors. After our proposal is accepted by the city, we will go forward with the excavation and construction of the structure.

A playground area for families to play

Finally, it is the intention of the city that this park be a location that families are drawn to for relaxation, play, artistic inspiration, and socialization. Near the sport fields, there is to be a playground and picnic tables for families to use. Like the sport fields, Samco will be responsible for managing the bidding process and excavating the area upon which the playground will be constructed.

Further details about the different deliverables can be found in the Appendixes found at the end of this proposal. Appendices A and F break out the different tasks, G and H show the planned schedule and how tasks connect, and I shows the probability of us completing the project by our January 1st deadline.

Project Completion

We will know our project is complete when it is able to be successfully integrated into the regular operations of the city. This means that people can use the playground and greenspace for relaxation and exercise; the sport fields are able to be rented and used; and the food court will be ready enough that the city can obtain leases from food providers and they can begin their individual build-out processes.

SCHEDULES

As mentioned previously, the city wants the park up and running by January 1, 2016 which includes having tenants operational in the food court. We have been told that they will need 45 days to build out the individual food vendor spaces so we need to have our work complete by **November 15, 2015**. We can start as early as April 1, 2015 and based on our bottoms up schedule, it is expected that we should complete our project by October 14, 2015. This gives us an additional month of time before we *must* be complete in case there are delays along the way. Based on prior experiences, best-case, worst-case, and most likely scenarios were identified and the PERT Three Point method was used to come up with an expected duration for each task. Based on this analysis, we are confident that we can get the work done in this time based on a confidence level of 97.8% detailed in Appendix I.

Milestones have been established to help us understand that we are on target with our planned schedule. These milestones include finishing the bidding processes, delivery of materials, completion of the food court, completion of the sport fields, completion of the playground, and completion of the landscaped green spaces. Details about the scheduled tasks and work breakdown are found in the attached appendices. Appendices A and F break out the different tasks and G and H show the planned schedule and how tasks connect.

RESOURCES AND PERSONNEL

Human Resources

As you are aware, our company is organized as a composite structure where some projects are managed within functional areas, but many are managed like a matrix with the PMO coordinating with functional managers to utilize resources to get more complex project done. Most of our projects take on the strong matrix form as will this proposed park project. We will require resources from our plumbing, electrical, building construction, landscaping, cement, HVAC, and painting divisions. The project will be overseen by an experienced project manager who will work with our staff civil engineer, commercial architect, and landscape architect to plan, implement, monitor, and control the project. A snapshot of our organization is in Appendix C. In addition to resources we have in-house, we will require some outsourcing and subcontracting in order to complete all areas of the project. Services we will outsource include the landscaping design which will be done by a selected landscape architecture firm, the food court design which will be done by a selected commercial architecture firm, the design and construction of a playground to be done by a selected playground equipment company, and the design and construction of the sport fields which will be done by a selected sport field company. We will subcontract for excavation and natural gas installation as we don't currently have these services within our company. On the job site, day to day operations will be managed by divisional foremen who will ensure that the workers under their supervision complete work within quality, time, and budgetary expectations. Details of who will be responsible for various tasks throughout the project are found in the RACI Matrix as Appendix B.

Budget

We have looked at our budget from both a top down (Appendix E) and planned value (Appendix K and L) standpoint. These budgets take into account estimates of personnel and material costs and when they will be needed based on our baseline schedule of tasks. Labor rates used for different workers are based upon current market expectations and are detailed in Appendix Q. Utilization of human resources was an important factor in coming up with a budget. As can be seen in Appendix J, Effort in work days is spread across different tasks and work functions. Dividing this Effort by the expected duration of each task gave us a Utilization rate that could be used for budgeting purposes. Initially, we had some over-allocation of resources for our excavation work. After looking at slack time, we decided to delay the excavation of the sport fields and playground areas in order to ensure that the more complex and time-sensitive workflows within the landscaping and food court tasks were completed without needing overtime or more workers.

Details for actual material and human resources used at each task as well at their respective cost estimates are found in Appendices K and P.

RISK MANAGEMENT PLANS

As you are aware, risk management is one of the most important aspects of a successful project and is at the same time one of the most uncertain. We have identified the foreseeable risks for our project and have analyzed both the probability of them occurring and their impact if they do. Additionally, we have laid plans or expectations on how we will handle the situations if they arise.

Appendix M details these risks, triggers for detecting them, and our plans for addressing them.

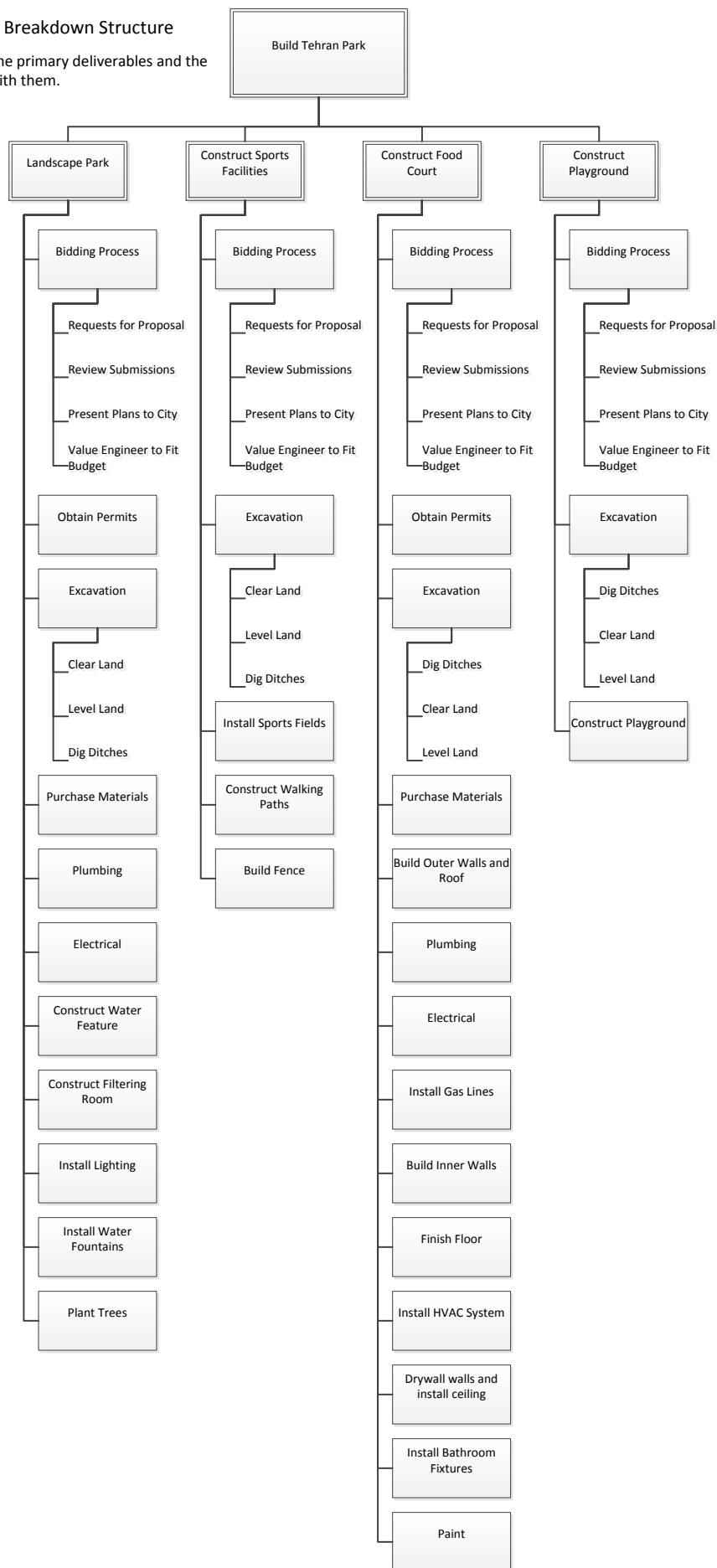
EVALUATION METHODS

Related to the management of risk, we have specific measurements that we will track throughout the duration of the project. As mentioned before, schedule is more important to the city than budget or scope. To ensure that we remain on target with our progress, we will utilize Schedule Performance Index (Earned Value / Planned Value). We would work to maintain a ratio equal or greater than 1 and will implement control measures if it slips below 1. Both the landscaping (which contains the critical path) and the food court (which has a total duration shorter than the critical path, but is more complex and has a harder deadline with the city) will be measured and controlled to ensure completion by November 15, 2015. In addition to monitoring the SPI, we will measure the critical ratio which shows our deviation from schedule and cost (Actual Progress/ Scheduled Progress)*(Budget Cost/ Actual Cost), particularly on the critical path. With Critical Ratio measurement, different types of tasks may have different control limit; therefore, we came up with the idea of various limits (Appendix N).

These measurements provide an early warning signal for prompt corrective action. As discussed with our risk management plans, we have some flexibility with schedule on some tasks and could potentially use increased workers or overtime if delays in our schedule become apparent.

Exhibit A: Work Breakdown Structure

This chart shows the primary deliverables and the tasks associated with them.



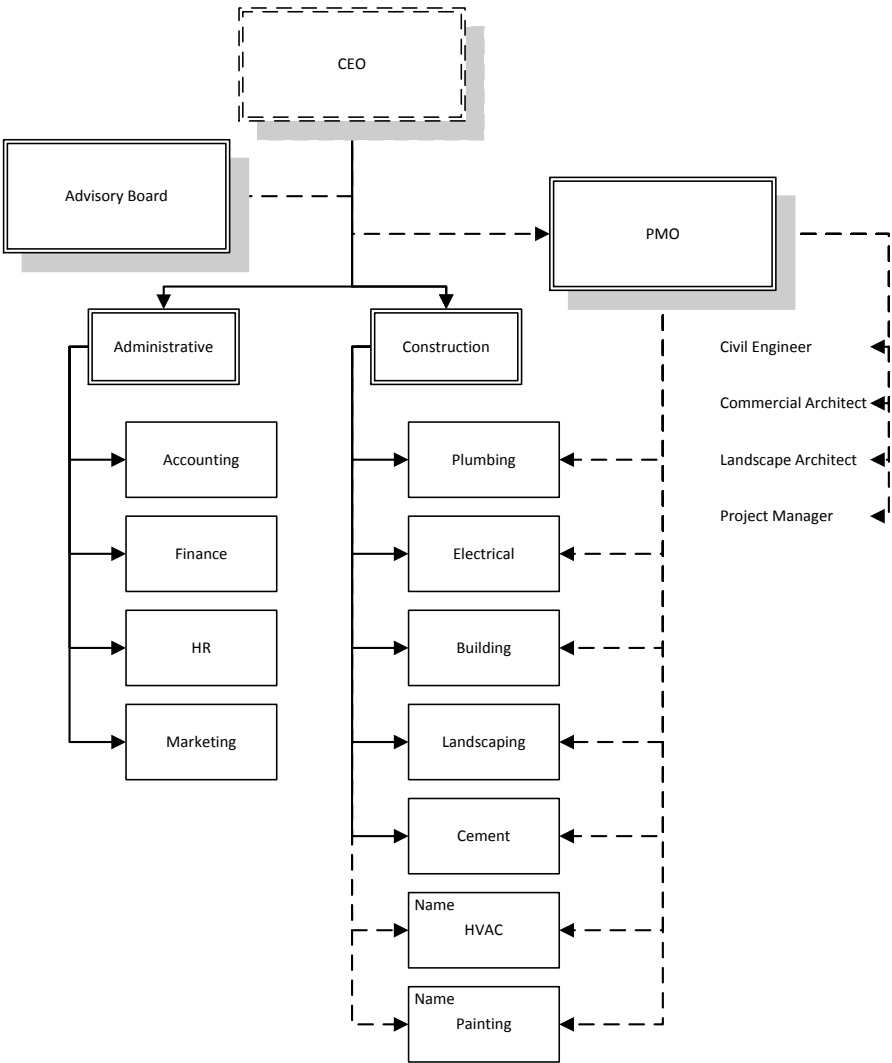
Appendix B – RACI Matrix

This is an explanation of who is responsible, accountable, consulted, or informed for every task.

		Executives		PMO			Construction																Subcontractors				Administration			City																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Exhibit C: Composite Organizational Structure

Our park project is managed by the PMO where bids and designs are reviewed, projects are prioritized, and resource needs are identified and obtained from the functional groups. The PMO has precedence over the functional groups, but functional managers are responsible for work fulfillment and quality.



Appendix D – Summary Schedule with Milestones

ID	Task Name	Date	Predecessors
0	Begin Project	4/1/2015	
8	Finish the Bidding Process (Landscape)	6/4/2015	7
16	Delivery of Materials(Landscape)	8/28/2015	15
24	Opening the Landscape	10/14/2015	23
31	Finish the bidding process (Sport Field)	6/4/2015	30
40	Opening The Sport Field	10/7/2015	37,38,39
47	Finish the bidding process (Food Court)	6/4/2015	46
55	Delivery of materials (Food Court)	7/8/2015	54
66	Opening the Food Court	9/28/2015	65
79	Finish the Play Ground	10/8/2015	78
80	Open the Park	10/14/2015	24,40,66,79

Appendix E – Top-Down Phased Budget

[illegible]

Tasks	Duration	Cost Of Material	Total Cost		7/1/2015	7/8/2015	7/15/2015	7/22/2015	7/29/2015	8/5/2015	8/12/2015	8/19/2015	8/26/2015	9/2/2015	9/9/2015	9/16/2015	9/23/2015	9/30/2015	10/7/2015	10/14/2015
Landscape Park	141 days																			
Bidding Process	47 days																			
Request for proposal	22 days		\$ 79,331.18																	
Review submission	6 days		\$ 976.72																	
Present plans to city	6 days		\$ -																	
Value engineer-to fit Budget	13 days	\$ 75,000.00	\$ 75,581.90																	
Finish the bidding process	0 days		\$ -																	
Obtain permits	14 days		\$ 327.00																	
Excavate Landscape	47 days		\$ -																	
Clear Land	22 days	\$ 26,400.00	\$ -				\$ 20,954.26													
Level Land	15 days	\$ 28,200.00	\$ 51,103.43				\$ 37,581.71	\$ 1,865.43	\$ 1,865.43	\$ 9,790.86										
Dig Ditches	19 days	\$ 20,480.00	\$ -							\$ 6,375.88	\$ 6,375.88	\$ 13,951.76								
Purchase materials	7 days		\$ -																	
Purchase materials	7 days	\$ 1,260.00	\$ -																	
Delivery of materials	0 days		\$ 1,350.00																	
Plumbing	17 days	\$ 37,134.80	\$ 60,683.28									\$ 31,141.64	\$ 7,385.41	\$ 7,385.41	\$ 14,770.82					
Electrical	10 days	\$ 50,362.20	\$ -									\$ 32,430.78	\$ 15,855.33	\$ 15,855.39						
Construct water feature	10 days	\$ 13,200.00	\$ 19,492.96										\$ 4,748.24	4748.24	\$ 9,996.48					
Construct filtering Rooms	15 days	\$ 4,000.00	\$ -										\$ 3,813.00	1906.5	\$ 5,719.50	\$ 3,813.00				
Install lighting	23 days	\$ 7,820.00	\$ 20,471.97											\$ 18,871.97	\$ 1,600.00	1600	\$ 1,600.00	\$ 18,871.97		
Install water fountains	5 days	\$ 500.00	\$ -													3077.88				
Plant tree	18 days	\$ 18,720.00	\$ 19,260.68												\$ 3,077.88	\$ 19,260.68	5086.89	\$ 5,086.89	\$ 5,086.89	\$ 15,260.68
Opening the Landscaped Part	0 days		\$ -																	
Construct Sport Facilities	136 days		\$ -																	
Bidding Process	47 days		\$ -																	
Request for Proposal	11 days		\$ 673.92																	
Review Submission	6 days		\$ 553.93																	
Present Plans to City	6 days		\$ 570.71																	
Value Engineer to Fit Budget	13 days		\$ -																	
Finish the bidding process	0 days		\$ -																	
Obtain Permits	11 days		\$ -																	
Excavate Sport Field	7 days		\$ -																	
Clear Land	3 days	\$ 3,600.00	\$ -																	
Level Land	3 days	\$ 5,640.00	\$ 15,163.13	\$ 7,200.00																
Dig Ditches	1 day	\$ 2,048.00	\$ -																	
Construct sport field	9 days	\$ 40,152.00	\$ 40,814.28	\$ 20,407.14	\$ 20,407.14															
Construct Walking Path	11 days	\$ 17,408.00	\$ -	\$ 4,517.57	\$ 4,517.57	\$ 9,035.14														
Build fence	10 days	\$ 1,000.00	\$ 5,986.20			\$ 2,394.48	\$ 1,197.24	\$ 2,394.48												
Open the Sport Field	0 days	\$ -	\$ -																	
Construct Food court	129 days		\$ -																	
Bidding Process	47 days		\$ -																	
Request for Materials	22 days		\$ 1,504.50																	
Review Submission	6 days		\$ 1,117.38																	
Present Plans to City	6 days		\$ 875.82																	
Value Engineer to Fit Budget	13 days		\$ -																	
Finish the bidding process	0 days		\$ -																	
Obtain Permits	14 days		\$ -																	
Excavate Food Court	14 days		\$ -																	
Clear Land	5 days	\$ 6,000.00	\$ -	\$ 10,704.52																
Level Land	3 days	\$ 5,640.00	\$ 7,561.66	\$ 7,561.66																
Dig Ditches	2 days	\$ 4,096.00	\$ -	\$ 11,796.70																
Purchase Materials	22 days		\$ -																	
Purchase materials	16 days	\$ 2,880.00	\$ 4,422.63	\$ 3,522.63	\$ 300.00	\$ 300.00	\$ 300.00													
Delivery of materials	0 days		\$ -																	

Tasks	Duration	Cost Of Material	Total Cost	4/1/2015	4/8/2015	4/15/2015	4/22/2015	4/29/2015	5/6/2015	5/13/2015	5/20/2015	5/27/2015	6/3/2015	6/10/2015	6/17/2015	6/24/2015
Build Outer walls and roof	15 days	\$ 18,430.75	\$ -													
Plumbing	12 days	\$ 3,360.00	\$ 11,889.40													
Electrical	15 days	\$ 1,800.00	\$ -													
Install Gas Lines	15 days	\$ 2,300.00	\$ 9,985.04													
Build Inner Walls	5 days	\$ 9,225.00	\$ -													
HVAC System	15 days	\$ 10,800.00	\$ 22,445.52													
Drywall Walls and Install Ceiling	10 days	\$ 4,000.00	\$ -													
Finish Floor	4 days	\$ 4,600.00	\$ 14,693.52													
Install Bathroom Fixtures	3 days	\$ 5,300.00	\$ -													
Paint	6 days	\$ 2,000.00	\$ -													
Turn Food Court over for T.I.	0 days		\$ -													
Playground	137 days		\$ -													
Bidding Process	47 days		\$ -													
Request for Proposals	11 days		\$ 1,107.85	\$ 276.96	\$ 276.96	\$ 553.93										
Review Submission	6 days		\$ 285.36					\$ 285.36	\$ 285.36							
Present Plans to City	6 days		\$ 570.72						\$ 285.36	\$ 285.36						
Value Engineer to Fit Budget	13 days		\$ -							\$ 145.48	72.5	\$ 72.50	\$ 290.95			
Obtain Permits	11 days		\$ 331.15									\$ 82.79	82.79	\$ 165.57		
Excavate Sport Field	7 days		\$ -													
Clear Land	3 days	\$ 3,600.00	\$ 5,795.94												\$ 2,897.97	2897.97
Level Land	3 days	\$ 5,640.00	\$ -													\$ 7,835.94
Dig Ditches	1 day	\$ 2,048.00	\$ 2,779.98													\$ 2,779.98
Construct Playground	15 days	\$ 20,000.00	\$ -													
Finish the Playground	0 days		\$ -													
Open the Park	0 days		\$ -													
Total				\$ 39,941.76	\$ 996.96	\$ 1,560.89	\$ 730.00	\$ 41,344.50	\$ 3,942.00	\$ 1,808.18	\$ 19,510.44	\$ 19,225.08	\$ 41,127.36	\$ 52,098.54	\$ 36,313.40	\$ 74,292.89

Tasks	Duration	Cost Of Material	Total Cost	7/1/2015	7/8/2015	7/15/2015	7/22/2015	7/29/2015	8/5/2015	8/12/2015	8/19/2015	8/26/2015	9/2/2015	9/9/2015	9/16/2015	9/23/2015	9/30/2015	10/7/2015	10/14/2015
Build Outer walls and roof	15 days	\$ 18,430.75	\$ -	\$ 7,143.65	\$ 7,143.65	\$ 7,143.65	\$ 7,143.65												
Plumbing	12 days	\$ 3,360.00	\$ 11,889.40				\$ 2,972.35	\$ 2,972.35	\$ 2,972.35	\$ 2,972.35									
Electrical	15 days	\$ 1,800.00	\$ -				\$ 5,347.26	\$ 6,347.26	\$ 5,347.26	\$ 5,347.26									
Install Gas Lines	15 days	\$ 2,300.00	\$ 9,985.04				\$ 4,992.52			\$ 4,992.52									
Build Inner Walls	5 days	\$ 9,225.00	\$ -						\$ 12,975.48										
HVAC System	15 days	\$ 10,800.00	\$ 22,445.52				\$ 5,611.38	\$ 2,805.69	\$ 2,805.69	\$ 11,222.76									
Drywall Walls and Install Ceiling	10 days	\$ 4,000.00	\$ -							\$ 3,453.44	\$ 4,153.44	\$ 6,906.88							
Finish Floor	4 days	\$ 4,600.00	\$ 14,693.52								\$ 7,346.76	\$ 7,346.76							
Install Bathroom Fixtures	3 days	\$ 5,300.00	\$ -												\$ 3,661.91	\$ 3,661.91			
Paint	6 days	\$ 2,000.00	\$ -												\$ 2,554.43	\$ 2,554.43			
Turn Food Court over for J.	0 days		\$ -																
Playground	137 days		\$ -																
Bidding Process	47 days		\$ -																
Request for Proposals	11 days		\$ 1,107.85																
Review Submission	6 days		\$ 285.36																
Present Plans to City	6 days		\$ 570.72																
Value Engineer to Fit Budget	13 days		\$ -																
Obtain Permits	11 days		\$ 331.15																
Excavate Sport Field	7 days		\$ -																
Clear Land	3 days	\$ 3,600.00	\$ 5,795.94																
Level Land	3 days	\$ 5,640.00	\$ -																
Dig Ditches	1 day	\$ 2,048.00	\$ 2,779.98																
Construct Playground	15 days	\$ 20,000.00	\$ -	\$ 10,501.72		\$ 10,501.72													
Finish the Playground	0 days		\$ -																
Open the Park	0 days		\$ -																
Total				\$ 83,355.58	\$ 32,368.36	\$ 87,910.96	\$ 29,429.83	\$ 16,385.21	\$ 40,867.52	\$ 34,364.21	\$ 81,677.62	\$ 46,055.61	\$ 56,114.27	\$ 35,164.68	\$ 31,413.46	\$ 12,903.23	\$ 26,513.29	\$ 5,086.89	

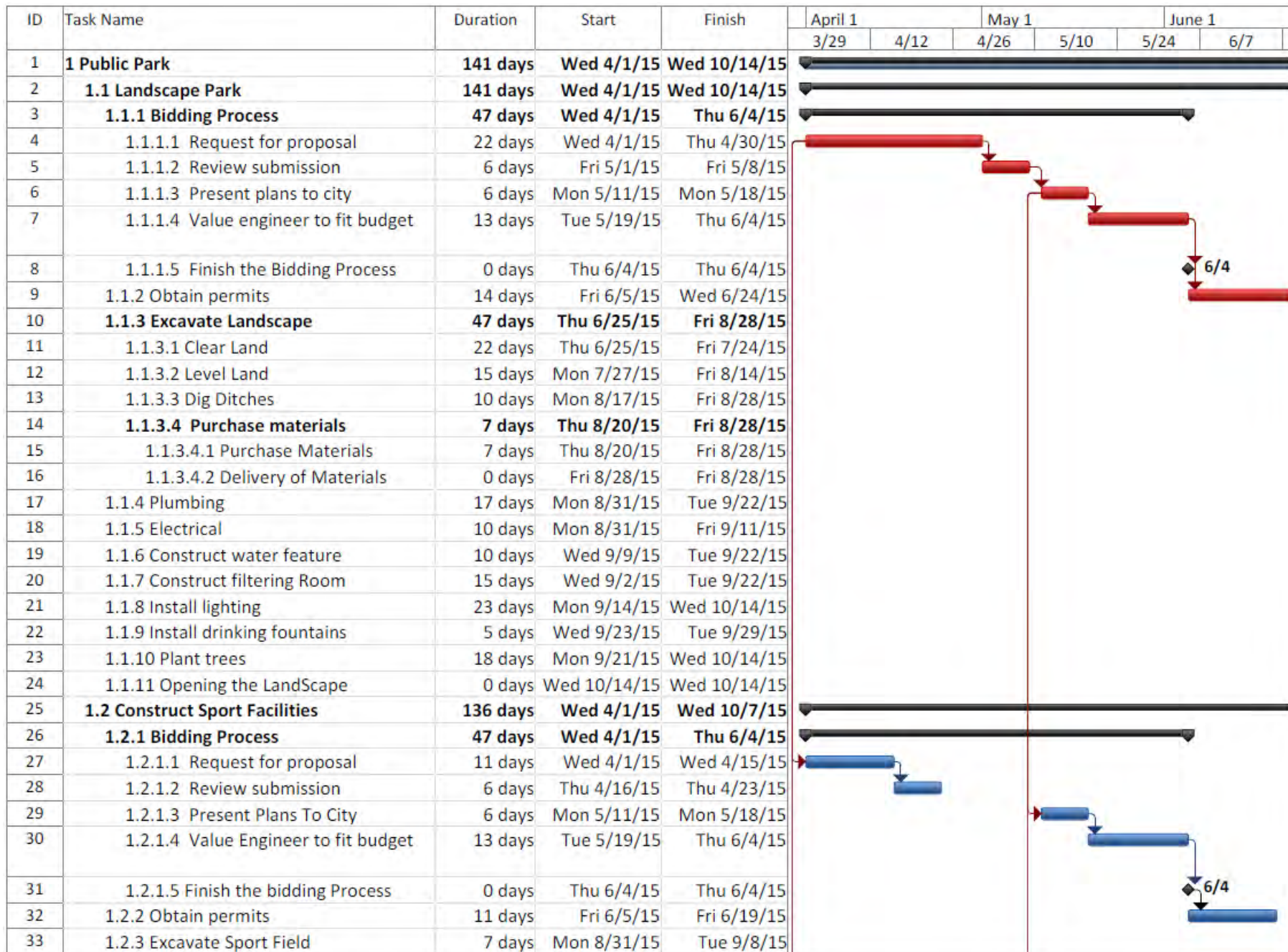
Appendix F – Table of tasks

Estimated duration was based on experience and logical time frames. Expected Time utilizes the PERT Three Point method of determining a statistically plausible duration.

ID	Task	Predecessor(s)	Optimistic	Most Likely	Pessimistic	Expected Time (a + 4m + b)/6	Variance	Standard Deviation
1	Public Park Project							
2	Landscape Park		121	205	367	219	137.056	
3	Bidding Process		21	43	80	46	96.694	9.833
4	.Requests for Proposal		10	20	40	22	25.000	5.000
5	.Review submissions	4	3	5	10	6	1.361	1.167
6	.Present Plans to City	5	3	5	10	6	1.361	1.167
7	.Value Engineer to Fit Budget	6	5	13	20	13	6.250	2.500
8	.FINISH THE BIDDING PROCESS	7						
9	Obtain Permits	7	5	10	40	14	34.028	5.833
10	Excavate Landscaping		25	45	75	47	69.444	8.333
11	.Clear Land	9	10	20	40	22	25.000	5.000
12	.Level Land	11	10	15	20	15	2.778	1.667
13	.Dig Ditches	12	5	10	15	10	2.778	1.667
14	Purchase Materials		4	5	15	7	3.361	1.833
15	.Purchase Materials	13FF	4	5	15	7	3.361	1.833
16	.DELIVERY OF MATERIALS	15						
17	Plumbing	13,15	10	15	30	17	11.111	3.333
18	Electrical	13,15	7	10	15	10	1.778	1.333
19	Construct Water Feature	17FF	7	10	15	10	1.778	1.333
20	Construct Filtering Room	19FF,18FF	10	15	20	15	2.778	1.667
21	Install Lighting	18	10	25	30	23	11.111	3.333
22	Install Drinking Fountains	17	3	5	7	5	0.444	0.667
23	Plant Trees	21FF	15	17	25	18	2.778	1.667
24	OPEN THE LANDSCAPED PARK	23						
25	Construct Sports Facilities		43	77	145	83	35.444	
26	Bidding Process		16	33	60	35	53.778	7.333
27	.Requests for Proposal	4SS	5	10	20	11	6.250	2.500
28	.Review submissions	27	3	5	10	6	1.361	1.167
29	.Present Plans to City	6SS	3	5	10	6	1.361	1.167
30	.Value Engineer to Fit Budget	29	5	13	20	13	6.250	2.500
31	.FINISH THE BIDDING PROCESS	30						
32	Obtain Permits	31	5	10	20	11	6.250	2.500
33	Excavate Sport Fields		5	7	10	7	0.694	0.833
34	.Clear Land	13	2	3	4	3	0.111	0.333
35	.Level Land	34	2	3	4	3	0.111	0.333
36	.Dig Ditches	35	1	1	2	1	0.028	0.167
37	Construct Sport Fields	36	5	7	20	9	6.250	2.500
38	Construct Walking Paths	37SS	7	10	20	11	4.694	2.167
39	Build Fence	38	5	10	15	10	2.778	1.667
40	OPEN THE SPORT FIELDS	37,38,39						

ID	Task	Predecessor(s)	Optimistic	Most Likely	Pessimistic	Expected Time (a + 4m + b)/6	Variance	Standard Deviation
41	Construct Food Court		130	213	362	224	108.556	
42	<i>Bidding Process</i>		21	43	80	46	96.694	9.833
43	.Requests for Proposal	4SS	10	20	40	22	25.000	5.000
44	.Review submissions	43	3	5	10	6	1.361	1.167
45	.Present Plans to City	6SS	3	5	10	6	1.361	1.167
46	.Value Engineer to Fit Budget	45	5	13	20	13	6.250	2.500
47	.FINISH THE BIDDING PROCESS	46						
48	Obtain Permits	47	5	10	40	14	34.028	5.833
49	<i>Excavate Food Court</i>		10	20	40	22	25.000	5.000
50	.Clear Land	48	5	10	20	11	6.250	2.500
51	.Level Land	50	3	5	10	6	1.361	1.167
52	.Dig Ditches	51	2	5	10	5	1.778	1.333
53	<i>Purchase Materials</i>	42	10	15	25	16	6.250	2.500
54	.Purchase Materials	52FF	10	15	25	16	6.250	2.500
55	.DELIVERY OF MATERIALS	54						
56	Build Outer Walls & Roof	55	12	15	20	15	1.778	1.333
57	Plumbing	56	10	12	15	12	0.694	0.833
58	Electrical	56	10	15	20	15	2.778	1.667
59	Install Gas Lines	56	10	15	20	15	2.778	1.667
60	Build Inner Walls	57SS+6 days	2	5	7	5	0.694	0.833
61	Install HVAC System	56	10	15	20	15	2.778	1.667
62	Finish Floor	57,58,59,60,61	10	15	20	15	2.778	1.667
63	Drywall Walls & Install Ceiling	62	5	10	15	10	2.778	1.667
64	Install Bathroom Fixtures	63	2	3	5	3	0.250	0.500
65	Paint	64FF	3	5	10	6	1.361	1.167
66	OPEN THE FOOD COURT	65						
67	Construct Playground		36	65	110	68	24.500	
68	<i>Bidding Process</i>		16	33	60	35	53.778	7.333
69	.Requests for Proposal	4SS	5	10	20	11	6.250	2.500
70	.Review submissions	69	3	5	10	6	1.361	1.167
71	.Present Plans to City	6SS	3	5	10	6	1.361	1.167
72	.Value Engineer to Fit Budget	71	5	13	20	13	6.250	2.500
73	Obtain Permits	72	5	10	20	11	6.250	2.500
74	<i>Excavate Playground Area</i>		5	7	10	7	0.694	0.833
75	.Clear Land	36,73	2	3	4	3	0.111	0.333
76	.Level Land	75	2	3	4	3	0.111	0.333
77	.Dig Ditches	76	1	1	2	1	0.028	0.167
78	Construct Playground	77	10	15	20	15	2.778	1.667
79	OPEN THE PLAYGROUND	78						
80	OPEN THE PARK	24,40,66,79						

Appendix G – Gantt Chart

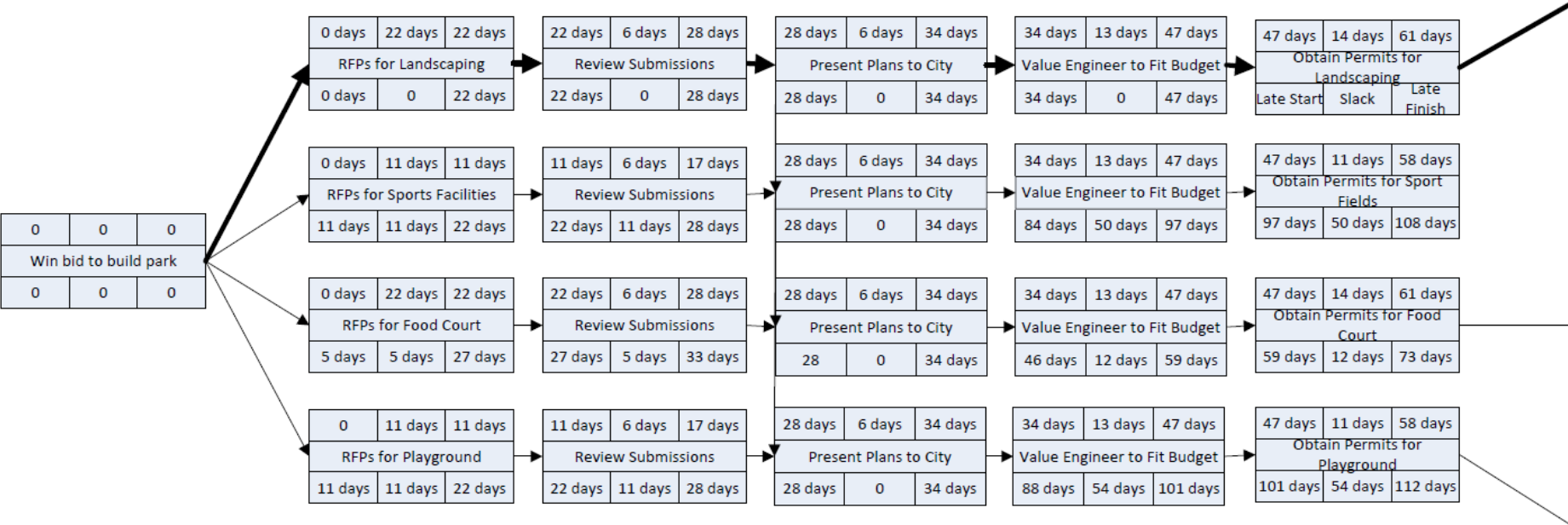


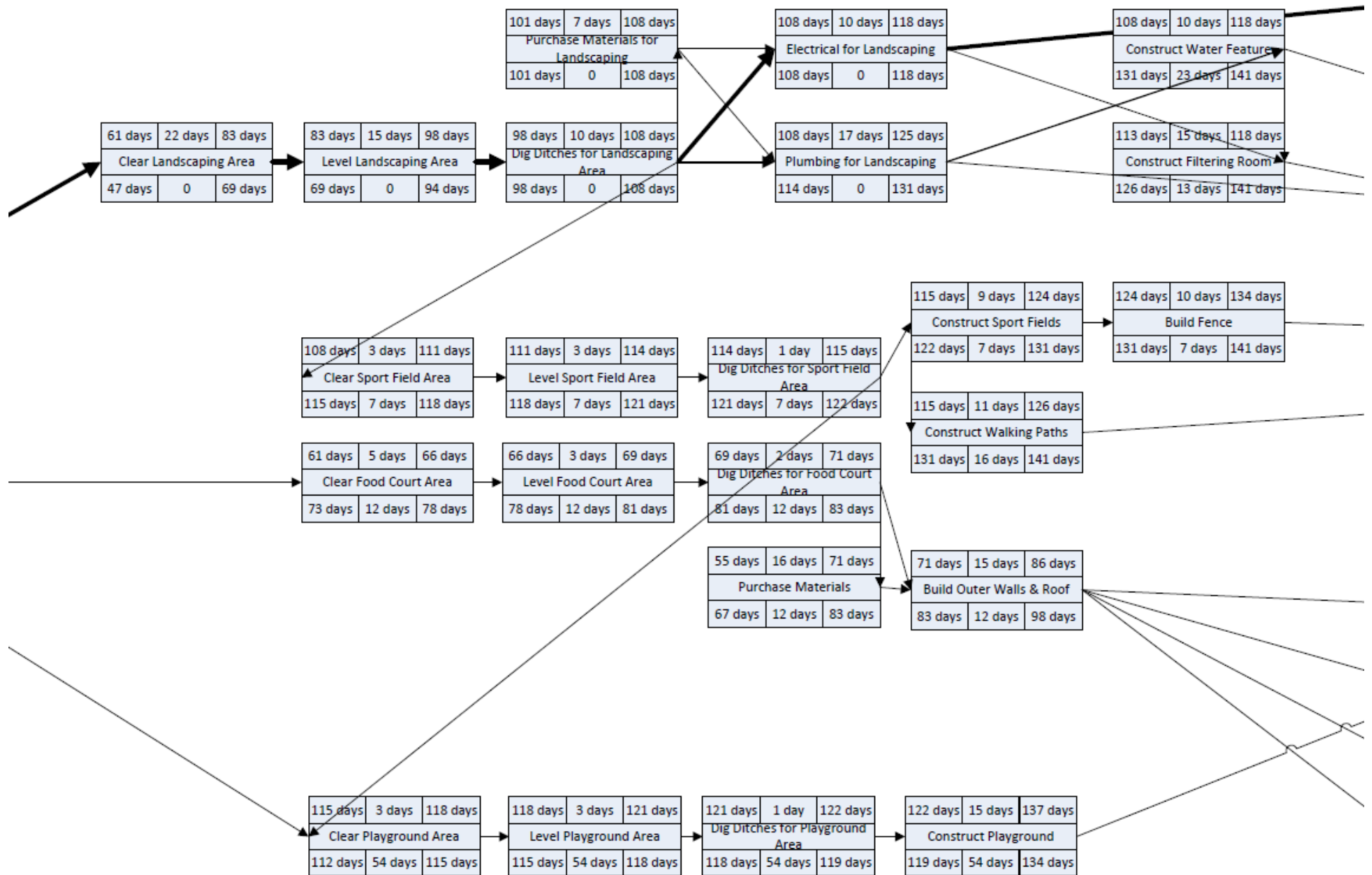
ID	Task Name	Duration	Start	Finish	April 1		May 1		June 1	
					3/29	4/12	4/26	5/10	5/24	6/7
34	1.2.3.1 Clear Land	3 days	Mon 8/31/15	Wed 9/2/15						
35	1.2.3.2 Level Land	3 days	Thu 9/3/15	Mon 9/7/15						
36	1.2.3.3 Dig Ditches	1 day	Tue 9/8/15	Tue 9/8/15						
37	1.2.4 Construct sport field	9 days	Wed 9/9/15	Mon 9/21/15						
38	1.2.5 Construct Walking Path	11 days	Wed 9/9/15	Wed 9/23/15						
39	1.2.6 Build fence	10 days	Thu 9/24/15	Wed 10/7/15						
40	1.2.7 Opening The Sport Field	0 days	Wed 10/7/15	Wed 10/7/15						
41	1.3 Construct Food court	129 days	Wed 4/1/15	Mon 9/28/15						
42	1.3.1 Bidding Process	47 days	Wed 4/1/15	Thu 6/4/15						
43	1.3.1.1 Request for proposal	22 days	Wed 4/1/15	Thu 4/30/15						
44	1.3.1.2 Review submission	6 days	Fri 5/1/15	Fri 5/8/15						
45	1.3.1.3 Present Plans To City	6 days	Mon 5/11/15	Mon 5/18/15						
46	1.3.1.4 Value Engineer to fit budget	13 days	Tue 5/19/15	Thu 6/4/15						
47	1.3.1.5 Finish the bidding Process	0 days	Thu 6/4/15	Thu 6/4/15						
48	1.3.2 Obtain permits	14 days	Fri 6/5/15	Wed 6/24/15						
49	1.3.3 Excavate Food Court	10 days	Thu 6/25/15	Wed 7/8/15						
50	1.3.3.1 Clear Land	5 days	Thu 6/25/15	Wed 7/1/15						
51	1.3.3.2 Level Land	3 days	Thu 7/2/15	Mon 7/6/15						
52	1.3.3.3 Dig Ditches	2 days	Tue 7/7/15	Wed 7/8/15						
53	1.3.4 Purchase Materials	16 days	Wed 6/17/15	Wed 7/8/15						
54	1.3.4.1 Purchase Materials	16 days	Wed 6/17/15	Wed 7/8/15						
55	1.3.4.2 Delivery of Materials	0 days	Wed 7/8/15	Wed 7/8/15						
56	1.3.5 Build Outer walls and roof	15 days	Thu 7/9/15	Wed 7/29/15						
57	1.3.6 Plumbing	12 days	Thu 7/30/15	Fri 8/14/15						
58	1.3.7 Electrical	15 days	Thu 7/30/15	Wed 8/19/15						
59	1.3.8 Install Gas Lines	15 days	Thu 7/30/15	Wed 8/19/15						
60	1.3.9 Build Inner Walls	5 days	Fri 8/7/15	Thu 8/13/15						
61	1.3.10 HVAC System	15 days	Thu 7/30/15	Wed 8/19/15						
62	1.3.11 Drywall Walls and Install Ceiling	10 days	Thu 8/20/15	Wed 9/2/15						
63	1.3.12 Finish Floor	15 days	Thu 9/3/15	Wed 9/23/15						
64	1.3.13 Install Bathroom Fixtures	3 days	Thu 9/24/15	Mon 9/28/15						
65	1.3.14 Paint	6 days	Mon 9/21/15	Mon 9/28/15						
66	1.3.15 Opening the Food Court	0 days	Mon 9/28/15	Mon 9/28/15						
67	1.4 Playground	137 days	Wed 4/1/15	Thu 10/8/15						
68	1.4.1 Bidding Process	47 days	Wed 4/1/15	Thu 6/4/15						

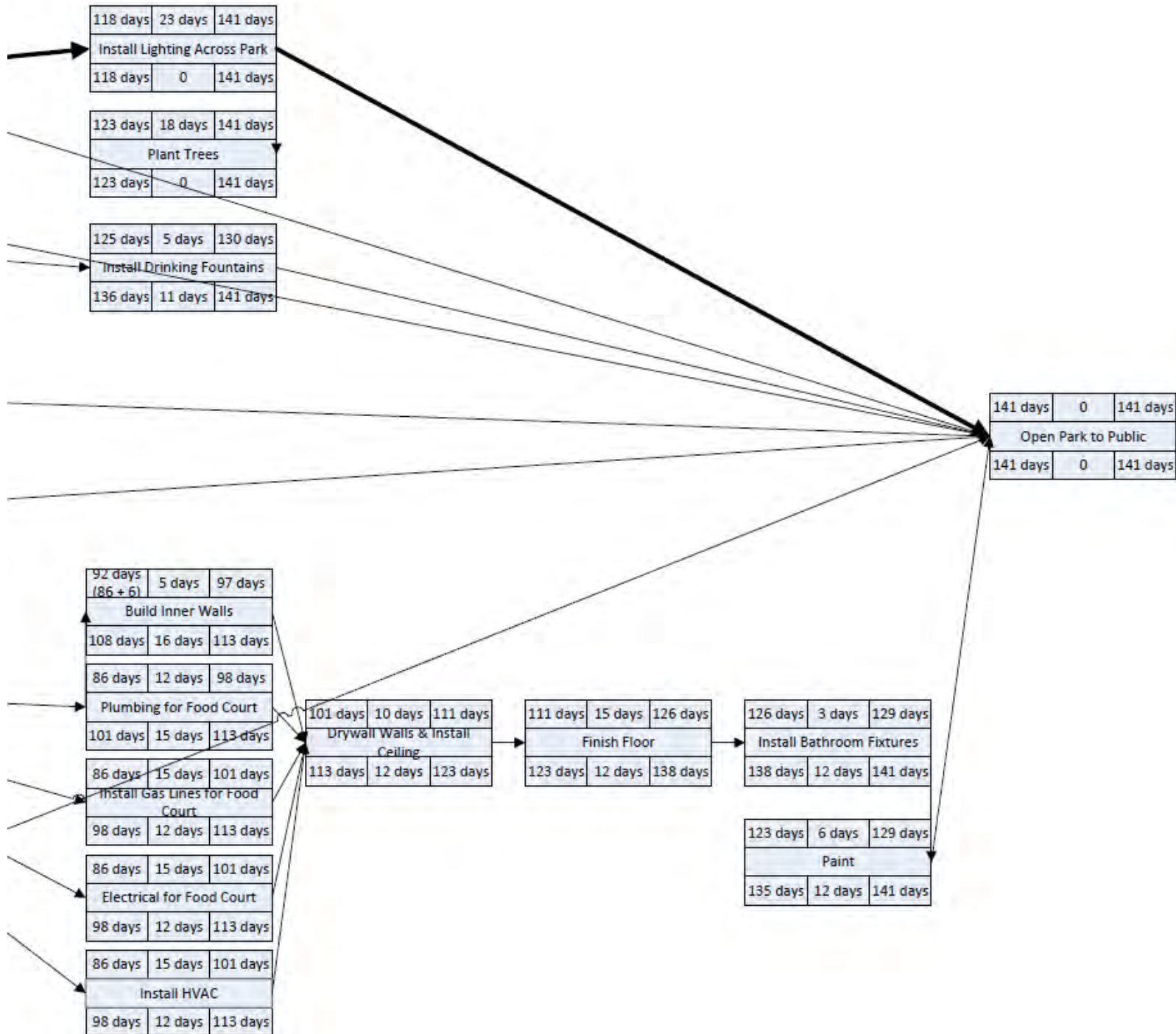
[illegible]

H – Activity on Node Network

Critical path is outlined with bold arrows.







Appendix I – Probability Diagram for Critical Path

	<i>Optimistic</i>	<i>Most Likely</i>	<i>Pessimistic</i>	<i>Expected Time (a + 4m + b)/6</i>	<i>Variance</i>	<i>Standard Deviation</i>	<i>Critical Path?</i>	<i>Variance of Critical Path</i>	<i>Z Score</i>	<i>Probability of Success</i>
<i>Bidding Process for Landscape</i>	13	25	50	27	38.028	6.167			2.025	0.9786
.Requests for Proposal	10	20	40	22	25.000	5.000	X	25.000		
.Review submissions	3	5	10	6	1.361	1.167	X	1.361		
.Present Plans to City	3	5	10	6	1.361	1.167	X	1.361		
.Value Engineer to Fit Budget	5	13	20	13	6.250	2.500	X	6.250		
Obtain Permits	5	10	40	14	34.028	5.833	X	34.028		
<i>Excavate Landscaping</i>	25	45	75	47	69.444	8.333				
.Clear Land	10	20	40	22	25.000	5.000	X	25.000		
.Level Land	10	15	20	15	2.778	1.667	X	2.778		
.Dig Ditches	5	10	15	10	2.778	1.667	X	2.778		
Purchase Materials	4	5	15	7	3.361	1.833				
Electrical	7	10	15	10	1.778	1.333	X	1.778		
Install Lighting	10	25	30	23	11.111	3.333	X	11.111		
Install Water Fountains	3	5	7	5	0.444	0.667				
Plant Trees	15	17	25	18	2.778	1.667				
TOTAL	90	160	287	170	118.028			111.444	2.025	0.9786

Requirement: by 11/15/15

Goal: 7.5 months

4/1/15 through 11/15/15

163 work days (excludes weekends)

Appendix J – Resource Loading Table

		Project Manager																									
		Civil Engineer																									
		Commercial Architect																									
		Landscape Architect																									
		Plumber																									
		Plumbing Foreman																									
		Electrician																									
		Electrical Foreman																									
		Builder																									
		Building Foreman																									
		Landscape																									
		Landscape Foreman																									
		Concrete Mason																									
		Concrete Foreman																									
		Drywall																									
		Drywall Foreman																									
		Painter																									
		Painting Foreman																									
		HVAC Technician																									
		HVAC Foreman																									
		Excavator																									
		Excavating Foreman																									
		Gas Technician																									
Task	Duration																										
Landscape Park		212																									
Bidding Process	46																										
.Requests for Proposal	22	5			5																						
.Review submissions	6	1			4																						
.Present Plans to City	6	1			1																						
.Value Engineer to Fit Budget	13	1			1																						
Obtain Permits	14	1																									
Purchase Materials	7	1											7														
Excavate Landscaping		47																									
.Clear Land	22	1											4									88	5.5				
.Level Land	15	3											3									60	3.8				
.Dig Ditches	10	2											2									40	2.5				
Plumbing	17	1				85	8.5																				
Electrical	10	2						50	10																		
Construct Water Feature	10	2												30	10												
Construct Filtering Room	15	3												30	10												
Install Lighting	23	4						115	23				1														
Install Water Fountains	5	1				25	5						1														
Plant Trees	18	3										72	18														
Construct Sports Facilities		83																									
Bidding Process	16																										
.Requests for Proposal	11	1			1																						
.Review submissions	6	2			2																						
.Present Plans to City	6	1			1																						
.Value Engineer to Fit Budget	13	1			1																						
Obtain Permits	11	1																									
Excavate Sport Fields		7																									
.Clear Land	3	1																				12	0.8				
.Level Land	3	1																				12	0.8				
.Dig Ditches	1	0.3		0.3																		4	0.3				
Construct Sport Fields	9	2																									
Construct Walking Paths	11	2																									
Build Fence	10	2										20	10														

Task	Duration	PMO				Construction																Outsource		
		Project Manager	Civil Engineer	Commercial Architect	Landscape Architect	Plumber	Plumbing Foreman	Electrician	Electrical Foreman	Builder	Building Foreman	Landscaper	Landscaping Foreman	Concrete Mason	Concrete Foreman	Drywall	Drywall Foreman	Painter	Painting Foreman	HVAC Technician	HVAC Foreman	Excavator	Excavating Foreman	Gas Technician
Construct Food Court	208																							
Bidding Process	27																							
.Requests for Proposal	22	1	1	1																				
.Review submissions	6	2	3	3																				
.Present Plans to City	6	1	1	1																				
.Value Engineer to Fit Budget	13	1	1	1																				
Obtain Permits	14	1																						
Purchase Materials	16	1					1		1		1		1		1				1		1			
Excavate Food Court	22																							
.Clear Land	5	2																				44	11	
.Level Land	3	1																				24	6	
.Dig Ditches	2	1																				20	5	
Build Outer Walls & Roof	15	3												45	15									
Plumbing	12	2				24	6																	
Electrical	15	3						75	15															
Install Gas Lines	15	3																						30
Build Inner Walls	5	1																						
Install HVAC System	15	3						1												45	15			
Finish Floor	15	3												45	15									
Drywall Walls & Install Ceiling	10	2														40	10							
Install Bathroom Fixtures	3	1				6	1	3	1															
Paint	6	1																12	6					
Construct Playground	68																							
Bidding Process	16																							
.Requests for Proposal	11	1			1																			
.Review submissions	6	1			1																			
.Present Plans to City	6	1			1																			
.Value Engineer to Fit Budget	13	1			1																			
Obtain Permits	11	1																						
Excavate Playground Area	7																							
.Clear Land	3	1																				12	0.8	
.Level Land	3	1																				12	0.8	
.Dig Ditches	1	0.3																				3	###	
Construct Playground	15	3																						
TOTALS		90	6	6	20	140	22	244	50	0	1	92	47	150	51	40	10	12	7	45	16	331		30

K – Planned Value Budget Using 50-50 Rule

Task Name	Cost of Material	Cost of Labor	Cost of Task	4/1/2015	4/8/2015	4/15/2015	4/22/2015	4/29/2015	5/6/2015	5/13/2015
Landscape Park			\$ -							
Bidding Process			\$ -							
Request for proposal	\$ 75,000.00	\$ 2,831.17	\$ 77,831.18	\$ 38,915.59				\$ 38,915.59		
Review submission		\$ 1,553.43	\$ 1,553.44					\$ 776.72	\$ 776.72	
Present plans to city		\$ 570.72	\$ 570.72						\$ 285.36	\$ 285.36
Value engineer to fit budget	\$ 75,000.00	\$ 581.90	\$ 75,581.90							\$ 37,790.95
Finish the bidding process			\$ -							
Obtain permits		\$ 327.79	\$ 327.80							
Excavate Landscape			\$ -							
Clear Land	\$ 26,400.00	\$ 12,712.69	\$ 39,112.70							
Level Land	\$ 28,200.00	\$ 8,952.26	\$ 37,152.26							
Dig Ditches	\$ 20,480.00	\$ 5,651.90	\$ 26,131.90							
Purchase materials			\$ -							
Purchase Materials	\$ 1,260.00	\$ 125.91	\$ 1,385.92							
Delivery of Materials			\$ -							
Plumbing	\$ 37,134.80	\$ 21,493.58	\$ 58,628.38							
Electrical	\$ 50,362.20	\$ 12,724.88	\$ 63,087.08							
Construct water feature	\$ 13,200.00	\$ 4,919.77	\$ 18,119.78							
Construct filtering Room	\$ 4,000.00	\$ 11,365.76	\$ 15,365.76							
Install lighting	\$ 7,820.00	\$ 6,597.71	\$ 14,417.72							
Install drinking fountains	\$ 500.00	\$ 1,372.12	\$ 1,872.12							
Plant trees	\$ 18,720.00	\$ 8,595.14	\$ 27,315.14							
Opening the Landscaped Park			\$ -							
Construct Sport Facilities			\$ -							
Bidding Process			\$ -							
Request for Proposal		\$ 553.92	\$ 553.92	\$ 276.96		\$ 276.96				
Review Submission		\$ 1,107.85	\$ 1,107.86			\$ 553.93	\$ 553.93			
Present Plans to City		\$ 570.71	\$ 570.71						\$ 285.36	\$ 285.36
Value Engineer to Fit Budget		\$ 581.90	\$ 581.90							\$ 290.95
Finish the bidding process			\$ -							
Obtain Permits		\$ 331.14	\$ 331.14							
Excavate Sport Field			\$ -							
Clear Land	\$ 3,600.00	\$ 2,323.13	\$ 5,923.14							
Level Land	\$ 5,640.00	\$ 2,323.13	\$ 7,963.13							
Dig Ditches	\$ 2,048.00	\$ 774.38	\$ 2,822.38							
Construct sport field	\$ 40,152.00	\$ 662.27	\$ 40,814.28							
Construct Walking Path	\$ 17,408.00	\$ 662.27	\$ 18,070.28							
Build fence	\$ 1,000.00	\$ 2,825.36	\$ 3,825.36							
Open the Sport Field	\$ -		\$ -							

Task Name	Cost of Material	Cost of Labor	Cost of Task	5/20/2015	5/27/2015	6/3/2015	6/10/2015	6/17/2015	6/24/2015	7/1/2015
Landscape Park			\$ -							
Bidding Process			\$ -							
Request for proposal	\$ 75,000.00	\$ 2,831.17	\$ 77,831.18							
Review submission		\$ 1,553.43	\$ 1,553.44							
Present plans to city		\$ 570.72	\$ 570.72							
Value engineer to fit budget	\$ 75,000.00	\$ 581.90	\$ 75,581.90			\$ 37,790.95				
Finish the bidding process			\$ -							
Obtain permits		\$ 327.79	\$ 327.80			\$ 163.90			\$ 163.90	
Excavate Landscape			\$ -							
Clear Land	\$ 26,400.00	\$ 12,712.69	\$ 39,112.70						\$ 19,556.35	
Level Land	\$ 28,200.00	\$ 8,952.26	\$ 37,152.26							
Dig Ditches	\$ 20,480.00	\$ 5,651.90	\$ 26,131.90							
Purchase materials			\$ -							
Purchase Materials	\$ 1,260.00	\$ 125.91	\$ 1,385.92							
Delivery of Materials			\$ -							
Plumbing	\$ 37,134.80	\$ 21,493.58	\$ 58,628.38							
Electrical	\$ 50,362.20	\$ 12,724.88	\$ 63,087.08							
Construct water feature	\$ 13,200.00	\$ 4,919.77	\$ 18,119.78							
Construct filtering Room	\$ 4,000.00	\$ 11,365.76	\$ 15,365.76							
Install lighting	\$ 7,820.00	\$ 6,597.71	\$ 14,417.72							
Install drinking fountains	\$ 500.00	\$ 1,372.12	\$ 1,872.12							
Plant trees	\$ 18,720.00	\$ 8,595.14	\$ 27,315.14							
Opening the Landscaped Park			\$ -							
Construct Sport Facilities			\$ -							
Bidding Process			\$ -							
Request for Proposal		\$ 553.92	\$ 553.92							
Review Submission		\$ 1,107.85	\$ 1,107.86							
Present Plans to City		\$ 570.71	\$ 570.71							
Value Engineer to Fit Budget		\$ 581.90	\$ 581.90			\$ 290.95				
Finish the bidding process			\$ -							
Obtain Permits		\$ 331.14	\$ 331.14			\$ 165.57		\$ 165.57		
Excavate Sport Field			\$ -							
Clear Land	\$ 3,600.00	\$ 2,323.13	\$ 5,923.14							
Level Land	\$ 5,640.00	\$ 2,323.13	\$ 7,963.13							
Dig Ditches	\$ 2,048.00	\$ 774.38	\$ 2,822.38							
Construct sport field	\$ 40,152.00	\$ 662.27	\$ 40,814.28							
Construct Walking Path	\$ 17,408.00	\$ 662.27	\$ 18,070.28							
Build fence	\$ 1,000.00	\$ 2,825.36	\$ 3,825.36							
Open the Sport Field	\$ -		\$ -							

Task Name	Cost of Material	Cost of Labor	Cost of Task	7/8/2015	7/15/2015	7/22/2015	7/29/2015	8/5/2015	8/12/2015	8/19/2015
Landscape Park			\$ -							
Bidding Process			\$ -							
Request for proposal	\$ 75,000.00	\$ 2,831.17	\$ 77,831.18							
Review submission		\$ 1,553.43	\$ 1,553.44							
Present plans to city		\$ 570.72	\$ 570.72							
Value engineer to fit budget	\$ 75,000.00	\$ 581.90	\$ 75,581.90							
Finish the bidding process			\$ -							
Obtain permits		\$ 327.79	\$ 327.80							
Excavate Landscape			\$ -							
Clear Land	\$ 26,400.00	\$ 12,712.69	\$ 39,112.70			\$ 19,556.35				
Level Land	\$ 28,200.00	\$ 8,952.26	\$ 37,152.26			\$ 18,576.13			\$ 18,576.13	
Dig Ditches	\$ 20,480.00	\$ 5,651.90	\$ 26,131.90						\$ 13,065.95	
Purchase materials			\$ -							
Purchase Materials	\$ 1,260.00	\$ 125.91	\$ 1,385.92							\$ 692.96
Delivery of Materials			\$ -							
Plumbing	\$ 37,134.80	\$ 21,493.58	\$ 58,628.38							
Electrical	\$ 50,362.20	\$ 12,724.88	\$ 63,087.08							
Construct water feature	\$ 13,200.00	\$ 4,919.77	\$ 18,119.78							
Construct filtering Room	\$ 4,000.00	\$ 11,365.76	\$ 15,365.76							
Install lighting	\$ 7,820.00	\$ 6,597.71	\$ 14,417.72							
Install drinking fountains	\$ 500.00	\$ 1,372.12	\$ 1,872.12							
Plant trees	\$ 18,720.00	\$ 8,595.14	\$ 27,315.14							
Opening the Landscaped Park			\$ -							
Construct Sport Facilities			\$ -							
Bidding Process			\$ -							
Request for Proposal		\$ 553.92	\$ 553.92							
Review Submission		\$ 1,107.85	\$ 1,107.86							
Present Plans to City		\$ 570.71	\$ 570.71							
Value Engineer to Fit Budget		\$ 581.90	\$ 581.90							
Finish the bidding process			\$ -							
Obtain Permits		\$ 331.14	\$ 331.14							
Excavate Sport Field			\$ -							
Clear Land	\$ 3,600.00	\$ 2,323.13	\$ 5,923.14							
Level Land	\$ 5,640.00	\$ 2,323.13	\$ 7,963.13							
Dig Ditches	\$ 2,048.00	\$ 774.38	\$ 2,822.38							
Construct sport field	\$ 40,152.00	\$ 662.27	\$ 40,814.28							
Construct Walking Path	\$ 17,408.00	\$ 662.27	\$ 18,070.28							
Build fence	\$ 1,000.00	\$ 2,825.36	\$ 3,825.36							
Open the Sport Field	\$ -		\$ -							

Task Name	Cost of Material	Cost of Labor	Cost of Task	8/26/2015	9/2/2015	9/9/2015	9/16/2015	9/23/2015	9/30/2015	10/7/2015	10/14/2015
Landscape Park			\$ -								
Bidding Process			\$ -								
Request for proposal	\$ 75,000.00	\$ 2,831.17	\$ 77,831.18								
Review submission		\$ 1,553.43	\$ 1,553.44								
Present plans to city		\$ 570.72	\$ 570.72								
Value engineer to fit budget	\$ 75,000.00	\$ 581.90	\$ 75,581.90								
Finish the bidding process			\$ -								
Obtain permits		\$ 327.79	\$ 327.80								
Excavate Landscape			\$ -								
Clear Land	\$ 26,400.00	\$ 12,712.69	\$ 39,112.70								
Level Land	\$ 28,200.00	\$ 8,952.26	\$ 37,152.26								
Dig Ditches	\$ 20,480.00	\$ 5,651.90	\$ 26,131.90	\$ 13,065.95							
Purchase materials			\$ -								
Purchase Materials	\$ 1,260.00	\$ 125.91	\$ 1,385.92	\$ 692.96							
Delivery of Materials			\$ -								
Plumbing	\$ 37,134.80	\$ 21,493.58	\$ 58,628.38	\$ 29,314.19			\$ 29,314.19				
Electrical	\$ 50,362.20	\$ 12,724.88	\$ 63,087.08	\$ 31,543.54		\$ 31,543.54					
Construct water feature	\$ 13,200.00	\$ 4,919.77	\$ 18,119.78			\$ 9,059.89	\$ 9,059.89				
Construct filtering Room	\$ 4,000.00	\$ 11,365.76	\$ 15,365.76		\$ 7,682.88		\$ 7,682.88				
Install lighting	\$ 7,820.00	\$ 6,597.71	\$ 14,417.72			\$ 7,208.86				\$ 7,208.86	
Install drinking fountains	\$ 500.00	\$ 1,372.12	\$ 1,872.12					\$ 1,872.12			
Plant trees	\$ 18,720.00	\$ 8,595.14	\$ 27,315.14				\$ 13,657.57				\$ 13,657.57
Opening the Landscaped Park			\$ -								
Construct Sport Facilities			\$ -								
Bidding Process			\$ -								
Request for Proposal		\$ 553.92	\$ 553.92								
Review Submission		\$ 1,107.85	\$ 1,107.86								
Present Plans to City		\$ 570.71	\$ 570.71								
Value Engineer to Fit Budget		\$ 581.90	\$ 581.90								
Finish the bidding process			\$ -								
Obtain Permits		\$ 331.14	\$ 331.14								
Excavate Sport Field			\$ -								
Clear Land	\$ 3,600.00	\$ 2,323.13	\$ 5,923.14	\$ 2,961.57	\$ 2,961.57						
Level Land	\$ 5,640.00	\$ 2,323.13	\$ 7,963.13		\$ 7,963.13						
Dig Ditches	\$ 2,048.00	\$ 774.38	\$ 2,822.38		\$ 2,822.38						
Construct sport field	\$ 40,152.00	\$ 662.27	\$ 40,814.28			\$ 20,407.14	\$ 20,407.14				
Construct Walking Path	\$ 17,408.00	\$ 662.27	\$ 18,070.28			\$ 9,035.14		\$ 9,035.14			
Build fence	\$ 1,000.00	\$ 2,825.36	\$ 3,825.36					\$ 1,912.68		\$ 1,912.68	
Open the Sport Field	\$ -		\$ -								

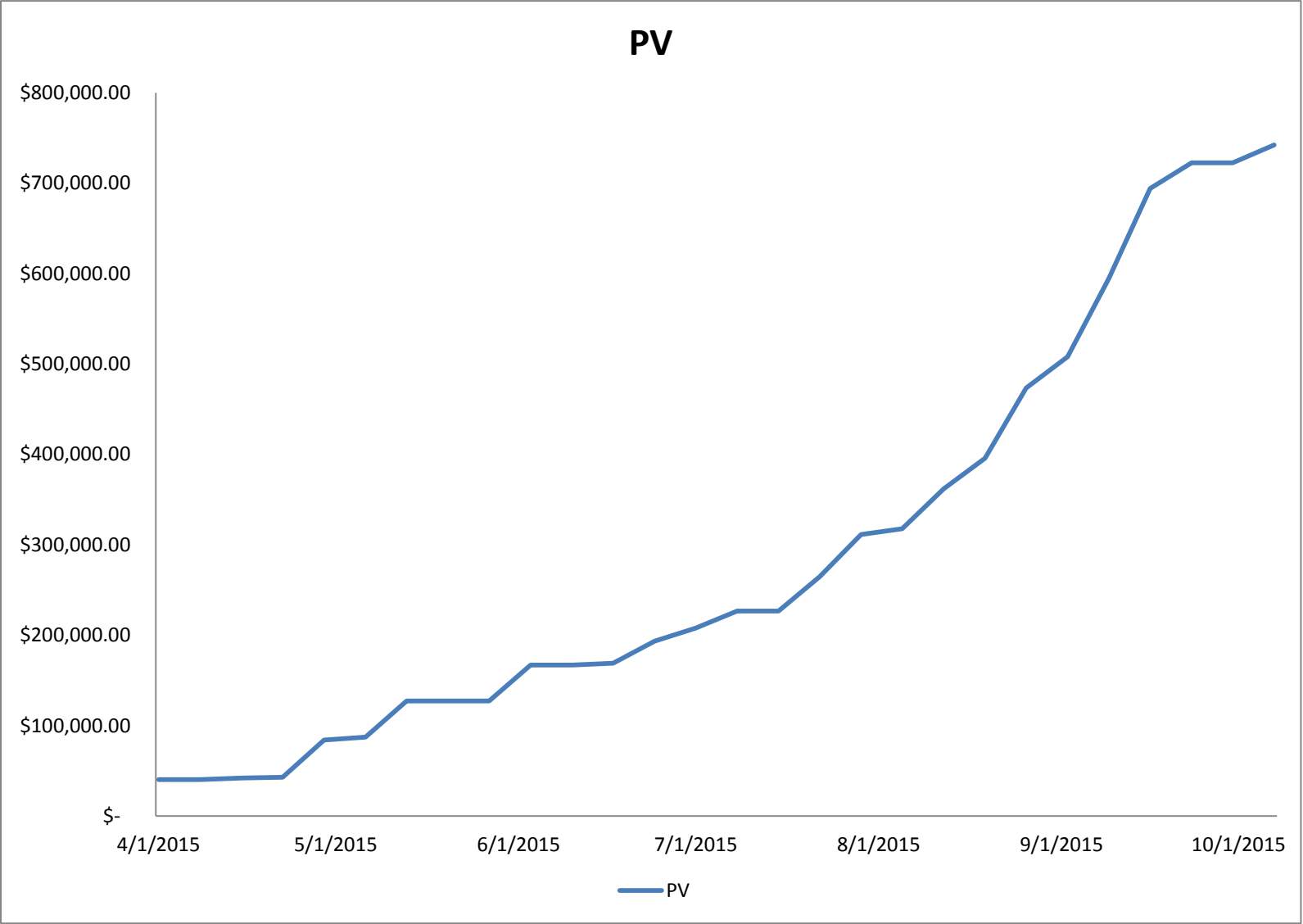
Task Name	Cost of Material	Cost of Labor	Cost of Task	4/1/2015	4/8/2015	4/15/2015	4/22/2015	4/29/2015	5/6/2015	5/13/2015
Construct Food court			\$ -							
Bidding Process			\$ -							
Request for Materials		\$ 944.50	\$ 944.50	\$ 472.25				\$ 472.25		
Review Submission		\$ 2,234.75	\$ 2,234.76					\$ 1,117.38	\$ 1,117.38	
Present Plans to City		\$ 875.81	\$ 875.82						\$ 437.91	\$ 437.91
Value Engineer to Fit Budget		\$ 892.99	\$ 893.00							\$ 446.50
Finish the bidding process			\$ -							
Obtain Permits		\$ 327.79	\$ 327.80							
Excavate Food Court			\$ -							
Clear Land	\$ 6,000.00	\$ 3,005.43	\$ 9,005.44							
Level Land	\$ 5,640.00	\$ 1,679.50	\$ 7,319.50							
Dig Ditches	\$ 4,096.00	\$ 1,323.26	\$ 5,419.26							
Purchase Materials			\$ -							
Purchase Materials	\$ 2,880.00	\$ 642.63	\$ 3,522.64							
Delivery of Materials			\$ -							
Build Outer walls and roof	\$ 18,430.75	\$ 10,143.84	\$ 28,574.60							
Plumbing	\$ 3,360.00	\$ 8,529.38	\$ 11,889.38							
Electrical	\$ 1,800.00	\$ 19,029.24	\$ 20,829.24							
Install Gas Lines	\$ 2,300.00	\$ 7,685.04	\$ 9,985.04							
Build Inner Walls	\$ 9,225.00	\$ 3,750.48	\$ 12,975.48							
HVAC System	\$ 10,800.00	\$ 11,143.80	\$ 21,943.80							
Drywall Walls and Install Ceiling	\$ 4,000.00	\$ 9,813.76	\$ 13,813.76							
Finish Floor	\$ 4,600.00	\$ 7,459.09	\$ 12,059.10							
Install Bathroom Fixtures	\$ 5,300.00	\$ 1,793.02	\$ 7,093.02							
Paint	\$ 2,000.00	\$ 2,968.37	\$ 4,968.38							
Turn Food Court over for T.I.			\$ -							
Playground			\$ -							
Bidding Process			\$ -							
Request for Proposals		\$ 1,107.85	\$ 1,107.86	\$ 553.93		\$ 553.93				
Review Submission		\$ 570.71	\$ 570.72			\$ 285.36	\$ 285.36			
Present Plans to City		\$ 570.71	\$ 570.72						\$ 285.36	\$ 285.36
Value Engineer to Fit Budget		\$ 581.90	\$ 581.90							\$ 290.95
Obtain Permits		\$ 331.14	\$ 331.14							
Excavate Sport Field			\$ -							
Clear Land	\$ 3,600.00	\$ 1,965.14	\$ 5,565.14							
Level Land	\$ 5,640.00	\$ 1,965.14	\$ 7,605.14							
Dig Ditches	\$ 2,048.00	\$ 655.05	\$ 2,703.05							
Construct Playground	\$ 20,000.00	\$ 1,003.44	\$ 21,003.44							
Finish the Playground			\$ -							
Open the Park			\$ -							
TOTAL	\$ 539,644.75	\$ 216,086.55	\$ 755,731.41	\$ 40,218.72	\$ -	\$ 1,670.17	\$ 839.29	\$ 41,281.93	\$ 3,188.07	\$ 40,113.33
CUMULATIVE TOTAL				\$ 40,218.72	\$ 40,218.72	\$ 41,888.89	\$ 42,728.18	\$ 84,010.11	\$ 87,198.18	\$ 127,311.51

Task Name	Cost of Material	Cost of Labor	Cost of Task	5/20/2015	5/27/2015	6/3/2015	6/10/2015	6/17/2015	6/24/2015	7/1/2015
Construct Food court			\$ -							
Bidding Process			\$ -							
Request for Materials		\$ 944.50	\$ 944.50							
Review Submission		\$ 2,234.75	\$ 2,234.76							
Present Plans to City		\$ 875.81	\$ 875.82							
Value Engineer to Fit Budget		\$ 892.99	\$ 893.00			\$ 446.50				
Finish the bidding process			\$ -							
Obtain Permits		\$ 327.79	\$ 327.80			\$ 163.90		\$ 163.90		
Excavate Food Court			\$ -							
Clear Land	\$ 6,000.00	\$ 3,005.43	\$ 9,005.44						\$ 4,502.72	\$ 4,502.72
Level Land	\$ 5,640.00	\$ 1,679.50	\$ 7,319.50							\$ 7,319.50
Dig Ditches	\$ 4,096.00	\$ 1,323.26	\$ 5,419.26							\$ 2,709.63
Purchase Materials			\$ -							
Purchase Materials	\$ 2,880.00	\$ 642.63	\$ 3,522.64					\$ 1,761.32		
Delivery of Materials			\$ -							
Build Outer walls and roof	\$ 18,430.75	\$ 10,143.84	\$ 28,574.60							
Plumbing	\$ 3,360.00	\$ 8,529.38	\$ 11,889.38							
Electrical	\$ 1,800.00	\$ 19,029.24	\$ 20,829.24							
Install Gas Lines	\$ 2,300.00	\$ 7,685.04	\$ 9,985.04							
Build Inner Walls	\$ 9,225.00	\$ 3,750.48	\$ 12,975.48							
HVAC System	\$ 10,800.00	\$ 11,143.80	\$ 21,943.80							
Drywall Walls and Install Ceiling	\$ 4,000.00	\$ 9,813.76	\$ 13,813.76							
Finish Floor	\$ 4,600.00	\$ 7,459.09	\$ 12,059.10							
Install Bathroom Fixtures	\$ 5,300.00	\$ 1,793.02	\$ 7,093.02							
Paint	\$ 2,000.00	\$ 2,968.37	\$ 4,968.38							
Turn Food Court over for T.I.			\$ -							
Playground			\$ -							
Bidding Process			\$ -							
Request for Proposals		\$ 1,107.85	\$ 1,107.86							
Review Submission		\$ 570.71	\$ 570.72							
Present Plans to City		\$ 570.71	\$ 570.72							
Value Engineer to Fit Budget		\$ 581.90	\$ 581.90			\$ 290.95				
Obtain Permits		\$ 331.14	\$ 331.14			\$ 165.57		\$ 165.57		
Excavate Sport Field			\$ -							
Clear Land	\$ 3,600.00	\$ 1,965.14	\$ 5,565.14							
Level Land	\$ 5,640.00	\$ 1,965.14	\$ 7,605.14							
Dig Ditches	\$ 2,048.00	\$ 655.05	\$ 2,703.05							
Construct Playground	\$ 20,000.00	\$ 1,003.44	\$ 21,003.44							
Finish the Playground			\$ -							
Open the Park			\$ -							
TOTAL	\$ 539,644.75	\$ 216,086.55	\$ 755,731.41	\$ -	\$ -	\$ 39,478.28	\$ -	\$ 2,256.36	\$ 24,222.96	\$ 14,531.85
CUMULATIVE TOTAL				\$ 127,311.51	\$ 127,311.51	\$ 166,789.79	\$ 166,789.79	\$ 169,046.15	\$ 193,269.11	\$ 207,800.96

Task Name	Cost of Material	Cost of Labor	Cost of Task	7/8/2015	7/15/2015	7/22/2015	7/29/2015	8/5/2015	8/12/2015	8/19/2015
Construct Food court			\$ -							
Bidding Process			\$ -							
Request for Materials		\$ 944.50	\$ 944.50							
Review Submission		\$ 2,234.75	\$ 2,234.76							
Present Plans to City		\$ 875.81	\$ 875.82							
Value Engineer to Fit Budget		\$ 892.99	\$ 893.00							
Finish the bidding process			\$ -							
Obtain Permits		\$ 327.79	\$ 327.80							
Excavate Food Court			\$ -							
Clear Land	\$ 6,000.00	\$ 3,005.43	\$ 9,005.44							
Level Land	\$ 5,640.00	\$ 1,679.50	\$ 7,319.50							
Dig Ditches	\$ 4,096.00	\$ 1,323.26	\$ 5,419.26	\$ 2,709.63						
Purchase Materials			\$ -							
Purchase Materials	\$ 2,880.00	\$ 642.63	\$ 3,522.64	\$ 1,761.32						
Delivery of Materials			\$ -							
Build Outer walls and roof	\$ 18,430.75	\$ 10,143.84	\$ 28,574.60	\$ 14,287.30			\$ 14,287.30			
Plumbing	\$ 3,360.00	\$ 8,529.38	\$ 11,889.38				\$ 5,944.69		\$ 5,944.69	
Electrical	\$ 1,800.00	\$ 19,029.24	\$ 20,829.24				\$ 10,414.62			\$ 10,414.62
Install Gas Lines	\$ 2,300.00	\$ 7,685.04	\$ 9,985.04				\$ 4,992.52			\$ 4,992.52
Build Inner Walls	\$ 9,225.00	\$ 3,750.48	\$ 12,975.48					\$ 6,487.74	\$ 6,487.74	
HVAC System	\$ 10,800.00	\$ 11,143.80	\$ 21,943.80				\$ 10,971.90			\$ 10,971.90
Drywall Walls and Install Ceiling	\$ 4,000.00	\$ 9,813.76	\$ 13,813.76							\$ 6,906.88
Finish Floor	\$ 4,600.00	\$ 7,459.09	\$ 12,059.10							
Install Bathroom Fixtures	\$ 5,300.00	\$ 1,793.02	\$ 7,093.02							
Paint	\$ 2,000.00	\$ 2,968.37	\$ 4,968.38							
Turn Food Court over for T.I.			\$ -							
Playground			\$ -							
Bidding Process			\$ -							
Request for Proposals		\$ 1,107.85	\$ 1,107.86							
Review Submission		\$ 570.71	\$ 570.72							
Present Plans to City		\$ 570.71	\$ 570.72							
Value Engineer to Fit Budget		\$ 581.90	\$ 581.90							
Obtain Permits		\$ 331.14	\$ 331.14							
Excavate Sport Field			\$ -							
Clear Land	\$ 3,600.00	\$ 1,965.14	\$ 5,565.14							
Level Land	\$ 5,640.00	\$ 1,965.14	\$ 7,605.14							
Dig Ditches	\$ 2,048.00	\$ 655.05	\$ 2,703.05							
Construct Playground	\$ 20,000.00	\$ 1,003.44	\$ 21,003.44							
Finish the Playground			\$ -							
Open the Park			\$ -							
TOTAL	\$ 539,644.75	\$ 216,086.55	\$ 755,731.41	\$ 18,758.25	\$ -	\$ 38,132.48	\$ 46,611.03	\$ 6,487.74	\$ 44,074.51	\$ 33,978.88
CUMULATIVE TOTAL				\$ 226,559.20	\$ 226,559.20	\$ 264,691.68	\$ 311,302.71	\$ 317,790.45	\$ 361,864.96	\$ 395,843.84

Task Name	Cost of Material	Cost of Labor	Cost of Task	8/26/2015	9/2/2015	9/9/2015	9/16/2015	9/23/2015	9/30/2015	10/7/2015	10/14/2015
Construct Food court			\$ -								
Bidding Process			\$ -								
Request for Materials		\$ 944.50	\$ 944.50								
Review Submission		\$ 2,234.75	\$ 2,234.76								
Present Plans to City		\$ 875.81	\$ 875.82								
Value Engineer to Fit Budget		\$ 892.99	\$ 893.00								
Finish the bidding process			\$ -								
Obtain Permits		\$ 327.79	\$ 327.80								
Excavate Food Court			\$ -								
Clear Land	\$ 6,000.00	\$ 3,005.43	\$ 9,005.44								
Level Land	\$ 5,640.00	\$ 1,679.50	\$ 7,319.50								
Dig Ditches	\$ 4,096.00	\$ 1,323.26	\$ 5,419.26								
Purchase Materials			\$ -								
Purchase Materials	\$ 2,880.00	\$ 642.63	\$ 3,522.64								
Delivery of Materials			\$ -								
Build Outer walls and roof	\$ 18,430.75	\$ 10,143.84	\$ 28,574.60								
Plumbing	\$ 3,360.00	\$ 8,529.38	\$ 11,889.38								
Electrical	\$ 1,800.00	\$ 19,029.24	\$ 20,829.24								
Install Gas Lines	\$ 2,300.00	\$ 7,685.04	\$ 9,985.04								
Build Inner Walls	\$ 9,225.00	\$ 3,750.48	\$ 12,975.48								
HVAC System	\$ 10,800.00	\$ 11,143.80	\$ 21,943.80								
Drywall Walls and Install Ceiling	\$ 4,000.00	\$ 9,813.76	\$ 13,813.76		\$ 6,906.88						
Finish Floor	\$ 4,600.00	\$ 7,459.09	\$ 12,059.10		\$ 6,029.55			\$ 6,029.55			
Install Bathroom Fixtures	\$ 5,300.00	\$ 1,793.02	\$ 7,093.02					\$ 7,093.02			
Paint	\$ 2,000.00	\$ 2,968.37	\$ 4,968.38				\$ 2,484.19	\$ 2,484.19			
Turn Food Court over for T.I.			\$ -								
Playground			\$ -								
Bidding Process			\$ -								
Request for Proposals		\$ 1,107.85	\$ 1,107.86								
Review Submission		\$ 570.71	\$ 570.72								
Present Plans to City		\$ 570.71	\$ 570.72								
Value Engineer to Fit Budget		\$ 581.90	\$ 581.90								
Obtain Permits		\$ 331.14	\$ 331.14								
Excavate Sport Field			\$ -								
Clear Land	\$ 3,600.00	\$ 1,965.14	\$ 5,565.14			\$ 5,565.14					
Level Land	\$ 5,640.00	\$ 1,965.14	\$ 7,605.14			\$ 3,802.57	\$ 3,802.57				
Dig Ditches	\$ 2,048.00	\$ 655.05	\$ 2,703.05				\$ 2,703.05				
Construct Playground	\$ 20,000.00	\$ 1,003.44	\$ 21,003.44				\$ 10,501.72			\$ 10,501.72	
Finish the Playground			\$ -								
Open the Park			\$ -								
TOTAL	\$ 539,644.75	\$ 216,086.55	\$ 755,731.41	\$ 77,578.21	\$ 34,366.39	\$ 86,622.26	\$ 99,613.20	\$ 28,426.70	\$ -	\$ 19,623.26	\$ 13,657.57
CUMULATIVE TOTAL				\$ 473,422.04	\$ 507,788.43	\$ 594,410.69	\$ 694,023.88	\$ 722,450.58	\$ 722,450.58	\$ 742,073.84	\$ 755,731.41

Planned value S Curve shows the cumulative planned cost over the duration of the project.



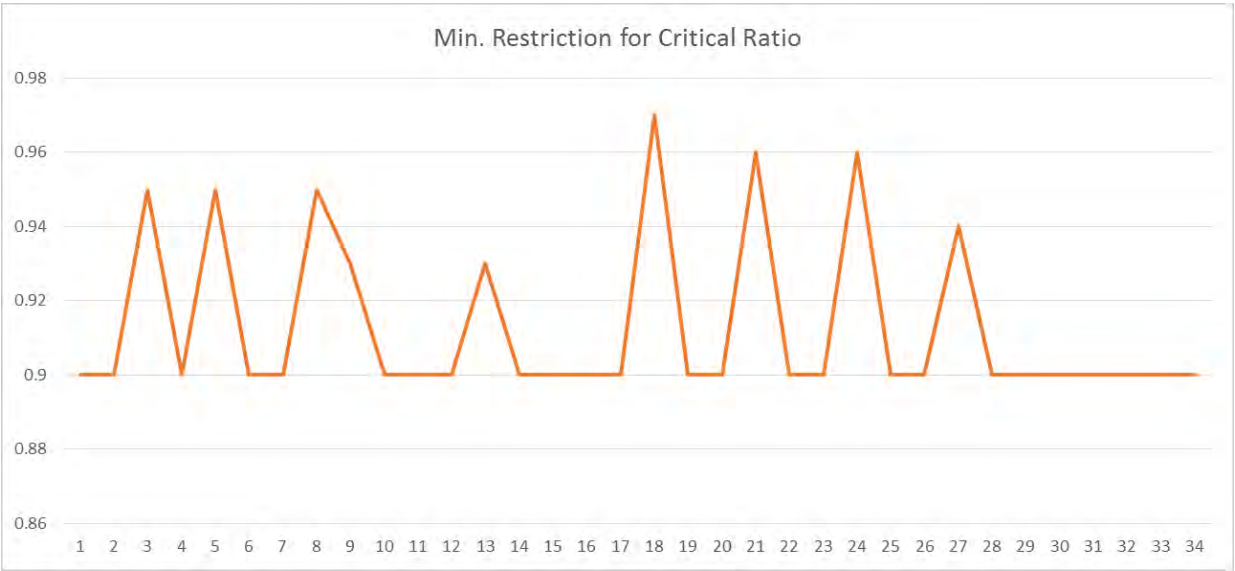
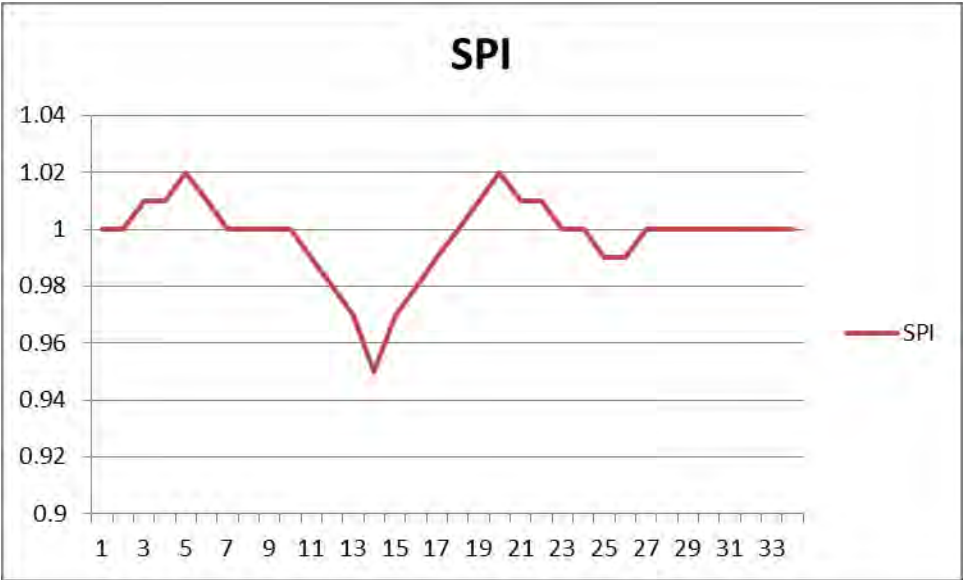
Appendix M – Risk Management

ID	Risk	Probability	Impact	Trigger	Action
1	Delivery of materials is delayed	Medium	High	Call to vendors	We have good relationships with customer and will provide list of materials needed as soon as permits are obtained to ensure lead times are as expected. We will make calls prior to due date to ensure delivery is on schedule.
2	Designing Time takes longer than expected	Medium	Medium	SPI, Task Delay, Milestone missed	Based on prior experience and accept for normal lag
3	Property is vandalized	Medium	Medium	Discover damage to property	Protect and insure tools and equipment.
4	Power outage occurs	Medium	Low	Power goes out	Accept that this happens frequently but there is usually no major delay
5	City takes longer to approve plans	Low	High	SPI, Task Delay, Milestone missed	Partner with city up front to ensure we are on target and accept risk
6	Excavators hit water, gas, or electric pipes	Low	High	Pipe is hit	By outsourcing, we defer risk to excavation company
7	City funds run out or are re-distributed	Low	High	Notification from city	Periodic invoicing will be done to ensure timely payment for work completed
8	Labor dispute delays work	Low	High	Strike happens	Accept risk and work to ensure that fair wages and hours are paid
9	Earthquake causes damage	Low	High	Earthquake happens and damage is assessed.	Tehran is sitting on a major fault line and earthquakes are frequent, but design and construction will resist all but major damage
10	War or political conflict begins	Low	High	War starts	Accept as this is beyond our control. Periodic invoicing will be done to ensure timely payment for work completed
11	Workers are needed for higher priority project	Low	High	Workers are pulled from project	Work with PMO to understand where project fits, but have contingency plan including subcontracting if the situation occurs on critical tasks.
12	Outsourced companies take longer than promised	Low	Medium	SPI, Task Delay, Milestone missed	Incentives for early completion and penalties for delay will be built into contracts



Appendix N – Control Charts

These charts show examples of how SPI or Critical Ratio would be used to see if or when we were deviating from our planned schedule and or cost.



Appendix O – Termination

This is an example checklist that would be used when the project is integrating into the city's ongoing operations.

Task Name	Required		Due Date	Actual Date of Completion	Assigned Responsibility	Notes
	Yes	No				
Landscaping						
Test functionality of water feature						
Test functionality of lights						
Ensure person taking over responsibility knows what they are working with						
Sport Fields						
Evaluate quality of sport fields						
Inspect walking paths						
Hand over keys to city						
Food Court						
Test functionality of building functions						
Have city inspector check building						
Playground						
Ensure playground company has tested equipment						
General						
Get city's sign off that work is complete						
Ensure all keys and controls are turned over						

Appendix P – Estimated Material Costs

Task Name	Duration	Number of Human resources	Materials	Cost of resources	Cost of Material	Total
Landscape Park	141 days					
Bidding Process	47 days					
Request for proposal	22 days	PM, Landscape Arch.	Outsourced Landscape Arch.	\$ 2,831.17	\$ 75,000.00	\$ 77,831.17
Review submission	6 days	PM, Landscape Arch.		\$ 1,553.43		\$ 1,553.43
Present plans to city	6 days	PM, Landscape Arch.		\$ 570.72		\$ 570.72
Value engineer to fit budget	13 days	PM, Landscape Arch.	Outsourced Landscape Arch.	\$ 581.90	\$ 75,000.00	\$ 75,581.90
Obtain permits	14 days	PM		\$ 327.79		\$ 327.79
Excavate Landscape	47 days					
Clear Land	22 days	4 Exca L, 1 Excavator F, 1 Land F, PM	Digging Machines, Cleaning Machine	\$ 12,712.69	\$ 26,400.00	\$ 39,112.69
Level Land	15 days	4 Exca L, 1 Excavator F, 1 Land F, PM	2 Leveling Machines, 1 Rolling Machine	\$ 8,952.26	\$ 28,200.00	\$ 37,152.26
Dig Ditches	19 days	4 Exca L, 1 Excavator F, 1 Land F, PM	2 Digging Machines, 2bobcat	\$ 5,651.90	\$ 20,480.00	\$ 26,131.90
Purchase materials	7 days					
Purchase materials	7 days	PM, Landscaping Foreman	Delivery	\$ 125.91	\$ 1,260.00	\$ 1,385.91
Plumbing	17 days	1 Plumber F, 5 Plumber L, PM	Plumbing machine, Pipe	\$ 21,493.58	\$ 37,134.80	\$ 58,628.38
Electrical	10 days	1 Electrician F, 5 Electrician L, PM	3 Generators, Welding Machine, wire	\$ 12,724.88	\$ 50,362.20	\$ 63,087.08
Construct water feature	10 days	1 CementF, 3 Cement L, PM	2 machines, 160 Lumber	\$ 4,919.77	\$ 13,200.00	\$ 18,119.77
Construct filtering Room	15 days	1 CementF, 3 Cement L, PM	Brick, sand, cement	\$ 11,365.76	\$ 4,000.00	\$ 15,365.76
Install lighting	23 days	1 Electrician F, 5 Electrician L, PM	3 Generators, Welding Machine	\$ 6,597.71	\$ 7,820.00	\$ 14,417.71
Install water fountains	5 days	2 Plumber L, 1 Plumber F, PM	1 Generator	\$ 1,372.12	\$ 500.00	\$ 1,872.12
Plant trees	18 days	4 Land L, 1 Land F, PM	Planting Machine 2	\$ 8,595.14	\$ 18,720.00	\$ 27,315.14
Construct Sport Facilities	136 days					
Bidding Process	47 days					
Request for proposal	11 days	PM, Landscape Arch.		\$ 553.92		\$ 553.92
Review submission	6 days	PM, Landscape Arch.		\$ 1,107.85		\$ 1,107.85
Present plans to city	6 days	PM, Landscape Arch.		\$ 570.71		\$ 570.71
Value engineer to fit budget	13 days	PM, Landscape Arch.		\$ 581.90		\$ 581.90
Obtain permits	11 days	PM		\$ 331.14		\$ 331.14
Excavate Sport Field	7 days					
Clear Land	3 days	4 Exca L, 1 Excavator F, PM	Digging Machines, Cleaning Machine	\$ 2,323.13	\$ 3,600.00	\$ 5,923.13
Level Land	3 days	5 Exca L, 1 Excavator F, PM	2 Leveling Machines, 1 Rolling Machine	\$ 2,323.13	\$ 5,640.00	\$ 7,963.13
Dig Ditches	1 day	6 Exca L, 1 Excavator F, PM	2 Digging Machines, 2 bobcats	\$ 774.38	\$ 2,048.00	\$ 2,822.38
Construct sport field	9 days	PM	Outsource to Sport Field Co.	\$ 662.27	\$ 40,152.00	\$ 40,814.27
Construct Walking Path	11 days	PM	Outsource to Sport Field Co.	\$ 662.27	\$ 17,408.00	\$ 18,070.27
Build fence	10 days	2 Excavate L, 1 Excavate F, PM	1 Welding Machine	\$ 2,825.36	\$ 1,000.00	\$ 3,825.36
Construct Food court	129 days					
Bidding Process	47 days					
Request for proposal	22 days	PM, Commercial Arch., Civ Engineer		\$ 944.50		\$ 944.50
Review submission	6 days	PM, Commercial Arch., Civ Engineer		\$ 2,234.75		\$ 2,234.75
Present plans to city	6 days	PM, Commercial Arch., Civ Engineer		\$ 875.81		\$ 875.81
Value engineer to fit budget	13 days	PM, Commercial Arch., Civ Engineer		\$ 892.99		\$ 892.99
Obtain permits	14 days	PM		\$ 327.79		\$ 327.79
Excavate Food Court	14 days					
Clear Land	5 days	4 Exca L, 1Excavator F, PM	Digging Machines, Cleaning Machine	\$ 3,005.43	\$ 6,000.00	\$ 9,005.43
Level Land	3 days	5 Exca L, 1Excavator F, PM	2 Leveling Machines, 1 Rolling Machine	\$ 1,679.50	\$ 5,640.00	\$ 7,319.50
Dig Ditches	2 days	6 Exca L, 1Excavator F, PM	2 Digging Machines, 2 bobcats	\$ 1,323.26	\$ 4,096.00	\$ 5,419.26
Purchase Materials	22 days					
Purchasing Materials	15 days	PM, Building F, Concrete F, Drywall F, Electrical F, Gas Tech, HVAC F, Painting F, Plumbing F	Delivery	\$ 642.63	\$ 2,880.00	\$ 3,522.63
Build Outer walls and roof	15 days	1 Cement F, 3 Cement L, PM	2 machines, 430 Lumber	\$ 10,143.84	\$ 18,430.75	\$ 28,574.59
Plumbing	12 days	1 Plumber F, 6 Plumber L, PM	1 Plumbing machine	\$ 8,529.38	\$ 3,360.00	\$ 11,889.38
Electrical	15 days	1 Electrician F, 5 Electrician L, PM	Wires	\$ 19,029.24	\$ 1,800.00	\$ 20,829.24
Install Gas Lines	15 days	2 Gas Tech, PM	Pipe, 1 welding machine	\$ 7,685.04	\$ 2,300.00	\$ 9,985.04
Build Inner Walls	5 days	1 Builder F, 3 Builder L, PM	2 machines, 430 Lumber	\$ 3,750.48	\$ 9,225.00	\$ 12,975.48
HVAC System	15 days	1 HVAC F, 3 HVAC L, 1 electrician L, PM	HVAC equipment	\$ 11,143.80	\$ 10,800.00	\$ 21,943.80
Drywall Walls and Install Ceiling	10 days	4 Drywall L, 1 Drywall F, PM		\$ 9,813.76	\$ 4,000.00	\$ 13,813.76
Finish Floor	4 days	1 Cement F, 3 Cement L, PM	700 Tiles, Material	\$ 7,459.09	\$ 4,600.00	\$ 12,059.09
Install Bathroom Fixtures	3 days	2 Plumber L, Plumber F, 2 Electrician L, Electrical F, PM	6 Sinks, 6 toilets, 4 Hand Dryer, Lights	\$ 1,793.02	\$ 5,300.00	\$ 7,093.02
Paint	6 days	2 painter L, 1 painter F, PM		\$ 2,968.37	\$ 2,000.00	\$ 4,968.37
Playground	137 days					
Bidding Process	47 days					
Request for proposal	11 days	PM, Landscape Arch.		\$ 1,107.85		\$ 1,107.85
Review submission	6 days	PM, Landscape Arch.		\$ 570.71		\$ 570.71
Present plans to city	6 days	PM, Landscape Arch.		\$ 570.71		\$ 570.71
Value engineer to fit budget	13 days	PM, Landscape Arch.		\$ 581.90		\$ 581.90
Obtain permits	11 days	PM		\$ 331.14		\$ 331.14
Excavate Playground Area	7 days					
Clear Land	3 days	4 Exca L, 1 Excavator F, PM	Digging Machines, Cleaning Machine	\$ 1,965.14	\$ 3,600.00	\$ 5,565.14
Level Land	3 days	5 Exca L, 1 Excavator F, PM	2 Leveling Machines, 1 Rolling Machine	\$ 1,965.14	\$ 5,640.00	\$ 7,605.14
Dig Ditches	1 day	6 Exca L, 1 Excavator F, PM	2 Digging Machines, 2 bobcats	\$ 655.05	\$ 2,048.00	\$ 2,703.05
Construct Playground	15 days	PM	Outsourced Playground Co.	\$ 1,003.44	\$ 20,000.00	\$ 21,003.44
Total				\$ 216,086.55	\$ 539,644.75	\$ 755,731.30

Appendix Q – Worker Salaries

Worker	Laborer			Foreman*			Data Source
	Annual	Daily	Hourly	Annual	Daily	Hourly	
Landscaper	\$23,940	\$91.77	\$11.47	\$33,516	\$128.48	\$16.06	http://money.usnews.com/careers/best-jobs/landscaper-and-groundskeeper/sala
Excavator	\$30,025	\$115.09	\$14.39	\$42,035	\$161.13	\$20.14	http://www1.salary.com/Excavating-Loading-Machine-Operator-Salary.html
Cement	\$36,130	\$138.50	\$17.31	\$50,582	\$193.89	\$24.24	http://money.usnews.com/careers/best-jobs/cement-mason-and-concrete-finisher
Carpenter	\$40,500	\$155.25	\$19.41	\$56,700	\$217.35	\$27.17	http://money.usnews.com/careers/best-jobs/carpenter/salary
Drywall	\$44,174	\$169.33	\$21.17	\$61,844	\$237.06	\$29.63	http://www1.salary.com/Drywall-Installer-Salary.html
Gas technician	\$58,098	\$222.70	\$27.84	\$81,337	\$311.79	\$38.97	http://www1.salary.com/Pipeline-Technician-I-Salary.html
Electrician	\$50,510	\$193.62	\$24.20	\$70,714	\$271.06	\$33.88	http://money.usnews.com/careers/best-jobs/electrician
Plumber	\$50,180	\$192.35	\$24.04	\$70,252	\$269.29	\$33.66	http://money.usnews.com/careers/best-jobs/plumber
Painter	\$35,390	\$135.66	\$16.96	\$49,546	\$189.92	\$23.74	http://money.usnews.com/careers/best-jobs/painter
HVAC	\$41,269	\$158.19	\$19.77	\$57,777	\$221.47	\$27.68	http://www1.salary.com/HVAC-Mechanic-I-Salary.html
Project Manager	\$87,248	\$334.44	\$41.81				http://www1.salary.com/OR/Portland/Project-Manager-I-salary.html
Civil Engineer	\$70,078	\$268.63	\$33.58				http://www1.salary.com/Civil-Engineer-I-Salary.html
Commercial Architect	\$66,659	\$255.52	\$31.94				http://www1.salary.com/Architect-III-Salary.html
Landscape Architect	\$58,704	\$225.03	\$28.13				http://www1.salary.com/Landscape-Architect-I-Salary.html

*average foreman makes 40% more than median salary

*2087 worker hours in a year