

Construction of sports hall (GYM) in a school in Bahrain

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1. Scope of the project

Sports or physical activity is arguably one of the most integral parts of a human's life regardless of their age. Not only does it help keep them maintain their physically fitness but it also allows them to be mentally focused. For many sports or other physical activity is a profession whereas for many it is a hobby. However, it has to be kept in mind that there is a third group of people who do not have the slightest of opportunity to maintain their physical fitness by engaging in sports or other physical activity. This holds true for a majority of school students in the Kingdom of Bahrain. Despite being a country where sports is loved by majority of the population (especially students), the government of the Kingdom of Bahrain failed to construct adequate sport or gym facilities in the schools largely due to the lack of financial assistance. However over the last few years, the awareness of sports has increased by an unprecedented level amongst the students in the Kingdom of Bahrain given that the country was due to the host the mini Olympics. As a consequence, the demand for advanced and well equipped sports hall (Gym) facilities also grew by a drastic margin. In light of these events the government of the Kingdom of Bahrain felt the urge to make prospective investments behind building sport hall (Gym) in government sponsored schools.

The scope of this project lays in the fact that construction of sports hall (Gym) in the government sponsored schools will allow students to be engaged in a physical activity of their choice besides being engaged in academic curriculum. It will also held students who are obese and are affected by other weakness to regain their physical fitness and strength. This is perhaps the most relevant scope of this project provided that the percentage of students suffering from health issues such obesity, respiratory problems, heart problems, bone density have increased by a considerable margin (Baby, 2006). Therefore construction of sports hall (Gym) facilities will allow the government of the Kingdom of Bahrain to bring down this ever growing rate of health disorders. Another relevant scope of this project is evident in the fact that it will allow the government schools to build their profile in order to grab attention of parents and convince to enroll their children to the corresponding schools (Ministry of Education of Kingdom of Bahrain, 2013). In addition to that construction of proper sport hall (Gym) facilities in government sponsored schools will allow student to engage in physical activities and practice under expert trainers in state of the art faculties. Such facilities might even encourage them to take sports as a profession and later represent their country in the international arena.

2. Briefing document

2.1. Project brief

The underlying objective of this project is to construct a sport hall (Gym) facility in one of the government schools at the Kingdom of Bahrain. The project duration is estimated to be a little more than 8 months with an estimated expenditure of £2.5 million.

3. Definition document

3.1. Project definition

The project involves construction of a 5 court advanced sport hall (Gym) facility in a government school in the Kingdom of Bahrain. The dimensions of the sports hall shall be 40.6 x 21.35 x 7.5 meter with an estimated base construction cost of £1100/square meter. The sports hall (Gym) will be equipped state of the art gym machineries, basket ball court, badminton court, lawn tennis court, indoor football space, aerobics, spa, swimming pool and a changing room. The project manger has been in constant contact with the architects and engineers and all of them have concurred that using a single attached building plan will be the most appreciate model in order to space in order to ensure that each and every available square meter of space is used effectively and efficiently.

The government school management believes in maintaining the sustainability of the environment as well that of the sports hall facility. This is precisely the reason why a green building model will be applied while constructing the facility. In order to bring down the level of energy conservation, the entire facility will be powered by solar cells which will be mounted on the open roof area of the building. In addition to that water conservation reservoirs will also be constructed in order to conserve rain water and the same will be converted to freshwater with the help of water pumps and filters which will also be fitted within the water reservoirs. This freshwater can then be used by the washrooms and changing rooms for sanitation purposes thereby avoiding any need to consume water resource.

The engineers will also attempt to bridge the gap between the sports hall (Gym) facility and the adjacent school in order to make sure that no open space is wasted. In that way the school administration will be able to keep up their spirit to maintain the sustainability of the environment by planting trees in the remaining open area. The architects and engineers have also agreed to give a rectangular shape to the building as its is beloved that this structure will allow more natural light to enter the building thereby reducing the need for artificial light which in turn will also reduce the consumption of electricity. The sport hall will be at the ground floor whereas the Gym will be situated in the first floor.

3.2. Feasibility study

The sports hall (Gym) facility will consist of the following major portions:

- State of the art gym facility.
- Swimming pool.
- Spa and aerobics.
- Indoor football space.

- Basket ball court.
- Badminton court.
- Lawn tennis court.
- Changing rooms and lockers.
- Roof tops mounted with solar cell panels
- Rain water reservoirs
- Water pumps and filters for rainwater to freshwater conversion

Approximate project duration	8 months
Construction cost/square meter	£1100
Total projected expenditure	£2,089,000

The minimum estimated duration for this project is 32 weeks which is equivalent to 8 months. As mentioned above, the cost of this project has been estimated to be close to £6 million with an average estimated construction cost of £1100/ square meter of area.

3.3. Risk exposures

The project is associated with a number of risks which may arise during the lifecycle of the project. The first and foremost that may prove to be a barrier to the successful completion of the project is inadequate investment of capital. The investment that will be done in order to complete this project may prove to be insufficient due to several reasons such as rise in commodity prices, raw materials cost, procurement prices and so on and so forth. That is why it is suggested that the raw materials are ordered in a contractual basis where the price will be set up front. This will help the school administration to protect its investment from any market wide fluctuations. The procurement contract should also be set up front. By doing so, the administration will be able to have a precise idea about the capital that may be required for fulfilling this project which in turn will allow the government to accumulate and allocate funds accordingly.

Unanticipated breakdowns in the construction machinery may delay the project which in turn will increase the cost to be incurred in this project. The replacement cost of machineries can prove to be huge. That is why the school administration should have adequate cash reserves at place alongside the investment capital. This will enable them to deal with any such adverse scenarios and prevent further delay. Accidents can also happen in a construction related project

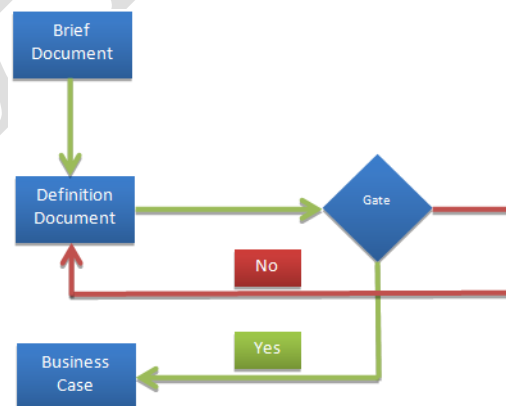
which in turn will also increase the cost for the school administration as they will have to provide compensation for the treatment.

Another risk associated with the project is unavailability of skilled workforce. This may lead to erroneous activities during the lifecycle of the project thereby delaying its completion. That is why the school administration needs to make sure that highly skilled and experienced workforce is recruited for the purpose of completing this project on schedule.

3.4. Authorization point

It is extremely important to outline the authorization point for a project which is as complicated as constructing sports hall with gym facilities in a government sponsored school in the Kingdom of Bahrain. Introducing a sports hall combined with gym facilities is extremely important considering the fact that such facilities are scarcely available in schools in this part of the world. Moreover, the increasing demand as well as awareness for physical or sports activity has also influenced the government of the Kingdom of Bahrain to turn this dream into a reality. Such facilities would later be considered as an asset for the schools and for the country as a whole and this is precisely the reason why construction of such facilities is of utmost importance. However, in order to make sure that the project is initiated through proper channel and approach, a briefing document was prepared that includes an overview of the project. Following that the definition document was prepared that includes key information related to the project such as project definition, feasibility and risks. These document works as a foundation which allows administrators to assess the viability of the project on the basis of all the aspects that have been mention within those documents. Following this assessment, the project is either approved or rejected. In case of the latter, the project manager is asked to rewrite the project documents with different sets of assumptions and in case the project is approved the project manager is asked to prepare the business case.

Figure 8: Authorization point map



(Source: Author's creation)

4. Business case

4.1. Opportunity description

- Sports hall/gym facilities have become a major ingredient in modern institutions all over the world. Inclusion of such facilities allows schools to be globally recognized. Therefore, the construction of such facilities in government schools in the Kingdom of Bahrain will allow the school administration to internationalize the education system. By doing so, not only will they be able to grab the attention of local students but will also be able to appeal to foreign students.
- Incorporation of such facilities will also provide the government schools in the Kingdom of Bahrain to spread mass awareness regarding the importance of being engaged in sports and other physical activity. In doing so, the school administration will be able to resonate this importance to other schools which in turn will encourage them to incorporate such facilities. As a consequence the school administrations all over the country will have a major contribution in bringing down the rate of occurrence of chronic diseases among students which has been a major problem in this part over the past few years.
- Inclusion of sports hall combined with gym facilities will also allow the school administration to prepare a good curriculum that not only focuses on academic developments of a student but provides students with the opportunity to attain all round development.

4.2. Predicted outcome

The project is set to begin on January 2015 with estimated project duration of 8 months. It is expected that the project will conclude in the month of August with the facility being fully functional by September 2015. The estimation has been done after careful consideration of all the delays that may occur during the lifetime of the project. The overall expenditure of this project is estimated to be within £2.5 million. The raw materials are expected to be delivered on time which in turn will enable the project managers to avoid delay in any of the activities. It is expected that after the completion of the sports hall/gym facility construction, the number of student enrollment next season will be twice as much as the enrollment in this year. The school administration also anticipates that greater number of students will be thoroughly engaged with sports activity after visiting the sports hall/gym facilities. According to predictions a lot many of those students may take sports as a profession as the sports hall and gym will have state of the art facilities. It is believed that after completion of this project, the school administration will be able to recruit highly experienced and skilled trainers and athletes who have performed both in the national as well international level. They will be extremely instrumental in encouraging the students to consider sports as a regular activity.

4.3. Advantages to the school

- Incorporation of sports hall/gym facilities will garner more attention which in turn will increase the number of student's enrollment in the upcoming years.
- The incorporation of such facilities and its subsequent usage will allow school administration to improve the health of students.
- The academic curriculum that is equivalently complimented with co-curriculum modules will allow students to relive their day's stress and attain all round development.
- State of the art sports hall and gym facilities will also allow the school administration to spread massive awareness of importance of sports all round the school and the country as a whole. The administration may later include sports science as a separate subject within the academic curriculum which may later encourage students to pursue this field of education and subsequently choose this as a career development plan.
- The sports hall/gym facility will have rain water reservoirs which will conserve rain water. The reservoirs will be fitted with water pumps and filters which will convert rainwater to freshwater that will be used for sanitation purposes. According to estimates the rainwater reservoir will lead to a 30% reduction in water consumption in the school.
- The use of solar cells as a source of electricity to power the gym and sports hall facility will definitely reduce the electricity consumption of the school by a considerable level.

4.4. Resource requirements

In order to complete the construction work within eight months the total number of workers to be appointed is 200. This includes project manager, team leaders, consultants, architects, engineers, manual labors and a test and review team. A detailed staffing plan for the project is provided in the following table:

Table 1: Staffing plan

Name	Job role/responsibility	Skills/expertise	Head count
John Doe 1	Project manager (Gym, spa and aerobics)	Proj. management	1
John Doe 2	Project manager (Sports hall and swimming pool)	Proj. management	1
Consulting team	Discuss concept of the building and provide key inputs regarding the plan	Proj. Management and proj. consultant	20

	of approach, risks, costs and duration of the project		
Architect team	Preparation of the internal and external layout of the building according to the specifications.	Civil engineering, building architecture and design	20
Engineers	Operating excavation machinery, operating cranes, construction of building according to the architecture	Civil engineering, construction management	50
Manual labors	Providing assistance to lead engineers	Civil engineering, construction management	50
Solar cell installers	Installation of roof top solar cell panels and establishing electricity connection throughout the building.	Electronics/Electrical engineering	5
Water pump and filter installers	Installation of water pump and filter in the rainwater reservoirs and connecting the source with sanitation water pipes throughout the building	Water pumps installation and plumbing utilities.	10
Test and review team	Testing the facilities for any loopholes and areas of improvement	Sports management, gym operations	20

4.5. Budget requirements

Table 2: Budget requirements

Expense Summary	Amt £
Gym facility	180000
Swimming pool	190000
Basket ball, tennis, badminton courts	373000
Spa facility	15000
Changing rooms and lockers	86000
Aerobics centre	123000
Internal walls & partitions	160000
Internal doors & windows	81000
Additional furniture and Fittings	125000
Wall, Floor and Ceiling Finishes	187000
Preliminaries	182000
Rain water reservoirs	70000
Restroom	35000
Water pumps and pipes	20000
Labour cost	113000
Electrical settings	40000
Solar panel	33000
Service charges	76000
TOTAL	2,089,000

4.6. Major risk and assumptions

Table 3: Risk management matrix

VHI	>50%	5	5	10	15	20	25
HI	30-49%	4	4	8	12	16	20
MED	15-29%	3	3	6	9	12	15
LO	10-15%	2	2	4	6	8	10
VLO	<10%	1	1	2	3	4	5
			1	2	3	4	5
			<10%	10-15%	15-29%	30-49%	>50%
			VLO	LO	MED	HI	VHI

Major risk factors considered in the project

Table 4: Risk assumptions

Risk Type	Impact Score	Probability Score	Risk Score	Mitigation Action
Financial risks	HI[4]	MED[3]	12	Full fund acquisition at the start of the project.
Unanticipated breakdowns	HI[4]	LOW[2]	8	Arrangements with local dealers for acquiring machines and tools readily in the last minute.

Accident caused to workers	VHI[5]	HI[4]	20	Presence additional workforce to fill gap.
Lack of skilled workforce	MED[3]	LOW[2]	6	Training and detailed instructions provided to workers.
Sand storms	VHI[5]	VHI[5]	25	Adequate facilities for fast clearing of sand from site and plan outdoor construction according to climatic predictions.
Political conflicts	HI[4]	MED[3]	12	Negotiations and strategic meetings with the Ministry of Education and other government bodies.
Delivery of raw materials	VHI[5]	VHI[5]	25	Efficient management assigned for handling inventory orders and their timely placement.

4.7. Recommendations

In lights of the facts that have been mentioned within the business case, the school administration is recommended to have a capital of £2.5 million in order to ensure that they have adequate

capital at their reserve that will serve as a cushion if the projects suffers from any setback. The administration should also maintain a reserve workforce of engineers and manual labors who can compensate for the absence of any worker due to accident. The school administration should make sure that accurate quantity of raw materials is procured at the right place and at the right time so as to prevent any sort of resource wastage. The contract for the price of raw materials and its subsequent procurement should be fixed beforehand in order to prevent further expenditures due to rise in raw material price or procurement cost. The school administration is suggested to have adequate safety measures and health facilities in place in order to provide proper services to workers who may suffer from work related accidents.

5. Stakeholder management plan

The stakeholder management plan provides a brief overview of the internal and external stakeholders who are involved with this project directly or indirectly. The plan also explains the impact that the stakeholders will have during the lifecycle of the project (Love, Edum-Fotwe and Irani, 2003). In addition to that the contribution of the stakeholders as well as their extent of involvement within the project has also been provided in details within the stakeholder management plan. Refer to table 2 for the stakeholder management plan.

Table 5: Stakeholder management plan

No.	Stakeholder	Stakeholder type	Stakeholder impact	Stakeholder contribution	Extent of involvement
1	The government of Kingdom of Bahrain	External	Very Low	Very Low	Very Low
2	The school administration	Internal	Very Low	Very Low	Very Low
3	Project managers	Internal	High	High	High
4	Raw materials manager	Internal	High	Very High	Medium
5	Construction area supervisor	Internal	Very High	High	Low
6	Consulting and planning team	Internal	Very low	Very High	High
7	Architect and design team	Internal	Very High	Very High	Very High
8	Engineering team	Internal	Very High	Very High	Very High
9	Manual labor/support team	Internal	Medium	High	Very High

10	Solar pane installation team	Internal	Very High	Very High	Very High
11	Water pump and filter installation team	Internal	Very high	Very high	Very high

6. Stakeholder management: Communication plan

Table 3 given below is the stakeholder communication plan that provides key details associated with the project stakeholders such as their address, telephone and email contacts. In addition to that the table also includes key information such as the frequency of reports to be provided to the stakeholders. The table also includes information regarding the officials who would be responsible for preparing the report.

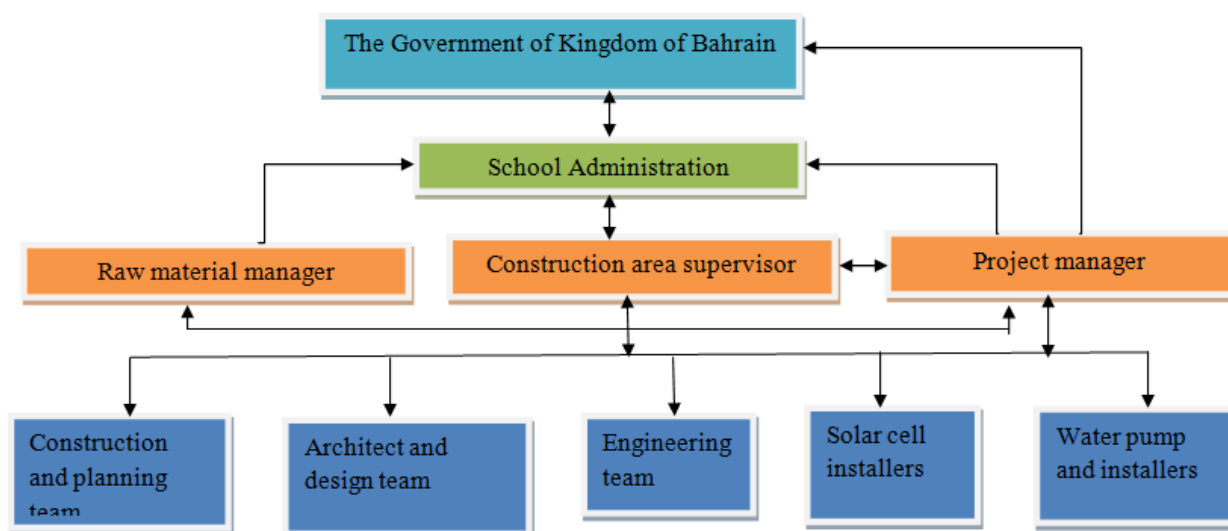
Table 6: Stakeholder communication plan

No	Stakeholder Name	Stakeholder type	Email 1	Address	Phone	Frequency of the report	Report responsibility
1	The government of Kingdom of Bahrain	External	ab@xy.com	abcxyz	00	Progress report on a monthly basis	Project Manager
2	The school administration	Internal	ab1@xy.com	abcxyz1	101	Progress report on a monthly basis	Project manager in coordination with team leads and construction area supervisor
3	Project managers	Internal	ab2@xy.com	abcxyz2	102	Progress report on a daily basis	Construction area supervisor
4	Raw materials manager	Internal	ab3@xy.com	abcxyz3	103	Twice in a week progress report	Assistant project manager
5	Constructio	Internal	ab4@xy.com	abcxyz4	104	Progress	Assistant

	n area supervisor		com			report on a daily basis	project manager
6	Consulting and planning team	Internal	ab5@xy.com	abcxyz5	105	Weekly progress report	Consulting and planning department
7	Architect and design team	Internal	ab6@xy.com	abcxyz6	106	Progress report on a daily basis	Architecture and design department
8	Engineering team	Internal	ab7@xy.com	abcxyz7	117	Progress report on a daily basis	Team leader
9	Manual labor/support team	Internal	ab8@xy.com	abcxyz8	108	Progress report on a daily basis	Team leader
10	Solar pane installation team	Internal	ab9@xy.com	abcxyz9	109	Progress report on a daily basis	Team leader
11	Water pump and filter installation team	Internal	ab10@xy.com	abcxyz10	110	Progress report on a daily basis	Team leader

7. Stakeholder communication map

Figure 2 given below is a depiction of the stakeholder communication map which explains the interconnectivity between the project team members. This provides the a holistic view of how the project team members will be communication will be communicating to each other and who will be responsible for reporting to the school administration and the government representations (Huchzermeier and Loch, 2001). The fundamental rational behind the preparation of this communication map is to explain the flow of information as it is extremely important in a project that is as complex as construction of sports hall and gym facilities (Kerzner, 2002).

Figure 9: Stakeholder communication map

(Source: Author's creation)

8. Planning/structuring and procurement

During the planning/structuring phase, the project manager conducted weekly meetings with government representatives, school administration representatives, consulting and planning team, financial analysts, construction managers, raw materials manager, architects, civil engineers, construction site supervisor, solar cell installers and water pump installers in order to ensure that the project is approached in a collaborative manner (Pich, Loch and Meyer, 2002). The fundamental aim behind these meetings was to clearly specify the responsibilities of each and every individual as well as to discuss key issues related to the project. The progress reports of one such meeting has been provided as meeting template in table 4.

Table 7: Meeting template

Meeting Template	Meeting with Project Team members and stakeholders	
Purpose of Meeting:	Project Planning	
Location:	Sheraton Bahrain Hotel, 6 Palace Avenue Manama, Bahrain	
Time:	2nd November, 2014, 10.00AM	
Invitees:	Project team comprising of civil engineers, school administration representatives, planning and consultant team, construction site supervisor, raw materials manager, financial analysts, government representatives, solar cell installers, water pump installers	
In attendance:	State representatives	
Apologies:	None	

Agenda items (number):	Need of the project and presentation of project plan	35mins
Agenda items:	Resource and Budget Planning	40mins
Agenda items:	Risk assessment and contingency plan evaluation	100mins
Agenda items:	Communication plan	100mins
Agenda items:	Construction site supervision	45mins
Agenda items:	Project execution and subsequent management	45mins
Agenda items:	Discussion and objectives and responsibilities	45mins
Any Other Business:	Project testing, review and closure	
AOB:	Workforce allocation	
AOB:		
Benefits & Concerns:		
Date of Next Meeting:	30th January, 2015	

9. Issues and action matrix

Table 8: Issues and action matrix

TOC items	Item	Owner	Cat.	Notes & Actions	Status
Increasing health issues amongst students	Decision	Ministry of Education		Development of the sports hall and gym facility in the school to make students more active and fit.	Open
Awareness regarding the benefits of sports amongst students	Action	School board members		Inclusion of sports in academic curriculum.	Open

Inadequate sports facility in public schools	Action	Ministry of Education		Convincing government to provide necessary fund for developing more sports facilities in schools.	Open
Complexity of the project	Decision	Civil engineers and school board members		Developing accurate blueprint of the project.	Open

10. Risk management plan

Figure 10: Risk management plan

Item	Risk Type	Uncertainty/Hazard (Cause & Effect)	Impact Score	Probability Score	Risk Score	Mit. Cat.	Mitigation Action	Status	Contingency
1	Financial risks	Causes the total project cost to rise to decline	4	3	12	Manage	Full fund acquisition at the start of the project	Mitigation in progress	Borrow from other sources
2	Unanticipated breakdowns	Causes stoppage of work and delay in meeting deadlines	4	2	8	Manage	Arrangements with local dealers for acquiring machines and tools readily in the last minute	Open	Accept delay and initiate repairs
3	Accident caused to workers	Causes delay in meeting deadlines	5	4	20	Accept	Presence additional workforce to fill gap.	Open	Accept delay and initiate fresh hiring
4	Lack of skilled workforce	Effect the quality of work	3	2	6	Manage	Training and detailed instructions provided to workers	Passed	Accept risk and continue with existing workforce
5	Sand storms	Causes delay and extrat effort for site clearing	5	5	25	Manage	Adequate facilities for fast clearing of sand from site and plan outdoor construction according to climatic predictions	Open	Accept delay
6	Political conflicts	Create issues in gaining clearance for the project	4	3	12	Accept	Negotions and strategic meetings with the Ministry of Education and other government bodies.	Passed	Accept risk
7	Delivery of raw materials	Impacts the total time required for project completion	5	5	25	Manage	Efficient management assigned for handling inventory orders and their timely placement	Passed	Accept risk

(Source: Author's creation)

The project has identified seven important types of risks. The risk management plan constructed by the company involves identifying the major types of risks which are associated with the project. On the basis of the risk assessment matrix, it can be seen that the project involves majorly three very highly risk factors and four medium risk factors. The three high risk induced factors are accident caused to workers, sand storms and delivery of raw materials. When workers get injured, they remain unable to contribute to the construction project for a considerably long time. As a result new workers are required to be employed. Much time and effort gets wasted in training the newly hired workers and providing them information regarding the needs of the project (Dym, et al, 2004). This not only leads to an increase in the cost of the project, but the stipulated time within which the project is deemed to be completed gets extended. In order to prevent such a scenario, the project managers are required considering extra workers and make them work in shifts. When any worker is unfit for working, the extra workers can take their place (Turner, 2006). Such a set up facilitates minimizing the shortages of labour availability and facilitates maintaining continuity of work (Barkley, 2004). Sand storms are identified to be a frequent occurrence in Bahrain and construction project managers are required to make provisions for the same in advance. If risk mitigation measures taken in this respect are not adequate it may impact the project in a highly negative manner. The construction work may get damaged and much time may be lost in repairs and clearing sand from the site. As a result the project managers are required to analyse the predicted climatic conditions and accordingly make provisions for reducing the impact of sand storms upon the site and the fast clearance of sand.

Raw materials are an important factor of production and delay or shortages in the same may affect a project in a highly negative manner causing the project to be completed much after the expected time (Turner and Müller, 2003). Raw material acquisition issues might arise out of a number of reasons such as shortage of resources, disputes with suppliers in terms of prices and transportation related issues (Clough, G. A. Sears and S. K. Sears, 2000). This kind of risk can only be mitigated through the strategic abilities of the management. The management must be able to develop good relations with the suppliers and able to gain their trust. The support of suppliers facilitates maintaining continuity in the project. Other types of medium impact risks identified in association with the project are financial, unanticipated breakdowns, lack of skilled workforce and political conflicts. These risks however are manageable and mitigated easily if the project developers are efficient and planning is done carefully. Developing such risk mitigation plans is crucial in the success of a project as it facilitates the management to make provision for reducing the negative impact of changes occurring in the external environment. The proper identification of risks also facilitates the management to make adequate set aside stipulated sums of money to meet contingencies.

11. Procurement contract

The project manager had a detailed discussion with the consultant and planning team before choosing the suppliers for the purpose. The suppliers were chosen on the basis of a bidding process. The supplier partners who were considered eligible to participate in the bidding process

were chosen on the basis of their prior experience and performance, cost of delivery and raw materials price. After a stringent process of bidding a procurement partner was chosen who will be entirely responsible for supplying all the raw materials required for constructing the sports hall cum gym facility. The procurement contractor will be in constant contact with the raw materials manager. Both the procurement contractor and the raw materials manager will be entirely responsible for scheduling the procurement and raw materials in order to make sure that the materials are available right on time before the associative activity begins. The raw materials will be procured through road and rail transport. The route has already been pre-planned during the meeting held on 2nd November 2014. The procurement service provider was also responsible for inspecting the construction site for soil testing as well as to have an estimation of the machineries that are to be provided for excavation. The supplier company established two temporary contact offices within proximity of 1 km from the site of construction so as to address any incumbent issues.

12. Planned Cash flow

Figure 11: Planned cash flow

Planned Cash flow								
Description	Amt in £							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Gym facility	180000							
Swimming pool		190000						
Basket ball, tennis, badminton courts		373000						
Spa facility			15000					
Changing rooms and lockers			86000					
Aerobics centre				123000				
Internal walls & partitions				160000				
Internal doors & windows					81000			
Additional furniture and Fittings					125000			
Wall, Floor and Ceiling Finishes						187000		
Preliminaries		182000						
Rain water reservoirs							70000	
Restroom								35000
Water pumps and pipes								20000
Labour cost								113000
Electrical settings		40000						
Solar panel		33000						
Service charges								76000
b/f		180000	998000	1099000	1382000	1588000	1775000	1845000
c/d	180000	818000	101000	283000	206000	187000	70000	244000
Balance	180000	998000	1099000	1382000	1588000	1775000	1845000	2089000

(Source: Author's creation)

The net cash required for meeting the operational expenses of the project are anticipated to be £ 2089000. The expenses incurred in meeting the project requirements have been allocated across eight months, which is the stipulated time for the completion of the construction of the gym. The planned cash flows of the project show that majority of the expenses have been incurred in respect of constructing the gym, swimming pool and the development of the courts for basketball, tennis and badminton. Labour costs and the construction of internal walls, ceilings and furniture also take up a large amount of finances in the overall project.

13. Actual cash flow

Figure 12: Actual cash flow

Item	Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
	1 Gym facility	180000							
Actual	Actual cost of this item	-10000							
	2 Swimming pool		190000						
Actual	Actual cost of this item								
	3 Basket ball, tennis, badminton courts		373000						
Actual	Actual cost of this item	-100000							
	4 Spa facility			15000					
Actual	Actual cost of this item								
	5 Changing rooms and lockers			86000					
Actual	Actual cost of this item								
	6 Aerobics centre				123000				
Actual	Actual cost of this item								
	7 Internal walls & partitions				160000				
Actual	Actual cost of this item				-5000				
	8 Internal doors & windows					81000			
Actual	Actual cost of this item								
	9 Additional furniture and Fittings					125000			
Actual	Actual cost of this item								
	10 Wall, Floor and Ceiling Finishes						187000		
Actual	Actual cost of this item						-2500		
	11 Preliminaries		182000						
Actual	Actual cost of this item		-30000						
	12 Rain water reservoirs							70000	
Actual	Actual cost of this item							-8400	
	13 Restroom								35000
Actual	Actual cost of this item								
	14 Water pumps and pipes								20000
Actual	Actual cost of this item								
	15 Labour cost								113000
Actual	Actual cost of this item								-6500
	16 Eletrical settings		40000						
Actual	Actual cost of this item								
	17 Solar panel		33000						
Actual	Actual cost of this item								
	18 Service charges								76000
Actual	Actual cost of this item								
PLANNED	b/f		180000	998000	1099000	1382000	1588000	1775000	1845000
PLANNED	c/d	180000	818000	101000	283000	206000	187000	70000	244000
PLANNED	Balance	180000	998000	1099000	1382000	1588000	1775000	1845000	2089000
ACTUAL	b/f		-10000	-140000	-140000	-145000	-145000	-147500	-155900
ACTUAL	c/f	-10000	-130000	0	-5000	0	-2500	-8400	-6500
ACTUAL	balance	-10000	-140000	-140000	-145000	-145000	-147500	-155900	-162400

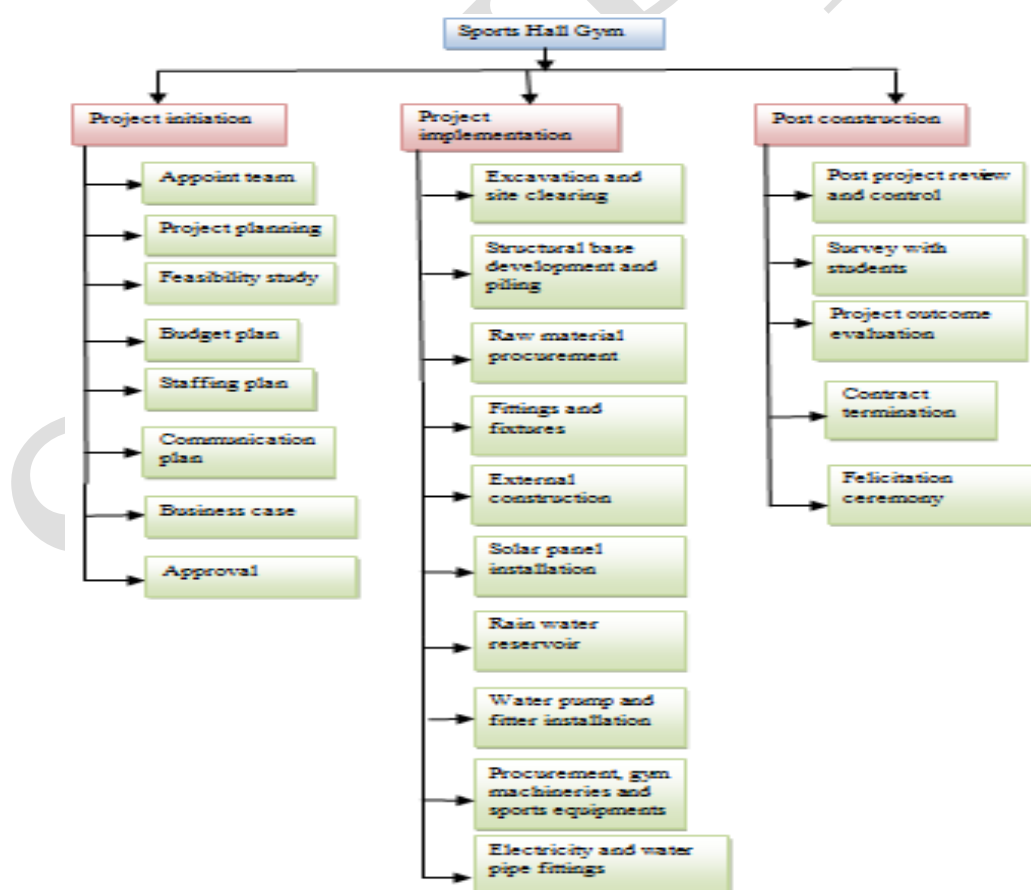
(Source: Author's creation)

The actual cash flow predicted by the managers of the company is seen to reduce the estimated cash flows of the project to a large extent. The estimated cost of construction is seen to reduce by almost £ -162400. The reduction is primarily expected to arise in respect of gym, sports courts, walls and partition, wall and ceiling preliminary expenses and labour related expenses. The expenses associated with the project are seen to be highly fluctuating leading to changes in the overall costs associated with the project. The costs associated with the project were initially kept high so that there are no shortages in fund. Any reduction in expenses would result in savings.

14. Project work breakdown structure

As is evident from the work breakdown structure given in figure 4, the entire project is divided into three phases. The first phase is the project initiation phase which is followed by the project implementation and thereafter comes the post construction phase. The work breakdown structure serves as an action plan that details all the activities that are to be performed under the three phases (Stevenson and Hojati, 2007). The structure provides a schematic of the sequence according to which the project is to be approached.

Figure 13: Work breakdown structure

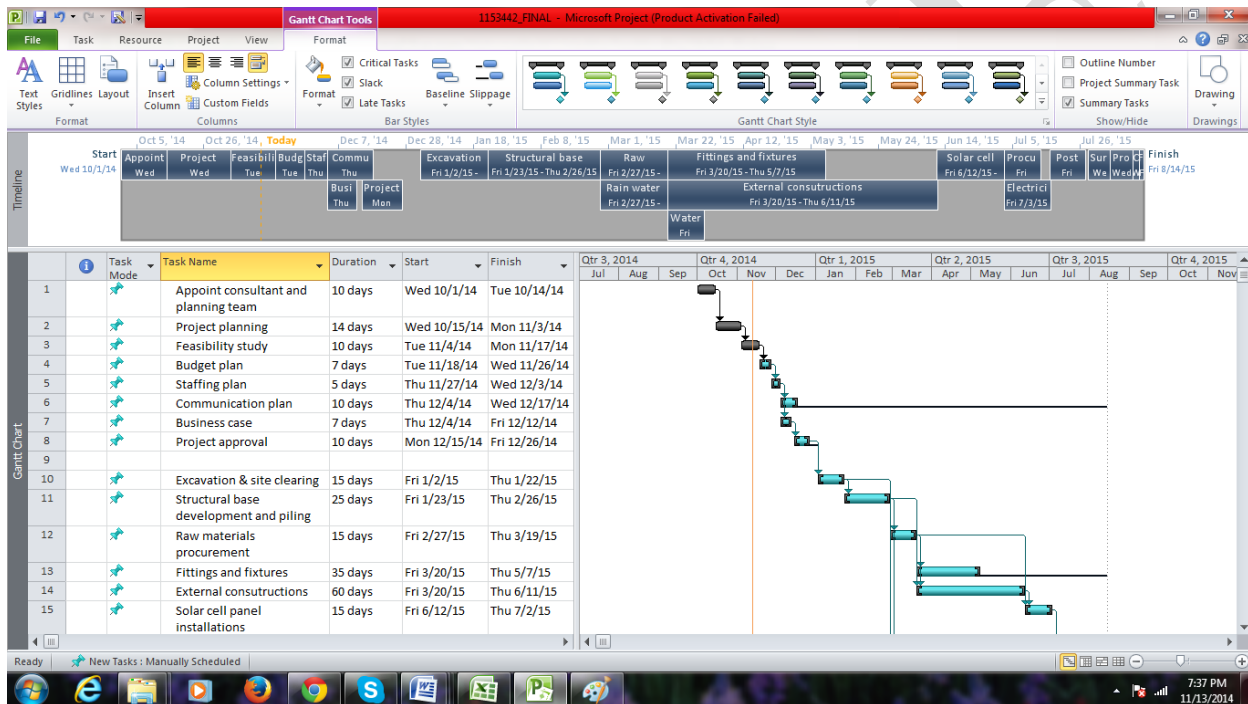


(Source: Author's creation)

15. Project Gantt chart

The Gantt chart provided in the figure below provided a detailed description of the activities that are to be performed during the project and the estimated start time and finishing time of each of those activities (Kerzner, 2013; Meredith and Mantel Jr., 2011). In that way the project manager was able to comprehend the duration of a particular activity and the overall duration of the project (Baker, Murphy and Fisher, 2008). The Gantt chart also enabled the project manager to identify the activities that had slack or float time. This is measure of the extent to which a particular activity can be delayed.

Figure 14: Gantt chart



(Source: Author's creation)

The Gantt chart reveals that slack is associated with activities 6, 13, 17 and 18 which are communication plan, fittings and fixtures, water pump & filter installation and procurement of gym machineries respectively.

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