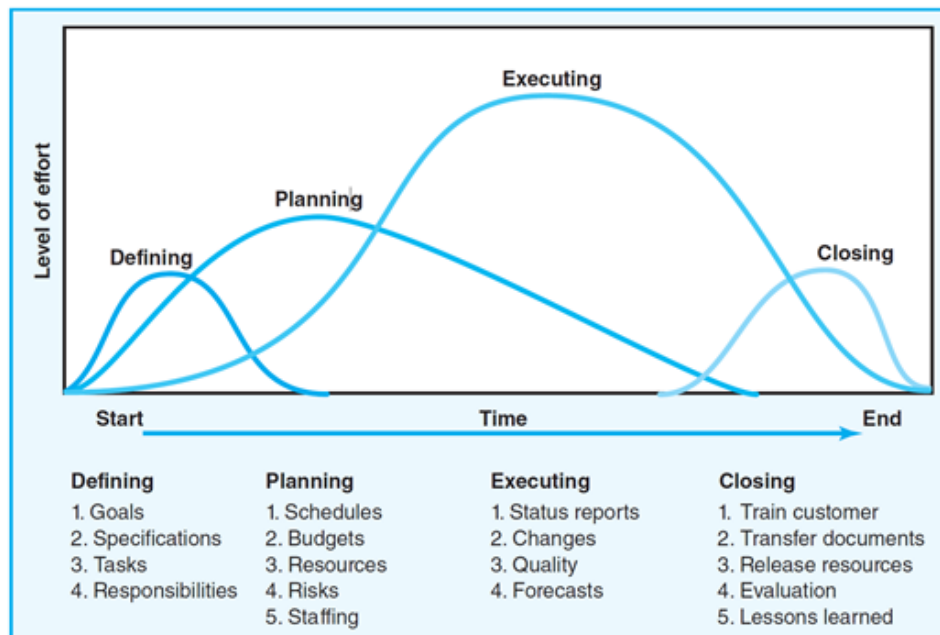


1. INTRODUCTION

1.1 About the Project:

This project is about constructing a new computer-controlled conveyer belt system that will move and position items on the conveyor belt within < 1 millimeter. It will be updateable with future installations and will be able to replace those in the field, at low cost. It has the potential to be a critical component in 30% of the systems installed. The conveyer belt system will follow the project life cycle.

1.2 Project Life Cycle Overview:



2. MONITORING AND CONTROL

2.1 Defining Stage

In this stage of the project life cycle, we begin with defining the specifications of the project, chartering objectives, forming teams, and assigning roles and responsibilities.

2.1.1 Objective:

To construct a computer-controlled conveyor belt not to exceed a cost estimate of \$1.6 million dollars within 530 days.

Deliverables:

1. Hardware
2. Operating System
3. Utilities
4. System Integration

Milestones:

1. Start hardware development by TBD: 02/08/2016
2. Start utilities production by TBD: 02/08/2016
3. Complete development of Operating Systems by TBD: 11/03/2017
4. Complete System Integration and testing by TBD: 02/02/2018

Technical Requirements:

1. The conveyor belt will move and position items within <1 millimeter.
2. The conveyor belt will have wide conveyers and cylindrical radial circular runout.
 - a. Idler bearing lubrication
 - b. Lithium grease NLGI Grade 2 or 3
3. Software (BELTSTAT V8):
 - a. Windows (XP, Vista, 7, 10)
 - b. 1.0 Ghz Processor
4. OSHA Standard 1926.555(a)(3):
 - a. Emergency stop switches will be arranged so that the conveyor cannot be started again until the actuating stop switch has been reset to running or "on" position.
5. The conveyor belts must satisfy the following ISO standards:
 - a. ISO 18573:2012 - Test atmospheres and conditioning periods
 - b. ISO 284:2012 - Electrical conductivity - Specification and test method
 - c. ISO 282:1992 – Sampling

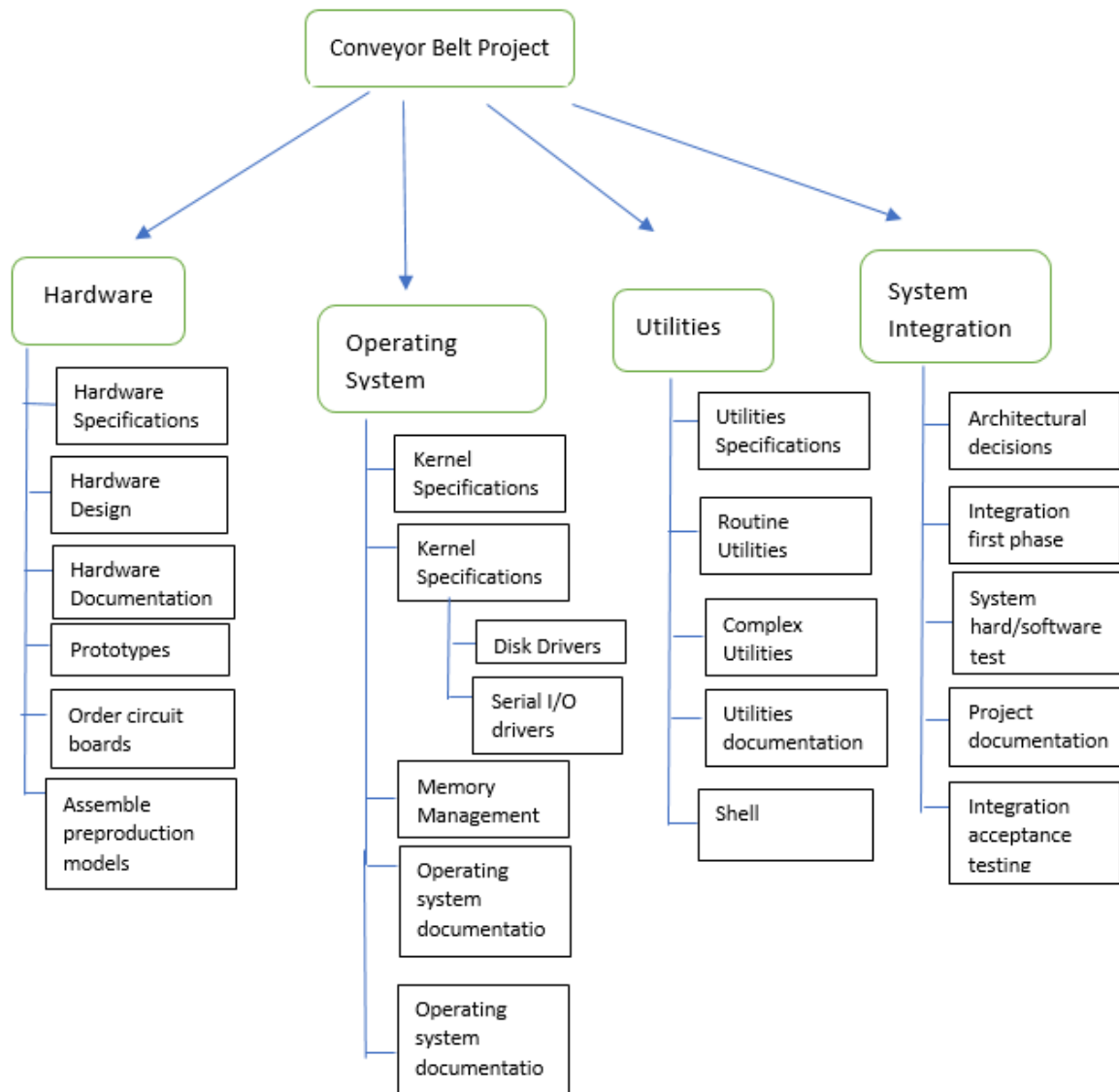
Limitations and exclusions:

1. The project team must follow normal 8 hours/day from Monday through Friday.
2. Overtime works require approvals from VP.
3. VP approval is needed for any use of budget reserves.
4. The project team must follow normal U.S. holidays.
5. Cleanliness of project work area will be performed by the custodial staff.
6. Future installation and upgradation costs are not covered in the allocated budget.

Considering all this, the project priority matrix is as follows:

	Time	Scope	Cost
Constraint	X		
Enhance		X	
Accept			X

Initial Work Breakdown Structure:



2.2 Planning Stage

In this stage, the level of effort required is more. We need to create plans to determine what the project will involve, when it will be scheduled, what level of quality should be maintained, what kind of resources will be needed, and how much the budget should be allocated to complete the project.

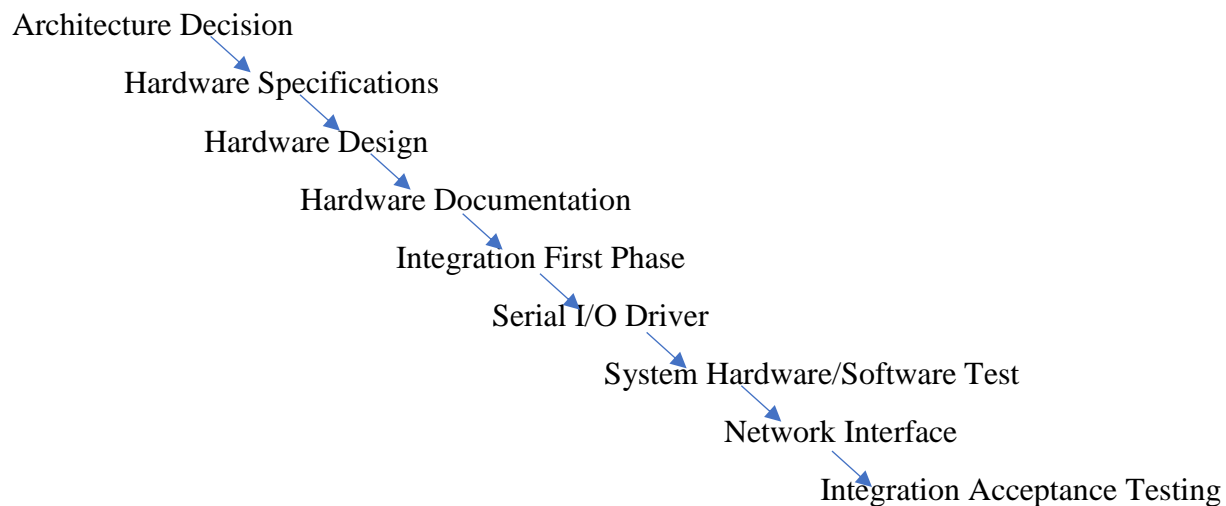
2.2.1 Schedule

This project is scheduled to start on 4th of January 2010 and is estimated to complete on 2nd February 2012 with a total of 530 days.

Since this is a time-constrained project, the time for each task was scheduled. Dependencies between tasks were verified using the Network Diagram.

There is a single critical path in the project which means that the network is not very sensitive.

Critical Path:



2.2.2 Resources

The next step after scheduling is allocation of resources. A number of things had to be determined like the number of resources needed to be allocated for each task, cost associated with each resource etc.

There were a number of resources used. They were classified as Design, Development, Documentation, Assembly/Test and Purchasing. Resources for Design, Development and Documentation was over-allocated. This was resolved but it was done at the cost of a considerable increase in the duration of the project.

Since the project is a time-constrained project and it was taking 30 days more than the initial schedule we considered a few options to reduce the duration. The only possible way to do it is by increasing the resources. We considered adding an external team, or overtime for some resources or reducing slack.

We then decided to make some changes to the resource allocation to reduce the duration from 560 days to 530. We added one more Development resource to Serial I/O. By doing this the duration reduced without having the need to spend any extra money.

.2.3 Budget

We were given a tentative budget of 1.6M and were expected to complete the project lesser than this budget. We were also asked to allocate some of this amount for Management and Budget reserves.

Management reserve:

These are reserves that are withheld by management but are actually a part of the overall project budget. These are meant for the “unknown-unknowns” that is they are funds that are used to cover major unforeseen risks. To use any amount from this reserve, we will need approval from the management. For this project, we set aside \$109,568.00.

Budget Reserves:

These are reserves that are allocated for identified risks. These are used to address the known risks and for this project we allocated \$44,480.00 as the budget reserve.

Risk	Work Package	Probability/ Likelihood	Cost Impact	Budget Reserve
1. Hardware or software malfunction/downtime	Assemble pre-production models	60%	\$26880	\$16128
2. Project delay (unforeseen Activities)	Integration Acceptance Testing	40%	\$26880	\$10752
3. Delay in material supply.	Assemble pre-production models	20%	\$20160	\$4032
4. Improper system Integration.	Integration First Phase	40%	\$33600	\$13440
5. Increase of material costs.	Ordering circuit boards	20%	\$640	\$128
Total Budget Reserves				\$44480
Total Project Cost				\$1051200

2.2.4 Risks

In Project Management, risk is an uncertain event or condition that, if it occurs, has an effect on at least one project objective. Risk management focuses on identifying and assessing the risks to the project and managing those risks to minimize the impact on the project.

The following are our risk assessment form and risk response matrix:

Risk Event	Probability / Likelihood	Impact	When
1. Hardware or software malfunction/downtime	3	4	System operational / installation time
2. Project delay (unforeseen Activities)	2	2	Can happen anytime
3. Delay in material supply.	1	3	During material ordering
4. Improper system Integration.	2	3	Final integration setup
5. Increase of material costs.	1	2	Purchasing materials

Risk Event	Response	Contingency Plan	Trigger	Responsible team
1. Hardware or software malfunction/downtime	Mitigate	Replace Hardware Proper software update	Equipment failure	Operations and support Team
2. Project delay (unforeseen Activities)	Avoid	Act accordingly	Task duration increase	Planning Team
3. Delay in material supply.	Transfer	Choose another supplier	Material acquiring	Logistics Team
4. Improper system Integration.	Avoid	Rework on design	Design failure	Design Team
5. Increase of material costs.	Accept	Deal with supplier	Market Inflation	Purchasing Team

3. Project Status Reports

3.1 Project Status Report: Quarter 1

Project Number: 32

Project Manager: Members of Team 32

Project Priority now: 1

Status as of: April 1, 2016

Earned Value Figures:

PV	EV	AC	SV	CV	BAC	SPI
\$126,800	\$155,980.83	\$151,680	\$29,180.83	\$4,300.83	\$1,205,248	1.23
EACf	VAC	CPI	PCIB	PCIC	TCPI	MRI
\$1,172,020.51	\$33,227.49	\$1.03	0.12941804	0.12941753	1	0.04

Project Description:

To complete an automated conveyor belt which is designed based on specifications to provide maximum output.

Status Summary:

The project is having a variance at completion of \$33,227.49. The Cost Variance is \$4300.83. The cost variance (CV) is positive which implies that based on what work has been completed till date we are under budget by \$4,300.83.

Explanations:

The project is now completed 12% and the estimated completion duration is 526 days which is within the set date. The project is on schedule.

Major Changes since last report:

None, The Estimated Cost at Completion EACf is \$1,172,020.51 which means that the project will be under budget by \$33,227.49.

Projected Cost at Completion:

The EACf is projected to be \$1,172,020.51. The predicted VACf is \$33,227.49 which means that the project will be under budget. The CPI is 1.03 which implies the project is earning 1.03 dollars for every dollar spent.

3.2 Project Status Report: Quarter 2

Project Number: 32

Project Manager: Members of Team 32

Project Priority now: 1

Status as of: July 1, 2016

Earned Value Figures:

PV	EV	AC	SV	CV	BAC	SPI
\$417,200	\$452,952.83	\$470,720	\$35,752.93	(\$17,767.07)	\$1,205,258	1.09
EACf	VAC	CPI	PCIB	PCIC	TCPI	MRI
\$1,252,528.33	(\$47,280.33)	0.96	0.375814	0.375815851	1.02	(0.16)

Project Description:

To complete an automated conveyor belt which is designed based on specifications to provide maximum output.

Status Summary:

The project is having a variance at completion of -\$47,280.33. The Cost Variance is -\$17,767.07. The cost variance (CV) is negative which implies that based on what work has been completed till date we are over budget by \$17,767.07.

Explanations:

The project is now completed 40% and the estimated completion duration is 524 days which is within the set date. The project is on schedule.

Major Changes since last report:

The project is ahead of schedule the duration has been reduced by 2 days. Projected Cost at Completion: The EACf is projected to be 1,252,528.33 which means that the project will be under budget by \$47,280.33 (VACf).

Projected Cost at Completion:

The EACf is projected to be \$1,252,528.33. The predicted VACf is -\$47,280.33 which means that the project will be over budget. The CPI is 0.96 which implies the project is earning 0.96 dollars for every dollar spent.

3.3 Project Status Report: Quarter 3

Project Number: 32

Project Manager: Members of Team 32

Project Priority now: 1

Status as of: October 1, 2016

Earned Value Figures:

PV	EV	AC	SV	CV	BAC	SPI
\$599,440.00	\$609,520.00	\$631,600.00	\$10,080.00	(\$22,080.00)	\$1,205,248.00	1.02
EACf	VAC	CPI	PCIB	PCIC	TCPI	MRI
\$1,248,909.13	(\$43,661.13)	0.97	0.50572164	0.505721341	1.04	(0.20)

Project Description:

To complete an automated conveyor belt which is designed based on specifications to provide maximum output.

Status Summary:

The project is having a cost variance at completion of -\$22,080 which will cause problems.

Explanations:

The project is on schedule. The estimated days is 526 days which is within the set date and the resources are not overallocated. All the deliverables are being executed as per the schedule.

Major Changes since last report:

None Projected Cost at Completion: The EACf is projected to be \$1,205,651.09 which means that the project will be under budget by \$34,181 (VACf).

Projected Cost at Completion:

The EACf is projected to be \$1,248,909.13. The predicted VACf is -\$43,661.13 which means that the project will be over budget. The CPI is 0.97 which implies the project is earning 0.97 dollars for every dollar spent.

3.4 Project Status Report: Quarter 4

Project Number: 32

Project Manager: Members of Team 32

Project Priority now: 1

Status as of: 1 January 2017

Earned Value Figures:

PV	EV	AC	SV	CV	BAC	SPI
\$685,120.00	\$690,009.50	\$719,520.00	\$4,889.50	(\$29,510.50)	\$1,205,248.00	1.01
EACf	VAC	CPI	PCIB	PCIC	TCPI	MRI
\$1,256,797.63	(\$51,549.63)	0.96	0.57250417	0.572502671	1.06	(0.27)

Project Description:

To complete an automated conveyor belt which is designed based on specifications to provide maximum output.

Status Summary:

The project is having a variance at completion of -\$51,549.63. The Cost Variance is -\$29,510.50. The cost variance (CV) is negative which implies that based on what work has been completed till date we are over budget by \$29,510.50.

Explanations:

The project is now completed 61% and the estimated completion duration is 549 days which is outside the set date. The project is behind the schedule.

Major Changes since last report:

The previous report is 9 days ahead of schedule and this report it is 19 days behind the schedule. This is because of Integration first phase. The Serial I/O Drivers is still behind schedule.

Projected Cost at Completion:

The EACf is projected to be \$1,256,797.63. The predicted VACf is (\$51,549.63) which means that the project will be over budget. The CPI is 0.96 which implies the project is earning 0.96 dollars for every dollar spent.

3.5 Project Status Report: Revised Quarter 4

Project Number: 32

Project Manager: Members of Team 32

Project Priority now: 1

Status as of: 1 January 2017

Earned Value Figures:

PV	EV	AC	SV	CV	BAC	SPI
\$685,120.00	\$688,281.67	\$719,520.00	\$3,161.67	(\$31,238.33)	\$1,205,248.00	1
EACf	VAC	CPI	PCIB	PCIC	TCPI	MRI
\$1,259,951.89	(\$54,703.89)	0.96	0.57107058	0.571069424	1.06	(0.29)

Project Description:

To complete an automated conveyor belt which is designed based on specifications to provide maximum output.

Status Summary:

The project is having a variance at completion of -\$54,703.89. The Cost Variance is -\$31,238.33. The cost variance (CV) is negative which implies that based on what work has been completed till date we are over budget by \$31,238.33.

Explanations:

The project is now completed 61% and the estimated completion duration is 560 days which is outside the set date. The project is behind the schedule.

Major Changes since last report:

The duration of the project has now been increased by 11 days since the last report.

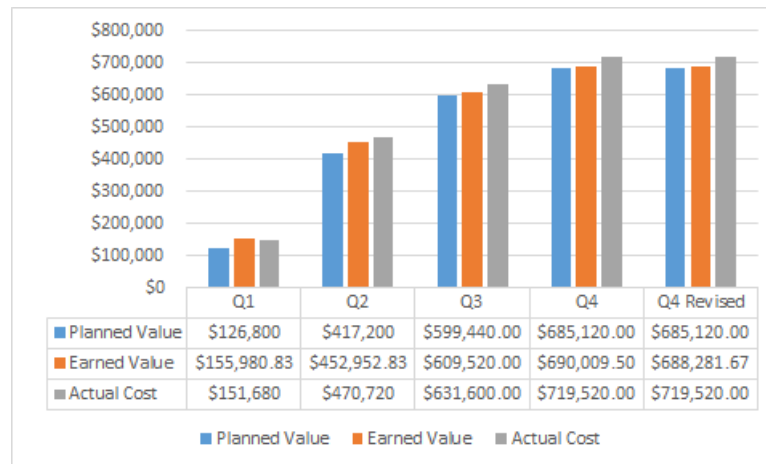
Projected Cost at Completion:

The EACf is projected to be \$1,259,951.89. The predicted VACf is -\$54703.89 which means that the project will be over budget. The CPI is 0.96 which implies the project is earning 0.96 dollars for every dollar spent.

4. Trend Comparison:

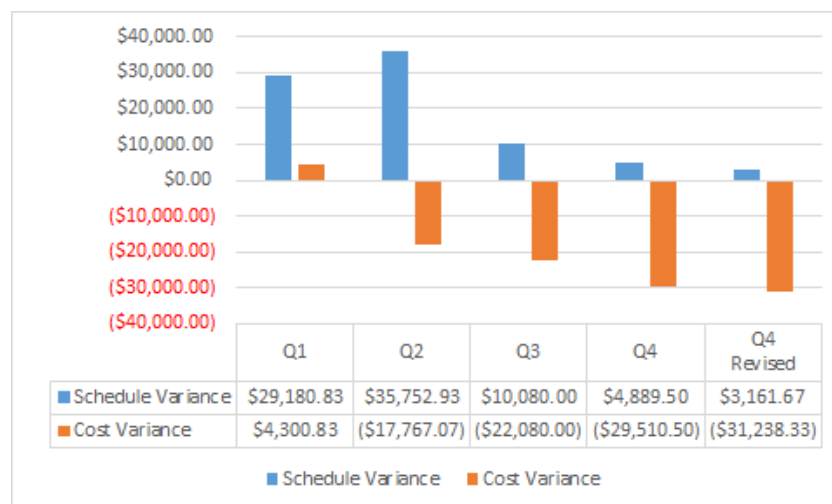
4.1 PV vs EV vs AC: Cumulative Trends

The figure shows the cumulative trends of the project. We can observe that the EV PV and AC has been increasing and there is significant gap between Earned value and actual value. There has been significant change in the project duration. Initially we can see that the project is ahead of the schedule and by Quarter 4 we note that project is behind the schedule. The actual cost has been



4.2 Variance Comparison in Schedule and Cost:

The figure shows the comparison of Schedule variance and Cost variance for all the quarters. We can see that the Schedule variance has been reducing since Quarter 3 and Cost variance is reducing since Quarter 1. The schedule variance shows us that the project has been ahead of schedule till Quarter 3 and then behind the schedule from Quarter 4. The Cost variance shows us that the project has been under budget in Quarter 1 and over budget from Quarter 2.



5 Project Closure

5.1 Train Customer

A formal training will be provided to the customers on how to operate the system. A representative on behalf of the customers will be provided a demo of the new system by our team.

5.2 Transfer of Documents

A set of all the required documents will be provided to the customers. This will have everything they will need to know to run the new system. It will contain documents like the user manual, FAQs, run book, etc.

5.3 Release Resources

All resources except the maintenance will be moved to the central resource pool. This will make them available to be assigned to other projects that need them.

5.4 Closing Accounts

All the outstanding bills must be paid and accounts are closed.

5.5 Evaluation

Evaluation is a very important factor that motivates employees to give their best and keep improving. An appraisal is conducted by the Project Manager in which he evaluates the individual performance of every member in the team. There is also a team peer evaluation in which the team members evaluate each other. At the end of this, outstanding performers are recognized and are awarded based on their performance.

5.6 Wrap-up Checklist

Having a check-list is one of the best practices that can be followed during project closure. The following checklist was used by us:

	Task	Completed? Yes/No
	Team:	
1	Has a schedule for reducing project staff been developed and accepted?	
2	Has staff been released or notified of new assignments?	
3	Have performance reviews for team members been conducted?	
4	Has staff been offered outplacement services and career counseling activities?	
	Vendors/contractors:	
5	Have performance reviews for all vendors been conducted?	
6	Have project accounts been finalized and all billing closed?	
	Customer/Users:	
7	Has the customer signed-off on the delivered product?	
8	Has an in-depth project review and evaluation interview with the customer been conducted?	
9	Have the users been interviewed to assess their satisfaction with the deliverables? With the project team? With vendors? With training? With support? With maintenance?	
	Equipment and facilities:	
10	Have project resources been transferred to other projects?	
11	Have rental or lease equipment agreements been closed out?	
12	Has the date for the closure review been set and stakeholders notified?	
	Attach comments or links on any tasks you feel need explanation.	

5.7 Project Closeout Plan:

The following is our closeout plan:

	Item	Status	Comment/Plan to Resolve
1	Have all the product or service deliverables been accepted by the customer?		
1.1	Are there contingencies or conditions related to the acceptance? If so, describe in the Comments.		
2	Has the project been evaluated against each performance goal established in the project performance plan?		
3	Has the actual cost of the project been tallied? and compared to the approved cost baseline?		
3.1	Have all approved changes to the cost baseline been identified and their impact on the project documented?		
4	Have the actual milestone completion dates been compared to the approved schedule?		
4.1	Have all approved changes to the schedule baseline been identified and their impact on the project documented?		
5	Have all approved changes to the project scope been identified and their impact on the performance, cost, and schedule baselines documented?		
6	Has operations management formally accepted responsibility for operating and maintaining the product(s) or service(s) delivered by the project?		
6.1	Has the documentation relating to operation and maintenance of the product(s) or service(s) been delivered to, and accepted by, operations management?		
6.2	Has training and knowledge transfer of the operations organization been completed?		
6.3	Does the projected annual cost to operate and maintain the product(s) or		

	service(s) differ from the estimate provided in the project proposal? If so, note and explain the difference in the Comments column.		
7	Have the resources used by the project been transferred to other units within the organization?		
8	Has the project documentation been archived or otherwise disposed of as described in the project plan?		
9	Have the lessons learned been documented in accordance with the Commonwealth Project Management guideline?		
10	Has the date for the post-implementation review been set?		
10.1	Has the person or unit responsible for conducting the post-implementation review been identified?		

5.8 Lessons Learned:

This is also a very important part of the project closure. The following were the lessons learnt from this project:

1. See to that resources are not multi-tasking. A dedicated team for each task will not only save time but will also bring more productivity.
2. When working as teams, it is essential to come up with a communication plan that is effective.
3. Keep motivating the team to bring out the best in them. Events like team building activities.
4. Regular meetings must be held to keep track of all the activities.
5. Project manager should always monitor the progress of the tasks.
6. Professional ethics must be maintained throughout the project.

5.9 Keys to Success:

1. Try to build a good team.
2. Communicate effectively among team.
3. Analyze problems and solve them.
4. Be ready to multitask and juggle among your project tasks.
5. Make responsibilities and deadlines crystal clear.
6. Always find ways to motivate your team from time to time.
 - a. Develop and maintain good relations with stakeholders and Senior Management.

Management Issues

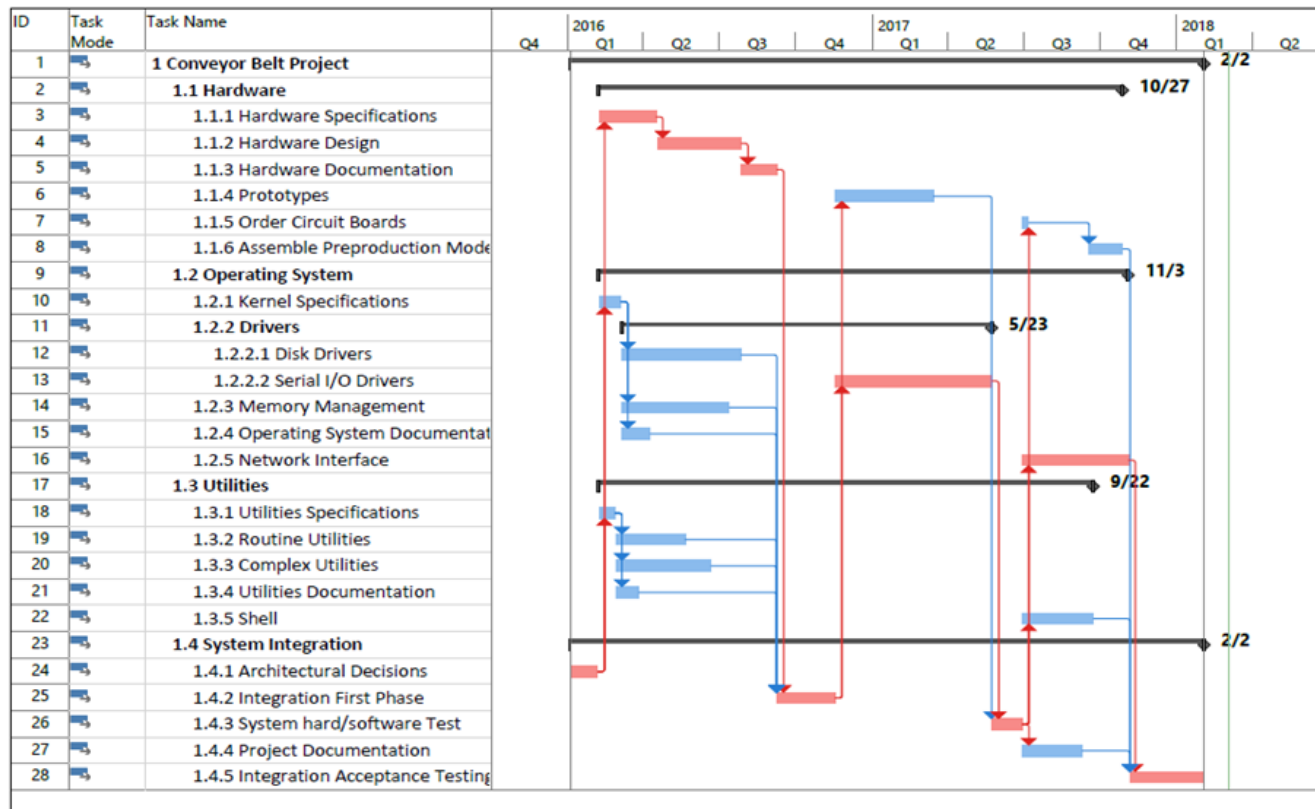
- Poor communication may affect the project.
- Lack of Stakeholder Engagement can destroy a project.
- Lack of necessary recourses can delay project and cause problems
- Unrealistic deadlines may cause the project to fail.
- Lack of proper Risk Management can cause problems.

6 References:

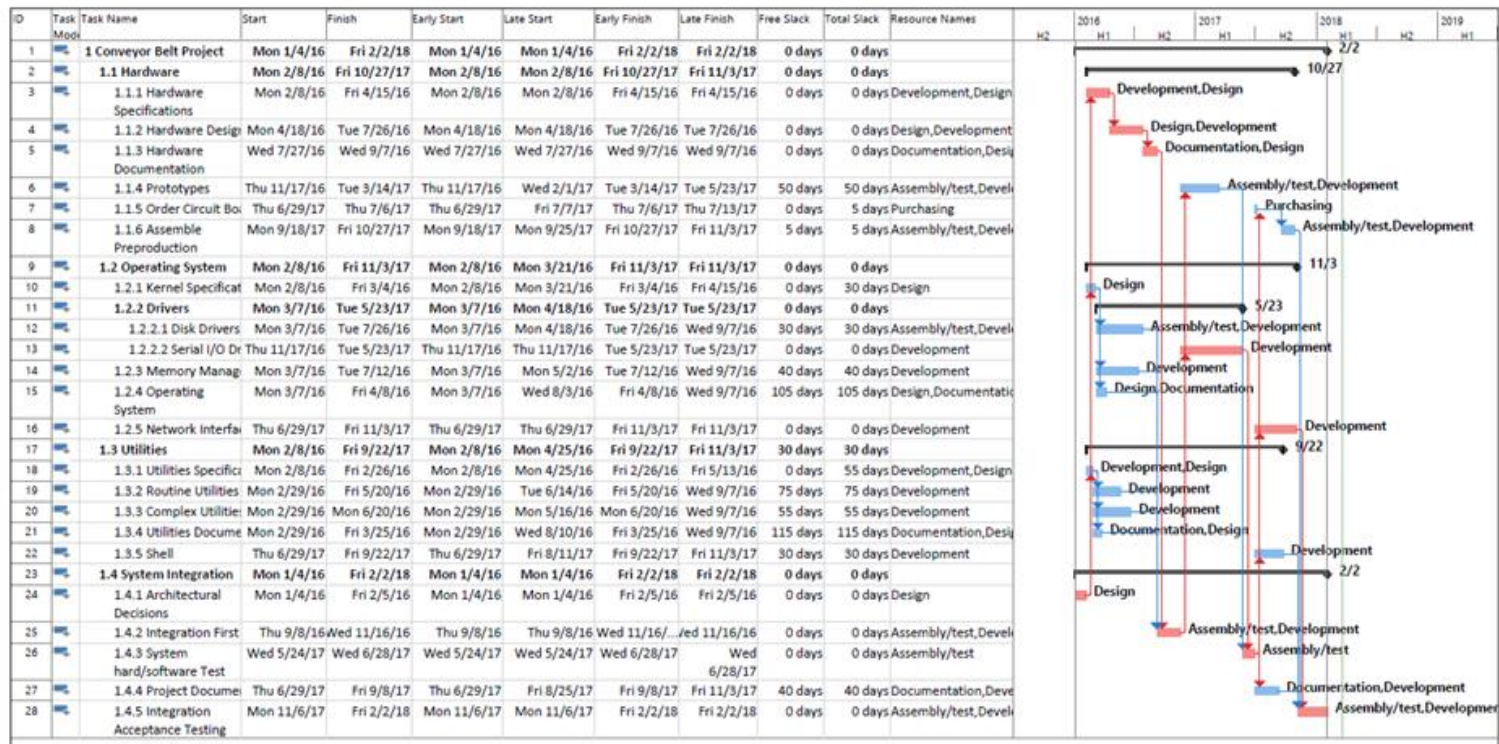
1. <https://pm4id.org/chapter/11-1-defining-risk/>
2. <https://www.villanovau.com/resources/project-management/top-10-challenges/#.WvE8VIgvxPY>
3. <https://www.proofhub.com/articles/project-management-challenges>

7 Appendices-

Appendix1- Gantt Tracking chart

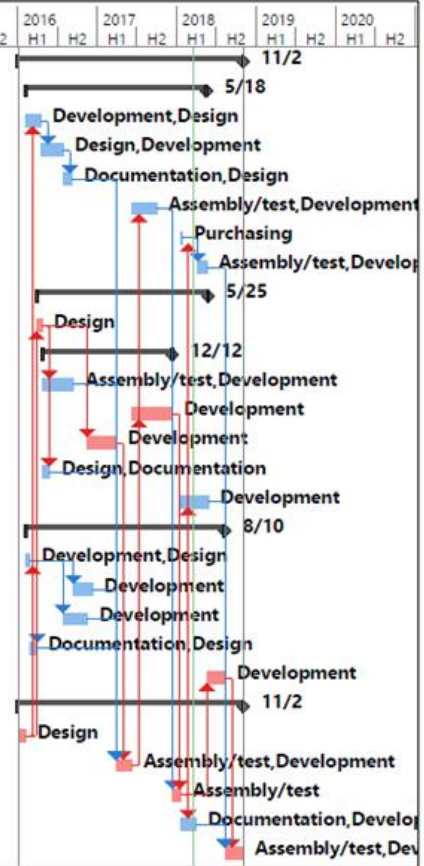


Appendix 2 – Level within slack

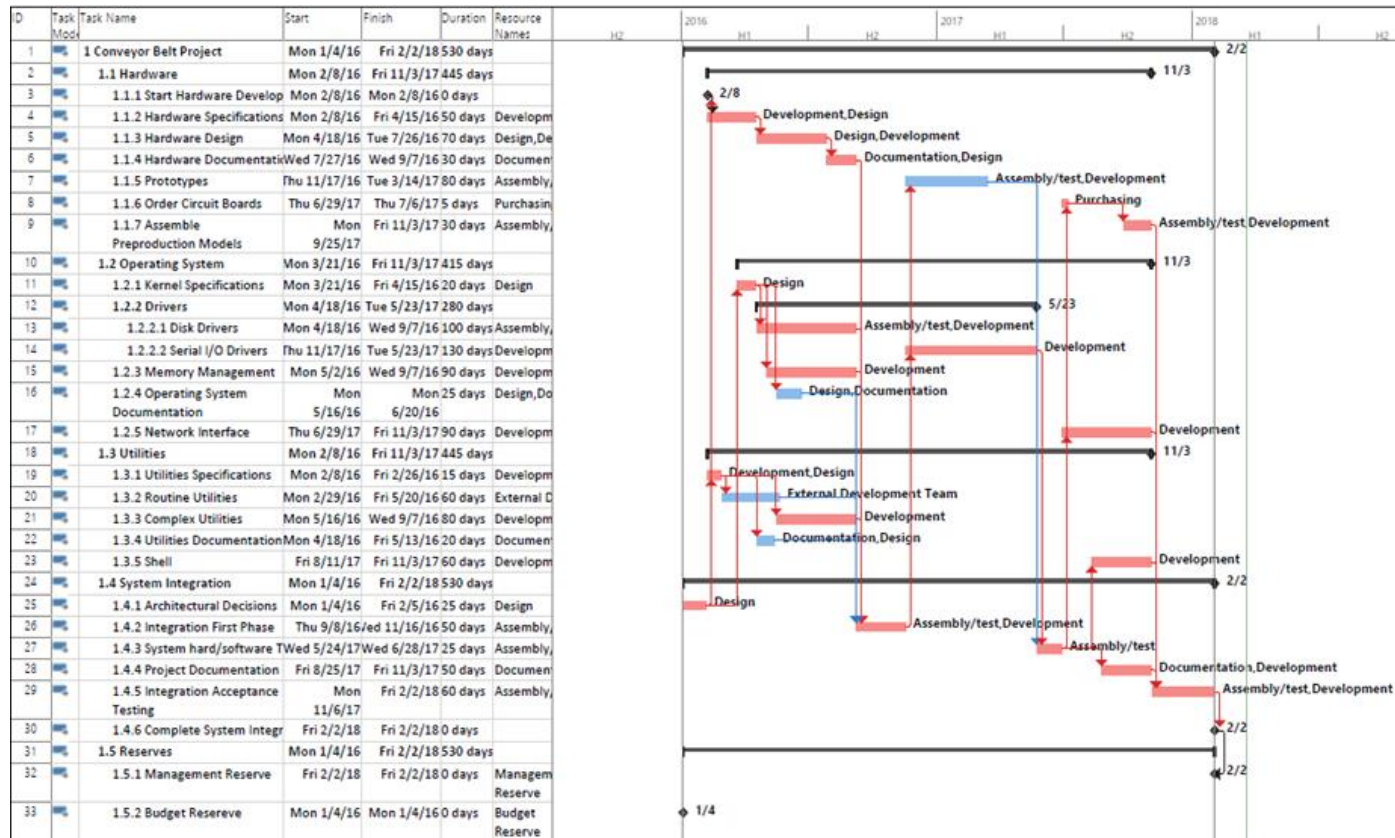


Appendix –3 – Level outside slack

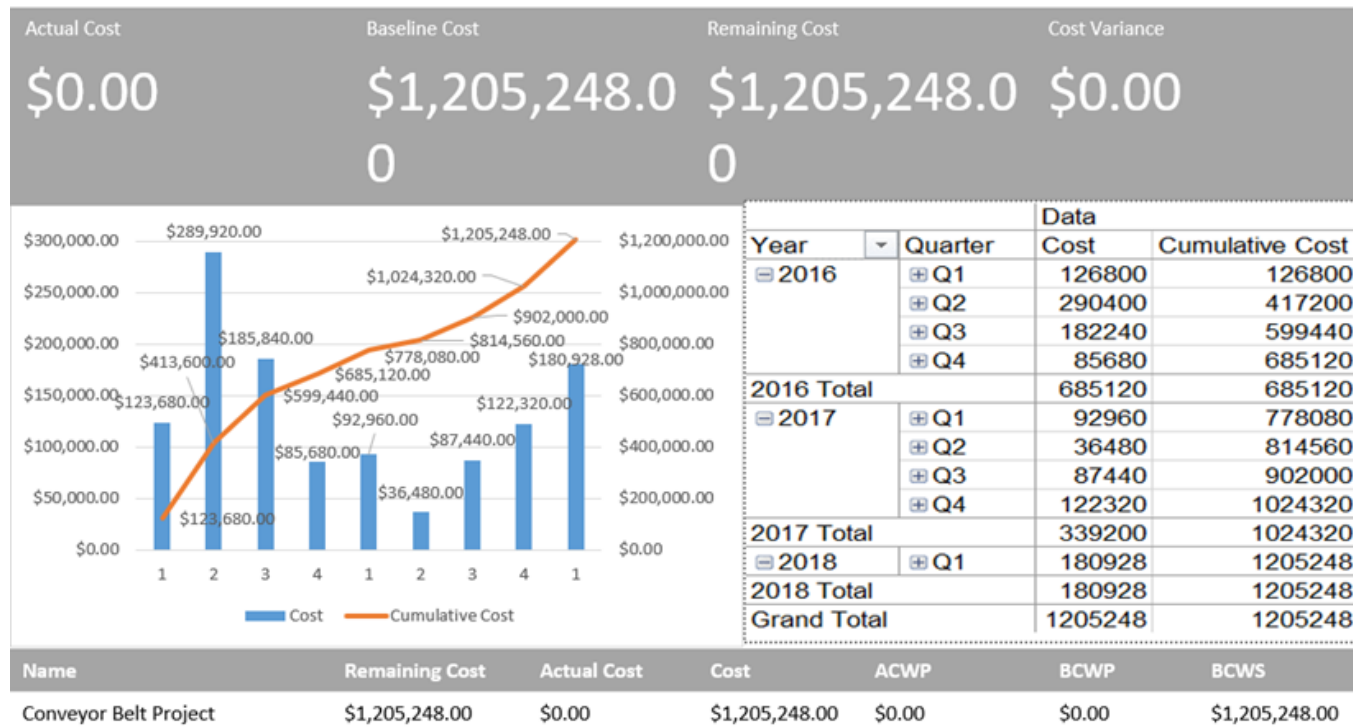
ID	Task Mode	Task Name	Start	Finish	Resource Names	Duration	Predecessors	2016 H2	2016 H1	2016 H2	2017 H1	2017 H2	2018 H1	2018 H2	2019 H1	2019 H2	2020 H1	2020 H2
1		1 Conveyor Belt Project	Mon 1/4/16	Fri 11/2/18		725 days												
2		1.1 Hardware	Mon 2/8/16	Fri 5/18/18		580 days												
3		1.1.1 Hardware Specifica	Mon 2/8/16	Fri 4/15/16	Development,D	50 days	24											
4		1.1.2 Hardware Design	Mon 4/18/16	Tue 7/26/16	Design,Develop	70 days	3											
5		1.1.3 Hardware Documer	Wed 7/27/16	Wed 9/7/16	Documentation	30 days	4											
6		1.1.4 Prototypes	Thu 6/8/17	Fri 9/29/17	Assembly/test,	180 days	25											
7		1.1.5 Order Circuit Board	Mon 1/22/18	Fri 1/26/18	Purchasing	5 days	26											
8		1.1.6 Assemble Preprodu	Mon 4/9/18	Fri 5/18/18	Assembly/test,	130 days	7FS+50 days											
9		1.2 Operating System	Mon 3/28/16	Fri 5/25/18		550 days												
10		1.2.1 Kernel Specification	Mon 3/28/16	Fri 4/22/16	Design	20 days	24											
11		1.2.2 Drivers	Mon 4/25/16	ie 12/12/17		415 days												
12		1.2.2.1 Disk Drivers	Mon 4/25/16	Ved 9/14/16	Assembly/test,	1100 days	10											
13		1.2.2.2 Serial I/O Drive	Thu 6/8/17	ue 12/12/17	Development	130 days	25											
14		1.2.3 Memory Managem	Thu 11/17/16	Tue 3/28/17	Development	90 days	10											
15		1.2.4 Operating System C	Mon 4/25/16	Fri 5/27/16	Design,Docume	25 days	10											
16		1.2.5 Network Interface	Mon 1/22/18	Fri 5/25/18	Development	90 days	26											
17		1.3 Utilities	Mon 2/8/16	Fri 8/10/18		640 days												
18		1.3.1 Utilities Specificatio	Mon 2/8/16	Fri 2/26/16	Development,D	15 days	24											
19		1.3.2 Routine Utilities	Thu 9/15/16	Fri 12/9/16	Development	60 days	18											
20		1.3.3 Complex Utilities	Wed 7/27/16	ed 11/16/16	Development	80 days	18											
21		1.3.4 Utilities Documenta	Mon 2/29/16	Fri 3/25/16	Documentation	20 days	18											
22		1.3.5 Shell	Mon 5/21/18	Fri 8/10/18	Development	60 days	26											
23		1.4 System Integration	Mon 1/4/16	Fri 11/2/18		725 days												
24		1.4.1 Architectural Decisi	Mon 1/4/16	Fri 2/5/16	Design	25 days												
25		1.4.2 Integration First Ph	Wed 3/29/17	Wed 6/7/17	Assembly/test,	150 days	12,14,15,19											
26		1.4.3 System hard/software	Wed 12/13/17	Fri 1/19/18	Assembly/test	25 days	6,13											
27		1.4.4 Project Documenta	Mon 1/22/18	Fri 3/30/18	Documentation	50 days	26											
28		1.4.5 Integration Accepta	Mon 8/13/18	Fri 11/2/18	Assembly/test,	160 days	8,16,22,27											



Appendix-4 – Adding of routine utilities



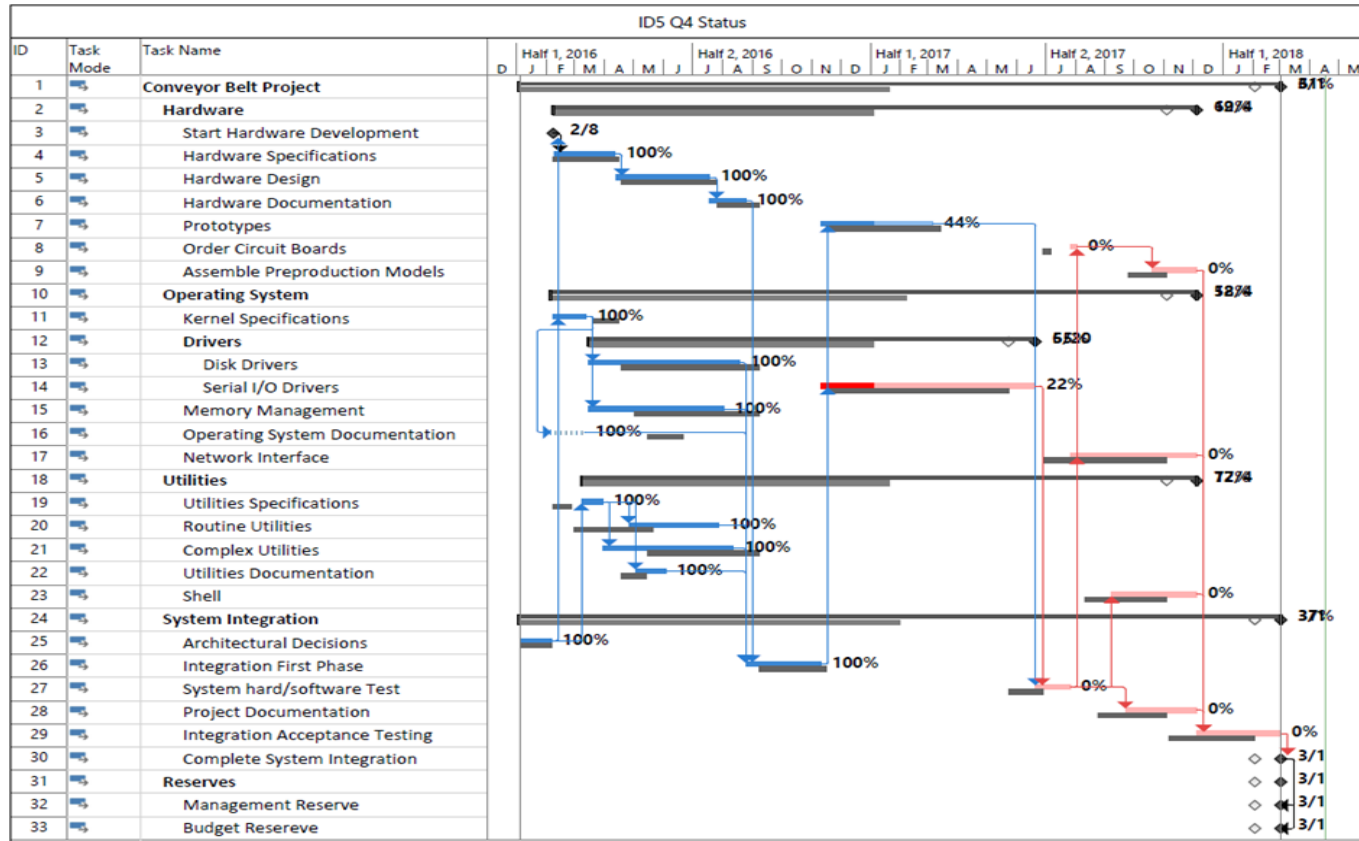
Appendix –5 Cash Flow



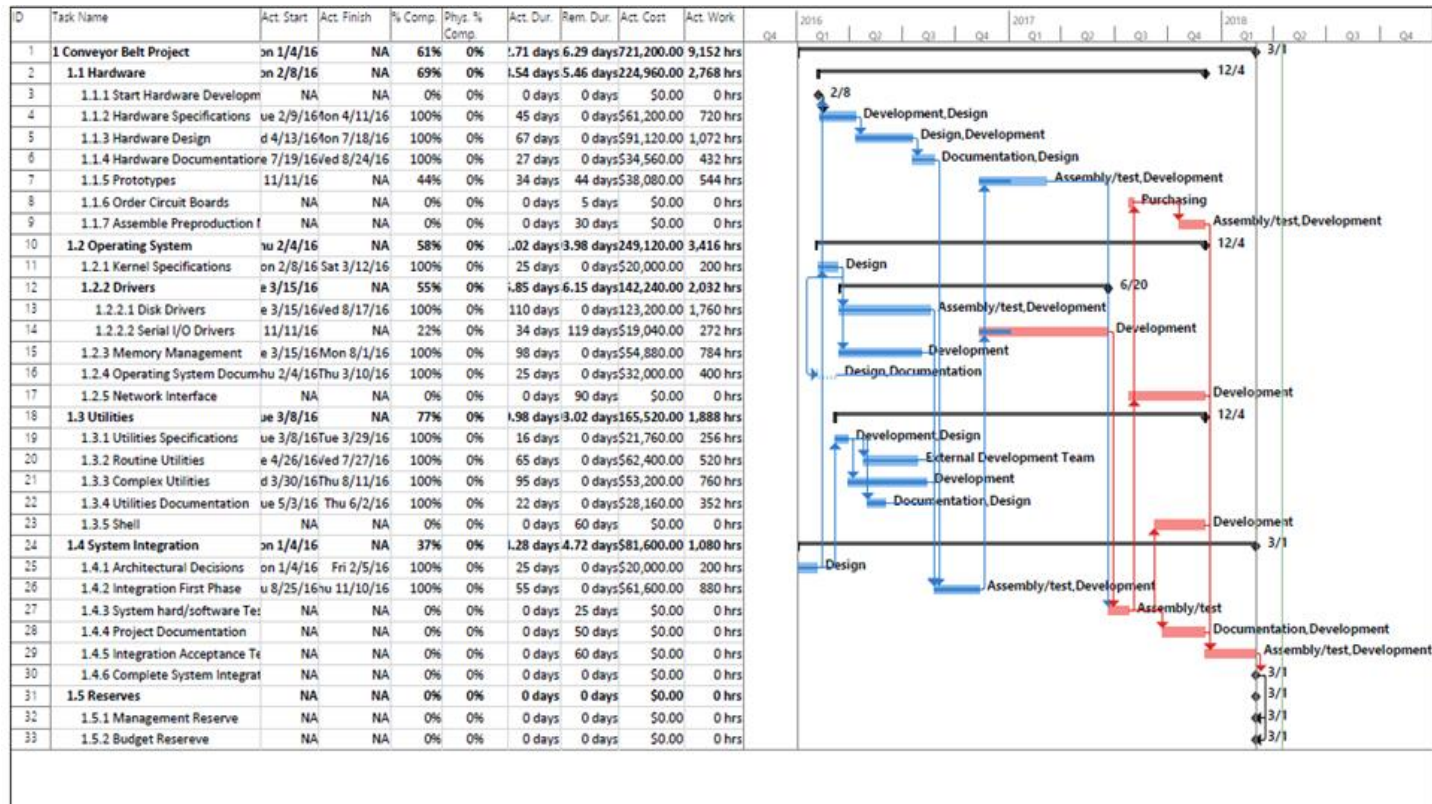
Appendix- 6 Costs Involved

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
1	1 Conveyor Belt Project	\$0.00	Prorated	\$1,205,248.00	\$1,205,248.00	\$0.00	\$0.00	\$1,205,248.00
2	1.1 Hardware	\$0.00	Prorated	\$326,400.00	\$326,400.00	\$0.00	\$0.00	\$326,400.00
3	1.1.1 Start Hardware Development	\$0.00	Prorated	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
4	1.1.2 Hardware Specifications	\$0.00	Prorated	\$68,000.00	\$68,000.00	\$0.00	\$0.00	\$68,000.00
5	1.1.3 Hardware Design	\$0.00	Prorated	\$95,200.00	\$95,200.00	\$0.00	\$0.00	\$95,200.00
6	1.1.4 Hardware Documentation	\$0.00	Prorated	\$38,400.00	\$38,400.00	\$0.00	\$0.00	\$38,400.00
7		\$0.00	Prorated	\$89,600.00	\$89,600.00	\$0.00	\$0.00	\$89,600.00
8	1.1.6 Order Circuit Boards	\$0.00	Prorated	\$1,600.00	\$1,600.00	\$0.00	\$0.00	\$1,600.00
9	1.1.7 Assemble Preproduction Models	\$0.00	Prorated	\$33,600.00	\$33,600.00	\$0.00	\$0.00	\$33,600.00
10	1.2 Operating System	\$0.00	Prorated	\$333,600.00	\$333,600.00	\$0.00	\$0.00	\$333,600.00
11	1.2.1 Kernel Specifications	\$0.00	Prorated	\$16,000.00	\$16,000.00	\$0.00	\$0.00	\$16,000.00
12	1.2.2 Drivers	\$0.00	Prorated	\$184,800.00	\$184,800.00	\$0.00	\$0.00	\$184,800.00
13	1.2.2.1 Disk Drivers	\$0.00	Prorated	\$112,000.00	\$112,000.00	\$0.00	\$0.00	\$112,000.00
14	1.2.2.2 Serial I/O Drivers	\$0.00	Prorated	\$72,800.00	\$72,800.00	\$0.00	\$0.00	\$72,800.00
15	1.2.3 Memory Management	\$0.00	Prorated	\$50,400.00	\$50,400.00	\$0.00	\$0.00	\$50,400.00
16	1.2.4 Operating System Documentatio	\$0.00	Prorated	\$32,000.00	\$32,000.00	\$0.00	\$0.00	\$32,000.00
17	1.2.5 Network Interface	\$0.00	Prorated	\$50,400.00	\$50,400.00	\$0.00	\$0.00	\$50,400.00
18	1.3 Utilities	\$0.00	Prorated	\$182,000.00	\$182,000.00	\$0.00	\$0.00	\$182,000.00
19	1.3.1 Utilities Specifications	\$0.00	Prorated	\$20,400.00	\$20,400.00	\$0.00	\$0.00	\$20,400.00
20	1.3.2 Routine Utilities	\$0.00	Prorated	\$57,600.00	\$57,600.00	\$0.00	\$0.00	\$57,600.00
21	1.3.3 Complex Utilities	\$0.00	Prorated	\$44,800.00	\$44,800.00	\$0.00	\$0.00	\$44,800.00
22	1.3.4 Utilities Documentation	\$0.00	Prorated	\$25,600.00	\$25,600.00	\$0.00	\$0.00	\$25,600.00
23	1.3.5 Shell	\$0.00	Prorated	\$33,600.00	\$33,600.00	\$0.00	\$0.00	\$33,600.00
24	1.4 System Integration	\$0.00	Prorated	\$209,200.00	\$209,200.00	\$0.00	\$0.00	\$209,200.00
25	1.4.1 Architectural Decisions	\$0.00	Prorated	\$20,000.00	\$20,000.00	\$0.00	\$0.00	\$20,000.00
26	1.4.2 Integration First Phase	\$0.00	Prorated	\$56,000.00	\$56,000.00	\$0.00	\$0.00	\$56,000.00
27	1.4.3 System hard/software Test	\$0.00	Prorated	\$14,000.00	\$14,000.00	\$0.00	\$0.00	\$14,000.00
28	1.4.4 Project Documentation	\$0.00	Prorated	\$52,000.00	\$52,000.00	\$0.00	\$0.00	\$52,000.00
29	1.4.5 Integration Acceptance Testing	\$0.00	Prorated	\$67,200.00	\$67,200.00	\$0.00	\$0.00	\$67,200.00
30	1.4.6 Complete System Integration	\$0.00	Prorated	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
31	1.5 Reserves	\$0.00	Prorated	\$154,048.00	\$154,048.00	\$0.00	\$0.00	\$154,048.00
32	1.5.1 Management Reserve	\$0.00	Prorated	\$109,568.00	\$109,568.00	\$0.00	\$0.00	\$109,568.00
33	1.5.2 Budget Reserve	\$0.00	Prorated	\$44,480.00	\$44,480.00	\$0.00	\$0.00	\$44,480.00

Appendix-7 Updated Gantt Tracking chart

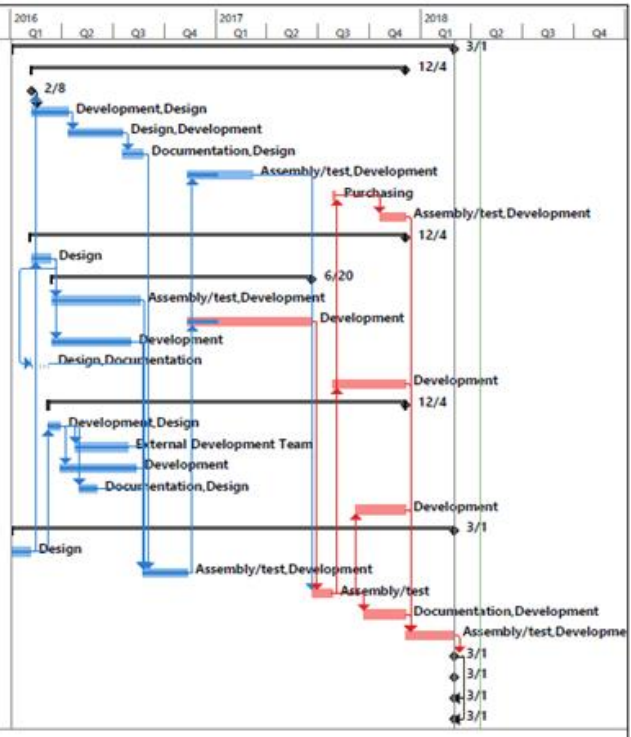


Appendix- 8 Gantt Tracking table

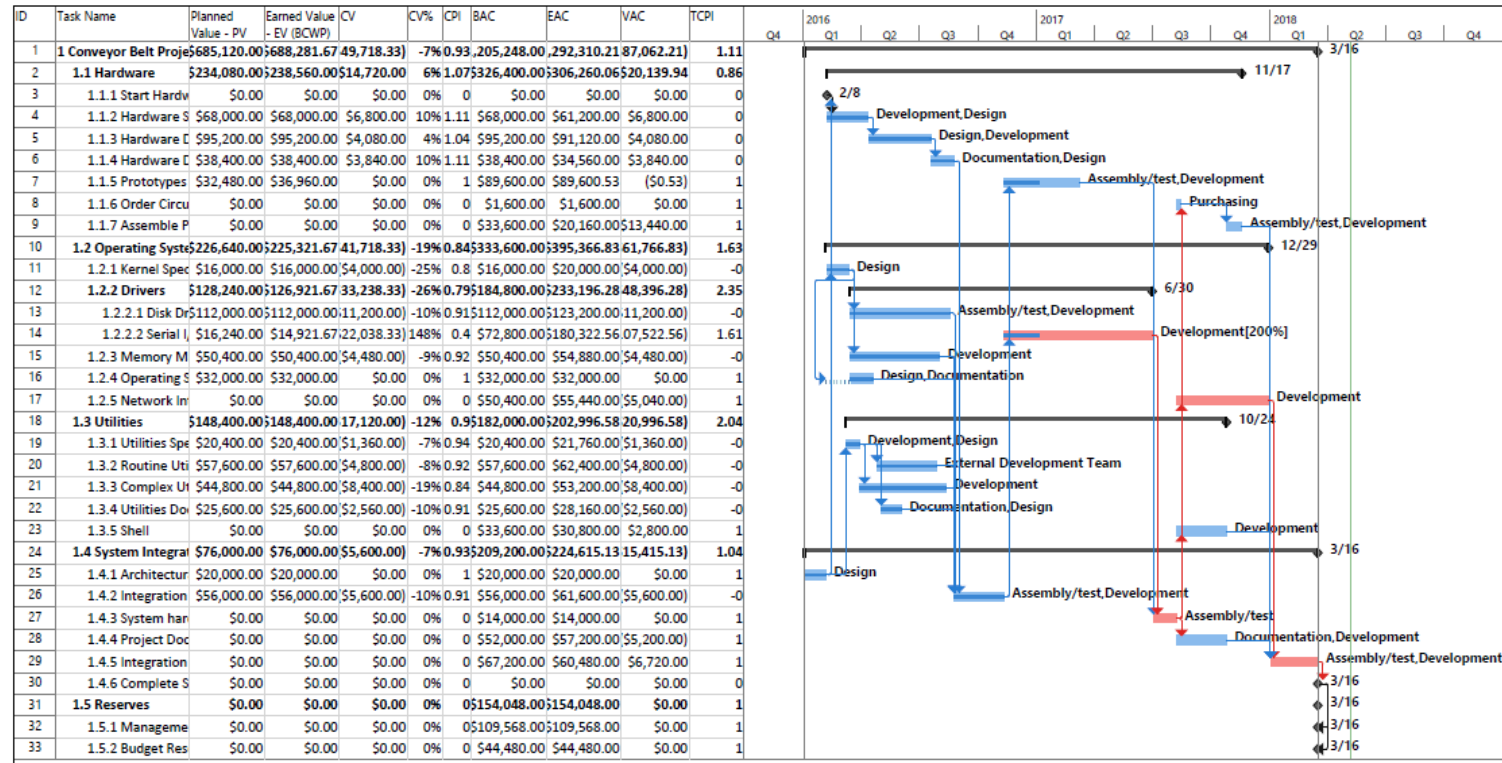


Appendix 9 – Earned Value table

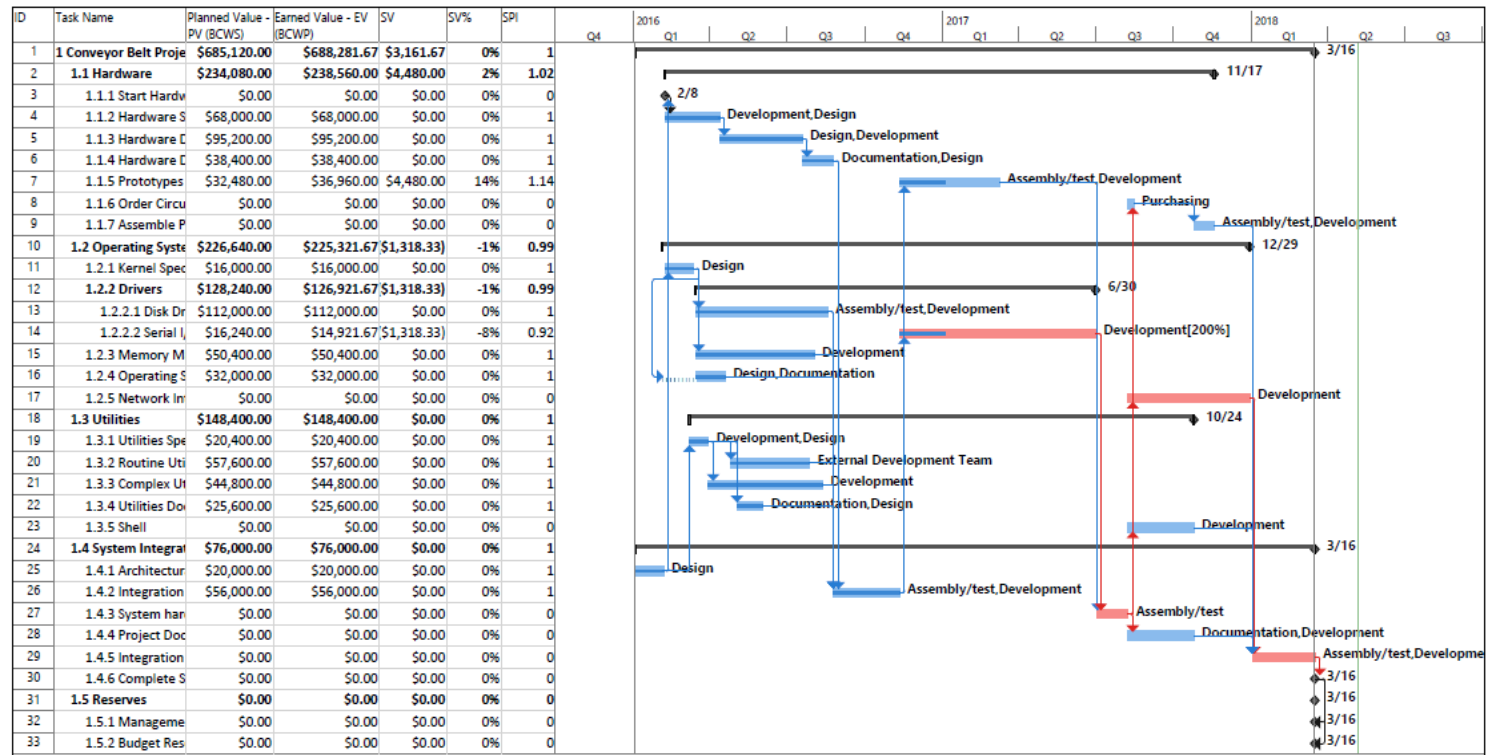
ID	Task Name	Planned Value - PV	Earned Value - EV (BCWP)	AC (ACWP)	SV	CV	EAC	BAC	VAC	CR	SPI	Gantt Chart															
												2016				2017				2018							
												Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
1	1 Conveyor Belt Project	\$685,120.00	\$690,009.50	\$719,520.00	\$4,889.50	\$29,510.50	\$256,797.63	\$1,205,248.00	\$51,549.63	1.96	0.01																
2	1.1 Hardware	\$234,080.00	\$239,507.57	\$223,840.00	\$5,427.57	\$15,667.57	\$305,048.64	\$326,400.00	\$21,351.36	0.72	0.02																
3	1.1.1 Start Hardware	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	0.00	0.00																
4	1.1.2 Hardware S	\$68,000.00	\$68,000.00	\$61,200.00	\$0.00	\$6,800.00	\$61,200.00	\$68,000.00	\$6,800.00	1.11	1.00																
5	1.1.3 Hardware C	\$95,200.00	\$95,200.00	\$91,120.00	\$0.00	\$4,080.00	\$91,120.00	\$95,200.00	\$4,080.00	1.04	1.00																
6	1.1.4 Hardware C	\$38,400.00	\$38,400.00	\$34,560.00	\$0.00	\$3,840.00	\$34,560.00	\$38,400.00	\$3,840.00	1.11	1.00																
7	1.1.5 Prototypes	\$32,480.00	\$37,907.57	\$36,960.00	\$5,427.57	\$947.57	\$87,360.66	\$89,600.00	\$2,239.34	0.33	0.17																
8	1.1.6 Order Circu	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,600.00	\$1,600.00	\$0.00	0.00	0.00																
9	1.1.7 Assemble P	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33,600.00	\$33,600.00	\$0.00	0.00	0.00																
10	1.2 Operating Syst	\$226,640.00	\$226,101.93	\$248,560.00	(\$538.07)	\$22,458.07	\$366,736.49	\$333,600.00	\$33,136.49	0.91	1.00																
11	1.2.1 Kernel Spec	\$16,000.00	\$16,000.00	\$20,000.00	\$0.00	(\$4,000.00)	\$20,000.00	\$16,000.00	(\$4,000.00)	0.80	0.80																
12	1.2.2 Drivers	\$128,240.00	\$127,701.93	\$141,680.00	(\$538.07)	\$13,978.07	\$205,027.98	\$184,800.00	\$20,227.98	0.90	0.91																
13	1.2.2.1 Disk Dr	\$112,000.00	\$112,000.00	\$123,200.00	\$0.00	\$11,200.00	\$123,200.00	\$112,000.00	\$11,200.00	0.91	1.00																
14	1.2.2.2 Serial I	\$16,240.00	\$15,701.93	\$18,480.00	(\$538.07)	(\$2,778.07)	\$85,680.29	\$72,800.00	\$12,880.29	0.85	0.97																
15	1.2.3 Memory M	\$50,400.00	\$50,400.00	\$54,880.00	\$0.00	(\$4,480.00)	\$54,880.00	\$50,400.00	(\$4,480.00)	0.92	1.00																
16	1.2.4 Operating S	\$32,000.00	\$32,000.00	\$32,000.00	\$0.00	\$0.00	\$32,000.00	\$32,000.00	\$0.00	1.00	1.00																
17	1.2.5 Network In	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$50,400.00	\$50,400.00	\$0.00	0.00	0.00																
18	1.3 Utilities	\$148,400.00	\$148,400.00	\$165,520.00	\$0.00	\$17,120.00	\$202,996.58	\$182,000.00	\$20,996.58	0.90	1.00																
19	1.3.1 Utilities Spe	\$20,400.00	\$20,400.00	\$21,760.00	\$0.00	(\$1,360.00)	\$21,760.00	\$20,400.00	(\$1,360.00)	0.94	1.00																
20	1.3.2 Routine Uti	\$57,600.00	\$57,600.00	\$62,400.00	\$0.00	(\$4,800.00)	\$62,400.00	\$57,600.00	(\$4,800.00)	0.92	1.00																
21	1.3.3 Complex Ut	\$44,800.00	\$44,800.00	\$53,200.00	\$0.00	(\$8,400.00)	\$53,200.00	\$44,800.00	(\$8,400.00)	0.84	1.00																
22	1.3.4 Utilities Do	\$25,600.00	\$25,600.00	\$28,160.00	\$0.00	(\$2,560.00)	\$28,160.00	\$25,600.00	(\$2,560.00)	0.91	1.00																
23	1.3.5 Shell	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33,600.00	\$33,600.00	\$0.00	0.00	0.00																
24	1.4 System Integr	\$76,000.00	\$76,000.00	\$81,600.00	\$0.00	(\$5,600.00)	\$224,615.13	\$209,200.00	\$15,415.13	0.93	1.00																
25	1.4.1 Architectur	\$20,000.00	\$20,000.00	\$20,000.00	\$0.00	\$0.00	\$20,000.00	\$20,000.00	\$0.00	1.00	1.00																
26	1.4.2 Integration	\$56,000.00	\$56,000.00	\$61,600.00	\$0.00	(\$5,600.00)	\$61,600.00	\$56,000.00	(\$5,600.00)	0.91	1.00																
27	1.4.3 System har	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$14,000.00	\$14,000.00	\$0.00	0.00	0.00																
28	1.4.4 Project Doc	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$52,000.00	\$52,000.00	\$0.00	0.00	0.00																
29	1.4.5 Integration	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$67,200.00	\$67,200.00	\$0.00	0.00	0.00																
30	1.4.6 Complete S	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	0.00	0.00																
31	1.5 Reserves	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$154,048.00	\$154,048.00	\$0.00	0.00	0.00																
32	1.5.1 Manageme	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$109,568.00	\$109,568.00	\$0.00	0.00	0.00																
33	1.5.2 Budget Res	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44,480.00	\$44,480.00	\$0.00	0.00	0.00																



Appendix-10 Earned Value Cost Indicators



Appendix –11 Earned Value Schedule Indicators



Appendix -12 Quarterly Cash Flow breakdown

A	B	C	D
Tasks	All		
		Data	
Year	Quarter	Cost	Cumulative Cost
2016	Q1	157920	157920
	Q2	317360	475280
	Q3	156320	631600
	Q4	87920	719520
2016 Total		719520	719520
2017	Q1	123760	843280
	Q2	99320	942600
	Q3	83240	1025840
	Q4	211728	1237568
2017 Total		518048	1237568
2018	Q1	0	214528
2018 Total		0	214528
Grand Total		1237568	1237568