Concordia Institute for Information System Engineering
(CIISE)

Concordia University

INSE 6230 Total Quality Project Management

Final Project Report

Project Title

Construction of an Airport on an Island

Submitted to:

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1. Introduction

We the residents of ***Madagascar - I***, a private island in the Caribbean have seen a massive boom in tourism since the coverage of our island was published in ***Lonely Island*** Magazine. The feedback from our tourists is that we need to improve transportation facilities as the only way to reach the island is via seaplane or a 2-hour ferry journey.

This island is owned and maintained by a prestigious private builder, ***DDLJ-NR Group***. The board of directors have planned to hire our team as the project managers for a project to boost the tourism and economy of this private island. We have shortlisted the most viable and feasible top 4 solutions out of which we selected the construction of an Airport as our final project.

This single terminal, one airstrip airport is expected to have approximately 1000 passengers per day arriving and departing at the beginning which would increase to about 20,000 passengers per day by the end of 2022.

2. Initiation Phase

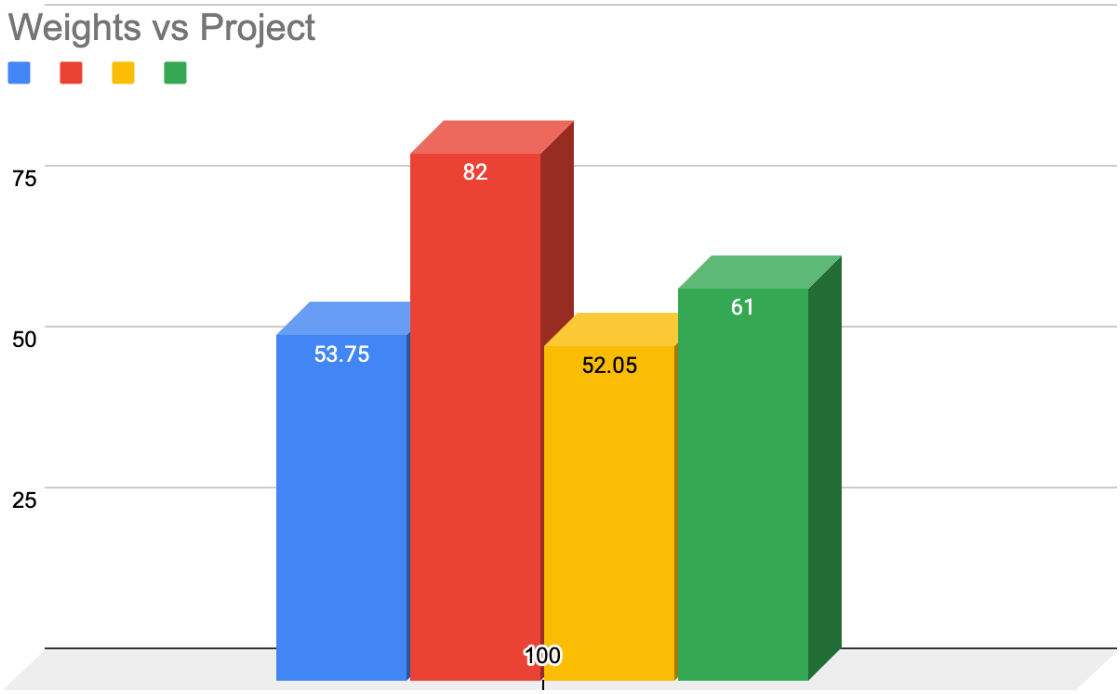
2.1 Weighted Decision Matrix for the Project

We have shortlisted 4 projects for the problem statement as presented to us by the board of directors. The top 4 project options that we considered are as follows:

1. Construction of a Port
2. Building an Airport
3. Developing an Artificial Biological Reserve
4. Setting up a Manufacturing Facility

Out of the above-given options, the first two options would help us improve the transportation system of the island while the other two would increase job opportunities for the residents of the island. All 4 options solve our primary motive of boosting the economy and promoting the popularity of the island. We have used a weighted decision matrix and selected construction of an airport to be the most viable project from the list.

Criteria	Weight	Project 1	Project 2	Project 3	Project 4
Boosting the economy	25	70	90	60	90
Tourism	10	30	80	90	50
Ease of accessibility to the Island	15	80	90	10	10
Provides positive NPV	15	60	75	40	80
Sposnser's Support	15	35	85	65	80
Sustainability towards environment	10	25	65	90	25
Has low risk in meeting scope, time and cost	10	45	75	15	55
Weighted project scores(%)	100	53.75	82	52.05	61



2.2 SWOT Analysis

We considered performing a SWOT analysis as an assessment tool to help identify major strengths, weaknesses and susceptibility to the risks. It will also help us determine the new opportunities that this project will bring to the island. SWOT analysis will provide us with a realistic view of the major dimensions of the project.

Strength

We identified the strength of the project as defined in the points below:

- This is a one-time investment with a comparatively low maintenance cost that will invariably provide us with long term benefits.
- It will provide convenience to the passengers to commute to the island.
- It will reduce the transit time from and to the island and help provide better connectivity to the world.
- It can be used in case of emergencies and also be used in the creation of contingency plans in case of natural disasters.

Weakness

We Identified the weakness of the project as defined in the points below:

- In the construction phase, there will be a lot of disturbance and pollutants which may affect the environment for a certain period.
- Deforestation at and around the area chosen for the construction of the airport.
- Relocation of some of the wildlife in proximity to the airport construction zone.
- Maintenance of the airport is a cumbersome task that requires a lot of resources.

Opportunity

The airport construction project will provide us with different new opportunities that are listed below:

- More visitors will pour in due to convenience in transit to the island.
- More economically beneficial
- More investment options for non-residents will inevitably be beneficial for the island's growth.
- It will boost national and international trade as the island will have a rise in the number of visitors.
- It will provide new business options to the island dweller.
- Burgeoning in import and export activities.

Threat

- There is a major possibility of weather going bad and which may halt the operations.
- There is a slight chance that the island is receiving fewer visitors than expected.

2.3 Financial Analysis

Financial analysis was performed to check the feasibility of the project. Several calculations were done to find the Net Present Value (NPV) of the project as well as the Return on Investment(ROI) and Payback Analysis was also calculated to find out the profitability of the project.

Here are the major calculations for the financial analysis of the project. With expert's help and assumptions Discount factor was taken as 8% for this project.

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Benefits	0	50	60	65	65	70	70
Costs	+150	20	20	20	25	25	20
Cash Flow	-150	30	40	45	40	45	50

Based on the data given above the calculated NPV of the project is

NPV = Total Discounted Cash Flow = 39.33

Here the NPV is positive which suggests that the project can be taken into consideration and it will be profitable at the end.

For business perspective to measure the profits based on the large scale investment been done, ROI was calculated which was,

ROI = (Total Discounted Benefits - Total Discounted Costs)/Total Discounted Costs

= 15.7%

As the goal of the project is not just to gain profit but to help boost the economy in the long haul and also to provide a very important mode of transportation which will benefit the residents in many other ways, this was considered a good return on investment.

Based on the above given data it was calculated that 4 years is the payback period for this project.

2.4 Scope Statement

Scope Statement (Version 1)

Project Title: Construction of an Airport **Date:** 15th February 2019
Project Justification: After applying some project selection methods and calculating NPV and ROI. We found out that at this instance construction of an airport on the island will provide us with a promising future. So we further plan to build an airport on this exclusive island within a timeframe of 2 years to boost the economic growth and increase the accessibility to the island.
Product Characteristics and Requirements: ● To construct an airport with a capacity to handle upto 30,000 passengers per day ● The airport would have state of the art architecture design and safety procedures ● The airport would have one 8000 feet long runway ● The airport would be equipped with automatic landing system ● Smart check-in for improved security and high reliability

Summary of Project Deliverables

Project management-related deliverables: Business case, charter, team contract, scope statement, WBS, schedule, cost baseline, status reports, final project presentation, final project report, lessons-learned report, and any other documents required to manage the project.

Product-related deliverables: research reports, design documents, software code, hardware, etc.

- Airport
- Airstrip
- Hangers
- Taxiways

Project Success Criteria:

- Successful take off and landing of the aircrafts on the air strips.
- Acceptance by the stakeholders.
- Conformance to time,cost.
- Meeting all the objectives in scope.

Scope Statement (Version 2)

Project Title: Construction of an Airport

Date: 10th October 2019

Project Justification:

After applying some project selection methods and calculating NPV and ROI. We found out that at this instance construction of an airport on the island will provide us with a promising future. So we further plan to build an airport on this exclusive island within a timeframe of 2 years to boost the economic growth and increase the accessibility to the island.

Product Characteristics and Requirements:

- To construct an airport with a capacity to handle upto 30,000 passengers per day
- The airport would have state of the art architecture design and safety procedures
- The airport would have one 8000 feet long runway
- The airport would be equipped with automatic landing system
- We would add the facility of an airport lounge for our business class customers

Summary of Project Deliverables

Project management-related deliverables: business case, charter, team contract, scope statement, WBS, schedule, cost baseline, status reports, final project presentation, final project report, lessons-learned report, and any other documents required to manage the project.

Product-related deliverables: research reports, design documents, software code, hardware, etc.

- Airport
- Airstrip
- Hangers
- Taxiways

Project Success Criteria:

- Successful working of smart check-in system
- Successful take off and landing of the aircrafts on the airstrips after testing..
- Acceptance by the stakeholders.
- Conformance to time,cost.
- Meeting all the objectives in scope.

2.5 Business Case

Prepared at: 12-01-2019

1. Introduction/ Background: The construction of modern international Airports Construction is considered one of the most complicated construction projects. In such projects, the classical design and construction management approach would be difficult to deal with the variety of Airport project components along with the latest technology utilized for the operation of the airport. Airports design management complexity is in approaching the enormous extent of information flow in all the stages of design, handling the various regulations involved in Airport projects, administering the variety of stakeholders input and feedback in various projects' stages, and dealing with complications of design and fulfillment of the project.

2.**Business Objective:** The Airport on an island project is designed and constructed to further welcome the world to the Caribbean classics by bringing commercial air traffic to the Island for the first time. By constructing a modern airport, the region will stay competitive with international destinations for tourism and get away and visitors will spend more time and in turn generating more money and creating opportunities for the 'residents of the island.

3. Current Situation and Problem/Opportunity Statement: Caribbean Island has the fastest growing tourism and a getaway in the Atlantic Ocean, with no shortage of offerings, assets, and scenery to enjoy. This airport will revamp the time and access hurdles for travel from major regions to Madagascar - I Island. A new commercial airport will target those exploring to visit the Caribbean Island and enhance access to the world-famous crystal-clear

water and white sand beaches. Also, the island attracts wildlife enthusiasts, other attractions, and communities, serving travellers from major areas, including New York, Montreal, Toronto, and Florida.

As global air travel bolsters the Island of Madagascar - I have an opportunity to attract more population directly, building on an existing, fascinating, and successful tourism experience. By improving this critical accessibility and frequency, this modern airport will be a gamechanger for growing every business that is related directly and indirectly to tourism on the Caribbean islands. This investment in infrastructure is a contribution for the future, in the extended growth and opportunity of Madagascar - I's tourism sector, and in the whole Caribbean Island as a whole

4. Critical Assumption and Constraints: The assumption of the returned benefits would be discovered after five years, which is also the payback period for the project. In order to receive the expected assumptions, the airport should be meeting all the Aviation rules and requirements, also the proper integration of workforce and smooth operation without any security issues.

Some of the critical constraints are :

- Regulatory and Institutional (Health, immunization, customs)
- Physical Characteristics (Airport Plant and Local vicinity)
- Airport Management (Labor relations, negotiation strategies)
- Financial (Inflation, existing leases, Income generation, operating agreements)
- Technical (Technology evolution, Airline Equipment, Energy consumption)
- Environmental (Ecology, Noise, weather, clean air act compliance, pollution)

5. Analysis of Option and Recommendation:

- Justifying the construction of an airport program focused on the needs of transport, tourism, and development in the Caribbean to the impacted authorities.
- Compliance with environmental standards of pollution, noise, and clean air act.
- Usage of advanced technology such that it will sustain for foreseeable future
- Provide guidance on governing, funding, and administering an airport construction program.

6. Preliminary Project Requirements

- Airport Sponsor and Capital
- Airport Construction Architecture and Design
- Feasibility Study
- Airport Site Selection (relatively flat area)
- Necessary approval from The International Civil Aviation Organization
- Preliminary Environmental Planning
- Facility Planning
- Workforce Planning
- Environmental Impact Analysis

7. **Budget Estimate and Financial Analysis:** The estimated budget for this project is $157,000,000 CAD. Any changes of this would be accumulated by the project Sponsor as we have agreed upon the buffer budget. This estimate will cover all the project requirements, workforce, and the construction.
8.**Schedule Estimate:** The estimated time of delivering this project is two years, and any changes in the project timeline should not delay the time of the project delivery as we have prepared the contingency plans in such scenarios.
9. Potential Risks: The Initial definition of risks requiring control plus assignment of risk owners and verifiers for input into the project risk register, with potential risks considered in terms of: ● Key project deliverable of time, cost, and quality ● Aviation safety risks ● Robustness of health and safety framework and related systems ● Aviation commercial risks because of: 1. Reduced aircraft movements 2. Reduced aircraft maintenance activity 3. Schedule inefficiencies 4. Reduced aircraft payloads

2.6 Project Charter

1. SUMMARY	
Project Name	Construction of an Airport on an Island
Executive Sponsor	Lakshay Bareja
Project Manager	Darshan Maniar
Project Start Date	11th February 2019
Project End Date	6th March 2021

Approved Date	26th January 2019

2. SCOPE

Inclusions:

- Construction of a world class international airport on an Island.
- One 8,000-foot runway.
- Runway and Taxiway lighting system.
- Creation of buffer zonal areas to protect surrounding localities.
- 1 International/Domestic Terminal.
- The Air Traffic Control infrastructure

Exclusions:

- Maintenance and Operations of the airport.
- Managing the cafeteria, it would be auctioned to restaurants.
- The security of the airport.
- The Air Traffic Control would not be managed by us.
- We would not manage the aircraft maintenance crew and the refueling station.

3. Project Objectives

The main objectives of our project are:

- Build an airstrip
- Build Taxiways
- A small emergency room with 24/7 doctor on call
- Fire services
- Refueling station
- Aircraft maintenance infrastructure
- ATC (Air Traffic Control) infrastructure
- Airport security equipments pertaining to infrastructure
- Construction of a cafeteria and an airport lounge.

4. Stakeholders

Internal stakeholders

- Project manager
- Project sponsor
- Construction team
- Suppliers of raw materials
- Interior designers

External stakeholders

- General public
- Tourists
- Airlines
- Vendors

5. Project Milestones

- Construction of Airstrip
- Setup and configuration of Automatic Landing System
- Construction of Airport Terminal
- Creation of Hanger and Maintenance Room
- Quality Conformance Certification from International Aviation Organization

6. Project Budget

Approximate budget would be CAD$157 million.

7. Project Team

Role	Name	Contact Information
Project Manager	Darshan Maniar	darshanmaniar1997@gmail.com
Project Supervisor	Devanshi Rajpara	rajparadevanshi@gmail.com

Project Sponsor	Lakshay Bareja	luckbareja2019@gmail.com
Designer and Architect	Jeevesh Awal	jeeveshawal@gmail.com
Quality Conformance Analyst	Rida Rais	ridarais50@gmail.com
Chief Aeronautical Engineer	Nithish Reddy	nithishreddy.yalaka@mail.concordia.ca

8. Authorization

Role	Signature
Project Sponsor	Lakshay Bareja

Sign-off: Darshan Maniar Lakshay Bareja

Devanshi Rajpara Jeevesh Awal

Nithish Reddy Rida Rais

2.7 Stakeholder register

Name	Position	Internal/ External	Project Role	Contact Information
Lakshay Bareja	CEO	Internal	Project Sponsor	luckbareja2019@gmail.com
Darshan Maniar	PMO Director	Internal	Project Manager	darshanmaniar1997@gmail.com
Devanshi Rajpara	Operations Head	Internal	Project Supervisor	rajparadevanshi@gmail.com
Jeevesh Awal	Construction and Interiors Head	External	Architect and Designer	jeeveshawal@gmail.com
Rida Rais	Quality Head	External	Quality Conformance Analyst	ridarais50@gmail.com
Nithish Reddy	Ex- Air force	External	Chief Aeronautical Engineer	nithishreddy.yalaka@mail.concordia.ca
Maison Oberoi	Resident	External	N/A	Maison@xyzxcx.com

3. Planning Phase

3.1 Team Contract

Project members and sign - off

NAME	SIGN - OFF ON TEAM CONTRACT
Lakshay Bareja	*Lakshay Bareja*
Darshan Maniar	*Darshan Maniar*
Devanshi Rajpara	*Devanshi Rajpara*
Jeevesh Awal	*Jeevesh Awal*
Rida Rais	*Rida Rais*
Nithish Reddy	*Nithish Reddy*

Code of Conduct: As the members of the team we have the same opinion on:

- Going ahead with that work which is one hundred percent best suited for us and in the same way we give our best to finish it.
- We are very peculiar about the design of our project.
- Concentrating on each task first as an individual and then as a team so that we can cross verify if we are on the right track or not.
- Straight away informing the team members if there is any change in the budget or time period.
- We should complete the project within the time period even if there's any delay in between the tasks.

Participation: We acknowledged on:

- Considering opinions of the team members which is beneficial to the advancement of the project.
- Opting to go for a vote if the team is not getting on the same page.
- The time period allotted should be taken very seriously. In certain emergency conditions with proper discussion with the team it can be resolved.
- Not to let any personal dispute have an effect on the project.

Communication: We acknowledged on:

- Getting a clear picture of any discussion and analyzing it.
- Making sure that whatever said is clear to every person which is there in the project
- Working on individual skills by practicing more and more.
- Always give a brief discussion of what you're going to discuss before the meeting where you get to the main point.
- Finding a suitable connection between team members to make them feel comfortable while working together.
- Having only one team member to communicate with the sponsor and sharing the insights.
- Having one platform to share all the documents with the team.

Problem solving: We proposed:

- To encourage every member to do their best and contribute towards the project efficiently with their highest level of knowledge and intelligence.
- To exhibit out of the box ideas in order to make the project better than the other existing one.
- To look for all the ideas and choose which one will be the best.
- To adapt with circumstances and technology.
- To provide well equipped tools for working.
- To gain experience from the past similar projects.
- To be creative in their own way.

Meeting Strategy: We proposed:

- To be there in every meeting and should always have a microphone and camera on.
- For high efficiency and accuracy two meetings are to be held every week as per the following schedule
  (Tuesday from 5:45 PM to 7:00 PM & Friday 3:00 PM to 4:30 PM)
- Meetings will be extended if the deadlines are near and we are lacking behind some crucial tasks and attendance is mandatory.

3.2 Responsibility Assignment Matrix

Refer to #Appendix 1 for this.

3.2 Kick-off Meeting

Date: February 11, 2019

Objective: To have the very first meeting for this project and explain who needs to do what in order to proceed in a positive way

Agenda:

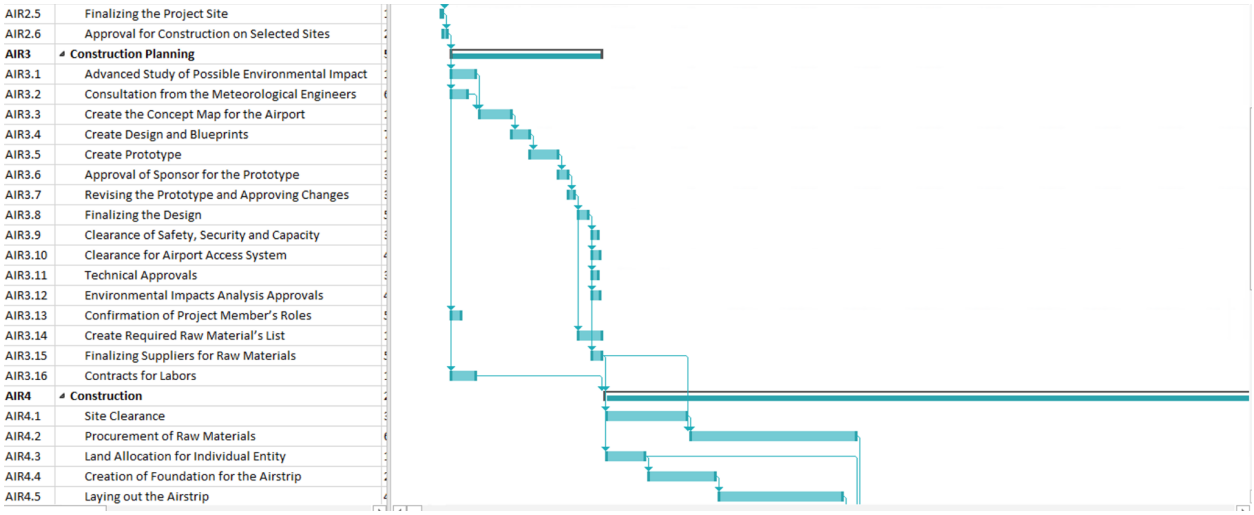
- Introduce the team members with each other
- Discuss the objectives of our project
- Review the documents related to the project.
- Determine project process
- Make a chart on the requirements.
- Define project scope,time and cost goal.
- Define the priority for each task.
- Assigning activities to each member.

Action Plan	Assigned to whom	Due date
Planning, acquiring the land and getting necessary documents for the approval	Management team	March 10, 2019
Acquiring all the resources	Supervising team	April 25, 2019
Giving out contract to build prototype architecture for the proposed project	Design & Architecture team	June 20, 2019
Testing and security measures	Quality Testing team	October 28, 2020
Opening the Airport	Chief Engineer and sponsor team	March 6, 2021

3.3 Work Breakdown Structure

3.4 Gantt Chart with milestones and required resources

Here is a screenshot of the gantt chart for the project timeline. The image below does not portray the entire gantt chart as it is too big for this. The entire gantt chart can be found in the MS Project file or the pdf attached with this report. Activity lists and their timeline is there in **Appendix 2**



3.5 Milestone List

Milestones	Date	Status	Responsible	Issues/Comments
Approval of Project Charter	1/26/19	Completed	Project Sponsor	Approved without any changes
Construction of Airstrip	1/10/20	Partially Completed	CAE, Project Supervisor	
Creation of Hanger and Maintenance Room	3/27/20	Not started	Project Supervisor	
Construction of Airport Terminal	8/12/20	Not started	Chief Construction Engineer	
Setup and configuration of Automatic Landing System	4/1/20	Not Started	CAE, Project Supervisor	Addition to scope
Quality Conformance Certification	10/28/20	Not attained	Project Manager	Team finalized

3.6 Activity Time Estimates

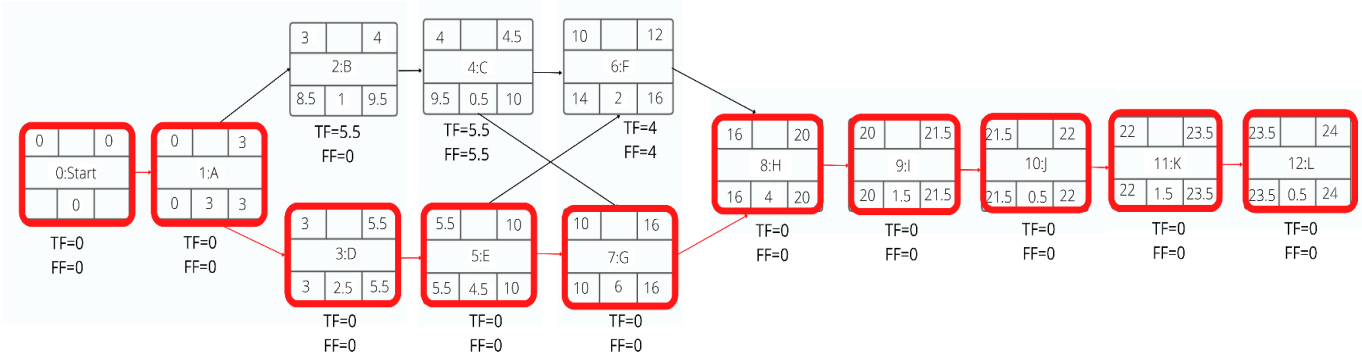
For the total time estimate, help was taken from the experts and it was estimated that it should take no longer than 24 months for the completion of such a project. Also it was approved by the sponsor in the pre-initiation phase as according to them and the stakeholders this is a time-sensitive project and needs to be finished at the earliest time possible.

So to have a broader perspective major activities were defined for the overall project which will consist of each single activity as part of it.

Here below table represents the major activities of the project.

	Activites	**Predecessors**
A	Selection of project teams	
B	Land Selection	A
C	Inspection	B
D	Planning of construction and other technical stuff	A
E	Procurement of raw materials	D
F	Construction of Airstrip and ATC	C,E
G	Construction of Terminal and Hangar	C,E
H	Installation of other Important Facilities	F,G
I	Overall Quality Testing	H
J	Testing run of Air Strip and ATC controls	I
K	Improvement Phase	J
L	Completion	

Based on this AON diagram was made and analysis was done for the critical path method for the project. CPM provides the information for the activities that are on the critical path and cannot be delayed, along with that it gives information for the free float and total float of individual activities.



Not all the activities are always completed on time, and this project being more difficult than anticipated was faced with several uncertainties, to deal with these uncertainties Project Evaluation and Review Technique (PERT) was used. For **PERT** along with most likely duration which is expected duration, Minimum and Maximum duration is also calculated and based on that Mean and Variance is calculated for all the major activities.

Activity	Minimum	Most Likely	Maximum	Mean	Variance
A	2	3	4	3	0.11
B	0.5	1	2	1.08	0.06
C	0.5	0.5	1	0.75	0.006
D	1.5	2.5	4	2.58	0.17
E	3.5	4.5	7	4.75	0.34
F	2	2	4	2.33	0.11
G	5	6	10	6.5	0.69
H	3	4	6	4.16	0.25
I	1	1.5	3	1.66	0.11
J	0.5	0.5	1	0.58	0.006
K	0.5	1.5	3	1.58	0.17
L	0.5	0.5	1	0.58	0.006

3.7 Activity Cost Estimates

For cost estimation Top-Down Approach has been followed. Here a similar project was taken into consideration that was completed 10 years ago. And two major factors for cost were “Labor” and “Material”, so indices were taken for both of them individually to come up with the estimate

The total budget at completion of the sample project was 96.6 million out of which 30 millions was the cost for the labor which includes all the human resources that will be allocated for the project, and 66.6 million was the cost incurred by the materials that were used for the project.

Using the index values of 10 years ago and present one, the estimated budget was calculated.

For labor,

30/x = 210/350

x= 50, i.e 50 millions for Labor

For material,

66.66/y = 250/375

Y = 100 i.e 100 millions for Material

This gives the total estimated budget of 150 millions.

Further with the help of the project team and experts the total budget of 150 millions was divided for each activity individually based on the requirement.

Appendix 4 shows the breakdown of budget pertaining to individual activities.

3.8 Network Diagram

Please check the Network Diagram in **Appendix 3**

3.9 Quality Management and Assurance Plan

The document is being produced as a guideline to keep up the high and significant quality of the Airport Construction Project developed by our project team at the time of the Lifecycle implementation of the project. Quality management and quality assurance are performed by our “Quality Conformance Analyst” and her team, which consists of remarkably experienced professionals from construction, management, and technical background. This specific quality

management plan describes the guidelines to adopt, standards to be sustained and quality metrics to be accomplished before every milestone and the final release of the product. This plan is responsible for all the stakeholder feedback, experience and satisfaction and their good response.

Introduction

The main intent of this plan is to verify and confirm that the quality of the product milestones achieved during each phase is up to the defined standards and respecting the appropriate time frame. The quality of the product is handled and guaranteed at all stages of the Product Life Cycle by adhering to the instructions and following the Construction's requirements and specification document prepared in the initial planning and requirements gathering phase. Assuring quality is a must for any project to be successful, as it helps maintain the project in the right direction by respecting the scope, time, cost and stakeholders' feedback and satisfaction. In the end when the final variant of the product is delivered, the success ratio of the product depends on the satisfaction of the stakeholders, the requirement and Specification document's fulfilment and proper error-free operation of the airport construction product.

Purpose

The main agenda of the Quality Assurance Plan is to satisfy the key project deliverables of time, cost, and quality constraints that have been followed also by keeping stakeholders' satisfaction and fulfilment as the final goal.

Policy Statement

The paramount objective of our organization is to deliver the best quality product respecting the timeline and deliverables. Our organization always focuses on stakeholder-centric satisfaction and feedback. The product our team designed and delivered should be an accomplishment and success in terms of functionality and customer's satisfaction.

Scope

The scope of the Quality Assurance Plan is to ensure that the appropriate standards have been followed during the Construction lifecycle of an airport on an island and all the steps and results have been documented thoroughly at every step during the implementation. It assures the following:

- The Requirements and Specification document defines the scope and construction strategy
- Documentation is finished by respecting the timeline during the planning phase
- Foundation, laying and marking of the Airstrip
- Construction of the Terminal and its Interior design
- Airport wind observatory system
- Proper functional analysis of Runway and Taxiway lighting systems.

- Air traffic control infrastructure and Aircraft Maintenance Infrastructure
- Testing of Automatic landing systems
- Timely checks during the creation of buffer zone areas to protect surrounding localities
- Geotechnical investigations
- Summary reports on soil Tests and Cement Concrete Mix Designs

Organizational structure

Our organization has a functional structure, which means it is divided into groups based on tasks, responsibilities, or expertise. Because our different departments trust our employees' abilities and competence, as well as the formation of clearly defined roles and responsibilities, this functional organization is extremely valuable to us. We have many teams working on various projects at the same time, as well as expertise, focused teams addressing key challenges that arose throughout various stages of the development phase. Each project has its own project manager and a dedicated team of highly skilled and motivated specialists that are committed to its success. A quality assurance team that keeps track of all project deliverables and ensures correct progress and quality at all times during the project's lifecycle.

3.10 Risk Register

R1: Risk of land acquisition due to environmental risks and safety hazards such as floods.

R2: Damage to physical assets due to some natural hazards, Technological hazards

R3: Change of standards
R4: Technical management problems causing delay in flights and unable to manage traffic control

R5: Poor construction design

R6: Runways and taxiways

R7: Insufficient goods supply

R8: Revenue risk

R9:Operational Readiness Landside

R10: Delay in project approvals and permits

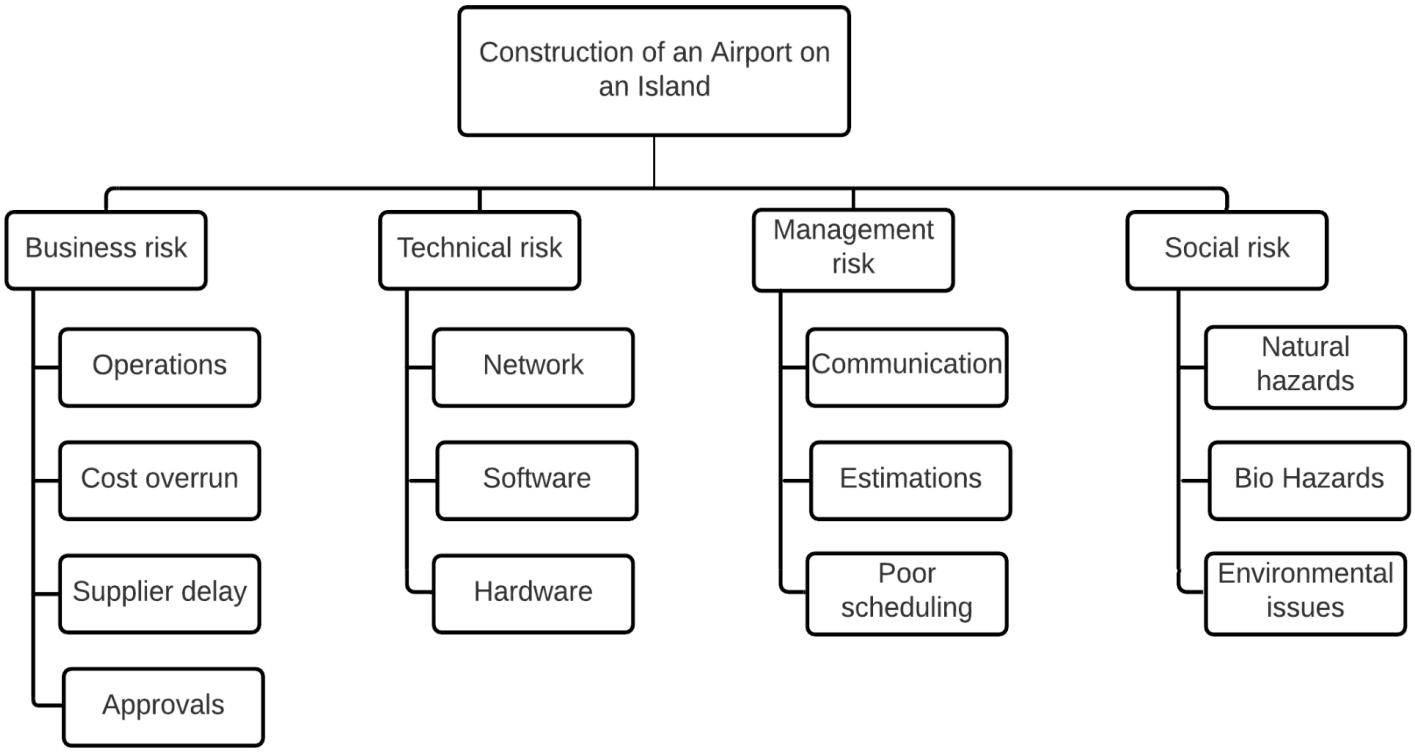
R11: Inadequate experience in operation and management of this project

R12: Operational cost overrun.

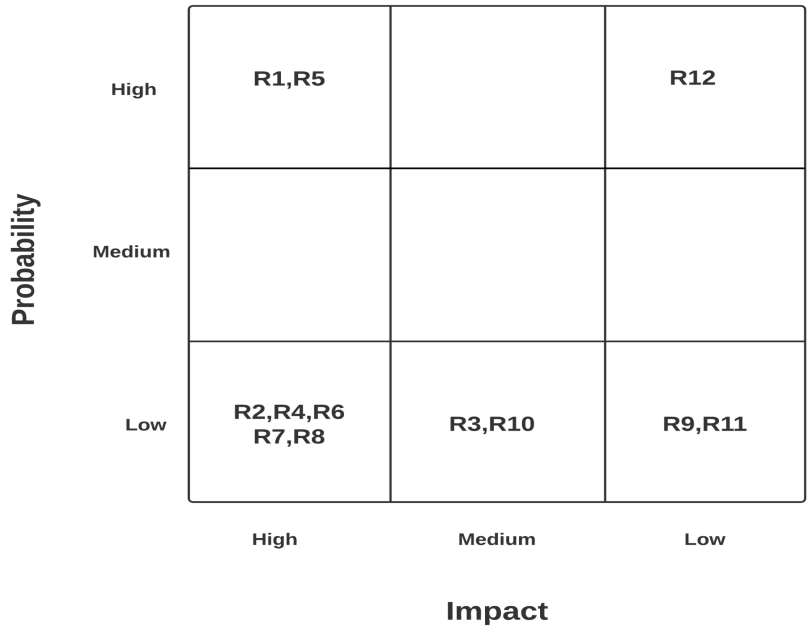
Risk ID	Risk Description	Category	Risk Probability	Risk Impact	Status	Mitigation
R1	Risk of land acquisition due to environmental risks and safety measurements	Environmental	HIGH	HIGH	RED	Opting for environmentally friendly land on the island.
R7	Supplier Risk	External	LOW	HIGH	RED	Backup supplier just in case the current supplier has some problems.
R10	Project approvals and permits	External	LOW	MEDIUM	AMBER	Be on good terms with other neighbouring countries and get approval beforehand.
R2	Physical Damage	External	LOW	HIGH	RED	Proper plans to overcome these situations and test cases every 2 months to know people will react
R5	Poor Construction Design	Management	HIGH	HIGH	RED	Regulate construction design after every milestone.
R4	Technical Management problems	Technical	LOW	HIGH	AMBER	
R6	Runways and Taxiways (live operations Delay and added complexity to airfield construction)	Technical	LOW	HIGH	AMBER	Making sure that the construction of those doesn't affect the airfield construction and make it delay in time.
R8	Revenue Risk (insufficient revenue generated)	Financial	LOW	HIGH	AMBER	Follow cost revenue process and market revenue after every step.
R12	Operation cost overrun	Financial	HIGH	LOW	AMBER	Have cost budgeting for every department, additional funds are available for use.
R11	Inadequate experience	Management	LOW	LOW	GREEN	Proper training to everyone who is working in this project and regular evaluation.
R9	Operational Readiness Landside (interfacing	External	LOW	LOW	GREEN	Prepare a well planned structure for how to

	with existing airports)					communicate with different airports and how to balance the traffic.
R3	Change of Standards	Internal	LOW	MEDIUM	GREEN	Evaluating the changes we are making and providing other feasible solutions beforehand.

3.11 Risk Breakdown Structure



3.12 Probability Impact Matrix



3.13 Quality Metrics

Cost, time, and quality are all critical metrics for a successful project. The building and operation of an airport on an island is a difficult task. Finishing the airport construction on time and on budget while maintaining the quality of the deliverables is considered a success. Meeting this Performance standard is a metric. The tasks are delivered according to the project's work breakdown structure (WBS). The "Review and Audit Process," which compares the projected budget and time with the real, can be used to track both budget and time parameters. These can give the Project Manager an indication of how well the project is progressing. Metrics are used to assess the quality of performance. For all metrics, the FAA is working to standardize language, methodology, and governance across all lines of business. Its goal is to make metric reporting more orderly, consistent, and accurate.

Safety, Capacity, Cost Effectiveness, Efficiency, and Environment are the five primary quality attributes in our methodology. Of course, finding the correct metrics to assess each characteristic and its associated sub characteristics is the most challenging element, but our team has tried to consider all parts of the Airport Construction and Project metrics. The following are the quality characteristics:

Safety:

- Hazard Risk Mitigations
- Runway Incursion Rates
- Aviation fatality Rates
- System Risk Event Rate
- Surface Incidents

Capacity:

- Daily Capacity
- Daily Operations
- NAS Reliability
- Runway Pavement Condition

Cost-Effectiveness:

- Unit Cost per Operation
- Airport cost for operation
- Airport cost for Enplanement

Efficiency:

- Average Gate Arrival Delay
- NAS On-time arrivals
- Number of Operations
- Number of Arrival and Departure delays
- Average Gate to Gate Times
- Taxi-in time
- Taxi-out time
- Cancellations

Environment:

- Noise Exposure
- Renewable Fuel
- Emissions Exposure
- Wildlife Threat/ Bird Strikes
- NAS-wide Energy efficiency
- Carbon Footprint

4. Execution Phase

4.1 Work Performance Information – Status of the work completed and remaining

Status/Progress Report (1)

Reporting period: 11-Feb-2019 to 7-Oct-2019 (Monday)

Work completed during this interval:

- In the initial eight months, the tasks completed so far were: Selection of project teams which includes selection of project manager, project supervisor, hiring of designer, architect, constructors and chief aeronautical engineer.
- After completion of selecting internal stakeholders, the most important document for the project “Project Charter” was created and later approval of project charter by project sponsor was completed.
- For construction of an airport, selection of land was completed along with its inspection and approval for construction.
- Further, construction planning was initiated which includes: study of possible environmental impacts during the whole project, consultation from meteorological engineers, creation of consult map for airport, design of blueprints and prototyping.
- Later the approval was taken from project sponsors for the prototype and different versions of prototypes were created based on the suggestions from sponsor.

Work to complete next reporting period:

- Technical approvals, confirmation of project member’s roles. For the construction process to get started, creation of a list of raw materials and also finalizing the supplier for raw materials.
- Then the actual process of construction would take place and finally testing and making changes according to the requirements.

What’s going well and why:

- The selection of project teams went well as a top-down approach was followed and the exact requirements of team members were pre-defined and analysed based on the previous airport project’s team selection.
- Approval from the sponsor was very quick and easy as scope and budget was defined very accurately.

What’s not going well and why:

- Different problems were faced during specifying and selecting land requirements, as airport construction would take place on an island, due to various environmental issues, land selection with specific requirements was a bit difficult task.

Suggestions:

- Weather disturbance was needed to be considered at the very beginning of project initiation.

Project changes:

- Due to problems faced during land selection, the construction process was modified a bit.

- Advanced study was carried out by environmental experts on future forecasts of possible environmental impacts.

Status/Progress Report (2)

Reporting period: 10-Oct-2019 to 1-Jun-2020 (Monday)

Work completed during this interval:

- Clearance of safety, security, capacity as well as clearance for airport access system was completed.
- Approvals for technical stuff and for environmental impacts analysis were taken.
- Roles for project members were confirmed and a checklist for required raw materials was made. Later a supplier for raw materials was finalized along with a contract for laborers.
- Finally, a construction process was started which included site clearance, procurement of raw materials, layout of the airstrip and construction of the terminal.

Work to complete next reporting period:

- After the construction of the terminal, it's interior design has to be done.
- Construction of major sections of airport like hangar, maintenance facility, air traffic control and airport wind observation system.
- Installation of automatic landing system and safety mechanism like fire evacuation services etc.
- Finally comes testing of airports.

What's going well and why:

- Construction process of the terminal and hangar went very well due to expert designers and trained workers.

What's not going well and why:

- There were delays during the construction process due to various environmental changes which also impacted cost overrun.

Suggestions:

- Proper planning should be done at the very beginning and all the worst case scenarios should've been considered.

Project changes:

- No changes were made to the project during this period.

Status/Progress Report (3)

Reporting period: 3-Jun-2020 to 6-Mar-2021

Work completed during this interval:

- Interior designing of the terminal by well-known designers.
- Construction of hanger, maintenance facility, air traffic control and wind observation system. Also the installation of an automatic landing system was completed.

● Most crucial part i.e, testing was completed during this period which included testing of the airstrip and all equipment pertaining to the runway. ● Finally the test run of flight was done along with testing of the automatic landing system.
Work to complete next reporting period: ● Official closure of the project and inauguration of the airport.
What's going well and why: ● Testing of all parts of the airport went very well as we did through testing of everything under expert's observation.
What's not going well and why: ● Because of a few delays, the project was finished later than expected. However after finishing everything went well.
Suggestions: ● No suggestions
Project changes: ● No changes were made to the project during this period.

4.2 Quality Assurance Checklist:

Here is a list of qualitative points that we as a team have included and given emphasis while making sure that the quality of the project is taken care of as deemed necessary.

Quality Checklist		
Project:		
Quality points	**Yes**	**No**
Analysis and inspection of the land	✔	
Acknowledging environmental impacts	✔	
Are the team members and the organisation well acquainted with their functional duties	✔	
Quality Metrics developed	✔	
Procurement Management Plan	✔	
QA/QC during construction of the 8000-foot runway and Taxiway	✔	
QA/QC during construction of terminals	✔	
QA/QC of all traffic control infrastructure	✔	
QA/QC done by chief engineer	✔	
Safety protocols confirmed, recorded, and conveyed	✔	

Functions of Quality Assurance Team:

1. **Site Team-**

They are responsible for:

1. Analyzing and acknowledging the procedural duties of construction.
2. Supervision of the runway and the taxiway inspection activities.
3. Collaborating with a person looking after regulatory inspection at the construction site.
4. Monitoring the testing phase of the runway and taxiway.

2. **Procurement Team-**

They are responsible for:

1. Procuring resources for construction.
2. Analyzing and acknowledging documents.
3. Developing QA logistics and policies.

3. **Constructors Team**-

They are responsible for:

1. Supervising and inspecting raw materials and equipment for construction.
2. Supervising the construction of runway, taxiway, terminals, and ATC infrastructures.

4. **Quality Testing Team**-

1. Regulate the course of action required to deliver a high-quality Airport.
2. Establishing and examining course of action and making necessary changes if required.
3. Monitoring the procedural changes and making sure at last it meets the initial objective of the project.

4. QA tests should take necessary measures to maintain the high-quality.

Performing Quality Assurance during construction of runway and taxiway

During the construction of the runway and taxiway the construction Team and Site Team are solely responsible for making sure that the construction is progressing as per the established needed requirements. All the construction related activities of the Airport are subject to regulatory inspection which comes under Site Team and particularly the chief engineer or by any other external regulatory auditor.

In accordance with the sequence of construction of the airport processing according to the initial plan, it is feasible to aim attention towards control and verification events on 3 distinguished steps to be performed. They are:

1. Pre-construction substantiation to make sure that the procedural activities for the construction are well planned to be carried out.
2. Construction progress control and in-progress verification.
3. After construction detailed inspection and testing of the constructed runway and taxiway.

The QA Team is solely responsible for making sure these 3 activities are well performed and implemented.

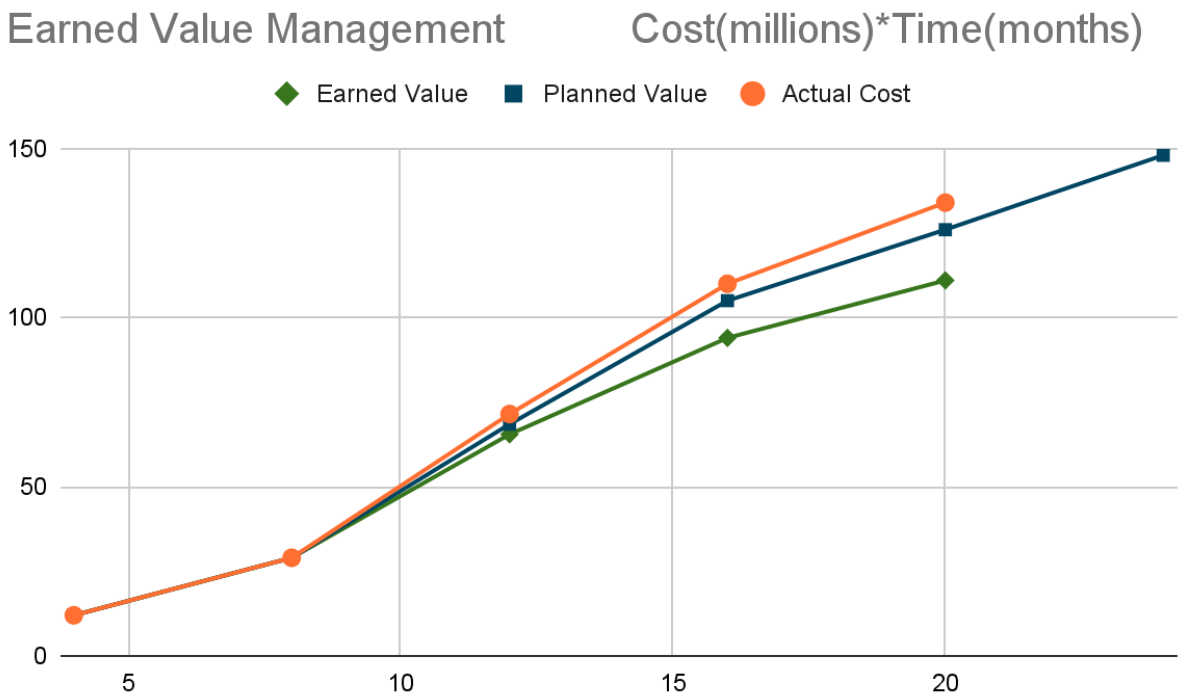
4.3 Milestone Report

Milestones	Date	Status	Responsible	Issues/Comments
Approval of Project Charter	1/26/19	Completed	Project Sponsor	Approved without any changes
Construction of Airstrip	1/10/20	Completed	CAE, Project Supervisor	Approved without any changes
Construction of Hangar and Maintenance Room	3/27/20	Completed	Project Supervisor	No issues
Construction of Airport Terminal	8/12/20	Completed	Chief Construction Engineer	
Setup and configuration of Automatic Landing System	4/1/20	Completed	CAE, Project Supervisor	Addition to the scope
Quality Conformance Certification	10/28/20	Completed	Project Manager	

5. Monitoring and Controlling Phase

5.1 Earned Value Analysis

Time (Months)	Earned Value	Planned Value	Actual Cost
4	12	12	12
8	29	29	29
12	65.5	68.5	71.5
16	94	105	110
20	111	126	134
24	-	148	-



Earned Value Analysis was done periodically to check the progress of the project, above mentioned analysis was done after 20 months.

The value of work performed after 20 months was 111 millions (Earned Value) while it was supposed to be 126 millions (Planned Value). And the actual cost incurred at that period was 134 millions (Actual Cost).

Cost Variance (CV) = EV - AC

= 111 millions - 134 millions
= -23 millions which is a negative CV

Schedule Variance (SV) = EV - PV
= 111 millions - 126 millions
= -15 millions which is negative SV

The work that should have been completed 16 months took almost 20 months to complete and at that time the cost which should have been 126 millions was 134 millions.

To further check the performance Cost Performance Index (CPI) as well as Schedule Performance Index (SPI) can be calculated.

CPI = EV/AC = 111/134 = 0.82835

CPI < 1, which indicates that the project is Over Budget

SPI = EV/PV = 111/126 = 0.88095

SPI < 1, which indicates that the project is Behind Schedule

Here as before 4 months of the estimated completion we faced a cost overrun so calculate the new estimation, medium estimate is used as it is believed that the project will continue under similar conditions

EAC = BAC/CPI
= 150/0.82835 = 181.08

To calculate the variance,

VAC = BAC - EAC
= 150 - 181.08
= -31.08

Here the negative variance shows that at the end there will be a cost overrun of 31 millions.

5.2 Changed Request and Recommended Actions

Change Request 1

Description of change requested: Increment of Labor
Events that made this change necessary or desirable: Delay in the procurement of some part of the raw material which has to be procured from overseas.
Justification for the change/why it is needed/desired to continue/complete the project: During the analysis of the project, the project was falling behind the schedule due to supplier's delay in raw material from overseas. There was a foreseeable change in the project schedule due to the reason stated above and to cover that we need some extra workforce as it is imperative for the stakeholders to complete the project on time irrespective of some cost variance, as they have some extra budget in hand.
Impact of the proposed change on: **Scope:** There will be no change in scope. **Schedule:** This change will help with finishing the project on the previously agreed schedule by coping up with the schedule delay faced by the above mentioned reason. **Cost:** This will increase the budget of the project, but as during analysis medium estimate was calculated for EAC of the project, this change will be under the same category. **Staffing:** It will increase the staff as more human resources will be hired than actually planned. **Risk:** No change **Other:** No change
Suggested implementation if the change request is approved: The implication of change will be we have to get more staff from overseas as soon as possible.

Change Request 2

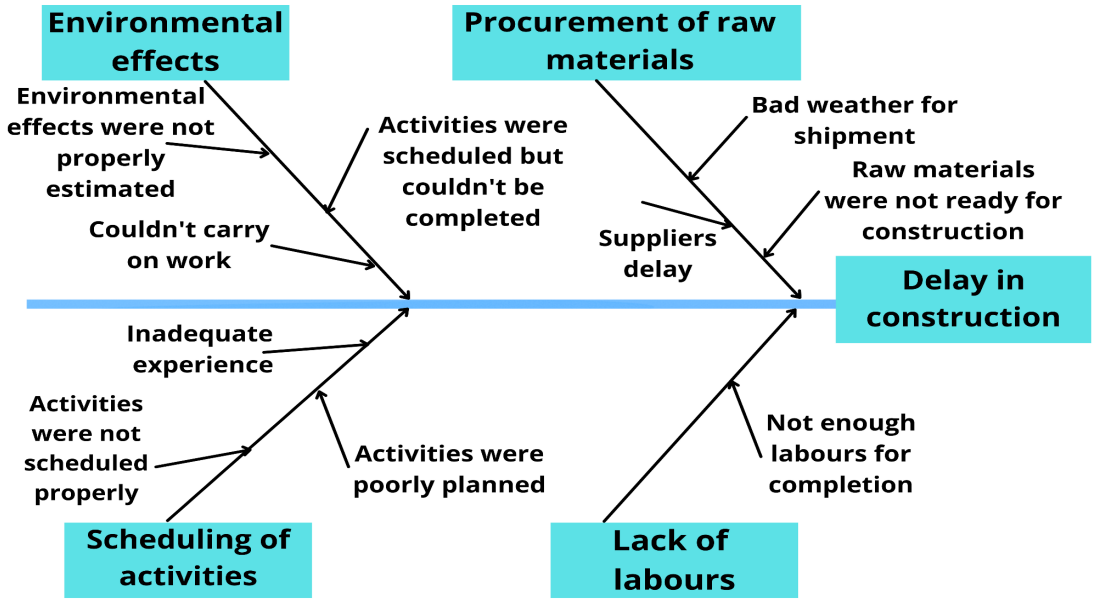
Description of change requested: Addition of Automatic landing system to the scope.
Events that made this change necessary or desirable: Stakeholders need
Justification for the change/why it is needed/desired to continue/complete the project: Stakeholders want to equip the airport with the automatic landing system due to the seasonal weather disturbances which will assist the pilots to land the planes safely.
Impact of the proposed change on: Addition to the scope baseline **Scope:** This will increase the scope of the project as a new task that was earlier excluded from the scope is now a part of it. **Schedule:** This will have no effect on the schedule of our project as creation of such a facility will not be on the critical path of the activities and can be done sideways along with the creation of the terminal. **Cost:** This will have a little effect on the cost as some of the resources available will get invested in this activity, but as the change is asked by the project sponsors and other stakeholders, an increment in cost will also be approved by them. **Staffing:** This will ask for extra staffing as these activities need to be finished alongside, with no effect on the major activities that are going on. **Risk:** There will be no risk involved with this change. **Other:** none
Suggested implementation if the change request is approved: The airport will be equipped with a world class automatic landing system.

5.3 Quality control Plan:

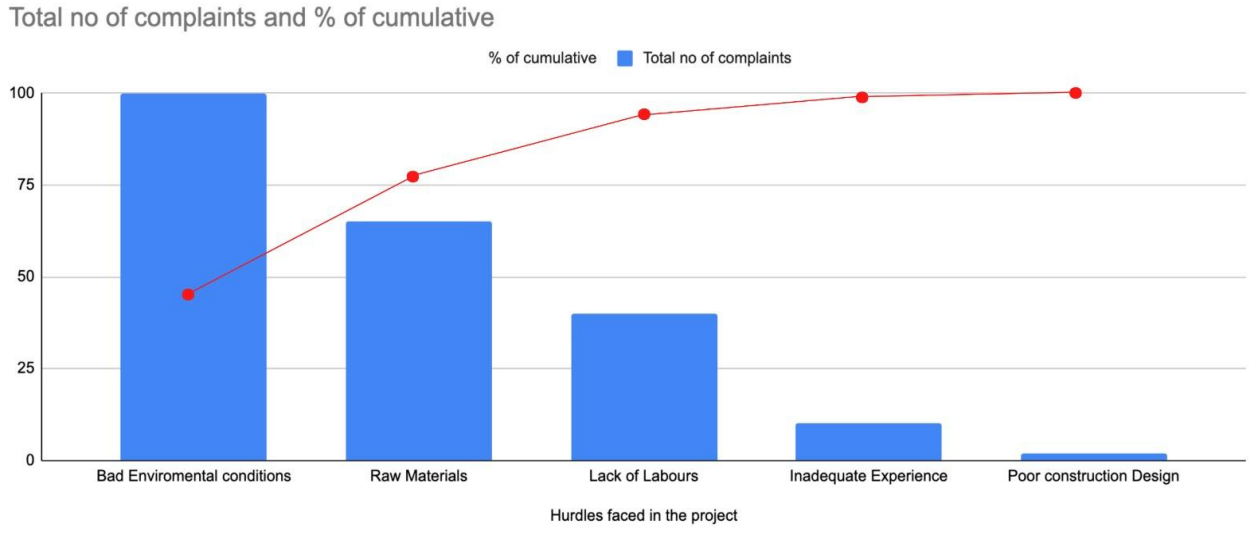
Several techniques were used to perform the quality control plan:

5.3.1 Cause and effect diagram (Fish-bone diagram)

This technique helps to find the root cause of any problem that occurred during the project. Here it was used to find the root cause for the delay that happened during the construction. “5 whys” technique was used to find the root cause. Here below is the Cause and effect diagram for that.



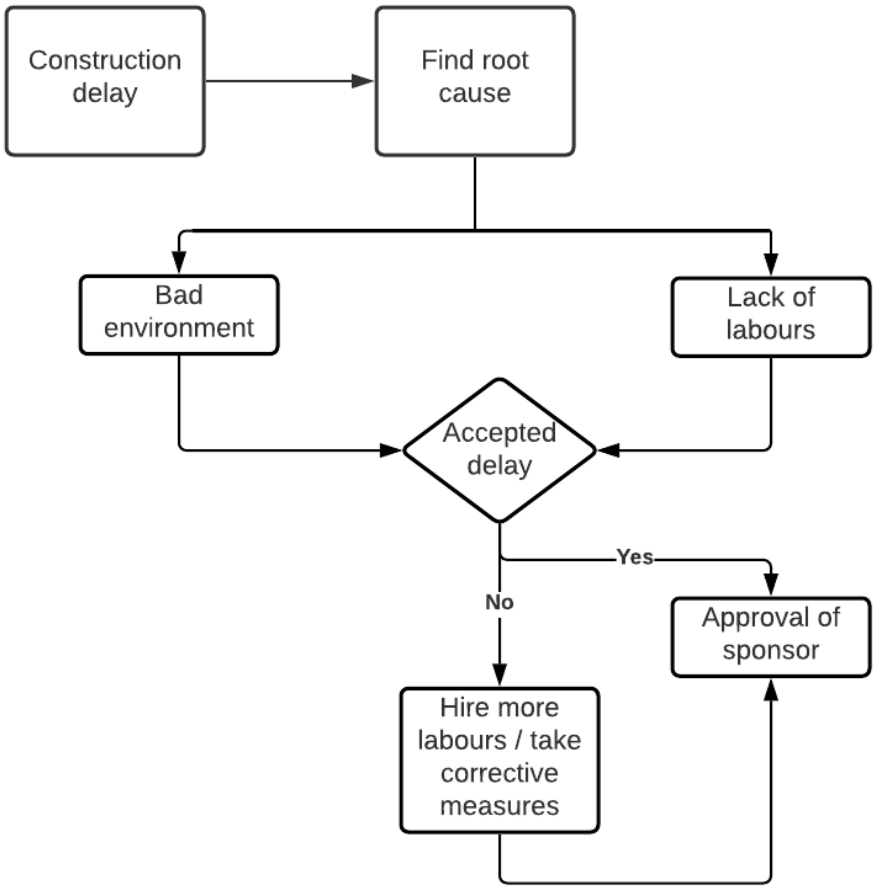
5.3.2 Pareto chart: It was found that most of the complaints received during the project were because of few issues so to identify those problem areas and prioritize them Pareto Chart was implemented.



This chart is a sub-part of histogram which helps in recognizing and aligning the problem areas. They are often termed as 80-20 rule, which basically stands for 80% of the problems are due to 20% of the causes. In the project because of the inadequate experience which resulted in failing to analyze bad environmental conditions, raw materials supply and lack of labours. This Pareto chart depicts our quality control method perfectly.

5.3.3 Flow Diagram

Quality tools help in taking corrective measures in case of any issues faced, here a flow chart was created that needs to be followed in case of its occurrence. Here below is the flowchart for the problem of delay in construction.



6. Project Closing Phase

The goal of this report is to demonstrate how and what the outcomes of an airport construction project using a modern and technologically advanced model it is built with. The main focus is to document what has been accomplished, the costs and features associated with this project, as well as advancements to the airport's usability and functioning.

General Project Information:

Project Name	Airport Construction on an Island
Project Description	The Airport on an island project is designed and constructed to further welcome the world to the Caribbean classics by bringing commercial air traffic to the Island for the first time. By constructing a modern airport, the region will stay competitive with international destinations for tourism and get away and visitors will spend more time and in turn generating more money and creating opportunities for the ‘residents of the island.
Project Manager	Darshan Maniar
Project Sponsor	Lakshay Bareja
Project Supervisor	Devanshi Rajpara
Designer and Architect	Jeevesh Awal
Chief Aeronautical Engineer (CAE)	Nithish Reddy Yalaka
Quality Conformance Analyst	Rida Rais

6.1 Project Closure Documents

The construction of modern international Airports Construction is considered one of the most complicated construction projects. In such projects, the classical design and construction management approach would be difficult to deal with the variety of Airport project components along with the latest technology utilized for the operation of the airport. The deliverables include the construction of an Airport with an automatic landing system, Airstrip, Hangers, taxiways and integrated smart check-in for improved security and high reliability. Our model of airport construction focused on attracting more population directly, building on an existing, fascinating, and successful tourism experience. By improving this critical accessibility and frequency, this modern airport will be a gamechanger for growing every business that is related directly and indirectly to tourism on the Caribbean islands. This investment in infrastructure is a contribution for the future, in the extended growth and opportunity of Madagascar - I's tourism sector, and in the whole Caribbean Island as a whole.

There were many issues encountered during the projects but the most important and highly prioritized issues were with the project duration. During the initial phases of our project, we were lagged in time because of the delay in initial setup requirements and the permissions. What we did to be within the timeframe of the delivery is that we have invested a little more in the next phases by increasing the workforce and raw material in order to beat the delay and deliver within the deadline. This resulted in little cost overrun but that's okay as we already have the pre-approved buffer budget from the project sponsor during our initial agreement. Our Quality Assurance Team have ensured that the appropriate standards have been followed during the Construction lifecycle of an airport on an island and all the steps. In the end, We managed all resources to assure a high-quality project delivery.

6.2 Final Project Report

	Estimated	Actual	Variance
Start Date	**11/2/19**	**11/2/19**	**0 days**
End Date	**03/06/21**	**03/06/21**	**0 days**
Cost	**150 Million**	**181 Million**	**-31 Million**

The table below shows the details about the project

6.3 Lessons Learnt Document

Project Name: Airport Construction on an Island

Project Sponsor: Lakshay Bareja

Project Manager: Darshan Maniar

Project Supervisor: Devanshi Rajpara

Designer and Architect: Jeevesh Awal

Chief Aeronautical Engineer: Nithish Reddy Yalaka

Quality Conformance Analyst: Rida Rais

Project Completion Date: 6th March 2021

Final Budget: 181 Million CAD

Our project was completed on schedule, although it was slightly over budget, necessitating minute changes in the budget. Our project complied with all requirements that were agreed upon in the initial phases. Our primary success criterion was to complete the project on schedule, as the Project Sponsors required that the airport operations begin immediately. We managed to pull this off by incorporating the talented professionals in every field as quality and performance as the paramount need.

Lessons Learnt:

- Engage stakeholders, particularly employees, early and often throughout the planning process.
- Sustainability activities have the extra benefit of lowering operating expenses, and many green projects are free to execute.
- Include sustainability planning from the start of a project to ensure that facilities, operations, and maintenance are aware and can contribute ideas, saving time, effort, and money.
- Recycling and energy conservation are low-cost, high-yield options.
- It's critical to gain the support of the local community and the governing legislative body, therefore spending time educating the relevant stakeholders on how the operations are run.
- Maintain strong community relations and be conscious of the influence of airport noise on the surrounding area.
- Recognize that information technology equipment, such as computers, screens, servers, printers, and fax machines, consumes a large amount of energy

- Small airports face a huge challenge in delivering on the promises made by larger airports, and we must consider the financial implications carefully.

The main obstruction during our work was the initial time constraint. While working on this project, our team has learned a great deal in a lot of things related to project management and also different techniques on how to convince the stakeholders, employees, local community, government and the Aviation Authorities.

8. Appendix

Appendix 1

	Responsible
	Accountable
	Consulted
	Informed

	Project Tasks	Project Manager	Project Sponsor	Project supervisor	Chief Aeronautical Engineer	Architect and designer	Quality Conformance Analyst	Environmental Experts
1	**Selection of Project Teams (3 months)**							
1.1	Project Manager Selection							
1.1.1	Project Supervisor Selection							
1.2	Hire designer and architect							
1.2.1	Hiring of construction engineers and teams							
1.3	Hire chief aeronautical engineer							
1.4	Select quality conformance analyst							
1.5	Hire tech team							
1.6	Create project charter							
1.7	Approval of project charter by sponsors							
2	**Land Selection**							
2.1	Define land requirements							
2.2	Shortlist possible locations							
2.2.1	Inspect site environment							
2.2.2	Inspect the fitness of land for runways							
2.3	Finalizing the Project Site							
2.4	Approval for construction on selected sites.							

3	**Construction Planning**							
3.1	Advanced Study of Possible Environmental Impact							
3.2	Consultation from the Meteorological Engineers							
3.3	Create the Concept Map for the Airport							
3.3.1	Create Design and Blueprints							
3.3.2	Create Prototype							
3.4	Approval of Sponsor for the Prototype							
3.4.1	Revising the Prototype and Approving Changes							
3.5	Finalizing the Design							
3.6	Clearance of Safety, Security and Capacity							
3.6.1	Clearance for Airport Access System							
3.7	Technical Approvals							
3.1.1	Environmental Impacts Analysis Approvals							
3.8	Confirmation of Project Member's Roles							
3.9	Create Required Raw Material's List							
3.1	Finalizing Suppliers for Raw Materials							
3.11	Contracts for Labors							

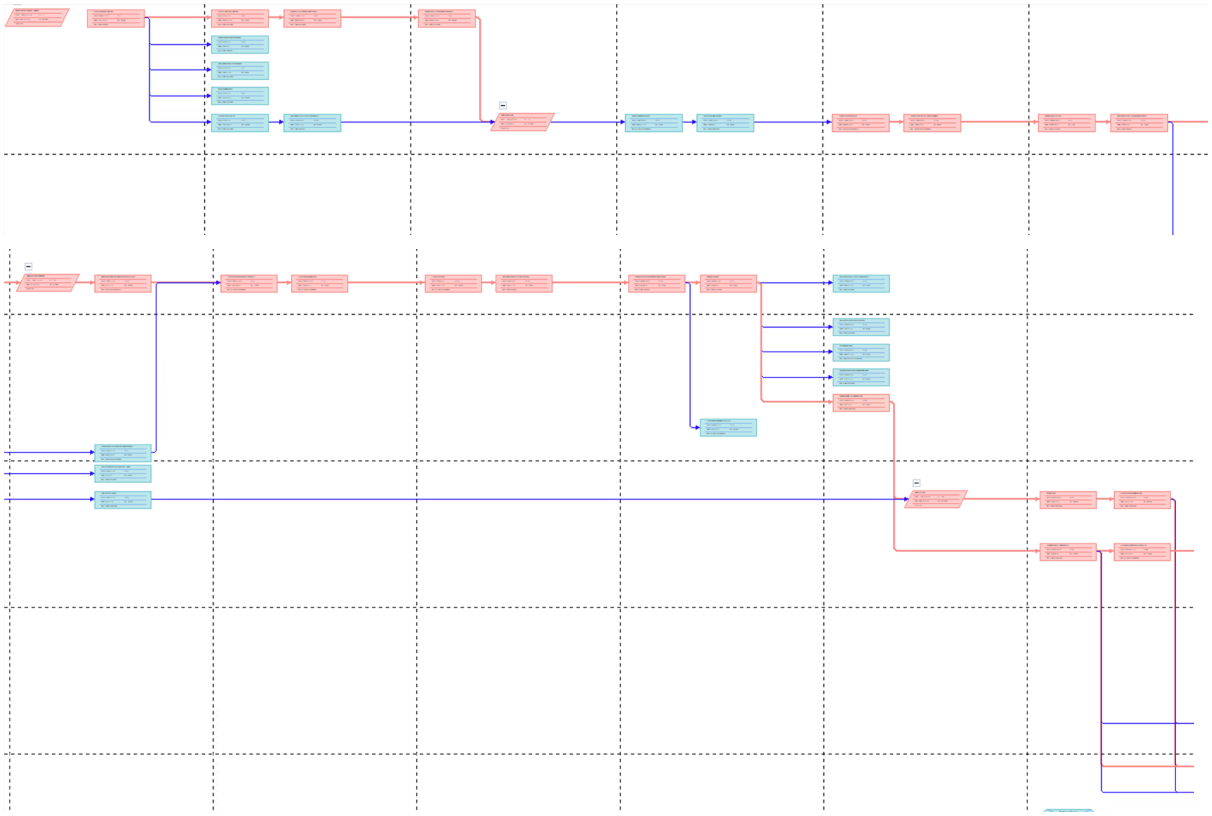
4	**Construction**							
4.1	Site Clearance							
4.2	Procurement of Raw Materials							
4.1.1	Land Allocation for Individual Entity							
4.2	Creation of Foundation for the Airstrip							
4.3	Laying out the Airstrip.							
4.3.1	Markings of Airstrip							
4.3.2	Following Lights and other Lighting System							
4.4	Elevation of the Platform for the Terminal							
4.4.1	Construction of the Terminal Structure							
4.4.2	Interior Designing of the Terminal							
4.5	Construction of Hanger and Maintenance facility							
4.6	Air Traffic Control Construction							
4.7	Construction of Airport Wind Observation system							
4.8	Installation of Automatic Landing System							
4.9	Installation of Safety Mechanism (Fire Evacuation Services and Emergency exits)							
5	**Testing**							
5.1	Testing of Airstrip using Simulations							
5.2	Testing of all the Equipments Pertaining to Runway							
5.3	Test Run of Flight							
5.4	Testing of the Automatic Landing System							
5.5	Fixing Loopholes and Final Touches							
5.6	Compliance of Requirements for the Terminal as per Stakeholders.							

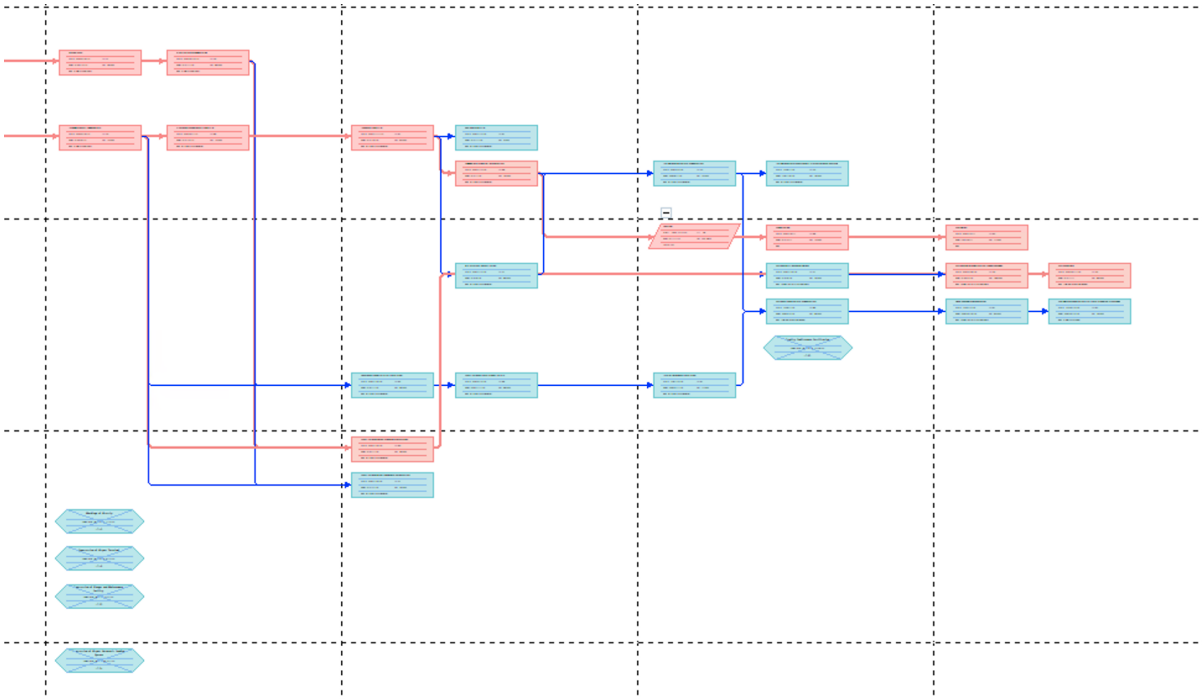
Appendix 2

	WBS	Task Name	Duration	Start	Finish	Prec	Resource Names
1	**AIR1**	**Selection of Project Teams**	**66 days**	**Mon 2/11/19**	**Mon 5/13/19**		
2	AIR1.1	Project Manager Selection	14 days	Mon 2/11/19	Thu 2/28/19		Project Sponsor
3	AIR1.2	Project Supervisor Selection	7 days	Fri 3/1/19	Mon 3/11/19	2	Project Manager
4	AIR1.3	Hiring of Project Designer and Architect	7 days	Tue 3/12/19	Wed 3/20/19	3	Project Manager
5	AIR1.4	Hiring of Construction Engineer and Teams	38 days	Thu 3/21/19	Mon 5/13/19	4	Project Manager
6	AIR1.5	Hiring of Chief Aeronautical Engineer	6 days	Fri 3/1/19	Fri 3/8/19	2	Project Sponsor
7	AIR1.6	Select Quality Conformance Analyst	8 days	Fri 3/1/19	Tue 3/12/19	2	Project Manager
8	AIR1.7	Hire Technology Team	10 days	Fri 3/1/19	Thu 3/14/19	2	Project Manager
9	AIR1.8	Create Project Charter	10 days	Fri 3/1/19	Thu 3/14/19	2	Project Manager
10	AIR1.9	Approval of Project Charter by Sponsors	5 days	Fri 3/15/19	Thu 3/21/19	9	Project Sponsor
11	AIR1.10	Approval of Project Charter	0 days	Thu 3/21/19	Thu 3/21/19		
12	**AIR2**	**Land Selection**	**34 days**	**Tue 5/14/19**	**Fri 6/28/19**	**5,10**	
13	AIR2.1	Define Land Requirements	7 days	Tue 5/14/19	Wed 5/22/19	5	Architect and Designer
14	AIR2.2	Shortlist Possible Locations	8 days	Tue 5/28/19	Thu 6/6/19	13	Project Supervisor
15	AIR2.3	Inspect Site Environment	5 days	Thu 6/13/19	Wed 6/19/19	14	Environmental Experts
16	AIR2.4	Inspect the Fitness of Land for Runways	4 days	Thu 6/20/19	Tue 6/25/19	15	Chief Aeronotical Engineer
17	AIR2.5	Finalizing the Project Site	1 day	Wed 6/26/19	Wed 6/26/19	16	Project Manager
18	AIR2.6	Approval for Construction on Selected Sites	2 days	Thu 6/27/19	Fri 6/28/19	17	Project Sponsor
19	**AIR3**	**Construction Planning**	**55 days**	**Mon 7/1/19**	**Fri 9/13/19**	**18**	
20	AIR3.1	Advanced Study of Possible Environmental Impact	10 days	Mon 7/1/19	Fri 7/12/19	18	Environmental Experts
21	AIR3.2	Consultation from the Meteorological Engineers	6 days	Mon 7/1/19	Mon 7/8/19	18	Chief Aeronotical Engineer
22	AIR3.3	Create the Concept Map for the Airport	12 days	Mon 7/15/19	Tue 7/30/19	20,21	Architect and Designer
23	AIR3.4	Create Design and Blueprints	7 days	Wed 7/31/19	Thu 8/8/19	22	Architect and Designer
24	AIR3.5	Create Prototype	10 days	Fri 8/9/19	Thu 8/22/19	23	Architect and Designer
25	AIR3.6	Approval of Sponsor for the Prototype	3 days	Fri 8/23/19	Tue 8/27/19	24	Project Sponsor
26	AIR3.7	Revising the Prototype and Approving Changes	3 days	Wed 8/28/19	Fri 8/30/19	25	Project Sponsor
27	AIR3.8	Finalizing the Design	5 days	Mon 9/2/19	Fri 9/6/19	26	Project Manager
28	AIR3.9	Clearance of Safety, Security and Capacity	3 days	Mon 9/9/19	Wed 9/11/19	27	Project Manager
29	AIR3.10	Clearance for Airport Access System	4 days	Mon 9/9/19	Thu 9/12/19	27	Project Manager
30	AIR3.11	Technical Approvals	3 days	Mon 9/9/19	Wed 9/11/19	27	Quality Conformance Analys
31	AIR3.12	Environmental Impacts Analysis Approvals	4 days	Mon 9/9/19	Thu 9/12/19	27	Project Manager
32	AIR3.13	Confirmation of Project Member's Roles	5 days	Mon 7/1/19	Fri 7/5/19	18	Project Manager
33	AIR3.14	Create Required Raw Material's List	10 days	Mon 9/2/19	Fri 9/13/19	26	Architect and Designer
34	AIR3.15	Finalizing Suppliers for Raw Materials	5 days	Mon 9/9/19	Fri 9/13/19	27	Project Supervisor
35	AIR3.16	Contracts for Labors	10 days	Mon 7/1/19	Fri 7/12/19	18	Project Supervisor
36	**AIR4**	**Construction**	**239 days**	**Sun 9/15/19**	**Wed 8/12/20**	**35,34**	
37	AIR4.1	Site Clearance	30 days	Mon 9/16/19	Fri 10/25/19	34	Project Supervisor
38	AIR4.2	Procurement of Raw Materials	60 days	Mon 10/28/19	Fri 1/17/20	37,34	Project Supervisor
39	AIR4.3	Land Allocation for Individual Entity	15 days	Mon 9/16/19	Fri 10/4/19	34	Project Supervisor
40	AIR4.4	Creation of Foundation for the Airstrip	25 days	Mon 10/7/19	Fri 11/8/19	39	Architect and Designer
41	AIR4.5	Laying out the Airstrip	45 days	Mon 11/11/19	Fri 1/10/20	40	Architect and Designer
42	AIR4.6	Markings of Airstrip	5 days	Mon 1/13/20	Fri 1/17/20	41	Architect and Designer
43	AIR4.7	Markings of Airstrip	0 days	Mon 1/13/20	Mon 1/13/20		
44	AIR4.8	Following Lights and other Lighting System	20 days	Mon 1/13/20	Fri 2/7/20	41	Architect and Designer
45	AIR4.9	Elevation of the Platform for the Terminal	90 days	Mon 1/20/20	Fri 5/22/20	38,39	Architect and Designer
46	AIR4.10	Construction of the Terminal Structure	46 days	Mon 5/25/20	Mon 7/27/20	45	Architect and Designer
47	AIR4.11	Interior Designing of the Terminal	12 days	Tue 7/28/20	Wed 8/12/20	46	Architect and Designer
48	AIR4.12	Construction of Hanger and Maintenance facility	50 days	Mon 1/20/20	Fri 3/27/20	38,39	Architect and Designer
49	AIR4.13	Construction of Airport Terminal	0 days	Wed 8/12/20	Wed 8/12/20		
50	AIR4.14	Construction of Hanger and Maintenance facility	0 days	Fri 3/27/20	Fri 3/27/20		
51	AIR4.15	Air Traffic Control Construction	40 days	Mon 1/13/20	Fri 3/6/20	41	Architect and Designer
52	AIR4.16	Construction of Airport Wind Observation system	10 days	Mon 1/20/20	Fri 1/31/20	38,39	Architect and Designer
53	AIR4.17	Installation of Automatic Landing System	18 days	Mon 3/9/20	Wed 4/1/20	51,44	Architect and Designer
54	AIR4.18	Construction of Airport Automatic Landing System	0 days	Wed 4/1/20	Wed 4/1/20		Architect and Designer
55	AIR4.19	Installation of Safety Mechanism (Fire Evacuation Services and Emergency exits)	74 days	Thu 4/2/20	Tue 7/14/20	53	Architect and Designer
56	**AIR5**	**Testing**	**235 days**	**Mon 2/10/20**	**Fri 1/1/21**	**44**	
57	AIR5.1	Testing of Airstrip using Simulations	20 days	Mon 2/10/20	Fri 3/6/20	44	Quality Conformance Analys
58	AIR5.2	Testing of all the Equipments Pertaining to Runway	140 days	Mon 3/30/20	Fri 10/9/20	48,57	Quality Conformance Analys
59	AIR5.3	Test Run of Flight	60 days	Mon 10/12/20	Fri 1/1/21	58	Chief Aeronotical Engineer
60	AIR5.4	Testing of the Automatic Landing System	90 days	Thu 4/2/20	Wed 8/5/20	53	Chief Aeronotical Engineer
61	AIR5.5	Fixing Loopholes and Final Touches	45 days	Thu 8/13/20	Wed 10/14/20	60,47	Quality Conformance Analys
62	AIR5.6	Quality Confirmance Certification	0 days	Wed 10/28/20	Wed 10/28/20		Quality Conformance Analys
63	AIR5.7	Compliance of Requirements for the Terminal as per Stakeholders	10 days	Thu 10/15/20	Wed 10/28/20	61	Project Manager
64	AIR6	Cool Off Period	25 days	Mon 1/4/21	Fri 2/5/21	56	
65	AIR7	**Completion**	21 days	Mon 2/8/21	Sat 3/6/21	64	

Appendix 3

These Network Diagram screenshots are in continuation





Appendix 4

Cost Estimation by Activities

	Activities	COST (Millions)
1	**Selection of Project Teams**	**27.2**
1.1	Project Manager Selection	1
1.2	Project Supervisor Selection	0.5
1.2	Hire designer and architect	1.5
1.3	Hiring of construction engineers and teams	20
1.4	Hire chief aeronautical engineer	1
1.5	Select quality conformance analyst	0.5
1.6	Hire tech team	2.5
1.7	Create project charter	0.1
1.8	Approval of project charter by sponsors	0.1
2	**Land Selection**	**3.4**
2.1	Define land requirements	0.1
2.2	Shortlist possible locations	0.1
2.3	Inspect site environment	1
2.4	Inspect the fitness of land for runways	2
2.5	Finalizing the Project Site	0.1
2.6	Approval for construction on selected sites.	0.1
3	**Construction Planning**	**8.9**
3.1	Advanced Study of Possible Environmental Impact	0.5
3.2	Consultation from the Meteorological Engineers	0.1
3.3	Create the Concept Map for the Airport	1
3.4	Create Design and Blueprints	2
3.5	Create Prototype	0.5
3.6	Approval of Sponsor for the Prototype	0.1
3.7	Revising the Prototype and Approving Changes	0.2
3.8	Finalizing the Design	0.1
3.9	Clearance of Safety, Security and Capacity	1
3.10	Clearance for Airport Access System	1

3.11	Technical Approvals	0.5
3.12	Environmental Impacts Analysis Approvals	0.5
3.13	Confirmation of Project Member Roles	0.1
3.14	Create Required Raw Materials List	1
3.15	Finalizing Suppliers for Raw Materials	0.2
3.16	Contracts for Labors	0.1
4	**Construction**	**95.5**
4.1	Site Clearance	2.5
4.2	Procurement of Raw Materials	22
4.3	Land Allocation for Individual Entity	2
4.4	Creation of Foundation for the Airstrip	3
4.5	Laying out the Airstrip.	7.5
4.6	Markings of Airstrip	2
4.7	Following Lights and other Lighting System	2.5
4.8	Elevation of the Platform for the Terminal	7
4.9	Construction of the Terminal Structure	11
4.10	Interior Designing of the Terminal	10
4.11	Construction of Hanger and Maintenance facility	7
4.12	Air Traffic Control Construction	5
4.13	Construction of Airport Wind Observation system	3
4.14	Installation of Automatic Landing System	6
4.15	Installation of Safety Mechanism (Fire Evacuation Services and Emergency exits)	5
5	**Testing**	**15**
5.1	Testing of Airstrip using Simulations	1
5.2	Testing of all the Equipments Pertaining to Runway	1
5.3	Test Run of Flight	2.5
5.4	Testing of the Automatic Landing System	0.5
5.5	Fixing Loopholes and Final Touches	6
5.6	Compliance of Requirements for the Terminal as per Stakeholders.	4
	Total	**150**

Table of Contribution

Name	Student ID	Task
Darshan Maniar	40138514	Change Request, WBS ,Financial analysis, Weighted decision matrix , Scope statement, Activity Time Estimates, PERT analysis, EVM, Cause and Effect Diagram and Flow Diagram
Devanshi Rajpara	40164374	Progress Report, Charter, Scope statement,Stakeholder register, WBS chart, CPM (AON), RBS, Probability Impact Matrix, Cause and effect diagram, Flow diagram, Responsibility Assignment matrix
Jeevesh Awal	40169864	MS Project, Scope Statement, Introduction, Network Diagram, Resource allocation.
Lakshay Bareja	40156832	Activity Cost Estimation, SWOT analysis, EVM, Scope Statement, Milestone List and Report, Change requests, WBS, MS Project, Financial analysis, Weighted decision matrix
Nithish Reddy	40164619	Business case, Quality Management and Assurance Plan,Quality metrics, Project Closing Phase, Responsibility Assignment Matrix
Rida Rais	40161813	Team Contract, Kick off Meeting, Risk Register, Quality Assurance Checklist, Pareto Chart