OF CAPITAL EXPENDITURE FOR DEVELOPMENT OF GREENFIELD AIRPORT FACILITIES AT MANOHAR INTERNATIONAL AIRPORT AT MOPA, GOA

VALUATION REPORT PREPARED BY

KITCO LTD, KOCHI

KITCO Ltd.
MM Gardens, Church Landing Road,
Near Kerala Fine Arts Hall,
Kochi – 682 016

21.06.2023

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ANNEXURES

ABBREVIATIONS

AERA	:	Airports Economic Regulatory Authority of India
ADRM	:	Airport Development Reference Manual
AOCC	:	Airport Operations Control Centre
AODB	:	Airport Operational Data Base
ATRS	:	Automatic Tray Return Systems
BC	:	Bituminous Concrete
BHS	:	Baggage Handling System
BMS	:	Building Maintenance System
BT	:	Bituminous
CA	:	Concession Agreement
CAGR	:	Compounded Annual Growth Rate
CBR	:	California Bearing Ratio
CFR	:	Code of Federal Regulations
COD	:	Commercial Operations Date
CUSS	:	Common Use Self Service
CUTE	:	Common User Terminal Equipment
DBFOT	:	Design, Build, Finance, Operate and Transfer
DSRA	:	Debt Service Reserve Account
E&M	:	Engineering and Maintenance
EPC	:	Engineering, Procurement and Construction
GIAL	:	Goa International Airport Limited, Mopa
GoG	:	Government of Goa
ICAO	:	International Civil Aviation Organization
IMG	:	Inter-Ministerial Group
LoS	:	Level of Services
MARS	:	Multiple Aircraft Ramp System
MATV	:	Master Antenna Television System
MCC	:	Megawide Construction Corporation
MoRTH	:	Ministry of Road Transport and Highways
MPPA	:	Million Passengers Per Annum
MRSS	:	Main Receiving Sub-Station
MSA	:	Million Standard Axle
MSL	:	Mean Sea Level
mtr	:	Metre
MYTP	:	Multi Year Tariff Proposal
NCAP	:	National Civil Aviation Policy, 2016

NOTAM	:	Notice to Airmen
PBB	:	Passenger Boarding Bridge
PLF	:	Peak Load Factor
PTB	:	Passenger Terminal Building
RESA	:	Runway End Safety Area
RET	:	Rapid Exit Taxiways
SCADA	:	Supervisory Control and Data Acquisition
SOCC	:	Station Operations Control Center
SSB	:	Stabilized Base/Sub Base
ToW	:	Take-off Weight
UDAN	:	Ude Desh Ka Aam Naagrik
VDGS	:	Visual Docking Guidance System
WPI	:	Wholesale Price Index

DEFINITIONS

Project	:	Greenfield International Airport at Mopa, Goa
Authority	:	Government of Goa
Concessionaire/ Airport Operator	:	Goa International Airport Limited (GIAL), Mopa

1 Introduction

1.1 Background

India is in a stage to become the most populated country in the world having a population of over 1.4 billion, representing one-sixth of the world's population. The substantial boost in spending power of the aspiring huge middleclass population of India, along with the expansion of airport network throughout the country, aided by various policies/ schemes/programs of Government of India in the aviation sector like National Civil Aviation Policy, 2016 (NCAP), Regional Airports Development Program, UDAN, etc. has led to a remarkable growth in air passenger traffic in the country.

Goa is one of the most popular tourist destinations in the country with more than 80 lakh tourist arrivals including 9 lakh foreign tourists per year. Considering the importance of tourism industry, which offers a huge potential for direct and indirect employment in the state, Government of Goa has been giving thrust to develop the tourism infrastructure with the support of Government of India. Given its inherent potential and locational advantages, the presence of a full-fledged, state-of-the-art International Airport is one such pre-requisite to provide a growth stimulus to the tourism sector of the state of Goa. This can also unleash the state's potential of serving as a key logistics hub in the western region of the country, directly connecting many domestic and international destinations.

The state of Goa has an existing airport in Dabolim, which is being operated by the Airports Authority of India (AAI). This airport, being a civil enclave, is faced with operational restrictions from 8:30 am to 12:30 pm and 3:30 pm to 4:30 pm during which commercial operations are not permitted. Considering the urgent need for an unhindered international airport and with the vision of long-term economic growth of the state, Government of Goa decided to develop a Greenfield Airport at Mopa exclusively for commercial operations on Public Private Partnership (PPP) mode in accordance with the Greenfield Airports Policy/Guidelines of the Ministry of Civil Aviation (MoCA), Government of India.

Goa International Airport Limited (GIAL), the Special Purpose Vehicle (100% subsidiary of the Successful Bidder, GMR Airports Limited), signed the Concession Agreement ("CA") with Government of Goa ("GoG") on 8th November 2016 to develop the Greenfield International

Airport at Mopa in Goa ("the Project"), under DBFOT (Design, Build, Finance, Operate and Transfer) model for an initial period of 40 years from the appointed date (4th September 2017), which is further extendable by another 20 years (based on competitive bidding) with First Right of Refusal to the Concessionaire, GIAL.

The salient features of the Concession Agreement relevant to this report are highlighted below:

a) Nature of Agreement

The Concession Agreement dated 8th November 2016 has been executed between Government of Goa and Goa International Airport Limited (GIAL) for the development of Greenfield International Airport on Public Private Partnership basis at Mopa in Goa and the project is to be implemented on DBFOT (Design, Build, Finance, Operate and Transfer) basis.

b) Scope of Concessionaire

In accordance with the provisions of the Concession Agreement, the scope of the Concessionaire is as follows.

1. Development and Construction of Airport in the Specified Site along with Project facilities and City Side in conformity with the laid down Specifications & Standards.

2. Operation, Maintenance and Management of the Airport.

3. Development, Operation and Maintenance of City Side.

4. Development, Operation and Maintenance of Aviation Skill Development Centre at ITI Pernem or any other Government ITI in the state of Goa as directed by the Authority.

5. Performance and fulfilment of all other obligations of GIAL and matters incidental thereto.

c) Fee

In consideration of the grant of Concession, GIAL (the Concessionaire) shall pay to the Authority by way of Concession fee a sum of Rs.1 (Rupee One) per annum and for each year commencing from the 6th (Sixth) year of occurrence of the Appointed Date, a premium (the "Annual Premium") equal to 36.99% (Thirty-Six point Nine percent) of the Gross Revenue during that year, in the form and manner specified in the CA.

d) Charges

For the provision of Aeronautical and Non-Aeronautical Services, GIAL (the Concessionaire) shall be entitled to Levy, Collect and Appropriate Fees from Users (of Terminal Building) including Airlines, Passengers, Advertisers and Visitors as per rates determined and revised by AERA, in accordance with provision of the Applicable Laws, Applicable Permits and Clauses specified in Article 31 of the Concession Agreement.
The Designated GOI agency shall be entitled to Levy, Collect and Appropriate the Route Navigation Facilities Charges (RNFC) and Terminal Navigational Landing Charges (TNLC) from Airlines in accordance with Applicable Laws.

e) Concession Period

The initial Concession Period for the Concessionaire is 40 Years, which is further extendable by another 20 years (based on competitive bidding) with First Right of Refusal to the Concessionaire. Accordingly, the Master Plan prescribes a Phased Development of the Airport over a period of 40 years (the Concession period) in a sequential manner based on the design capacity of the airport and the traffic triggers as follows:

Table 1 - Design Capacity & Traffic Trigger for Phasing as per CA

Phasing	Design Capacity (MPPA)	Traffic Trigger for Phasing
Phase I	4.4	-
Phase II	5.8	80% of Phase I Capacity
Phase III	9.4	80% of Phase II Capacity
Phase IV	13.1	80% of Phase III Capacity

In view of the delay in achieving Commercial Operations Date (COD) of the Project and the resultant changes in the traffic forecast, the Airport operator has obtained approval from Government of Goa to construct the terminal building area corresponding to 7.7 MPPA in Phase I with Fit Outs for 4.4 MPPA in the first year and have proposed the full Fit Outs for 7.7 MPPA and corresponding Apron expansion in year 2024. The Design Capacity as per MYTP for the First Control Period submitted by GIAL is as follows.

Table 2 - Revised Design Capacity as per MYTP

Phasing	Year	Design Capacity (MPPA)	
		Terminal Area	Fit Outs
Phase I	2022-23	7.7	4.4
Phase II	2023-24	7.7	7.7
Phase III	2025-26	11.1	11.1

Subsequently, there is expansion of Terminal building as well as Apron proposed to cater to 11.1 MPPA in the year 2026 as per the CAPEX outlay of the GIAL in the First Control Period i.e. FY 2023-28.

The Commercial Operations Date (COD) for Phase-I was achieved on 7th December 2022 and the first domestic flight operated from Greenfield International Airport at Mopa, Goa on 5th January 2023.

1.2 Scope of Services of KITCO Ltd

AERA, vide Letter of Award dated 8th June 2022, appointed KITCO for the Consultancy Services for analysis of Capital Expenditure for Development of Airport Facilities by Goa International Airport Limited, MOPA, Goa with the following scope of work.

1. To examine the proposal of the Airport Operator in terms of the designated capacity of the airport/scope with reference to Passenger Growth/Cargo volumes/Air Traffic Movement and to assess cost effectiveness of the proposal.

2. To examine the Building standards, Designs and Pavement works including Cost thereon proposed by the Airport Operator is in line with IMG norms/IATA/ICAO norms.

3. To analyze the reasonableness of the proposed cost with reference to the Tentative Ceiling decided by Authority vide order No. 7/2016-17 dated 13.06.2016 based on the details of the rates and quantity as per Government / Industry approved norms and advise AERA on the reasonableness of the cost.

4. To review designs and specifications proposed, in case the costs are assessed to be excessive where the works are already in progress or the contracts are already awarded. Further to examine whether proper procedures have been followed in the award of work.

5. To review and justify the Reasonableness of Time Schedule of Completion of work proposed by Airport Operator.

6. To assist AERA in case any Litigation arises in future in connection with the reasonableness of the cost estimates.

7. To perform any other Duties as may be deemed necessary and specified in the award letter.

1.3 Data Collection

After a series of email communications and discussions between KITCO and Airport Operator on dates - 02.08.2022, 22.08.2022, 10.09.2022, 20.09.2022, 25.10.2022, 01.11.2022, 24.12.2022, 13.01.2023, 24.01.2023, 10.02.2023, 15.02.2023, 16.02.2023, 06.03.2023, 24.03.2023, 29.03.2023, 08.04.2023, 03.05.2023, 04.05.2023 & 23.05.2023 - the following data has been received and studied:

- Multi Year Tariff Proposal for the First Control Period of Goa International Airport, Mopa, Goa.
- Concession Agreement for Development of Greenfield International Airport on Public Private Partnership at Mopa in Goa.

- Order No.07/2016-17 dated 13th June 2016 issued by AERA in the matter of Normative Approach to Building Blocks in Economic Regulation of Major Airports-Capital Costs Reg.
- Building Drawings
- Master Plan Report with drawings, DBR.
- Tender Evaluation & Contract documents and Amendments
- Summary of Variance of Project Cost (MYTP vs. Revised)
- Final Cost Estimate
- Letter of EOT due to 2nd & 3rd COVID Wave.
- Revised Project CAPEX intimation
- Letter of Approval of Revised cost of Mopa Airport Project.
- Report of Auditors (M/s Brahmayya & Co.)
- Revised Multi Year Tariff Proposal for the First Control Period of Goa International Airport, Mopa, Goa submitted by GIAL on 29.03.2023.

1.4 Report

This report sets out the evaluation by KITCO Ltd on the Capital Cost for the development of Greenfield International Airport at Mopa, Goa. This exercise is undertaken to assist AERA in assessment of the Capital Expenditure for the aforesaid project.

2 Project Details

2.1 Project Location

The Government of Goa has undertaken the development of a New Greenfield Airport through PPP mode for the state of Goa (the Project), near the village of Mopa as outlined in Figure 1. The village of Mopa is in North Goa near the Maharashtra border, approximately 35 kilometers (km) north of Panaji, the State Capital of Goa. Situated in the taluk of Pernem, the area is part of the Konkan Coast, which attracts visitors from all over India and other parts of the world.

Figure 1 - Location Overview

2.2 Site Description

As per Schedule A of the Concession Agreement, the total land area of the project is 2092.55 acres out of which 381 acres of land is earmarked for City Side development. The land is predominantly a "Table-top" Plateau area surrounded by Steep Slopes that act as Natural Drains and the nature of soil is Laterite. The approximate Ground Level of the plateau areas range between 140 mtr and 170 mtr above mean sea level (MSL), while the proposed approach road levels from NH 17 range from 6 mtr to 155 mtr above MSL. However, as per the Master Plan, the land area shown for the project is 2132 acres as against 2092.55 acres mentioned in the Concession agreement.

Figure 2 - Airport Location (Satellite Image)

The Master Plan is developed primarily in accordance with the Land Use Map outlined in the Concession Agreement (CA). The CA is quite prescriptive and specifies the location and land use at the Airport with respect to the Aeronautical Assets, the Passenger Terminal Building

(PTB), Non-Aeronautical Assets, Alignment of the Primary Access Road and City Side development. The site area of 2132 acres is divided into 4 categories:

- Airside comprising Runways and Taxiways
- Passenger Terminal Building (PTB) and Apron areas comprising the PTB, Aircraft Stands, Airfield Roads and Related Support Functions
- Unrestricted Landside areas
- Restricted Landside areas

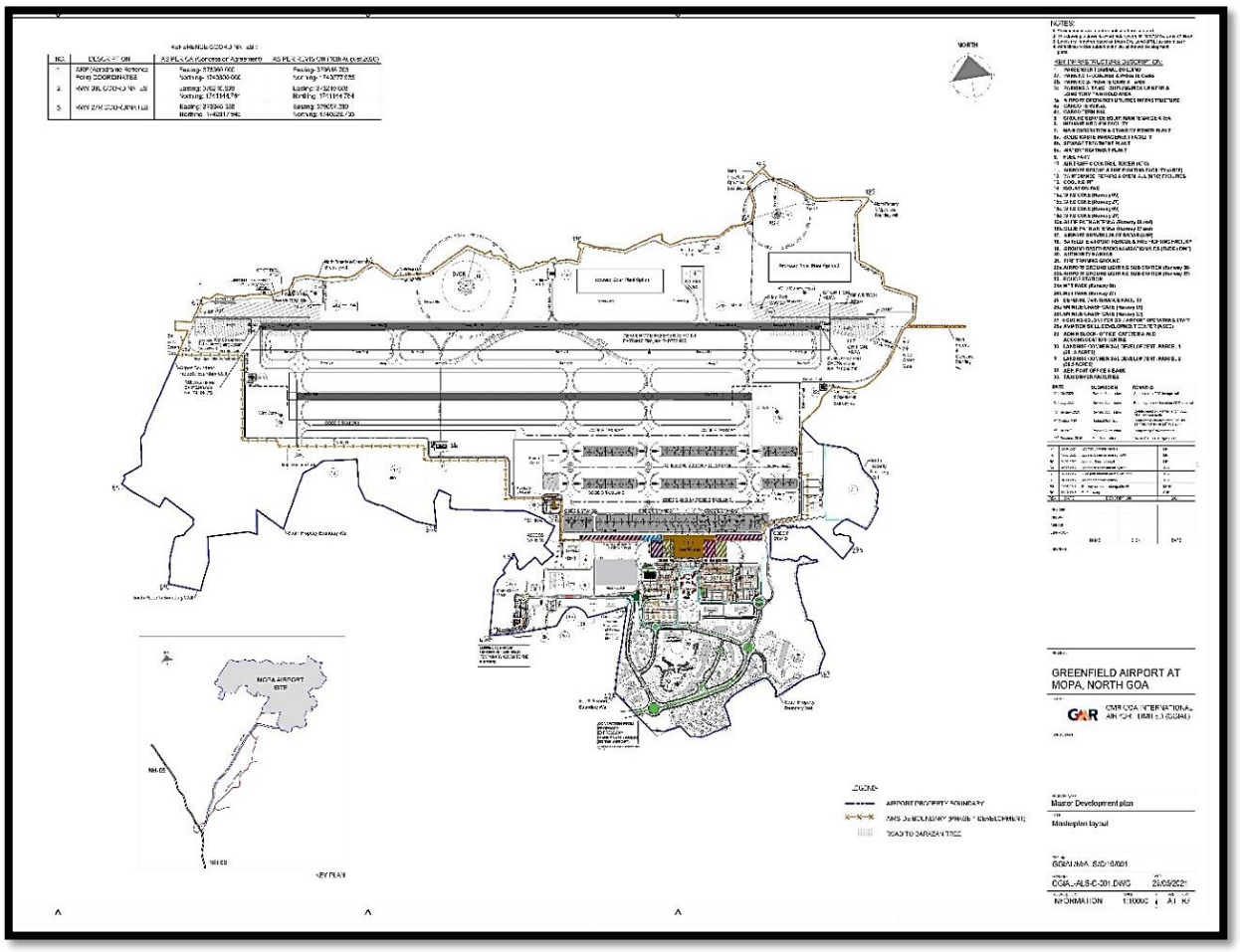

Figure 3 - Master Plan Drawing

2.3 Necessity of a Greenfield Airport in Goa

The existing airport at Dabolim is civil enclave in nature and has got certain operational restrictions from 8:30 am to 12:30 pm and 3:30 pm to 4:30 pm during which commercial operations are not permitted. With these constraints, the present integrated passenger terminal building of 2750 PHP capacity at Dabolim airport has reached the saturation level of around 9 MPPA capacity in FY 2018-19 and FY 2019-20 before the onset of COVID-19 pandemic. The growing tourist sector which is the biggest GDP contributor of the State, demands a second Airport that is functional 24 X 7.

Even though the proposal for development of second airport at Goa was envisaged by Government of Goa in the year 2000, due to the delay occurred in Land acquisition and obtaining statutory clearances, the Request for Proposal for the development of greenfield airport at Mopa on DBFOT basis could be floated only by the year 2016. A Concessionaire Agreement was entered into by Government of Goa with the successful bidder, M/s GMR Airports Limited through its 100% subsidiary, Goa International Airport Ltd. (GIAL).

2.4 Salient Features of the Project as per Concession Agreement

The salient features of the greenfield airport at Mopa as mentioned in the Concessionaire Agreement includes the following:

- Land area is 2093 acres subject to joint verification (2132 acres as per Master Plan).
- Master Plan of the airport in 4 phases – 4.4 MPPA in Phase I, 5.8 MPPA in Phase II, 9.4 MPPA in Phase III and finally Phase IV catering to 13.1 MPPA. However, the Concessionaire obtained approval from the Authority (Government of Goa) for revised phasing of the project with Terminal Building area for 7.7 MPPA (Fit Outs for 4.4 MPPA in Phase I, 7.7 MPPA in Phase II and 11.1 MPPA in Phase III.
- Runway to cater to Category 4E in Phase I & II, and 4F in Phase III & IV.

- Passenger Terminal Building with all services and amenities necessary for IATA Level of Service "C" (optimum standards) requirements; (25-40 sq. m/pax), 80% of passengers to be served by boarding bridges.
- Air-Traffic Control and Meteorological facilities.
- Airside and Landside Access Roads and Forecourts, including Curbside, Traffic Signals and Way- finding Signage.
- Cargo Terminal and Ancillary Facilities for processing and storage.
- Aircraft Rescue & Fire Fighting facilities.
- Infrastructure for Aircraft Fueling Services.
- Reserved Services and Defense area.
- Emergency services.
- Storm and surface water drainage.
- Aircraft Ground Service Equipment Maintenance facilities.
- Hangars.
- MRO facility.
- In-flight Catering services.
- Vehicle parking.
- Police Station and Customs Building.
- Other activities related to Passenger Services at the Airport.
- In addition, any facility mandated as per ICAO documents and annexes, Applicable Laws and as per the direction of the Authority would need to be provided.

Based on the above requirements as per CA and relevant governing parameters, the review of documents related to Passenger Traffic, Cargo Traffic, etc., ADRM calculations, sizing of

Airside components and analysis of PTB area of the project have been done for assessing the Capital Expenditure of the Project.

2.5 Project Proposal by GIAL

As per the Concession Agreement, the Design Capacity required for Phase I is 4.4 MPPA. However, due to delay in commencing the construction activities, the Commercial Operations Date (COD) could be achieved in December 2022 against the original COD of September 2020 and the traffic projections for Phase I & II also got revised accordingly. Hence the traffic forecast for FY 2024 corresponds to Design Capacity of 7.7 MPPA, which falls between Phase II (5.8 MPPA) and Phase III (9.4 MPPA). As per the Airport Operator, the FY 2022 build out shall satisfy all requirements set down in the CA from FY 2020 through FY 2023 with some flexibility built in to accommodate the additional demand until the delivery of next phase. Hence, the Concessionaire obtained approval from Government of Goa to construct Terminal Building area corresponding to 7.7 MPPA and with Fit Outs for 4.4 MPPA in Phase I and commissioned this initial phase in December 2022. It may be noted that the Traffic Design Capacity of 7.7 MPPA is above the traffic trigger of 7.52 for Phase III (80% of 9.4 MPPA) as per the Concession Agreement.

As per the MYTP Capital Expenditure outlay, the Airport Operator has proposed full Fit Outs for 7.7 MPPA and corresponding Apron expansion in the year 2024. Subsequently, there is expansion of Terminal building as well as Apron proposed to cater to 11.1 MPPA in the year 2026 as per CAPEX Outlay of GIAL in the First Control Period i.e. from FY 2022-23 to FY 2027-28.

The major components of the project as per Project Information file of GIAL include the following heads.

2.5.1 Passenger Terminal Building (PTB)

The Passenger Terminal Building (PTB) facilities is designed for catering to Peak Hour Demand of 2400 PHP and the Terminal Building has been developed for a capacity of 7.7 MPPA with a Floor Area of 67,726 sq. m {including Utility Building & Airport Plaza). The area of PTB per Peak Hour Passenger works out to 28.22 sq. m (25 to 40 sq. m as per CA). However, the Airport

Operator has provided Fit Outs and Airport Systems for 4.4 MPPA corresponding to Phase I and will keep adding Fit Outs on the basis of Capacity Utilization in phases. The modular development proposed for the expansion shall ensure that the airport operations are not interrupted whenever the construction of subsequent phase commences after completion of the previous phase.

The development of PTB for the concession period is spread over a large area on the South West corner of the Airport site. The Architectural Concept of the passenger terminal is a simple composition of a Central Building with Connected Piers on each side on the Airside and the structure is G+2 building. The PTB will handle both International and Domestic traffic. The Check-In Island including 18 traditional Check-In counters and 4 Baggage Drop and Arrival Carousel (3 Domestic + 1 International Baggage Belt) are located at the Ground floor. The Central Processing Zone contains all the common facilities like Check-In, Baggage Drop, Security Screening, Baggage Sorting, Baggage Claim, Offices, Lounges and Passenger Service. All the Boarding Bridges are connected at Upper levels.

The Pier portion has Passenger Circulation and Waiting Areas with Commercial Areas forming a part of the Central Concourse at the departure level. The Pier area also serves as the connection to the boarding bridges for departing passengers and as an entry to the central building for the arrival concourse. The International traffic is proposed to be handled on the Eastern side of the PTB whereas the Domestic traffic shall be processed from the Western end.

2.5.2 Runway and Taxiways

The Runways are oriented in the East-West direction. The primary Runway (10/28) is 3500 mtr length having a width of 45 mtr and shoulders of 7.5 mtr on both sides (total width of 60 mtr). A Parallel Taxiway is located 225 mtr away from the Primary Runway centerline. The Parallel Taxiway is also planned to serve as an Emergency Runway for Code E aircraft during periods of Maintenance or Operational requirements. The Runway End Safety Area (RESA) is provided at either end of the Runway Strip. The area extends 240 mtr from the strip and has a width of 90 mtr on both sides of the extended centerline of the Runway. The main runway is provided with:

- Two Rapid Exit Taxiways (RET) catering to Code E type of aircraft.

- Four perpendicular Taxiway exits from the main Runway. Two of these Taxiway exits and the exits from the RET connect the Runway system to the Apron. The other two Taxiway exits provide approaches to other airfield activities.

Sufficient area for Second Runway has been earmarked with a center-to-center distance of 415 mtr between two runways.

2.5.3 Apron

The Apron is designed for catering to aircraft from Code A to Code E. An Apron of area 79,380 sq. m (540 mtr x 147 mtr) on the northern side of the Passenger Terminal Building with rigid pavement is proposed for the Phase I. The Apron is designed to accommodate 8 stands for Narrow Body (Code C) aircraft and 2 stands for Wide Body (Code E) aircraft at a time. Since the Wide body aircraft stands are designed as flexible stands to handle 2 Narrow body aircraft simultaneously, the Apron can accommodate a total of 12 Narrow Body (Code C) aircraft at the same time.

The number of contact stands is 3 catering to Narrow body aircraft and 1 catering to Wide body aircraft (equivalent to 2 Narrow body aircraft). The number of remote stands is 5 for Narrow body aircraft and 1 for Wide body aircraft (equivalent to 2 Narrow body aircraft).

Table 3 - Aircraft Stand Details of Mopa Airport for Phase I

Sl. No	Particulars	Code C	Code E (MARS stand)	With Only Code C
1	Apron Stands	8	2 (4*)	12
2	Contact Stands	3	1 (2*)	5
3	Remote Stands	5	1 (2*)	7

**(Configuration with Narrow Body aircraft)*

In Phase II, when the Fit Outs will be upgraded for 7.7 MPPA from 4.4 MPPA design capacity, the apron expansion is planned to accommodate 4 more Code C aircraft.

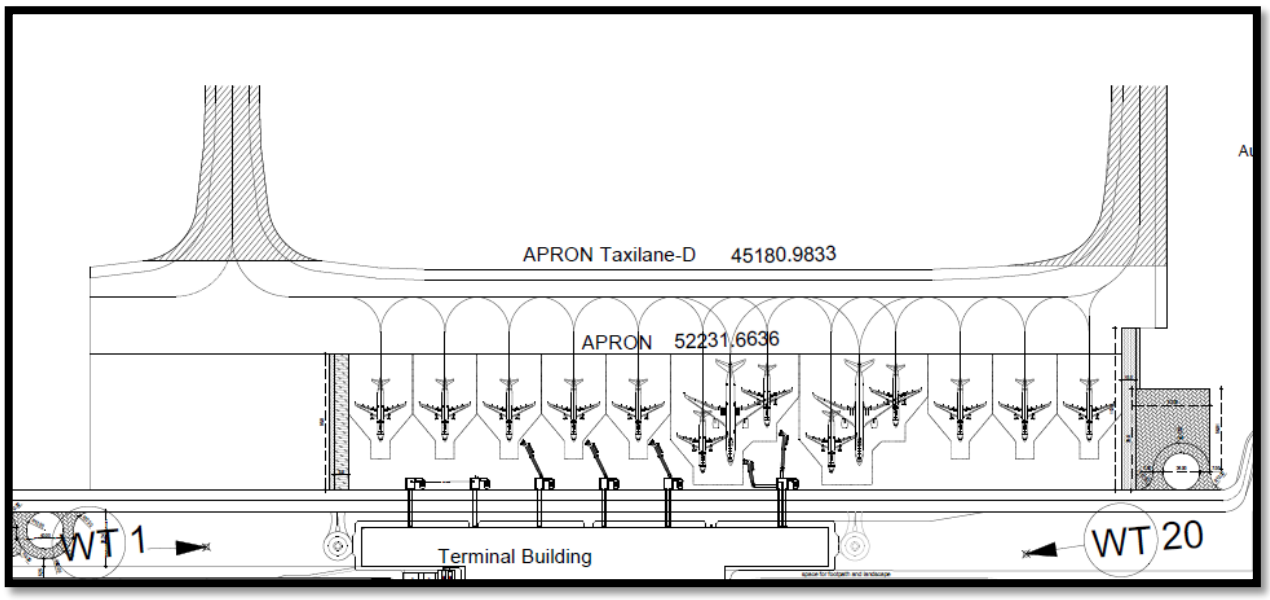

Figure 4 - Apron Configuration

The Project Proposal by GIAL is summarized as given below:

Table 4 - Project Proposal by GIAL

Scope of Work	Details
Site preparation work	• Site Establishment • Bulk Earthworks
Passenger Terminal Building	• Airport plaza • Passenger Concourses • Ticket offices • Check-in facilities • Centralized Security Screening • Security systems • Immigration, Customs and Security Counters • Baggage Handling System (BHS) • Elevators and Escalators • Fixed PBBs including ramp houses • Movable PBBs • VDGS • Bus gates for remote stands • Baggage trolleys (airside and landside) • Baggage trolley storage and recirculation areas

Scope of Work	Details

	• Signage
	• Offices
	• Retail and F&B stores
	• Medical Centre
	• Airport Operations Control Centre (AOCC) and Security Operations Control Center (SOCC)
	• Technical areas, stores and facilities for the employee's/ airlines staff in basement
	• Technical Shafts
	• Smoking Rooms
	• Left luggage facility
	• First Aid Rooms
	• Unloading bay
	• E&M Infrastructure
	• Façade and maintenance equipment
	• BMS and SCADA
	• IT Systems
	  • Airport Community Network
	  • Flight Information Display System, (ACN)
	  • Common User Terminal Equipment (CUTE) and other Systems
	  • Apron Management System
	  • Airport Operational Database (AODB)
	  • Airport Management Administrative Network
	  • Billing System
	  • Master Clock System
	  • Master Antenna Television System (MATV)
	• Passenger Services
	• Passenger Lounges
	• VIP Lounges

Airside works	• The Runway and Taxiway system including adjacent restricted areas. • Apron for Passenger Terminal • Isolation Bay • Airfield Ground Lighting • Airside Service Road • Aviation Fuel Hydrant System • Storm water drains for runway, taxiways, aprons and airside roads

Scope of Work	Details

	• Necessary visual aids on runway, taxiways and aprons to ensure that aircraft can operate safely on a 24 Hrs. basis.
	• Civil and building works and utilities required for the meteorological communication, and navigational equipment
	• Air Traffic Control tower
	• Property Boundary Wall
	  • Operational Boundary Wall
	  • All other Associated Projects

Landside Works	• Main Access Roads • Traffic loop in front of PTB including departure and arrival • Road Systems to other airport facilities • Private and Taxi Car Park • Storm Water drains for landside roads and other areas • Utility trench from utility building in PTB • Utilities distribution Infrastructure • All other associated projects
Other Building & facilities	• CFR Stations • Ground handling equipment and maintenance facilities • Water Storage and distribution facilities • Water treatment plant and STP • MRSS and DG power station • Fuel Farm • Cargo Terminal • In Flight Kitchen • Miscellaneous buildings such as Substations, Pumping station and Gate houses • All other associated projects
Miscellaneous works	• Airside/landside security fence and control points • Airside Fire Drill facility • Operations and maintenance equipment facilities • Operation and maintenance of Site access roads and the site offices.

The following major facilities are being provided in Phase I as per the Concession Agreement:-

Table 5 - Phase I Project Facilities provided by GIAL

Airside	
Runway (10/28)	3500 X 45m + 7.5m Shoulder each side, Flexible Pavement
Parallel Taxiway	3500 X 45m + 7.5m Shoulder each side, Flexible Pavement
Apron including Taxi lane	79,380 sq. m, Rigid Pavement
Total In contact Aircraft Stands	5 Nos. (3 for code C, 1 MARS (1 code E or 2 code C).
Remote stands	7 Nos. (5 for code C, 1 MARS (1 code E or 2 code C).
VDGS	5 Nos.
Fuel Hydrant	On all stands excluding Authority's stands
Fire Stations	1 CFR Main + CFR Satellite (CAT-9 runway operations)
Landside	
Departure Forecourt	5 Lane (3 moving +2 parking); Carriage width: 14.5m
Arrival Forecourt	5 Lane (3 moving +2 parking); Carriage width: 14.5m
Car Parking	302 Cars and 54 coaches + Taxi bank of 1435 Nos.
ATC & ATCTB	Height 48.45m, Tech. Building G+3 (Area 4547 sq.m)
Cargo	25,000 Tons/ year. Belly Cargo for Phase I
Passenger Terminal Building	
Capacity	7.7 MPPA (Fit Outs for 4.4 MPPA)
Total Built-up area	67,726 sq. m
Entry Gates (Check -in Hall)	3 Nos.
Check-In-Island	1 No.
CUSS Machines	12 Nos.
Check-in counters	22 (11 Nos. for Self-Baggage Drop)
ATRS	7 Nos. (~300 Bags/hr.)
Baggage Screening Capacity	2 Lines (2400-3000 bags/hr.)
Bussing Gates Domestic	3 Nos.
Bussing Gates International	2 Nos.
Bussing Gate VIP	1 No.
Emigration counters	8 Nos. (Departure)
Immigration counters	12 Nos. (Arrival)
Baggage reclaim belt	2 Nos. (Domestic) + 1 (International)

2.6 Phased Expansion of Project in First Control Period (FY 2023-28)

Considering the traffic growth at Mopa Airport, the CAPEX for future expansion in First Control Period by GIAL is as below:

- Additional Fit Outs required in the Passenger Terminal Building (PTB) to cater to an increased design capacity of 7.7 MPPA from existing Fit Outs provided for 4.4 MPPA. This will include additional Fit Outs in the PTB like additional Check-in counters, Passenger Boarding Bridges (PBB), Escalators & Elevators, Screening Systems and additional Apron area of 20,000 sq. m, with additional Airside Infrastructure like VDGS and Airside Vehicles in Phase II (FY 2024).

- Expansion of Passenger Terminal Building (PTB) to handle design capacity of 11.1 MPPA - Increase in PTB area by 25,000 sq. m with Fit Outs and increase in Apron area by ~35,000 sq. m. in Phase III (FY 2026).

3 Project CAPEX Submitted by GIAL

Goa International Airport Limited ("GIAL") had entered into an Engineering, Procurement and Construction Contract ("EPC Contract") on 22nd February 2018 with the EPC Contractor, M/s. Mega wide Construction Corporation ("MCC") to design and execute the works comprising design, procurement, manufacture, assembly, construction, testing, commissioning and maintenance of the upcoming Greenfield International Airport at Mopa, Goa ("Airport"). The Notice to Proceed with the work was issued on 3rd March 2018 with original COD as 3rd September 2020.

The award of Fixed Lump Sum Price of the EPC Contract as per price Schedule 3A & 3B was Rs.1377.26 Crore including GST.

As per the submission of addendum -1 date 27.01.2021 to Contract "In view of the restraints imposed by the Hon'ble High Court/NGT & Hon'ble Supreme Court of India, Government of Goa ("GoG"), has granted time extension of 634 days with necessary approval from GoG on recommendation by the Independent Engineer (Engineers India Ltd., a Govt. of India CPSE) and accordingly the COD was revised to 30th May 2022.

In view of the revised COD, as time overrun of 634 days was not attributable to EPC Contractor, they had submitted claims towards increase in cost under the following main heads.

- Time related costs including staff salaries and admin costs for the extended duration.
- Work related cost including change in rates requested by vendors, monsoon protection cost, etc.
- Idling cost, multiple demolition and remobilization of resources during the period of stay on tree felling and suspension.

The cost of Rs.567 Crore claimed by the EPC Contractor was negotiated to Rs.437 Crore. Based on this, GIAL and the EPC Contractor have amended the contract and revised the Price of the EPC Contract as Rs.1814.18 Crore including GST as per Revised Price Schedule 3 A & 3 B.

The summary of original EPC amount of Rs.1377.26 Crore and the revised EPC amount of Rs.1814.18 Crore is given in the following table.

Table 6 - Summary of Price Schedule 3A of EPC as per Amendment No.1

Cost Centre		Description	Existing as per Original contract	Revised after Amendment No: 1
1	1.1	**General Requirements & Site Establishment**	1,67,09,65,155.00	2,67,49,17,614.00
2	**Airside & Landside**			
	2.1	Runway, Taxiway, Aprons, Roads, Surface Drainage	5,53,08,76,158.00	7,54,45,26,723.00
	2.2	AGL Systems	24,93,77,581.00	24,93,77,581.00
	2.3	Other Buildings	64,48,67,636.00	70,49,53,387.00
	2.4	Reserved		
	2.5	Electrical Supply Systems	26,12,29,118.00	26,12,29,118.00
	2.6	Plumbing, Firefighting & Sewage Systems	17,17,24,041.00	17,17,24,041.00
	2.7	Reserved		
	2.8	Aircraft Fuel Hydrant System	16,74,60,056.00	16,74,60,056.00
3	**Passenger Terminal Building**			
	3.1	Structures	1,18,29,37,296.00	1,30,23,22,862.00
	3.2	Finishing Works	1,04,61,01,423.00	1,22,82,64,724.00
	3.3	HVAC System	27,75,08,050.00	38,73,09,499.00
	3.4	Reserved		
	3.5	Plumbing & Firefighting Systems	14,66,23,772.00	20,50,11,342.00
	3.6	Low Voltage System	25,69,32,027.00	36,23,39,411.00
	3.6A	Extra Low Voltage System	3,79,22,523.00	8,78,63,280.00
	3.13	Signage	2,71,36,720.00	2,71,36,720.00
		Contract Sum excluding GST	11,67,16,61,556.00	15,37,44,36,358.00
		Contract Sum including GST@18%*	**13,77,25,60,636.00**	**18,14,18,34,902.00**

Again, as per the Amendment No:2 dated 30th September 2021, GIAL and the EPC Contractor have amended the contract for change in scope & cost with respect to Passenger Terminal Building (PTB) works. The PTB area was increased by 7,615 sq.m from bid scheme to enhance the passenger experience. The revised area of 67,615 sq.m is meeting the area requirements, as per standards.

Table 7 - Details of Amended PTB Area as per Amendment No. 2

Sl. No.	Description	Existing Area (sq. m) as per original contract	Revised Area (sq. m) as per Amendment No.2
	Terminal Gross Floor Area		
1	Additional area for BHS (GF)	809.00	875.80
2	Ground Level	27,840.00	27,723.10
3	BHS Mezzanine	1,794.00	3,153.70
4	First Floor	19,223.00	9,795.00
5	Second Floor arrivals & Commercial	1,027.00	16,338.90
6	Airport Plaza	6,211.00	5,728.70
7	Utility Building	4,000.00	4,000.00
	TOTAL	**60,904.00**	**67,615.00**

Accordingly, corresponding variation in price has been worked out for Rs.29.98 Crore including GST as given below:

Table 8 - Price increase due for PTB Area Variation as per Amendment No: 2

As per Schedule 2B of Addendum No.1		Existing	Increase / Variation	Revised as per Amendment No: 2
Cost Centre	**Item Description**	**Amount in Rs. (A)**	**Amount in Rs. (B)**	**Amount in Rs. (C) = (A) + (B)**
3.1.1	PTB Foundation & Sub Structure	28,57,81,994.00	3,37,04,838.00	31,94,86,832.00
3.1.2	PTB Super Structure	32,49,02,192.00	3,83,18,635.00	36,32,20,827.00
3.1.3	PTB Roof Structure	63,44,69,769.00	1,10,14,395.00	64,54,84,164.00
3.2.3	PTB Finishing Works	55,49,81,720.00	6,54,53,981.00	62,04,35,701.00
3.3.1	HVAC system for PTB	34,53,28,208.00	4,07,27,658.00	38,60,55,866.00

As per Schedule 2B of Addendum No.1		Existing	Increase / Variation	Revised as per Amendment No: 2
Cost Centre	**Item Description**	**Amount in Rs. (A)**	**Amount in Rs. (B)**	**Amount in Rs. (C) = (A) + (B)**
3.5.1 a)	Plumbing System for PTB	3,99,11,947.00	47,07,175.00	4,46,19,122.00
3.5.4 a)	Fire Fighting System for PTB	5,48,35,125.00	55,61,324.00	6,03,96,449.00
3.5.6	Fire Detection and Suppression System for PTB, ATC, ATCTB & other buildings	9,30,82,328.00	94,40,317.00	10,25,22,645.00
3.6.1	Electrical system for PTB	28,77,01,518.00	3,39,31,225.00	32,16,32,743.00
3.6.A	Extra Low Voltage System for PTB, ATC, ATCTB & other building	8,78,63,280.00	89,11,007.00	9,67,74,287.00
3.13.2	Signage - PTB, ATC, ATCTB, Utility and other buildings	2,29,61,840.00	23,28,767.00	2,52,90,607.00
Total for items excluding GST@18%		**2,73,18,19,921.00**	**25,40,99,322.00**	**2,98,59,19,243.00**
Total for items including GST@18%		**3,22,35,47,507.00**	**29,98,37,200.00**	**3,52,33,84,707.00**

With the above revision, the fixed lump sum price of the contract was increased from Rs.1814.18 Crore to Rs.1844.17 Crore.

Further to the EPC amended amount of Rs.1844 Crore, GIAL has received approval from the Civil Aviation Directorate, Government of Goa vide letter No. 97/ DOCA/ GIAL/ FC/ 2021/ VOLII/569 dated 1st December 2022 after the detailed evaluation by an Independent Engineer (M/s Engineers India Ltd, a Govt. of India CPSE) for the capital expenditure proposal for Phase I of the Airport for the First Control Period in MYTP for an amount of Rs.2615 Crore.

The EPC contractor has again submitted a consolidated claim for increase in costs due to impact of COVID, various scope changes and earthwork (due to conditional acceptance of EPC bid). The EPC Contractors' claim of Rs.804 Crore was evaluated, negotiated and finally Rs.454 Crore was approved by GoG vide letter No. 97/DOCA/GIAL/FC/2021/VOLII//569 dated 1st December, 2022 after the detailed evaluation by Independent Engineer (M/s Engineers India Ltd, a Govt. of India CPSE).

Table 9 - Variation in EPC Cost

Sl. No.	Description	Amount	Reasons as Per GIAL
1	Original Contract Value	Rs.1377 Cr	
2	With Amendment No.1	Rs.1814 Cr	Due to time extension of 634 days
3	With Amendment No.2	Rs.1844 Cr	Due to PTB scope change
4	With Amendment No.3 & 4		Not directly related to CAPEX, hence having no implications for this analysis
5	With Amendment No.5	Rs.2298 Cr	Impact of COVID-19 Pandemic, scope changes and additional earthwork cost due to conditional acceptance of EPC bid

The amount is inclusive of GST.

The final capital expenditure proposal submitted by GIAL is based on EPC and other contracts awarded under different Work Packages. The revised total cost was submitted for approval for an amount of Rs.3400 Crore (EPC Contract final amended value of Rs.2298 Crore) vide letter No. 97/DOCA/GIAL-FC/2021/VOL II /765 dated 6th March 2023. GIAL, vide email dated 29.03.2023 submitted a revised MYTP for a total CAPEX amount of Rs.3603 Crore by increasing only the Financing Allowance to Rs.448 Crore from Rs.245 Crore, a significant increase of Rs.203 Crore within a span of 8 months.

3.1 CAPEX Proposed for Subsequent Phases in First Control Period (FY 2023-28)

The CAPEX for future expansion proposed by GIAL in the First Control Period is as follows:

- Additional Fit Outs in PTB like additional Check-in counters, Passenger Boarding Bridges (PBB), Escalators & Elevators, Screening Systems, additional Apron area of 20,000 sq.m, and additional Airside Infrastructure like VDGS and Airside Vehicles to cater to a design capacity of 7.7 MPPA in FY2024.

- Increase in PTB area by 25,000 sq.m along with Fit Outs and increase in Apron area by ~35,000 sq.m to cater to a design capacity of 11.1 MPPA in FY2026.

Accordingly, the CAPEX for First Control Period as per final MYTP submitted by GIAL is as given in the following table.

Table 10 - Phase-wise Capacity & Project CAPEX plan submitted by GIAL (Mopa)

Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Total
Phase	I	II	-	III	-	-	-
Design Capacity (MPPA)	4.4	7.7	-	11.1	-	-	-
Project CAPEX with built-up structure for 7.7 MPPA in Phase-I and only Fit Outs in Phase- II. (Rs. Cr.)	3603.29	200.61	-	500.80	-	-	**4304.70**

The Project CAPEX submitted by GIAL for 1st Control Period is as given below:

Table 11- Project CAPEX submitted by GIAL for 1st CP

(Rs. in Cr.)

Sl. No	Component	Phase I		Phase II	Phase III	CAPEX for First Control Period
		As per Initial MYTP dated 01.12 2022	As per revised MYTP dated 29.03.2023	Expansion proposal submitted by GIAL	Expansion proposal submitted by GIAL	
1	General Requirements & Site Establishment	**640.34**	**964.34**	-	-	-
a)	Site Establishment & Site Management charges	325.28	386.53	-	-	-
b)	Site office/Admin building	4.72	43.47	-	-	-
c)	Site Preparation/Earthworks	310.34	534.34	-	-	-
2	Airside infrastructure	**674.00**	**716.00**	-	-	-
a)	Runway, Taxiways and Apron	408.52	415.95	65.51	63.00	-
b)	Airside Buildings, Roads and Drainage System	265.48	301.00		4.50	-
3	Passenger Terminal Building (a to f)	**599**	**730**	108.18	369.50	-
a)	Civil & Structural Works	313	347	-	-	-
b)	Terminal Equipment (HVAC, Plumbing, LV, ELV, etc.)	126	232	-	-	-

Sl. No	Component	Phase I		Phase II	Phase III	CAPEX for First Control Period
		As per Initial MYTP dated 01.12 2022	As per revised MYTP dated 29.03.2023	Expansion proposal submitted by GIAL	Expansion proposal submitted by GIAL	
c)	Contact Stand & VDGS	24	16	-	-	-
d)	BHS & Other Aero Equipment	61	79	-	-	-
e)	Operating Equipment	19	19	-	-	-
f)	Utilities (Power & Water)	56	37	-	-	-
4	Main Access Road and spine road	35	98	-	-	-
5	Car Park Area	3	3	-	-	-
6	ATC Complex	46	87	-	-	-
7	Additional Works	22	68	-	2	-
8	Permanent Water and Electricity	17	20	-	-	-
9	ASDC	-	8	-	-	-
A	**Sub Total (1 to 9)**	**2036**	**2694.29**	**173.69**	**439**	**3307.98**
10	Design Consultancy & PMC Expenses	107	112	13.90	36	-
11	Pre-Operative Expense	126	259	3.47	3.3	-
12	Contingencies	36	0	9.55	22.50	-
B	**Sub Total (10 to12)**	**269**	**371**	**26.92**	**61.8**	**459.72**
13	Financing Allowance	220	448	-	-	-
14	DSRA	89	89	-	-	-
C	**Sub Total (13-14)**	**309**	**537**	**-**	**-**	**537.00**
	Grand Total (A+B+C)	**2615**	**3603.29**	**200.61**	**500.80**	**4304.70**

The cost is inclusive of GST.

4 Traffic Review

4.1 Project Information File of GIAL

The extracts of Project Information File (PIF) submitted by GIAL regarding final traffic forecast for first control period for Goa International Airports Ltd. prepared by CRISIL is as below.

- Over the decade, passenger traffic in Goa state has grown from 3.5 MPPA in FY13 to a peak passenger traffic of 8.4 MPPA in FY19. There is a slight decrease in passenger traffic in FY20 and significant decrease during FY21 & FY22 due the impact of COVID-19 Pandemic. However, It is observed from the AAI statistics that the passenger traffic has now recovered to Pre-COVID level in FY23 as per passenger traffic data available up to December 2022.

- GIAL is relying on the traffic forecast of CRISIL Risk and Infrastructure Solutions Limited, India which projected traffic throughput of 13.32 million passengers by FY28.

- A total of 88,047 Air Traffic Movement is expected to be achieved by FY28.

- Freight handling facility to handle 25,590 MT of cargo is also expected to be achieved by FY28.

- The Airport is designed to have a capacity of 4.4 MPPA initially as per CA and a dedicated Cargo Handling Facility to cater the growth of cargo traffic in the state of Goa.

- In line with the projected traffic growth, GIAL is now contemplating to increase the terminal capacity to 11.1 MPPA in FY 2026 during the First Control Period.

4.2 Passenger Traffic Forecast

4.2.1 Existing Scenario of Passenger Traffic

The Domestic & International passenger traffic handled by Dabolim Airport during the years 2012-13 to 2022-23 (up to Dec 2022) have been collected from the traffic news published by Airports Authority of India and is tabulated in the following table:

Table 12 - Passenger Traffic at Dabolim Airport (Existing)

Sl. No.	Year	International Passengers	Domestic Passengers	Total Passengers
1	2012-13	6,56,325	28,86,422	35,42,747
2	2013-14	7,36,340	32,63,195	39,99,535
3	2014-15	6,13,110	39,00,091	45,13,201
4	2015-16	6,45,845	47,29,710	53,75,555
5	2016-17	8,04,760	60,51,602	68,56,362
6	2017-18	8,35,264	67,71,985	76,07,249
7	2018-19	7,81,745	76,85,581	84,67,326
8	2019-20	7,04,878	76,51,362	83,56,240
9	2020-21	39,866	28,50,679	28,90,545
10	2021-22	1,04,200	51,33,851	52,38,051
11	2022-23 (upto Dec 22)	2,84,585	57,43,710	60,28,295

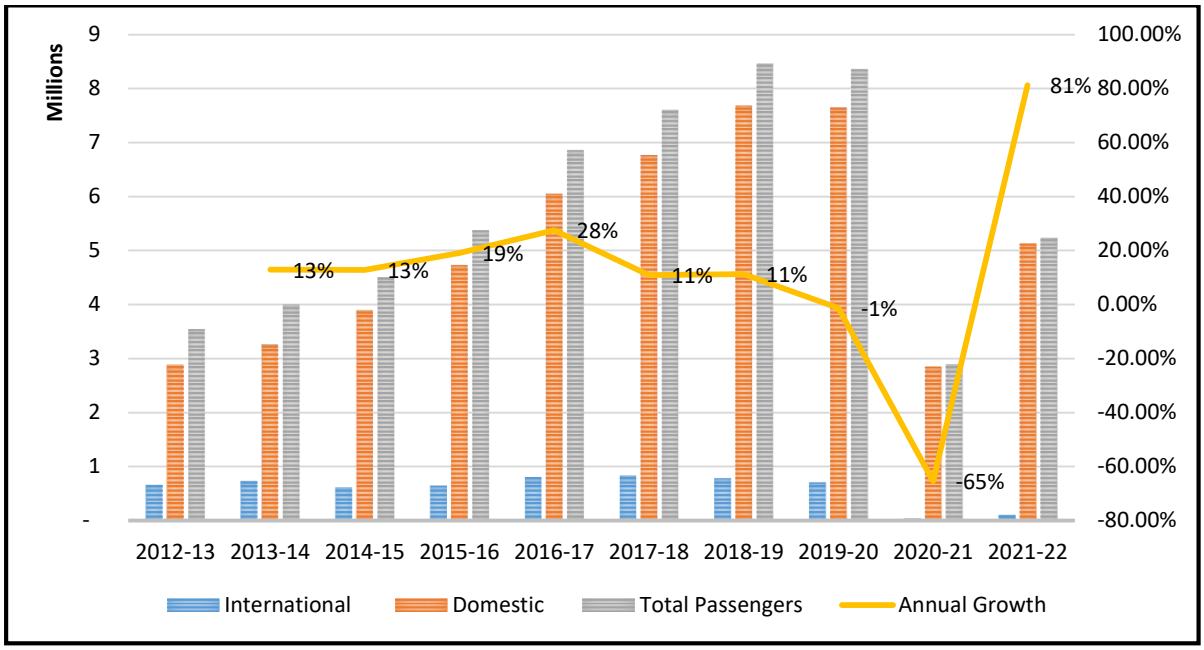

Figure 5 - Passenger Traffic Growth

4.2.2 Passenger Traffic Forecast by CRISIL

The newly constructed Airport at Mopa, Goa will have an initial capacity of 4.4 MPPA. The Airport Passenger capacity is projected to grow up to 20+ million in next 20 years.

CRISIL has forecasted the passenger traffic movement by employing the econometric model approach. For domestic passenger forecasting, a variable named Consolidated GDP, which is the Sum of States with highest share of passengers at the Goa airport (Gujarat, Maharashtra, Delhi, Telangana, Karnataka, Andhra Pradesh and Goa) is taken as Explanatory Variable and the passenger demand at the Goa airport is taken as the Dependent Variable. Further Regression Analysis is conducted using Ordinary Least Square method to arrive at the result. The analysis by CRISIL shows an Income Elasticity of 2, which means for every 1% increase in the Consolidated Income level, the Domestic Air Passenger Traffic demand at the Goa airport will grow by 2% with 95% confidence.

For International Passenger forecast using the same econometric model, a variable named Blended GDP is considered, which is the Weighted Average of the world GDP and Indian GDP. The weight assigned for world GDP is kept at 20% and Indian GDP is kept at 80%. Further

regression analysis using Ordinary Least Square method is conducted on the past decade data keeping Blended GDP as Explanatory variable and International Passenger demand as Dependent Variable. The result shows an Income Elasticity of 1.23 which indicates that for every 1% increase in blended income level the international air passenger traffic demand at Goa airport will grow by 1.23% with 95% confidence.

The data was corrected using a Correction Factor to reverse the impact of COVID-19 pandemic on the air passenger movement. The correction factor of 2.24% is based on the assumption that had COVID related disruptions been absent, the traffic for the last 8 days of FY2020 would have been same as that of the traffic for the last 8 days of FY 2019.

The CRISIL Traffic Forecast for First Control Period for Goa International Airport Limited 2021 report indicates that the total passenger traffic in Goa is expected to grow by 21 MPPA by FY28. The passenger growth is evident as the passenger movements have been restored into pre COVID levels. This forecasted passenger growth has to be handled by the two airports in Goa, Dabolim Airport and Mopa Airport. The total Passenger Traffic forecast has been reproduced below:

Table 13 - Passenger Traffic Forecast by CRISIL in the state of Goa

Particulars	FY23	FY24	FY25	FY26	FY27	FY28
Domestic Passenger Traffic (Nos.)	107,42,166	121,85,886	138,23,639	156,81,502	177,89,057	201,79,862
International Passenger Traffic (Nos.)	5,40,506	9,89,617	10,39,098	10,91,053	11,78,337	12,72,604
Total Passenger Traffic (Million)	11.28	13.18	14.86	16.77	18.97	21.45

Note: As can be seen the domestic traffic is approximately 10.74 MPPA to 20.18 MPPA. Further, international traffic is projected to be 0.54 MPPA to 1.27 MPPA.

As the Mopa Airport begins to operate, it is assumed that 35% of domestic passengers and 80% of international passengers will shift to the new airport at Mopa. The domestic and international passenger shift is further assumed to reach 60% and 95% respectively in FY28.

The passenger allocation to Mopa airport is also done by CRISIL in their study and is reproduced below:

Table 14 - Passenger Traffic Allocation to Mopa Airport by CRISIL

Particulars	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Domestic Passenger	35%	50%	50%	55%	60%	60%
International Passenger	80%	80%	90%	90%	95%	95%

Table 15 - Passenger Traffic Forecast for Mopa Airport by CRISIL

Particulars	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Domestic Passenger Traffic (Million)	3.76	6.09	6.91	8.62	10.67	12.11
International Passenger Traffic (Million)	0.43	0.79	0.94	0.98	1.12	1.21
Total Passengers in Million	4.19	6.88	7.85	9.61	11.79	13.32
Proposed Airport Passenger Handling Capacity by GIAL	**4.40**	**7.70**	**-**	**11.10**	**-**	**-**

4.2.3 Remarks on Passenger Traffic Forecast by KITCO

KITCO has reviewed the international and domestic traffic using Compounded Annual Growth Rate method based on the data gathered from the traffic news published by Airports Authority of India.

Table 16 - Passenger Forecast by KITCO in the state of Goa

Particulars	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Domestic passengers (Million)	11.6	13.4	15.4	17.6	20.3	23.3
International passengers (Million)	0.73	0.73	0.74	0.75	0.76	0.76
Total passengers (Million)	**12.3**	**14.1**	**16.1**	**18.4**	**21.0**	**24.1**

It is understood that the commissioning of new International Airport at Mopa in North Goa will not lead to the shutdown of the existing airport at Dabolim in South Goa. Both the airports will co-exist and handle the air traffic in the state of Goa. The Dabolim airport is expected to continue with the civilian aircraft operations especially in the domestic sector.

Considering the existing operational restrictions at Dabolim airport like no night parking availability and operational restrictions during day time, it is expected that 40% of domestic passengers will get shifted initially to Mopa airport progressively reaching 60% by FY28. However, the majority of international passengers (except chartered flights) are expected to shift to new Mopa airport by FY26 considering the fact that majority of tourist destinations in Goa are in the vicinity of new Mopa Airport in the Northern part of the State. Dabolim airport is expected to handle mainly the domestic passengers and chartered flights in FY26.

The diversion considered for International and Domestic passengers are as shown below:

Table 17 - Passenger Share Forecast to Mopa Airport by KITCO

Particulars	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Domestic passenger	40%	45%	50%	55%	60%
International passenger	80%	90%	90%	95%	95%

The total passenger traffic that may be handled by Mopa airport is as shown below.

Table 18 - Passenger Traffic forecast for Mopa Airport by KITCO

Particulars	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Domestic passengers (million)	5.34	6.91	8.82	11.16	13.99
International passengers (million)	0.59	0.67	0.67	0.72	0.73
Total passengers (million)	**5.93**	**7.58**	**9.50**	**11.87**	**14.71**

4.2.4 Passenger Traffic Forecast Scenarios

The analysis by both CRISIL and KITCO shows a steady increase in the air passenger traffic in Goa. The methods used for the forecast is different but the deviation in the forecasted number of passengers are justifiable. The forecasted values of KITCO and CRISIL are as below:

Table 19 - Passenger Traffic Forecast by KITCO and CRISIL (MPPA)

Particulars	FY24	FY25	FY26	FY27	FY28
KITCO	5.93	7.58	9.50	11.87	14.71
CRISIL	6.88	7.85	9.61	11.79	13.32

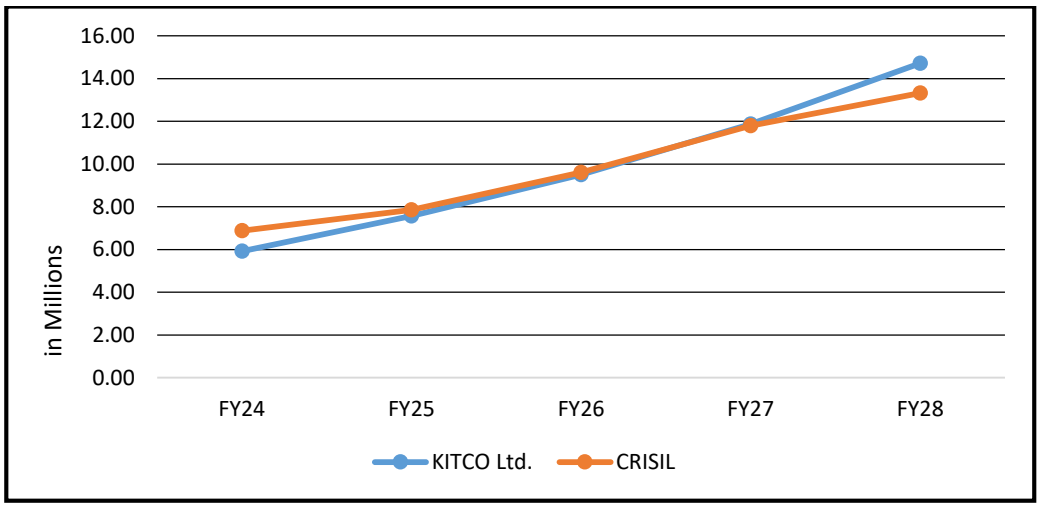

Figure 6 - Passenger Traffic Comparison

The actual and forecasted airport traffic data indicates that there is a significant increase in aircraft movement and passenger traffic in the state of Goa and same is expected to increase further in the coming years. The existing facilities at Dabolim airport is already operating under saturation and with the proposed expansion also, the airport facilities will be inadequate to cater to the increased volume of aircrafts and Passenger Traffic in Goa in the coming years.

The last two months of domestic passenger data shows an incremental growth in passenger to the state of Goa. **As per latest available statistics of AAI, the Mopa airport has achieved a domestic passenger traffic of 1.54 lakh in January 2023 (7.83 lakh for Dabolim) and has grown to 2.29 lakh in February 2023 (6.74 lakh for Dabolim) and 2.80 lakh in March 2023 (6.92 lakh for Dabolim),** which also indicates additional demand creation due to the new airport at Mopa, Goa. Both the airports operating simultaneously has led to increase in domestic passengers comparing to the previous year and Mopa has attracted new passengers rather than relying on to the existing passenger shift. This trend indicates that the air passenger capacity of the State is poised to meet the forecasted figures. The forecast by both CRISIL and KITCO shows less deviation and the data is reliable. It can therefore be concluded that the passenger traffic of MOPA Airport considered by GIAL aligns with the Traffic Forecast by KITCO in FY2025 and hence the proposal of GIAL of 4.4 MPPA in FY23 and expansion to 7.7 MPPA in FY24 is found to be acceptable in order to cater to the projected passenger traffic of around 7.5 MPPA in FY25.

4.3 Air Traffic Movement Forecast

4.3.1 Air Traffic Movement Forecast by CRISIL

For the ATM forecast, Peak Load Factor (PLF) was assumed at 75%, due to tendency of high PLF for Goa by CRISIL. The passenger per aircraft is assumed to be 150 and 165 for Domestic and International respectively. Based on this ATM forecast for the first control period is carried out as follows:

Table 20 - Air Traffic Movement Forecast by CRISIL

Particulars	FY24	FY25	FY26	FY27	FY28
Total Domestic ATM	40,620	46,079	57,499	71,156	80,719
Total International ATM	4,798	5,668	5,951	6,784	7,327
Total ATM	**45,418**	**51,747**	**63,450**	**77,941**	**88,047**

4.3.2 Air Traffic Movement Forecast by KITCO

The air traffic movement and peak hour forecast are done based on the forecasted passenger data. The average number of passengers for both the International and Domestic aircrafts are assumed to be 150. Also, the percentage share of international passengers are assumed to be 7.5%. For peak hour forecast, the normative ratio is as follows:

Normative Ratio – Domestic	0.15
Normative Ratio - International	0.20

Based on the historic data, the percentage of arriving or departing passengers are fixed as 58%. The summary of air traffic movement and peak hour forecast are shown below:

Table 21- Air Traffic Movement Forecast by KITCO

Particulars	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
PHP (Domestic)	2,254	2,880	3,610	4,514	5,593
PHP (International)	244	311	390	488	605
PHP (Total)	**2,498**	**3,191**	**4,001**	**5,002**	**6,198**
PH Arrival Passengers (Domestic)	1,307	1,670	2,094	2,618	3,244
PH Departing Passengers (Domestic)	1,307	1,670	2,094	2,618	3,244
PH Arrival Passengers (International)	141	181	226	283	351
PH Departing Passengers (International)	141	181	226	283	351
PH ATM (Domestic)	**15**	**19**	**24**	**30**	**37**
PH Arrival ATM (Domestic)	9	11	14	17	22
PH Departing ATM (Domestic)	9	11	14	17	22
PH ATM (International)	**2**	**2**	**3**	**3**	**4**
PH Arrival ATM (International)	1	1	2	2	2
PH Departing ATM (International)	1	1	2	2	2
Total PH ATM	**17**	**21**	**27**	**33**	**41**
Annual Domestic ATM	36,566	46,717	58,566	73,226	90,739
Annual International ATM	2,965	3,788	4,749	5,937	7,357
Annual ATM	**39,531**	**50,505**	**63,315**	**79,163**	**98,096**

4.3.3 Air Traffic Movement Scenarios

The Air Traffic Movement Forecast by CRISIL and KITCO is as follows:

Table 22 - Air Traffic Movement Forecast by KITCO and CRISIL (Nos.)

Particulars	FY24	FY25	FY26	FY27	FY28
By CRISIL	45,418	51,747	63,450	77,941	88,047
By KITCO Ltd	39,531	50,505	63,315	79,163	98,096

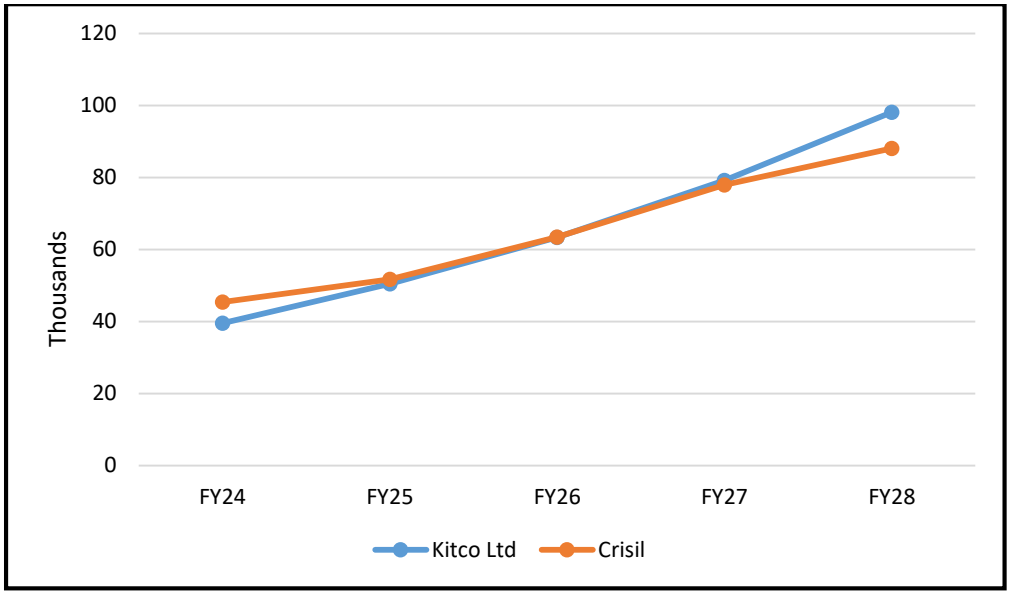

Figure 7 - ATM Comparison

The Air Traffic Movement forecast by both CRISIL and KITCO also aligns with each other. The variation between the forecast is less and the available data of the first three operational months of the new Mopa airport shows increase in Air Traffic Movement. The aircraft movements in Mopa airport for the first month (January 2023) was 1108, which increased to 1646 in February 2023 and to 2087 in March 2023. Many carriers those who backed out due the constraints in the Dabolim Airport are in line to start operation from the new Airport.

Hence the Air Traffic Movement Forecast considered by GIAL is justified. Thus, the need for a second Airport in Goa with respect to Air traffic and Passenger growth is justified.

4.4 Freight Traffic Forecast

The Domestic & International freight traffic handled by Dabolim Airport during from 2012-13 to 2021-22 as per statistics of Airports Authority of India and is given below:

Table 23 - Existing Freight Traffic at Dabolim Airport

Sl. No.	Year	International Freight (MT)	Domestic Freight (MT)	Total Freight (MT)
1	2012-13	2,379	2,573	4,952
2	2013-14	2,015	2,752	4,767
3	2014-15	1,210	3,288	4,498
4	2015-16	1,501	3,379	4,880
5	2016-17	1,165	2,938	4,103
6	2017-18	1,490	2,882	4,372
7	2018-19	1,812	2,724	4,536
8	2019-20	1,025	4,395	5,420
9	2020-21	183	3,782	3,965
10	2021-22	659	4,468	5,127
11	2022-23 (upto Dec 22)	1,704	2,949	4,653

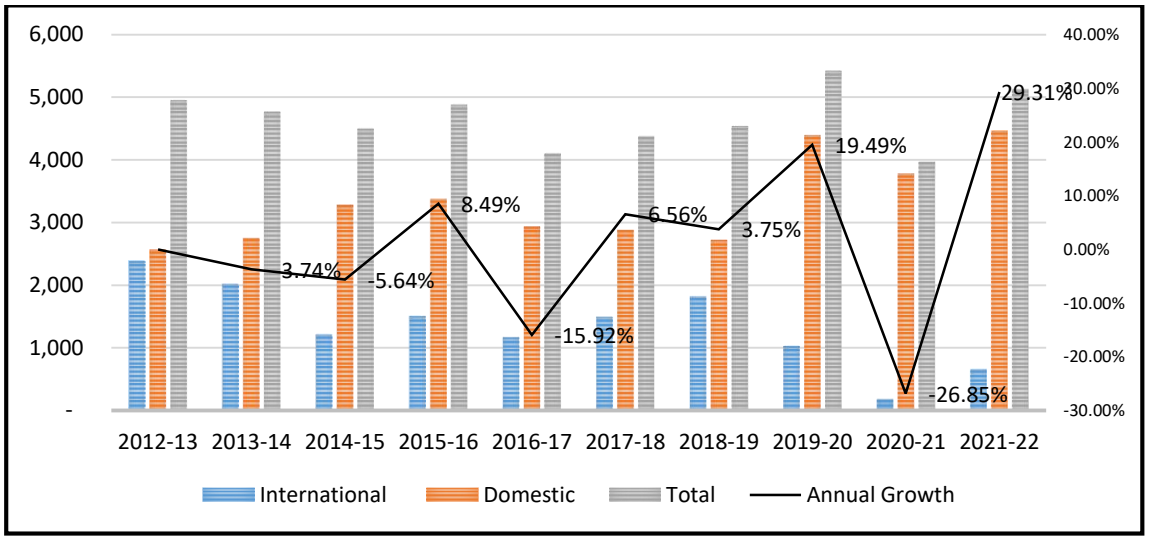

Figure 8 - Freight Traffic Growth

As the present operating airport at Dabolim in Goa does not have appropriate cargo handling facility. The cargo movement is very limited with volume of cargo handled is in the range of 4,000 MT to 5,000 MT per annum. The cargo handling at Dabolim airport stood at a saturation level for the past decade. The emerging economy of Goa is favoring the cargo movement which cannot be handled solely by the present operating airport.

4.4.1 Freight Traffic Forecast by CRISIL

The domestic cargo forecast by CRISIL is on the assumption that the cargo movement in the present operating airport will reach pre-COVID level in FY23 and additionally the cargo movement is assumed to increase in the same proportion as that of Goa GSDP. The projected domestic cargo growth by CRISIL is as below:

Table 24 - Domestic Freight Forecast by CRISIL for Mopa

Particulars	FY23	FY24	FY25	FY26	FY27	FY28
Domestic Cargo (MT)	4,493	4,795	5,116	5,510	5,934	6,391
Growth	-	6.7%	6.7%	7.7%	7.7%	7.7%

For international freight traffic forecast, it is expected that the freight traffic will reach pre-COVID level by FY23. Additionally, the assumption is that once the Mopa Airport becomes functional, the Spillover Cargo from the Dabolim Airport will be diverted to the new Mopa Airport. Thus, it increases the freight handling capability of the state. The major export/import industry which utilizes the freight services in Goa is Pharma Industry. For international freight forecast a blended metric of Pharma industry growth and Goa GSDP is computed and with respect to this metric the international freight movement is projected on one-on-one proportion. The projected International Cargo growth by CRISIL is as below:

Table 25 - International Freight forecast by CRISIL

Particulars	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
International Cargo (MT)	3,812	4,143	4,490	4,871	5,269	5,684
Growth	-	8.7%	8.4%	5.5%	8.2%	7.9%

The final forecast of cargo is done after assuming a shift of cargo from Dabolim Airport and also considering the spillover of cargo, which will be handled by the new Mopa Airport.

Table 26 - Projected Shift of Freight Traffic to Mopa Airport

Particulars	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Domestic Cargo	35%	50%	50%	60%	60%	70%
International Cargo	70%	80%	80%	90%	90%	90%

The final projected freight traffic by CRISIL is as follows:

Table 27 - Total Freight Traffic Forecast by CRISIL for Mopa

Particulars	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Domestic Cargo	4,573	5,397	7,058	7,806	9,560	10,474
International Cargo	5,168	5,814	8,592	9,384	14,742	15,116
Total	**9,741**	**11,212**	**15,560**	**17,190**	**24,303**	**25,590**

4.4.2 Freight Traffic Forecast by KITCO

The review of freight traffic forecast is done by KITCO Ltd using the CAGR method. The historic data from AAI is projected using CAGR method to identify potential growth of the freight traffic. The domestic cargo is expected to grow at a rate of 7.95% and international cargo at 7.5%. The operation of new airport in the Goa state will cater to the freight traffic growth, therefore, the spill over cargo from the nearby airports is also considered. The spill over cargo is estimated to be 1800 MT in FY24 and is expected to grow as that of the international cargo. The total projected freight traffic by KITCO is as below:

Table 28 - Total Freight Traffic forecast by KITCO in the state of Goa.

Particulars	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Domestic Cargo	5,968	6,442	6,954	7,507	8,104
International Cargo	4,136	4,446	4,780	5.138	5,523
Total	**10,104**	**10,889**	**11,734**	**12,645**	**13,627**

Considering the cargo diversion from nearby airports (at Bangalore & Mumbai) and cargo split to Dabolim airport, keeping the Dabolim airport at maximum utilization, the total cargo estimate for Mopa is as given below.

Table 29 - Cargo forecast by KITCO at Mopa Airport

Particulars	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Projected cargo in the state of Goa	10,104	10,889	11,734	12,645	13,627
Cargo diversion from Mumbai & Bangalore airports	3,960	7,920	9,900	9,900	9,900
Total	**14,064**	**18,809**	**21,634**	**22,545**	**23,527**
Dabolim Airport	5000	5000	5000	5000	5000
Mopa Airport	**9,064**	**13,809**	**16,634**	**17,545**	**18,527**

4.4.3 Freight Traffic Forecast Scenarios

The cargo forecast by CRISIL is found to be on the higher side, especially in FY27. The comparison of freight traffic forecast is as follows.

Table 30 - Freight Traffic Forecast (MT) for Mopa

Particulars	FY24	FY25	FY26	FY27	FY28
By KITCO	9,064	13,809	16,634	17,545	18,527
By CRISIL	11,212	15,650	17,190	24,303	25,590

The CRISIL forecast aligns with KITCO forecast in FY24, FY25 and FY26 but the growth from FY26 cannot be justified as it shows a sudden growth in the freight traffic.

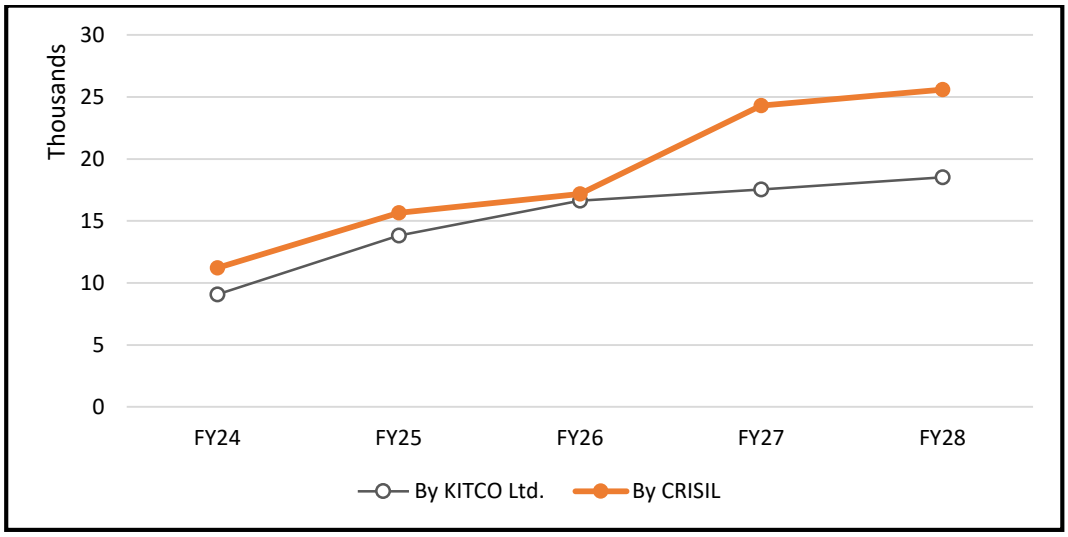

Figure 9 - Freight Traffic Comparison

The freight handling capacity of 25,000 MT is proposed by GIAL and is expected to be operational in a few months' time. Presently, the cargo is handled through the terminal buildings and significant cargo movement is seen from the new airport. Considering the opening up of new market and significant growth in the pharmaceutical industry in Goa, cargo handling capacity of 20,000 MT is justifiable. The proposed 25,000 MT cargo handling capacity is found to be on the higher side as per the Freight Traffic Forecast by KITCO.

The traffic forecast has already been done by CRISIL on behalf of the Airport Operator, GIAL. Even though, the traffic forecast is based on an independent study by CRISIL, KITCO has undertaken the review of traffic forecast to validate the forecasted figures with the updated statistics available with respect to existing airport at Dabolim as well as that for the initial months with respect to greenfield airport at Mopa after achieving its COD in December 2022. However, AERA with in-house expertise and core experience in this field, may take a balanced view on the forecasted traffic by CRISIL and KITCO accordingly.

5 Governing Parameters for Capacity and Cost Evaluation of Passenger Terminal Building

5.1 Inter-Ministerial Group (IMG) Report

The Inter-Ministerial Group (IMG) under Ministry of Civil Aviation, Govt. of India published the report in September 2008 (revised in January 2009) on the Norms & Standards for determining the Capacity of Airport Terminals in the country. IMG has deliberated in detail on various key issues and specified various norms and standards for evaluating capacity of airport terminals as follows:

5.1.1 Growth Rate for Traffic Forecast

The forecast/growth rate for Traffic Forecast is generally arrived using judgment analysis in the light of results obtained through Trend Analysis & Econometric Modelling and Origin Destination (O-D) Surveys & Market Surveys. In case of smaller airports and greenfield airports, O-D Surveys & Market Surveys are conducted to arrive at forecast. IMG in its report has recommended that a more reliable forecast may be obtained by employing more than one approach and consolidating differing results through judgment and knowledge of the markets concerned. The span for making forecast is recommended as 5 years up to 2011-12 and thereafter as the growth rate stabilizes, the span for making forecast should be increased to 7 years for a more realistic assessment.

5.1.2 Target year for Capacity Creation (Design Year)

IMG has recommended that the following norms could be adopted for capacity creation:

Smaller airports (< 5.0 MPPA) – 10th year from Planning year.
Bigger airports (> 5.0 MPPA) – 7th year from Planning year.

5.1.3 Peak Hour Projections

As per ICAO Manual, forecasts of peak period passengers are to be obtained from annual forecasts by applying ratios of busy period traffic to annual traffic derived from actual data at various airports. In the absence of actual data, the peak hour traffic may be estimated based on following norms:

Table 31 - Normative Traffic Ratios for Airports in India

SL. No	Traffic (in MPPA)	Ratios for Terminal (PH/AD) *	
		International	Domestic
1	1.0-5.0	0.3000	0.2500
2	0.5-1.0	0.3500	0.3500
3	Less than 0.5	0.4500	0.4500

**PH–Peak Hour, AD –Average Day*

It may be noted that the above norms were prescribed for traffic up to 5 MPPA. Hence it was noted that for traffic above 5 MPPA, planning is to be undertaken based on actual data collection as initiated by AAI. Since the passenger traffic has subsequently increased beyond 5 MPPA in several airports, the ratios of Peak Day (PD) to Average Day (AD) traffic and Peak Hour (PH) to Peak Day (PD) traffic generally considered and is as follows:

Table 32 - Traffic Ratios at International & Domestic Airports in India

SL. No	Traffic (in MPPA)	Ratios for Terminal			
		International		Domestic	
		PD/AD	PH/PD	PD/AD	PH/PD
1	10.0 and above	1.15	0.15	1.10	0.10
2	5.0-10.0	1.20	0.20	1.15	0.15
3	1.0-5.0	1.30	0.30	1.25	0.25
4	0.50-1.0	1.35	0.35	1.35	0.35
5	Less than 0.5	1.45	0.45	1.45	0.45

PD - Peak Day, AD - Average Day, PH - Peak Hour

5.1.4 Level of Services in Target Year

Level of Services 'C' (LoS) as per IATA Airport Development Reference Manual (Jan 2004) denotes good level of service (conditions of Stable Flow, Acceptable Delays and Good Levels of Comfort) at a reasonable cost. Therefore, this level could be used for design for target demand in the design year. A higher unit area than what is prescribed under Unit Area Norms (5.1.5) would ensure that in the initial years, the passengers may experience LoS 'A' or 'B' and as the traffic increases LoS 'C' would be achieved.

5.1.5 Unit Area Norms

In addition to sufficient facilities for passenger processing, area for commercial activities, retail outlets, food courts, bookshops, counters for car rental, vending machines, public rest rooms, etc. needs to be ensured in the terminal building. Considering these aspects and to ensure that the terminal is capable of handling peak hour passenger traffic at the target level of service standard in the design year, unit area norms with respect to sq.m per Peak Hour Passenger (PHP) has been prescribed by various authorities ranging from 22 sq.m/ PHP to 30 sq.m/PHP. AAI is adopting the following norms.

- Domestic Terminal : 22-23 sq.m/PHP
- International Terminal : 27-28 sq.m/PHP
- Integrated Terminal : 24-25 sq.m/PHP

As per IMG recommendation, Commercial or Retail area providing amenities like food & beverages, book shops, counters for car rental, vending machines, public rest rooms, etc., normally require 8-12 percent of the overall area, and should be planned and provided accordingly. In bigger airports, i.e., with annual passenger traffic exceeding 10 million, commercial area could be up to 20 percent of overall area. Keeping in view the IATA norms and above considerations, the following norms are considered appropriate for Indian Airports.

Table 33 - Unit Area Norms for Indian Airports

Sl. No	Nature of Terminal	Area Norm sq.m/ PHP
1	Domestic Terminals	
	a) Traffic up to 100 PHP	12
	b) Traffic between 100 -150 PHP	15
	c) Traffic between 150 – 1000 PHP	18
	d) Traffic above 1000 PHP	20
2	Integrated Terminals for handling both domestic and international	25
3	International Terminals	27.5

5.1.6 Unit Cost of Construction

The Terminal Building should not only be Functionally Efficient but should be Aesthetically and Architecturally appealing. It encompasses a wide variety of activities related to Aviation, Leisure, Comfort, Shopping and Business apart from Customs, Immigration, Security, etc. Construction cost is generally driven by the target level of Service Standards and location of the airport. Hence IMG had recommended for establishing an appropriate benchmarking for the construction cost.

6 Technical Evaluation of Project Components

The Technical Evaluation of following Project Components are done by KITCO based on the prevailing norms:

- Airside Infrastructure
- Passenger Terminal Building
- Landside Road Development Works

6.1 Airside Infrastructure

As per Concessionaire Agreement, the construction and procurement of the aeronautical assets including runways, taxiways, apron, aircraft parking bays and other associated facilities shall be developed meeting the following requirements:

- Airport to be designed for Code E/Code F for Phase I & Phase II (Code 4E minimum for Phase I and/or II at the discretion of Concessionaire) and Code 4F minimum for Phase III & IV.

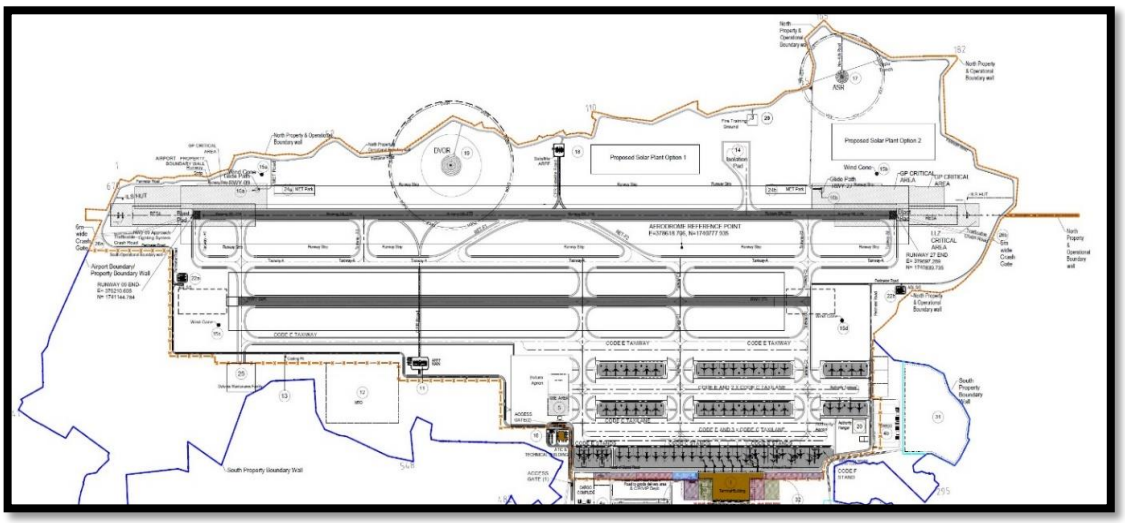

Figure 10 - Airside Development Works

6.1.1 Runway & Taxiways

6.1.1.1Runway

As per Concessionaire Agreement, the runway has to be designed for Code 4E category aircrafts in the initial phase. Therefore, an exercise is done to analyze the Runway length for Code 4E category and it was found that a length of 3500 mtr is sufficient for most of the Aircrafts in Code E category. The proposed fleet mix at Mopa, Goa is analyzed for Take-off and Landing lengths and the Runway length is substantiated as per the following table:

Table 34 - Analysis of Runway Length

Sl. No.	Aircraft Type	% share	Take off Length (m)	Maximum Take off Weight (kg)	Landing length (mtr)	Landing Weight (kg)	Remarks by KITCO
1	DHC 8	20%	1780	62000	800	60500	3500 mtr length Runway sufficient for all operations.
2	A320-200	44%	2700	83000	1500	66000	
3	A321-200		2700	88000	1700	78000	
4	B737-800	31%	2500	79000	1800 (dry)/ 2050 (wet)	66000	
5	B757-200	1%	2400	109000	1500 (dry)/ 1700 (wet)	90000	
6	A330-300	1%	3500	235000	1700	170000	
7	A340-600	1%	3700	380000	2600	300000	Aircraft can operate with load penalty.

Sl. No.	Aircraft Type	% share	Take off Length (m)	Maximum Take off Weight (kg)	Landing length (mtr)	Landing Weight (kg)	Remarks by KITCO
8	A350-900		2900	320000	2000	205000	3500 mtr length Runway sufficient for all operations
9	B777-200LR	1%	3000	345000	1850	225000	Some variants can operate with load penalty
10	B777-300ER	1%	3200	345000	2000	252000	Some variants can operate with load penalty
		100%					

NOTE: The above fleet mix was taken from the REDIM analysis for RET design. Additionally, the requirements for B747 and B767 aircraft were also checked and found that these series of aircraft can operate in 3500 mtr Runway length with load penalties.

The runway length of 3500 mtr is sufficient for most of the operating aircrafts and is justified.

6.1.1.2 Sizing of Runway and related components as per CA and ICAO guidelines

The main airside components related to Runway is cross-checked with CA and ICAO guidelines and the comparison is as listed below:

Table 35 – Airside Infrastructure –Runway related

Sl. No.	Component	Benchmark	Required as per CA/ICAO	Provided by GIAL	Remarks by KITCO
1	Runway	CA	4E in Phase I	4E in Phase I	Complied
2	Runway Length	CA	4E in Phase I	4E in Phase I (3500 mtr length for operating B 777 series & A 340-600)	Sufficient, considering major type of Aircrafts likely to operate in Mopa Goa
3	Runway Width	CA	45m	45m	Complied
4	Runway Shoulders	ICAO-Annex 14	7.5m	7.5m	Complied
5	Runway Strip	ICAO-Annex 14	280m	280m	Complied
6	Overrun	ICAO-Annex 14	60x45m	60x45m	Complied
7	RESA	ICAO-Annex 14	240x90m	240x90m	Complied
8	Isolation Bay	Critical Aircraft	120x80m	128x83m	Complied
9	Taxiway to Isolation Bay	Critical Aircraft	Code E – 23m wide, 280m long	Code E – 23m wide, 267m long	Complied (permits all aircrafts upto tail height 18m which covers most of the Code E aircrafts)

The Runway and related parameters provided are found justified as per CA/ICAO guidelines.

6.1.1.3 Taxiways

The Taxiway configuration at Mopa Goa Airport consists of the following:

1. Parallel Taxiway- A
2. Entry/ Exit Taxiways from Runway to Parallel Taxiway A - A1, A2, A5 & A6
3. RETs from Runway to Parallel Taxiway A – A3 & A4
4. Cross field Taxiways connecting Parallel Taxiway A to Main Apron - W & E
5. Main Apron Taxi lane –D
6. Taxiway to GoG Apron-Z
7. Taxiway to Isolation Bay-Y

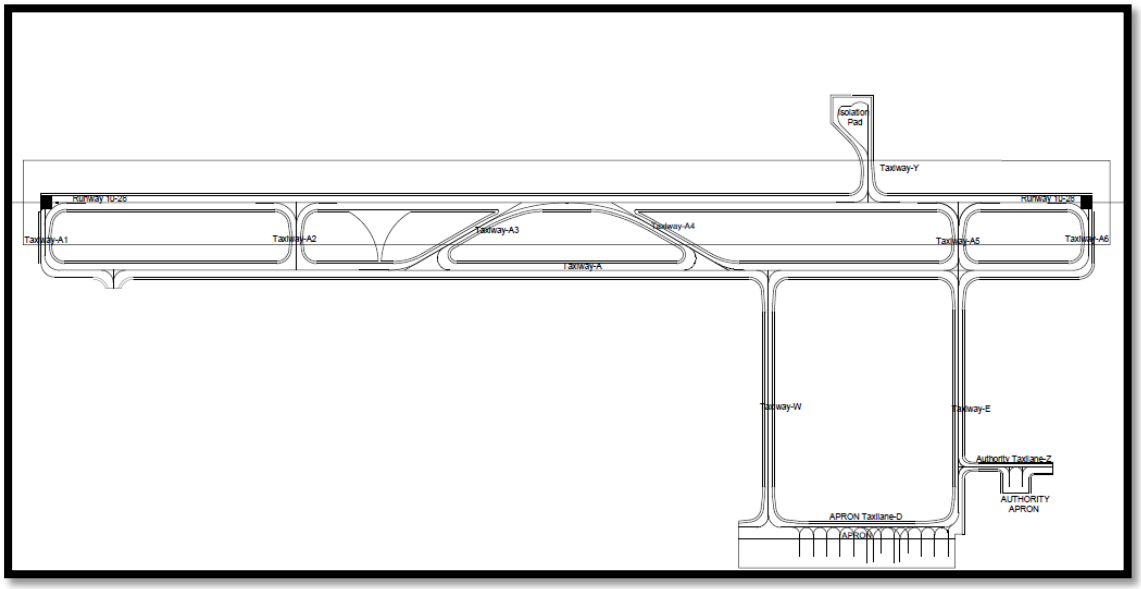

Figure 11 - Runway & Taxiway Configuration

The Taxiway configuration is assessed with respect to Code 4E requirements and tabulated as follows:

Table 36 - Taxiway Configuration Analysis by KITCO based on ICAO Guidelines

Taxiway Component	**Code**	**Description**	**Required as per KITCO assessment based on ICAO guidelines**	**Provided by GIAL**	**Remarks by KITCO**	**Additional Cost implication due to change in Master Plan, approved by GoG**
A	Code E	Parallel Taxiway	Only 23m width required for Code E operations	45m width provided	Parallel taxi track provided with additional width (22mtr) to be used as emergency runway for code E aircraft during breakdown	Rs.50 Crore for extra width (Can be put to use as emergency runway only after installation of all lighting/ marking/equipment to operationalize followed by approval by Regulator DGCA)
A1, A6	Code E	Runway end Taxiway, extending from Runway to Parallel Taxiway A.	Min. Taxiway length - 180m	Taxiway length of 225m provided	Taxiway lengths are increased from 180m to 225m to have non-instrument parallel operations in both the Runways.	Rs.9.2 Crore (For operational flexibility)
A2, A5	Code E					
A3, A4	Code E	Rapid Exit Taxiway, Connecting between Runway and Parallel taxiway A.	Required in future phases.	Provided	RETs are required when peak hour ATMs exceed 30. But RETs at later stage may require NOTAM	Rs.22 Crore (can be agreed)

Taxiway Component	Code	Description	Required as per KITCO assessment based on ICAO guidelines	Provided by GIAL	Remarks by KITCO	Additional Cost implication due to change in Master Plan, approved by GoG
					and regulatory clearance from DGCA. Therefore, can be agreed.	
W	Code E	Cross field taxiway, extending from Parallel Taxiway A to Main Apron.	Bare minimum length required: 240m	776 m long	Additional length provided due to consideration of second runway in future, and to avoid dismantling due to AGA clearance requirements. Hence can be agreed.	Rs.10 Crore (can be agreed)
E	Code E	Cross field taxiway, extending from Parallel Taxiway A to Main Apron.	Bare minimum length required: 240m	776 m long		Rs.10 Crore (can be agreed)
D	Code E	Main Apron Taxi Lane.	Length to serve 18 Code C aircrafts - Approx. 720m	720m	Provided as required.	No cost implication
Z	Code C	Connecting separate taxiway, apron for GoG	Required separately as per CA	Provided as per agreement		No cost Implication
Y	Code E	Connecting taxiway to Isolation Bay.	280m	267m	Reduced length is acceptable due to level difference of Isolation Bay and Runway threshold.	No cost implication

From the above table it can be seen that an amount of Rs.50 Crore has been incurred by AO for extra width of 22 mtr. for parallel taxiway to be used as emergency runway. The pavement of the parallel Taxiway is designed as a runway to enable the airport to have an emergency runway in the future phases as traffic increases. Therefore, the need for emergency runway has evaluated as follows:

Over the last few years, some single Runway Airports have converted Parallel Taxiway into a Secondary Emergency Runway, the most relevant example being Gatwick Airport. The northern Runway (08L/26R) of Gatwick airport was initially a Taxiway, now declared as a Runway and can be used as such when the main Runway (08R/26L) is not in use for any reason (e.g., maintenance, emergency). In "normal" operations, it is simply used as a Taxiway, as the two Runways cannot be operated in parallel. The time required for changing over the configuration is only two hours.

Such practice, not defined by ICAO, is referred to in the industry as "Switch-On/Switch-Off Runway", "Flexible Contingent Runway", or "Temporary Emergency Runway". It is very convenient when infrastructural development is limited. It enables extensive maintenance works to be carried out on the main runway without having to reduce scheduled operations or to close down the airport.

Nevertheless, such practice is extremely complex to introduce and manage. It requires important infrastructure adaptations, very precise procedures as well as a solid safety case to demonstrate that the concept can be operated safely. The main difficulty of such project resides in the management and mitigation of risks of confusion, runway incursion, ATC errors as well as risks related to the transition between the runway configurations.

The passenger details of some airports that have already implemented a stand-by Runway are as follows:

- Gatwick Airport with preliminary total passenger movement of 4,64,32,630 in FY 2018.
- Bahrain Airport with preliminary total passenger movement of 90,82,707 in FY 2018.
- Mauritius International Airport with preliminary total passenger movement of 38,39,049 in FY 2018.

Furthermore, in many cases, a taxiway cannot be fully upgraded to a runway, both in terms of infrastructure and equipment. If compliance cannot be fully achieved, a safety-based approach is required to manage non-compliances, or to prioritize the elements to be upgraded, e.g., runway guard lights, stop bars, markings.

M/s GIAL produced documents which exhibited DGCA approval for use of Parallel Taxiway, as emergency Runway (non-instrument VFR operations only) in Rajiv Gandhi International Airport, Hyderabad in the year 2011 and claimed that they have been using emergency runway during main Runway periodic maintenance works and other Runway closures. The Airport Operator claimed that it has been very helpful to avoid flight schedule changes during Runway Improvement works. Considering the operational independence, as claimed by the Airport Operator and also approved by GoG, on the recommendation of Independent Engineer, decision to upgrade the parallel Taxiway to emergency runway by AO can be agreed. Further this is subject to installation of required equipment / facilities such as runway edge lights, approach lighting system, PAPI, ILS, RESA, etc. for operationalization of parallel taxiway as emergency runway and necessary approval from DGCA to declare as emergency runway. All other additional works evaluated in table 36 seems justified due to the operational reasons related to safety issues.

All fillet designs of Taxiways are found sufficient as per CA requirements.

6.1.2 Apron

The Apron is designed to accommodate the Peak Arriving ATM, out of which 80% should be in contact stands as per CA. The Peak Hour ATM calculation by GIAL is as given below:

Table 37 - Peak Hour ATM

Busy Hour Total							
Phases	**Annual Traffic MPPA**	**Combined Peak Hour Passenger**	**Combined Peak Hour ATM**	**Domestic Peak Hour Passenger**	**Domestic Peak Hour ATM**	**International Peak hour Passengers**	**International Peak Hour ATM**
Phase I	4.4	1600	13	1437	11	172	2
Phase II	5.8	1914	17	1751	17	187	2

Busy Hour Total							
Phases	**Annual Traffic MPPA**	**Combined Peak Hour Passenger**	**Combined Peak Hour ATM**	**Domestic Peak Hour Passenger**	**Domestic Peak Hour ATM**	**International Peak hour Passengers**	**International Peak Hour ATM**
Phase IIA	7.7	2400	21	2211	21	221	2
Phase III	9.4	2820	24	2623	24	250	2
Phase IV	13.1	3930	32	3694	32	299	2

The apron size of 540 mtr x 147 mtr is planned with a 51.5 mtr wide Code E taxi lane and stand depth 95 mtr sufficient for Code E Aircrafts, including GSE equipment area. 2 MARS stands are provided for Code E Aircrafts and 8 Code C parking stands are shown, which brings down the utilization factor of the Apron drastically. As per GIAL, the aircraft stand requirement is as given below:

Table 38 - Requirement of Aircraft Stands

Phase	**Annual Traffic**	**Code C Domestic**	**Code C International**	**MRO & Cargo**	**Govt. of Goa (Authority)**	**Total Number of Stands**
Phase I	4.4 MPPA	10	2	0	2	14
Phase I	7.7 MPPA	14	2	0	2	18
Phase III	11.1 MPPA	22	2	0	2	26

The expansion to meet the design capacity of 7.7 MPPA is proposed in FY2024, which will be sufficient to meet the passenger traffic forecast of 7.58 MPPA for FY2025 as given below:

Table 39 - Comparison of Requirement for Aircraft Stands

Sl. No.	**Particulars**	**As per GIAL Design Year FY2024**	**As per Traffic Forecast of KITCO FY2025**
1	Annual Traffic (MPPA)	7.7	7.58
2	Peak hour ATM	21	21
3	Domestic Peak Hour ATM (combined)	21	19
	Domestic PH Arriving ATM	11	11
	Domestic PH Departing ATM	11	11
4	International Peak hour ATM (combined)	2	2
	International PH Arriving ATM	1	1
	International PH Departing ATM	1	1

In the above table, the Peak hour ATM are calculated by considering Average Seating factor as 150 for Code C aircraft. As per ADRM, when Peak Arriving ATM is established as 11, the stand capacity is calculated as 18 from the formula, n = vt/u, where n = No. of stands, v = Arriving Peak hour ATM, t = Turnaround time of the aircraft (60min for Code C aircrafts) and u = Efficiency factor (0.6)

Therefore, the availability of 18 Aircraft parking stands by the Airport Operator is justified.

As only Code C aircraft were expected initially as per ATM forecast of GIAL, the apron width is sufficient to have Code C stands on both sides of Apron, with a central Code C taxi lane and the apron can park 24 Code C aircraft at a time.

Since the runway provided as per CA is Code 4E category, the Airport Operator has designated the entire apron as Code E and has provided 8 Code C stands as well as 2 Code E stands (4 Code C in MARS configuration) corresponding to 4.4 MPPA in Phase I and has also provided a separate Apron for the Authority (Govt. of Goa) to park 2 Code C aircraft. As the peak hour International Arriving ATM is 1(one) and Goa has a good potential for International connectivity, Code E operations cannot be ruled out completely and therefore, the apron sizing by the Airport Operator in Phase I is justified.

As per CA, the Airport Operator has to provide Authority (Govt. of Goa) stands, which is operationally independent of the Commercial aircraft stands. Hence the separate Code C Apron provided for the Authority (Govt. of Goa) to accommodate 2 Code C Aircraft is justified.

6.1.3 Assessment of Airside Infrastructure

The assessment of following Airside Infrastructure components have been carried out.

- Runway 10L/28R
- Taxiways & RETs
- Apron
- HOS road and other roads

6.1.3.1 Airside Infrastructure - Pavement Type

- Runway, Taxiways, RETs, Isolation Bay and Taxi Lanes with Flexible pavement
- Apron and Authority Apron with Rigid pavement
- HOS road and other roads with Flexible pavement

6.1.3.2 Airside Infrastructure - Features

a) Runway 10L/28R

- Length - 3500 mtr
- Category - Code E
- Width taken - 45 mtr with paved shoulder of 7.5 mtr on either side, overall width 60 mtr.
- Design subgrade bearing capacity – 12% CBR
- Critical aircrafts declared by Airport Operator - B777-300ER and A350-900

b) Taxiways and RETs

- Category - Code E
- Width taken - 23 mtr with paved shoulder 10.5 mtr on either side, overall width 44 mtr.
- Design subgrade bearing capacity - 12% CBR

c) Apron

- Category - Code C & Code E
- Design Subgrade Bearing Capacity - 12% CBR

d) HOS Roads & Other roads

- Head of Stand (HOS) road
  - Design MSA - 20 for BT and 20 for granular
  - Design subgrade bearing capacity - 12% CBR

- Perimeter road (south)
  - Design MSA - 5 for BT and 20 for granular
  - Design subgrade bearing capacity – 12% CBR

- Perimeter road (north)
  - Design MSA - 1.25 for BT and 5 for granular
  - Design subgrade bearing capacity - 12% CBR

- CFR road
  - Design MSA - 5 for BT and 20 for granular
  - Design subgrade bearing capacity - 12% CBR

- Other roads
  - Design MSA - 0.5 for BT and 2 for granular
  - Design subgrade bearing capacity - 12% CBR

6.1.3.3 Airside Infrastructure - Design Assessment

The assessment done for the functional and engineering design adopted for the Airside facilities is as per following table.

Table 40 - Design Assessment of Airside Infrastructure

Component	Feature	Pavement Layer	Remarks by KITCO
Runway 10L/28R	Code E, 45 m width 7.5 m paved shoulder with flexible pavement – overall width 60 m	Runway, Apron Taxi Lane and Parallel taxiway -1B BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 295mm GSB – 100mm Sub grade – 15% CBR	The proposed runway features are sufficient for the critical aircraft B777-300ER and A350-900
		Runway and parallel taxiway Shoulder-1B BC (PMB) -50mm DBM (VG 40) – 50mm WMM – 275mm GSB – 100mm Sub grade – 15% CBR	
		Parallel Taxiway 1-A BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 225mm GSB – 100mm Sub grade – 15% CBR	
		Parallel Taxiway Shoulder A BC (PMB) -50mm DBM (VG 40) – 50mm WMM – 260mm GSB – 100mm Sub grade – 15% CBR	
Taxiways and RETs	Code E – 23 m width, 10.5 m paved shoulder with flexible pavement – overall width 44 m	Taxiways A1 & A3 BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 210mm GSB – 100mm Sub grade – 15% CBR	The proposed Taxiway features and pavement layers are sufficient for the Critical Aircraft types considered.
		For RET- F1 BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 170mm	

		GSB – 100mm Sub grade – 15% CBR	
		For RET- F2 BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 150mm GSB – 100mm Sub grade – 15% CBR	
		For Taxiway -A5 BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 210mm GSB – 100mm Sub grade – 15% CBR	
		For Taxiway -A6 BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 220mm GSB – 100mm Sub grade – 15% CBR	
		For Taxiway –C1 BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 250mm GSB – 100mm Sub grade – 15% CBR	
		For Taxiway C2 BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 275mm GSB – 100mm Sub grade – 15% CBR	
		For Isolation Bay- Taxiway & Authority (GoG)– Taxi Lane BC (PMB) -100mm DBM (VG 40) – 125mm WMM – 150mm GSB – 100mm Sub grade – 15% CBR	

Component	Feature	Pavement Layer	Remarks by KITCO
		For runway and taxiway shoulders BC (PMB) -50mm DBM (VG 40) – 50mm WMM – 175mm GSB – 100mm Sub grade – 15% CBR	
Apron, Authority Apron and Isolation Bay	Code E, Apron, Code C, Authority Aprons and Isolation bay are proposed as rigid pavement	For code E - MARS PQC -430mm CTB/DLC – 150mm GSB – 150mm Sub grade – 15% CBR	The proposed Aprons features and Pavement Layers are sufficient for the Critical Aircraft types considered.
		For code C and Authority Apron PQC -385mm CTB/DLC – 150mm GSB – 150mm Sub grade – 15% CBR	
		For Isolation Bay PQC -375mm CTB/DLC – 150mm GSB – 150mm Sub grade – 15% CBR	
Head of Stand (HOS) road	20 MSA for BT and 20 for granular	40mm BC (VG 30), 55mm DBM (VG -30), 250m WMM and 200mm GSB over 500mm 12% CBR subgrade	Adopted design criteria and pavement layers provided are adequate for design load
Perimeter road (south)	5 MSA for BT and 20 for granular	40mm BC(VG 30), 200m WMM and 200mm GSB over 500mm 12% CBR subgrade	Adequate for design load.
Perimeter road (north)	1.25 MSA for BT and 5 MSA for granular	30mm BC(VG 30), 150m WMM and 200mm GSB over 500mm 12% CBR subgrade	
CFR Road	5 MSA for BT and 20 for granular	40mm BC(VG 30), 200m WMM and 200mm GSB over 500mm 12% CBR subgrade	
Other Roads	0.5 MSA for BT and 2 for granular	30mm BC(VG 30), 150m WMM and 200mm GSB over 500mm 12% CBR subgrade	

6.2 Passenger Terminal Building

As per the Concessionaire Agreement, the various standards and requirements specified for the Terminal Building are as follows.

- Level of service for Terminal Building – IATA Level of Service "C" (optimum standards) compliance. The total area of the Terminal Building should be based on 25-40 sq.m per peak hour passenger for the design year.

- 80% of each of the international and domestic aircrafts B737/A320 or larger aircraft shall be served by the boarding bridges.

- Provide international standard range of retail and other passenger services and Terminal design must be capable of incremental expansion with minimum impact on current operations.

The Level of Service of PTB is assessed based on the details as per table below:

Table 41 - Peak Hour Passenger (PHP) Calculation

Peak Hour Calculation with 90% Domestic & 10% International Passengers for Mopa, Goa						
Phase	**Annual Traffic forecast**	**Average Day**	**IMG norms (5 MPPA - 10 MPPA)**	**Peak Hour Passenger**		**Variation with respect to IMG norms**
				As per IMG norms	**As per GIAL***	
Phase IIA	7.70	21096				
Domestic (90%)		18986	PH/AD=0.15	2848		-16%
International (10%)		2110	PH/AD=0.2	422		NA
				3270	**2400**	**-27%**

The Domestic Peak Hour demand will be 16% more than IMG norms, which implies that the design will result in Sub-optimum LoS.

* GIAL vide mail dated 14.02.2023 had provided clarification for PHP, based on which the sizing of the Terminal Building is found to be adequate.

6.2.1 Passenger Terminal Building - Area per PHP assessment

The Passenger Terminal Building is designed for Peak Hour Passengers. Due to delay in commencing the construction activities, the airport could be commissioned in December 2022 against the original COD of September 2020 and the traffic projections for Phase I & II also got revised accordingly. The Design year for initial phase was established as 2024 and a traffic of 7.7 MPPA was calculated for year and the corresponding PHP was established as 2400. Considering the IMG ratio of PH/AD for 7.7 MPPA, the consideration of 2400 PHP is relatively conservative. As per IMG norms, 25 sq.m/PHP is the benchmark for Integrated Terminals. Therefore, an area of 60,000 sq.m is justifiable for 2400 PHP. The area statement of 67,726 sq.m proposed by the Airport Operator as per table below includes an extensive forecourt area and utility area including Baggage areas.

Table 42 - PTB- Floor-wise Area Statement

Sl. No.	Floor Description	Area (sq.m)	Remarks
1	Lower Ground Floor	32,402	
2	Ground Floor	16,975	
3	First Floor	18,349	
	Total Area	**67,726**	***28.22 sq.m/PHP**

**Sqm area per PHP is calculated based on the PHP of 2400.*

Moreover, as per CA, the Terminal Building should be based on 25 - 40 sq.m/PHP. Hence the PTB area of 67,726 sq.m is justified for the design year.

6.2.2 Passenger Terminal Building - Process Area assessment

The individual Terminal process areas are found to be sufficient for 2400 PHP. The required Terminal processes areas are derived using the same in ADRM calculations. The busy hour arriving and departing traffic is as follows:

Table 43 - Arriving Passenger Traffic in Peak Hour

Phase	Annual Traffic	Combined		Domestic		International	
		Arriving Peak Hour Passenger	Peak Hour Arrival ATM	Arriving Peak Hour Passenger	Peak Hour Arrival ATM	Arriving Peak Hour Passenger	Peak Hour Arrival ATM
Phase I	4.4 MPPA	928	7	834	7	100	1
Phase II	5.8 MPPA	1110	10	1016	10	109	1
Phase IIA	7.7 MPPA	1388	13	1283	11	128	1
Phase III	9.4 MPPA	1636	14	1521	12	145	1
Phase IV	13.1 MPPA	2279	19	2143	16	173	1

Table 44 - Departing Passenger Traffic in Peak Hour

Phase	Annual Traffic	Combined		Domestic		International	
		Departure Peak Hour Passenger	Peak Hour Departure ATM	Departure Peak Hour Passenger	Peak Hour Departure ATM	Departure Peak Hour Passenger	Peak Hour Departure ATM
Phase I	4.4 MPPA	928	7	834	7	100	1
Phase II	5.8 MPPA	1110	10	1016	10	109	1
Phase IIA	7.7 MPPA	1388	13	1283	11	128	1
Phase III	9.4 MPPA	1636	14	1521	12	145	1
Phase IV	13.1 MPPA	2279	19	2143	16	173	1

Table 45 - Total Passenger Traffic in Peak Hour

Phase	Annual Traffic	Combined		Domestic		International	
		Peak Hour Passenger	Peak Hour ATM	Peak Hour Passenger	Peak Hour ATM	Peak Hour Passenger	Peak Hour ATM
Phase I	4.4 MPPA	1600	13	1437	11	172	2
Phase II	5.8 MPPA	1914	17	1751	17	187	2
Phase IIA	7.7 MPPA	2400	21	2211	21	221	2
Phase III	9.4 MPPA	2820	24	2623	24	250	2
Phase IV	13.1 MPPA	3930	32	3694	32	299	2

Accordingly, a comparison table is made to understand the facility that is required (as per the in-house ADRM calculation tool of KITCO) and what is provided in the Passenger Terminal Building by the Airport Operator.

Table 46 - Peak Hour Projections

Sl. No.	Particulars for Design Year 2024	As per GIAL	As per KITCO	Remarks
1	Annual Traffic (MPPA)	7.7	5.9	40% share of Domestic traffic & 80% share of International traffic for Mopa airport as per KITCO projections
2	Peak Hour Passenger - Total	2400	2498	KITCO PHP as per IMG norms (Table 12)
3	Domestic PHP - Total	2211	2254	KITCO PHP as per IMG norms (Table 12)
	Domestic Arriving PHP - Total	1283	1307	58% of PHP considered by GIAL and KITCO
	Domestic Departing PHP - Total	1283	1307	58% of PHP considered by GIAL and KITCO
4	International PHP - Total	221	244	KITCO PHP as per IMG norms (Table 12)
	International Arriving PHP –Total	128	141	58% of PHP
	International Departing PHP -Total	128	141	58% of PHP

All the values as per above table are comparable and therefore, the basis of Terminal building design taken as 2400 PHP is justified for the year 2024 and the Terminal area of 67,726 in Design year 2024 is also justified.

Though the Terminal building structure is built for 7.7 MPPA/2400 PHP, the Fit outs are provided only for 4.4 MPPA/1600 PHP and the shortfalls that need to be upgraded in Phase II (planned in the year 2024) is specified in the following table.

Table 47 – Cross-checking Process Facilities for 2400 PHP: ADRM Calculations by KITCO

Sl. No	Departure Process Areas	Unit	Required as per ADRM			Provided by GIAL		Total	Remarks
			Domestic	International	Integrated	Domestic	International	Integrated	
1	Peak Hour Passenger	Nos	1283	150	1433	1283	150	1433	150 considered instead of 128 in International Departure considering 80% seating capacity of Code C
1a	No. of Door entry check points	Nos	6	1	7			7	Sufficient
1b	Area for Door entry check points	sq.m	513	34.2	547.2			256.2	Area available for additional space in future (For 7.7MPPA Capacity)
2a	No. of Self Service Check in Kiosks	Nos	8	1	9			12	Sufficient
2b	Area of Self Service Check in Kiosks	sq.m	199.01	23.51	222.52			80	Area available for additional kiosks in future (For 7.7MPPA Capacity)
3a	No. of Traditional Service Check in Kiosks	Nos	34	6	40			18	Provision for additional check-in island is available
3b	Area of Traditional	sq.m	968	136.2	1104.2			423.38	Area available for additional kiosks in

Sl. No	Departure Process Areas	Unit	Required as per ADRM			Provided by GIAL		Total	Remarks
			Domestic	International	Integrated	Domestic	International	Integrated	
	Service Check in Kiosks								future(For 7.7MPPA Capacity)
4a	No. of Baggage Drop Facilities	Nos	8	3	11			4	Provision for additional facility in second island available
4b	Area of Baggage Drop Facilities	sq.m	149.2	40.2	189.4			51.3	Area available for additional facility in future(For 7.7MPPA Capacity)
5a	No. of Emigration Counters	Nos	NA	2				8	Sufficient
5b	Area of Emigration Counters	sq.m	NA	43.2				96.96	Sufficient
6a	No. of Departure Security Screening	lanes	9	1	10	15	4	19	Sufficient
6b	Area of Departure Security Screening	sq.m	837.6	89.6	927.2			381.2	Area available for future(For 7.7MPPA Capacity)
7a	No. of Gate Lounges	Nos			0	5	1	6	Sufficient
7b	Area of Gate Lounges	sq.m	2919.95	341.38	3261.33	2880	360	3240	Sufficient
7c	Pier width	m	22.01	14.05				19.5	Sufficient

Sl. No	Arrival Process Areas	Unit	Required as per ADRM			Provided by GIAL		Total	Remarks
			Domestic	International	Integrated	Domestic	International	Integrated	
1	Peak Hour Passengers		1283	416	1699	1283	416	1699	416 International arriving considered for Code E aircraft
1a	No. of Immigration Counters	Nos	NA	12			12		Sufficient
1b	Area of Immigration Counters	sq.m	NA	273.86			514.62		Sufficient
2a	No. of Baggage Reclaim Carousels	Nos	3	2		3	1		Sufficient considering the 60m long belts
2b	Area of Baggage Reclaim Carousels	sq.m	711.6	538.15		2390.35	794		Sufficient
3a	No. of Customs counters	Nos	NA	8	8		2		Area available for additional counters in future(For 7.7MPPA Capacity)
3b	Area of Customs counters	sq.m	NA	183	183		18		Area available for additional counters in future(For 7.7MPPA Capacity)
4a	No. of Customs Xray	Nos	NA	1	1		1		Sufficient
4b	Area of Customs Xray	sq.m	NA	102.06			18		Area available for additional space in future(For 7.7MPPA Capacity)
5a	Meet & Greet Area	sq.m	146	48	194			810	Area available to cater beyond 7.7 MPPA capacity

6.2.3 Justification of Terminal Building Area & Individual Process Areas

The Terminal Building area of 67,726 sq.m can be justified for 7.7 MPPA/2400 PHP. But as the Terminal Building is not planned for 2400 PHP in all the process areas, the additional cost that will be required to provide fit outs for same (Rs.200 Crore), i.e., 7.7MPPA capacity has to be evaluated in the same control period.

6.3 Landside Road Development Works

The Landside Road development works included in Phase-I are as follows:

- Rotary Intersection
- Loop roads in front of Passenger Terminal Building
- Service Roads

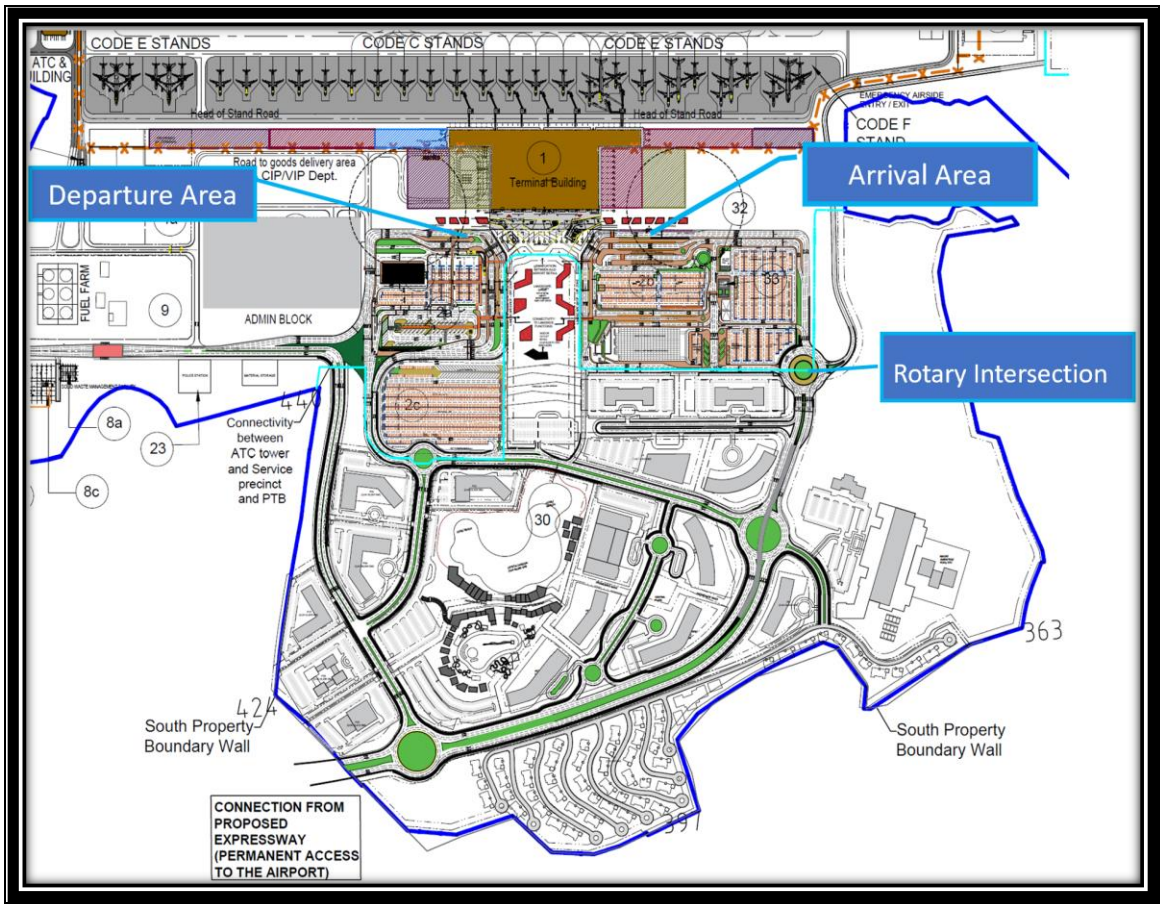

Figure 12 - Landside Road Works

6.3.1 Rotary Intersection

The rotary intersection is proposed in the junction created with main access road, loop roads to terminals and service road towards other buildings and airside - landside access gates. The rotary is designed with nearly 79 mtr diameter central island having three lane road to cater the required design speed of 30 kmph. The entire traffic to and from the airport is passing through the rotary intersection.

The parameters considered for the pavement designs are 50 MSA traffic load and 12% California Bearing ratio (CBR) for subgrade. The pavement layers of 40mm bituminous Concrete (BC), 60mm Dense Bituminous Concrete (DBM),10-12mm paving fabric/Chipseal, 250mm Stabilized base (SSB) in above subgrade with 360mm total crust thickness are provided.

6.3.2 Loop Roads in front of Passenger Terminal Building

The loop roads start from the rotary intersection and connects to the passenger terminal building for arrivals and departures. Different circulation plan and loop roads are provided for arrival and departure, which will help in handling the operations of the terminal building in Phase I, as the arrival and departure are in the same level.

The loop roads are designed with two lane configurations with 7.5 mtr wide carriageway, shoulders and footpath with cross slope of 2.5% in the main carriageway and 3% for earthen shoulders. The pavement design parameters considered are 50 MSA traffic load and 12% CBR for subgrade. The pavement layers of 40mm bituminous Concrete (BC), 60mm Dense Bituminous Concrete (DBM), 10-12mm paving fabric/Chipseal, 250mm Stabilized base (SSB) in above subgrade with 360mm total crust thickness are provided.

6.3.3 Service Roads

The service roads are provided for the access to the other airport facilities like cargo, fuel farm, substations, water tanks & treatment area, STP area, etc. The main service road leading to Departures access road is designed with two lane configurations having a 7.5 mtr carriage way with paved and unpaved shoulders and other service roads are provided with 7 mtr

carriageway with cross slope of 2.5% for carriageway and 3% for earthen shoulders. The pavement design parameter adopted are 5 MSA traffic load and 12% CBR for subgrade. The pavement layers of 40mm bituminous Concrete (BC), 10-12mm paving fabric/Chipseal, 280mm Soil Stabilized base (SSB) above subgrade with 330mm total crust thickness provided.

6.3.4 Land Side Road - Features

- Rotary Intersection
  - Three lane road with nearly 79 mtr central island
  - Design subgrade bearing capacity – 12% CBR

- Loop roads in front of Passenger Terminal Building
  - Two lane road (one way) with 7.5 mtr carriage way
  - Design subgrade bearing capacity – 12% CBR

- Service roads
  - Two lane one way with 7.5 mtr carriage way and two lane (two-way) with 7 mtr carriage way
  - Design subgrade bearing capacity – 12% CBR

6.3.5 Land Side Road - Design Assessment

The assessment done for the functional and engineering design for Land side Road development is as given in the table below:

Table 48 - Design Assessment of Landside Roads

Particulars	Features	Pavement layer	Remarks by KITCO
Rotary Intersection	50 MSA traffic load	BC – 40mm DBM– 60mm Paving fabric/Chipseal - 10-12mm Stabilized base – 250mm 12% CBR for sub – grade	The capacity provided and pavement design adopted is acceptable.
Loop roads in front of passenger terminal building	50 MSA traffic load	BC – 40mm DBM– 60mm Paving fabric/Chipseal - 10-12mm Stabilized base – 250mm 12% CBR for sub – grade	The capacity and pavement design adopted is acceptable.
Service roads	5 MSA traffic load	BC – 40mm Paving fabric/Chipseal - 10-12mm Stabilized base – 280mm 12% CBR for sub – grade	Adequate for the design load.

7 Cost Analysis of CAPEX for Development of Greenfield Airport at Goa

KITCO has analysed the GIAL's submission as per MYTP with respect to the capital expenditure incurred/to be incurred for the project for the period FY 2023 - 2028.

For the purpose of evaluation, KITCO has grouped the capital expenditure under the following components.

7.1 Hard Cost of Construction

7.1.1 Airside Pavement (Runway, Taxiways and Apron)

7.1.2 Passenger Terminal Building (PTB)

7.1.3 Airside Buildings, Roads & Drainage

7.1.4 Site Preparation/ Earthworks

7.1.5 Administrative office Building & Site Office

7.1.6 ATC Technical Block & ATC Tower

7.1.7 Main Access Road & Car Park

7.1.8 Additional Works

7.1.9 Permanent Water & Electricity

7.1.10 Construction of Aviation Skill Development Center (ASDC)

7.2 Soft Cost

7.2.1 Design Consultancy, PMC expenses & Independent Engineer Services

7.2.2 Pre-operative Expenses

7.2.3 Contingencies

7.3 Financing Allowance & Debt Service Reserve Account (DSRA)

7.3.1 Financing Allowance

7.3.2 Debt Service Reserve Account (DSRA)

General requirements of Rs. 386.49 Cr. in the original EPC contract has been apportioned and reallocated in various components by KITCO as given below:

Table 49 – Break up of CAPEX submitted by GIAL for 1st CP, reallocated and apportioned by KITCO

(Rs. in Cr)

Sl. No.	Description	Revised MYTP (A)	Apportioned General requirement cost on original EPC amount (B)	Amount including apportioned amount C= (A+B)	Prolonga-tion cost on EPC (D)	Additional Charges due to scope change (E)	TOTAL (C+D+E)
1)	**Airside Pavement (Runway, Taxiways and Apron)**						
1.1	Phase - I						
a)	EPC	**415.95**	44.48	460.43	28.77	13.99	**503.19**
b)	Other Contracts	-	-	-	-	-	-
1.2	Phase – II	65.51		65.51			65.51
1.3	Phase - III	63.00		63.00			63.00
2)	**Passenger Terminal Building (PTB)**						
2.1	Phase -I						
a)	EPC	**474.00**	50.69	524.69	32.78	15.95	**573.42**
b)	Other Contracts	256.00		256.00			256.00
2.2	Phase - II	108.18		108.18			108.18
2.3	Phase – III	369.50		369.50			369.50
3)	**Airside Buildings, Roads & Drainage**						
3.1	Phase - I						
a)	EPC	**257.00**	27.48	284.48	17.77	8.65	**310.90**
b)	Other Contracts	44.05		44.05			44.05
3.2	Phase – III	4.50		4.50			4.50
4)	**Site Preparation/ Earthworks**						
a)	EPC	**534.34**	57.14	591.48	36.95	17.98	**646.41**
5)	**Administrative office Building & Site Office**						
5.1	Phase-I						

(Rs. in Cr)

Sl. No.	Description	Revised MYTP (A)	Apportioned General requirement cost on original EPC amount (B)	Amount including apportioned amount C= (A+B)	Prolonga-tion cost on EPC (D)	Additional Charges due to scope change (E)	TOTAL (C+D+E)
a)	EPC	**43.47**	4.65	48.12	3.01	1.46	**52.59**
6)	**ATC Technical Block and ATC Tower**						
6.1	Phase - I						
a)	EPC	**80.00**	8.55	88.55	5.53	2.69	**96.77**
b)	Other contracts	7.00		7.00			7.00
7)	**Main Access Road,Spine Road & Car park**						
7.1	Phase - I						
a)	EPC	**38.00**	4.06	42.06	2.63	1.28	**45.97**
b)	Other contracts	60.00		60.00			60.00
7.2	Car Park	3.00		3.00			3.00
8)	**Additional Works**						
8.1	Phase - I						
a)	Other contracts	68.00		68.00			68.00
8.2	Phase – III	2.00		2.00			2.00
9)	**Permanent Water and Electricity**						
9.1	Phase - I	20.00		20.00			20.00
10)	**ASDC**						
10.1	Phase - I	8.00		8.00			8.00
	Total Hard Cost for Phases – I, II & III	**2921.50**	**197.05**	**3118.55**	**127.44**	**62.00**	**3307.99**
11)	**Soft Cost**						
11.1	Design Consultancy & PMC Expenses						
	Phase – I	96.00	-	-	-	-	-
	Phase – II	13.90	-	-	-	-	-
	Phase - III	36.00	-	-	-	-	-
11.2	Independent Engineer Services						

(Rs. in Cr)

Sl. No.	Description	Revised MYTP (A)	Apportioned General requirement cost on original EPC amount (B)	Amount including apportioned amount C= (A+B)	Prolonga-tion cost on EPC (D)	Additional Charges due to scope change (E)	TOTAL (C+D+E)
	Phase – I	16.00	-	-	-	-	-
	Phase – II	-	-	-	-	-	-
	Phase - III	-	-	-	-	-	-
11.3	Pre-operative Expenses						
	Phase – I	259.00	-	-	-	-	-
	Phase – II	3.47	-	-	-	-	-
	Phase - III	3.30	-	-	-	-	-
11.4	Contingencies						
	Phase – II	9.55					
	Phase - III	22.50		-			
	Total Soft Cost for Phases I, II & III	**459.72**		-			**459.72**
11.5	**Financing allowance and DSRA**						
	Financing allowance	448.00	-	-	-	-	-
	DSRA	89.00	-	-	-	-	-
	Total Financing Cost	**537.00**	-	-	-	-	**537.00**
	Grand Total	**3918.22**	**197.05**	**4115.27**	**127.44**	**62.00**	**4304.71**

Cost Analysis of Components

7.1 Hard Cost of Construction

7.1.1 Airside Pavement (Runway, Taxiways and Apron)

As per AERA normative approach order No. 07/2016-17 issued on 13-06-2016, for construction of pavement for Code E Aircraft excluding earth filling as part of site development and soil stabilization, the tentative ceiling cost is Rs.4,700/sq.m.

As the normative cost of Rs.4,700/sq.m is without inflation, KITCO has computed the inflation adjusted normative cost for Pavement in FY 2022 (based on actual WPI inflation rates for period FY 2016 to FY 2021) and including 6% adjustment for the impact of GST as given in the table below:

Table 50- Inflation Adjusted Normative Cost for Apron

Normative Cost (INR per Sq.m)	**FY2016**	**FY2017**	**FY2018**	**FY2019**	**FY2020**	**FY2021**
Apron (A)	4,700					
WPI Index (B)*	109.70	111.60	114.90	119.80	121.80	123.40
Inflation adjusted cost (C=A x B/109.70)	4,700	4,781	4,923	5,133	5,218	5,287

**htttps://eaindustry.nic.in/default.asp*

Table 51 - Inflation Adjusted Normative worked out Cost for Pavement

Particulars	**Amount (Rs.)**
Normative Cost for Airside Pavement considered in FY 2021(A)	5,287.00/sq.m
Inflation considered for FY 2022 (B)*	7.14%
Inflation adjusted Normative Cost in FY 2022 (C)= [A x (1+B)]	5,664.00/sq.m
Adjustment for impact of GST (D)**	6%
Final cost in FY 2022 [C x (1+D)]	6,004.00/ sq.m

**Average of WPI inflation for FY 2021 and FY 2022*

*** Normative cost as per AERA Order No.7/2016-17 dated 13th June 2016 includes the prevalent tax of 12%, additional 6% provided to account for the impact of GST as against 18%.*

Table 52- Inflation Indexed Rate considered for Phase III- Airside Pavement

Particulars	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**
WPI Inflation	9.7%	3.3%	3.3%	3.3%
Per sq.m cost	6586	6804	7028	7260

Source: Survey of Professional Forecasters on Macroeconomic indicators – Results of 80th Round (RBI)

As the CA stipulates the trigger for Phase II capacity expansion on 80% of Phase I capacity and as per the traffic forecast, GIAL got approval from Government of Goa on the recommendations of Independent Engineers (M/s EIL, a CPSE under Govt. of India) to construct Terminal Building area corresponding to 7.7 MPPA (Phase II) in Phase I itself and an Apron area of 20,000 sq.m to achieve Phase II capacity to be commissioned in the year 2024. Accordingly, KITCO computed the cost considering the year of commissioning of Phase II also.

As Phase III expansion is envisaged in the year 2026 as per Table 10, KITCO computed the reasonableness based on inflation indexed rate.

Table 53 - Cost Proposed by KITCO for Airside Pavement for 1st CP

(Rs. in Cr.)

Description	Unit Rate (Rs. per sq.m) As per KITCO	Quantity (sq.m)	Amount claimed by GIAL	Amount justified by KITCO	Remarks by KITCO
a) Cost for Airside Pavement		7,93,241 (Phase I & II)	525.94 (Phase I & II)	524.00 (Phase I & II) (Normative Cost) *Less : 50.00 474.00	*AO has incurred Rs. 50 crores for extra width of 22 mtr for parallel taxi way to be used as Emergency Runway. It can be used as Emergency runway only after installation of all equipments and DGCA approval. Accordingly, this CAPEX can be allowed (in absolute terms) when assets is put to use.
	7,260.00 (Phase III) (Inflation adjusted normative Rate as per Table 52)	35,000 (Phase III)	63.00 (Phase III)	25.41 (Phase III)	

Description	Unit Rate (Rs. per sq.m) As per KITCO	Quantity (sq.m)	Amount claimed by GIAL	Amount justified by KITCO	Remarks by KITCO
b) Prolongation cost due to restraints caused by NGT & Hon'ble Supreme Court of India	-	-	28.77	28.77	Admitted as reasons for delay like NGT order and time over run of 634 days etc. are not attributable to the Airport Operator as approval had been given by GoG after recommendation by Independent Engineer M/s EIL (a CPSE of GoI)
c) Additional Overhead (OH) charges due to scope change	-	-	13.99	-	Not admitted as machinery to carry out additional works including mobilization, site office and other infrastructure was already available. So, remobilization of resources included related cost not applicable.
Total = (a + b + c)			**631.70**	**528.18**	

The cost is inclusive of GST.

7.1.2 Passenger Terminal Building (PTB)

GIAL had commissioned PTB for Phase I capacity with built up structure for 7.7 MPPA in December 2022. As the CA stipulates revisiting the terminal capacity based on traffic trigger as detailed in Chapter 2, Clause 2.5, GIAL obtained approval from Government of Goa for providing the Shell Capacity corresponding to Phase II in Phase I itself, so that the expanded terminal of capacity 7.7 MPPA can be made ready in FY 2024 itself by doing the Fit Outs only for the remaining terminal capacity.

As such the warm shell for PTB corresponding to 7.7 MPPA amounting Rs.780.69 Crore is commissioned in the FY 2022-23 and Fit Outs amounting to Rs.108.81 Crore for Phase II as tabulated below is expected to be commissioned in the FY 2023-24. For ease of calculation, total cost of Phase I & II has been considered in FY 2022-23. As such, cost per sq.m incurred/to be incurred by GIAL in Phase I & II is Rs.1,31,500/- per sq.m (including GST).

Table 54 - Cost towards Fit outs for Capacity Enhancement submitted by GIAL

(Rs. in Cr.)

Components	Amount
Baggage Handling System, PBB (2 Nos.), Lifts (2 Nos.), Escalator (1 No.), Screening equipment, Check-in Island and other furniture, seating for Fit outs for capacity enhancement from 4.4MPPA (Phase I) to 7.7MPPA (Phase II)	108.18

The cost is inclusive of GST.

KITCO has worked out the justifiable cost based on following:

a) Cost allowed for various other PPP airports like HIAL, BIAL, DIAL by AERA, based on the studies conducted by Independent Consultants.

b) Terminal Building Cost considering the design and specifications provided by GIAL.

On the basis of above two factors, the Cost of Phase I & Phase II is justified.

As Phase III expansion is envisaged in the year 2026 as per Table 10, KITCO computed the reasonableness based on inflation-indexed rate.

Table 55 - Inflation Indexed Rate considered for Phase III- PTB

Particulars	FY 2023	FY 2024	FY 2025	FY 2026
WPI Inflation	9.7%	3.3%	3.3%	3.3%
Per Sq.m Cost	*1,31,500	1,35,840	1,40,322	1,44,953

Source: Survey of Professional Forecasters on Macroeconomic indicators – Results of 80th Round (RBI)

** Cost per sq.m by GIAL in Phase I & II*

Table 56 - Cost Proposed by KITCO for PTB for 1st CP

(Rs. in Cr.)

Description	Unit Rate (Rs.per sq.m) as per KITCO	Quantity (sq.m)	Amount submitted by GIAL (Rs. In Crore) including GST	Amount assessed by KITCO (Rs. In Crore) including GST	Remarks by KITCO
a) Cost for PTB	1,31,500.00	67,615	888.87 (Phase I & II)	888.87 (Phase I & II)	Cost justified
	1,44,953.00 Inflation adjusted normative cost (refer table 55).	25,000	369.50 (Phase III)	362.38 (Phase III)	To be incurred in the year 2026.
b) Prolongation cost due to restraints caused by NGT & SCI			32.78	32.78	Admitted as reasons for delay like NGT order and time over run of 634 days etc. are not attributable to the Airport Operator as approval had been given by GoG after recommendation by Independent Engineer M/s EIL (a CPSE of GoI)
c) Additional Overhead (OH) charges due to scope change			15.95	-	Not admitted as machinery to carry out additional works including mobilization, site office and other infrastructure was already available. So, remobilization of resources included related cost not applicable.
Total= a +b + c			**1307.10**	**1284.03**	

The cost is inclusive of GST.

7.1.3 Airside Buildings, Roads and Drainage Systems

The cost submitted by GIAL towards Airside buildings, Roads and Drainage System amounting to Rs.359.45 Cr (all inclusive) is analyzed and is given in the following table.

Table 57 - Cost Proposed by KITCO for Airside Buildings, Roads & Drainage System

(Rs. in Cr.)

Sl. No.	Description of item	Cost		Variance (A-B)
		As per GIAL (A)	Admitted by KITCO (B)	
1.	Airside Buildings, Roads & Drainage System	359.45	346.65	12.80

The Cost is inclusive of GST.

The detailed break up of items, cost analysis and justification done by KITCO is attached as Annexure-I.

7.1.4 Site Preparation /Earth works

The EPC Contractor had to perform additional earthwork by Ripping and Crushing as per Contract Schedule 3B item No. 2.1.2, 2.1.2 a and 2.1.2 b.

As per EPC Agreement, to arrive at the contract sum, it was agreed that 95% of the total excavation would be executed using Excavator & 5% may require the deployment of a Rippers to excavate & Crusher to crush such rock for use in embankment. This condition was part of the agreement.

In the EPC contract under Schedule 3 - I GENERAL - Clause 2 has a provision for the same. *Thus, in the event, such consideration exceeds more than 5% during the execution, the same would be considered as a Change in accordance with Clause 34.3 [Contractor's Changes] and the valuation for which shall be done set out in the Schedule of Prices. Thus, the Contractor would be compensated/paid under the items 2.1.2 (a) & 2.1.2 (b) of Schedule 3B.*

The EPC Contractor informed GIAL as early as August 2019 that they were encountering 100% rock and also requested for change in payment terms as per the contract. GIAL rejected the request initially and asked the EPC Contractor to demonstrate the difference. As the additional impact could not be evaluated till excavation in all areas and all levels was started at site, GIAL had not entertained the claim or its impact.

The EPC Contractor informed through daily reports, monthly reports etc. that the earth strata is rock formation (laterite, Soft rock, hard rock) and could not be executed with the Excavator (including higher capacity) & required crushing for re-use in the embankment.

Post substantial completion of excavation works, a Committee by GIAL has evaluated the Contractor's request and based on backup documentation / data, recommended the below mentioned amount. Before this amendment was carried out, Earthwork had already gone through amendment on account of delays attributed to SCI / HC/ NGT related delays. This has been captured and explained in Annexure – II of this report.

Table 58 – Earthwork Cost Evaluation by GIAL Committee

Description	**As submitted by EPC Contractor**	**Unit**	**As evaluated by Committee**	**Remarks**
Total Excavation	1,17,00,000	Cum	1,17,00,000	
Less -5%	5,85,000	Cum	5,85,000	
Net Excavation Qty for Ripping	1,11,15,000	Cum	1,11,15,000	
Unsuitable Soil Qty			6,76,686	Calculated from drawings
Net Excavation Qty for Ripping	1,11,15,000		1,04,38,314	
Extra excavation with ripper rate as per 2.1.2.a	51	Rs/Cum	51	
Additional Excavation Cost	**56,68,65,000**	**INR**	**53,23,54,014**	
Crushing Qty	1,11,15,000	Cum	85,24,748	Evaluation based on actual work on site
Extra Item rate for Crushing as per 2.1.2.b	161	Rs/Cum	161	
Additional Crushing cost	**1,78,95,15,000**	**INR**	**1,37,24,84,428**	

Description	As submitted by EPC Contractor	Unit	As evaluated by Committee	Remarks
Total Additional Extra item amount for Excavation & Crushing	**2,35,63,80,000**	**INR**	**1,90,48,38,442**	
GST	42,41,48,400	INR	34,28,70,920	
Total with GST	**2,78,05,28,400**	**INR**	**2,24,77,09,362**	

Rationale for Variation Clause in the EPC Contract Document

Even though extensive geotechnical investigations were carried out during the tender/pre-award stage, the appropriate methodology required for carrying out the excavation could not be fully ascertained.

Of the total estimated volume of 1,17,00,000 cum, in GIAL estimate about 15% to 20% would have required specialized excavation methods.

The complete risk on excavation, in the bid process was that of the bidders. One bidder (M/s Megawide) had provided a lower price with a condition that it would be compensated if a specialized methodology of excavation (ripping and crushing) has to be carried out beyond 5%. They had provided unit rates also for the same.

As the Bidder was still the lowest even after considering complete 95% excavation through ripping/crushing, work was awarded to the said Bidder M/s Megawide Construction Corporation Ltd (MCC) by GIAL vide GIAL Board approval on 6th day of February 2018 for an award value of Rs.1377 Cr.

In order to account for the above, a mechanism was built in the Schedule 3 of the EPC Contract at the time of award that allowed compensation to the EPC Contractor at the pre-defined rates if the earthwork methodology required more than 5% of ripping/blasting/crushing and the above contract including the clause was approved by Govt. of Goa also.

Considering the actual methodology followed on site, M/s Megawide claimed for 95% of the earthworks at rates as provided in the contract which worked out to Rs.278 Crore. However,

GIAL got the same verified with actual quantities derived from daily progress reports/ equipment deployment and average productivity and reduced the claim amount to Rs.224 Crore.

The final negotiated amount represents ~ 80% of the Claim amount that is further Rs.53 Crore. lower than Evaluated EPC L2 Price of M/s. L&T resulting in overall savings. The L1 remains L1 after loading the cost due to compensation for specialized excavation method also. Comparison of L1 & L2 bidder is as given below:

Table 59 - Comparison of EPC- L1 and L2 regarding Earth work

(Rs. in Cr.)

Particulars	**L&T (L2)**	**Megawide (L1)**
Earthwork	357	178
Other	1,397	1,199
Final EPC Price as submitted by Bidders	**1,754**	**1,377**
Loading for 95% excavation by rippers and 95% crushing @Rs.51/- per cum and Rs.161/- per m^3 for an overall volume of 11.7M cum + 18% GST	-	278*
Evaluated EPC Price	1,754	1,655
Final Bid Position	**L2**	**L1**

** Actual amount evaluated against the Contractor's claim for earthworks is Rs.224 Crore*

Further, the rates have been verified through those adopted under MoRTH and DSR and the quantities were used from the LIDAR survey and earthwork modeling report. The cost incurred by GIAL is below the cost arrived from the MoRTH and DSR rates, hence is justifiable.

Table 60 - Cost Proposed by KITCO for Site Preparation/ Earthworks

(Rs. in Cr.)

Sl. No	**Description of item**	**Cost including GST**		**Variance (A-B)**
		As per GIAL (A)	**Admitted by KITCO (B)**	
1	Site Preparation/Earthworks	646.41	628.43	17.98

The detailed break up of items, cost analysis and justification done by KITCO is attached as Annexure-II.

7.1.5 Administrative Office Building & Site Office

GIAL had considered the Administrative Office of Airport Operator under the head "Project Assets", as part of the CA. GIAL had decided to convert the site office to an administrative office with an area of 4281 sq.m considering the overall requirement of office space for an Airport Operator. It was considered prudent to construct a permanent structure once for all. The building is designed as a permanent establishment that would be used as a site office by the project team/commissioning team, etc. and would be later used by GIAL as its administration office. Accordingly, the various requirements had been finalized and incorporated including covered car park, landscaping, external protection through gabion wall, stand by power, etc. The revised cost of Administrative Office Building amounts to Rs.52.59 Crore, which includes external works amounting to Rs.5.06 Crore. The cost submitted by GIAL and proposed by KITCO towards Administrative Office Building is given in the table below:

Table 61 - Cost Proposed by KITCO for Administrative Office Building and Site Office

(Rs. in Cr.)

Sl. No	Description of item		Cost		Variance (A-B)
		Area in sq.m	As per GIAL (A)	Admitted by KITCO (B)	
1	Administrative Office building and Site Office	4281	52.59	50.37	2.22

The cost is inclusive of GST.

The detailed break up of items, cost analysis and justification done by KITCO is attached as Annexure-III.

7.1.6 ATC Technical Block & ATC Tower

The ATC tower and Technical building has designed by GIAL as per AAI manual and the areas provided originally are as follows:

- ATC tower- 474 m2 and 48 m in height
- Technical building – 1519 m2 and G+1 building.

But, during execution, as per AAI, the space requirement of ATC Complex shall be as per the new requirements of 2018. Hence, the final areas constructed are as follows:

Table 62 – Final Area Requirements of ATC TB and ATC Tower

Particulars	Original Area in sqm	Revised Area in sqm
ATC TB	1519 (G+1)	3826 (G+3)
ATC Tower	474	721
Total	**1993**	**4547**

The area for ATC Technical Block including ATC Tower has been increased from 1993 to 4547 sq.m and the revised amount as per GIAL is Rs.103.77 Crore (all inclusive). The cost submitted by GIAL and proposed by KITCO towards ATC Technical Block and Tower is given in the table below:

Table 63- Cost Proposed by KITCO for ATC Technical Block & ATC Tower

(Rs. in Cr.)

Sl. No	Description of item		Cost		Variance (A-B)
		Area in sq.m	As per GIAL (A)	Admitted by KITCO (B)	
1	ATC Technical Block & ATC Tower	4547	103.77	87.43	16.34

The cost is inclusive of GST.

The detailed break up of items, cost analysis and justification done by KITCO is attached as Annexure-IV.

7.1.7 Main Access Road & Car Park

Due to the non-completion of the "Express link way" to the airport, an alternative access has to be provided and further revision done to Master Plan for city side development requiring additional road/drainage network. The final amount comes to Rs.105.97 Crore (all inclusive) for road work including drainage as given in the table below:

Table 64 - Cost Proposed by KITCO for Main Access Road & Car Park

(Rs. In Cr.)

Sl. No.	Description of item	Cost		Variance (A-B)
		As per GIAL (A)	Admitted by KITCO (B)	
1.	Main Access Road	105.97	104.73	1.24
2.	Car Park	3.00	Not analyzed as not forming part of aeronautical revenue	3.00

The cost is inclusive of GST.

The breakup of item, cost analysis and justification done by KITCO is attached as Annexure-V.

7.1.8 Additional Works

GIAL had submitted cost of various components amounting Rs.70.00 Crore under the head 'Additional Works' for which detailed analysis was done based on the various POs submitted by GIAL.

Table 65 - Cost proposed by KITCO for Additional Works

(Rs. in Cr.)

Sl. No.	Description of item	Cost		Variance (A-B)
		As per GIAL (A)	As per KITCO (B)	
1	Additional Works	70.00	63.59	6.41

The cost is inclusive of GST.

The detailed break up of items, cost analysis and justification done by KITCO is attached as Annexure-VI.

7.1.9 Permanent Water & Electricity

For Permanent Water & Electricity infrastructure, GIAL has deposited Rs. 20 Cr. to GoG. Being a statutory levy, the same is justified.

7.1.10 Construction of Aviation Skill Development Center (ASDC)

As per the Concessionaire Agreement, development, operation and maintenance of ASDC and ancillary facilities has to be done by GIAL.

Table 66- Cost proposed by KITCO for ASDC

(Rs. In Cr.)

Sl. No.	Description of item	Cost		Variance (A-B)
		As per GIAL (A)	As per KITCO (B)	
1	ASDC	8.00	7.66	0.34

The cost is inclusive of GST.

7.2 Soft Cost

In the CAPEX submission, GIAL had considered an amount of Rs.459.72 Crore above the hard cost as the expenses incurred towards various Technical Services, Pre-Operatives, Insurance/Statutory Payments, contingencies etc. as given below:

7.2.1 Design Consultancy, PMC expenses & Independent Engineer Services.

An amount of Rs.112 Crore is provided in the capital cost towards design development, PMC works and Independent Engineer Services for Phase I, Rs.13.90 Crore for Phase II & Rs.36.00 Crore for Phase III totaling an amount of Rs.161.90 Crore. In this case design and PMC expenses of Rs.137.83 Crores can be considered as justified as per the analysis by KITCO, attached as Annexure-VII.

7.2.2 Pre-operative Expenses

GIAL had considered an amount of Rs.265.77 Crores for Phase I, II & III combined as pre-operative expenses. The final justified cost recommended after analysis is Rs.251.36 Crore as per Annexure-VIII.

7.2.3 Contingencies

An amount of Rs.9.55 Crore is provisioned in the capital cost as contingencies for Phase II and Rs. 22.50 Crore for Phase III totaling to Rs. 32.05 Crore, which has been limited to 3% of Hard cost as per CPWD Manual/ Government of India guidelines.

7.3 Financing Allowance & Debt Service Reserve Account (DSRA)

7.3.1 Financing Allowance

As per the Final Multi Year Tariff proposal of GIAL, the Financing related Cost is given as follows:

Table 67 - Financing Related Costs submitted by GIAL

(Rs. in Cr.)

Particulars	**Amount**
Financing Allowance	448.00
DSRA	89.00
Sub Total	**537.00**

As per AERA guidelines 2011 dated 28th February 2011, the financing allowance has to be computed as per formula provided under Section 5.2.7. GIAL has given a statement applying Interest Rate to Capital Expenditure incurred (total of Debt and Equity with no split up) in respective years, which works out to Rs.488 Crore. However, while assessing the same as per AERA formula given in the guidelines published in February 2011, the Financing Allowance works out to Rs.306.76 Crore. The computation is given as Annexure-IX.

KITCO has worked out the Financing Allowance on the basis of WIP and cost of debt as provided by the Airport Operator and AERA/their Financial Consultant may review the same.

7.3.2 Debt Service Reserve Account (DSRA)

The Debt Service Reserve Account (DSRA) is a reserve account specifically set aside to make debt payments in the event of a disruption of cash flows to the extent that debt cannot be serviced. As per the information provided by GIAL, updated position of DSRA is as under:

Table 68- DSRA details provided by GIAL

(Rs. in Cr.)

Name of the Lender	LCN Raised	Disbursement Received	Balance to be received	Received Date	Transferred to DSRA A/c
Central Bank of India	18.48	18.48	-	13-Jan-23	08-Feb-23
Axis Bank	19.89	19.89	-	23-Mar-23	27-Mar-23
Indian Bank	10.64	10.64	-	29-Mar-23	03-Apr-23
Exim Bank	10.07	10.04	0.03	31-Mar-23	06-Apr-23
IIFCL	20.11	20.11		20-Apr-23	20-Apr-23
Bank of Maharashtra	9.80	9.80		04-May-23	06-May-23
TOTAL	**89.00**	**88.96**	**0.03**		

An amount of Rs.88.96 Crore (out of total requirement of Rs.89.00 Cr.) has been transferred to DSRA after completion of Phase I and COD and progressively till 06.05.2023 by the AO. Further, AO is earning interest @ 7.19% p.a. (weighted average) on quarterly compounding on such deposit. Hence, the return to be provided on the amount in DSRA is to be computed on differential interest i.e., Weighted Average Cost of Capital (WACC) minus 7.19% p.a. (quarterly compounding), as per the applicable guidelines for the first control period up to FY 2028. Since DSRA is not a part of CAPEX, therefore same is not being reflected in the amount recommended by KITCO for CAPEX.

7.4 Capital Expenditure Assessment by KITCO for First Control Period

The CAPEX details provided by GIAL under their final MYTP has been assessed by KITCO as per applicable norms/guidelines. The assessed cost with remarks are given in the following table:

Table 69- Capital Expenditure for 1st CP

(Rs. in Cr.)

Sl. No.	Description	As per Revised MYTP submitted by GIAL	Cost as assessed by KITCO	Variations	Remarks by KITCO
1	Runway, Taxiways and Apron	631.70 (Phase I,II & III)	*528.18	103.52	Refer section 7.1.1

Sl. No.	Description	As per Revised MYTP submitted by GIAL	Cost as assessed by KITCO	Variations	Remarks by KITCO
2	Passenger Terminal Building including Fit Outs (for 7.7 MPPA)	1307.10 (Phase I,II & III)	1284.03	23.07	Refer section 7.1.2
3	Airside buildings, Airside roads & Drainage System	359.45 (Phase I & III)	346.65	12.80	As per Annexure-I
4	Site Preparation/ Earthwork	646.41	628.43	17.98	As per Annexure-II
5	Administrative building & Site office	52.59	50.37	2.22	As per Annexure-III
6	ATC Technical Block and Tower	103.77	87.43	16.34	As per Annexure-IV
7	Main Access Road, Spine Road and Car park	108.97	104.71	4.26	As per Annexure-V
8	Additional Works	70.00 (Phase I & III)	63.59	6.41	As per Annexure-VI
9	Permanent Water & Electricity	20.00	20.00	0.00	Amount deposited to GoG as per PO submitted by GIAL
10	ASDC	8.00	7.66	0.34	As per CA. Details as submitted by GIAL
A	**Sub Total (1 to 10)**	****3307.99**	**3121.05**	**186.94**	
11	Design Consultancy & PMC Expenses	145.90	122.76	23.14	As per Annexure-VII
12	Independent Engineer Services	16.00	15.07	0.93	
13	Pre-operative Expenses	265.77 (Phase I,II & III)	251.36	14.41	As per Annexure-VIII

Sl. No.	Description	As per Revised MYTP submitted by GIAL	Cost as assessed by KITCO	Variations	Remarks by KITCO
14	Contingencies	32.05 (Phase II & III)	18.38	13.67	Refer Section 7.2.3
B	**Sub Total (11 to14)**	**459.72**	**407.58**	**52.15**	
15	Financing Allowance	448.00	306.76	141.24	As per Annexure-IX
16	DSRA	89.00	NA	89.00	Refer Section 7.3.2
C	**Sub Total (15 &16)**	**537.00**	**306.76**	**230.24**	
	Grand Total A+B+C	**4304.71**	**3835.38**	**469.33**	

The cost is inclusive of GST.

**AO has incurred Rs. 50 crores for extra width of 22 mtr for parallel taxi way to be used as Emergency Runway. It can be used as Emergency runway only after installation of all equipment's and DGCA approval. Accordingly, this CAPEX can be allowed (in absolute terms) when assets is put to use.*

***The CAPEX for hard cost of construction includes the works executed by EPC and other related works contract for PBB, BHS, Elevators & Escalators, Security systems, IT systems, etc.*

7.5 Means of Finance

GIAL has submitted the following source of financing to meet the Capital Expenditure requirement as per the table below:

Table 70 - Means of Finance submitted by the GIAL

(Rs. in Cr.)

Sources	Amount
Rupee Term Loan	2227
Equity	1376
Concessionaire Deposit/Quasi Equity	
Total Source of Funds	**3603**

As per GIAL, the effective D/E ratio comes to 62:38.

8 Tendering Process and Time Line Schedule

8.1 Analysis of Tendering and Contract Award Procedures Adopted by GIAL

The analysis of the tendering and work award procedures of various packages also approved by GoG have been carried out and the summary of the analysis done by KITCO is tabulated below:

Table 71- Summary of Contract Award Procedure

(Rs. in Cr)

Sl. No.	Description of Work	Qualified Bidder (L1)	Type of Tender	Evaluation Procedure adopted	Contract Agreement Date	Original Contract Amount (incl. GST)
1	EPC contractor for Greenfield Airport Construction at Mopa, Goa.	M/s Megawide Construction Corporation Ltd, Philippines.	Two stage open competitive bidding procedure adopted. RFQ Notice was published in Business Standard Newspaper -5 editions and GIAL website on 13.06.2017	Contract Award Evaluation Report is available. 4 bidders submitted RFQ and on scrutiny only 3 bidders were found qualified and RFP document issued to these 3 bidders. Techno commercial evaluation of 3 bids were carried out. M/s Megawide Construction Corporation, Philippines had given a conditional clause stating "As per price schedule 3B it is agreed that 95% Earthwork considered in normal soil with normal excavators and assuming that the same will be suitable for filling without any crushing and remaining 5% has	22-02-2018	1377.26

Sl. No.	Description of Work	Qualified Bidder (L1)	Type of Tender	Evaluation Procedure adopted	Contract Agreement Date	Original Contract Amount (incl. GST)
				been considered as excavation in rock. Excavation by rippers or by blasting shall be paid extra by the Employer as per the rate only item no 2.1.2a. Similarly filling by crushed material shall be paid extra by the Employer under the item 2.1.2b" and quoted a lump sum amount of Rs.1377.26 Cr. and was declared as L1. M/s Larson and Toubro Ltd, Chennai, India (L2) quoted lump sum amount of Rs.1,754.20 Cr.		
2	Project Management Consultant	M/s GMR Airport Developers Ltd (M/s. GADL)	Two stage open competitive bidding procedure is followed by Bid Management company M/s. ABPS Infrastructure Advisory Pvt Ltd (BMC), Mumbai who was selected through a competitive bidding process by GIAL. RFQ Notice for PMC Consultant was published in Business Standard Newspaper – 4 editions and GIAL	Contract Award Evaluation Report and Independent Probity Auditor Report to review and monitor the tender procedure as per CA in respect of Related Party Transaction is available. 6 bidders submitted RFQ and 3 bidders were qualified for RFP. M/s GMR Airport Developers Ltd quoted Rs.41.32 Cr and was declared as L1. M/s Dorsch Consult (India) Private Limited quoted	05-10-2018	41.32

Sl. No.	Description of Work	Qualified Bidder (L1)	Type of Tender	Evaluation Procedure adopted	Contract Agreement Date	Original Contract Amount (incl. GST)
			website on 17.10.2017	Rs.45.91 Cr. and was declared as L2.		
3	Security Services for Airport Site	M/s RAXA Security Services Ltd	Two stage open competitive bidding procedure adopted. RFQ notice was published in Business Standard Newspaper -4 editions and GIAL website on 17.11.2017	Contract Award Evaluation Report and the Probity Auditor Report available as M/s RAXA Security Services Ltd being a group entity of GMR. Tender Participation from 7 bidders and RFQ issued to 3 qualified bidders.	07-06-2018	10.38
4	Design & SITC of Airport Security System & Comprehensive O&M for 7 years post commissioning	M/s Macdonald Hamfrey (automation) India Private Ltd (L3 Harris/ Leidos)	Open Competitive Bidding in E-procurement platform in two cover system adopted. RFQ Notice was published in Business Standard Newspaper – 5 editions and GIAL website on 28.01.2020	Contract Award Evaluation Report Available. Tender Participation from 5 bidders. Only 2 bidders were technically qualified. M/s Harris/Leidos quoted an amount of Rs.57.31 Cr and was declared as L1 and M/s Smith Detections quoted an amount of Rs.57.66 Cr and became L2.	08-11-2021	57.31
5	Design, Procurement, Testing and Commissioning of Baggage Handling System & Comprehensive O&M for 7 years post commissioning	M/s Siemens Post Parcel & Airport Logistics Pvt Ltd.	Open Competitive Bidding in E-procurement platform in two cover system adopted. RFQ Notice was published in Business Standard Newspaper -5 editions and GIAL	Contract Award Evaluation Report Available. Tender Participation from 4 bidders and all were technically qualified. M/s Siemens who quoted Rs.48.27 Cr became L1 and M/s Beumer was L2 (Rs.52.93 Cr)	12-03-2021	48.27

Sl. No.	Description of Work	Qualified Bidder (L1)	Type of Tender	Evaluation Procedure adopted	Contract Agreement Date	Original Contract Amount (incl. GST)
			website on 05.11.2018.			
6	Design, Procurement, Testing and Commissioning of Passenger Boarding Bridge (PBB) & Visual Docking Guidance System (VDGS) & Comprehensive O&M for 7 years post commissioning	M/s Thyssenkrupp Airport Solutions SA	RFP uploaded in GIAL Procurement Portal on29.05.2018	Contract Award Evaluation Report Available. Tender Participation from 4 bidders for both PBB & VDGS. For PBB all the 4 bidders were qualified and for VDGS only 3 bidders were qualified. M/s Thyssenkrupp was L1 for both PBB & VDGS and M/s CIMC was L2 for PBB & M/s Vardhman was L2 for VDGS.	20-10-2020	38.14
7	SITC of Escalators and Elevators & Comprehensive O&M for 7 years post commissioning	M/s Thyssenkrupp Elevator India Pvt Ltd	RFP uploaded in GIAL Procurement Portal 09.10.2018	Contract Award Evaluation Report Available. Tender Participation from 4 bidders. L1 was M/s Thyssenkrupp and L2 was M/s Mitsubishi	05-10-2020	14.10
8	Landscape & Hardscape works.	M/s Grotech Landscape Developers, Hariyalee Nursery, Aditi Irrigation Technologies Pvt Ltd.	RFP uploaded in GIAL Procurement Portal 17.03.2022	Contract Award Evaluation Report Available. Tender Participation from 4 bidders. Contract awarded by splitting the order considering the magnitude of work.	19-09-2022	16.68
9	Construction of Airport Surveillance Radar (ASR) Building	M/s URC Constructions Pvt Ltd.	RFP uploaded in GIAL Procurement Portal 30.03.2021	Contract Award Evaluation Report Available. Tender Participation from 3 bidders	24-09-2021	6.64

Sl. No.	Description of Work	Qualified Bidder (L1)	Type of Tender	Evaluation Procedure adopted	Contract Agreement Date	Original Contract Amount (incl. GST)
10	Master Plan & Development Plan	M/s NORDIC In association with M/s COWI.		Based on GMR internal assessment and previous track record with GMR	22-10-2016	Euro 7,32,000 (Tax Extra)
11	Pre-Monsoon Works	M/s. Megawide Construction Corporation Ltd	Additional Work Order	Additional Purchase Order By GMR	08-11-2019	2.36
12	Design Supply Installation, testing and commissioning of Container Noise Monitoring Terminator and AMC for 5 years period post DLP of 3 years.	M/s Topsonic Systemhaus, GmbH, Germany.	Enquiry was floated to 14 contractors	Contract Award Evaluation Report Available. Tender Participation from 5 bidders	16-09-2020	3.00
13	DSITC of 7 units of Automated Tray Retrieval System and Comprehensive O & M for 7 years	M/s SJK Innovations Ltd	Replacement due to COVID pandemic	Contract Award Evaluation Report Available. M/s Smith Detection terminated and replaced with M/s SJK Innovations Ltd	12-05-2022	14.63
14	Construction of Airport Engineering and Maintenance Building	M/s DR Construction	RFP uploaded in GIAL Procurement Portal 24.06.2021	Contract Award Evaluation Report Available. Tender Participation from 3 bidders	26-11-2021	6.53
15	DSITC of TETRA Radio System and Comprehensive O & M for 7 years post commissioning	M/s Cellcomm Solutions Ltd	RFP uploaded in GIAL Procurement Portal 25.06.2021	Contract Award Evaluation Report Available. Tender Participation from 4 bidders and 3 bidders qualified.	01-03-2022	10.80
16	Construction of Police Station Building	M/s URC Construction Pvt Ltd	RFP uploaded in GIAL Procurement Portal 08.07.2021	Contract Award Evaluation Report Available. Tender Participation from 2 bidders	04-02-2022	6.79

Sl. No.	Description of Work	Qualified Bidder (L1)	Type of Tender	Evaluation Procedure adopted	Contract Agreement Date	Original Contract Amount (incl. GST)
17	Finishes for Airline Office, Commercial and Back of House at Passenger Terminal Building	M/s Spectrum Infrastructure	RFP uploaded in GIAL Procurement Portal 23.12.2021	Contract Award Evaluation Report Available. Tender Participation from 4 bidders	14-04-2022	4.38
18	Check in Counters - Fixed Furniture	M/s Rachana Arts (L2) Work awarded to meet critical inauguration deadlines as L1 could not meet the same.	RFP uploaded in GIAL Procurement Portal on 23.04.2022	Contract Award Evaluation Report Available. Tender Participation from 3 bidders	18-06-2022	3.56
19	Loose Furniture for Passenger Terminal Building & Other Building	M/s Feather Lite Office Systems Pvt Ltd.	RFP uploaded in GIAL Procurement Portal on 10.02.2022	Contract Award Evaluation Report Available. Tender Participation from 3 bidders and all 3 bidders were qualified.	29-05-2022	3.57
20	EPC for Construction of Aviation Skill Development Center with ancillaries.	M/s URC Construction Pvt Ltd	RFP uploaded in GIAL Procurement Portal on 09.10.2020	Contract Award Evaluation Report Available. Tender Participation from 3 bidders	05-02-2021	4.95
21	Supply and Installation of Airport Gate Seating in PTB	M/s Vitra International AG, Switzerland.	RFP uploaded in GIAL Procurement Portal	Contract Award Evaluation Report Available. Tender Participation from 4 bidders	01-04-2022	2.99
22	Consultant for airline marketing & on-board of airlines	M/s CAPA India Pvt Ltd.	RFP uploaded in GIAL Procurement Portal	Contract Award Evaluation Report Available. Tender Participation from 5 bidders	19-11-2020	3.18

Sl. No.	Description of Work	Qualified Bidder (L1)	Type of Tender	Evaluation Procedure adopted	Contract Agreement Date	Original Contract Amount (incl. GST)
23	Consultancy for Commercial asset bid strategy and its funding, Airport Land Development - funding structures	Indus India Holding and Financial Services Pvt Ltd.	Based on GIAL internal assessment and previous track record with GMR	Based on GIAL internal assessment and previous track record with GMR	17-10-2018	1.98
Note :- As per Concession Agreement Clause 5.6.2, procurement above Rs.25 Crore shall be by open competitive bidding. GIAL has complied to this requirement. All procurement below Rs.25 Crore was carried out through standard procurement manual formulated by GIAL specifically for the Mopa Project.						

Remarks by KITCO on Tendering Procedures adopted by GIAL

- Open Tendering procedure was found to be adopted for the following critical packages:

  a. EPC for Greenfield Airport Construction awarded to M/s Megawide Construction Corporation Ltd, Philippines for an amount of Rs.1377.26 Crore. RFQ notice was published in Business Standard Newspaper and GIAL website on 13.06.2017.

  b. Project Management Agreement for M/s GMR Airport Developers Ltd for an amount of Rs.41.32 Crore - RFQ notice was published in Business Standard Newspaper and website on 17.10.2017. M/s GMR Airport Developers Ltd being a 99.99% subsidiary of GMR, probity Auditor M/s BNPSY & Associates, Chartered Accountants certified that appointment of M/s GMR Airport Developers Ltd (M/s GADL) is on arm's length basis and is in ordinary course of business vide letter dated 13.08.2018. Further, the Audit Committee approval and Written Consent from Authority (GoG) as per CA have been provided by GIAL.

  c. SITC of Airport Security System awarded to M/s Macdonald Hamfrey (automation) India Private Ltd (Harris/ Leidos) for an amount of Rs.57.31 Crore. RFQ Notice was published in Business Standard Newspaper and GIAL website on 28.01.2020.

d. SITC of Baggage Handling System awarded to M/s Siemens Logistics India for an amount of Rs.48.27 Crore. RFQ Notice was published in Business Standard Newspaper and GIAL website on 05.11.2018.

e. Security Services for Airport site awarded to M/s RAXA Security Service Ltd for an amount of Rs.10.38 Crore. RFQ notice was published in Business Standard Newspaper and website on 17.11.2017. M/s RAXA Security Service Ltd being a group entity of GMR, Probity Auditor report is available certifying that appointment of M/s RAXA Security Service Ltd is on arm length basis vide letter dated 21.02.2018. Further, the Audit Committee approval and Written Consent from Authority (GoG) as per CA have been provided by GIAL.

- RFQ for all work packages other than mentioned above were floated through the M/s.GIAL/ GMR internal procurement portal and it was explained that they have adopted the procedures laid out in their Standard Procurement Manual formulated specifically for this Project.

- Agreement between GIAL and Megawide Construction Corporation whether comes under "related party transaction" is reviewed with respect to their association in Mactan Cebu International Airport of Philippines.

Contract Agreement between M/s. GIAL & M/s. Megawide Construction Corporation:

Clause 5.6.2 of Concession Agreement between GIAL & Government of Goa states as under:

"For procurement of goods, works or services and for award of leases, licences, sub-licences or any other rights or privilege where the consideration exceeds Rs.25,00,00,000 (Rupees twenty-five crore) in any Accounting Year (collectively the "Contracts"), the Concessionaire shall invite offers through open competitive bidding by means of e-tendering and shall select the awardees in accordance with the policy specified under Clause 5.6.1. For the avoidance of doubt, the Parties agree that the Concessionaire may, in its discretion, pre-qualify and shortlist the applicants in a fair and transparent manner for ensuring that only experienced and qualified applicants are finally selected on arm's length in a manner that is commercially prudent and protects the interests of the Users. The Parties further agree that the Concessionaire shall not enter into any Related Party Transaction or contract with any related party except with (a) with the prior written consent of the Authority, which consent shall not

be unreasonably withheld as a reserved item/affirmative action in accordance with the terms of the Shareholders' Agreement; and (b) such transaction is on arm's length basis and is in compliance with the provisions of the Companies Act, 2013. The Parties also agree that before granting any consent hereunder, the Authority shall be entitled to seek such information as it may reasonably require in relation to the Contract and the Related Party with whom the Contract is proposed to be executed and in the event the Authority does not approve or reject the proposal within 30 (thirty) days of the date on which the required information has been provided, it shall be deemed that the Authority has no objection to such Contract."

GMR Infrastructure in partnership with Megawide Construction Corporation of Philippines is operating and developing Mactan Cebu International Airport of Philippines. Subsequently GMR-Megawide Cebu Airport Corporation (GMCAC) is Mactan-Cebu International Airport's Private Operator and GMR Group holds a 40% stake in the airport, while 60% is owned by Megawide Construction Corporation.

GIAL had invited open competitive bids for design, procurement, manufacture, assembly, construction, testing, commissioning and maintenance of the upcoming Greenfield airport at MoPA Goa, in which M/s. Megawide Construction Company (the parent company of Megawide Construction Corporation) became L1. In this regard, following factors are relevant:

a. M/s. Megawide Construction Company (the parent company of Megawide Construction Corporation) participated in the bids as an independent bidder

b. Related party issue was enquired by Government of Goa and it was clarified by GIAL. On the basis of such clarification, Govt. of Goa had given their approval for the EPC Contract following the provisions of the Concession Agreement.

c. It is noted that there is no common shareholding between GMR and Megawide Construction Company.

d. No related party transaction has been established by the expert opinions given by Learned AG of Govt. of Goa and Independent Expert (Dr. K. R. Chandratre, Practicing Company Secretary) also.

Hence, no related party transaction is seen in the present case.

8.2 Analysis of Timeline Schedule for Completion of Work

1. The original COD was on 3rd September 2020.

2. In view of restraints by Hon'ble High Court/ NGT, Hon'ble Supreme Court an extension of COD by 634 days is granted by GoG on recommendation by the Independent Engineer (Engineers India Ltd., a Govt. of India CPSE) . Accordingly, COD is revised to 30th May 2022 vide letter no. 114/DOCA/MOPA//MILESTONES/2018/666 dated 7th February 2020.

3. Vide letter no. 114/DOCA/MOPA/MILESTONES/2021/VOLII/617 dated 13th December 2021an extension of COD from 30th May 2022 to 28th August 2022 is granted by GoG.

4. Due to the 2nd and 3rd wave of COVID, COD is extended further for three (3) months from 28th August 2022 vide letter no.131/DOCA/MOPA/FM notice/2020/520 dated 30th November, 2022 by GoG. Accordingly, the revised COD is 28th November 2022.

5. Actual COD is achieved on 7th December 2022 as per M/S GIAL letter No. GIAL/AERA/2022-23/1379 dated 23rd December 2022 to AERA.

9 Conclusion

9.1 Findings

The major findings in the Capital Expenditure Assessment by KITCO with reference to scope of work are summarized as below:

The major scope is to examine the proposal of the airport and assess the need for the proposed project and its capacity/scope with reference to passenger growth/ Cargo volumes/ Air Traffic Movement and also to suggest cost effective alternatives.

- The Constructed Greenfield Airport at Mopa, by GIAL is justified in view of the traffic forecast and ATM projections for the design year 2024 and is detailed in Chapter 4.

- Considering the forecasted Traffic Data indicating significant increase in Aircraft Movement and Passenger Traffic in the state of Goa and also the saturation of operations in Dabolim Airport the need for a New International Airport at Mopa is justified.

- Since the Mopa Airport is completed and commissioned during December 2022, cost effective alternatives are technically not feasible.

To examine the building standards and designs proposed by the Airport Operator in line with IMG norms/IATA/ICAO norms

- The built-up area of 67,726 sq. m of Passenger Terminal building for 2400 PHP is satisfying the IMG Area norms and is also within the limit of 25-40 sq. m as per CA and is discussed in detail in Chapter 6.

- The built-up area of 67,726 sq. m can be justified for 7.7 MPPA but as the Terminal Building is not planned for corresponding PHP of 2400 in all the process areas (deficiency found in certain process areas), with the existing sufficient area available, future accommodation of deficient process area could be done. The additional cost required to provide fit outs for 2400 PHP is also considered while evaluating the Project CAPEX.

To analyze the reasonableness of the proposed cost with reference to the tentative ceiling decided by Authority vide order No.7 dated 13.06.2016 based on the details of the rates and quantity as per Government/Industry Approved Norms and advise the Authority on the reasonableness of the costs.

- Review of the cost estimate submitted by GIAL has been done by KITCO based on the information provided by GIAL, lump sum estimates, various Purchase Orders (POs) submitted and Government/Industry Approved Norms. Being EPC contract for major components, no detailed estimates or component wise BOQ are available.

- In view of this, KITCO evaluated the same in detail, on the basis of site visit, analysis of design and specifications provided by AO, cost allowed at other airports and arrived to the final cost as per the table below.

- Soft costs submitted by GIAL are reviewed as per industry practices and as certified by Statutory Auditor.

- The details of above analysis briefed in Chapter 7 are summarized as below:

Table 72- CAPEX for 1st CP claimed by GIAL and recommended by KITCO

(Rs. in Cr.)

Sl. No.	Description	As per Revised MYTP submitted by GIAL	Cost as assessed by KITCO	Variations
1	Hard Cost (A)	**3307.99	3121.05*	186.94
2	Soft Cost (B)	459.72	407.57	52.15
3	Financing Allowance and DSRA (C)	537.00	306.76	230.24
	Grand Total A+B+C	**4304.71**	**3835.38**	**469.33**

The cost is inclusive of GST.

**AO has incurred Rs. 50 crores for extra width of 22 mtr for parallel taxi way to be used as Emergency Runway. It can be used as Emergency runway only after installation of all equipment's and DGCA approval. Accordingly, this CAPEX can be allowed (in absolute terms) when assets is put to use.*

***The CAPEX for hard cost of construction includes the works executed by EPC and other related works contract for PBB, BHS, Elevators & Escalators, Security systems, IT systems, etc.*

To review designs and specifications proposed in case the costs are assessed to be excessive where the Projects are already in progress or the contracts are already awarded. Further to examine whether proper procedures have been followed in the award of the work.

- Design and specifications proposed for Terminal Building and other works can be considered generally in order keeping in view the best industry practices as per the analysis done by KITCO.

- Review of the Tendering process and award of work submitted by GIAL has been done by KITCO based on the information provided by GIAL. The details of analysis are briefed in Chapter 8.

- Two stage Open competitive bidding procedure was found to be adopted for critical packages as detailed in Chapter 8.

- For tender packages wherever RPT in question, Independent Probity Auditors report certifying appointment on arm's length basis and audit committee approval/Authority (GoG) consent as per CA requirement have been provided by GIAL. Same is analyzed by KITCO and found to be in order.

- RFQ for all work packages other than mentioned above were floated through the M/s GIAL/ GMR Internal Procurement Portal and it was explained that they have adopted the procedures laid out in their Standard Procurement Manual formulated specifically for this Airport project.

To review and justify the reasonableness of time schedule of completion of work proposed by Airport Operator.

- Review of the reasonableness of time schedule of completion of work submitted by GIAL has been done by KITCO based on the information provided by GIAL. The details of analysis are briefed in Chapter 8.

****

Annexure-I

Airside Building, Roads and Drainage System

Cost Analysis for Airside building, Roads and drainage System is as follows:

Cost for Airside building, Roads and drainage System submitted by GIAL amounts to Rs.359.45 Cr. Including Phase III works.

(Rs. in Cr.)

Sl. No.	Particulars	Amount Claimed by GIAL	Amount justified/ admitted by KITCO	Remarks by KITCO
a.	Storm water drainage system	107.34		Length of RCC Drain for entire area considered is 19.126km. As per the direction of Hon'ble Supreme Court/ NGT, the complete drainage plan was revisited and additional provision of culverts, manhole was also included, other than drainage works. The cost was checked and found to be reasonable.
b.	Roads (Airside Road, Cross Service Roads at both east and west of parking stands, Vehicle Turn Pads in Head of stand Road	38.18		As per GIAL for flexible pavement of 14.015 km, 2 lane road, rate adopted is Rs.3632/sqm including marking, signage etc. all complete. As per MoRTH, for flexible pavement, rate per sqm comes to Rs.4632/-, (considering BC:40mm, DBM: 60mm and SSB:250mm). Hence, rate considered is found reasonable.
c.	Buildings & Other Airside Infrastructure, Fire station, Sub-station,	75.21		For service building with Civil works, MEP and other service related requirements, rates

	Pump house, NAVAID, Utility building, DG yard, STP, boundary wall, Workshop, Watch Tower and Morcha) Washing & Hot treatment area			adopted are found to be reasonable considering DSR rates.
d.	MEP works (Runway, taxiway lighting, AGL system, CCTV system and IT works, HT Electrical works, Fire Hydrant Line)	38.20		Comparing with similar airside facilities airport the rates adopted for MEP works at Airside are found reasonable.
e.	Installation of Gabion wall	20.36		Gabion walls provided with heights varying from 10.40 m to 18.4 m. Comparing the rate of Maccafferi Terramesh and other related components with similar project values is found reasonable.
A	**Sub Total (a to e)**	**279.29**	**279.29**	As the rates adopted by GIAL are comparable with the rates worked out by KITCO comparing CPWD/ MoRTH/ Similar projects the amount submitted by GIAL under the head Airside Buildings, Roads and Drainage system is found justified.
f.	Prolongation Cost by EPC due to restraints imposed by NGT & Hon'ble Supreme Court of India	14.48	14.48	Admitted as reasons for delay like NGT order and time over run of 634 days etc. are not attributable to the Airport Operator as approval had been given by GoG after recommendation by Independent Engineer M/s EIL (a CPSE of GoI).
g.	Additional OH charges by EPC due to scope change	7.04	-	Not admitted as machinery to carry out additional works including mobilization, site office and other infrastructure was

				already available. So, remobilization of resources included related cost not applicable.
B	**Sub Total (A+f+ g)**	**300.81**	**293.77**	-
h.	GST @ 18%	54.14	52.88	-
C	**Sub Total (B+h)**	**354.95**	**346.65**	-
i.	Airside additional works in Phase III	4.50	-	Detailed estimate not provided for analysis. Hence, not admitted.
	Total (C+i)	**359.45**	**346.65**	-

Annexure-II

SITE PREPARATION/EARTH WORK

Cost Analysis for Site Preparation /Earth Work:

Cost for Site Preparation /Earth Work submitted by GIAL is Rs.646.41 Cr

(Rs. in Cr.)

Particulars	**Quantity (m^3)**	**Rate (Rs. per m^3)**	**Amount**	**Remarks by KITCO**
a) Earth work excavation in ordinary soil	1,17,00,000*	225.00**	263.25	* Total quantity considered in the tender assuming ordinary soil and normal excavation methodology. ** For the purpose of Amendment 1 to EPC contract post Hon'ble Supreme Court of India and High Court/NGT stay order and related delays, as on Jan 2019 (immediately before Hon'ble Supreme Court of India stay order, ~40 Lakh cubic meters of excavation was completed at contracted rate but out of that only ~0.6 lakh cubic meter could be filled due to the restriction on tree felling and consequently unavailability of filling sites. This balance excavated earth was stored within the site at various locations available for filling and remained there for more than one year during the stay order, exposed to natural elements including monsoon rains.) While revised rates were worked out for remaining cut & fill quantity of ~ 76.87 lakhs cubic meters, a reduced rate for re-transport of balance quantity already excavated and

				stored for refilling was necessitated, and a rate of Rs.117 per cubic meter was agreed for re-transportation and filling as the earth had to be picked up through earth moving equipment and transported to intended fill locations before processing and filling. This rate was lower than amended composite Cut & Fill rate of Rs.225 as the earth was already excavated and was only to be transported and compacted. The amended rate so arrived was inclusive of steep increase in diesel price during this intervening period and earthwork rates primarily consists around 60% on account of diesel since the machines are primarily running on diesel. Diesel prices moved up from Rs. 54 per liter to Rs. 72 per liter which was the primary factor. In addition, an idling claim of Rs. 10.62 Cr. was also agreed to be paid as most of the machineries used for Earthwork (Rippers etc.) were kept at site due to the uncertainty of lifting of stay order Hon'ble Supreme Court of India till June, 2019. For the purpose of ease and enabling measurements, all these above factors were agreed to be captured in terms of composite rate for entire quantity of earthwork at a rate of Rs. 225 per cum from Rs. 129 per cum (as per original EPC contract) to arrive at the price in Amended EPC contract, Amendment 1 (As per revised schedule 3A & 3B).

b) Earth work excavation in rock i) Ripping ii) Crushing	 1,04,38,314* 85,24,748*	 51.00** 161.00**	 53.24 137.25	* Quantity allowed by GIAL as rock requiring specialized excavation methodology ** Rate as per the conditional clause submitted by EPC during tendering as per item no. 2.1.2 (a) & (b).
c) Earth work initiation charge			47.52	
d)Prolongation Cost due to restraints imposed by NGT & Hon'ble Supreme Court of India			31.31	Admitted as reasons for delay like NGT order and time over run of 634 days etc. are not attributable to the Airport Operator as approval had been given by GoG after recommendation by Independent Engineer M/s EIL (a CPSE of GoI)
e)Additional Overhead (OH) charges due to scope change			15.23	Not admitted as machinery to carry out additional works including mobilization, site office and other infrastructure was already available. So remobilization of resources included related cost not applicable.
Total (a+b+c+d+e)			**547.80**	
Total incl. GST @18%			**646.41**	Rate justified by KITCO is Rs 628.43 Crore excluding item (e) as per comparison of rate done based on CPWD schedule of rates and MoRTH.
Rate adopted by GIAL is cross checked by KITCO based on CPWD schedule of rates as follows:				
a) Earth work excavation in ordinary soil	1,17,00,000*	172.52**	201.84	* Total Quantity verified by KITCO

				** Deducting amount of initial lead of 50m from original rate of Rs.205.45/m3 for all kinds of soil as per DSR 2021. Refer calculation attached as Annexure II-A.
b) Additional rate for i) Ripping ii) Crushing iii) Additional Lead of 1km considered	 1,04,38,314* 85,24,748* 85,24,748	 50.12** 158.72** 180.40***	 52.31 135.30 193.77	 *Quantity as per GIAL ** Rate for excavation in ordinary rock as per DSR 2021.Rate proportionately applied for ripping & crushing. Refer calculation attached as Annexure II-A *** Rate as per DSR 2021 item 1.1.2 (carriage by mechanical means)
Total (a+b) (incl. GST @14.05%)			**583.22**	
Applying balance GST @3.95% (as DSR rate is inclusive of GST @14.05%) = 583.22*1.0395 = **606.26 Cr**				
Rate adopted by GIAL is cross checked by KITCO based on MoRTH rate as follows:				
a) Earth work excavation in ordinary soil	12,61,686*	93.00**	11.73	* Quantity of ordinary soil (1,17,00,000-1,04,38,314=12,61,686) **Refer calculations attached as Annexure II-B (MoRTH item no. 301/3.06)
b) Earth work excavation in ordinary rock i) Ripping and crushing	94,81,531*	460.00**	436.15	*Quantity of ordinary rock as per GIAL (90% only considered) ** GIAL explained that Excavation by rock excavator is not possible. Hence average rate of excavation in Ordinary rock by Dozer and breakers

ii) Filling	94,81,531*	58.00	54.99	adopted. Refer calculations attached as Annexure II-B (MoRTH item no.301/3.04 & 301/3.07) *Quantity of filling as per the details submitted GIAL and rates as per MoRTH.
Total (a+b)			**502.87**	
Total amount with GST @18% = 502.87*1.18 = 593.39 Cr				

Annexure II-A

Earthwork – Rate Analysis as per CPWD Schedule of Rates, DSR 2021

DSR item no	Description Of Items	Unit	Qty	Rate in Rs	Amount in Rs
	As per CPWD Schedule of Rates, DSR 2021				
2.6.1	**Details of cost for 10 cum.**				
	MACHINERY				
	Hydraulic Excavator (3D) with driver and fuel.(SOR)	Day	0.04100	7,000.00	287.00
	Hire and running charges of loader. (SOR)	Day	0.04100	0.00	0.00
	Labour				
	Mate	Day	0.3200	714.00	228.48
	Beldars/Coolies	Day	1.2000	645.00	774.00
	TOTAL				1289.48
	Add 1 % for water charges				12.89
	TOTAL				1302.37
	Add GST on "X" (multiplying factor 0.1405)				182.98
	TOTAL				1485.36
	Add 15% CPOH on "Y"				222.80
	TOTAL				1708.16
	Add Cess @ 1% on "Z"				17.08
	Cost of 10 cum				1725.24
	Cost of 1 cum				172.52
	Say				**172.52**
2.7.1	**Details of cost for 10 cum.**				
	MACHINERY				
	Hydraulic Excavator (3D) with driver and fuel.(SOR)	Day	0.06300	7,000.00	441.00
	Hire and running charges of loader. (SOR)	Day	0.06300	0.00	0.00
132	Roack excavator	Day	0.70500	645.00	454.73
133	Rock Breaker	Day	1.59000	645.00	1025.55
134	Rock Hole Driller	Day	0.35500	645.00	228.98

DSR item no	Description Of Items	Unit	Qty	Rate in Rs	Amount in Rs
	Labour-				
	Beldar	Day	0.5000	645.00	322.50
	Coolies	Day	0.5500	645.00	354.75
	Sundries	LS	10.7900	2.12	22.87
	TOTAL				2850.37
	Add 1 % for water charges				28.50
	TOTAL				2878.88
	Add GST on "X" (multiplying factor 0.1405)				404.48
	TOTAL				3283.36
	Add 15% CPOH on "Y"				492.50
	TOTAL				3775.87
	Add Cess @ 1% on "Z"				37.76
	Cost of 10 cum				3813.62
	Cost of 1 cum				381.36
	Say				**381.36**
	Rate of ordinary rock-ordinary soil=381.36-172.52= 208.84				208.84
	Percentage of 51 and 161 (51/(51+161)=24%,(161/(51+161)=76%				50.1216
	Considered for the calculation.				**Rs.158.7184/m3**

Annexure II-B

Earthwork – Rate Analysis as per MoRTH

MoRTH DATA ANALYSIS FOR EXCAVATON OF SOIL WITH EXCAVATOR					
Ref. to MoRTH Spec.	**Description**	**Unit**	**Rate in Rs**	**Qty**	**Amount in Rs.**
301/3.06	Excavation in Soil using Hydraulic Excavator and Tippers with disposal upto 1000 metres.				
	Excavation for roadwork in soil with hydraulic excavator including cutting and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location with all lifts and lead upto 1000m	Cum			
	Unit = cum				
	Taking output = 350 cum				
a)	Labour				
	Mate	day	714	0.040	29
	Mazdoor	day	784	1.000	784
b)	Machinery				
	Hydraulic Excavator				
	(i) 1.2 cum bucket capacity	hour	3420	3.926	13,427
	(ii) 1.1 cum bucket capacity	hour	3074		
	(iii) 0.9 cum bucket capacity	hour	2782		
	Hydraulic Excavator of 1 cum bucket capacity @ 60 cum per hour	hour			
	Tipper				
	For transportation considering lead @ 1 km				
	(i) 18 cum capacity	t.km	5.887	525.000	3,091
	(ii) 14 cum capacity	t.km	6.682		
	(iii) 10 cum capacity	t.km	8.255		
	For loading & unloading time				
	(i) 18 cum capacity	hour	2435	3.926	9,560
	(ii) 14 cum capacity	hour	2435		
	(iii) 10 cum capacity	hour	2229		
	Tipper - 5 cum capacity, 4 trips per hour.	hour			
c)	Overhead charges		10%	@ on (a+b)	2,689
d)	Contractor's profit		10%	@ on (a+b+c)	2,958
	Cost for 350 cum = a+b+c+d	350			32,537
	Rate per cum = (a+b+c+d)/350				**93**
	Excavation in soil using excavators				**Rs.93/m3**

MoRTH DATA ANALYSIS FOR EXCAVATION IN ORIDNARY ROCK WITH DOZER					
Ref. to MoRTH Spec.	**Description**	**Unit**	**Rate in Rs.**	**Qty**	**Amount in Rs,**
301/3.04	Excavation in Ordinary Rock with Dozer with lead upto 1000 metres				
	Excavation for roadway in ordinary rock by deploying a dozer, including cutting and transporting the earth to site of embankment/dumping area with lead upto 1000 metres, trimming bottom and side slopes in accordance with the requirements of lines, grades and cross sections.	cum			
	Unit = cum				
	Taking output = 300 cum				
a)	Labour				
	Mate	day	714.00	0.040	29
	Mazdoor	day	784.00	1.000	784
b)	Machinery				
	Dozer				
	Dozer (240HP)	hour	6273	4.688	29,408
	Dozer (175 HP)	hour	4845		
	Dozer (90 HP)	hour	3336		
	Dozer D - 80 - A 12 @ 20 cum per hour	hour			
	Tipper				
	(i) 18 cum capacity	t.km	5.887	720.000	4,239
	(ii) 14 cum capacity	t.km	6.682		
	(ii) 10 cum capacity	t.km	8.255		
	Loading & unloading charges				
	Using by 18 cum capacity Tipper & 3.1 Cum capacity Loader	cum	88.307	360.000	31,791
	(ii) Using by 14 cum capacity Tipper & 2.1 Cum capacity Loader	cum	88.393		
	(iii) Using by 10 cum capacity Tipper & 1 Cum capacity Loader	cum	123.479		
c)	Overhead charges		10%	@ on (a+b)	6,625
d)	Contractor's profit		10%	@ on (a+b+c)	7,287
	Cost for 300 cum = a+b+c+d		300		80,162
	Rate per cum = (a+b+c+d)/300				**267**
	Excavation in rock (without blasting)**				**Rs.267/m3**

MoRTH DATA ANALYSIS FOR ORDINARY ROCK BY EXCAVATOR					
Ref. to MoRTH Spec.	**Description**	**Unit**	**Rate in Rs.**	**Qty**	**Amount in Rs,**
301/3.07	Excavation in Ordinary Rock using Hydraulic Excavator and Tippers with Disposal upto 1000 metres.				
	Excavation for roadwork in Ordinary Rock with hydraulic excavator including cutting and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location within all lifts and lead upto 1000m	cum			
	Unit = cum				
	Taking output = 60 cum				
a)	Labour				
	Mate	day	714	0.040	29
	Mazdoor	day	784	1.000	784
b)	Machinery				
	Hydraulic Excavator for Jack Hammer				
	(i) 1.2 cum bucket capacity	hour	3293	6.982	22,992
	(ii) 1.1 cum bucket capacity	hour	2965		
	(iii) 0.9 cum bucket capacity	hour	2689		
	Hydraulic Excavator of 1 cum bucket @ 36 cum per hour	hour			
	Jack Hammer	hour	206	6.982	1,438
	Tipper				
	For transportation considering lead @ 1 km				
	(i) 18 cum capacity	t.km	5.887	120.000	706
	(ii) 14 cum capacity	t.km	6.682		
	(iii) 10 cum capacity	t.km	8.255		
	For loading & unloading charges for disposed of grabbed material				
	Using by 18 cum capacity Tipper & 3.1 Cum capacity Loader	cum	88.307	72.000	6,358

	(ii) Using by 14 cum capacity Tipper & 2.1 Cum capacity Loader	cum	88.393		
	(iii) Using by 10 cum capacity Tipper & 1 Cum capacity Loader	cum	123.479		
	Tipper 5.5 tonnes capacity 4 trips per hour	Hr			
c)	Overhead charges		10%	@ on (a+b)	3,231
d)	Contractor's profit		10%	@ on (a+b+c)	3,554
	Cost for 60 cum = a+b+c+d	60			39,092
	Rate per cum = (a+b+c+d)/60				**652**
	Excavation in rock- (without blasting)**				652
	Average of excavation in rock by dozer and excavator		(267+652)/2= **460/m3**		

Annexure-III

Administrative Office Building & Site Office

Cost analysis of Administrative Office Building & Site Office is as follows:

The cost of Administrative Office Building submitted by GIAL amounts to Rs.52.59 Crore, which includes an amount of Rs.5.06 Crore for external work.

(Rs. in Cr.)

Sl. No.	Particulars	Amount claimed by GIAL	Amount Admitted/ justified by KITCO	Remarks by KITCO
a.	Building works	35.95		Justified as per the similar works executed, considering the rate per sqm as Rs. 65,000/- (As per CPWD Schedule of Rates)
b.	Profit, Preliminaries, Labour cess	0.69		Already included in the rates adopted. Hence not allowed
c.	External works	4.29		As per the similar works executed, the amount for Gabion wall is justified.
A	**Sub Total (a to c)**	**40.93**	**40.24**	Amount admitted by KITCO excluding item (b)
d	Prolongation Cost by contractor due to restraints by NGT & Hon'ble Supreme Court of India	2.45	2.45	Admitted as reasons for delay like NGT order and time over run of 634 days etc. are not attributable to the Airport Operator as approval had been given by GoG after recommendation by Independent Engineer M/s EIL (a CPSE of GoI)

Sl. No.	Particulars	Amount claimed by GIAL	Amount Admitted/ justified by KITCO	Remarks by KITCO
e	Additional Overhead (OH) charges due to scope change	1.19	Nil	Not admitted as machinery to carry out additional works including mobilization, site office and other infrastructure was already available. So remobilization of resources included related cost not applicable.
B	**Sub Total (A+ d + e)**	**44.57**	42.69	
f	GST @18%	8.02	7.68	
	Total (B+f)	**52.59**	**50.37**	Amount admitted by KITCO excluding item (b) & (e).

Annexure-IV

ATC Technical Block & ATC Tower

Cost analysis of ATC Technical block & ATC tower is as follows:

Cost of ATC Technical block & ATC tower submitted by GIAL is Rs.103.77 Cr.

(Rs. in Cr.)

Sl. No.	Particulars	Amount claimed by GIAL	Amount Admitted/ justified by KITCO	Remarks by KITCO
1	ATC Technical Block with ATC Tower			
a	ATC Technical block of built up area 3826 sqm including MEP and other services and with external envelope.	45.26	41.80	Rate adopted by GIAL for ATC TB including civil, structural and MEP (considering the enhanced electromechanical and Extra Low Voltage (ELV) infrastructure) and with external envelope comprising of steel and aluminium sections and 46 mm thick DGU unitized glass fascade is analysed comparing similar projects executed and the technical backup requirements. Final amount justified is Rs. 41.80 Cr (all inclusive) as given in Annexure IV-A.
b	ATC Tower of built up area 721sqm with MEP and other services and with external envelope.	35.98	27.78	Rate adopted by GIAL for ATC Tower including civil, structural (considering the height of 50 mtrs approx. and related design considerations) and MEP (considering the enhanced electromechanical and Extra Low Voltage (ELV) infrastructure and with external envelope comprising of heavy steel and aluminium sections and 46 mm thick DGU unitized glass fascade is analysed comparing similar projects executed and the technical backup requirements. Final amount justified is Rs. 27.78 Cr (all inclusive) as given in Annexure IV-A.
A	**Sub Total (a+b)**	**81.24**	**69.58**	Amount admitted by KITCO

Sl. No.	Particulars	Amount claimed by GIAL	Amount Admitted/ justified by KITCO	Remarks by KITCO
c	Prolongation cost due to restraints imposed by NGT & Hon'ble Supreme Court of India	4.51	4.51	Admitted as reasons for delay like NGT order and time over run of 634 days etc. are not attributable to the Airport Operator as approval had been given by GoG after recommendation by Independent Engineer M/s EIL (a CPSE of GoI)
d	Additional Overhead (OH) charges due to scope change	2.19		Not admitted as machinery to carry out additional works including mobilization, site office and other infrastructure was already available. So remobilization of resources included related cost not applicable.
B	**Sub Total (A+c+d)**	**87.94**	**74.09**	
e	GST @ 18%	15.83	13.34	
	Total (B+e)	**103.77**	**87.43**	

Annexure IV-A

Cost Analysis of ATC Technical Block with ATC Tower

(Rs in Cr)

A.	**ATC Technical Block of built up area 3826 sq. mtr. Including MEP and other services and with external envelope.**	**Amount**
	Cost for civil, structural, flooring and finishes= 3826 sq. mtr. X Rs. 35,000 * per sq. mtr (*rate (excluding GST) as per CPWD Schedule of rates)	13.39
	External envelope (consisting of 46 mm thick DGU glazing and associated structural supports)	9.43
	Furniture and Cabling	2.90
	MEP and ELV services (considering enhanced MEP and ELV infrastructure)	16.08
	Total	**41.80**
B.	**ATC Tower of built up area 721 sq. mtr with MEP and other services and with external envelope.**	
	Cost for civil, structural, flooring and finishes= 721 sq. mtr. X Rs. 45,000* per sq. mtr (Considering 50 mtr. height building and related structural design requirements) (*rate (excluding GST) as per CPWD Schedule of rates)	3.24
	External envelope (consisting of 46 mm thick large panel DGU glazing and associated heavy structural supports)	20.24
	MEP and ELV services (considering enhanced MEP and ELV Infrastructure)	4.30
	Total	**27.78**

Annexure-V

Main Access Road & Car Park

Cost analysis of Main Access Road and car park is as follows:

Cost of Main Access Road and Car park submitted by GIAL is Rs.108.97 Cr.

(Rs. in Cr.)

Sl. No.	Particulars	Length of road (in KM)	Amount claimed by GIAL	Amount Admitted/ justified by KITCO	Remarks by KITCO
a.	Main access road to terminal / car park including, intersections, rotary, Marking , signage and road furniture all complete	0.84	13.35	**35.65**	Total length of road = 4.723km (Item a to d). Width of road- 5lane & 2 lane As per MoRTH , for flexible pavement, rate per sqm comes to Rs.4632/-, considering BC:40mm, DBM:60mm and SSB:250mm As per the details submitted by GIAL, the rate per sqm including marking, signages and etc. all complete comes to Rs.4,597.56/- As the amount claimed by GIAL is within the amount as per the rate adopted based on MoRTH, the amount claimed is justified. (a to d)
b.	Terminal forecourt, waiting lane, passenger drop-off, pick up points including drainage, marking, signage and road furniture all complete	0.663	8.94		
c.	Service roads on land side including marking , signage and road furniture all complete	2.00	8.94		
d.	Other approach roads on landside including Marking , Signage and Road	1.22	4.42		

Sl. No.	Particulars	Length of road (in KM)	Amount claimed by GIAL	Amount Admitted/ justified by KITCO	Remarks by KITCO
	furniture all complete				
e	Road connecting express way to PTB		50.97	50.97	As per PO submitted by GIAL.
I	**Sub Total (a+b+c+d+e)**		**86.62**	**86.62**	
f	Prolongation cost due to restraints by NGT & Hon'ble Supreme Court of India		2.14	2.14	Admitted as reasons for delay like NGT order and time over run of 634 days etc. are not attributable to the Airport Operator as approval had been given by GoG after recommendation by Independent Engineer M/s EIL (a CPSE of GoI)
g	Additional Overhead (OH) charges due to scope change		1.04	Nil	Not admitted as machinery to carry out additional works including mobilization, site office and other infrastructure was already available. So, remobilization of resources included related cost not applicable.
II	**Sub Total (I+f+g)**		**89.80**	**88.73**	
h	GST @ 18%		16.16	15.98	
	Total (II +h)		**105.97**	**104.71**	**Amount admitted by KITCO excluding item (g)**
i	Car Park		3.00	-	Not analyzed as not forming part of aeronautical revenue

Annexure-VI

Additional Works

Cost analysis of Additional Works is as follows:

Cost of Additional work submitted by GIAL is Rs.70 Cr for Phase I & III.

(Rs. in Cr.)

Sl. No.	Particulars	Amount submitted by GIAL	Amount justified /Admitted by KITCO	Remarks by KITCO
I	Additional works for Phase I			
a.	Police station	4.79	4.79	Justified based on similar work undertaken by KITCO. Hence admitting the amount submitted by GIAL
b.	Taxi driver's facility, AEP, Post office, Bank, Tensile Fiber covered footpath, Canteen etc.,	5.41	1.79	Out of Rs. 5.41 Crore submitted by GIAL details submitted is only for Rs. 1.79 Crore as given below which is justified by KITCO: Canteen : Rs. 1.00 Cr AEP : Rs. 0.41 Cr Taxi Driver Facility: Rs. 0.38 Cr **Total : Rs. 1.79 Cr**
c.	Material Storage yard (2000 Sq.m)	5.08	5.08	Admitted as per details submitted by GIAL
d.	Infrastructure Tax	1.69	1.69	Tax paid to Mopa Airport Development Authority.
e.	Tree Translocation	0.85	0.66	Admitted as per the PO submitted by GIAL and as per the requirement of Hon'ble Supreme Court of India.
f.	Landside Staff Canteen	0.85	0.85	Admitted as per the PO submitted by GIAL
g.	Central Store	0.85	0.26	Admitted as per the PO submitted by GIAL which is 0.26 Cr only against the claim amount of Rs.0.85 Cr.
h.	Post Office (20 sqm) & Bank	0.85	0.85	Admitted as per the PO submitted by GIAL

Sl. No.	Particulars	Amount submitted by GIAL	Amount justified /Admitted by KITCO	Remarks by KITCO
i.	Miscellaneous	1.69	1.69	Admitted as per the PO submitted by GIAL
j.	ASR/MSSR Building & Other Airside Infrastructure	5.63	5.63	Admitted as per the PO submitted by GIAL for items (j) to (t).
k.	MT and GSE WS Area (1000 SQM)	5.09	5.09	
l.	Compliance with new conditions imposed by Hon'ble Supreme Court of India	7.63	7.63	
m.	Art works -Subodh Kerkar	1.69	1.69	
n.	Signages- NH66	1.69	1.69	
o.	Signages - Approach Road	0.85	0.85	
p.	Signages- Village Road	0.85	0.85	
q.	Signages & Installations- Airport	2.96	2.96	
r.	Horticulture	2.33	2.33	
s.	Pax Experience	3.28	3.28	
t.	City side Development	4.23	4.23	
A	**Sub Total (a to t)**	57.63	53.89	
	GST @18%	10.37	9.70	
B	**Sub Total**	**68.00**	**63.59**	
II	Additional works for Phase III	2.00		Cost not admitted as no details submitted for analysis.
C	**Sub Total**	**2.00**		
	Total (B+C)	**70.00**	**63.59**	

Annexure-VII

Design Consultancy and PMC Expenses

Analysis of Design Consultancy and PMC Expenses are done considering the following facts:

M/s GIAL had provided an amount of Rs.161.90 crore for design & PMC services for construction of Greenfield International Airport at Goa for the 1st control period under three heads as given below.

Design Consultancy Charges

M/s GIAL had submitted PO's of 16 nos Consultants for services which includes Master Plan Preparation, Various surveys/studies, Airport Rating, IGBC certification, preparation of documents for Govt approvals, Structural liability stability of various structures etc. amounting Rs 14 Crore.

PMC Expenses

M/s GADL through bidding procedure had quoted an amount of RS 37.43 Crore for PMC services and escalation rate on 3rd year prices for providing services for 4th year as 10% (as per Annexure 5 Item 4 of bid document) for the construction of Greenfield International Airport at Goa –Phase I in the year 2018.During the progress of work, for last 2 years i.e., from June '22 to March'23 rate of escalation revised to 8%.

Independent Engineer Services

As per CA, GoG has to appoint an Independent Engineer and remuneration, cost and expenses for IE shall be reimbursed by the Concessionaire to GoG after receiving a statement of expenditure from GoG.

Amount analyzed by KITCO is as follows:

Cost towards Design Consultancy, PMC Expenses & Independent Engineering Services submitted by GIAL is Rs.161.90 Cr.

(Rs. in Cr.)

Description	Amount Claimed by GIAL (Phase I, II & III)	Amount Admitted/ justified by KITCO	Remarks by KITCO
a) Design Consultancy Charges	14.00	14.00	Admitted as per PO submitted by GIAL.
b) PMC expenses towards Airside works, PTB and Landside works	a) 82.00 Phase I b) 13.90 Phase II c) 36.00 Phase III	a) 81.59 Phase I b) 5.22 Phase II c) 21.95 Phase III	a) As clause 3.2 (Technical Criteria) of RFQ for selection of PMC Consultants for Mopa Project was found to be restrictive, KITCO recommends a deduction of 0.5 % from the PMC fee of Rs.82 Cr. assessed by us. b) As Phase II works includes only additional fit outs required to attain 7.7 MPPA, and all items included are SITC, only 3% of CAPEX submitted by AO for Phase II only allowed towards PMC charges. c) Phase III works considers increase in PTB area with fit outs and expansion in Apron area. This being an extension of already adopted procedures of contracting, 5% of CAPEX submitted by

			AO for Phase III considered for design and PMC charges.
c) Fee for Independent Engineer Services.	16.00	15.07	Considered Rs.15.07Cr. as per PO submitted by GIAL (against claim amount of Rs.16 Cr) and approved by GoG.
Total	**161.90**	**137.83**	

The Cost is inclusive of GST.

Annexure-VIII

PRE-OPERATIVE EXPENSES

Pre-Operative expenses submitted by GIAL is analyzed as follows:

Pre-Operative expenses submitted by GIAL is Rs.265.77 Cr. for Phase I, II & III.

(Rs. in Cr.)

Sl. No.	Description of item	Cost submitted by GIAL including cost to be incurred for International Operations	Amount Admitted/ justified by KITCO	Remarks by KITCO
I	**Phase I**			
1	Manpower related cost	96.65	96.65	Cost admitted as per details submitted by GIAL/ CA certificate for amount incurred. *Security of entire area including land parcels of AO are seen included in the cost provided by GIAL. Hence, allowing only 2/3rd cost for security related to Airport premises. ** As legal charges are mainly for NGT & Hon'ble Supreme Court of India orders, allowing 2/3rd cost.
2	Other Consultancy Charges	38.07	38.07	
3	Others (Incl. Admin & Finance Charges)	87.37	87.37	
4	Security Cost	15.60	*10.40	
5	Legal Charges	7.31	**4.87	
6	ORAT	14.00	14.00	As submitted by GIAL
	Total for Phase I	**259.00**	**251.36**	**-**
II	**Phase II**	**3.47**	**-**	No details submitted by GIAL for analysis Hence, not allowed.
III	**Phase III**	**3.30**	**-**	
	Total (Phase I to III)	**265.77**	**251.36**	**-**

The cost is inclusive of GST.

ANNEXURE IX

FINANCING ALLOWANCE

(Rs. in Cr.)

Financial Year	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Rate of interest	10.25%	10.25%	10.55%	10.78%	10.75%	10.75%	10.73%	
Opening WIP	0.00	13.01	27.80	169.46	356.09	725.97	1673.57	
Capital Expenditure	12.38	12.80	131.77	159.75	314.69	825.20	1691.49	3148.08
Capital Receipts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Commissioned Assets							3365.06	
Closing WIP (before FA)	12.38	25.81	159.57	329.21	670.78	1551.17	0.00	
Financing Allowance (FA)	0.63	1.99	9.88	26.88	55.19	122.40	89.79	306.76
Closing WIP (after FA)	13.01	27.80	169.46	356.09	725.97	1673.57		

The cost is inclusive of GST.