

# ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED EXTENSION AND STRENGTHENING OF RUNWAY AT TIRUPATI AIRPORT, RENIGUNTA MANDAL, CHITTOOR DISTRICT, ANDHRA PRADESH



## EXECUTIVE SUMMARY

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**Project Proponent:**



Airports Authority of India  
Tirupati

November, 2018



## **1.0 EXECUTIVE SUMMARY**

**Airports Authority of India (AAI)** proposes for the extension and strengthening of runway at Tirupati airport to meet the growing demand of the traffic and to facilitate code-E aircrafts. The cost envisaged for the proposed runway extension is estimated as Rs. 177.10 Crores.

As per the prevailing Environmental Impact Assessment (EIA) Notification dated 14<sup>th</sup> September 2006, the proposed airport extension project falls under 'Category A' under physical infrastructure projects with activity type number 7 (a), which require preparation of EIA report to get Environmental Clearance (EC) from the Ministry of Environment, Forest and Climate Change (MoEF&CC), New Delhi. The present EIA report addresses the environmental impacts of the proposed runway extension project and proposes the mitigation measures for the same.

### **1.1 Location Details and Environmental Setting**

Tirupati airport is located at Kothapalem, Kurakalva, Elamandyam villages in Renigunta mandal and Zinkalmita, Vikruthamal villages in Yerpedu mandal, Chittoor district of Andhra Pradesh state. The airport is located at a distance of 1.0 km from NH-205. The airport is connected with Renigunta city through a major district road. The airports reference point is located at latitude 13°37'59.1" N and longitude 79°32'30.5" E. The elevation of the site is about 103-m above MSL at ARP.

The environmental setting around the existing airport complex is given in **Table-1**.

**TABLE-1**  
**ENVIRONMENTAL SETTING AROUND THE AIRPORT SITE**

<b>Sr. No.</b>	<b>Particulars</b>	<b>Details</b>
1	Coordinates of Airport Reference Point (ARP)	13°37'59.1" N 79°32'30.5" E
2	Elevation above MSL (ARP)	103-m above MSL at ARP
3	Nearest highways	NH-205 (1.0 km, W)
4	Nearest railway station	Renigunta Railway Station (5.0 km, WNW)
5	Nearest village/city	Renigunta (5.0 km, WNW) Tirupati (14 km, W)
6	Forest areas in 10 km radius	Erpedu P.F (5.5 km, NNE) Krishnapuram P.F (5.6 km, N) Karakambati R.F (6.0 km, NW) Narayanavan P.F (6.5 km, SE) Tirupati Extension R.F (9.0 km, NW)
7	Defence and other related Establishments	Nil within 15 km radius
8	Major water bodies	Ralla Kaluva River (1.0 km, NE) Swarnamukhi River (2.2 km, S)
9	Seismic zone	The project area falls under seismic zone-III as per IS: 1893 (Part-1): 2002

*Note: All distances mentioned above are aerial distances*



## 1.2 Project Description

The operational airport is currently handling about 28 Air Traffic Movements (ATMs)- 14 landing and 14 takeoffs. The facilities at airport comprise terminal building for 700 Pax, air-field pavements consisting of runway, aprons, air traffic control tower along with CNS/ATM facilities and complete range of facilities for baggage handling and passenger handling, including waiting-in lounges, retail, flight catering facilities etc. The size and number of aircraft hangars, fuel tank farm, STP and the flight kitchen facilities etc. are developed considering future expansion.

To meet the growing demands of the traffic and to facilitate bigger code-E aircrafts at Tirupati airport, the runway is proposed to be extended. The extension of apron with new link taxiway in front of the new passenger terminal building is under implementation for 3 parking bays of A-320/A-321 type of aircraft.

The present study undertaking EIA is for extension of runway towards runway 26 by 240 m and extension of runway 08 by 1284 m (from 2286 m to 3810 m) suitable to cater for B-747-400, B-777-300 ER type of aircraft. The total length of runway after extension will be 3810 m.

Salient features of the proposed proposal are given in **Table-2**.

**TABLE-2**  
**FEATURES OF RUNWAY EXTENSION**

Sr. No.	Facilities	Design Features
1	Orientation	08-26
2	Runway	2286 m to 3810 m
3	Apron extension under implementation	415.5 m x 166.5 m
4	Isolation Bay	91 m x 76 m x 120 m x 110 m
5	RESA	90 m x 240 m after the proposed extension and pavement against blast erosion at both the ends of runway
6	Visual aids at runway facilities	Available
7	Runway light facilities	Available
8	Approach lights	
	Runway 08	Available
	Runways 26	Available
9	Landing Aids Visual & Instrumental	
	Runway 08	PAPI 08
	Runway 26	PAPI 26

Source: AAI, Tirupati



### **1.3 Resources Requirement**

- **Land Requirement**

The existing airport covers an area of 339.56 acres. AAI projected additional 733.15 acres of land to state government out of which 702.27 acres of land has already been handed over to AAI. Balance area of 30.88 acres is yet to be handed over by state government to AAI, Tirupati. The total land after expansion will be 1072.71 acres.

- **Water Requirement**

Total water consumption in the operating airport is about 100 KLD. The water requirement for the proposed project activity during construction phase is estimated to be around 150 KLD and will be sourced from municipal water supply.

- **Power Requirement**

Overall demand on completion of the runway extension project will be 1730 KVA. Current peak demand is about 1150 KVA which is being met from the sanctioned Contract demand of 1200 KVA from Andhra Pradesh State Electricity Board. Additional 530 KVA is required for the present proposal. 3 x 750 KVA stand by DG sets are available in the existing airport.

### **1.4 Baseline Environmental Status**

Field monitoring studies to evaluate the baseline status of the project site were carried out during the period of 1<sup>st</sup> March 2018 to 31<sup>st</sup> May 2018, representing pre-monsoon season.

#### **1.4.1 Meteorology**

The recorded temperature at site during study period ranges between 25.1 to 42.1°C and relative humidity ranges in between 37% to 65%. Predominant winds from SW and S directions were observed during the study period.

#### **1.4.2 Ambient Air Quality**

To establish the baseline status of the ambient air quality in the study area, the air quality was monitored at ten locations during pre-monsoon season. The PM<sub>10</sub> and PM<sub>2.5</sub> are observed to vary from 27.8 µg/m<sup>3</sup> to 48.9 µg/m<sup>3</sup> and 11.2 µg/m<sup>3</sup> to 23.2 µg/m<sup>3</sup> respectively. The SO<sub>2</sub> and NO<sub>2</sub> are observed to vary from 8.1 µg/m<sup>3</sup> to 16.6 µg/m<sup>3</sup> and 10.2 µg/m<sup>3</sup> to 18.6 µg/m<sup>3</sup> respectively. The values of other parameters as per NAAQS 2009 are well within the prescribed limits.

#### **1.4.3 Water Quality**

The baseline water quality status in the region is established by collecting water from 8 ground water sources and 8 surface water sources.



➤ *Surface Water Quality*

The pH varies from 6.8-7.6. Electrical conductivity was observed to be 244 and 1235  $\mu\text{S}/\text{cm}$ . The total dissolved solids concentrations were found to be 151.8 mg/l and 803.4 mg/l. Chlorides and sulphates were in the range of 28.6 and 176.2 mg/l and 11.17 and 77.40 mg/l respectively. The physico-chemical and biological analysis revealed that these waters are well within the prescribed limits of IS: 10500. The surface water quality in the study area does not indicate any industrial contamination.

➤ *Ground Water Quality*

The pH value varied from 7.1 to 8.1. The total hardness was observed to be in the range of 290.1 to 555.9 mg/l. Chlorides and sulphates were found to be in the range of 186.5 to 326.4 mg/l and 56.54 to 88.6 mg/l respectively and found to be within the maximum permissible limits of IS-10500. Nitrates and fluorides are found to be in the range of 4.4-13.2 mg/l and 0.4-0.7 mg/l respectively and found to be within the IS-10500 drinking water limits. Heavy metal contents are found to be below the detection limit. The E.Coli is found to be absent. The ground water quality in the study area does not indicate any external industrial contamination.

1.4.4 Noise Level Survey

The noise monitoring has been conducted at ten locations in the study area including the funnel zone of the runway on both sides. Day time, night time noise levels were found to be varying from 43.3 dB(A) to 62.4 dB(A) and 40.3 dB(A) to 59.3 dB(A) respectively in the study area. The noise levels in general found within the acceptable levels as per Ambient Noise Standards of CPCB for different land use categories.

1.4.5 Soil Characteristics

The soil samples were tested at eight locations during study period covering various land uses. It has been observed that the pH of the soil in the study area ranged from 7.2 to 8.0. The electrical conductivity was observed to be in the range from 186 to 242  $\mu\text{mhos}/\text{cm}$ . The nitrogen values range between 44.49 – 75.06 kg/ha. The phosphorus values range between 38.5 – 56.4 kg/ha. The potassium values range between 476.8 – 657.6 kg/ha. The soils from the study area indicate less to medium fertility due to their NPK content. Further, the soil in the study area does not indicate any industrial contamination.

1.4.6 Ecological Studies

There is no forest land in the airport project site. Sri Venkateswara National Park is situated at distance of 14.1 km/NW and Sri Venkateswara Wildlife Sanctuary is situated at a distance of 11.7 km/NW and during the field study.



The fauna are listed in the schedule-II, III, IV and V of the Wildlife (Protection) Act, 1972. Yellow Throated Bulbul is listed in the vulnerable status of International Union for Conservation of Nature (IUCN), and is listed in the Schedule-IV of the WLP, 1972.

There are presence of rare and endangered flora such as 'Red Sanders and *Cyas beddomei* and other endemic tree species in the 10 km radius. Predator species such as leopard was not observed during the study area.


#### 1.4.7 Demography and Socio-Economic Profile

The information on socio-economic aspects of the study area has been compiled from secondary sources, which mainly include census data of 2011 and also during primary survey in the study area.

The total population of the study area is about 223895. The study area on an average has 978 females per 1000 males as per 2011 census reports. In the study area about 6.26% population belong to Scheduled Tribes (ST) and 16.17% Scheduled Castes (SC) indicating that about more than 22% of the population in the study area belongs to socially weaker sections. About 73.96 % of people are literates. Total work participation in the project study areas is 40.50% and the non-workers constitute 59.50% of the total population respectively. The distribution of workers by occupation indicates that the non-workers are the predominant population. The female non workers to the total non-workers are 62.27% and male non-workers are 37.73%.

### 1.5 **Anticipated Environmental Impacts and Mitigation Measures**

The potential environmental impacts due to the proposed runway extension project have been assessed in detail. These include impact on air quality, noise, water quality, solid waste, ecology and socio economics, etc. The modelling and analysis of the data indicated that the predicted impacts are minimal and are within the prescribed norms and standards. Comprehensive mitigation measures have been incorporated in the environment management plan to ensure that the environmental quality is protected and enhanced. These have been summarised in **Table-3**.

	<b>Environmental Impact Assessment for the Proposed Extension and Strengthening of Runway at Tirupati Airport, Renigunta Mandal, Chittoor District, Andhra Pradesh</b>
	<b>Executive Summary</b>

**TABLE-3**  
**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Discipline	Potential Impacts	Probable Source	Mitigation Measures	Remarks
<b>Constructional Impact</b>				
Water Quality	Increase in suspended solids due to soil run-off during heavy precipitation	Loose soil at construction site	During monsoon season run-off from construction site will be routed to a temporary sedimentation tank for settlement of suspended solids	-
Air Quality	Increase in dust and NO <sub>x</sub> concentration	Vehicular movement, excavation and Leveling activity	Sprinkling of water in the construction area and restricting dust-generating activities. The construction equipment will be regularly serviced and lubricated.	The impact will be low, as the main approach road is already tarred.
Noise	Increase in noise level	Construction equipment	Equipment will be maintained and serviced regularly	Equipment shall be kept in good condition to keep the noise level within 85 dB (A). Workers shall be provided with necessary protective equipment e.g. earplugs, earmuffs.
Socio-economics	Land oustees, if any	Land Acquisition	Additional land required is to be handed over to AAI by state government.	There are no habitations in the land that is being acquired. Hence, there is no issue of R&R.
<b>Operational Impact</b>				
Water Quality	Deterioration of quality of receiving water body, if any.	Discharge from various units at airport terminal	Provide adequate treatment and conditioning facilities so that the treated effluents conforms to the regulatory standards.	Domestic wastewater from toilets including hand wash water will be treated in STP and then will be reused for greenbelt development.
Air Quality	Increase in PM, SO <sub>2</sub> , NO <sub>2</sub> , CO and HC levels in ambient air.	Fugitive dust and gaseous emissions due to vehicular movement and aircraft movements	Ensure operational procedures are adequately implemented and regularly reviewed so as to identify opportunities for continual improvement. The proposed bigger aircrafts will have lesser emissions.	The resultant air quality will conform to the stipulated standards.
Terrestrial Ecology	Positive Impact on plant species below certain levels.	-	Fugitive Emission will be controlled as well as dispersed through appropriate design; Greenbelt will be developed	As emissions will be controlled within limits, no active injury to the vegetation is expected.
Noise	Increase in noise levels in the area.	aircraft movements and traffic	Equipment shall be designed to conform to noise levels prescribed by regulatory agencies. Flight scheduling will be properly done so that the sensitive timings are avoided.	Noise generating equipment will be provided with acoustic enclosure for attenuating the noise levels by the Operators.
Demography and Socio-economics	Strain on existing amenities like housing, water sources, and sanitation and infrastructure facilities.	Influx of people of proposed expansion project.	Facilities shall be developed by the project proponents, if needed.	Overall socio-economic status of the area is expected to improve.



## **1.6 Environmental Monitoring Programme**

A comprehensive monitoring program of environmental quality parameters is suggested in this section.

### ➤ Ambient Air Quality Monitoring

The ground level concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and CO in the ambient air shall be monitored at regular intervals. Any abnormal rise shall be investigated to identify the causes and appropriate action shall be initiated. Green cover shall be developed for minimising dust propagation.

All construction equipment shall be operated within specified design parameters. Vehicle trips to be minimized to the extent possible.

### ➤ DG Stack Monitoring

The emissions from all the DG stacks shall be monitored regularly. The exit gas temperature, velocity and pollutant concentrations shall be measured. Any unacceptable deviation from the design values shall be thoroughly examined and appropriate action shall be taken. Air blowers shall be checked for any drop in exit gas velocity.

### ➤ Water and Wastewater Quality Monitoring and Data Analysis

To ensure a strict control over the water consumption, flow meters will be installed for all major inlets. In addition, periodic water audits shall be conducted to explore further possibilities for water conservation. Untreated wastewater is not to be discharged into surface water, groundwater or soil.

Methods prescribed in "Standard Methods for Examination of Water and Wastewater" prepared and published jointly by American Public Health Association (APHA), American Water Works Association (AWWA) is recommended.

### ➤ Noise Levels

List of all noise generating machinery onsite along with age shall be prepared. Equipment will be maintained in good working order and the frequency of monitoring is once a week. Daily monitoring shall be done for vehicular noise generation. Ambient noise monitoring will be done as per CPCB/SPCB requirement or on quarterly basis whichever is earlier. The aircraft generated noise in the funnel zone shall be monitored on both sides of the runway by continuous integrating noise level meters. These equipment will be linked to the data center in the airport.

## **1.7 Risk Assessment and Disaster Management Plan**

Airport emergency planning is the process of preparing an airport to cope with an emergency occurring at the airport or in its vicinity. The objective of airport emergency planning is to minimize the effects of an emergency, particularly in





respect of saving lives and maintaining aircraft operations. The airport emergency plan sets forth the procedures for coordinating the response of different airport agencies (or services) and those agencies in the surrounding community that could be of assistance in responding to the emergency.

The DMP plan should be prepared in accordance with the Civil Aviation requirement laid down by the Director General of Civil Aviation (DGCA), the National Disaster Management Act, 2005, the National Building Code as well as various code provisions of the International Civil Aviation Organization (ICAO) Airport Service Manual, Part-7.

### **1.8 Project Benefits**

Tirupati is well known for pilgrimage tourism and thus the proposed runway extension will cater to the growing aviation demand. This will directly and indirectly enhance the economy of the region and state.

The proposed project will lead to direct and indirect benefits to the overall socio-economic status of the region also. During construction phase, there will be opportunities for local skilled and unskilled workers to be employed in the various construction related activities like material handling, operation of construction machinery, actual construction etc.

At the same time, local small contractors, vehicle owners, machinery owners will get substantial amount of business for providing their services. The construction activity and influx of visitors will also open up opportunities for setting up establishments like lodging, telephone, kiosks, small shops etc. in the vicinity of the airport. These may be considered indirect benefits due to the setting up of the project in the area.

### **1.9 Environment Management Plan**

Environment management will be headed by a manager and will constitute environmental engineer, safety officer and ecologist/horticulturist. The manager (env) will be responsible for environment management activities in the proposed project. Basically, this department will supervise the monitoring of environmental pollution levels viz. source emission monitoring, ambient air quality, water and effluent quality, noise level either departmentally or by appointing external agencies wherever necessary.

In case the monitored results of environmental pollution are found to exceed the allowable limits, the environmental management cell will suggest remedial action and get these suggestions implemented through the concerned authorities. The environment management cell also co-ordinate all the related activities such as collection of statistics of health of workers and population of the region, afforestation and greenbelt development. It is proposed to invest about Rs. 15 crores towards pollution control measures.



## **1.10 Conclusions**

Tirupati airport is a recently declared international airport serving most passengers who visit Tirupati on pilgrimage. Considering the factor and the potential growth, the airport is anticipated to have a considerable increase in air traffic. It is therefore essential that airport expansion is planned and implemented to meet this demand, to serve the passengers and also the economy.

While the proposed project would have marginal impacts as detailed in the EIA report, these can be effectively mitigated by judicious implementation of the environment management plan as suggested.

The proposed project will provide employment to a large number of personnel and will generate considerable revenue for the state of Andhra Pradesh. This project will also generate indirect employment to a considerable number of people.