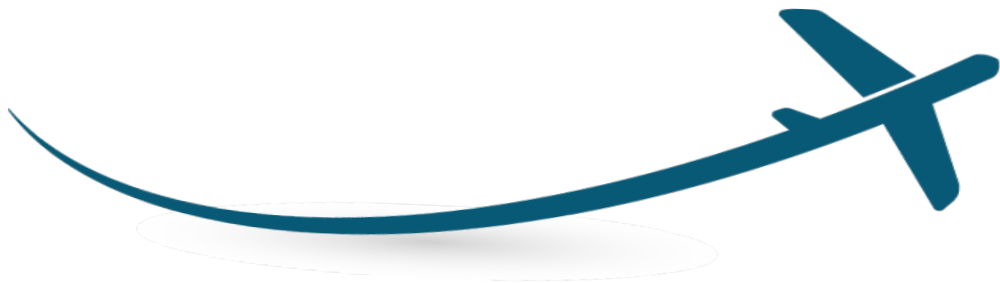


# ENVIRONMENTAL IMPACT ASSESSMENT

## EXECUTIVE SUMMARY



### Expansion of Existing Integrated Terminal Building, Construction of New ATC Tower cum Technical Block and Miscellaneous Works at Madurai Airport



#### Project Proponent

**Airports Authority of India,  
Madurai Airport, Madurai – 625022.  
Tamil Nadu.**

#### **NABET Accredited Environmental Consultant**

### **ABC Techno Labs India Private Limited**

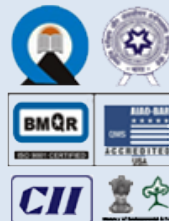
An ISO : 9001:2008, ISO:14001:2004 & OHSAS:18001:2007 Certified Company

(Accredited by NABL, NABET, MoEF)



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## **EXECUTIVE SUMMARY**

### **1 Introduction**

Madurai Airport is a customs airport serving Madurai and southern districts, in the state of Tamil Nadu, India. It is the fourth busiest airport in Tamil Nadu after Chennai, Coimbatore & Tiruchirapalli. Madurai Airport is located on State Highway, SH-32 connecting Madurai and Tuticorin. It is located at Perungudi and Ayanpappakudi villages of Madurai South Taluk and Madurai District. Geographically, the airport is located at Latitude 09°49'47.48" to 09°50'26.50" N, Longitude 78°04'32.33" to 78°06'14.80" E and altitude of 136m above MSL.

Madurai Airport is spread over an area of 502 acres (203.16 ha) and no additional land is required for the expansion proposal. The existing Integrated Terminal Building (ITB) is having an area of 17,560-Sq. m. is capable of handling 700 peak hour passengers with annual design capacity of 1.5 MPPA. It has 16 check-in counters for both domestic and international passengers. The existing Runway 09/27 of dimension 2286m X 45m is suitable for operation of A-320/B737 type of aircraft. The Apron is capable to park total 7 aircraft i.e. 2 nos. Code-D, 2 nos. Code-C and 3 nos. ATR-72 type of aircraft at a time.

Airports Authority of India has planned for proposed development at Madurai Airport.

The EIA studies have been carried out as per TOR approved by MoEF & CC vide letter F. No. 10-47/2020-IA-III dated 15 September 2020.

### **2 Project Description**

#### **2.1 Justification of proposed Development at Madurai Airport**

The justification for the proposed Development at Madurai Airport is given below:

- The passenger handling capacity of the existing integrated terminal building at Madurai Airport has saturated. In view of the future traffic growth, there is an urgent requirement of expansion of existing integrated terminal building and construction of new ATC Tower cum Technical Block at Madurai Airport premises without any additional land.
- A large number of industries and infrastructure development in the southern region of the state will avail the facilities of Madurai Airport. Besides, passenger traffic growth, a large mix of industries in this region offers a great potential of the enhanced

cargo activities. The region offers unlimited scope for the growth of tourism, trade and commercial activities.

Therefore, air connectivity at Madurai is required and demanded by people.

## **2.2 Key Scope of Proposed Development at Madurai Airport**

Brief scope of work for expansion project involves expansion of Existing Integrated Terminal Building and Construction of New ATC Tower cum Technical Block & Miscellenious Works at Madurai Airport, Tamil Nadu is given below:

- The existing Integrated Terminal Building is proposed to be expanded by an area of 7680 sqm. to have a total area of 25,240 sqm.
- The proposed ATC Tower cum Technical Block is a four storied structure with tower cabin at 33.4 m above ground level. The ATC Tower cum Technical Block of ATC Category – 2 and IMD Category – 2.
- Other allied Works including Electrical Work, Mechanical Work, Airport systems, IT Systems, CNS Works, etc.

## **2.3 Utilities and Other Features**

- Total power requirement for the proposed development of Madurai Airport will be 1900 KVA. There will be power backup through 2 No of DG sets of capacity of 750 KVA & 2 No of DG sets of 400 KVA used in case of power cut or failure.
- Renewable source of energy in the form of solar power generation units having capacity of 100 KW and 60 KW will be provided in building roof tops as per ECBC, 2017. It is also proposed a ground mounted solar power plant of 3.9 MW in Madurai Airport.
- Total water requirement for domestic use and horticulture will be about 1388 m<sup>3</sup>/day. Out of it 608 KLD will be fresh water which will be met through TWAD Board water supply / Bore wells.
- As per water balance diagram, 822 KLD of sewage will be generated after the development of Madurai Airport which will be treated in STP of capacity 900 KLD. Moving Bed Biofilm Reactor (MBBR) type STP will be installed for treatment of waste water at the proposed.
- For storm water management at the site, rainwater harvesting has been provided.

## **2.4 Project Cost**

The cost of proposed development of Madurai airport is estimated as Rs. 145 Crores.

## **3 Description of Environment**

**Topography and Physiography:** The topography of the most of study area is plain topography. The elevation of the site varies from 136 m above MSL. Not much hills are located in the study area

**Geology:** Madurai District represents a well – developed lithopackage of Granite gneiss, charnockites and alluvium as patches along the river. In Madurai District, Melur Taluk and Madurai North Taluk are having enormous wealth of Granites. All over Madurai District lot of Minerals such as Sand, lime, Blue Metal & Quarts are available. Sedimentary rocks namely calcareous gritty (sand stone mixed clay), and quartz vein are also found.

**Soil Characteristics:** The study area soil pH indicate that the soil is slightly to moderately alkaline in nature. Conductivity of the soil indicates that the soil in the study area is non-saline in nature. Texture of the soil sample is predominantly clay loam in nature. Organic Matter in the soil indicates average to more than sufficient quantities of organic matter. The available nitrogen, phosphorus, potassium content are sufficient in the locality.

**Surface Water Resources:** Vaigai, a major ephemeral river originates in Western Ghats of Theni district flow in NW-SE direction, in the central part of the district. In addition, tributaries of Vaipar and Gundar drain in south-western part of the district, while the tributaries of Pambar drained in north eastern part. Thenkarai Pond is situated at 5 km, NNW from project site.

**Ground Water Quality:** Ground water quality of study area meet permissible limits as per IS: 10500. Ground water resources in the study area were found fit for drinking purpose.

**Micro Meteorology:** The maximum ambient temperature during the study period was ranging between 32.0°C - 40.2°C while the minimum temperature was ranging between 17.5°C - 23.6°C. The monthly mean maximum relative humidity recorded at site for monsoon period ranged between 59% - 80% and the monthly mean minimum relative humidity recorded at site for the same period ranged from 36% to 67%. During the study period, maximum wind speed recorded at Madurai Airport was 35 kmph while minimum wind speed was recorded as 1 kmph. Average wind speed was 10 kmph. During the study period, predominant wind direction was recorded from West to East.

**Ambient Air Quality:** Ambient air quality monitoring have been carried out at eight locations during winter season for PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>2</sub>, NH<sub>3</sub>, O<sub>3</sub>, C<sub>6</sub>H<sub>6</sub>, BaP, Pb, As, Ni and CO. All monitored parameters at all AAQM locations met National ambient quality standards for industrial, residential, rural & other areas.

**Noise Level:** Noise measurements were carried out at 8 locations. Measured day and night time Leq noise levels are within the limit stipulated noise standards.

**Natural Hazards and Disaster Risk:** Madurai Airport lies in seismic zone II according to zoning map of India. Structure of new terminal building has been designed in view of seismic factor and other natural hazards.

**Land use & Land Cover in the Study Area-**As per satellite image interpretation, agriculture crop land (35.97 %), agriculture fallow land (26.43 %), Vegetation (9.70 %), Waste Lands / Scrub Lands (4.43 %), built up land (14.99 %), Quarry (0.21 %), Airport (0.47 %) and water body (7.79 %).

**Terrestrial Ecology:** Within 10 km radius area, no species of flora and fauna have been categorized as rare, endangered and threatened (RET) species. There is no wildlife sanctuary, national park or other protected area within 10 km distance from the Madurai Airport.

**Socio-Economic Environment of Study Area:** As per 2011 census records, the study area consisted of 165081 persons inhabited in the 10 km radius study area. The male population constituted nearly 50.76% persons while the female population is 49.24% of the total population. The study area on an average had 969 females per 1000 males as per 2011 census. Scheduled castes population is 20.53% and Scheduled tribes population is 0.82%, of the total population of the area. In the study area, the average literacy rate is 67.40%, 56.63% amongst males and 43.37% amongst females.

#### **4 Anticipated Environmental Impacts & Mitigation Measures**

**Topography & Physiography:** Topography of the area is plain. Therefore, for development of Madurai Airport and associated facilities, major filling of earth will not be required.

##### Mitigation Measures

- Land clearing at the site will be kept to the absolute minimum practicable; and
- Construction site would be designed to minimize filling of the earths.

**Land Use Pattern:** The land required for the development of Madurai Airport is available within Madurai Airport premises, which is for airport related activities. No felling of timber yielding trees except some bushes and shrubs, which will be cleared for construction of proposed buildings. Thus, the overall impact on land use will be Nil.

*Mitigation Measures*

- Land clearing for construction site will be kept to the absolutely minimum practicable;
- The filling and cutting of soil would be kept minimum; and
- Construction debris and waste generated during construction activities will be collected and disposed in environmental sound manner as per applicable rules depending upon type of wastes.

**Water Resources and Water Quality:** During the construction phase of the construction of the proposed development at Madurai Airport, approx. 40 to 50 kl/day water will be required depending upon the type of construction activities. The water requirement will be met through existing TWAD water supply & Bore wells. Total fresh water requirement for Madurai Airport after proposed development is estimated as 1388kld. Approx. 822 KLD waste water generated from Madurai Airport after development will be treated in MBBR technology based Sewage Treatment Plant (STP) and reused for HVAC, flushing, greenery development.

*Mitigation Measures*

- Continuous efforts will be made to reduce water consumption using less water required cisterns;
- Continuous attempts will be made to avoid wastage and leakage of water
- Sewage and domestic waste water will be treated in MBBR based Sewage Treatment Plant
- Reused treated waste water in HVAC, flushing, greenery and landscaping

**Soils:** Approx. 1500 kg per day solid waste will be generated during operation of Madurai Airport and aircrafts after the proposed development, which will be collected, segregated and managed by external agency for disposal as per Solid Waste Management Rules, 2016. It may contaminate soil of the site, if not disposed properly. Hence, the impact on the soil will be insignificant as an organized solid waste collection and disposal practices will be followed at the Madurai Airport.

**Mitigation Measures**

- Compaction and stabilization will be ensured during filling to ensure that no loose soil is washed away with runoff during rains,
- Restoration of land surface with the condition and contours, prior to instigation of construction activities,
- Wastes, fuel, oil drums, used oil, etc. would be collected and disposed properly,
- Dust bins will be placed at requisite locations at construction site and there will be segregation of wastes before disposal,
- Used oil from maintenance of DG sets engines and construction equipment will be collected separately in drums and will be handed over to the authorized used oil recyclers by the Tamil Nadu Pollution Control Board as per the CPCB guidelines.

**Ambient Air Quality:** During the operational phase of the Madurai Airport after development, the intermittent air emissions are generated from aircraft engines during approach, landing, taxiing, take-off and initial climb, which is termed as reference Landing and Take-off Cycle (LTO cycle). For power back up, there will be 2 DG sets of 750 KVA and 2 DG sets of 400 KVA capacity will be available. Vehicular emissions will also be generated from the operation of vehicular traffic at the airport from ground support vehicles, passengers' pickup and dropping vehicles. Exhaust emissions comprising NO<sub>2</sub>, SO<sub>2</sub>, PM, CO, HC, etc will be generated from aircraft, DG sets and vehicular emissions.

**Mitigation Measures**

- Dust suppression systems (water spray) will be used as per requirement at the construction site;
- Construction materials and earth will be fully covered during transportation to the construction site by road;
- Standard prescribed by the CPCB/ Tamil Nadu Pollution Control Board (TNPCB) for stack height and emissions from DG sets will be complied with;
- Preventive maintenance will be carried out for vehicles and pollution check will be mandatory on periodic basis all the vehicles approaching to the construction site;
- Earth moving equipment, typically a bulldozer with a grader blade and ripper, will be used for excavation work;

**Noise Levels:** The terminal building at Madurai Airport will be sound proof. DG sets room will be acoustically treated to control noise levels.

### **Mitigation Measures**

- Provision of rubber padding/ noise isolators to DG sets and construction machines
- Preventive maintenance of the machine/ equipment will be carried out;
- Provision of silencers to modulate the noise generated by machines;
- Provision of protective devices like ear muff/ plugs to the workers;

**Terrestrial Ecology:** Greenery and landscaping will be developed at Madurai Airport. For irrigation of green belt, treated waste water from STP and accumulated rainwater will be available and used. This will have positive and long term beneficial impact on terrestrial ecology of the area.

**Socio-Economic Environment:** During construction and operation phases of development in Madurai Airport will provide additional direct and indirect job opportunities in the area and region. Further, it will attract more and more commercial and developmental activities in the area. Therefore, positive impacts are anticipated on socio-economic environment during operation of Madurai Airport.

**Employment and Economic Growth** -The development of Madurai Airport will result in a boost in commercial activities in the region. This will improve direct and indirect employment opportunities, revenue generation, commercial and industrial activities; therefore, resulting in positive impact on the employment and economic growth of the region.

## **5 Analysis of Alternatives**

The existing terminal building at Madurai Airport has saturated. In view of the future traffic growth at Madurai Airport, there is an urgent need of construction of new terminal building, New ATC Tower cum Technical Block and Miscellaneous works within the Madurai Airport premises. For proposed development works, no excess land will be utilized other than the existing plot area. Therefore, no alternative site has been considered for this project.

## **6 Environmental Monitoring Plan**

To ensure the effective implementation of the mitigation measures and environmental management plan during construction and operation phases of Madurai Airport after development, environmental monitoring plan have been prepared for ambient air quality, water quality, soil characteristics and noise monitoring. Suitable mitigation measures will be taken in case of monitored parameters are exceeding the stipulated limits.



## **7 Additional Studies - Risk Assessment & Disaster Management Plan**

Hazard occurrence at Madurai Airport may result in on-site implications, like, fire at the storage of HSD in barrels for DG sets followed by fire, bomb threat at terminal building, cargo terminal & aircraft and natural calamities like, earthquake, flood, etc. Other incidents, which also result in a disaster at the Madurai Airport are agitation/forced entry by external group of people, sabotage, air raids; and aircraft crash while landing or take-off.

Disaster management plan has been prepared comprising key functions of Airport operator, other supporting organizations/agencies/services for response during emergency at the Madurai Airport.

## **8 Project Benefits**

The direct and indirect benefits of the development of Madurai Airport are as follows:

- Better infrastructure facilities to the passenger at new terminal building,
- More parking facilities for Aircrafts and safe taxiing,
- Increase in regional economy as it will boost tourism and commercial activities in the region.
- Generation of more revenue to the state, hence more development of the region.
- Boost in tourism and more people to travel in the state
- Employment opportunity to people.
- More business and industrial opportunities

## **9 Environmental Management Plan**

The Airports Authority of India will be responsible for the implementation of mitigation measures identified in Environmental Management Plan (EMP) for construction and operation phases of Madurai Airport. There will be Environmental Management Cell (EMC) at Madurai Airport to look after day to day basis implementation of mitigation measures for construction and operation phases.

### **Budget for Environmental Management and Monitoring Plan**

Total budget of Rs 2.95 Crores has been kept for implementation of environmental management plan during construction and operation phases of Madurai Airport. Total budget of Rs 0.12 Crore has been kept for environmental monitoring during construction and operation phases. The recurring cost per annum for Environmental Management, fund of Rs. 25 lakhs has been allocated.

## **10 Conclusions**

Anticipated adverse environmental impacts from development of Madurai Airport will be localised, short term and low/moderate in nature, and visible only during construction phase. Adverse environmental impacts identified in EIA study due to the proposed project will be mitigated by implementation of mitigation measures/ environmental management plan (EMP) described in EIA report and compliance of applicable environmental regulations. The proposed project will have long term and regional beneficial/positive direct and indirect impacts on employment, socio-economic conditions, state economy, tourism and development of the area and region.