

### 4.2.3.15 Airports

#### 1.0 Subject Matter

(Present a brief historical background on the growth of airports – a bird's eye view picture and analysis of the airport using the information/ tables) provided in the annexure.

GIS based map depicting location of all the airports (based on Metro, Tier I, Tier II, Tier III/ others)

Number of fixed and floating population at the Airports in the State. (Refer Annexure- Table-1).

Time trend of the number (growth) of Airports. (Refer Annexure- Table-2).

#### 2.0 Details of Water Availability, Supply, Demand, Withdrawal & Consumption for the Airports

##### Water Supply & Demand for Airports in the State

Time trend of total water demand and actual current water supplied to the Airports along with growth of Airports in the state. (Refer Annexures- Table 2, 3)

##### Total Freshwater Withdrawal and Actual Water Consumption by Airport Sector in the State

Comparative trend of Total Freshwater Withdrawal Vs Actual Water Consumption by Airport Sector in a State

Comparative status of total water consumption by each Airport:

State Water Budgeting: (Refer Annexure- Table 3(d)).

SECTOR	Previous Year / Average Annual Demand (MCM)	Previous Year/ Average Annual Supply & Consumptive Use (MCM)		Demand for the present Water Year (MCM)
		Supply	Consumptive Use	
Airport 1				
Airport 2				
All Airports				
<b>GRAND TOTAL</b>	xxx	xxx	Xxx	xxx

#### 3.0 Issues and Challenges

Illustrative issues and challenges may include problems of waste water disposal and associated surface and ground water contamination, water pricing, monitoring and data reporting, etc.

#### 4.0 Problem Tree / Root cause Analysis: Cause, Effect and Interventions

#### 5.0 Governance / Management:

##### Statute / Law / Policy/ Regulations if any

- State level laws, policy and governance for the Airport sector in the state on water access, consumption and wastewater discharge.
- Any specific fresh and waste water regulation/ guidelines in state, provide details.
- Has the state notified any regulations including for zero liquid discharge for the Airport in state? Provide details.

##### Institutions governing / managing / monitoring the resources and Institutional structure.

- Institutions governing / managing / monitoring the water consumption and supply.

Governing body for Airport	Water allocation & Monitoring authority	Waste water discharge monitoring
<i>E.g. Airport Authority of India</i>	<i>E.g. CGWA/ Water resource department/ Urban or Rural body</i>	<i>e.g. State pollution Control Board</i>

#### Schemes, Economics & Financing-

Existing schemes and programs along with financial allocations, expenditure etc.

- Water Tariff and procurement cost (*Refer Annexure- Table 6(a) & 6(b)*)
- Expenditure on Water management (*Refer Annexure- Table 6(c) & 6(d)*)

#### 6.0 Measurement, Monitoring and Data Constraints/ Management

##### • Water & Wastewater Measurement:

Shall specify measurement methods and technologies at Raw water source, various processes and Waste Water (generation, recycle/reuse & discharge) and Water Quality as per CPCB / SPCB

- **Monitoring** at State Government: Institution/ Agency/ Official responsible for Sustainable Water Management comprehensively for this Sector.
- **Data Management:** Should specify - Frequency of measurement, Frequency of Reporting to centralized agency, Water Quality Parameters monitored, how data is being used to improve Water Use Efficiency and ensure water quality parameters within the prescribed norms etc.
- **Constraints** with respect to the measurement & monitoring.

#### 7.0 Performance Indicators:

a. Benchmarks on water use (*Refer Annexure- table 10*)

b. Status of various Performance Indicators– for comparison across Airports/Districts

Category	Indicator		Bench Mark/ Unit (as applicable)	Airport 1	Airport 2	Airport 3
Measurement	<b>Water Quantity</b>					
	Measurement at Raw water source	Manual	Yes/No			
		Real Time/ Automatic	Yes/No			
	Measurement at major water usage areas	Manual	Yes/No			
		Real Time/ Automatic	Yes/No			
	Waste Water (generation, recycle/reuse & discharge)	Manual	Yes/No			
		Real Time/ Automatic	Yes/No			
Undertaken internal Water Audit in the last Year?		Yes/No				
Undertaken Third party Water Audit in the last Year?		Yes/No				
Submitting monthly water balance to state pollution control board (SPCB)?		Yes/No				
Management Plans	Having Water Management Plans?		Yes/No			
	Whether Water Managements are operational		Yes/No			
Water Conservation	Have taken up RWH/ GW Recharge?		Yes/No			
	% of total Water requirement being met from Treated Waste Water					
	Have taken up Restoration measures?		Yes/No			

	% of reduction of water demand compared to the previous year.					
	Introduction of water efficient technologies in process to reduce water consumption.		Yes/No			
<b>Water Use Efficiency</b> (Annexure- Table 7)	Specific Water Consumption ( <b>Water Consumption per Passenger</b> ); (m <sup>3</sup> /passenger) (refer Annexure-Table 7(a), (b) & (c))					
	Have specific water consumption benchmarks established?		Yes/No			
	Have specific water consumption within the norms/bench marks/standards		Yes/No			
<b>Waste Water</b> (Annexure- Table 8)	Total Waste Water Generated					
	% Waste Water Treated					
	% Treated waste water recycled					
	Implementation/ achieved zero liquid discharge (ZLD).		Yes/No			
<b>Water Quality</b> (Annexure-Table 9)	Installation of online water quality monitoring systems.		Yes/No			
	Compliance with the wastewater quality discharged norms.		Yes/No			
	Discharging wastewater into open area/ earthen nallah /open drain/ municipal sewer?					
	Notified for violating effluent discharge norms for discharge in natural resources (surface/ground).		Yes/No			
	No. of areas near airport where Water Quality has adversely affected					
<b>Economics</b>	Whether economic incentives are in place to encourage water efficiency & conservation?		Yes/No			
	Whether economic disincentive mechanisms like penalties etc. are in place to discourage water wastage & inefficient use?		Yes/No			
	Whether water use charges & tariff are revised regularly and are reflective of rational pricing mechanisms?		Yes/No			
<b>Public Interface</b>	Operationalization of online water quality portal for information dissemination and feedback		Yes/No			

Category	Indicator	Bench Mark/ Unit (as applicable)	District 1	District 2	District 3
Water Quantity Measurement	% of Airports with water flow meters				
	% of water sources of Airports geotagged				
	% of Airports undertaking internal water audits in last year				
	% of Airports undertaking external water audits in last year				
	% of Airports submitting water balance to SPCB (state pollution control board)				

8.0 Reforms undertaken/ being undertaken/ proposed if any

9.0 Road map of activities / tasks proposed for

- Better governance
- Better source / supply management
- Better demand management / improved Water Use Efficiency
- Water Quality
- Water Economics and Financing
- Sustainable Water budgeting with timelines and agencies responsible for each task/activity.

#### ANNEXURE

##### 1 Total number, types & capacity of Airports in the State

Type of Airport	No. of Airports	Total Capacity of all the Airports (Million Passengers per Annum)	Daily Average passengers at all the Airports
Tier – I			
Tier – II			
Tier – III			
Metro			
Others			
<b>Total</b>			

##### 2 Growth Trend of Airports over a period and Water Demand and Supply position

Airports	Years					
	1990	1995	2000	2005	2010	2017
<b>No. of Airports</b>						
Tier – I						
Tier – II						
Tier – III						
Metro						
Others						
<b>Total</b>						
<b>Water Demand and Supply</b>						
<b>Total Water Demand (MCM)</b>						
<b>Total Water Supply (MCM)</b>	<i>GW</i>					
	<i>SW</i>					
	<i>Municipal Supply</i>					
	<i>Total</i>					
<b>Demand-Supply Gap</b>						

### 3 Water Budgeting

#### 3(a) Demand, Supply (Withdrawals) & Consumptive Use:

Airports: (MCM) Present Water Year: 1 <sup>st</sup> June to 31 <sup>st</sup> May next year									
INDUSTRY (within the Basin/ Sub- basin A)	Previous Year/ Average Annual Demand	Demand for Present Water Year	Previous Year/ Average Annual Supply				Previous Year/ Average Annual Waste Water Generated	Previous Year/ Average Annual Consumptive Use	Remarks
			Rain Water	Surface Water	Ground Water*	TOTAL SUPPLY			
Unit 1									
Unit 2									
<b>GRAND TOTAL</b>									

\*GW Draft can be calculated from the number of GW abstraction structures & corresponding draft for each Industrial Use/ Process.

#### 3(b) Source Wise: Previous Year/ Average Annual Water Supply

Airports: (MCM)											
Source	Sub Source	Unit 1	Unit 2	Unit 3	Unit 4						TOTAL
Rain Water	Directly Harvested Rain Water										
<b>Total</b>											
Surface Water	Springs, Nallahs										
	Major Projects										
	Medium Projects										
	Minor Projects										
	Ponds, Tanks										
	Wetlands										
	Sea Water /Desalinated Water										
Inter Basin Transfer											
<b>Total</b>											
Ground Water* (Dynamic / Static)	Dug wells (Total No. x Draft)										
	Dug cum Bore well (Total No. x Draft)										
	Bore/Tube wells (Total No. x Draft)										
	Others etc										
<b>Total</b>											
<b>Treated Waste Water</b>											
<b>GRAND TOTAL</b>											

\*GW Draft can be calculated from the number of GW abstraction structures & corresponding draft for each Industrial Use/ Process.

**3(c) Previous Year/ Average Annual Demand, Supply (Source wise) and Consumption for Basin/ Sub-basin A:**

Source of Water	Demand of all Units in Basin/ Sub-basin A	Supply/ Withdrawal for all Units	Consumptive Use of all Units	Gap/Remarks	
Rain Water (Directly Harvested)					
Springs, Nallahs					
Major Projects					
Medium Projects					
Minor Projects					
Ponds, Tanks					
Wetlands					
Desalinated Water/ Sea water					
Inter-Basin Transfer					
Ground Water (Dynamic)					
Treated Waste Water					
<b>TOTAL (MCM)</b>					

**3(d) Previous Year/ Average Annual Demand, Supply (Source wise) and Consumption for Whole State:**

Source of Water	Demand of all Units in the State	Supply/ Withdrawal for all Units	Consumptive Use of all Units	Gap/Remarks	
Rain Water (Directly Harvested)					
Springs, Nallahs					
Major Projects					
Medium Projects					
Minor Projects					
Ponds, Tanks					
Wetlands					
Desalinated Water/ Sea water					
Inter-Basin Transfer					
Ground Water (Dynamic)					
Treated Waste Water					
<b>TOTAL (MCM)</b>					

**3(e) Summary State Water Budget for Airports**

SECTOR	Previous Year / Average Annual Demand (MCM)	Previous Year/ Average Annual Supply & Consumptive Use (MCM)		Demand for the present Water Year (MCM)
		Supply	Consumptive Use	
<b>All Airports</b>	xxx	xxx	xxx	xxx

**4Proportion of Water withdrawal and consumption by Airports against total industries in the State**

Airports	Total Water Withdrawal by all Airports (%) (Refer Annexure-4(a))	Total water withdrawal by all the Industries in state	Total Water Consumption by all Airports (%) (Refer Annexure-4(b))	Total water Consumption by all the Industries in state
Tier – I				
Tier – II				
Tier – III				
Metro				
Others				
<b>Total</b>				

**4(a) Total Water Withdrawal/Abstraction by Airports** in the State as percentage of Total water withdrawal by all the industries in the State

$$\text{Total water withdrawal by Airport Sector (\%)} = \frac{(\text{Total water withdrawal by all the airports in the State}) \times 100}{(\text{Total water withdrawal by all the industries in the state})}$$

**4(b) Total Actual Water Consumption by Airports** in the state as percentage of Total water consumption by all the industries in the State

$$\text{Total water consumption by Airport Sector (\%)} = \frac{(\text{Total actual water consumption by all airports in State}) \times 100}{(\text{Total water consumption by all the industries in the state})}$$

**4(c) Total Freshwater Withdrawal by all Airports and Total Actual Water Consumption by all Airports in the State**

	CY -11	CY -10	CY -9	CY -8	CY -7	CY -6	CY -5	CY -4	CY -3	CY -2	CY -1	CY / 2017
Total Fresh Water Withdrawal by all airports (MCM)												
Total Actual Water Consumption by all airports (MCM)												

**5 Total Water Withdrawal (Abstraction) and Actual Water Consumption as percentage of total renewable freshwater resources**

	CY-5	CY-4	CY-3	CY-2	CY-1	CY/ 2017
Total Fresh Water Withdrawal by all airports (%) (Refer Annexure-5(a))						
Total Actual Water Consumption by all airports (%) (Refer Annexure-5(b))						

**5(a) Total Water Withdrawal/Abstraction by Airports** in the State as percentage of Total available freshwater resources of the State

$$\text{Total water withdrawal by Airport Sector (\%)} = \frac{(\text{Total water withdrawal by all the airports in the State}) \times 100}{(\text{Total available freshwater resources of the state})}$$

**5(b) Total Actual Water Consumption by Airports** in the state as percentage of Total available freshwater resources of the State

$$\text{Total water consumption by Airport Sector (\%)} = \frac{(\text{Total actual water consumption by all airports in State}) \times 100}{(\text{Total available freshwater resources of the state})}$$

**6 Water Economics & Financing:****6(a) Water Tariff (Rs./m<sup>3</sup>)**

Source	CY-5	CY-4	CY-3	CY-2	CY-1	CY/ 2017
GW						
Urban body						
Treated Waste Water for reuse						
Others						

**6(b) Procurement Cost of Water (in Rs)**

Year wise cost of procurement of Water				
CY-5	CY-4	CY-3	CY-2	CY-1

**6(c) Expenditure on Water including Treatment and Management-Time trend at State level**

	CY-5	CY-4	CY-3	CY-2	CY-1	CY/ 2017
Total Capex by the airports (Lakhs) on water treatment and management						
Total O&M Expenditure by the airports on water treatment and management (Lakhs)						
Total						
O&M Expense (%)						

**6(d) Expenditure at each Airport for the Current Year- CY**

Units	Capital Expenditure (Lakhs)	O&M Expenditure (Lakhs)	Total	O&M Expense (%)
Airport 1				
Airport 2				
Airport 3				
Total				

**7 Water Use Efficiency:**

Water use efficiency in terms of Specific Water Consumption (SWC) viz. amount of water used/consumed per unit. In case of Airports, it can be represented as the total volume of water used/consumed (m<sup>3</sup>) per passenger.

Specific Water Consumption (SWC) of Airports:

$$\text{Specific Water Consumption (SWC); (m}^3\text{/passenger)} = \frac{\text{Volume of water consumed by the Airport, (m}^3\text{)}}{\text{(Total no. of passengers at Airports), (passenger)}}$$

**7(a) Specific Water Consumption in m<sup>3</sup>/Passenger for Current Year**

	Vol. of Water Consumed (m <sup>3</sup> )	Total no. of passengers (passenger)	SWC (m <sup>3</sup> /passenger)
Airport 1			
Airport 2			
Airport 3			



**7(b) Average Water Consumption per passenger at Airports for the State – time trend (also represent through Graph)**

	CY-5	CY-4	CY-3	CY-2	CY-1	CY/ 2017
Average Water Consumption per passenger at Airports in State						

**7(c) Specific Water Consumption (Water Consumption per Passenger)**

**Comparative Water Consumption per Passenger of the Airports.**

**Trend of Water Consumption per Passenger for each Airport.**

Percentage of airports having specific water consumption (Water Consumption per Passenger) within the norms/bench marks/standards (if applicable).

**8Waste Water**

	Bench Mark/ Units (as applicable)	Airport 1	Airport 2	Airport 3
Total Waste Water Generated				
% Waste Water Treated				
% Waste Water Recycled				
• % Treated waste water used in activities at airport				
• % Treated waste water used in Green belt				
• % Treated waste water used in others				
% Total quantum of wastewater discharged.				
Implementation/ achieved zero liquid discharge (ZLD).				

**8(a) Use of Treated Waste Water**

	Source of Waste Water	Source of Treated Waste Water for reuse	Qty. of Treated WW consumed	Total Water Consumption	% use of Treated WW out of total Water Consumption
Airport 1					
Airport 2					
Airport 3					

**9 Water Quality**

		<b>Bench Mark/regulatory norms (as applicable)</b>	<b>Airport 1</b>	<b>Airport 2</b>	
Water Quality	Installation of online water quality monitoring systems.				
	Compliance with the wastewater regulatory quality discharge norms.				
	Discharging wastewater into open area/ earthen nallah /open drain/ municipal sewer?				
	Notified for violating effluent discharge norms for discharge in natural resources (surface/ground).				

Water Quality Time trend- Graphs: Compliance to Waste water discharge Quality norms (E.g. BOD / PH /COD / TSS etc.)

**10 Bench Marks/ Norms/ Standards and deviation from the norms/bench marks/standards currently for airports in state.**

**10(a) Benchmark for Water Consumption, Waste Water Generation etc.**

	<b>Parameters</b>	<b>Unit</b>	<b>Indian Bench Mark</b>	<b>International Bench Mark</b>
1	Specific Water Consumption	m <sup>3</sup> /passenger		
2	Waste Water generation	m <sup>3</sup> /passenger		
3	Waste Water discharged	m <sup>3</sup> /passenger		