TURKS AND CAICOS ISLANDS AIRPORTS AUTHORITY

STRATEGIC MASTER PLAN FOR THE TCIAA

Conceptual Master Plan – Grand Turk (GDT)

October 2024

ALG

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Glossary of terms and abbreviations

ADRM	Airport Development Reference Manual
ARFF	Aircraft Rescue and Fire Fighting
ASK	Available Seat per Kilometers
ATC	Air Traffic Control
ATM	Air Traffic Movement
ATR	Avions de Transport Régional
Avg	Average
B737	Boeing 737
CAGR	Compound Annual Growth Rate
CapEx	Capital Expenditure
DOM	Domestic
EMB	Embraer
FBO	Fixed Base Operator
FOD	Foreign Object Debris
GA	General Aviation
GDP	Gross Domestic Product
GSE	Ground Support Equipment
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IFP	Instrument Flight Procedure
ILS	Instrument Landing System
INT	International
LF	Load Factor
MUSD	Million United States dollars
NB	Narrow Body Aircraft
NEO	New Engine Option
NM	Nautical Miles
PAX	Passengers
PHP	Peak Hour Passengers
POS	Point of Sale
PPP	Public-Private Partnership
RepEx	Replacement Expenditure
RESA	Runway End Safety Area
RET	Rapid-Exit-Taxiway
RPK	Revenue Passenger per kilometers
RWY	Runway
SQM	Square Meter
TCI	Turks and Caicos Islands
TCIAA	Turks and Caicos Islands Airports Authority
TORA	Take-off Runway Available
TWY	Taxiway
USA	United States of America
USD	United States Dollar
VFR	Visiting Friends and Relatives
WB	Wide Body Aircraft

List of airport codes

Turks and Caicos Islands airports

GDT	JAGS McCartney International Airport
MDS	Middle Caicos Airport
NCA	North Caicos Airport
PLS	Providenciales International Airport
SLX	Salt Cay Airport
XSC	South Caicos International

International airports

ATL	Hartsfield-Jackson Atlanta International Airport
AZS	El Catey International Airport
BIM	South Bimini Airport
BOS	Logan International Airport
BQN	Rafael Hernández International Airport
CAP	Cap Haitien International Airport
CCC	Jardines del Rey Airport
CCZ	Chub Cay Airport
CFG	Jaime González International Airport
CLT	Charlotte Douglas International Airport
CMW	Ignacio Agramonte International Airport
CXY	Cat Cay Airport
CYB	Sir Captain Charles Kirkconnell International Airport
CYO	Vilo Acuña Airport
DEN	Denver International Airport
ELH	North Eleuthera Airport
EWR	Newark Liberty International Airport
FLL	Fort Lauderdale–Hollywood International Airport
FPO	Grand Bahama International Airport
FXE	Fort Lauderdale Executive Airport
GGT	Exuma International Airport
GHB	Governor's Harbour Airport
GHC	Great Harbour Cay Airport
HOG	Frank País Airport
IAH	George Bush Intercontinental Airport
JFK	John F. Kennedy International Airport
KIN	Norman Manley International Airport
LAX	Los Angeles International Airport
LRM	La Romana Casa De Campo International Airport
MCO	Orlando International Airport
MHH	Marsh Harbour International Airport
MIA	Miami International Airport
MZO	Sierra Maestra Airport
NBW	Guantanamo Bay Naval Base Airport
NSB	North Bimini Airport

ORD	Chicago O'Hare International Airport
PBI	Palm Beach International Airport
PHL	Philadelphia International Airport
POP	Gregorio Luperón International Airport
PSE	Mercedita International Airport
RDU	Raleigh–Durham International Airport
RIH	Scarlett Martínez International Airport
RSD	Rock Sound International Airport
RTB	Juan Manuel Gálvez International Airport
SAQ	San Andros Airport
SCU	Antonio Maceo Airport
SEA	Seattle-Tacoma International Airport
SNU	Abel Santamaría Airport
STX	Henry E. Rohlsen Airport
TAB	Crown Point International Airport
TCB	Treasure Cay Airport
TPA	Tampa International Airport
VIJ	Virgin Gorda Airport
VRA	Juan Gualberto Gómez Airport
YHM	Munro Hamilton International Airport
YHZ	Halifax Stanfield International Airport
YOW	Ottawa Macdonald-cartier International Airport
YQB	Québec City Jean Lesage International Airport
YQG	Quaqtaq Airport
YQM	Greater Moncton International Airport
YUL	Montréal–Trudeau International Airport
YWG	Winnipeg James Armstrong Richardson International Airport
YYC	Calgary International Airport
YYZ	Toronto Pearson International Airport
ZSA	San Salvador Airport

1 Introduction

The airport network of the Turks and Caicos Islands is composed of 8 different airports, 6 of them public and 2 private airports. The public airports are under the scope of the Turks and Caicos Islands Airports Authority (TCIAA), which is a corporate body created under the Turks and Caicos Islands Airports Authority Ordinance and is responsible for the control, management, operation and development of all Turks and Caicos Islands' public airports.

Out of these 6 airports, Providenciales Howard Hamilton International Airport (PLS) is the country's gateway and concentrates more than 90% of country's total traffic, while the other 5 airports only operate domestic scheduled flights and general aviation operations. These 5 airports are Grand Turk JAGS McCartney International Airport (GDT), South Caicos Norman B. Saunders Sr. International Airport (XSC), Salt Cay Henry Leon Wilson Airport (SLX), North Caicos Clifford Gardiner International Airport (NCA) and Middle Caicos Eric Arthur Airport (MDS). The two airports under private management within the Turks and Caicos Islands are Pine Cay and Ambergris Cay.

Providenciales Airport is currently undergoing a restructuring process with the intention of being granted to a private operator through a PPP (Public-Private Partnership) contract. Once this process is completed, the TCIAA will concentrate its efforts in developing the secondary airports of its network, allowing for significant developing opportunities.

Particularly at Grand Turk Airport, there are currently no scheduled international flights. The international passengers who arrive to the island do it via cruise ships or domestic flights from Providenciales. There exists potential to receive this tourism directly through the airport, adapting its infrastructure for international flights. Achieving this positioning of the airport and the development of its air traffic is in line with the objectives of the Government of the Turks and Caicos Islands for the modernization of its airports. This would have an impact on the improvement of the country's connectivity and, in turn, on boosting its tourism, economic and social growth. And this traffic development is only possible if it is accompanied by a process of renovation and expansion of the current infrastructure.

In this context of airport development and changing environment, the TCIAA has decided to carry out a Strategic Master Plan for the entire organization, which includes de development of an individual Master Plan for each airport within its network.

Creating a Master Plan becomes an essential process to ensure coherent planning. The Master Plan is the main strategic tool to ensure the expansion of highly complex and constantly evolving infrastructures such as airports. The International Civil Aviation Organization (ICAO, Doc. 9184) agrees on the need for a Master Plan as guide for short-, medium- and long-term planning of airports that identifies expansion and investment needs.

Therefore, the main objective of the present document is to become the reference for the planning of Grand Turk Airport for a 30-year time horizon. To this end, the Master Plan includes the following sections:

- **Current situation of the airport**: this section contains a detailed description and characterization of the current infrastructure, including the evaluation of the airport's main assets, the analysis of their compliance with the aeronautical regulations, as well as the determination of the maximum capacity of the existing infrastructure.
- **Market analysis and traffic projections**: this chapter includes a detailed market study reviewing the evolution of air traffic at the airport, its positioning within the country, and identification of the levers for growth in the coming years. Based on this market study, traffic projections are developed for the airport for the next 30 years, evaluating both the annual traffic growth potential and peak hour design parameters, which are key to the subsequent definition of investment needs.
- **Infrastructure requirements and investment plan**: this section comprises a detailed capacity-demand analysis to identify the expansion needs in the different airport subsystems to be able to meet the expected traffic demand. It also includes the associated investment plan, not only the expansion projects identified, but also the replacement investments or major maintenance of the infrastructure.
- **Long-term development and land reservation**: this section shows the very long-term development potential of the airport, identifying the main areas that may be subject to expansion in the future and therefore should be reserved to ensure the airport's growth.
- **Collection of Drawings**: the last section includes the main drawings of the airport, both for its current situation as well as for the airport's future development.

2 Current situation of the airport

The objective of this section is to perform a detailed characterization of the current infrastructure existing at the airport, to know the starting point for the subsequent definition of the airport's infrastructure development plan. To this end, it includes:

- General description of the airport and its main subsystems, including airfield, aircraft parking apron, passenger terminal and other facilities.
- Evaluation of the current conditions of these facilities and their compliance with the regulatory reference framework, as well as the general environmental conditions at the airport.
- Definition of the estimated capacity of the main airport subsystems.

To facilitate its understanding, the chapter is structured by airport subsystem, so that all the analyses referring to the same subsystem are included in the same subchapter.

2.1 General considerations

2.1.1 Airport location

The JAGS McCartney International Airport (IATA code: GDT; ICAO code: MBGT) is located in the south of the Grand Turk Island, 3.2 km away from central Cockburn Town, capital city of the country. The airport is, along with the cruise terminal, the main enter point to the island. It reopened its newly refurbished infrastructure in July 2019, following extensive repairs due to damage from Hurricanes Irma and Maria in 2017.

Grand Turk Island, which hosts the capital of the country, is well known for its history, colonial architecture and the Turks and Caicos National Museum, as well as for offering a range of water sports, historical sights, and beautiful beaches. Besides, cruise ships frequent the Grand Turk Cruise Center, bringing a flux of tourists to its shores.

Figure 1. Grand Turk Airport location

Source: Google Earth, ALG Analysis

2.1.2 Airport general design

The Grand Turk Airport is a one-runway airport with a declared ICAO aerodrome category 4C, with preferential configuration for runway 12. Apart from the ARFF building and the general aviation apron, located in the

northern part of the airport, the ground access, parking, commercial terminal, commercial apron, and the unique existing taxiway are placed in the southern part of the runway.

The commercial apron counts with 4 different code A/B stands and 14,000 m^2, while the commercial terminal counts with 2,200 m^2. There is a 9,000 m^2 general aviation apron in the northern part. With respect to parking lots, there is a public car parking with 72 lots, an employees' parking with 15, and 10 spaces for taxis.

The airport borders in the north with the Great Salina and the southern edge of Cockburn Town, whereas in the south, it borders with the Hawkes Pond Salina.

The aerodrome reference temperature is 32 Celsius degrees, with an elevation of 11 feet (3 meters) above mean sea level. The airport operates between 10:00 UTC (6:00 local time) and 00:00 UTC (20:00 local time). Regarding flight operations, flights are operated with non-precision visual flight rules (VFR).

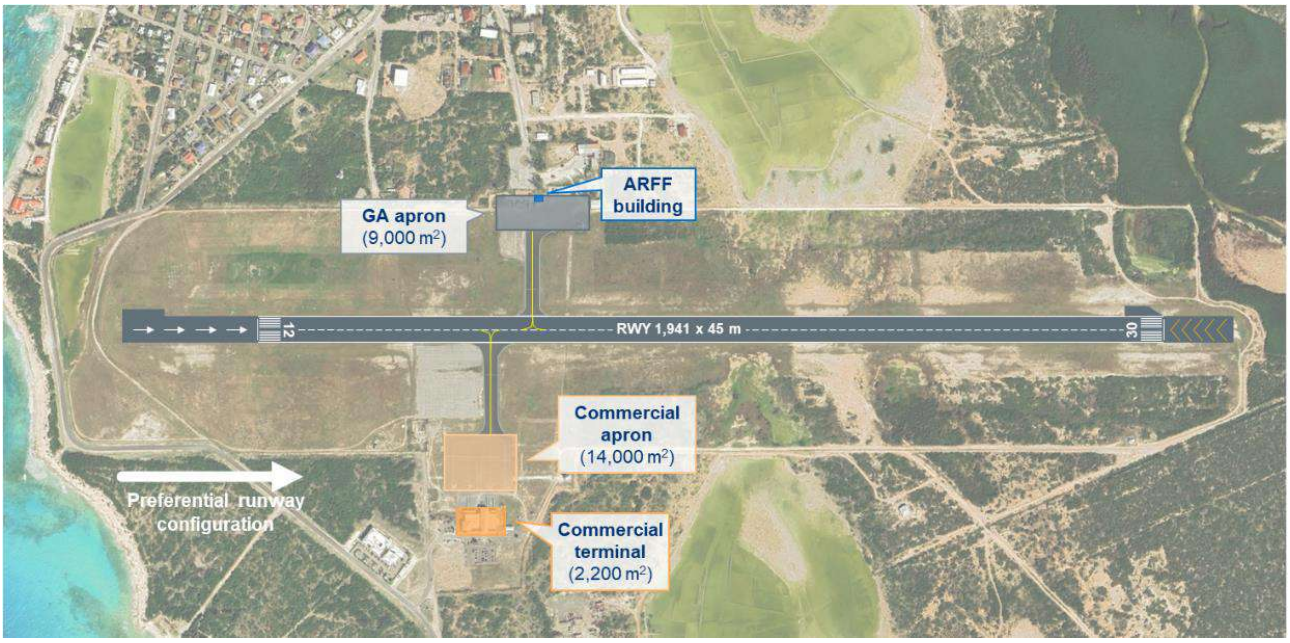


Figure 2. General view of Grand Turk Airport

Source: Google Earth, ALG Analysis

2.2 Airfield

2.2.1 General description

The airfield is composed by a unique asphalt runway (12/30) with the following dimensions:

- Runway 12: 1,941m x 45m (TORA, TODA, ASDA). The LDA is 1,691 x 45m. Preferential runway configuration.
- Runway 30: 1,791m x 45m (TORA, TODA, ASDA, LDA).

Besides, the airport has a strip of 2,061m x 150m (AIP data), and a declared RESA of 90x90m at each threshold. The airfield only has one taxiway of 23 meters width.

As Grand Turk Airport is classified as 4C aerodrome, aircrafts such as B737 could operate in it. Nevertheless, the greatest aircraft currently operating in the airport is the Embraer 120 Brasilia.

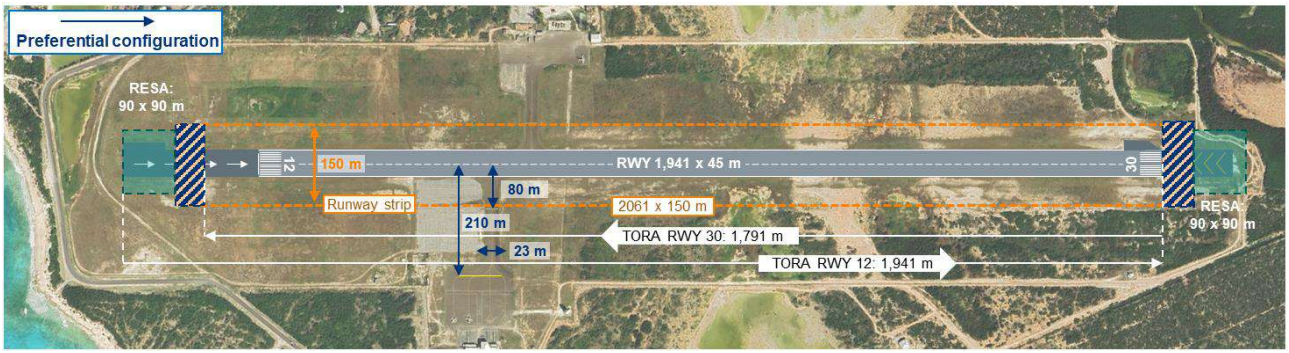


Figure 3. Airfield dimensions

Source: Google Earth, ICAO Annex 14, TCI AIP, ALG Analysis

2.2.2 Current runway and taxiway conditions

Runway and taxiway conditions were analyzed considering AIP data and the observations made by the project team during the site visit in March 2024. The conclusions about the runway are mostly positive: pavement condition is good throughout the entire runway. However, there is faded paint on RWY 30 threshold markings, and RESA on runway 30 counts with significant terrain irregularities, provoking a longitudinal slope greater than 5% (maximum allowed as per ICAO regulations).

Here below, there are some pictures illustrating the runway conditions previously commented:

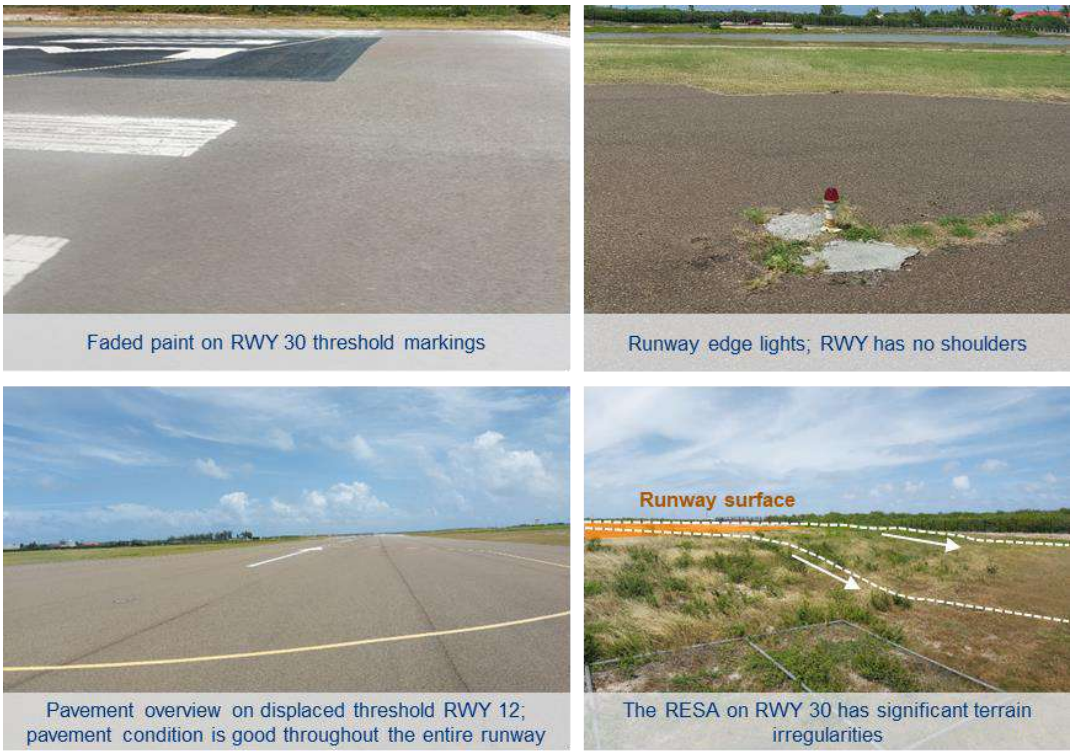


Figure 4. Runway images obtained during the site visit

Source: ALG Analysis

The taxiway's condition is good, albeit its non-compliance with ICAO requirements, topic that will be addressed in the following subchapter.

2.2.3 Compliance with ICAO regulations

The airfield infrastructure compliance with ICAO requirements is key to guarantee operational safety within the airport. For this analysis, both the observations obtained during the site visit and the ICAO Annex 14 rule were considered.

	Annex 14 ICAO
RWY width & shoulders	Width 45m without shoulders for code 4C (shoulders required for runway where code letter is D, E or F)
RWY strip length RWY strip width	60m before THR and beyond the end of RWY for code 4; 140m on each side of RWY centerline for non-instrument code 4
RESAs length RESAs width	90m from the end of the strip for code 4; at least twice of the RWY width, with longitudinal slopes <5%
TWY width & shoulders	Width 15m and 25m with shoulders for code 4C
Min distances	93 m between RWY & TWY centerlines for Non-instrument code 4C
Holding bays	75m from the RWY holding position to the RWY centerline for Non-precision code 4

Figure 5. Analysis of airfield compliance

Source: ICAO Annex 14, ALG Analysis

As the analysis shows, the main issues of non-compliance regarding the runway and the taxiway are the longitudinal slope greater than 5% in runway 30 RESA, and the taxiway width. To give response to these two infrastructure needs, it is recommended to level the RESA's terrain, and widen the taxiway (further detail in recommended actions).

2.2.4 Airfield operations

Grand Turk Airport has a single runway, so both take-offs and landings are carried out on the same runway. Since there is only one runway entrance/exit, most of the aircraft taking off or landing must taxi into the runway to execute a back-track. The different runway configurations and their respective operations are detailed below.

In the runway 12 landing and take-off configuration (preferential runway configuration), aircraft landing must taxi the entire runway to the apron, while the take offs are only required to taxi to the runway 12 headland, ~600 meters.

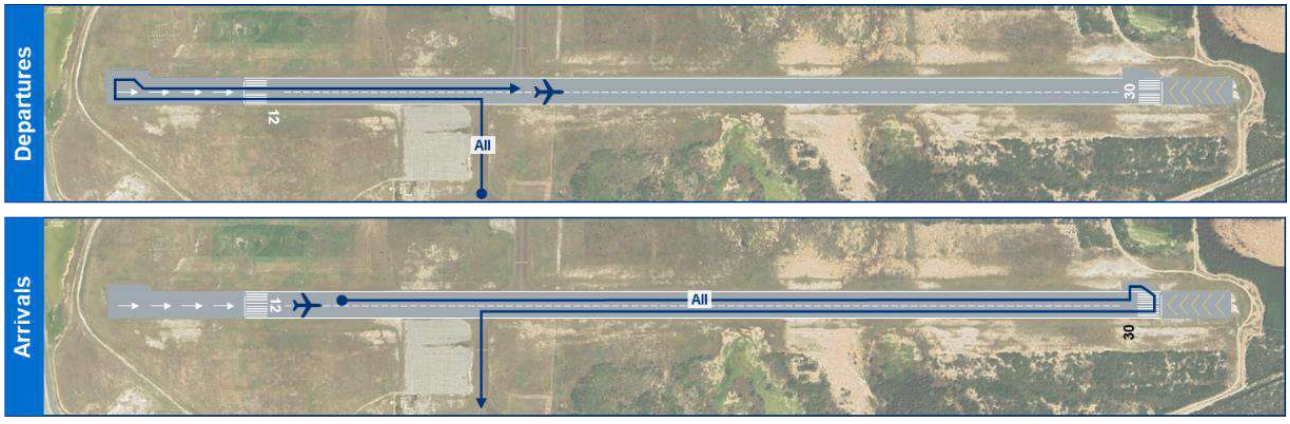


Figure 6. Take-off and landing routes in RWY 12 configuration

Source: Google Earth, ALG Analysis

On the other hand, in runway 30 configuration, for departures the aircraft must travel almost the entire runway and turn at the respective turning platform. Nevertheless, for arrivals, most arriving aircraft (based on the current fleet mix) can exit the runway without the need of backtracking at the end of it.

Figure 7. Take-off and landing routes in RWY 30 configuration

Source: Google Earth, ALG Analysis

2.2.5 Estimated airfield capacity

The runway capacity is directly related to the aerodrome configuration, the fleet mix, and the surveillance capacity of the air traffic controllers. To define the most restrictive minimum separation distance between operations of arrivals and departures, the airfield configuration has been analyzed, along with the classification of the wake turbulences and the capacity of the air traffic controllers, as previously mentioned. It was assumed a distance between arriving aircraft of 8 NM. Hereafter, separation times (in seconds) are shown for each configuration:

Arrival → Arrival

1st aircraft	2nd aircraft		
	A/B	C	D/E
Type A/B	~350	~348	-
Type C	~350	~348	-
Type D/E	-	-	-

Arrival → Departure

1st aircraft	2nd aircraft		
	A/B	C	D/E
Type A/B	~190	~190	-
Type C	~230	~230	-
Type D/E	-	-	-

Departure → Arrival

1st aircraft	2nd aircraft		
	A/B	C	D/E
Type A/B	~230	~190	-
Type C	~230	~190	-
Type D/E	-	-	-

Departure → Departure

1st aircraft	2nd aircraft		
	A/B	C	D/E
Type A/B	~105	~105	-
Type C	~105	~105	-
Type D/E	-	-	-

Figure 8. Separation times in RWY 12 configuration (seconds)

Source: ALG Analysis

Arrival → Arrival

1st aircraft	2nd aircraft		
	A/B	C	D/E
Type A/B	~260	~280	-
Type C	~260	~280	-
Type D/E	-	-	-

Arrival → Departure

1st aircraft	2nd aircraft		
	A/B	C	D/E
Type A/B	~170	~170	-
Type C	~225	~225	-
Type D/E	-	-	-

Departure → Arrival

1st aircraft	2nd aircraft		
	A/B	C	D/E
Type A/B	~230	~190	-
Type C	~230	~190	-
Type D/E	-	-	-

Departure → Departure

1st aircraft	2nd aircraft		
	A/B	C	D/E
Type A/B	~165	~165	-
Type C	~165	~165	-
Type D/E	-	-	-

Figure 9. Separation times in RWY 30 configuration (seconds)

Source: ALG Analysis

The results are based on a sample of 4,000 operating sequences assuming a 2023 design day fleet mix based on the airport's tower flight plan (34% code-A, 56% code-B, 10% code-C). The current runway capacity (sustainable) is around 17 ATM/h, for both configurations, reaching up to 18 ATM/h and 19 ATM/h for runway 12 and runway 30, respectively.

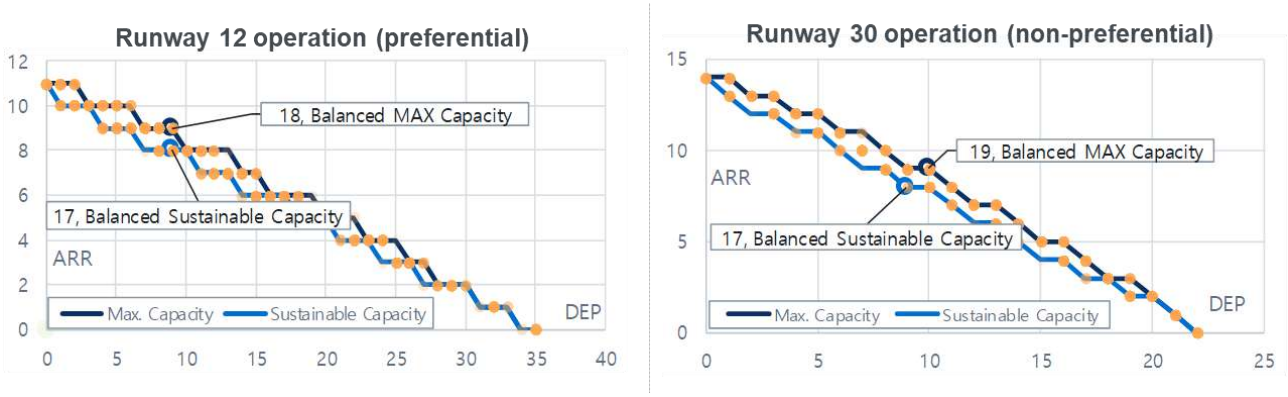


Figure 10. Runway capacity simulation results (ATM/h)

Source: ALG Analysis

Capacity in runway 12 operation is limited by landing aircraft having to backtrack on the longer portion of RWY 12 (1,270m). Departing aircraft are only required to backtrack ~600m before departure, reducing times between departures.

For runway 30, capacity is limited by departing aircraft, which must taxi on the longer portion of the RWY before departure. Most arriving aircraft (based on the current fleet mix) can exit the runway without the need of backtracking at the end of it.

2.3 Apron

2.3.1 General description and capacity

The Grand Turk Airport owns a sole commercial aviation apron in use within its perimeter (there is one old apron in disuse), and another apron for general aviation. The commercial apron is in the southern part of the airport, with direct connection to the taxiway. It can accommodate 4 type A/B aircrafts, or one type C aircraft every two A/B stands.

Figure 11. Commercial apron and stands

Source: Google Earth, ALG Analysis

2.3.2 Current apron conditions

The main commercial apron (south apron) has 4 parking positions for A/B code aircraft; however, it may accommodate larger code-C aircraft (code-C, given that it has a pavement PCN of 48/F/B/X/T).

The stands in the commercial apron are in a loop configuration, avoiding the need for light aircraft to use pushback tugs, and the north apron is used for additional parking and access to the police hangar, but it does not count with defined stands.

Both existing (usable) aprons are in an overall good state with no visible damage or wear on them; however, the old apron is clearly unusable, with evident signs of abandonment.

Figure 12. Apron images obtained during the site visit

Source: ALG Analysis

2.3.3 Compliance with ICAO regulations

Apart from the old apron, which is not currently in use and does not comply with ICAO requirements, the other aprons comply with all required parameters and estate.

2.4 Terminal building and other areas

2.4.1 General description of the terminal building

The current terminal has 2,200 m^2 with separated fluxes for arrivals (international and domestic). For departures the flux is the same for both type of passengers. The terminal is divided into a check-in area, international and domestic departures, domestic arrivals, international arrivals, and a restaurant, in addition to offices and other general areas, all in only one floor.

The terminal has a seating capacity of over 130 pax that board through 4 boarding gates and there is a single security screening lane and a general boarding area, which do not get saturated presently given the existing low traffic levels.

Although the layout of the immigration area should be studied, the international arrivals area was recently refurbished, and it is ready to handle arriving international passengers.

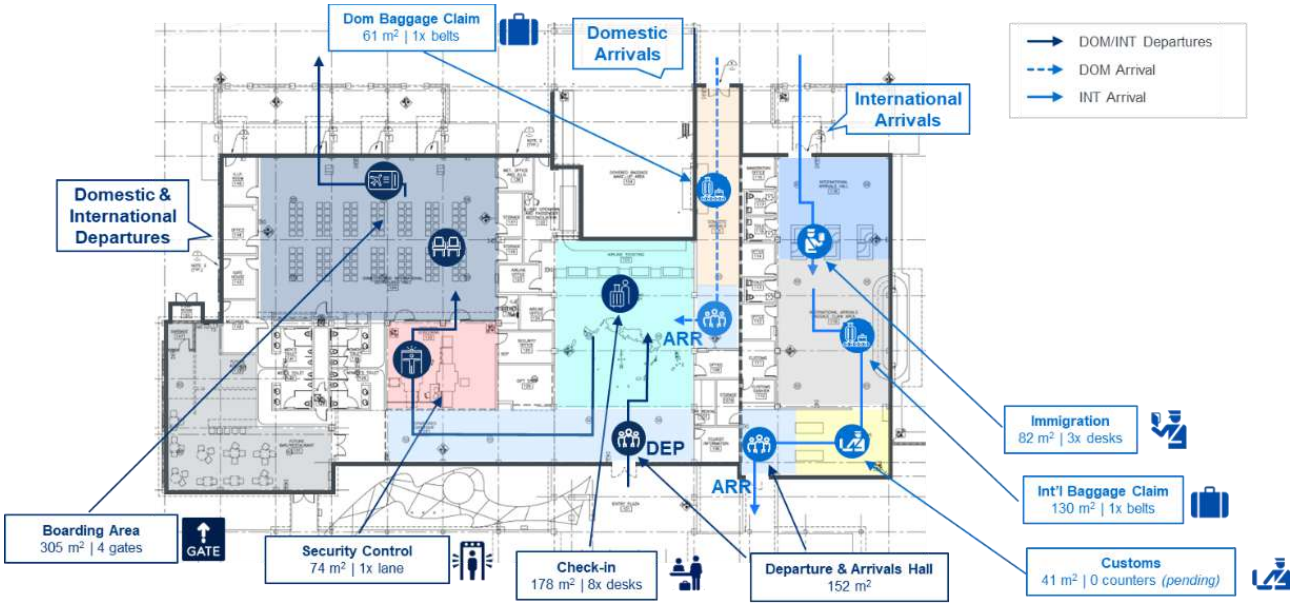


Figure 13. Terminal building drawing with the different equipment

Source: TCIAA AIP, ALG Analysis

2.4.2 Current conditions and operations of the terminal building

The analysis of current conditions and terminal operations has been carried out based on the information obtained during the visit to the airport.

The following was observed in the departures (domestic and international) and arrivals (domestic) hall and check-in area:

- There are 8 check-in desks for both domestic and international departure passengers.
- The domestic arrivals are mixed with all the departure passengers.

For the security and immigration zones:

- There is only one security control.
- The boarding area has 4 gates.

The check in area at GDT serves both DOM & INT passengers, with 8 checkin desks

Entrance to DOM & INT departure gates

Security screening area, with a single screening lane

DOM & INT departure waiting area with seating for over 130 passengers

Boarding gates 1 and 2, out of a total of 4 boarding gates

DOM arrivals bag carrousel

Figure 14. Departures flow images

Source: ALG Analysis

For the arrivals passengers, there are two separated flows:

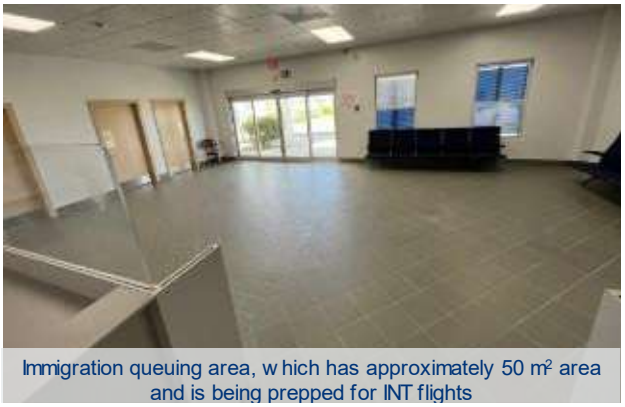
- For domestic arrivals, the passengers take their baggage (there is one domestic baggage claim belt), then they enter the check-in area, and exit via the entrance for departures.
- For international arrivals, the passengers first step into immigration control where there are 3 desks. Right after the control, they take their luggage in the unique international baggage claim belt and exit the terminal building.

The terminal from above; the walkway from the apron to the terminal is visible

INT arrivals bag carrousel and 3 immigration desks

Arrivals hall and drop-off/pick-up area

INT arrivals walkway from apron onto terminal building



Immigration queuing area, which has approximately 50 m² area and is being prepped for INT flights

Figure 15. Arrivals flow images

Source: ALG Analysis

2.4.3 Access and vehicle parking areas

The access to the terminal building is performed via the Osborne Road along the left side of the airport direct to the terminal, in case of coming from the city in the north. If the passengers come from the south of the island, they will also arrive via Osborne Road.

Regarding vehicle parking, the airport counts with 72 lots in the public car parking, apart from 15 lots for employees and 10 spaces for taxis. The current parking lot capacity is enough to cover the airport necessities.

Figure 16. Parking lots images

Source: Google Earth, ALG Analysis

2.4.4 Other areas

Other areas include the Aircraft Rescue and Fire Fighting facilities, the fenced and non-fenced perimeter, ATC tower and hangars. During the visit to the airport, the state of each facility, building and equipment was noticed.

The ARFF facility is classified as category 4 according to the AIP, and it is currently unable to upgrade beyond that, thus limiting the aircraft able to operate to a maximum length of 24 meters. It would require upgrading to an RFF category 6 or 7 to handle larger code-C aircraft. The fire trucks vehicles include a brand new Rosenbauer fire truck of 5,700 liters (water) and 227 kg dry chemical, and an Oshkosh of the same capacity.

The existing ARFF building at GDT is outworn, with visible signs of wear and rust, including leaks, damaged locks, and hygiene issues inside the firemen area. A new ARFF facility was being built but works have been halted for several years now, with no signal of being resumed.

Figure 17. Current state of ARFF facility and equipment

Source: ALG Analysis

Regarding the fenced perimeter, it is currently being upgraded with a new fence around the airport, in anticipation of new international services. The airport fencing works began in 2023, and cost above 2 MUSD. Temporary fences were erected while the new fences are finished, which are to be handed over by mid-March 2024. To facilitate the workers' duties, an area was set up next to the old apron for them. The entire fence perimeter is estimated at 5.5 km.

Figure 18. Current state of fenced area

Source: ALG Analysis

About the tower and hangars, the control tower shows signs of wear both on the inside and on the outside, although it is more evident on the façade, where rust may be seen in significant quantities. ATC equipment is outdated in general, although radio equipment is recent and in good condition; additionally, an area inside is being adapted to house an ATC office. The GSE storage area sits adjacent to the terminal and is used for general storage and cargo handling.


Outworn control tower, showing signs of rust on the outside


Front view of control tower


The tower has a single ATC position, with generally outdated equipment, although radios are recent and in good condition


Aerial view of the control tower and its distance to the commercial apron


The police hangar at GDT


Storage area adjacent to the terminal building


A new ATC office is Being refurbished

Figure 19. Current estate of tower and hangars

Source: ALG Analysis

2.5 Current environmental situation

During the site visit, the project team observed multiple areas with abandoned machinery and equipment around the airport, presenting risks such as fire and runway FOD:

- Poor equipment disposal and waste management practices.
- Unusable machinery is left exposed under the sun, presenting fire risk in areas next to the terminal.
- Several fire trucks are abandoned in areas close to the aprons and runway; these should be removed and properly disposed of.
- Uncovered construction equipment storage sites may result in FOD invading the runway and presenting safety risks to flights and generate points of attraction for fauna and diseases.

Figure 20. Current situation of machinery and equipment

Source: ALG Analysis

There are also half-demolished structures and abandoned buildings within the airport, resulting in potential wildlife and fire hazards:

- Multiple sites have remnants of demolished buildings, with exposed materials such as floors and torn wall presenting an environmental risk.
- There are also several abandoned buildings, which should be either refurbished or fully demolished to avoid issues with wildlife and pests.
- Proper environmental practices should be implemented for the disposal of old buildings.

Figure 21. Current situation of old structures and buildings

Source: ALG Analysis

3 Market analysis and traffic projections

The objective of this chapter is to analyze the current situation of the air transport market and the tourism sector in Turks and Caicos and the region influenced by JAGS McCartney International Airport (GDT) in Grand Turk, in order to establish the necessary basis for determining the expected air traffic (demand) at the airport over the next 30 years. Thus, it includes:

- The current context of the air transport market in Turks and Caicos in general and Grand Turk Airport in particular.
- The characterization of tourism in the country and its impact on the airport to define its strategy and development potential.
- Passenger traffic forecasts and annual aircraft movements for the next 30 years.
- Projections of peak hour design parameters, key for the subsequent definition of the infrastructure development plan.

3.1 Air transport market and tourism

3.1.1 Air transport market in Turks and Caicos

Turks and Caicos is located in the Caribbean region, specifically in the Lucayan Archipelago. Within the Caribbean, it ranks in the mid-low range of the top 20 destinations with 1.8 million seats, with an increase of +11% compared to 2019. The majority of its traffic is international, primarily from North America and the Caribbean, with relatively low domestic traffic.

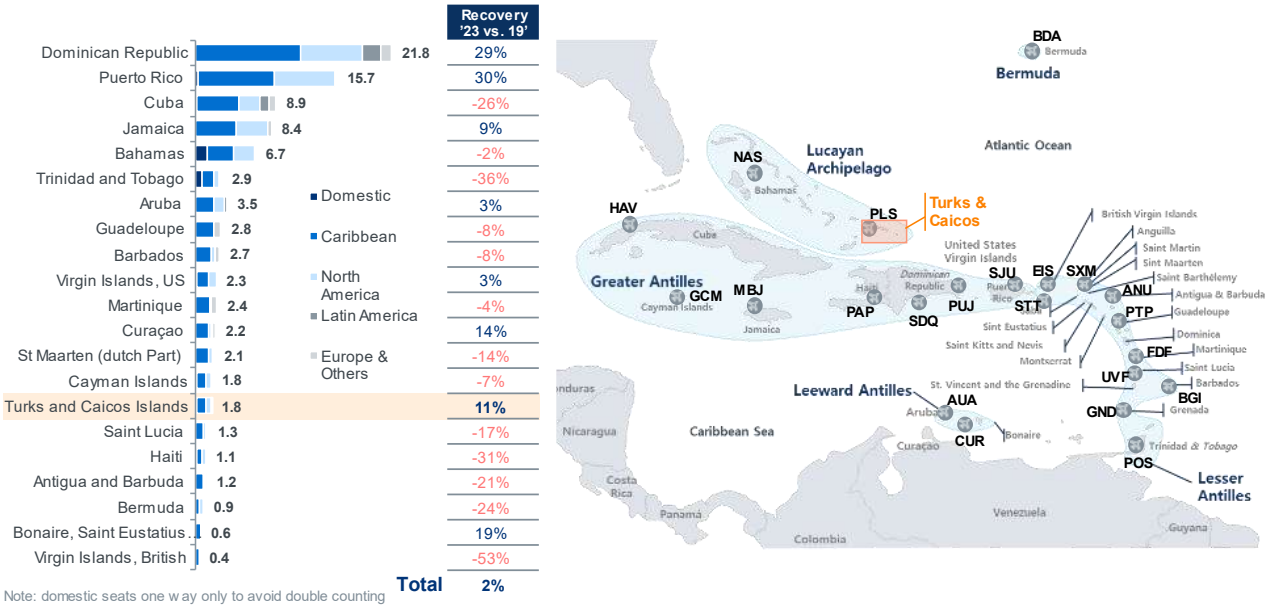


Figure 22. Air traffic of the Caribbean region by country (Mseats, 2023)

Source: OAG, ALG Analysis

The Caribbean region surpassed pre-COVID capacity levels in 2023, with an increase of +3.9%, led by the Dominican Republic and Puerto Rico. Turks and Caicos was among the top five countries with the most significant growth compared to 2019. This capacity recovery in the Caribbean was driven by traffic from North America and Latin America, where the market is predominantly controlled by foreign carriers, especially full-service carriers.

In contrast, the intra-Caribbean and domestic markets remain below 2019 levels, following a consistent trend over the past decade, with a -0.8% CAGR from 2013-2019. Factors contributing to this trend include the economic weakness of certain countries in the region, the absence of low-cost carriers, lack of competition, high fees and charges, and the use of turboprops with higher unit costs than larger aircraft.

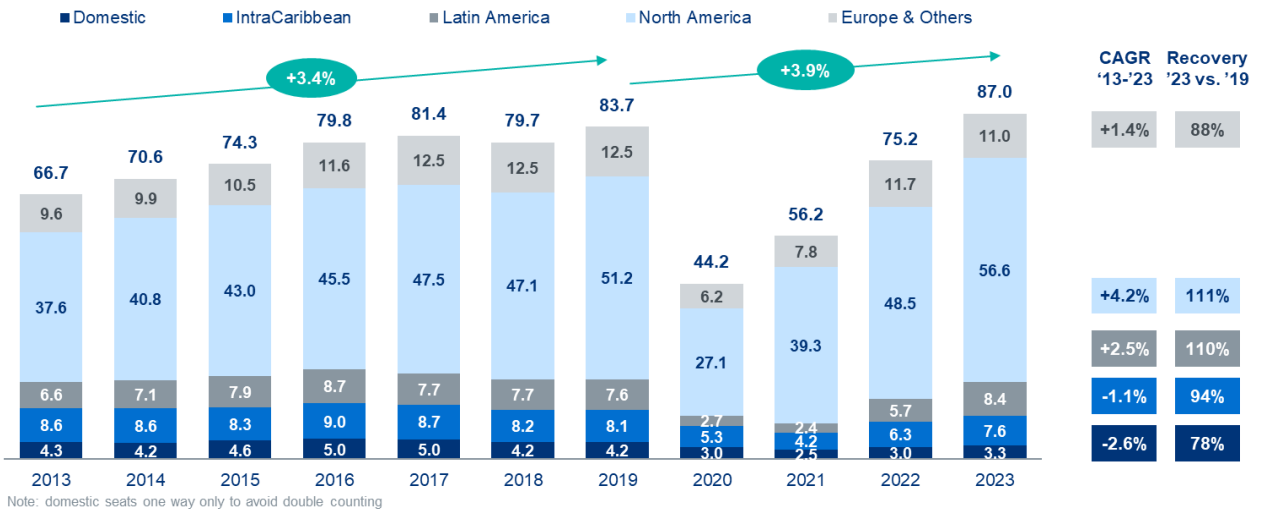


Figure 23. Historical Caribbean seat capacity evolution (Mseats, 2013-2023)

Source: OAG, ALG Analysis

The Turks and Caicos Islands Airports Authority (TCIAA) manages 6 of the country's 8 airports, including five secondary airports and Providenciales International Airport (PLS). Providenciales serves as the primary gateway and is the only airport with scheduled international commercial services, currently undergoing a PPP process.

- **Providenciales (PLS):** Located on Providenciales Island, it is the primary international gateway and the busiest airport in Turks and Caicos, accommodating a wide range of direct flights from various cities across North America and connection with Europe. Providenciales airport handled over 90% of the total passenger traffic in Turks and Caicos in 2023.
- **Grand Turk (GDT):** As the second largest airport in the territory, it is located 1.6 km south of Cockburn Town and handled over 90k scheduled passengers in 2023.
- **South Caicos (XSC)**: This airport, featuring a 1,829-meter asphalt runway, handled over 23k passengers in 2023, with scheduled flights from Providenciales and Grand Turk. Its terminal was inaugurated in Aug-23.
- **Salt Cay (SLX):** Serving Salt Cay Island, this airport is the 4th busiest in the country, handling approximately 900 passengers in 2023. It primarily connects to Grand Turk.
- **North Caicos (NCA):** Located adjacent to Major Hill Settlement and Bottle Creek Village, North Caicos airport caters to domestic charters and private flights, with plans for a boutique terminal but no commercial scheduled traffic as of today.
- **Middle Caicos (MDC):** This airport has been inactive since the construction of the North Caicos – Middle Caicos causeway, which began in 2007. It features a small terminal building and a 750-meter paved runway.

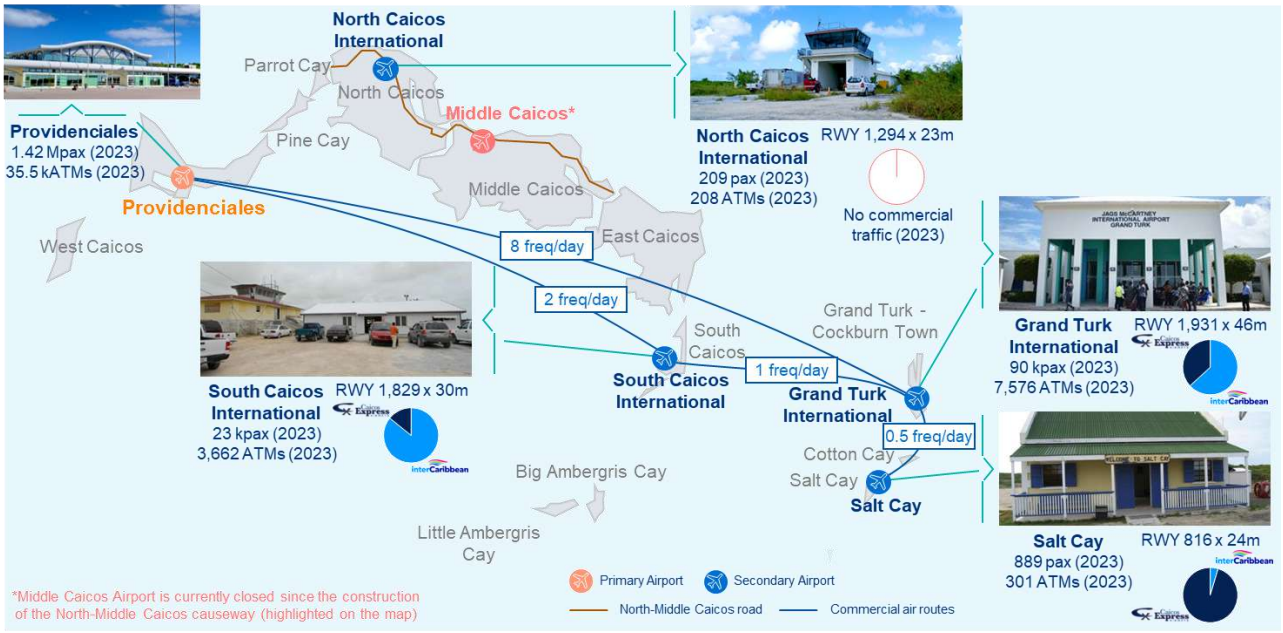


Figure 24. Turks and Caicos airport network characterization

Source: TCIAA, CAPA, OAG, ALG Analysis

In 2023, Providenciales International Airport flew to up to 45 destinations, making it the only airport in Turks and Caicos with international connections, as mentioned earlier. This includes 16 routes to North America and 23 routes to the Caribbean, giving the country the best intra-Caribbean connectivity in the region. The airport also operates three domestic routes to Grand Turk, South Caicos, and occasionally to Salt Cay. While international connectivity relies on foreign airlines, particularly USA carriers and InterCaribbean Airways, domestic connectivity is maintained by InterCaribbean Airways and Caicos Express.

Of the other TCIAA 5 airports, only South Caicos, Grand Turk, and Salt Cay operate scheduled domestic flights, while Middle Caicos remains closed. These domestic flights connect with Providenciales and include a few cross-island routes, such as Grand Turk to South Caicos and Grand Turk to Salt Cay.

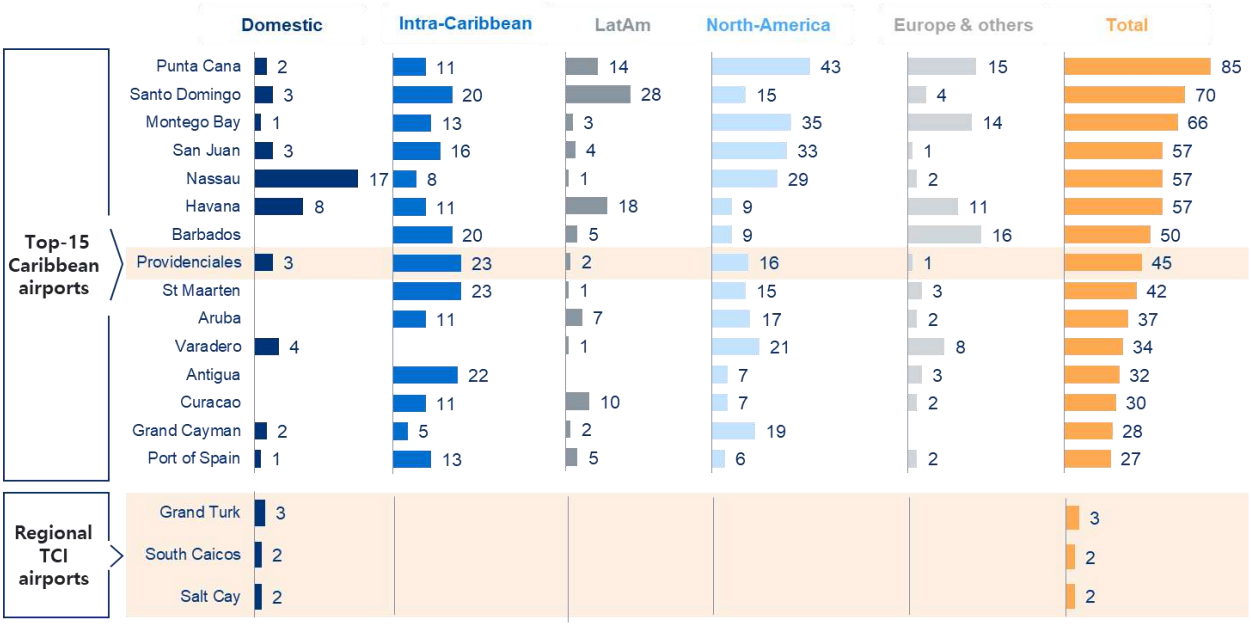


Figure 25. Connectivity at the Caribbean airports (# destinations, 2023)

Source: OAG, ALG Analysis

Turks and Caicos has demonstrated a strong post-pandemic recovery in seat capacity, surpassing 2019 traffic levels and reaching 1.93 million seats. From 2013 to 2023, the compound annual growth rate (CAGR) was 5.5%, driven mainly by international traffic, which has nearly doubled, and Caribbean traffic, which has almost tripled.

Figure 26. Evolution of seat capacity in Turks and Caicos (Mseats, 2013-2023)

Source: OAG, ALG Analysis

In terms of passenger traffic, it has grown at a slightly higher rate than seat capacity, with a CAGR of 6.0% from 2013 to 2023, reaching a peak of 1.54 million passengers in 2023. More than 90% of these passengers are handled at Providenciales, which saw almost 1.42 million passengers, followed by Grand Turk (90k pax) and South Caicos (23k pax). The other two airports with passenger traffic, Salt Cay and North Caicos, handled fewer than a thousand passengers each one.

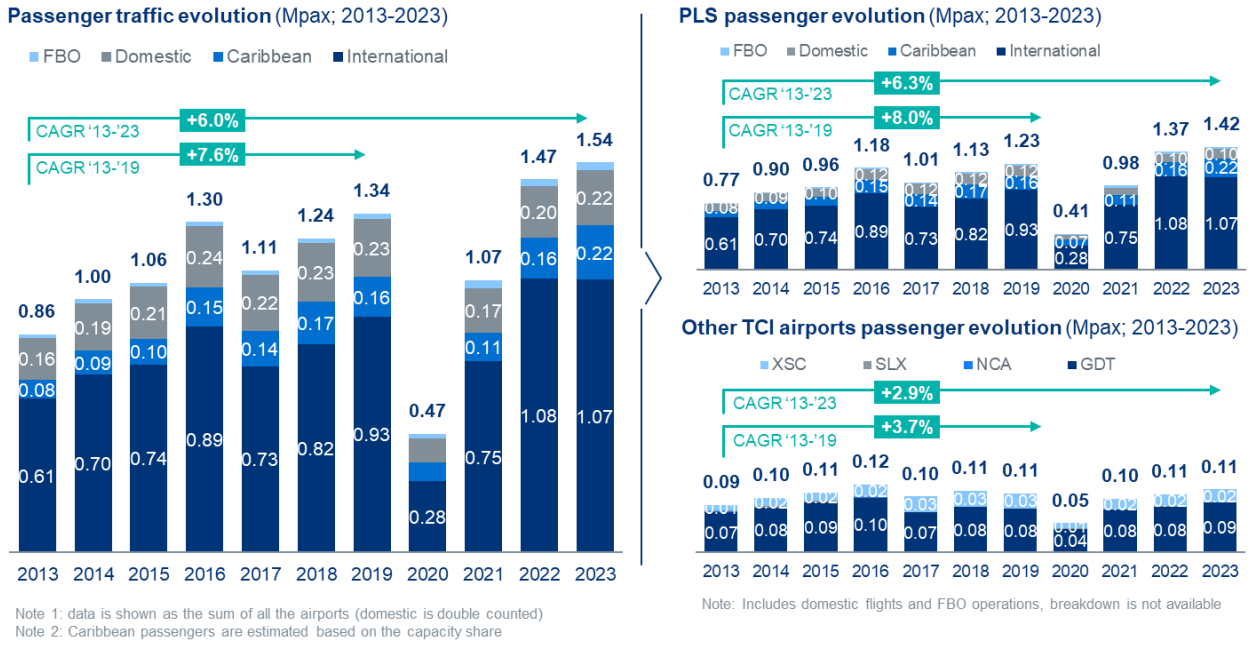


Figure 27. Evolution of passenger traffic in Turks and Caicos (Mpax, 2013-2023)

Source: TCIAA, OAG, ALG Analysis

This slightly higher growth rate in passenger traffic compared to seat capacity in recent years has enabled Turks and Caicos to recover and even surpass pre-pandemic load factors. In 2023, the overall load factor reached 78%, higher than the 76% in 2019. This improvement was driven primarily by international routes, which achieved an 80% load factor, while domestic routes had a load factor of 69%.

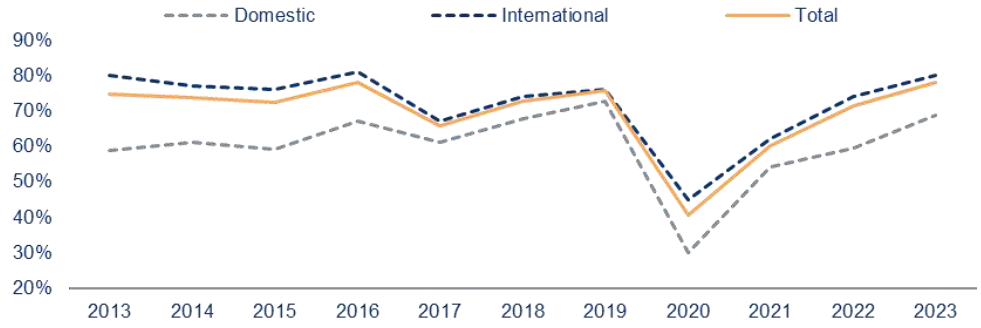


Figure 28. Evolution of load factor in Turks and Caicos (percentage, 2013-2023)

Source: TCIAA, OAG, ALG Analysis

3.1.2 Tourism in Turks and Caicos

International traffic is mainly driven by tourism, with approximately 49 million international tourists visiting the Caribbean region in 2019, of which Turks and Caicos accounted for around 3.3%.

Regarding tourism, the Caribbean has become a top destination, benefiting from its favorable climate and beaches. Turks and Caicos received 1.60 million visitors in 2019, reflecting an increase in its market share over the past few years. This growth underscores the rising popularity of Turks and Caicos as a preferred travel destination.

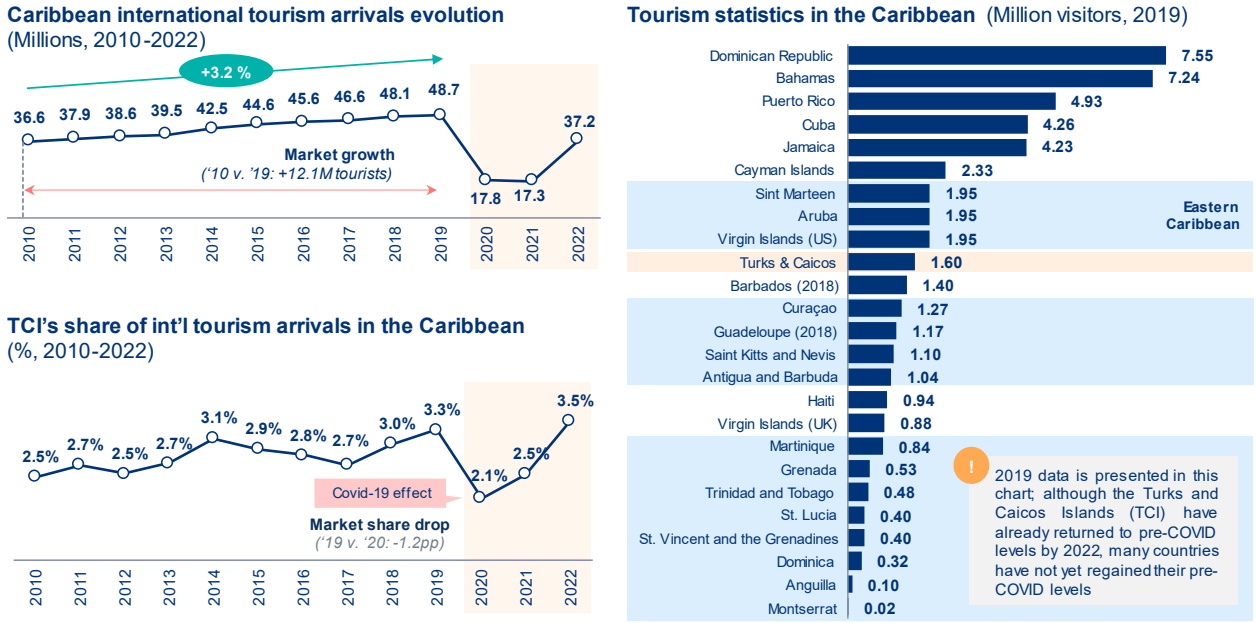


Figure 29. Caribbean Tourism sector

Source: World Tourism Organization (2023), World Bank, ALG Analysis

Turks & Caicos, with an area of 430 km² and a population of 49,300, is a constituent country of the British Overseas Territory located in the Caribbean Sea. The economy is primarily based on tourism, positioning Turks & Caicos as a high-yield tourist market among Caribbean destinations. In 2023, the GDP per capita was 23.9 kUSD, with over 90% of the GDP generated by the services sector. The islands attract almost 550,000 overnight visitors annually, highlighting their growing popularity as a premier travel destination.

Country	Surface (km²)	Population ('000)	GDP/ capita	Overnight visitors	Rooms	Tourism Expenditure (MUSD)	Diaspora ('000)	Top 3 Airlines	Positioning
Dominican Rep.	48,670	11,333	8,884	7,163,400	83,557	8,406	604	jetBlue, Delta, American Airlines	Mass tourism, VFR
Puerto Rico	8,870	3,260	28,976	3,273,100	14,488(*)	3,330	247	jetBlue, spirit, Frontier	Mass tourism, VFR
Jamaica	10,990	2,826	5,359	2,478,400	28,955	3,621	24	jetBlue, Delta, American Airlines	Mass tourism, VFR
Cuba	109,880	11,194	7,544	1,613,400	75,044	1,037	3	sunwing, Air transat, American Airlines	Mass tourism, VFR
Bahamas	13,880	413	31,002	1,452,400	15,724	3,515	64	jetBlue, bahamasair, American Airlines	Mid-range tourism, Niche, high-yield
Aruba	180	106	33,103	1,101,000	11,929(*)	2,303	54	jetBlue, United, American Airlines	Mid-range tourism
Virgin Isl. (U.S.)	346	106	38,454	684,800(*)	2,994(*)	-	-	spirit, Delta, American Airlines	Niche, high-yield
Guadeloupe	1,628	396	27,115	650,000(*)	5,443(*)	-	90	Air France, Corsair, Air Caraïbes	Mid-range tourism
Martinique	1,128	367	25,279	556,000	4,200	-	68	Air France, Corsair, Air Caraïbes	Mid-range tourism
Barbados	430	282	17,004	539,700	6,564(*)	929	35	Virgin Atlantic, Caribbean Airlines, InterCaribbean	Mid-range tourism
Curacao	444	192	13,771	489,600	11,000	988	57	KLM, TUI fly, American Airlines	Mid-range tourism
Turks & Caicos	**430**	**49**	**23,935**	**549,161(*)**	**4,647**	**877**	**26**	United, InterCaribbean, American Airlines	Niche, high-yield
Sint Marteen	34	44	35,873	373,000	3,368	957	29	Delta, Winair, American Airlines	Niche, high-yield
St. Lucia	620	180.25	10,734	356,000	4,767	1,080	8	British Airways, jetBlue, American Airlines	Mid-range tourism
Cayman	260	69	77,974	284,300	7,263(*)	39(*)	29	United, Cayman Airways, American Airlines	Niche, high-yield
Antigua Barbuda	440	94	15,702	265,100	3,816(*)	773	29	British Airways, InterCaribbean, American Airlines	Mid-range tourism
Trinidad Tobago	5,130	1,535	14,742	226,500	7,731	324	78	Caribbean Airlines, British Airways, jetBlue	Mid-range tourism, VFR
Virgin Isl. (UK)	153	31	31,738(*)	173,000	2,240(*)	-	-	Silver Airways, Cape Air, InterCaribbean	Niche, high-yield
Haiti	27,750	11,725	1,152	148,000(*)	1,814(*)	73	19	jetBlue, spirit	VFR
Bermuda	53	64	111,865	145,900	1,720	143(*)	-	jetBlue, British Airways, American Airlines	Niche, high-yield

(*) Last available year

Visitors Profile: Mass tourism; Mid-range tourism; Niche, high-yield; VFR

Figure 30. Caribbean Countries Positioning Analysis (2023)

Source: UNWTO, Oxford Economics, World Bank, ALG Analysis

Turks and Caicos Islands saw an estimated 1.46 million arrivals in 2023, with 520,000 of these being stayover visitors traveling by air. Air visitor arrivals have experienced moderate growth in recent years, with a compound annual growth rate (CAGR) of 4.1% from 2011 to 2019. Although the COVID-19 pandemic caused a significant drop of 77% in arrivals, the subsequent years saw a remarkable recovery of 82% in 2022. Most air travelers, over 90%, originate from the USA and Canada, while Europe accounts for less than 5% of visitors.

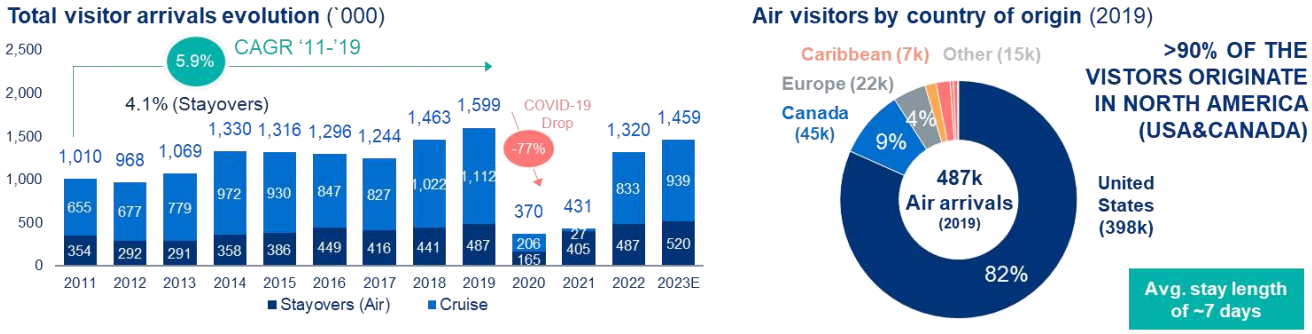


Figure 31. Visitor arrivals to Turks and Caicos

Source: Turks & Caicos Islands Tourist Board, TCIAA Brochure Investment Opportunities 2022-23, National tourism strategy and implementation plan for Turks & Caicos, ALG Analysis

Regarding the seasonality of visitors, September and October are the low season due to hurricanes. Air visitor numbers peak in December and from March to July, while cruise visitors see their highest numbers in December. Cruise arrivals, concentrated in Grand Turk, exhibited a stable monthly pattern before COVID-19, and it is expected to reach 1.1 million cruise passengers in 2024.

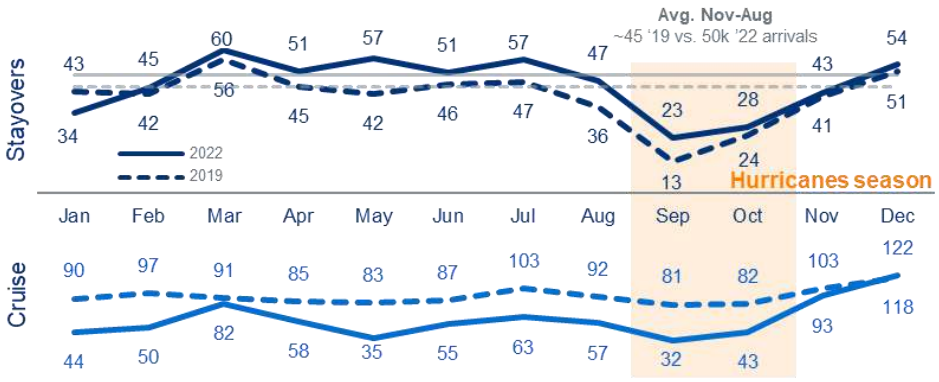


Figure 32. Monthly visitor arrivals evolution (thousands)

Source: Turks & Caicos Islands Tourist Board, TCIAA Brochure Investment Opportunities 2022-23, National tourism strategy and implementation plan for Turks & Caicos, ALG Analysis

The destination appeals to high-yield, high-end luxury markets, as well as significant mid-range and niche markets, attracting a diverse range of travelers. Business class travelers also contribute to the high yield. Visitors from the USA and Canada typically stay for an average of 7 days, those from Latin and South America for 6 days, and tourists from the UK and Europe for around 10 days. The main reasons for travel include business investment, beach experiences, diving, water sports, honeymoons or romantic getaways, attending festivals, golfing, and ecotourism. Visitor arrivals have been relatively consistent since 2018, with the exception of a decline in September and October due to the peak hurricane season. The destination is gaining significant popularity, establishing itself as a top destination in the Caribbean, with 98% of visitors likely to recommend it.

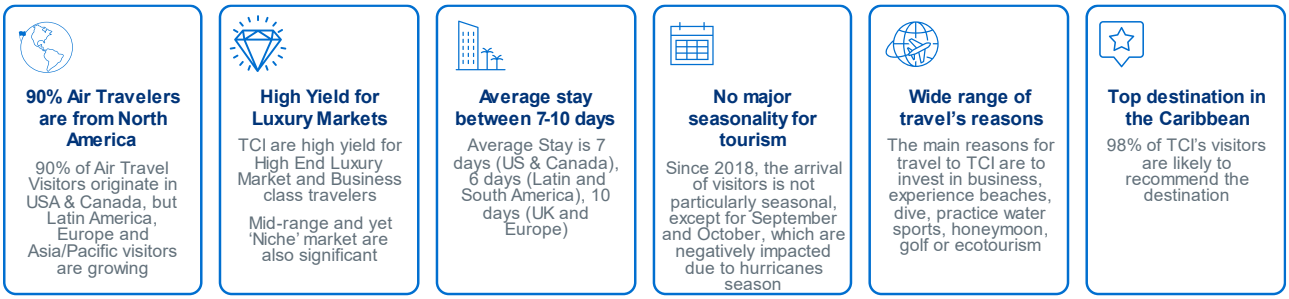


Figure 33. Turks and Caicos passenger profile

Source: National tourism strategy and implementation plan for Turks & Caicos, ALG Analysis

Each island in Turks and Caicos boasts a unique tourist profile, offering a variety of experiences that cater to diverse preferences:

- Providenciales serves as the gateway, renowned for its premium Grace Bay Beach and luxury accommodations, capturing the majority of international arrivals by air. This island is the hub of tourist activity, offering high-end resorts, fine dining, and various water sports.
- Grand Turk captivates visitors with its rich history and top-tier scuba diving opportunities. As the sole cruise port in the archipelago, it attracts significant cruise traffic, showcasing colonial architecture, historical landmarks, and vibrant marine life.
- South Caicos is known for its vibrant marine ecosystem and traditional fishing communities. This island presents a strategic opportunity for sustainable tourism, emphasizing eco-friendly practices and preserving local traditions, making it an ideal destination for environmentally conscious travelers.
- The quieter islands like North and Middle Caicos offer unique attractions for those seeking serene beauty, rich marine life, and authentic local experiences. These islands provide a tranquil escape with stunning landscapes, hidden beaches, and opportunities to explore the local culture and nature.

This diverse destination caters to luxury seekers, adventure enthusiasts, and cultural explorers alike, making Turks and Caicos a unique jewel in the Caribbean.

Compared to more developed tourist regions like Cancun or Montego Bay, Turks and Caicos has a lower overall hotel density. The country has a hotel density of 19 rooms per km², with nearly 87% of the hotel capacity concentrated in Providenciales. This brings Providenciales closer to typical values seen in other established regions, which range between 60-80 rooms/km².

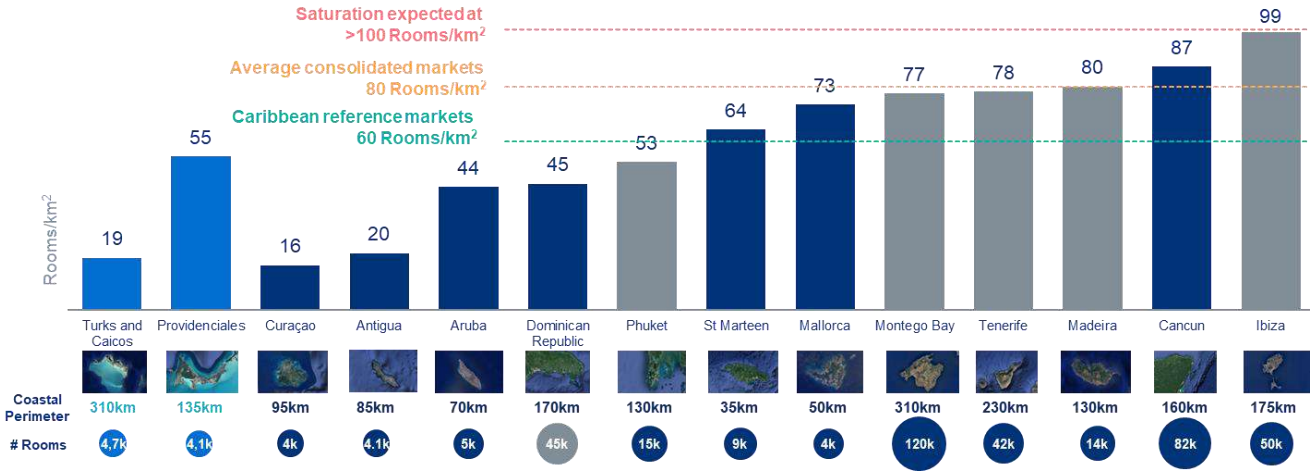


Figure 34. Hotel rooms per square kilometer at touristic destinations

Source: National tourism strategy and implementation plan for Turks & Caicos, ALG Analysis

This disparity highlights the potential for further tourism infrastructure development in Turks and Caicos. To foster balanced growth, it is essential to focus on developing infrastructure in islands other than Providenciales. This strategy will not only support the expansion of hotel capacity but also drive the development of airports and other essential facilities across the archipelago.

Given the current state of the tourism ecosystem in Turks and Caicos Islands (TCI), the National Tourism Development Strategy seeks to establish quantitative objectives for up to 2032, focusing on four key aspects: increasing the number of visitors and tourism revenue, enhancing the visitor experience, and expanding hotel capacity. The anticipated increase in hotel capacity is based on information gathered from on-site visits in the country.

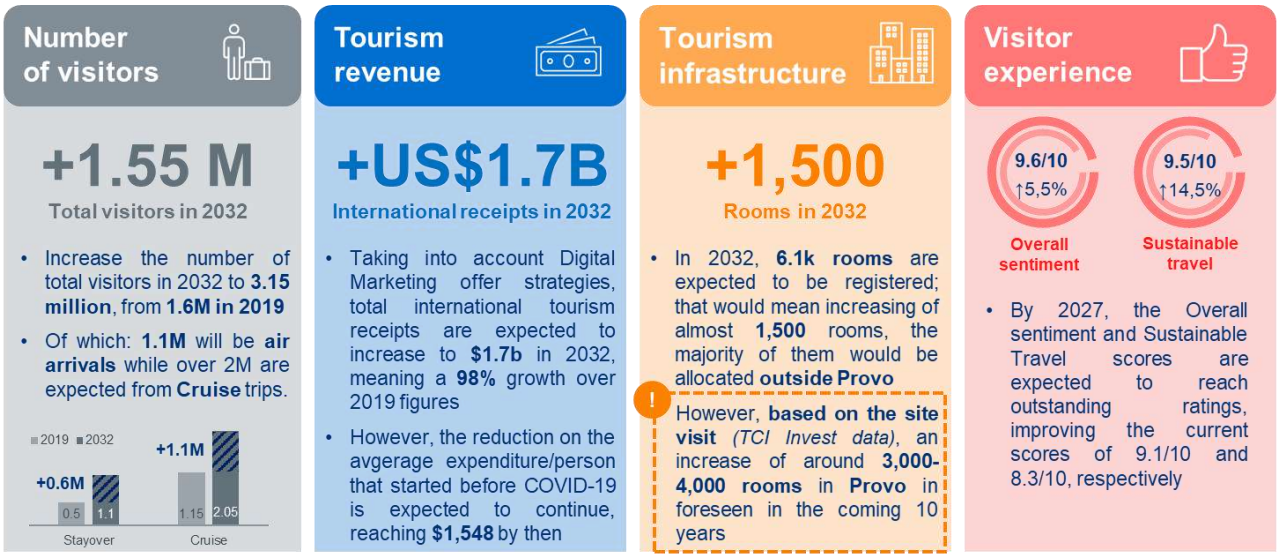


Figure 35. Objectives of the National Tourism Development Strategy (2032)

Source: Turks & Caicos Islands Tourist Board, National tourism strategy and implementation plan for Turks & Caicos, ALG Analysis

Additionally, the tourism development strategy also aims to achieve the following objectives:

- Enhance connectivity from Providenciales to all other tourism destinations in the country, with a particular focus on improving air connectivity.
- Diversify the current range of tourism products and strengthen existing offerings to attract a broader range of tourism segments and markets.
- Consolidate the primary source markets for tourism demand, namely the USA, Canada, and the UK, while expanding market share in new potential markets across Europe (Germany, Italy, France, Spain, Benelux, etc.), Latin America (Brazil, Colombia, Chile, Argentina, etc.), and the Caribbean region.
- Improve the quality of working conditions and increase job opportunities for the TCI population.

3.1.3 Grand Turk Airport - air transport market and tourism

Grand Turk is the historical center of Turks and Caicos, with its capital city, Cockburn Town, and the second most populated island in the country, home to the second-largest airport. Grand Turk Airport (GDT) is located approximately 1.6 km by road from the Grand Turk Cruise Center and about 3.2 km from central Cockburn Town. There is no public transportation on Grand Turk, but taxis are available outside the airport terminal, and rental cars can be found at the Grand Turk Cruise Center.

In 2023, Grand Turk reached 90,000 domestic passengers, surpassing pre-pandemic levels and achieving a compound annual growth rate (CAGR) of 2.2% from 2013 to 2023, but still below the peak of 2016. In 2017, Hurricanes Irma and Maria caused significant damage, and it was not until July 2019 that GDT reopened its newly refurbished infrastructure following extensive repairs.

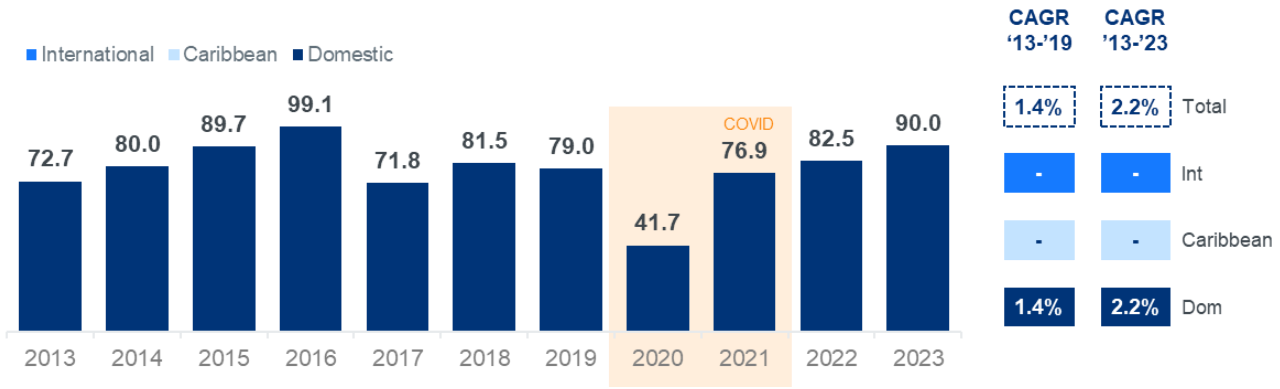


Figure 36. Evolution of passenger traffic in Grand Turk (kpax, 2013-2023)

Source: TCIAA, OAG, ALG Analysis

The airport's scheduled commercial flights are primarily operated by InterCaribbean Airways, which accounts for approximately two-thirds of the seat capacity, with the remaining capacity provided by Caicos Express. InterCaribbean primarily operates with a fleet consisting of Havilland Canada - Bombardier DHC6 Twin Otters (19 seats) and Embraer 120 Brasilia (30 seats). Meanwhile, Caicos Express uses Beechcraft 1900D aircraft (19 seats) and Cessna Light Aircraft Twin Turboprops (8 seats).

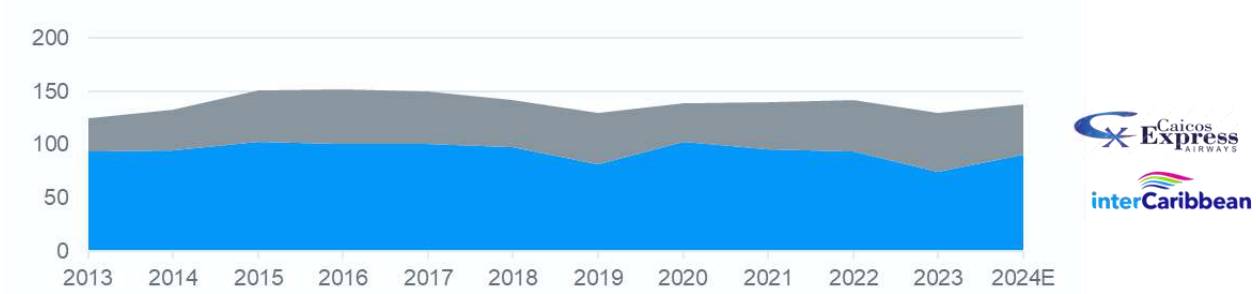


Figure 37. Evolution of seat capacity by airline in Grand Turk (kSeats; 2013-2024E)

Source: OAG, ALG Analysis

Grand Turk Airport maintains a major connection to Providenciales, with consistent demand throughout the year and minimal seasonal variations. The airport also offers daily flights to South Caicos and three weekly flights to Salt Cay, which is nearly the only way to reach Salt Cay by air.

Figure 38. Commercial scheduled routes in Grand Turk (2024E)

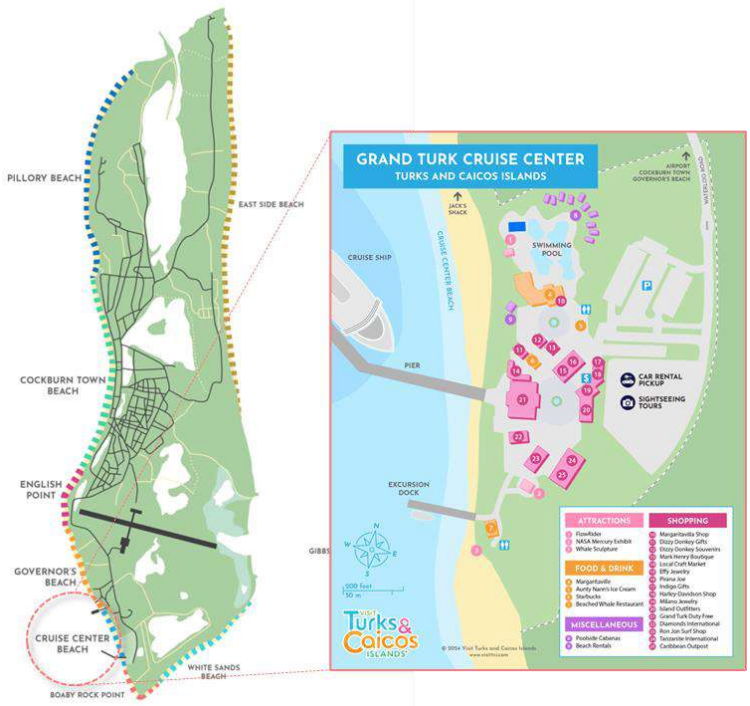
Source: OAG, ALG Analysis

Grand Turk, in addition to being the historical center of Turks and Caicos and the capital, offers a variety of tourist attractions:

- Beaches: Governor's Beach is the top beach on the island, but there are options for almost any activity. Cockburn Town is near great restaurants, English Point is secluded, and Pillory Beach offers excellent snorkeling opportunities.
- Water Sports: Grand Turk is a world-renowned scuba diving destination. Snorkeling is also popular at Gibbs Cay, where visitors can dive with stingrays in their natural environment.
- Attractions: The Lighthouse and the TCI National Museum are must-visit sites. Cockburn Town displays remnants of British-Bermudian colonial architecture. During the winter, humpback whale watching is another popular attraction.
- Cruise Center: Located near Governor's Beach, this complex, owned and operated by Carnival Cruise Lines, features shops, restaurants, the largest Margaritaville in the Caribbean, and the only Starbucks in the country.

One of the key issues facing the island is the lack of hotel capacity and major hotels, which constrains the development of activities such as diving. In the short to mid-term, there is anticipation for a hotel development with around 100 rooms. Additionally, there is an expectation of more than 300 additional rooms within the next five years, according to TCI Invest information.

The Grand Turk Cruise Center serves as the launch point for cruise ships, welcoming up to three ocean liners each day. To ensure safe access to ports and shipping channels, the Ports Authority is prioritizing port maintenance and dredging in the short term. This includes USD$1M for the rehabilitation of the Grand Turk Ports Authority office and USD$2M for the construction of a floating dock.



Quick Facts	
Population	~7.2k (2023 estimated)
Hotel rooms	155 (14 hotels)
Best Beach	Governor's Beach
Highest Point	Colonel Murray's Hill (27 m)
Most popular attraction	Grand Trk Lighthouse
Natural Hotspot	Columbus Landfall National Park

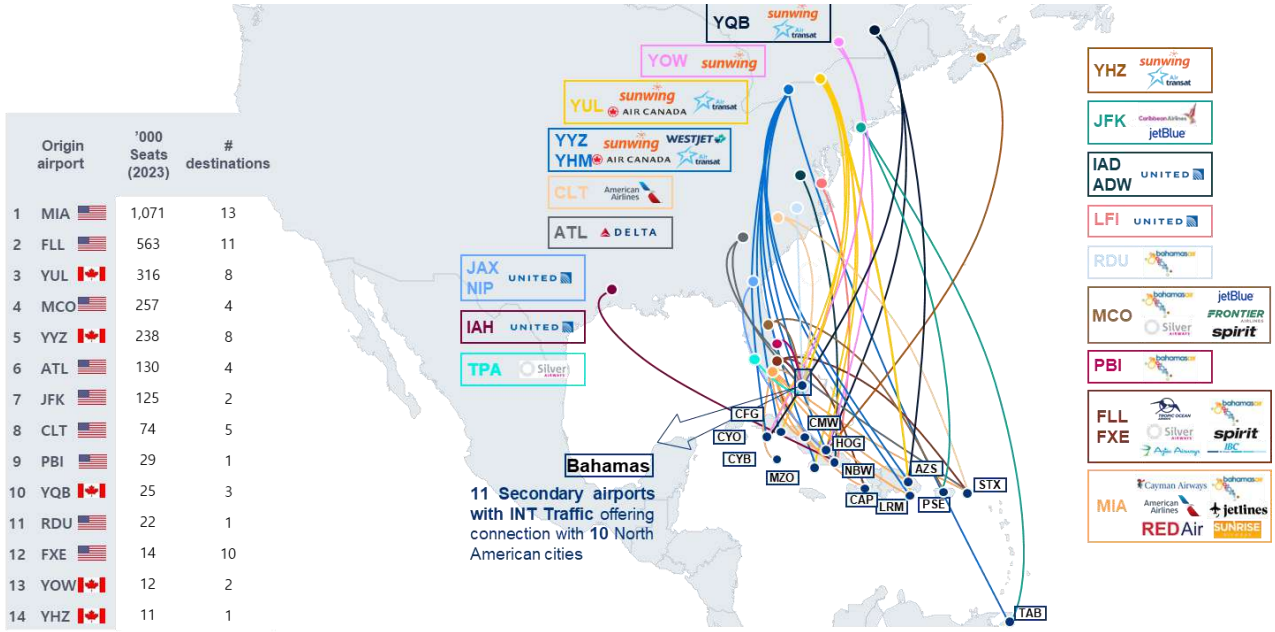
Figure 39. Main tourist attractions in Grand Turk (2024)

Source: Visit Turks & Caicos Islands, TCIAA, ALG Analysis

Currently, the main obstacle for an international traveler, primarily from North America, is the connection through Providenciales, as Grand Turk does not have any international scheduled commercial routes. This can lengthen the journey and add the inconvenience of a layover in PLS, which can be particularly troublesome during peak times and certain days of the week. As a result, North American passengers often need to spend nearly an entire day to travel to Grand Turk and another day for the return trip.

As previously mentioned, the American market is of critical importance for the development of Grand Turk. This market already enjoys solid connectivity with many airports handling fewer than 2 million passengers in the Central America and Caribbean regions, which are not the primary gateways of their respective countries, a position Grand Turk aims to achieve. North America has robust connectivity with the main airports of the Caribbean, concentrating most of the activity on the East Coast (~87%, ~50M seats), primarily from Florida and New York. These locations represent potential new destinations for secondary airports in Turks and Caicos.

North American hubs have solid connectivity with several secondary airports in the Caribbean, offering routes to over 25 destinations. In addition to these major hubs, there are more than 30 airports in North America that connect to secondary airports within the Caribbean. When focusing on the smallest Caribbean international airports with less than 0.5 million passengers, and their connections to North America, it is evident that Florida handles the majority of the traffic. This is particularly relevant for Grand Turk's short-term targets, with significant connections from Miami (MIA), Fort Lauderdale (FLL), and Orlando (MCO) airports.



Note: Caribbean secondary airports (excluding country main gateways) with INT traffic and <2MPax have been selected for the present analysis

Figure 40. Caribbean airports with <0.5 Mpax – Connectivity from North America

Source: OAG, CAPA, ALG Analysis

Based on the performance of other tourism-focused secondary airports, Grand Turk shows significant potential to develop connectivity to the US, where it currently does not have scheduled regular flights, and to strengthen its domestic capacity. Establishing connections to the US would open up a major market for Grand Turk, with Florida being the top priority due to its proximity and high demand for Caribbean travel.

Country	Airport	Seat Capacity (Mseats, 2023)	Destinations (# destinations, 2023)						Other		
			Domestic	Intra - Caribbean	Latin America	North America	Europe & Others	Total	Island Population (k, 2023)	#rooms	Main Airlines
Honduras	RTB	0.37 / 0.33 / 0.71	5	-	3	9	-	17	110.0	3,402	
Bahamas	FPO	0.32 / 0.23 / 0.55	1	-	1	7	1	10	47.5	1,694	
Bahamas	MHH	0.18 / 0.20 / 0.38	2	-	-	8	-	10	16.6	1,818	
Bahamas	GGT	0.15 / 0.22 / 0.37	3	-	-	5	-	8	7.3	826	
Bahamas	ELH	0.1 / 0.2 / 0.30	3	-	-	6	-	9	9.2	645	
Cayman Islands	CYB	0.14	2	-	-	1	-	3	2.0	268	
Turks & Caicos	GDT	0.13 ! Room for growth	3	-	-	- !	-	3	7.2	155 !	
Panama	RIH	0.07	-	-	-	3	-	3	267.0	2,200	
Turks & Caicos	XSC	0.03	2	-	-	-	-	2	2.0	87	
British Virgin Islands	VIJ	0.02 ■DOM ■INT	1	2	-	-	-	3	4.5	732	

Figure 41. Benchmark of Grand Turk vs. tourism-focused secondary airports

Source: OAG, Oxford Economics, UNWTO, ALG Analysis

Turks and Caicos aspires to develop its tourism industry to position itself alongside countries in the region that already attract American tourists to their secondary airports, such as the Bahamas, Cuba, the Cayman Islands, and the US Virgin Islands. In this context, Turks and Caicos should differentiate itself from countries like Antigua and Barbuda, the UK Virgin Islands, or Curaçao, which primarily attract tourists through their main gateways.

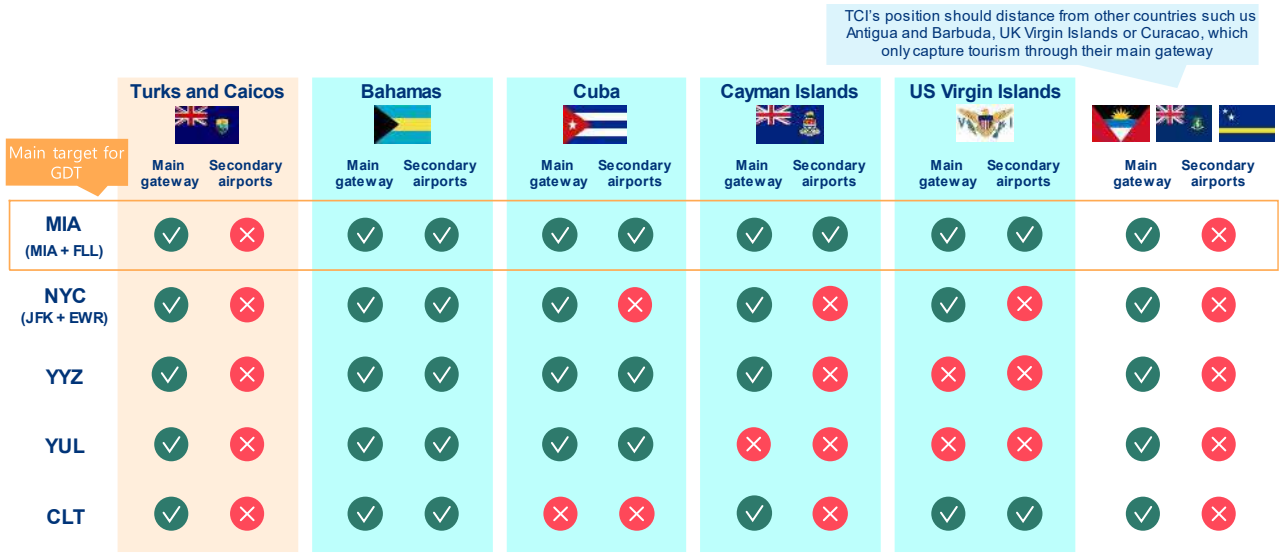


Figure 42. Main gateways and secondary airports connectivity

Source: OAG, CAPA, ALG Analysis

In conclusion, Grand Turk is the most populated island after Providenciales and one of the tourism destinations with the highest potential in the country, despite its development being historically hindered by a lack of hotel infrastructure. The island is globally renowned for scuba diving and receives approximately 1 million cruise passengers annually.

Growth is expected to stem mainly from enhanced domestic connectivity, both with Providenciales and other airports such as South Caicos, creating synergies between them, in addition to strengthening links to Salt Cay. With the planned improvements in hotel infrastructure over the next five years, there is also potential to develop regular flights to the US, primarily to Florida, initially using regional aircraft (ATR/EMB) with 70-140 seats, like other Caribbean tourist spots.

3.2 Traffic forecast for Grand Turk Airport

3.2.1 Traffic forecast methodology

The methodology for passenger traffic projection is based on a combination of a long-term macroeconomic top-down projection and short to mid-term adjustments made at an airline-route level (bottom-up projection). This approach considers the development of new routes at the airport in accordance with the previously defined strategy.

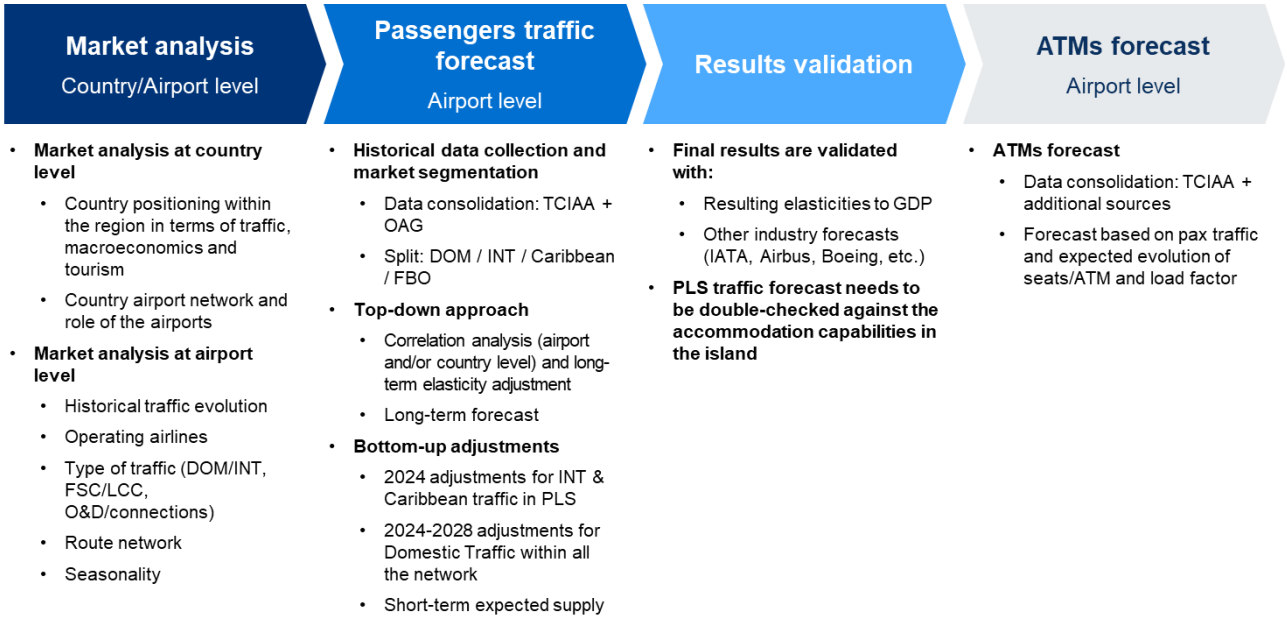


Figure 43. Traffic forecast methodology

Source: ALG Analysis

3.2.2 Macroeconomic projection (top-down approach)

The conclusions drawn from the market analysis serve as the foundational framework for the traffic projections. These insights guide the methodology application based on relevant market segmentation and the historical period for regression analysis. In this context, it is identified that the optimal approach for forecasting medium and long-term traffic at Turks and Caicos airports entails establishing growth rates through an econometric model.

Considering the econometric trend of the model, the Top-down approach emerges as the most suitable methodology consisting of:

- A multivariable linear regression based on macroeconomic variables is used to generate air traffic projections. The robustness and significance of these projections are determined by evaluating the correlation factor (R^2) and employing various statistical tools.
- When statistical significance is not achieved with the aforementioned methodology, an elasticity-based model is used. This econometric approach is based on assessing the impact of economic growth on air traffic growth. A coefficient of elasticity is derived and applied to the macroeconomic growth to calculate the air traffic growth.

Both methodologies are widely used in the market, preferring multiple linear regression whenever R^2>85%. While achieving higher correlation factors (R^2) is desirable, it does not always equate to the most accurate traffic projections. Conclusions identified on the market analysis are key, being used to select the adequate methodology and to address results validation. Also, by employing a range of additional statistical tools, the model aims to approach a more robust and reliable result.

Multivariable linear regression model

$$Pax = m_1 \cdot V_1 + m_2 \cdot V_2 + \ldots + m_n \cdot V_n + b$$

- V: Descriptive variables
- m: Coefficients of the regression
- b: Intercept

Key issues

Preferred model

- Regression is validated with statistical parameters:

Parameter	Validity	Meaning
R^2	> 85%	Quality of the model to replicate the results
Adjusted R^2	> 75%	Measures the same as R^2, taking into account the number of variables included in the model
P-value	< 0.05	Checks the contribution of each variable to the model

- Coefficients are estimated and variables are projected to obtain the passenger forecast. If no combination of variables is identified as significant, an elasticity-based model is then applied

Empirical elasticity model

$$\Delta Pax = \varepsilon_1 \cdot \Delta V_1 + \varepsilon_2 \cdot \Delta V_2 + \ldots + \varepsilon_n \cdot \Delta V_n$$

- V: Descriptive variables
- ε: Empirical elasticities

Key issues

Elasticities used for validation

- Growth in passenger traffic is explained by the variation of selected variables and empirical elasticities
- Normally applied to GDP for the specific market, elasticity relates GDP growth with traffic growth
- Historical values are used to validate future projections, as well as empirical values based on different sources (market, ICAO, etc.)

Figure 44. Top-down forecasting model selection

Source: ALG Analysis

Given the model's considerable sensitivity to macroeconomic assumptions over extended periods, the reliability of econometric variables becomes crucial to ensure a stable and robust traffic forecast. This involves a range of factors, highlighting the necessity for thorough accuracy and precision in the projection, such as national and regional GDP projections, GDP/capita, inflation and exchange rates, international trade (imports / exports), foreign direct investment, middle class size, average household income and other macro variables.

	TCI & Inbound countries GDP	GDP TCI	Population of TCI	ForEx (non-USD markets)	Oil price	Yields	Tourism
Relation with air traffic	GDP evolution reflects the economic development of the country and the wealth level of its citizens and economic sectors	Regional GDP reflects the particular economic development of the state and the wealth level of the citizens	Population reflects the development of the country and represents the volume of people which have access to air transport	As local currency devaluates, foreign currencies become stronger and inbound traffic is stimulated because travel becomes cheaper	Fuel usually represents the largest OpEx for airlines. Air fares are directly correlated with Brent price (lower yields, higher traffic)	The offer of airlines affects yields and stimulates short-term demand. Yields represent the accessibility to air transport	Tourism is one of the main sources of air traffic, and therefore airport traffic is directly correlated
Pros & Cons for air traffic forecast	**Pros** • Robust projections are available • Normally correlates extremely well **Cons** • May have limitations for very small markets	**Pros** • Normally correlates extremely well **Cons** • Does not take into account inbound traffic (the most important one within TCI)	**Pros** • Projections available **Cons** • Does not take into account inbound traffic (the most important one within TCI) • Might show dependence with GPD per capita	**Pros** • Projections available • Tends to correlate well with int'l traffic **Cons** • Volatile projections • Different impact for outbound and inbound • Non representative for TCI (USD-based)	**Pros** • Tends to correlate well with traffic **Cons** • Volatile projections, only for short-term • Difficult to find a good correlation	**Pros** • Good correlation with short-haul and long-haul markets **Cons** • No robust projections available	**Pros** • Exceptional correlation factors with traffic **Cons** • No robust projections available; usually projections are too optimistic (targets) • May inter-correlate with GDPs
Elasticity	+	+	+	+ −	−	−	+

Main descriptive variable

Figure 45. Top-down variable selection

Source: ALG Analysis

It is important to emphasize that GDP tends to be the most relevant and reliable macroeconomic variable to describe the evolution of air traffic demand, since it is the variable with more available projections from reliable sources. Besides, if the real origin of the passengers of a particular market is known, a blended GDP compounded by each GDP of each origin country tends to provide with greater correlation factors and better results.

Due to the low volumes of traffic within the secondary airports network, aggregate traffic for the country has been used in order to find suitable correlations for the macroeconomic forecast. By using a top-down approach, the traffic forecast for the medium to long-term is developed based on the relationship between GDP per point-of-sale and airport traffic for each market segment, using point-of-sale data from airline tickets.

While Caribbean and International traffic at Providenciales, show a strong correlation with the blended GDPs of each market (R^2 87-92%), the Domestic market does not correlate with GDP. Therefore, the projection methodology involves forecasting Caribbean and International traffic for PLS and projecting domestic and FBO traffic at PLS as a percentage of international traffic, based on the insights from the market analysis. This domestic traffic mainly consists of inbound international tourists who travel to other areas of TCI, such as Grand Turk, while FBO traffic corresponds to inbound international tourists arriving in TCI on private flights.

Domestic traffic for Grand Turk and the rest of the network heavily depends on projections for PLS, with only minor transversal routes between secondary airports. Providenciales' domestic traffic has been forecasted using a bottom-up approach for 2024-2028 by analyzing each route individually *(see details below)*, while for 2029-2055, it is projected as a percentage of the airport's international traffic.

3.2.3 Bottom-up adjustments

Top-down traffic projections are complemented by a micro bottom-up analysis at the route level, where the vast majority operate to/from PLS, except for cross-island routes such as Grand Turk to Salt Cay and Grand Turk to South Caicos.

For the 2024-2028 period, bottom-up adjustments were applied to project a more reliable traffic, based on OAG published schedules, airline interviews and empirical insights from air traffic trends, enabling the prediction of traffic volume based on operational variables like routes, frequency, and seats offered. The methodology encompasses an analysis of passenger, airline companies, existing frequencies, and routes, projecting the future evolution of traffic and capacity, considering factors like potential new routes at the airports, tourism strategy and infrastructure projects.

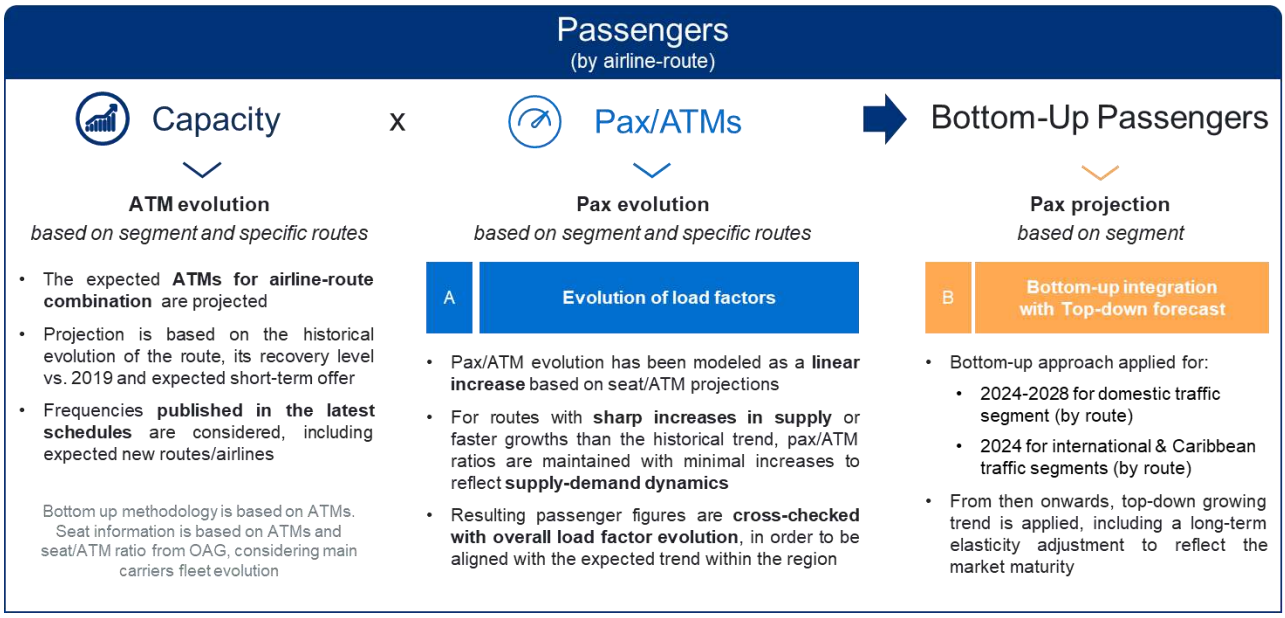


Figure 46. Bottom-up approach

Source: ALG Analysis

The objective is to provide a more empirical perspective on demand within the 2024-2028 timeframe that can be integrated into the top-down model from 2029 onwards, enhancing the accuracy of the model for the short/mid-term period. This approach involves a thorough analysis of airline activity and specific routes, considering new routes, tourism product, infrastructure changes, global economic drivers or any other phenomenon that might halt, accelerate, or disrupt traffic recovery or growth. The ultimate objective of this approach is to introduce essential refinements to the forecast, enabling it to account for nonlinear elements in the short-term that cannot be adequately addressed by the top-down analysis.

Domestic traffic is expected to continue growing at a stable pace due to additional frequencies scheduled on some existing routes, reflecting the expansion plans of InterCaribbean and Caicos Express. Based on Providenciales' domestic projections, traffic for Grand Turk is calculated almost automatically, as only the cross-island routes that do not pass through PLS need to be forecasted. These routes are Grand Turk to Salt Cay (expected to reach one daily frequency in the short-term) and Grand Turk to South Caicos (expected to reach two daily frequencies in the short-term).

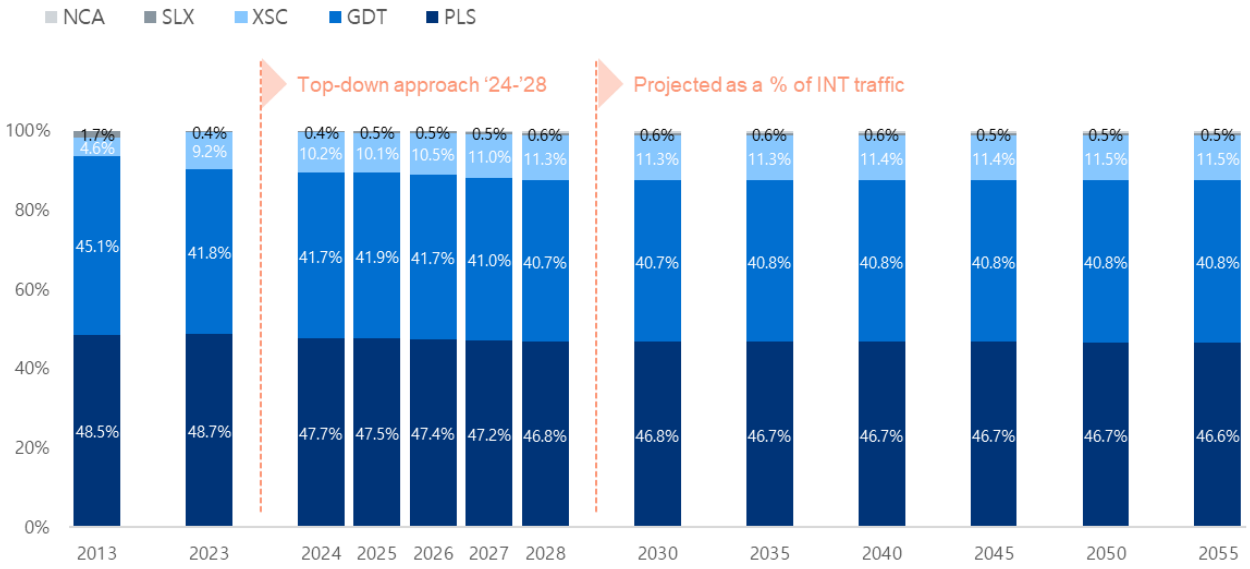


Figure 47. Domestic traffic projection: Distribution by airport (Mpax)

Source: ALG Analysis

Regarding international traffic, due to the ongoing tourism development in Grand Turk aimed at increasing tourism capacity, it is expected that international routes will be scheduled to/from their airports by 2025, offering a 2-3 weekly connection with some of the usual airports on the East Coast, likely MIA. In the mid/long-term, an increase in the weekly frequencies is anticipated, targeting a daily flight at GDT, all of which will mainly be operated using regional aircraft with 75-90 seats.

Passenger numbers and aircraft movements (Pax/ATMs) in both segments are expected to grow based on the projected fleet in each market. Domestic Pax/ATMs are expected to increase from approximately 13 pax/ATM to 20 pax/ATM by 2055, equivalent to an aircraft with 27 seats at a 75% load factor. For international traffic, Pax/ATMs are expected to reach 65 pax/ATM by 2055, equivalent to an aircraft with 81 seats at an 80% load factor.

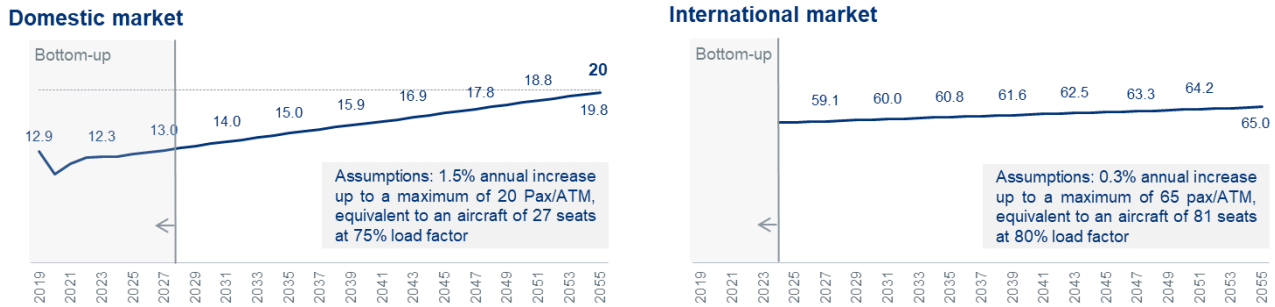


Figure 48. Pax/ATM forecast

Source: OAG, TCIAA, CAPA, ALG Analysis

3.2.4 Consolidated traffic forecast results

By integrating the top-down and bottom-up results, the forecast predicts that Grand Turk Airport will reach a volume of 430,000 passengers in 2055, with a CAGR of 5.0% for the period 2023-2055. Domestic traffic is expected to grow at 4.7%, and FBO traffic at 2.8%. International traffic up to 2028 is forecasted using the bottom-up approach as explained above, followed by annual growth rates similar to those of Providenciales' international traffic.

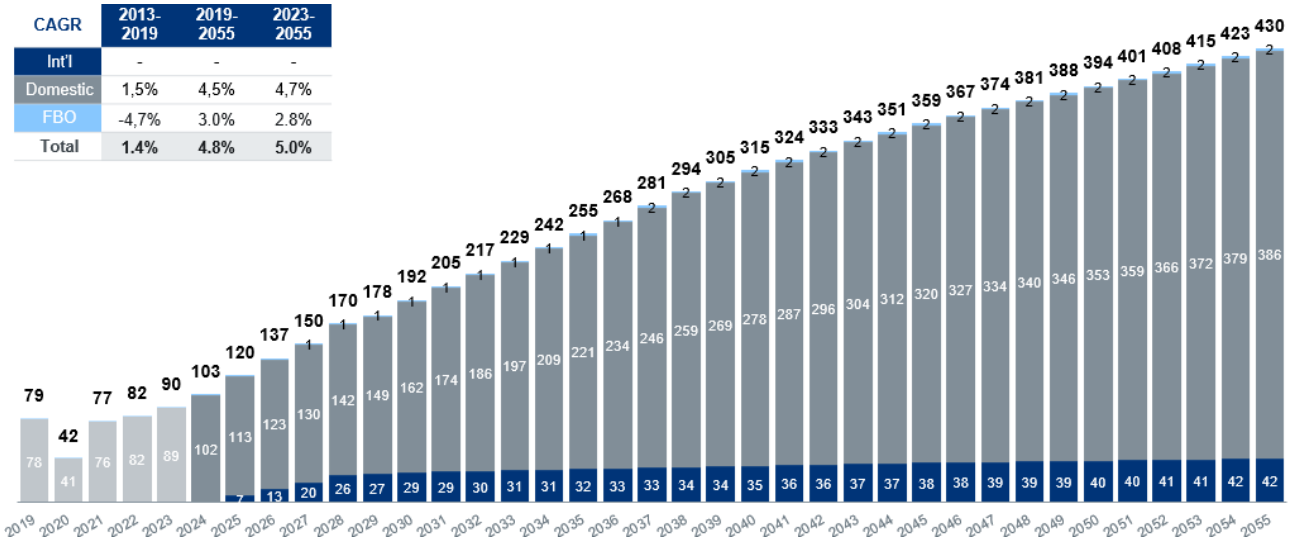


Figure 49. Grand Turk passenger traffic forecast (kpax)

Source: OAG, TCIAA, CAPA, ALG Analysis

Regarding the projection of aircraft movements, Grand Turk is expected to reach almost 21,000 operations in total by 2055, with a CAGR of 3.2% for the period 2023-2055. Of all of them, approximately 19,500 operations are expected to be domestic commercial flights, and around 650 international operations.

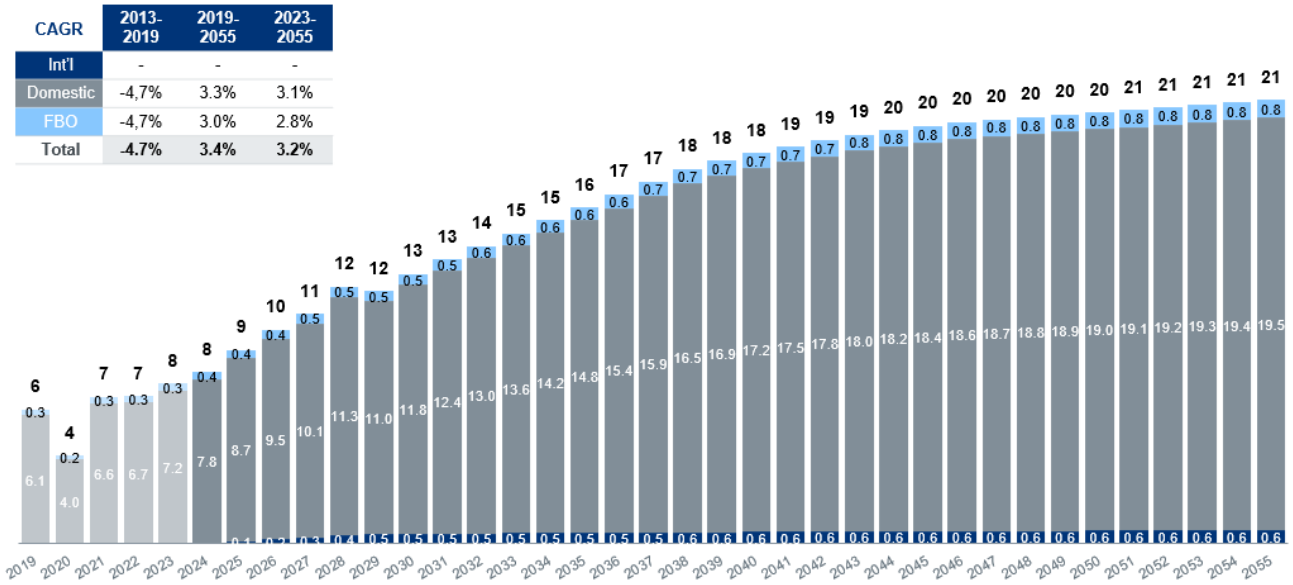


Figure 50. Grand Turk operations forecast (kATM)

Source: OAG, TCIAA, CAPA, ALG Analysis

3.2.5 Design parameters forecast

For the subsequent sizing of the infrastructure, it is not enough to simply have annual forecasts of passenger traffic and operations. It is also important to have certain parameters that indicate the infrastructure

requirements during peak operation periods. In this regard, it is crucial to know the expected volume of passengers and operations that the airport will need to process in an hour (passengers at peak hour or PHPs, and operations at peak hour or ATM/h, respectively), as well as the maximum expected demand for aircraft parking positions or stands.

The ATM/h and PHPs are projected using benchmarks from similar airports, which relate annual figures (ATMs and Mpax) to these peak hour parameters. These benchmarks consider the progressive reduction in the ratio between peak values and annual values as airport traffic grows due to the gradual flattening of the profile.

To select the design day for starting the projection, following the methodology recommended by IATA, the 30th hour criterion is used for PHPs (the day that contains the thirtieth busiest hour of the year). For selecting the design day for ATM/h, the peak hour criterion is used (the day that contains the busiest hour of the year), a more restrictive criterion to ensure capacity for the planned flight operations within the airfield.

The stands projection is based on the forecast of ATM/h, considering a progressive reduction due to the optimization of ground operations and turnaround times (taking into account the specific performance of the airport).

At Grand Turk Airport, the peak of operations in 2023 occurred between 9:30 and 10:30 on the design day, totaling 6 ATM/h, with 3 arrivals and 3 departures, meaning 3 code A/B stands used simultaneously.

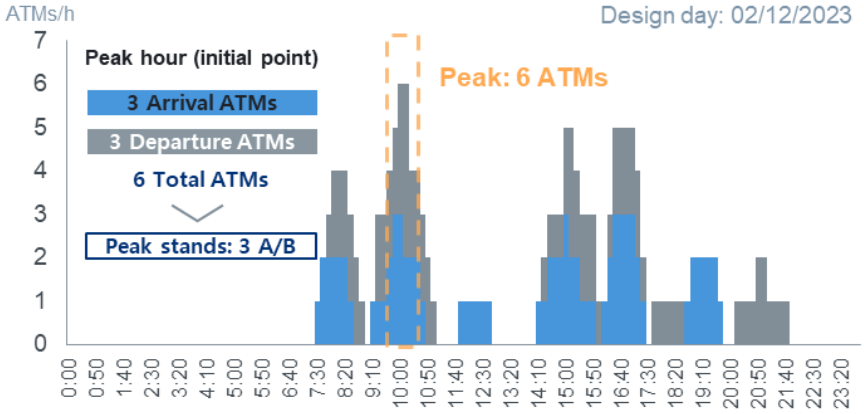


Figure 51. Daily profile of hourly operations at Grand Turk on the design day (2023)

Source: TCIAA, ALG Analysis

Projecting ATM/h using the benchmark, it is anticipated that the peak of commercial operations will reach 13 ATM/h in 2055, with the same peak for total operations (commercial + general aviation) that year. This projection assumes that the rest of the hours on the design day will grow in proportion to the annual operations.

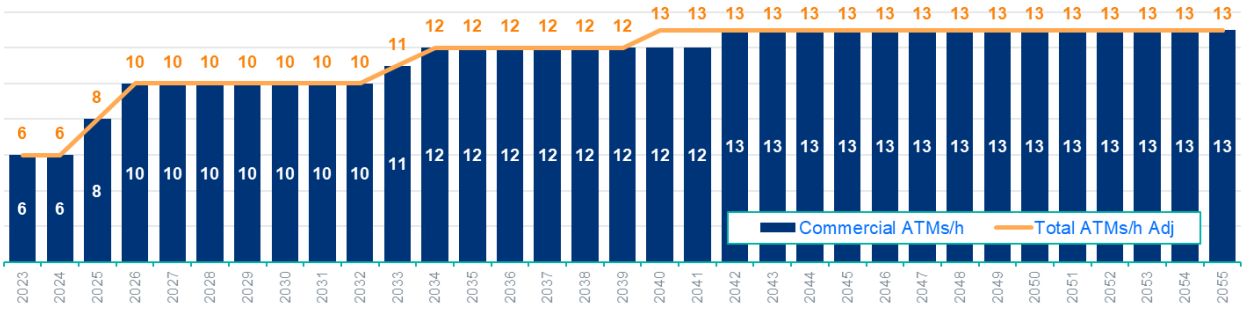


Figure 52. Projection of peak ATM/h at Grand Turk (2023-2055)

Source: TCIAA, ALG Analysis

Based on this projection and the maximum stand demand in 2023 (3 code A/B aircraft), it is estimated that the peak number of stands in 2055 will reach 6 positions, including one code C stand.

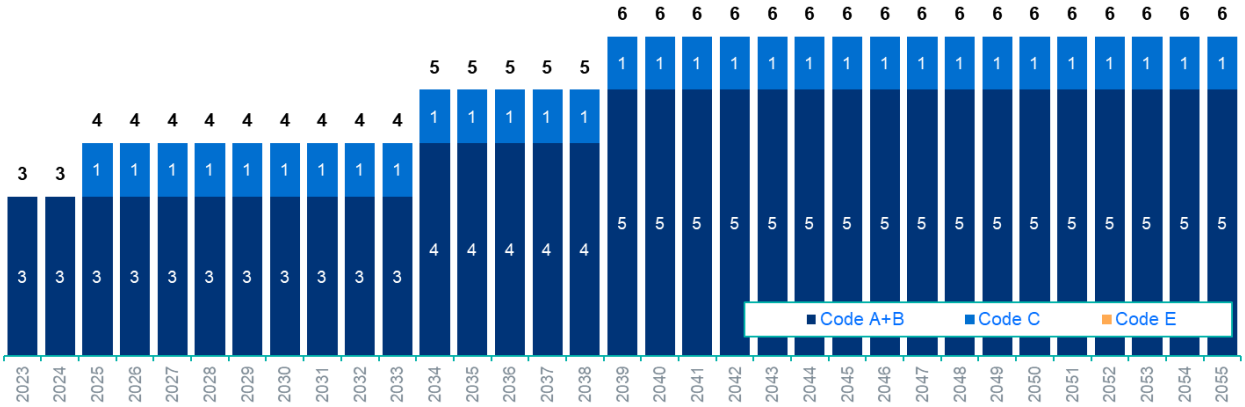


Figure 53. Projection of stand demand at Grand Turk (2023-2055)

Source: TCIAA, ALG Analysis

The design day for PHPs at GDT is the same as the one used for ATMs/h, which shows distinctive peaks throughout the day. Regarding passengers, the design day in 2023 had its PHP peak between 9:30 and 10:30, with a total value of 113 (57 arrivals and 56 departures).

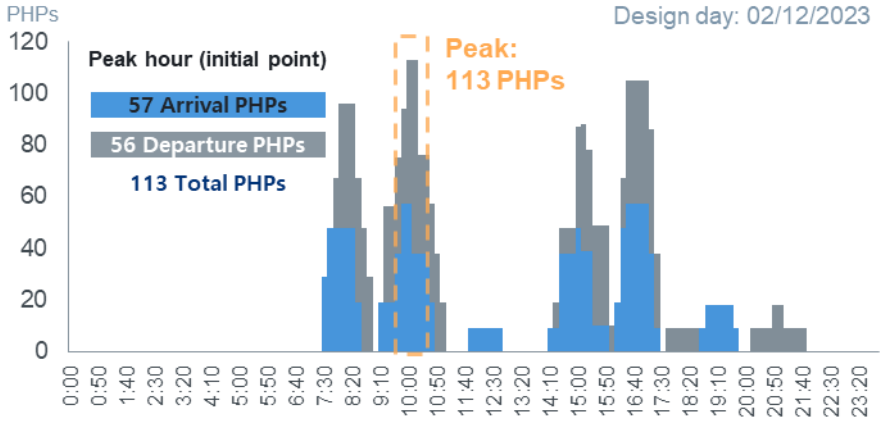


Figure 54. Daily profile of hourly passengers at Grand Turk on the design day (2023)

Source: TCIAA, ALG Analysis

For the projection of PHPs, a benchmark that relates annual traffic to peak hour traffic is also used. It is estimated that by 2055, the total volume will reach 370 PHPs (205 for arrivals and 222 for departures).

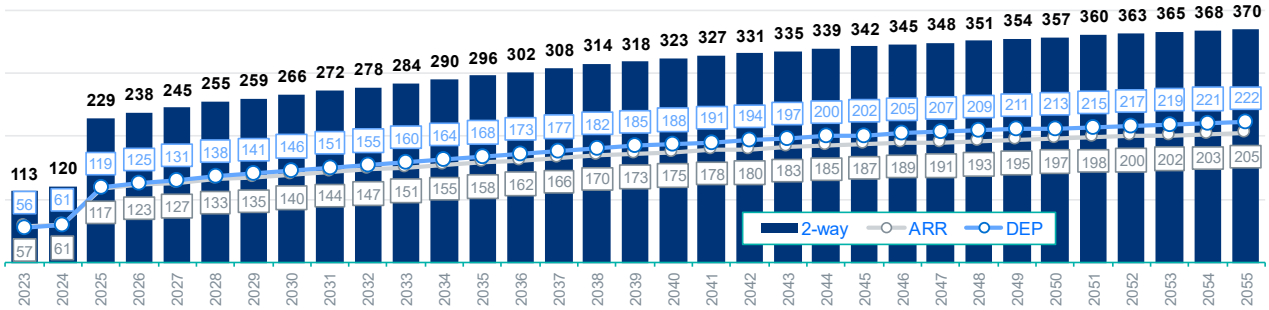


Figure 55. Projection of PHPs during peak hour at Grand Turk (2023-2055)

Source: TCIAA, ALG Analysis

4 Infrastructure requirements and investment plan

The objective of this section is to provide a detailed assessment of the airport's development requirements for each subsystem, in order to obtain the proposed airport development plan for the coming 30 years and its associated investment plan. To this end, this section includes:

- Capacity-demand analysis for each of the main subsystems (airfield, apron, passenger terminal and vehicle parking) to determine the infrastructure needs.
- General review of development alternatives for each of the subsystems requiring them.
- Recommended development plan for each subsystem, as a final alternative, and its investment plan.

4.1 Capacity-demand analysis

The different subsystems to be evaluated for Grand Turk International Airport are presented below. For each subsystem, a different design parameter is selected to perform the corresponding analysis. This approach helps to obtain information on the possible saturation of the subsystem under study and the time horizon to reach saturation.

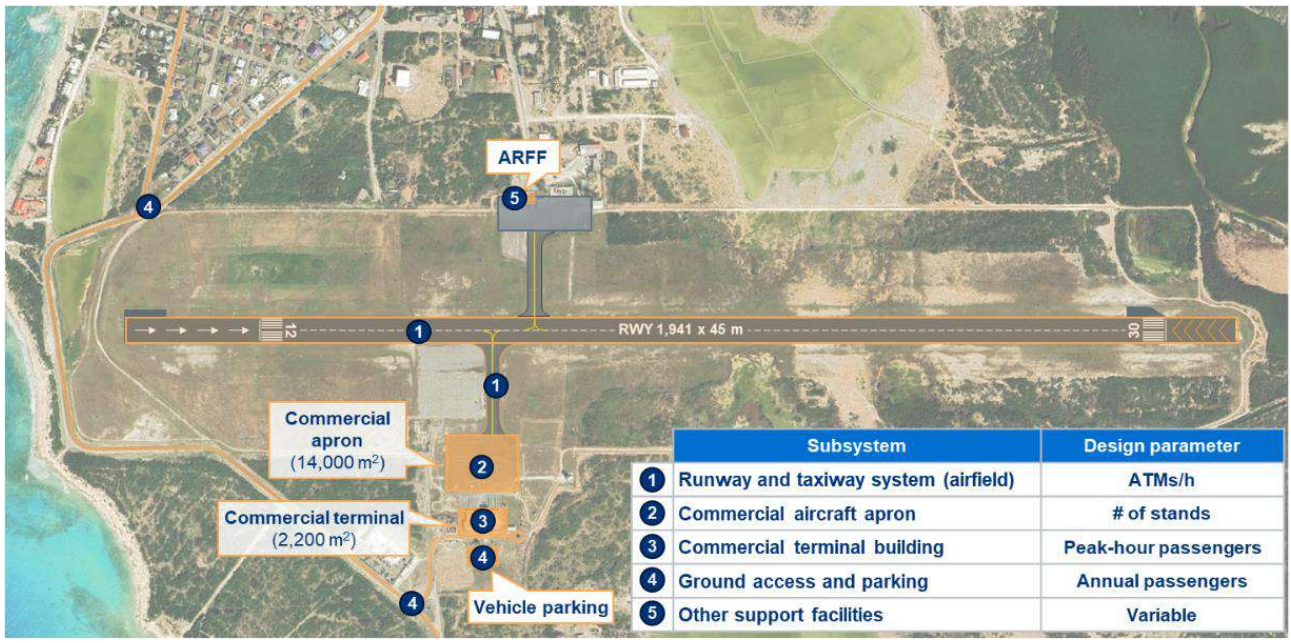


Figure 56. Subsystems to be assessed & design parameters

Source: Google Earth, TCI AIP, ALG Analysis

4.1.1 Airfield

The airfield study is split into two analyses: one is focused on the runway range assessment, and the other on the runway capacity in terms of ATMs per hour.

Regarding the runway range analysis, although the current aircraft type operating at the airport is A/B, the aerodrome category is 4C, and is prepared for the operation of narrowbody aircraft (code C). In addition, as shown in the previous section, the airport is expected to operate international scheduled flights with code C aircraft in the short-term, so it must be double checked that the current runway length provides enough range to flight to/from the expected new destinations, mainly in the US eastern coast. As it can be seen in the map below, even when considering the most restrictive runway (RWY 30, TORA 1,790m), all conventional code C aircraft can reach the potential destinations for Grand Turk, showing that there is no need for further expansion.

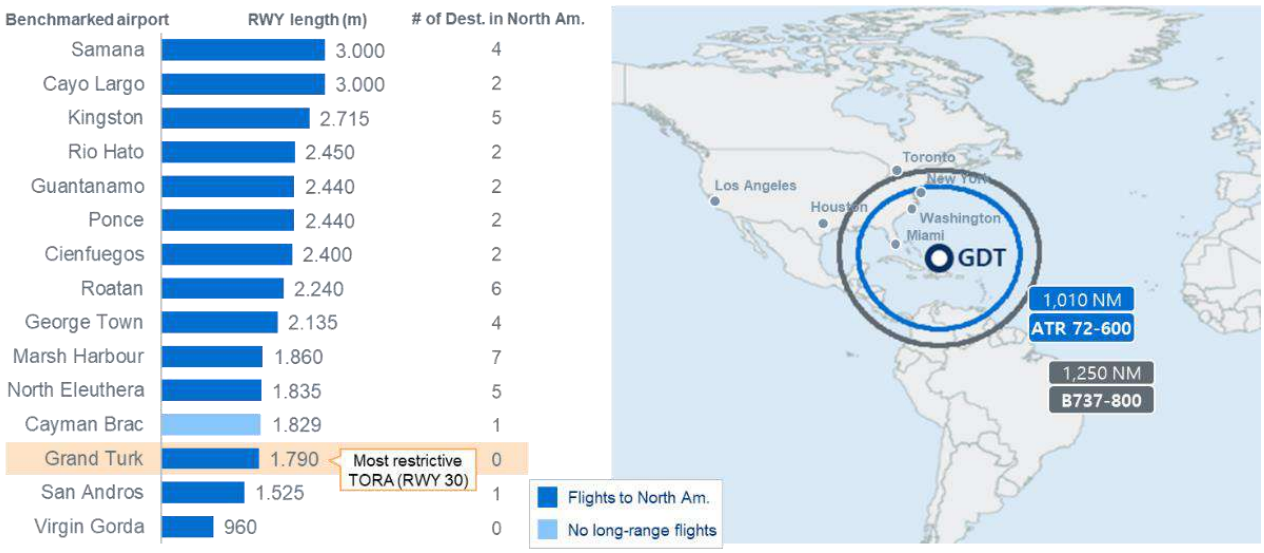


Figure 57. Aircraft range analysis from GDT

Source: Aircraft ACAPs, OAG, ALG Analysis

As it can be seen in the chart above, a 1,941m runway such as the one in GDT (RWY12, preferred runway configuration), is very aligned with other airports in the Caribbean with scheduled flights to the US.

Once it has been checked than a runway expansion is not necessary, it is important to assess if the current airfield capacity is enough to attend the expected traffic demand. In subchapter 2.2.5, an airfield capacity of 17-18 ATMs/h was estimated for Grand Turk Airport. By cross-checking the expected ATMs/h demand forecasted for the next 30 years in previous chapter with the current airfield capacity, it is concluded that there is no need for further expansions, as the existing infrastructure can absorb the expected 13 ATMs/h for 2055.

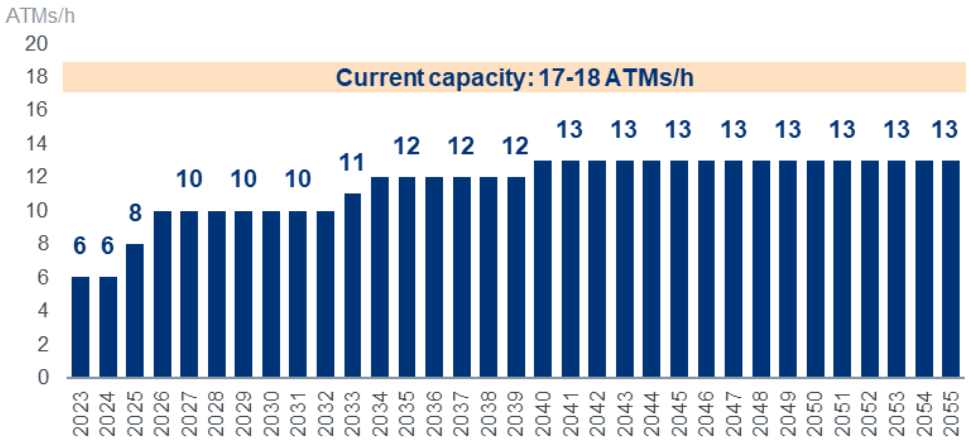


Figure 58. Grand Turk airfield capacity-demand analysis (2023-2055)

Source: ALG Analysis

4.1.2 Apron

The apron capacity-demand analysis is based on the peak demand for aircraft parking positions (stands), in other words, the total number of aircraft on the ground at the airport at any given time. As evaluated in subchapter 2.3, current apron capacity at Grand Turk Airport is 4 A/B stands, considering that two A/B stands could suit one C stand.

Figure 59. Current apron capacity & 2023 maximum occupancy

Source: Google Earth, TCIAA, TCI AIP, ALG Analysis

However, the capacity-demand analysis indicates that the existing apron space will become saturated in the short-term with the arrival of regular code C aircraft. The forecast estimates that GDT will require 6 aircraft stands by 2055 (5 codes A/B + 1 for code C) to handle peak stand demand. The ideal apron expansion would allow all aircraft to perform autonomous turnarounds (no need for pushback tugs), as it currently is the case at Grand Turk Airport.

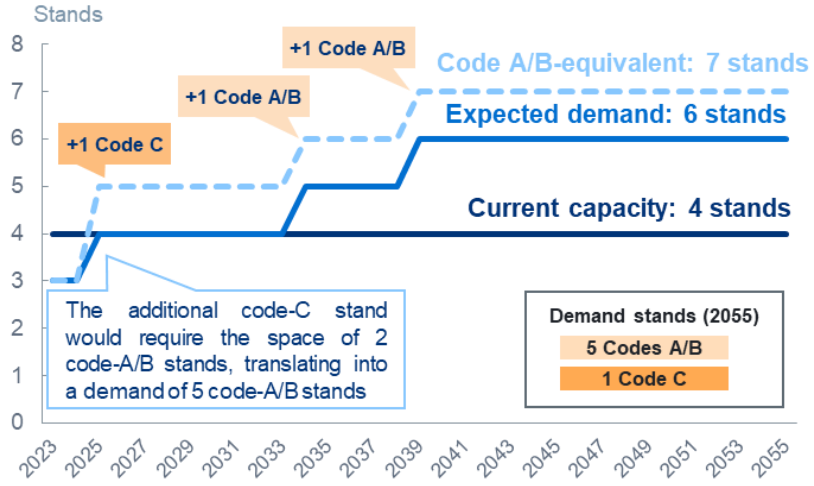


Figure 60. Apron capacity-demand gap analysis (2023-2055)

Source: TCIAA, TCI AIP, ALG Analysis

4.1.3 Terminal building

The capacity-demand analysis of terminal building has been developed following IATA ADRM (Airport Development Reference Manual) 12th edition. This methodology is widely recognised by top stakeholders in the industry and sets requirements in terms of area/pax and queuing times to ensure an Optimum Level of Service for passengers.

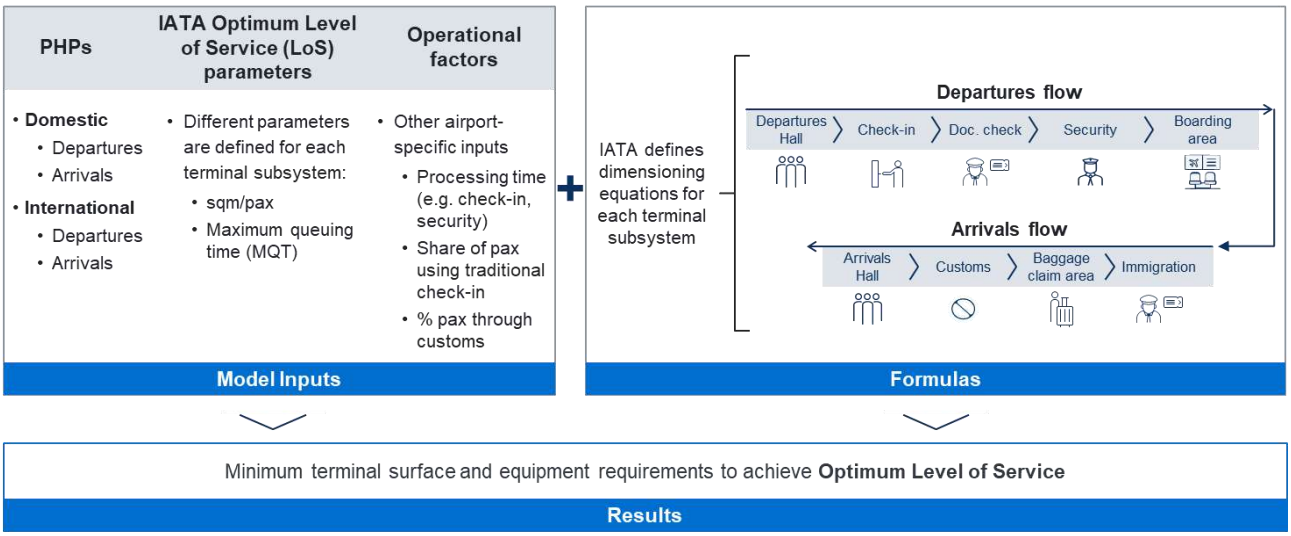


Figure 61. Conceptual scheme for terminal dimensioning IATA ADRM methodology

Source: IATA ADRM 12th Edition, ALG Analysis

Before starting to analyse the design parameters and its adherence to an optimum level of service, it is necessary to input the current features of the passenger terminal building for both arrivals and departures. It is worth mentioning that there are no emigration desks since Turks and Caicos Islands authorities do not check passports for exiting the country, similar to other countries such as the US.

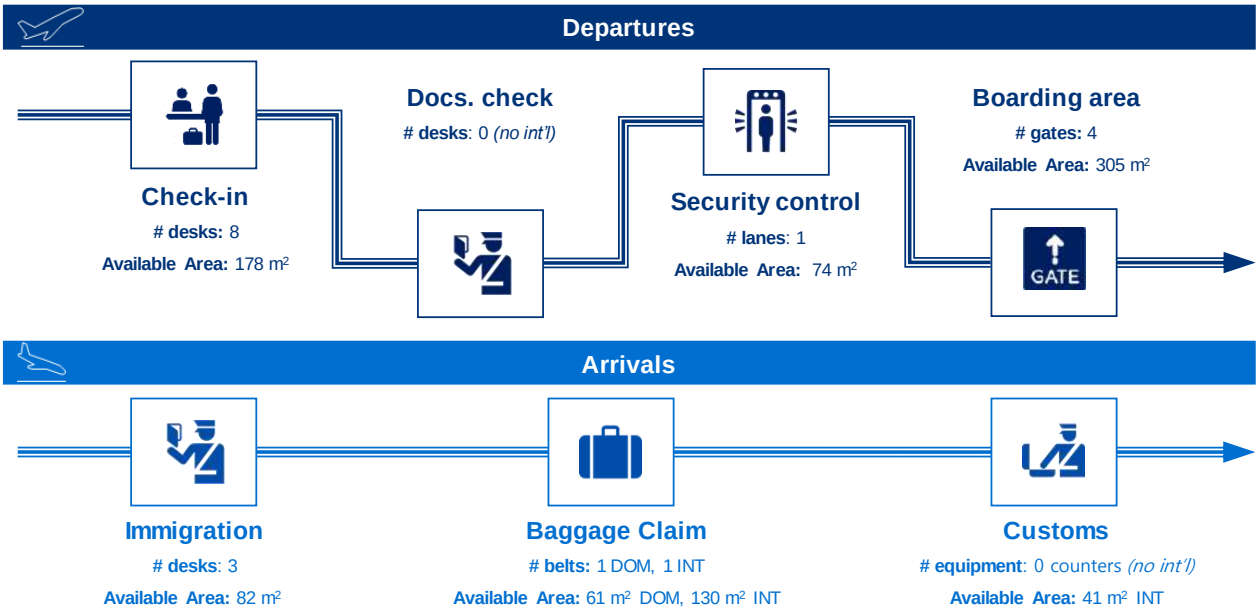


Figure 62. Current passenger flows in the terminal building

Source: TCIAA, IATA ADRM 12th Edition, ALG Analysis

As commented, the main assumption for the model was to ensure compliance with the optimum level of service defined by IATA in its aerodrome design manual and taking into account the start of operations of international flights in the coming years. Apart from the traffic forecast and available areas and equipment, other design parameters used for this analysis are shown below, aligned with the IATA requirements for having an optimum level of service.

Process	Parameter	Value	Source
Check-in	Required surface/person	1.8 m²	IATA ADRM 12th
	Pax arrival distribution during peak hour (% of PHPs in 30 mins)	50%	OAG / ALG
	Process Time *(Economy pax)*	180 s	ALG
	Process Time *(Business pax)*	180 s	ALG
	Maximum Queuing Time – *(Economy)*	20 min	IATA ADRM 12th
	Maximum Queuing Time – *(Business)*	5 min	IATA ADRM 12th
	Ratio of Passengers using Baggage Drop Facilities	15%	ALG *(only N.A. airlines)*
Security	Required queueing surface/person	1.0m²	IATA ADRM 12th
	Processing time	30 s	ALG
	Maximum Queuing Time	10 min	IATA ADRM 12th
Documents check*	Required surface/person	1.0 m²	IATA ADRM 12th
	Maximum Queuing Time	10 min	IATA ADRM 12th
	Processing time	30 s	ALG
Boarding Areas	Surface per Seated Person	1.8 m²	IATA ADRM 12th
	Surface per Standing Person	1.2 m²	IATA ADRM 12th
	Seat ratio (for area calculation)	70%	IATA ADRM 12th

Process	Parameter	Value	Source
Immigration	Pax arrival distribution during peak hour *(% of PHPs in 30 mins)*	50%	OAG / ALG
	Processing time *(s)*	90 s	ALG
	Required surface/person *(sqm)*	1.0 m²	IATA ADRM 12th
	Maximum Queuing Time (min)	10 min	IATA ADRM 12th
Baggage claim area	Required surface/person *(sqm)*	1.5 m²	IATA ADRM 12th
	Ratio of pax collecting bags	95%	ALG *(conservative hypothesis)*
	Avg pax waiting time	25 min	IATA ADRM 12th
	Peak proportion of pax collecting bags simultaneously	65%	ALG
	Claim belt frontage per pax	0.4 m	IATA ADRM 12th
Customs	Required surface/person	1.3 m²	IATA ADRM 12th
	Maximum Queuing Time (min)	10 min	IATA ADRM 12th
	Ratio of pax being inspected	10%	ALG
	Process Time per passenger	30 s	ALG
Arrivals hall	Required surface/person *(sqm)*	2.0 m²	IATA ADRM 12th
	Occupation time *(min)*	15 min	ALG

(*) TCI does not require emigration control, but IATA emigration standards have been used for the documents check stage

Figure 63. Design parameters for the IATA analysis of terminal capacity

Source: IATA ADRM 12th Edition, ALG Analysis

The capacity analysis according to IATA ADRM parameters shows that the main problem of the building is in the areas, which are responsible for most of the saturation in the future, along with security control and boarding gates.

		Available	2023	2030	2035	2045	2055
	Annual Passengers (Mpax)		**0.09**	**0.19**	**0.25**	**0.36**	**0.42**
Equipment	**Check-in - Common**	**8**	**50%**	**113%**	**113%**	**138%**	**138%**
	Required equipment		4	9	9	11	11
	Security Control - Common	**1**	**100%**	**200%**	**200%**	**200%**	**200%**
	Required equipment		1	2	2	2	2
	Gates - Common	**4**	**50%**	**75%**	**125%**	**125%**	**150%**
	Required equipment		2	3	5	5	6
	Immigration - International	**3**	**100%**	**100%**	**100%**	**100%**	**100%**
	Required equipment		3	3	3	3	3
	Baggage Belts - International	**1**	**100%**	**100%**	**100%**	**100%**	**100%**
	Required equipment		1	1	1	1	1
	Baggage Belts - Domestic	**1**	**100%**	**100%**	**100%**	**100%**	**100%**
	Required equipment		1	1	1	1	1
Areas	**Departures & Arrivals Hall**	**152**	**47%**	**111%**	**123%**	**143%**	**154%**
	Required Area (m²)		72	168	187	217	234
	Check-in Area - Common	**178**	**44%**	**178%**	**178%**	**202%**	**202%**
	Required Area (m²)		78	317	317	359	359
	Security Control - Common	**74**	**41%**	**105%**	**119%**	**132%**	**145%**
	Required Area (m²)		30	78	88	98	108
	Boarding Areas - Common	**305**	**21%**	**92%**	**122%**	**169%**	**172%**
	Required Area (m²)		65	280	372	514	527
	Immigration - International	**82**	**N/A**	**116%**	**134%**	**144%**	**154%**
	Required Area (m²)		N/A	95	110	118	126
	Baggage Claim - International	**130**	**N/A**	**69%**	**70%**	**73%**	**76%**
	Required Area (m²)		N/A	89	92	95	98
	Baggage Claim - Domestic	**61**	**57%**	**90%**	**103%**	**116%**	**126%**
	Required Area (m²)		36	55	63	71	77

Figure 64. Terminal areas & equipment capacity-demand analysis

Source: Google Earth, TCIAA, ALG Analysis

As shown before, the existing areas and equipment are sufficient to attend the current demand but will not be enough to provide an adequate level of service to passengers in the short-term, once the operation of international flights starts.

4.1.4 Vehicle parking

The parking facility has approximately 3,250 m^2 of total surface, with a single drop-off and pick-up curbside for taxis, an area of ~2,420 m^2 for private and rental cars, and 15 parking lots reserved for employees.

A ratio of 100-150 spaces per Mpax has been selected based on benchmark ratio for <1 Mpax airports. As projected, current capacity satisfies the present demand and is also sufficient for the long-term requirements, since almost a 230 spaces/Mpax ratio is expected by 2055 with the current car parking capacity.

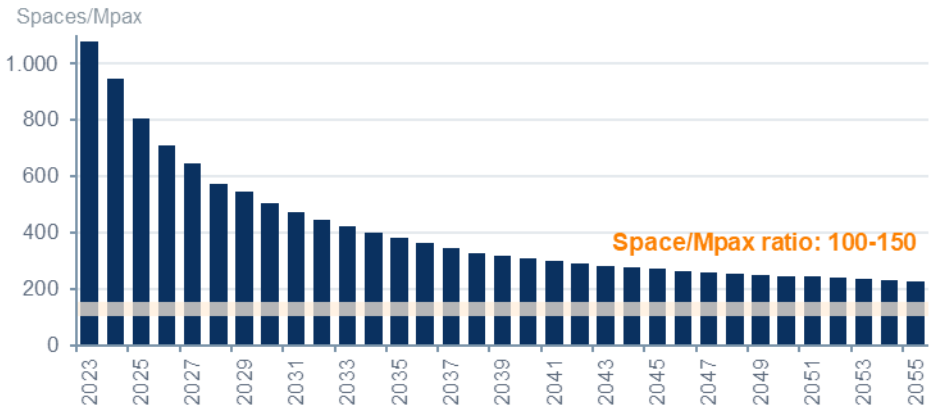


Figure 65. Spaces/Mpax ratio evolution

Source: Google Earth, TCI AIP, ALG Analysis

4.2 Airport development plan

For carrying out the development for the airport, two analyses were considered: the capacity-demand analysis shown in the previous section (see 4.1), and the current situation of the infrastructure (see chapter 2), along with the strategic and market vision of the airport.

By taking this into consideration, it can be concluded that:

- The airfield does not require any further expansion since the current infrastructure can accommodate the future demand. However, some works should be performed to comply with ICAO requirements for a 4C category aerodrome.
- The current commercial apron will be insufficient in the short/mid-term with the regular operation of code C aircraft. The airport needs 3 more code A/B equivalent stands to meet the future demand. This equivalence will let 5 code A/B aircrafts and one code C aircraft to simultaneously stand on the apron.
- The terminal will require expansions due to some equipment and areas congestion and saturation. According to the analyses, ~700 m^2 will be needed additionally, reaching a total area of 2,900 m^2.
- The parking area and accesses will not require future expansions.
- The development of a new ARFF station is required due to the bad conditions of the existing one.

4.2.1 Airfield development

While the capacity-demand analysis concluded that the airfield will not require expansions to serve future demand, it does require some work to ensure compliance with ICAO regulations (see section 2.2.3 for details of airfield compliance).

To solve the existing irregularities, it is recommended to perform and orographic assessment to determine the threshold 30 RESA's degree of non-compliance, and, if applicable, level the terrain to comply with the requirement of lower slope than 5%. Besides, the taxiway's width should be widened to 25 meters, resulting in a 15 meters-wide taxiway with shoulders.

	Annex 14 ICAO	Works to be performed
RWY width & shoulders	Width 45m without shoulders for code 4C (shoulders required for runway where code letter is D, E or F)	-
RWY strip length RWY strip width	60m before THR and beyond the end of RWY for code 4; 140m on each side of RWY centerline for non-instrument code 4	-
RESAs length RESAs width	90m from the end of the strip for code 4; at least twice of the RWY width, with longitudinal slopes <5%	**Perform an orographic study to determine the degree of non-compliance and, if applicable, level the RESA's terrain to comply with a <5% slope**
TWY width & shoulders	Width 15m and 25m with shoulders for code 4C	**Widen the taxiway for a total width of 25m, resulting in a 15m-wide taxiway with shoulders**
Min distances	93 m between RWY & TWY centerlines for Non-instrument code 4C	-
Holding bays	75m from the RWY holding position to the RWY centerline for Non-precision code 4	-

Figure 66. ICAO compliance effects on airport capacity

Source: IATA ADRM 12th Edition, ALG Analysis

4.2.2 Apron development

The capacity-demand analysis showed that more stands will be required to serve future demand. There are 4 code A/B stands, and there will be needed another 3 code A/B equivalent stands, reaching a total of 7 equivalent A/B stands. As previously commented, two code-B stands can accommodate one code-C aircraft, giving greater flexibility to the airport operation in case higher code-C stands are punctually required.

To meet expected peak hour demand over the next 30 years, it will be necessary to expand the existing commercial apron to the east and west by a total of 11,600 m^2. This expansion is intended to be performed in two phases.

The code-C stands have been designed for a B737/A320 aircraft, although it is expected that the international operation at the airport will be mainly with smaller code Cs, such as an ATR or Embraer. Moreover, all stands have been designed so that aircraft can operate autonomously, without the need for pushback.

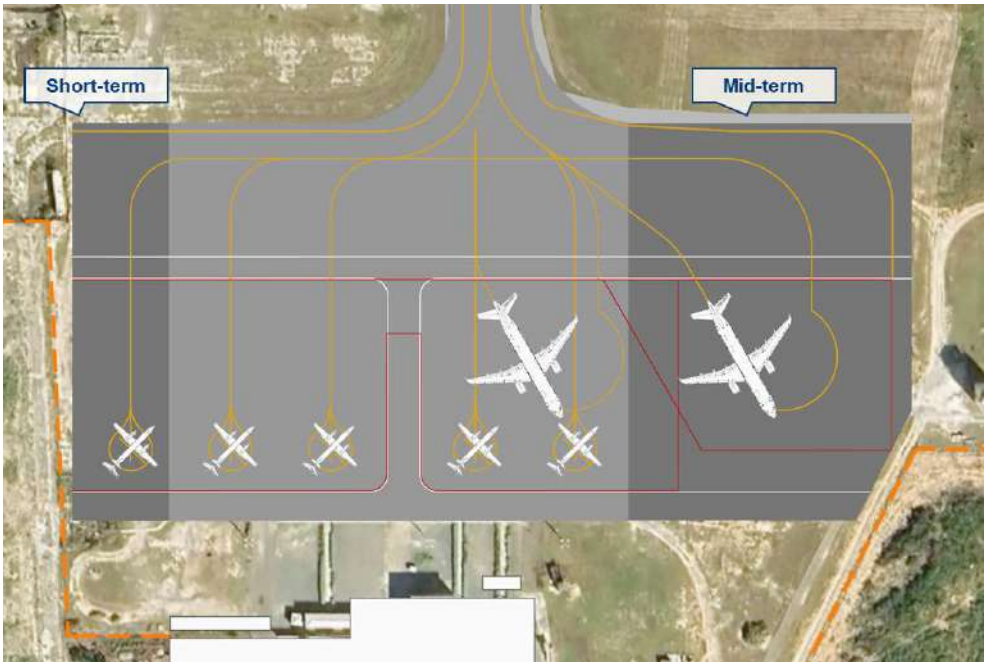


Figure 67. Future commercial apron development

Source: Google Earth, TCIAA, ALG Analysis

4.2.3 Terminal building development

The terminal building is the subsystem that requires more expansion works to serve the expected future demand. According to the capacity-demand analysis, an expansion of about ~700 m² is required, with a particular need to expand the areas of the departure/arrival hall, check-in area, security control, boarding gates, immigration, and domestic baggage claim areas. As well, it will be needed additional security control equipment, and more boarding gates given their imminent or, in some cases, existing saturation.

The expansion should be performed to the west side, maintaining the international arrivals flow as it is today. The domestic arrivals area remains practically unchanged too, while all the areas and equipment of the previous paragraph will be enhanced, attending the expected traffic demand with and adequate level of service.

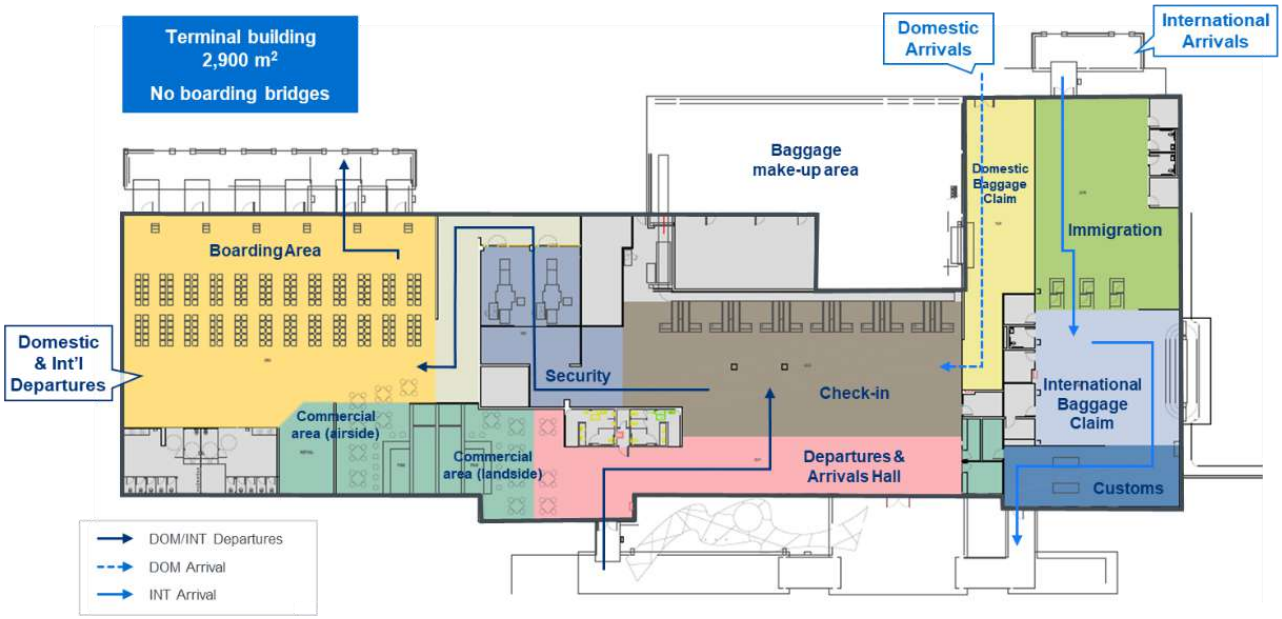


Figure 68. Passenger terminal development

Source: TCIAA, ALG Analysis

As it can be seen below, this expansion to 2,900 m² will place the m²/Mpax ratio by 2055 within the optimal design ratio range for this type of airport.

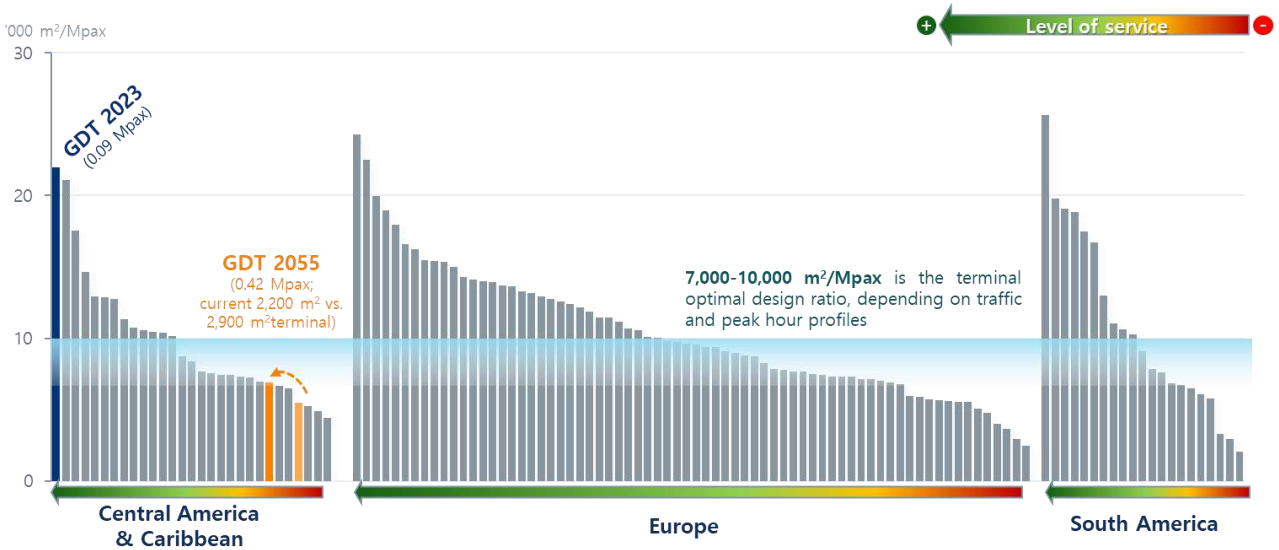


Figure 69. Terminal Building Area vs. Passenger Traffic Benchmark

Source: TCIAA, Satellite images, airport websites, CAPA, FlightGlobal, ALG Analysis

4.2.4 Development of vehicle parking areas

As it was explained in the previous section, current car parking capacity satisfies the present demand and is also sufficient for the long-term requirements, since almost a 230 spaces/Mpax ratio is expected by 2055.

However, if the traffic experiences an unexpected growth and/or increase in capacity is needed, there is enough space both sides of the current public car parking to expand it. This expansion could be relevant if additional developments such as hotels or a shopping mall are performed nearby.

4.2.5 Development of other airport facilities

Regarding the other airport facilities, there is still need for the refurbishment of the ~80 m^2 ARFF station on the opposite side of the runway from the commercial apron, due to its current condition. Furthermore, to accommodate international passengers, the perimetral fence should be upgraded, as other minor adjustments such as the ATC tower or hangars.

4.2.6 Environmental development plan

The key for a successful environmental development of Grand Turk is considering external factors beyond the airport perimeter. E&S management programs should begin immediately, particularly considering coastal management outside the perimeter fence.

Here below, the main environmental-related proposed developments are presented:

1. Improvement of the water cycle from supply to water recirculation.
2. Implementation of renewable energy infrastructure (ex. Photovoltaic plant for self-consumption in the terminal roof/car park).
3. Designation of a waste and hazardous materials management center.
4. Create and incentivize coastal conservation projects with other Government departments.
5. Incorporate materials resistant to salt erosion in existing infrastructure refurbishments and new developments to improve the sustainability of buildings.

Figure 70. Main environmental-related proposed developments

Source: Google Earth, TCIAA, ALG Analysis

4.3 Investment plan

The purpose of the investment plan is to set out the costs associated with each stage of recommended development above by subsystem, in a chronological context. To do this, each proposed development is integrated into an overall development plan, the cost of each proposed action is calculated, and finally ordered chronologically from today to 2055. In addition, a projection of major maintenance costs (RepEx, replacement

costs) is made for each subsystem, both for the existing infrastructure and for the proposed new one, to obtain the total of annual long-term investments.

4.3.1 General development plan

Each subsystem development plan has been detailed in the last subchapter. In summary, the main works to be performed are the commercial apron expansion, the passenger terminal expansion, the taxiway widening, levelling the RESA and the ARFF station completion:

1. Commercial apron expansion: +11,600 m2 to accommodate simultaneously 5 code-B and 1 code-C aircraft (autonomous stands).
2. Passenger terminal expansion: +700 m^2 (reaching 2,900 m^2) and reconfiguration of internal layout to guarantee an optimum level of service in all terminal subsystems.
3. Taxiway expansion: widening the taxiway to 25m (15m-wide taxiway with shoulders) to comply with ICAO regulations for code-C aircraft.
4. RESA leveling the RESA's terrain to comply with ICAO's required <5% slope (if necessary, after performing an orographic study).
5. ARFF station renewal: refurbishment of the existing ARFF station.

Figure 71. Infrastructure development plan

Source: Google Earth, TCIAA, TCI AIP, ALG Analysis

4.3.2 Expansion CapEx forecast

The approximate cost of each action to be carried out has been calculated, based on estimated dimensions (as detailed above in the development proposal) and unit costs from similar projects or, if applicable, benchmarks with historical data from various projects in the region adjusted for inflation and geographical area.

System	Item	USD 2022	Unit	Total surface	Total Cost[1] (MUSD)
Airfield	RESA leveling	50	USD/sqm	3,150	0.2
	TWY expansion	550	USD/sqm	520	0.3
Apron	Commercial Apron expansion	760	USD/sqm	11,600	8.8
	Commercial Apron lightning	110,600	USD/unit	2	0.2
Terminal	Terminal expansion	5,000	USD/sqm	700	3.5
	Terminal reconfiguration	1,500	USD/sqm	2,200	3.3
	Terminal equipment - Security RX	125,000	USD/unit	1	0.1
Support and E&S Facilities	ARFF Station	770	USD/sqm	100	<0.1
	Waste water treatment plant	250,000	USD/unit	1	0.3
	Waste storage facility	55,000	USD/unit	1	<0.1
	Hydrocarbon separation plant	182,000	USD/unit	1	0.2
	Power generator	430,000	USD/unit	1	0.4
	Other additional costs[2]	-	-	-	1.8
				Total Expansion CapEx	19.2

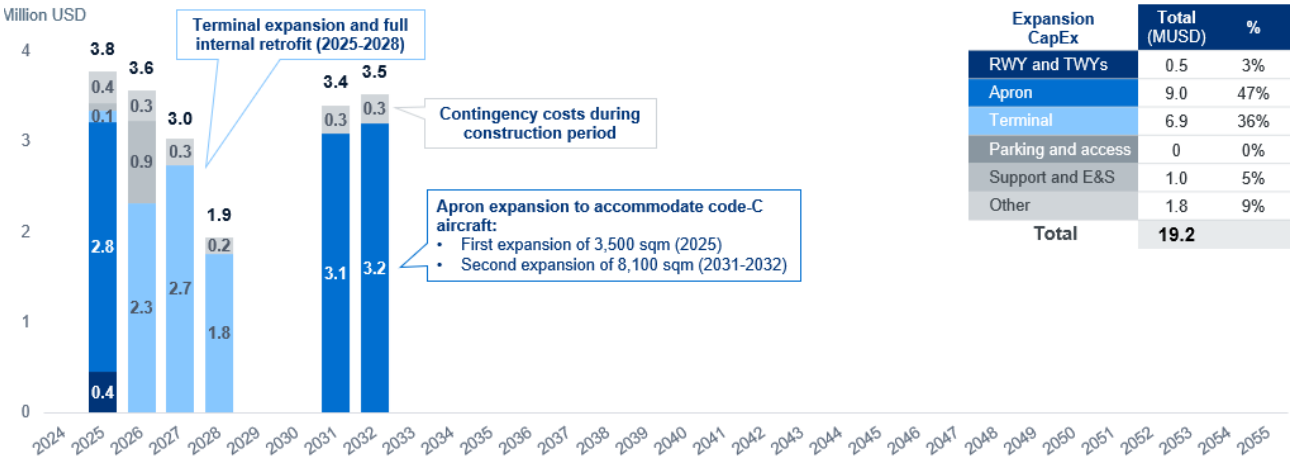
[1] Total Cost updated in real values including additional contingencies
[2] Contingency costs (5%), Preliminary costs (5%)

Figure 72. Estimated CapEx for Grand Turk development actions

Source: ALG Analysis

As presented above, a 10% additional cost for contingency and preliminary costs (5% each) has been considered. The total estimated expansion CapEx reaches 19.2 MUSD (real values 2024). This amount does not include maintenance CapEx costs, which are detailed in the next subchapter.

As it can be seen in the figure below, all expansion works are scheduled to be completed entirely in the short/mid-term, between 2025 and 2032, to allow the operation of international flights at the airport. The largest investments are allocated to the apron, with ~9 MUSD designated for expanding the commercial apron to accommodate 1 code-C and 5 code-B aircraft simultaneously (two phases expansion). Other significant investment corresponds to the terminal, where 3.5 MUSD are destined for the expansion and additional ~3 MUSD are projected for an internal retrofit to be able to accommodate the expected traffic demand.



Expansion CapEx	Total (MUSD)	%
RWY and TWYs	0.5	3%
Apron	9.0	47%
Terminal	6.9	36%
Parking and access	0	0%
Support and E&S	1.0	5%
Other	1.8	9%
Total	19.2	

Figure 73. Required investment projection for new infrastructure development (CapEx)

Source: ALG Analysis

4.3.3 Maintenance CapEx forecast

On the other hand, the major maintenance investment plan is based on the life cycle of each existing and future infrastructure, and depends on the type of facilities, materials used to be built, year of construction or historical repair data, among others. It is important to emphasize that major maintenance does not include

day-to-day repair costs, as these are operational costs; major maintenance only includes periodic and major maintenance costs. Unit costs are also calculated using data from similar projects and neighbouring countries adjusted for inflation and geographic area. Maintenance CapEx considers a percentage of reinvestment by the end of the lifecycle of each asset.

Item	USD 2022	Unit	Life cycle (year)	% Reinvest. /cycle
RWY and TWYs				
RWY repavement	88	USD/sqm	30	80%
TWY A repavement	80	USD/sqm	40	80%
TWY B repavement	80	USD/sqm	30	80%
RESA leveling repavement	100	USD/sqm	30	100%
TWY B expansion repavement	100	USD/sqm	30	100%
Apron				
South commercial apron repavement	114	USD/sqm	22	60%
Non-commercial Apron repavement	114	USD/sqm	40	60%
Commercial apron repavement	60	USD/sqm	20	60%
Commercial Apron Lighting - Replacement	54	USD/unit	20	60%
Terminal				
Terminal reconfiguration	1,500	USD/sqm	100	100%
Terminal equipment	245	USD/sqm	100	100%
Terminal equipment - Security RX	125,000	USD/unit	10	100%

Item	USD 2022	Unit	Life cycle (year)	% Reinvest. /cycle
Parking and access				
Parking repavement	80	USD/sqm	25	100%
Road repavement	80	USD/sqm	25	100%
Support and E&S facilities				
Perimeter road repavement	16	USD/sqm	15	20%
Perimeter fence	400	USD/m	15	100%
ATC Tower	1,450	USD/sqm	23	50%
ARFF Station	37	USD/sqm	15	10%
RFFS Trucks	1,090,000	USD/unit	15	100%
Waste water treatment plant	1,000,000	USD/unit	30	100%
Waste storage	55,000	USD/unit	30	100%
Hydrocarbon separation plant	182,000	USD/unit	30	100%
Power station	1,720,000	USD/unit	30	100%

Figure 74. Unit costs for Maintenance CapEx estimation

Source: ALG Analysis

As the previous CapEx investment projections, the following figure shows the major maintenance investment plan for the period 2024 to 2055.

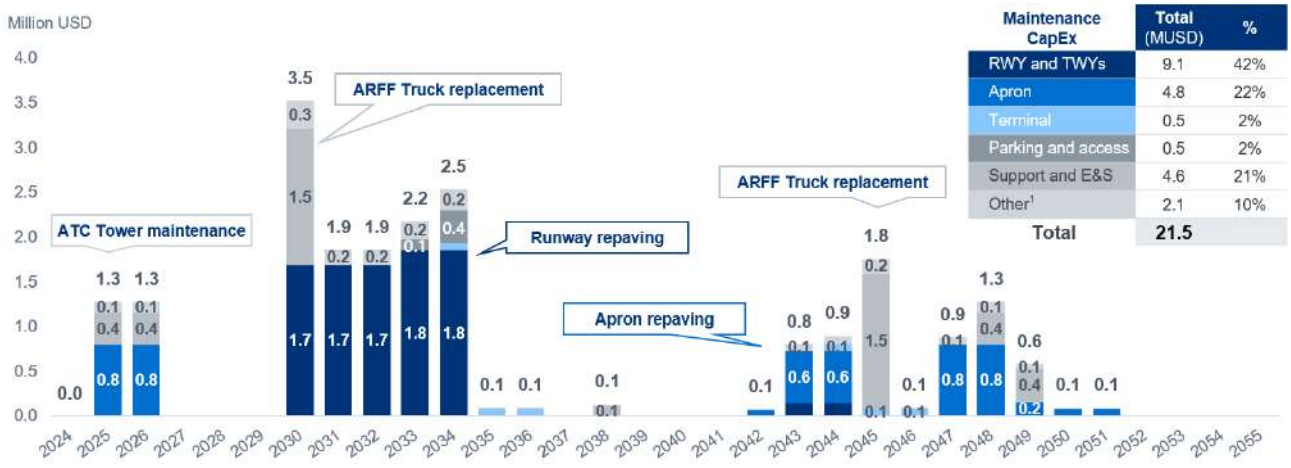


Figure 75. Maintenance CapEx plan (2024-2055)

Source: ALG Analysis

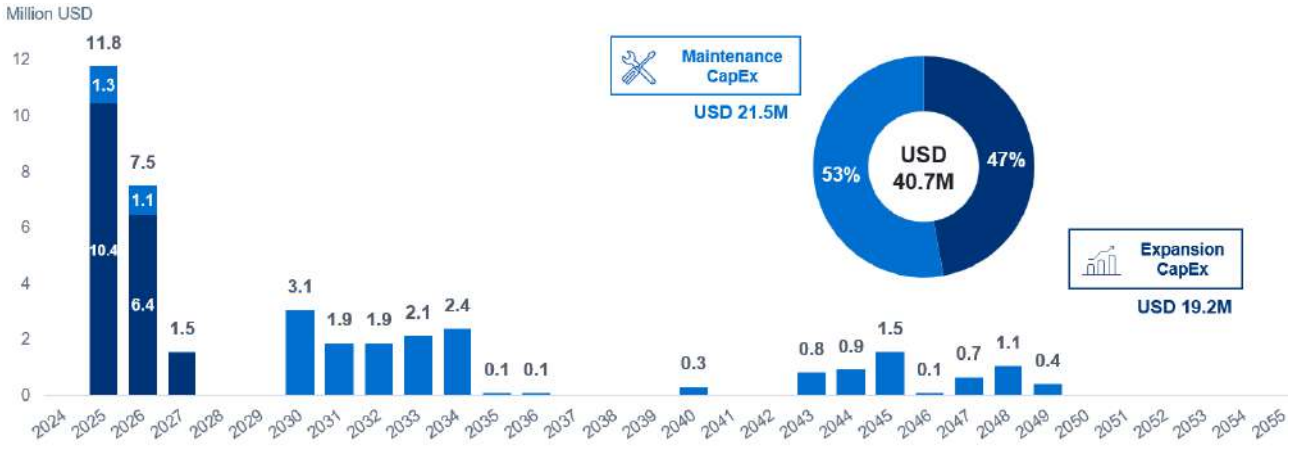
Major maintenance cycles are imminent in the short-term (2025-2027), requiring an investment of ~2.6 MUSD, followed by a medium-term cycle (2030-2034) of ~12 MUSD. In the long-term, between 2042 and 2051, additional ~7 MUSD would be required. The largest expenditure of the RepEx is demanded by the airfield, with RWY repavement works to undergo between 2030-2034 (~9 MUSD). The support facilities are also expected to contribute significantly to the maintenance CapEx, including ~1.5 MUSD designated for ATC Tower maintenance works in the short-term, and additional 2 MUSD for the replacement of the RFFS trucks, expected by 2030 and 2045. The existing apron would undergo major maintenance between 2025-2026 (1.6 MUSD), followed by a 2nd cycle (including the expanded area) between 2042 and 2048 (almost 6 MUSD).

4.3.4 Airport investment plan

In conclusion, as shown in figure below, it is anticipated that a total of 40.7 MUSD will be required between 2024 and 2055 at JAGS McCartney International Airport to:

I. adapt the infrastructure to the expected growth in demand to provide an adequate level of service for airport users (19.2 MUSD for expansion CapEx), and

II. maintain the infrastructure in optimal condition to ensure adequate levels of safety and passenger satisfaction (21.5 MUSD for maintenance CapEx).



	2024-2025	2026-2029	2030-2055	Total 2024-2055
Expansion CapEx	3.8 MUSD	8.5 MUSD	6.9 MUSD	19.2 MUSD
Maintenance CapEx	1.3 MUSD	1.3 MUSD	18.9 MUSD	21.5 MUSD
Total	**5.1 MUSD**	**9.8 MUSD**	**25.8 MUSD**	**40.7 MUSD**

Figure 76. Grand Turk Airport investment plan (2024-2055)

Source: ALG Analysis

5 Long-term development plan and land reservation

This Master Plan is focused on the development of Grand Turk Airport for the next 30 years. Thus, this document contains all needed development proposals to process, with an adequate level of service, the forecasted air traffic at the end of this period, which amounts up to 424,000 passengers in 2055.

However, a key issue when developing a Master Plan is to assess the potential development of the airport beyond the studied period. This is important with the objective to ensure land reservation within the airport perimeter in case that it is required in the future for further areas or facilities developments, avoiding less relevant constructions be undertaken on those terrains.

In this sense, as shown in earlier chapters, the investment plan for the next 30 years mainly contemplates the expansion of the commercial apron, the terminal building, the taxiway, as well as RESA's levelling and development of a new ARFF facility.

In the very long-term, if it is required due to higher traffic growth, the expansion of the airfield, the commercial apron, and the terminal building could be performed with no major issues, since the current airport layout allows for further developments.

For instance, current airfield capacity is estimated at 17 ATMs/h and may be not enough in the future. If there is a need to increase capacity, given the airport conditions, a new partial parallel taxiway from the commercial apron to the RWY 12 threshold would substantially reduce runway occupancy times for departures, letting the ATC tower coordinate simultaneous aircraft taxi movements, thus increasing airport capacity. Additionally, the construction of a holding bay on either threshold would also help to optimize the aircraft sequencing and increase airfield capacity. Finally, although it would not be necessary until reaching very high volumes of traffic (at least x10 the expected demand for 2055), the completion of the parallel taxiway to RWY 30 threshold would substantially increase capacity by helping landing aircraft.

Apart from this potential maximum development of the airfield, as the traffic increases, it will be necessary to expand the commercial apron and the terminal building. In the case of the apron, no major problems would arise to increase the capacity to the west, with the possibility of more than doubling current capacity. Regarding the terminal, there are not currently any obstacles or ongoing works that may undermine the expansion to the west or the east, depending on the saturation of each terminal subsystem. Finally, in the case of the parking lots, the passengers' parking could be expanded to both the west and east side, whereas the employees' parking should be relocated if the terminal expands.

The following figure shows a high-level proposal for this potential very long-term airport development, also showing the land that should be set aside for future developments, ensuring that it has no impact on the natural growth of Grand Turk Airport.

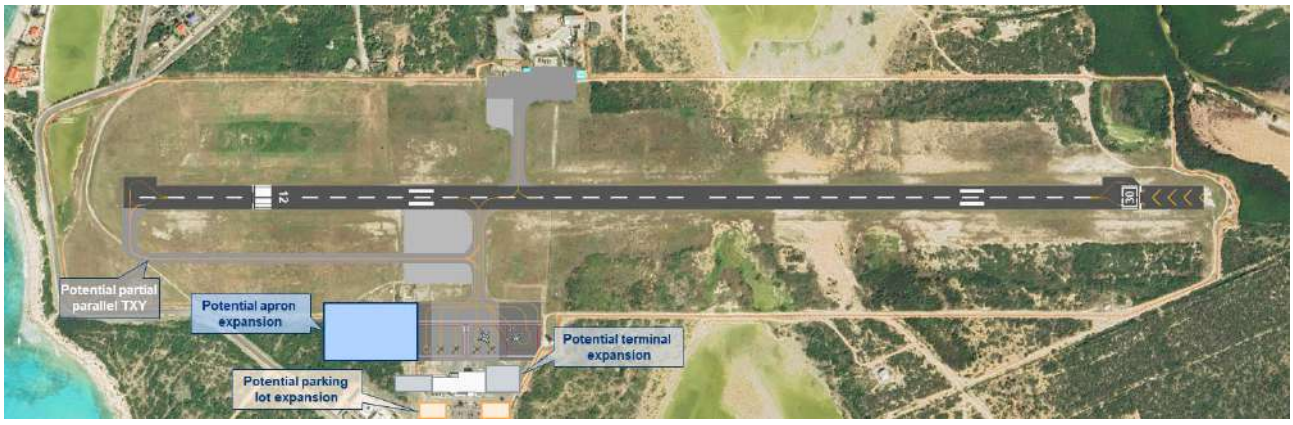


Figure 77. Future potential developments and land reservation

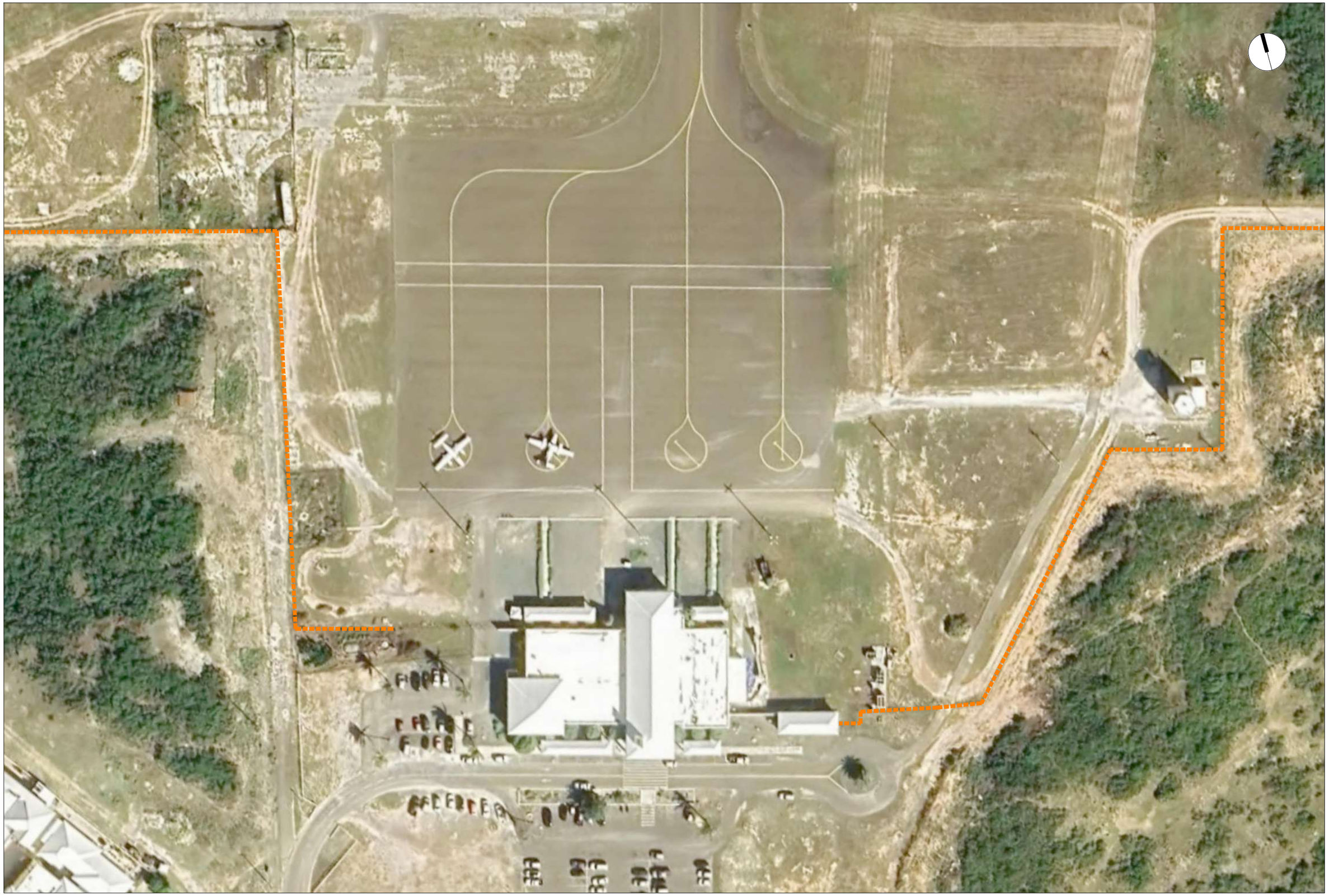
Source: ALG Analysis

6 Drawings

This chapter contains the main drawings carried out during the development of this Conceptual Master Plan. The following drawings are included:

- Airport general layout – Current situation
- Terminal area detail – Current situation
- Airport general layout – Development proposal
- Terminal area detail – Development proposal
- Terminal building layout – Development proposal

CLIENT:	CONSULTANT:	PROJECT:	SCALE:	DATE:	DRAWING NAME:	DRAWING NUMBER:
TCIAA TURKS AND CAICOS ISLANDS AIRPORTS AUTHORITY	ALG	STRATEGIC MASTER PLAN FOR THE TCIAA	1: 7.500 0 50 100m ORIGINAL A3 GRAPH	AUGUST 2024	GRAND TURK AIRPORT CURRENT SITUATION GENERAL LAYOUT	2.1.1 PAGE 1 OF 1



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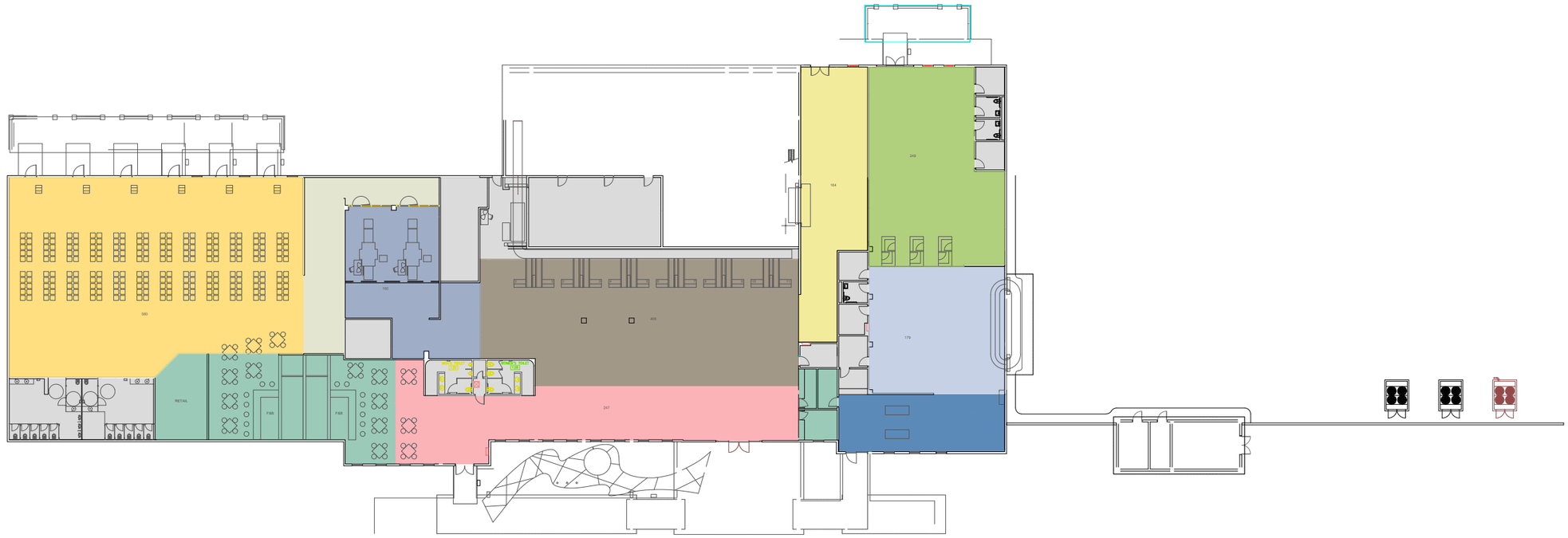
TCIAA TURKS AND CAICOS ISLANDS AIRPORTS AUTHORITY	ALG	STRATEGIC MASTER PLAN FOR THE TCIAA	1: 1.000 ORIGINAL A3 · 0 25 50m GRAPH	AUGUST 2024	GRAND TURK AIRPORT CURRENT SITUATION TERMINAL AREA	2.1.2 PAGE 1 OF 1

CLIENT:	CONSULTANT:	PROJECT:	SCALE:	DATE:	DRAWING NAME:	DRAWING NUMBER:
TCIAA TURKS AND CAICOS ISLANDS AIRPORTS AUTHORITY	ALG	STRATEGIC MASTER PLAN FOR THE TCIAA	1: 7.500 ORIGINAL A3 — 0 50 100m GRAPH	AUGUST 2024	GRAND TURK AIRPORT DEVELOPMENT PROPOSAL GENERAL LAYOUT	2.2.1 PAGE 1 OF 1

CLIENT:	CONSULTANT:	PROJECT:	SCALE:	DATE:	DRAWING NAME:	DRAWING NUMBER:
TCIAA TURKS AND CAICOS ISLANDS AIRPORTS AUTHORITY	ALG	STRATEGIC MASTER PLAN FOR THE TCIAA	1: 1.000 ORIGINAL A3 0 25 50m GRAPH	AUGUST 2024	GRAND TURK AIRPORT DEVELOPMENT PROPOSAL TERMINAL AREA	2.2.2 PAGE 1 OF 1



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