EXECUTIVE SUMMARY

URUGUAIANA AIRPORT
RUBEM BERTA
SBUG/URG

July/2020

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INTRODUCTION

The Infrastructure Ministry published, in the Union Official Journal, in the Edition Number 52, on March 18th, 2019, the Public Call Notice 2/2019, with the main goal to select projects, surveys, investigation and technical studies to subsidize the modelling of the concessions for the expansion, exploitation, and maintenance of the following airports:

South Cluster

Curitiba/PR – Afonso Pena;
Foz do Iguaçu/PR – Cataratas;
Navegantes/SC – Ministro Victor Konder;
Londrina/PR – Governador José Richa;
Joinville/SC – Lauro Carneiro de Loyola;
Bacacheri/PR;
Pelotas/RS;
Uruguaiana/RS – Rubem Berta;
Bagé/RS Comandante Gustavo Kraemer.

North Cluster

Manaus/AM – Eduardo Gomes;
Porto Velho/RO – Governador Jorge Teixeira de Oliveira;
Rio Branco/AC – Plácido de Castro;
Cruzeiro do Sul/AC;
Tabatinga/AM;
Tefé/AM;
Boa Vista/RR – Atlas Brasil Cantanhede.

Central Cluster

Goiânia/GO – Santa Genoveva;
São Luís/MA – Marechal Cunha Machado;
Teresina/PI – Senador Petrônio Portella;
Palmas/TO – Brigadeiro Lysias Rodrigues;
Petrolina/PE – Senador Nilo Coelho;
Imperatriz/MA – Prefeito Renato Moreira.

According to the Public Call Notice 2/2019, the Grupo de Consultores em Aeroportos (GCA) presented the following reports for each airport: **Market Reports, Engineering Studies, Environmental Studies and Economic and Financial Evaluation**. Furthermore, it presented a complementary Economic Financial and Evaluation Report, for each Cluster, which aimed the economic financial feasibility assessment of the airports that form the Cluster.

The purpose of the Executive Summary is to present the main arguments, information and conclusions of each one of the Uruguaiana Airport/RS Rubem Berta – SBUG/URG report. For a better understanding of the studies, it is recommended the reading of the reports.

1 MARKET REPORT

This section presents a Summary of the Market Report for the **Uruguaiana Airport/RS - Rubem Berta** (IATA URG or ICAO SBUG), which processed 22 thousand passengers in 0.6 thousand operations in 2018[1].

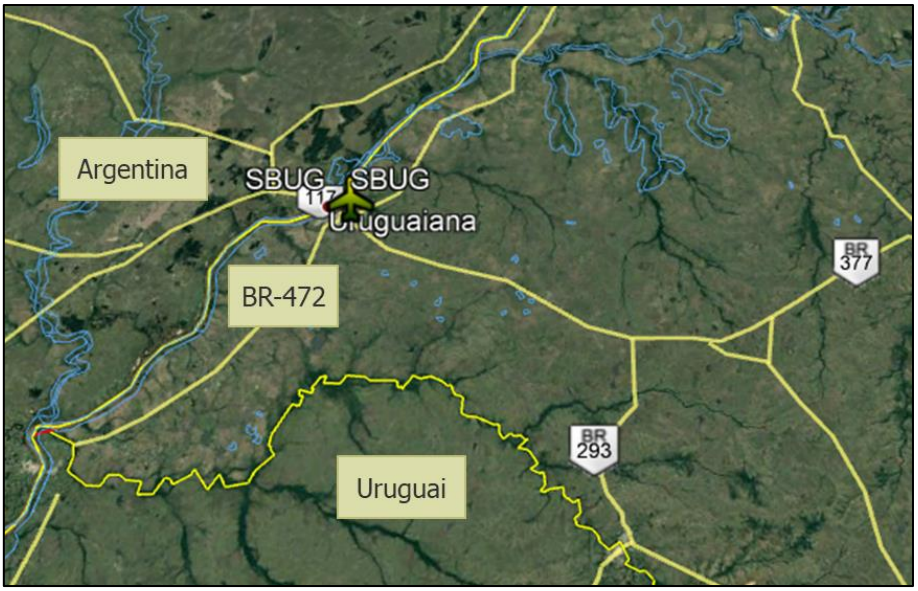
1.1 Overview

The Airport lies in the municipality of Uruguaiana, near the Missões Region and on the banks of the Uruguay river, at the river border with Argentina. It is approximately equidistant from the cities of Porto Alegre, Montevideo, Buenos Aires and Asuncion. It is an important border point, connecting Brazil with the city of Paso de Los Libres, Argentina.

The local economy is marked by farming, with beef cattle trade and rice crops. The region is also an important cargo route, with a dry port distant just 6 kilometers from the Airport. The city is also a gateway to the Missões region, which collects 20 municipalities in South Brazil and attracts domestic visitors.

Figure 1-1 shows the Airport's location and surroundings.

Figure 1-1: Borders and main highways near Uruguaiana

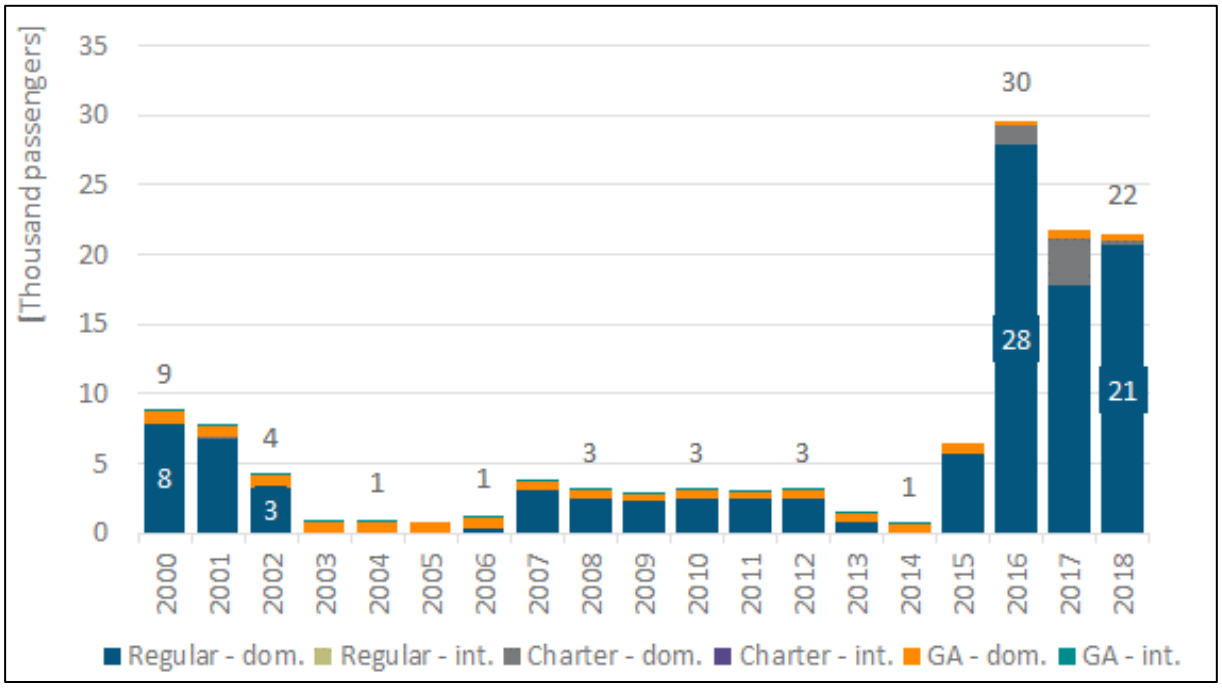


Source: Google Earth.

As Figure 1-2 shows, the airport processed 22 thousand passengers[2] in 2018, having peaked at 30 thousand in 2016. Records show small passenger flows until 2015, when the Azul airlines commenced operations there.

[1] Source: ANAC and INFRAERO statistics.
[2] ANAC statistics and data provided by Infraero

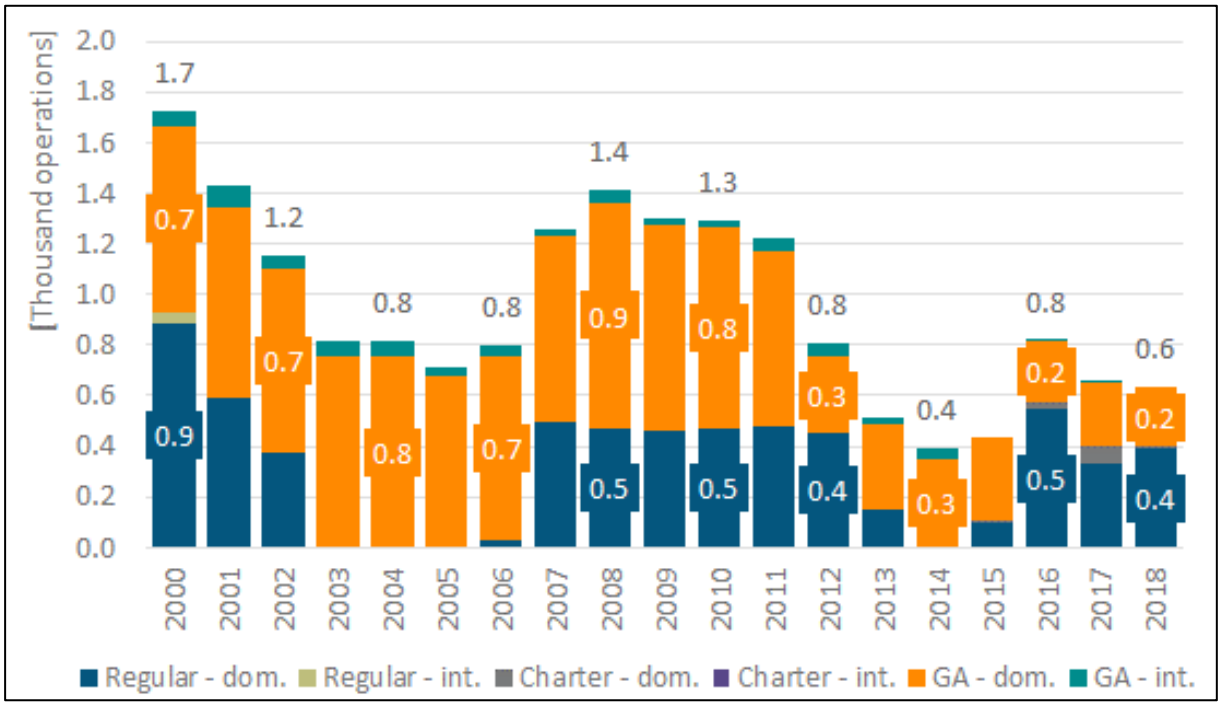
Figure 1-2: Passenger history (origin, destination and connections) for the Airport



Source: Infraero.

The Airport had 0.6 thousand operations in 2018, of which 62% were regular domestic flights and 37% were general aviation (Figure 1-3).

Figure 1-3: Annual operations history (landings and take-offs) at the Airport



Source: Infraero.

In 2018, the Airport had regular domestic routes[3] to Porto Alegre (SBPA) and Florianópolis (SBFL)[4], as Figure 1-4 shows (line thickness reflects relative route frequency).

Figure 1-4: Map of the Airport's domestic routes in 2018

Source: OAG and ANAC

Regarding the pandemic impacts, it stands out that the airport continued to receive flights from the essential airline network in March. The demand in March 2020 was 67% of the previous month. However, in April, the airport had its operations completely interrupted.

Current and forecast cargo operations at the Airport are practically non-existent (although SBUG currently has a TECA under concession).

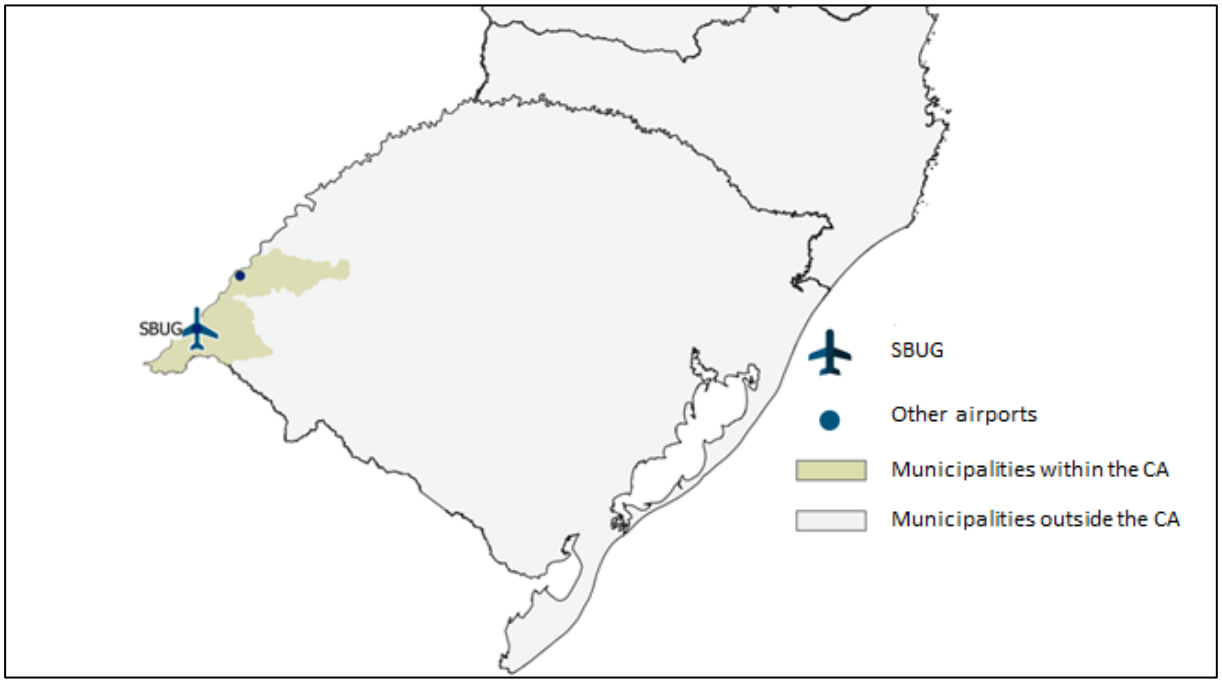
[3] Only considers routes with twice-weekly or greater frequency according to ANAC.
[4] The SBFL route was discontinued in 2019.

Catchment Area

SBUG's Catchment Area (CA) is defined based on the "City Catchment Areas" ("Regiões de Influência das Cidades" – REGIC)[5] study, by the Brazilian Geography and Statistics Institute (IBGE), which comprehensively covers a range of economic and socio-cultural aspects of the population.

According to the REGIC, Uruguaiana is under the influence of the Porto Alegre Metropolis, so that its own CA is contained within Porto Alegre's. Overall, the Uruguaiana CA, which Figure 1-5 shows, covers 4 municipalities and 12 thousand square kilometers in total area.

Figure 1-5: Airport CA according to the REGIC



Source: REGIC, ANAC and GCA Consortium.

To forecast the Airport's volumes and demand profile, the study analyzed the effective passenger catchment rea according to the origins and destinations survey published in the study Brasil Que Voa (BQV), which EPL[6] conducted in 2014. In the case at hand, a significant share of passengers from cities in the Rio Grande do Sul interior, such as Uruguaiana, uses SBPA – therefore, SBUG was assumed to compete with SBPA for passengers in its CA.

1.2 Demand forecasts

The Airport's demand has been forecast based on multivariate regression analyses whose parameters have been selected by means of tests with several potential independent variables for each flow analyzed.

[5] Source: IBGE. *Regiões de Influência das Cidades 2007*, IBGE, Rio de Janeiro, 2008. The IBGE has published other and more current Urban-Territorial Division studies, but they reference the same hierarchical review of municipalities as produced for the 2007 study, that is, their hierarchy is simplified, but consistent with the one in the 2007 study.

[6] EPL is a Federal-government agency focused on country-wide transportation & logistics planning.

1.2.1 Passengers

Commercial aviation passengers

To forecast domestic passengers with origin or destination in the CA[7], the study ran regressions using World's GDP, Brazil's GDP and the CA's average fares, adjusting GDP elasticity in the long term based on the passengers-to-per-capita GDP ratio of large countries to reflect the reduction of the marginal propensity to fly as average income increases.

Once domestic demand had been forecast for the CA, the study distributed it across competing airports based on their historic market shares, among other factors. Finally, compatibility adjustments were made between forecast demand and 2019 volumes. No international passengers have been forecast for SBUG.

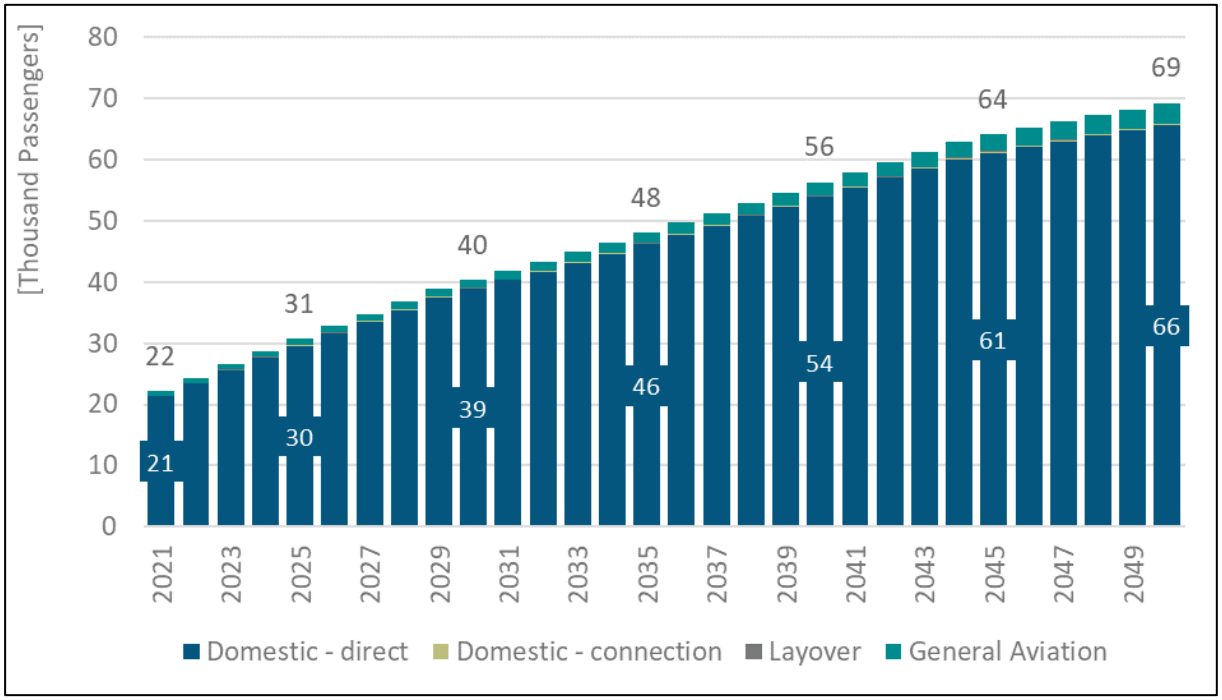
General aviation passengers

For general aviation passengers, the report first forecasts total aircraft operations based on several independent variables, such as Industrial GDP and Brazilian fleet (taking into account the effects of the pandemic). Then total passengers are estimated based on usual pax/operation parameters.

Total passengers

Figure 1-6 shows the consolidated results of the above forecasts. Total passengers at SBUG will grow 4.0% p.a. from 2021, the first, and 2050, the final year of the concession, at which time 69 thousand passengers are expected.

Figure 1-6: Total passengers forecast at the Airport by flow type



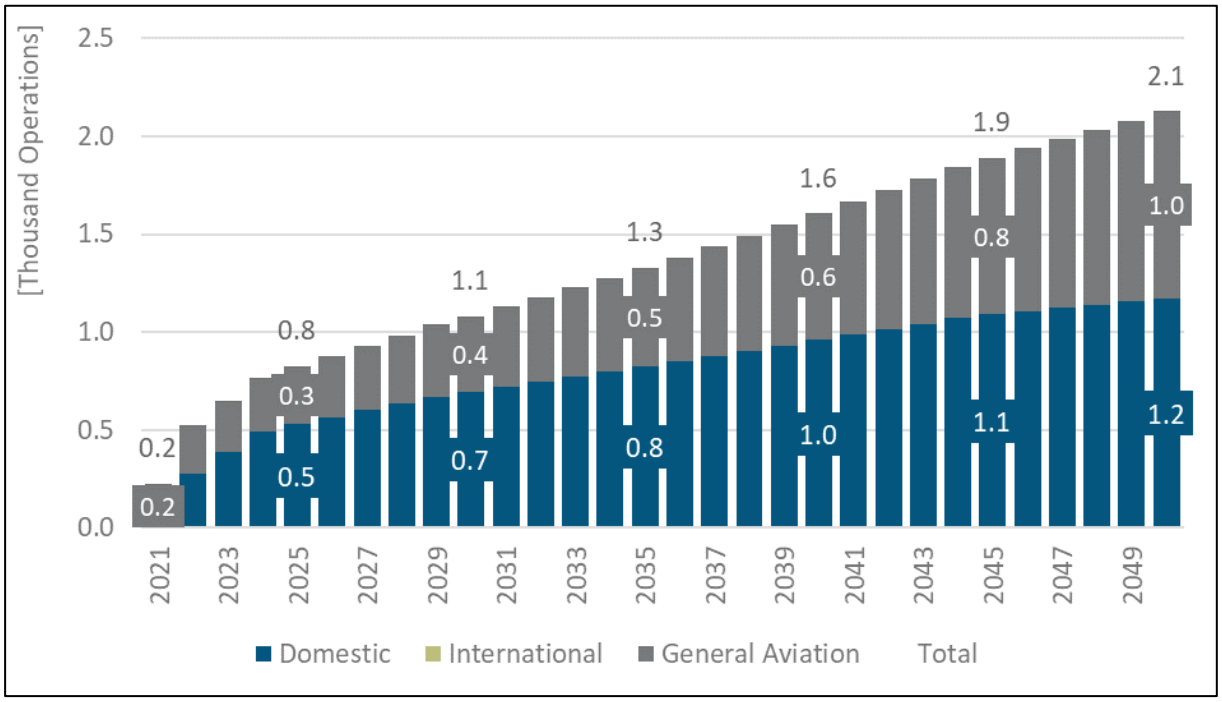
Source: GCA Consortium.

[7] Includes the Porto Alegre, Pelotas, Bagé, Passo Fundo, Santa Maria, Caxias do Sul and Santo Ângelo airports.

Domestic and international aircraft operations

Commercial aircraft operations were forecast based on passenger flows by origin-destination (OD) pairs, load factor, and aircraft mix. In 2050, the final full year of the concession period, the Airport is forecast to log 1.2 thousand domestic flight operations for commercial aviation and 1 thousand for general aviation, at average growth rates of 5.3% (between 2022 and 2050) and 5.1% (between 2021 and 2050), respectively.

Figure 1-7: Total annual Airport operations forecast



Source: GCA Consortium.

No new routes have been forecast for the Airport over the concession period.

1.2.2 Peak demand and restrictions

The Airport's main systems have been sized to meet demands at more intense flow times, so that users will receive appropriate service levels according to previously established criteria and, no severe operational and economic impacts will take place.

For Passenger Terminal (PT) areas and processors at airports flying under one million passengers per year, like SBUG, the applicable service level criterion in the initial investment phase is based on 1.3 times the number of seats in the critical aircraft[8] (or, in the case of simultaneous operations in 45 minutes, 1.3 times the number of seats available). In later phases of the project, the benchmark becomes the 30th busiest hour of the year.

[8] The aircraft with the largest number of seats available at the airport in the reference period. For this Airport, this is the ATR72 (70 seats).

The results for both criteria have been calculated as of 2018 based on Infraero records, and forecast according to domestic peak-factor benchmarks (peak demand/annual demand).

- Using the criterion of 1.3 times the number of seats on simultaneous operations in 45 minutes or on the critical aircraft, the study finds 0 passengers for departures and arrivals, and 0 simultaneous passengers at concession start, in 2021;
- Using the 30th busiest hour produces the following numbers:
    - 2021 (concession start): 62 departing passengers, 64 arriving passengers, and 114 simultaneous passengers;
    - 2050 (final full year of the concession): 108 departing passengers, 112 arriving passengers and 199 simultaneous passengers;

The Engineering Report discusses the use of this data for PT dimensioning.

For the runway system, the report considers maximum commercial aircraft operations per hour over a period of one year. As with passengers, the forecast embraces peak-factor benchmarks. It has been forecast that the Airport will have a peak of 4 commercial aircraft runway operations per hour in 2050.

Dimensioning also considers peak usage of apron positions based on 2018 maximum usage records[9] and peak factor benchmarks. According to the forecasts, a minimum 2 apron positions will be required by the end of the concession period.

Given the various systems' capacities (see Engineering Report), the study assesses potential restrictions on forecast demand. Considering the Airport's expected improvement and expansion works, no restrictions on traffic growth have been forecast for any of the Airport's systems.

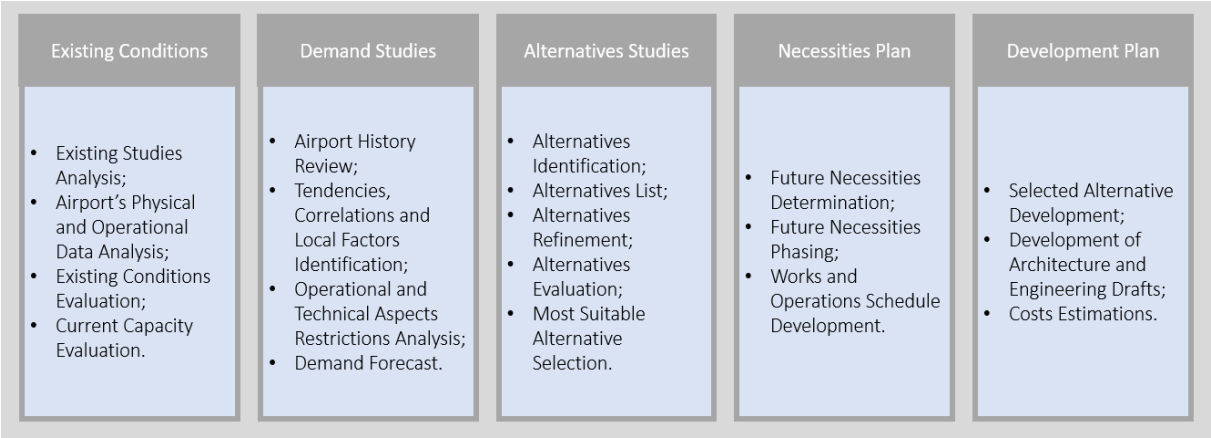
[9] Based on ANAC data.

2 ENGINEERING STUDIES

This section presents the Executive Summary of the Engineering Studies for the concession of the Uruguaiana Airport/Rubem Berta – SBUG/URG.

The Engineering Studies Report has been developed according to the methodology presented in Figure 2-1.

Figure 2-1: Study Methodology



Source: GCA Consortium.

Below, in brief explanations, the results and premises of each phase of the studies are presented. For further details, please check the complete studies report.

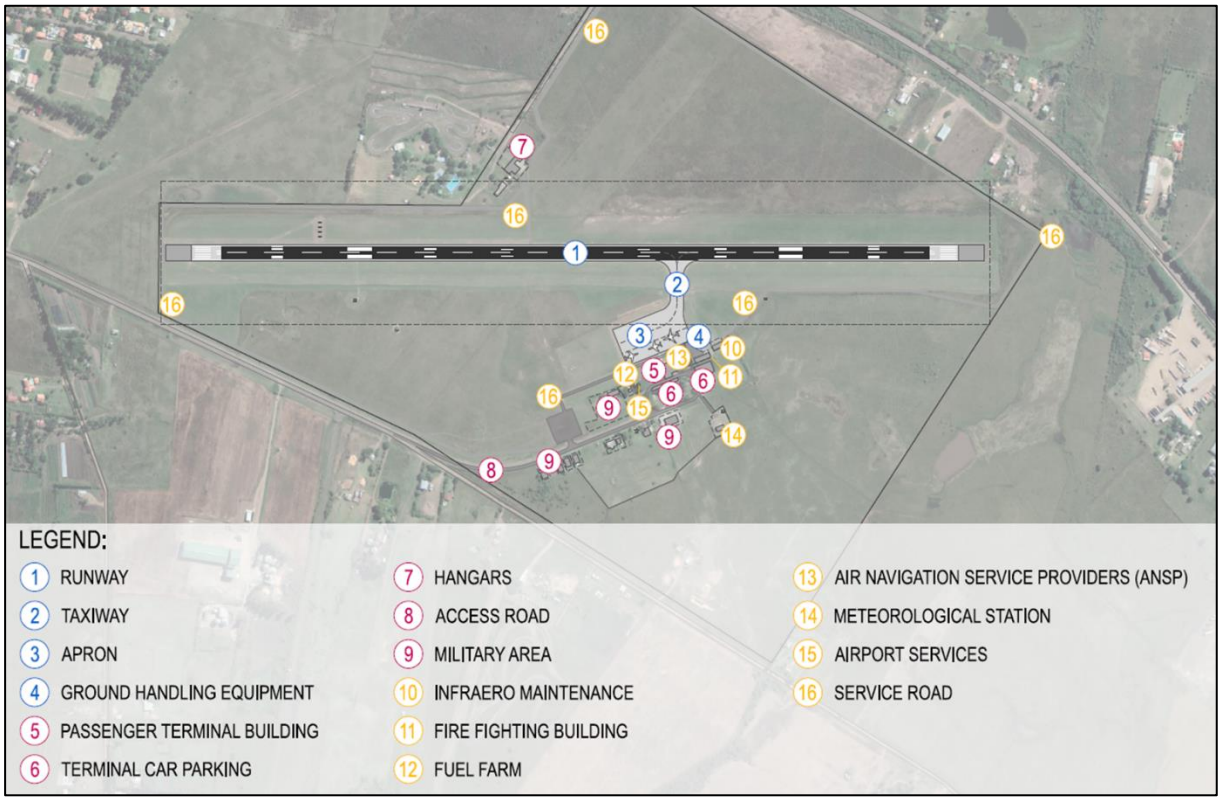
2.1 Existing Conditions

2.1.1 Current Situation

The current situation characterization is extremely important for an appropriate development of the Airport Site. Through it, it's possible to have an accurate understanding of the existing restrictions and opportunities for the expansion of the Airport complex. Among other aspects, the comprehension of the current situation involves operational, security, legal and social-environmental matters.

In order to characterize the present situation, it has also been evaluated the current operation and it has been done the identification of the existing infrastructures, by on-site visits, and of the main development plans and available studies. The Figure 2-2 illustrates the identification of the main existing facilities.

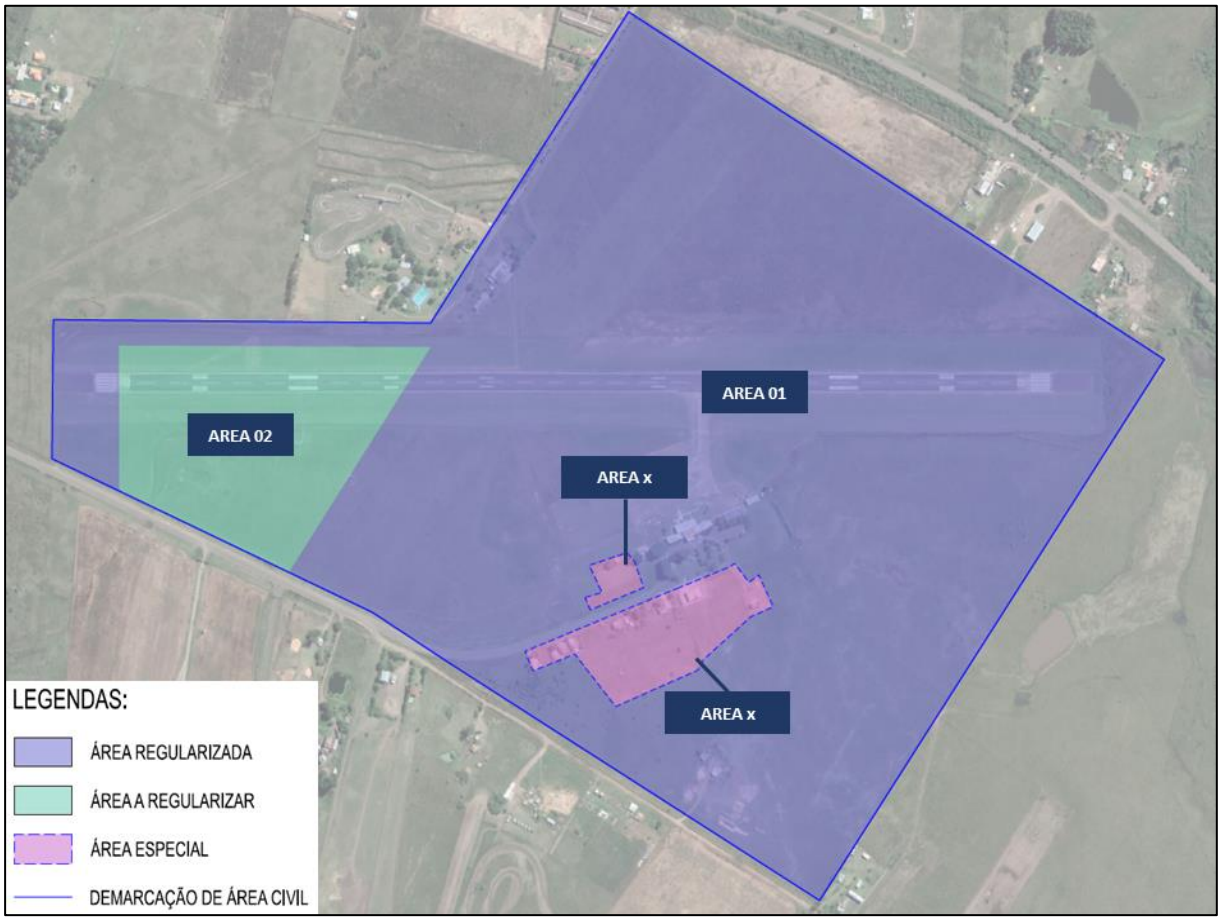
Figure 2-2: Current Facilities Situation



Source: GCA Consortium.

Furthermore, regarding the present patrimonial situation, it should be noted that the airport under study is in a patrimonial area divided in regularized area and area to be regularized. The regularized areas belong to the Ministry of Aeronautics. The areas to be regularized are properties of the City of Uruguaiana, going through the transference process, and the areas to be expropriated are under private third parties possession. The Figure 2-3 presents the patrimonial situation of the Airport.

Figure 2-3: Patrimonial Limits of the Airport Site



Source: Google Earth, GCA Consortium.

Currently, there are works in progress at the Airport, whose projects have been approved by INFRAERO. There are recently completed works, whose projects have already been approved by INFRAERO for implementation. These works had as main objective the expansion of the PTB. According to the SAC/MI guidance, until the start of the concession period, the ongoing works must proceed. From this date on, the remaining services must be completed by the concessionaire and the remaining costs considered in the financial modeling of this study. Since the works in the Airport are expected to be completed until this date, there won't be residual costs related to these works to be considered by CAPEX.

2.1.2 Installed Capacity Evaluation

The analysis of the installed capacity is one of the phases in the existing conditions evaluation process. In this stage are evaluated the capacity conditions according to the appropriate levels of service. Thus, it has been developed the capacity assessment for all airport systems. The installed capacities of the main systems are presented below.

2.1.2.1 Runway, Taxiway and Apron System

Table 2-1 and Table 2-2 summarize the results obtained from the installed capacity analysis and the existing demand for the runaways, taxiways and aprons systems. The taxiways were assessed based on geometric width and code of the aircraft design restrictions.

Table 2-1: Runway Capacity

Component	Current Capacity	Demand	Situation
Runway (mov/h)	19,4	2	Suitable

Source: GCA Consortium.

Table 2-2: Taxiways Capacity

Taxiway	Width (m)	Width Without Shoulders (m)	RBAC154 Code	Critical Aircraft	Situation
Taxiway A	25	25	C	AT72	Suitable

Source: AIP, GCA Consortium.

In order to measure the current capacity of the main aircraft aprons, the static and dynamic capacities were analyzed for five different scenarios. Each scenario prioritizes the maximum use of the most restrictive aircrafts, or rather, the occupying positions F, E, D and C in descending order of priority. The Table 2-3 shows the static capacity for the five scenarios evaluated.

- Scenario 1: Aircrafts code F, E, D, and C operating simultaneously, in descending order of priority;
- Scenario 2: Aircrafts code E, D and C operating simultaneously, in descending order of priority;
- Scenario 3: Aircrafts codes E and C operating simultaneously, in descending order of priority;
- Scenario 4: Aircrafts Codes D and C operating simultaneously, in descending order of priority;
- Scenario 5: Only aircrafts code C operating.

Table 2-3: Aprons Static Capacity

Type	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Boarding Bridge Positions	F/E/D/C	E/D/C	E/C	D/C	C
A	-	-	-	-	0
B	-	-	-	-	0
C	-	-	-	-	0
D	-	-	-	-	0

Type	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
E	-	-	-	-	0
F	-	-	-	-	0
Remote Stands	F/E/D/C	E/D/C	E/C	D/C	C
A	-	-	-	-	5
B	-	-	-	-	2
C	-	-	-	-	1
D	-	-	-	-	0
E	-	-	-	-	0
F	-	-	-	-	0
Positions (Remotes + Boarding Bridges)	F/E/D/C	E/D/C	E/C	D/C	C
A	-	-	-	-	5
B	-	-	-	-	2
C	-	-	-	-	1
D	-	-	-	-	0
E	-	-	-	-	0
F	-	-	-	-	0
Total Boarding Bridges	-	-	-	-	0
Total Remote Stands	-	-	-	-	8
Total Number of Stands	-	-	-	-	8

Source: PDC Chart, GCA Consortium.

In order to evaluating the hourly dynamic capacity of the main apron, the static capacity obtained by the average occupation time of each aircraft code for the same scenarios was considered, obtaining the total dynamic capacity, as shown in Table 2-4.

Table 2-4: Aprons Dynamic Capacity

Type	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Average turning time (min)	F/E/D/C	E/D/C	E/C	D/C	C
A	-	-	-	-	15
B	-	-	-	-	25
C	-	-	-	-	45
D	-	-	-	-	75

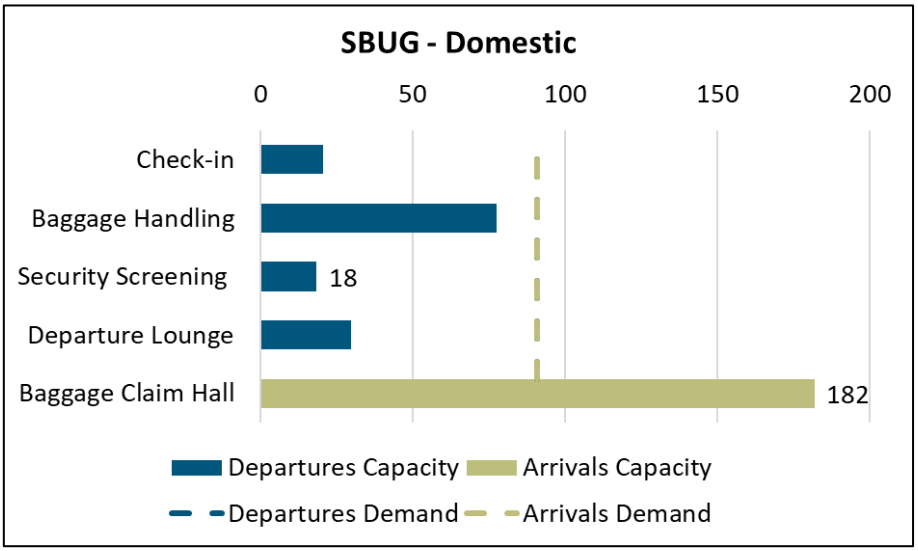
Type	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
E	-	-	-	-	85
F	-	-	-	-	130
Capacity	F/E/D/C	E/D/C	E/C	D/C	C
A	-	-	-	-	20
B	-	-	-	-	5
C	-	-	-	-	1
D	-	-	-	-	0
E	-	-	-	-	0
F	-	-	-	-	0
Total	-	-	-	-	26

Source: GCA Consortium.

2.1.2.2 Passenger Terminal System

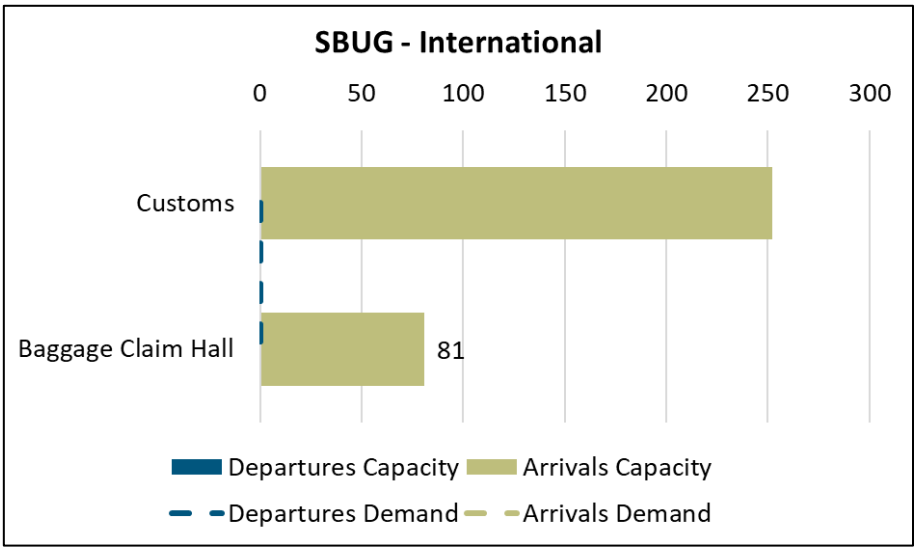
Figure 2-4, Figure 2-5 and Figure 2-6 summarize the results obtained from the installed capacity and the existing demands of the departures and arrivals flows. The components of the terminal were evaluated considering the international and domestic segments.

Figure 2-4: Terminal's Components Capacity – Domestic



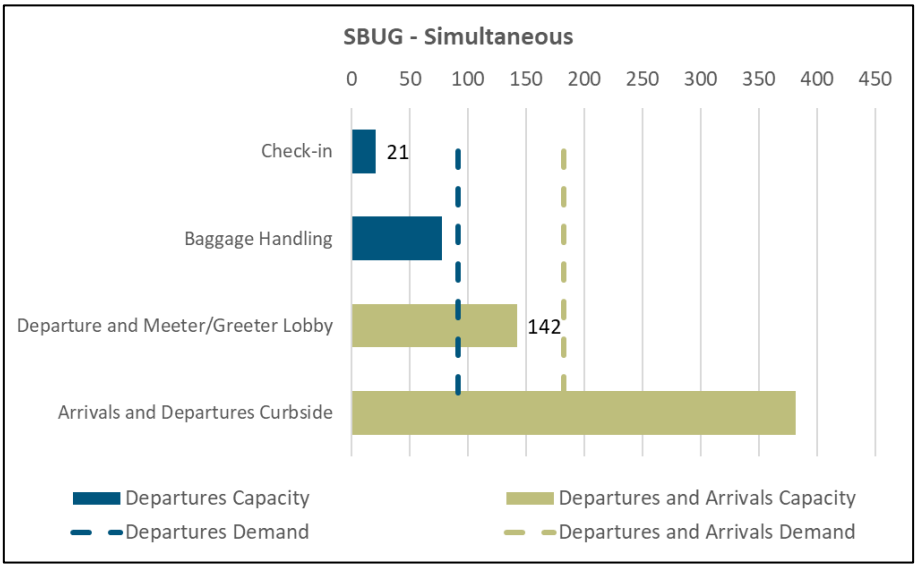
Source: GCA Consortium.

Figure 2-5: Terminal's Components Capacity – International



Source: GCA Consortium.

Figure 2-6: Terminal's Components Capacity – Simultaneous



Source: GCA Consortium.

2.1.2.3 Other Facilities

Regarding the current condition of other systems, the following observations can be noticed, about the present situation described on Table 2-5.

Table 2-5: Other Components Capacity Summary

Component	Facilities Description
Aeronautical Infrastructure	• **Operation:** presents technical capability for day/night non-precision VFR/IFR operation for threshold 27 and non-precision VFR for day/night operations at thresholds 09. With PAPI system at threshold 09, the Runway is capable of landing jet aircraft by this threshold. There is no PAPI systems at threshold 27.
Cargo Terminal System	• **Cargo Terminal Building:** suitable to current demand, considering cargo processing at the passenger's terminal. • **Airside Aprons:** suitable to current demand. • **Landside Aprons:** suitable to current demand. • **Cargo Terminal Parking:** suitable to current demand, considering cargo processing at the passenger's terminal.
General Aviation System	• **General Aviation Terminal:** there is no General Aviation Terminal currently and as the demand is less than 25,000, the sector is suitable to current needs. • **General Aviation Aprons:** not suitable to current demand. • **General Aviation Hangars:** not suitable to current demand. • **General Aviation Terminal Parking:** suitable to current demand.
Administration and Maintenance System	• **Administration:** suitable to current demand. • **Maintenance:** suitable to current demand.
Operation Support System	• **Fuel Farm:** suitable to current demand. • **Fire Fighting Installations:** suitable to current demand.
Airlines Support System	• **Cargo Processing:** not suitable to current demand. • **Airlines Support Maintenance:** not suitable to current demand. • **Maintenance and Hangars:** not suitable to current demand.
Industrial Support System	• **Mail:** suitable to current demand. • **Catering:** does not apply, there is no specific area at the airport. • **Airport Services:** not suitable to current demand.
Basic Infrastructure System	• **Electric Power:** suitable to current demand. • **Water Consumption:** suitable to current demand. • **Sewage Treatment:** not suitable to current demand. • **Solid Waste:** not suitable to current demand.

Source: GCA Consortium.

2.2 Demand Studies

In order to evaluate the current capacity to accommodate the forecast demand and the investments needs over the concession period, market reports and forecasts of passenger demands, aircrafts

operations and freight have been developed. The Figure 2-7 shows the results of the studies of demand.

Figure 2-7: Demand Forecast Summary

Source: Market Reports.

2.3 Necessities Plan

Given the demand projections and the installed capacity, the infrastructures required to meet the expected demand were evaluated for all airport systems. The following Figure 2-8, shows a summary of infrastructure needs for the airport throughout the development stages considered for the period of analysis. The requirements of each stage are based on the existing infrastructure in face of the projected demand. Thus, the installed infrastructures have been kept, reallocated or expanded according to the anticipated needs.

Figure 2-8: Necessities Plan

SBUG	Phase 1	Phase 2	Phase 3
Airside System			
Runway	Intervention	Suitable	0
Taxiways	Intervention	Suitable	0
Aprons	Intervention	Suitable	0
Ground Handling Equipments	Intervention	Suitable	0
Passenger Terminal System			
Passenger Terminal Building	Intervention	Intervention	0
Car Parking	Intervention	Intervention	0
Access Roads	Intervention	Suitable	0
Aeronautical Infrastructure			
Navigation Aids	Intervention	Suitable	0
Air Cargo Terminal System			
Air Cargo Terminal Building	Suitable	Suitable	0
Car Parking	Suitable	Suitable	0
Access Roads	Suitable	Suitable	0
General Aviation System			
General Aviation Terminal Building	Suitable	Suitable	0
Aprons and Taxiways	Intervention	Suitable	0
Car Parking	Suitable	Suitable	0
Access Roads	Suitable	Suitable	0
Administration and Maintenance System			
Administration	Suitable	Suitable	0
Maintenance	Suitable	Suitable	0
Operations Support System			
Fuel Farm	Intervention	Suitable	0
Firefighting Building	Suitable	Suitable	0
Airlines Support System			
Air Cargo and Maintenance Facilities	Intervention	Suitable	0
Maintenance and Hangars	Suitable	Suitable	0
Industrial Support System			
Mail	Suitable	Suitable	0
Catering	Intervention	Suitable	0
Airport Services	Intervention	Suitable	0
Basic Infrastructure System			
Eletric Power	Intervention	Suitable	0
Water Consumption	Intervention	Intervention	0
Sewage Treatment	Intervention	Intervention	0
Solid Waste	Intervention	Suitable	0

Source: GCA Consortium.

Furthermore, an infrastructure needs summary for the airport with its main information and components over the 30 years considered for the analysis period is presented in Table 2-6.

Table 2-6: Main Components Necessity Summary

SBUG	Current	Phase 01	Phase 02
DEMAND	**2018**	**15 Years**	**30 Years**
Annual Passengers Movements			
Regular Aviation	21,123	46,315	65,910
General Aviation	717	1,718	3,261
Total	21,840	48,033	69,171

SBUG	Current	Phase 01	Phase 02
Cargo (tons)			
Total	-	-	-
Aircraft Movements			
Passengers	392	823	1,171
Air Cargo	-	-	-
General Aviation	230	507	957
Total	622	1,330	2,128
RUNWAY SYSTEM			
Design Aircraft Code	C	C	C
Number of Runways	1	1	1
Runway Length (m) (1)	1,500	1,190	1,190
Operation Type	NPA	NPA	NPA
APRON SYSTEM			
Passengers Apron (2)			
Contact Stands	-	-	-
Remote Stands	1C	2C	2C
Total Number of Stands	1C	2C	2C
Cargo Apron (2)			
Total Number of Stands	-	-	-
PASSENGERS TERMINAL SYSTEM			
Departure Peak Hour Capacity	23	114	114
Arrival Peak Hour Capacity	142	111	111
Terminal Building			
Total Area (m²)	970	3,017	3,017
Baggage Handling System			
Processing Capacity (bhp)	36	57	68
Car Parking			
Total Area (m²)	1,070	2,060	2,555
Number of lots	40	76	95

SBUG	Current	Phase 01	Phase 02
Curbside			
Departure Curbside Length (m)	37	18	21
Arrival Curbside Length (m)	37	17	21
Total Length (m)	73	35	42
Ground Handling Equipment			
Total Area (m²)	70	900	900
CARGO TERMINAL SYSTEM			
Cargo Terminal Building Area (m²)	-	-	-
GENERAL AVIATION SYSTEM			
General Aviation Terminal (m²)	-	-	-
Total Number of Stands	7	2	2
General Aviation Terminal Car Parking	-	-	-
Hangars and Aprons Area (m²)	2,070	2,400	2,400
ADMINISTRATION AND MAINTENANCE SYSTEM			
Administration [3]			
Total Area (m²)	260	276	276
Maintenance			
Total Area (m²)	280	280	280
OPERATION SUPPORT SYSTEM			
Fuel Farm			
Total Area (m²)	770	900	900
5-day storage (m³)	8	20	30
Fire fighting Building			
Category	3	3	3
Total Area (m²)	1,180	1,180	1,180
AIRLINES SUPPORT SYSTEM			
Maintenance Area (m²)	-	150	150
Cargo Processing Area (m²) [4]	-	-	-
Aircraft Maintenance Area (m²)	-	-	-

SBUG	Current	Phase 01	Phase 02
INDUSTRIAL SUPPORT SYSTEM			
Mail Area(m²)	-	-	-
Catering Area (m²)	-	50	50
Airport Services Area (m²)	20	150	150
BASIC INFRASTRUCTURE SYSTEM			
Water Tank (m³)	10	30	50
Solid Waste Area (m²)	-	10	10
Electric Power Area (m²)	83	283	283
Sewage Treatment Units (5)	- (6)	1	2

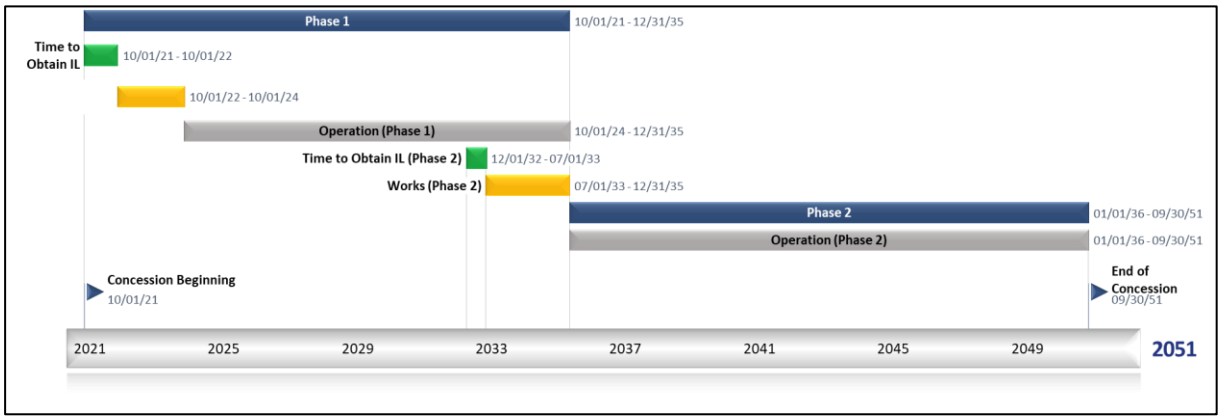
(1) It's been considered the Landing Distance Available (LDA).
(2) The cargo apron can be reversible, that means, shared with the commercial aviation.
(3) The area can be considered inside the PTB.
(4) Area can be considered inside the PTB or Cargo Terminal Building.
(5) Compact Sewage Treatment Unit, D70 model.
(6) Currently the airport doesn't have an area designated to Sewage Treatment Units.

Source: GCA Consortium.

After scheduling needs, based on the capacity of the airport systems, it was possible to define for each component when the interventions should be initiated, so that the service level can be maintained throughout the period.

Considering the concession starts in 2021, it's estimated a 12-month period to get the installation licenses (IL) necessary to start the works. After obtaining those licenses, the work can be started. Thus, as a result of the interaction of several planning elements, the work and operation phases were set, as shown in Figure 2-9.

Figure 2-9: Phasing and Works Estimated Schedule



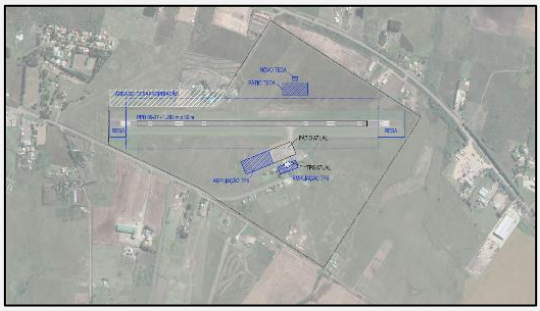
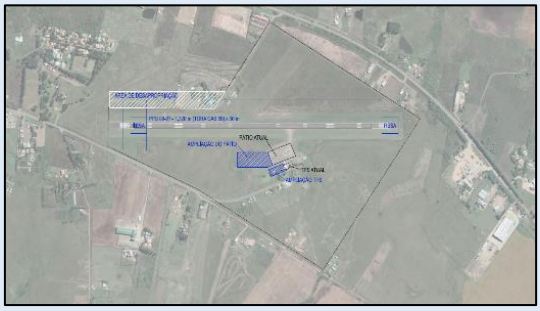
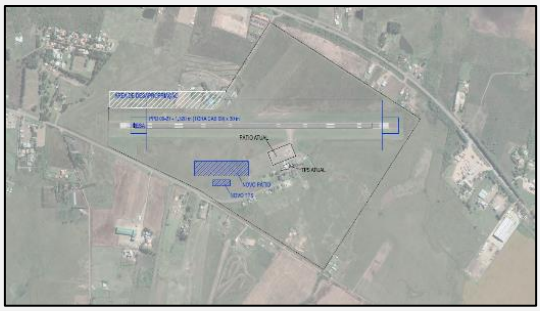
Source: GCA Consortium.

2.4 Alternatives Study

In order to choose the best alternative for the development of the airport site, it was considered the best solution for all infrastructure non-conformities, allowing the future development of the airport site in an optimized way, assuring a high level of service for all installations, minimizing the interference in the existing facilities and presenting compatible costs with the airport revenues during the concession period.

The proposed alternatives and their main characteristics are presented in Figure 2-10.

Figure 2-10: Proposed Alternatives

Alternative 01		• Runway with 1,282 m x 30 m; • Passenger terminal building extension from 970 m² to 3,630 m² (Costs > R$ 15 MM); • Apron reform and extension of 12,000 m² (Costs > R$ 4 MM); and • New cargo terminal building and apron implementation (Costs > R$ 5 MM).
Alternative 02		• Runway with 1,320 m (TORA threshold 09) x 30 m; • Passenger terminal building extension from 970 m² to 3,630 m² (Costs > R$ 15 MM); • Apron reform and extension of 12,000 m² (Costs > R$ 4 MM); and • Lower cost alternative.
Alternative 03		• Runway with 1,320 m (TORA threshold 09) x 30 m; • New passenger terminal building implementation with 3,630 m² (Costs > R$ 20 MM); • New apron implementation with 25,000 m² (Costs > R$ 9 MM); e • Higher cost alternative.

Source: GCA Consortium.

The presented costs were obtained from reference figures by square meter (m²) and have the purpose to compare in a macro way the different alternatives. The detailed cost analysis was made only for the chosen alternative and it is presented in the CAPEX report.

From the studied solutions, it is observed that alternative 03 clearly presents the highest costs of implementation, without bringing significant capacity gains to the system and, therefore, was discarded.

The demand studies showed that the demand for air cargo still does not justify the implementation of dedicated Air Cargo Terminal, as foreseen in the Master Plan and presented in alternative 01. In addition, this Alternative has a slightly shorter runway length than that presented in alternative 02. Finally, alternative 02 presents a geometric configuration of the PTB with less impact on adjacent infrastructures, so that it was chosen as the most advantageous.

2.5 Development Plan

After the selection of the most appropriate alternative and the Requirement Plans, it was designed the airport's development plan for the concession period. Furthermore, it was developed an architecture and engineering preliminary design. Thus, the costs of the project and operation along the implementation phases were estimated in order to enable the airport economic-financial modeling.

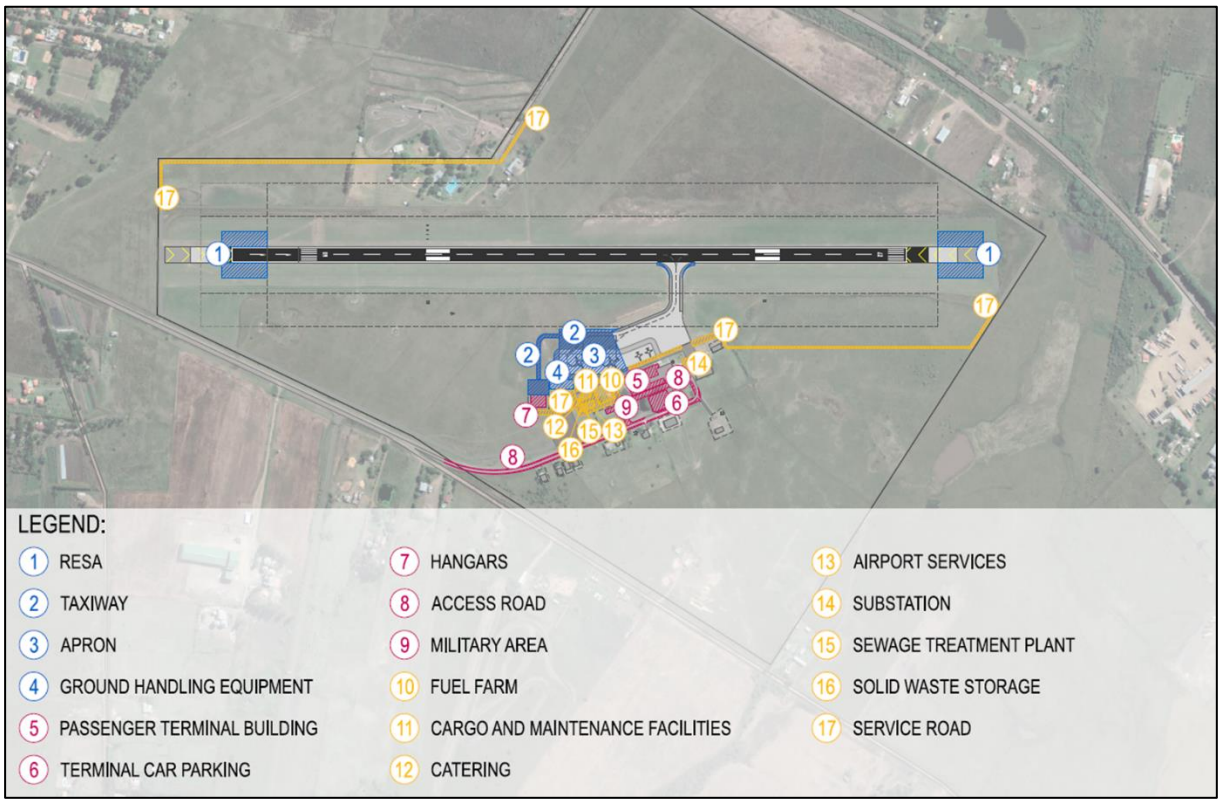
Below, the main investments for each phase of the planning are presented, as well as the implementation plants identifying the interventions at the airport and their subsequent level of details.

2.5.1 Phase 1

The first phase of the concession is expected to occur between the years 2024 and 2035, since the period between 2021 and 2024 will be used to get both the environmental licenses and carry out the constructions, so that all proposed works meet the demand of the year 2035.

In the Figure 2-11, it is presented the implementation proposed to Uruguaiana Airport, considering Phase 01.

Figure 2-11: Development Plan – Phase 01 Implementations



Source: GCA Consortium.

The main interventions proposed in this phase are:

- Threshold 09 displaced by 210 m and threshold 27 displaced by 100 m;
- Implementation of RESA on the thresholds 09 and 27;
- Runway 09/27 strip leveling;
- Runway 09/27 drainage system adequation;
- Passenger terminal building extension;
- Apron 1 and taxilane A extension.

2.5.2 Phase 2

The second phase of the operation is expected to be between the years 2036 and 2051, since the period for obtaining the environmental licenses and carrying out the constructions happen in the previous phase, in order to all proposed works meet the demands of the year 2050.

In Figure 2-12, it is presented the proposed implementation for the Uruguaiana Airport, considering the Phase 02.

Figure 2-12: Development Plan – Phase 02 Implementations

Source: GCA Consortium.

The main interventions proposed for this phase are:

- Terminal car parking extension.

2.6 CAPEX

To elaborate the budget for the planned investments, prices were considered in accordance with the reference tables of SINCRO and SINAPI, in order to get referential unit cost per airport component. It was also considered the BDI rate, according to the TCU guidance and SICRO methodology. So, from the planned investments, unit costs and BDI rate, it was obtained the budget for the investments to the airport development. The Table 2-7 summarize the investments by implementation phase.

Table 2-7: CAPEX – Summary per Phase

DESCRIPTION	VALUES [R$]
Phase 1 Airport Expansion	34,612,880.65
Phase 2 Airport Expansion	7,759,299.22
Airport Expansion Subtotal	**42,372,179.87**
Phase 1 Airport Expropriations	8,188,737.71
Phase 2 Airport Expropriations	-
Airport Expropriations Subtotal	**8,188,737.71**
CAPEX Total	**50,560,917.58**

Source: GCA Consortium.

The Table 2-8 compiles the investment, maintenance and expropriation expenses values for each phase, considering the investments used for the resurfaces in the runaway system (which is included in “Maintenance” in Table 2-8).

Table 2-8: Components Summary

DESCRIPTION	DEVELOPMENT (R$)	MAINTENANCE (R$)	EXPROPRIATION (R$)	VALUES (R$)
Phase 1 Airport Expansion	32,687,640.38	1,925,240.27	-	34,612,880.65
Phase 2 Airport Expansion	3,037,189.09	4,722,110.13	-	7,759,299.22
Airport Expansion Subtotal	**35,724,829.47**	**6,647,350.40**	**-**	**42,372,179.87**
Phase 1 Airport Expropriations	-	-	8,188,737.71	8,188,737.71
Phase 2 Airport Expropriations	-	-	-	-
Airport Expropriations Subtotal	**-**	**-**	**8,188,737.71**	**8,188,737.71**
CAPEX Total	**35,724,829.47**	**6,647,350.40**	**8,188,737.71**	**50,560,917.58**

Source: GCA Consortium.

3 ENVIRONMENTAL STUDIES

The Report 3 – Environmental Studies was elaborated to comply with the *Public Notice (Edital de Chamamento Público) N. 2/2019* regarding projects presentation, surveys, investigations and technical studies required to subsidize the concession modeling for expansion, exploration and maintenance of the Airport of Uruguaiana.

The report presents all the environmental studies performed in the field and in the office, by means of primary and secondary data, including a detailed assessment of every document provided by the Secretariat of Civil Aviation (*Secretaria de Aviação Civil – SAC)*, disclosed in Data Room, and of environmental processes verified at the State Foundation of Environmental Protection (*Fundação Estadual de Proteção Ambiental - FEPAM*) on April 16 and 23, 2019.

These data oriented the technical field visit to the Airport of Uruguaiana, which occurred on May 24, 2019.

Complementarily, on August 8 and 15, updates on the environmental processes were verified at FEPAM.

Environmental studies were conducted in order to meet the guidelines presented by the public notice, considering that all of the requirements were properly addressed in the report, according to certain analytical chronology, by means of careful evaluation of the airport's compliance with the respective licensing procedures, expansion studies, master plans and previous environmental studies.

The Airport of Uruguaiana, considered one of the busiest airports from Center-West Brazil, is in the urban region of Uruguaiana city, Rio Grande do Sul state. For its present location, the operations began in 1956. Under INFRAERO administration since 1974, the airport has been through important renovations. In 2011, the new departure hall started operating and, in the following year, the main parking lot was enhanced. In 2016, the new Passenger Terminal was inaugurated, enlarging the airport’s capacity.

The airport of Uruguaiana is in Uruguaiana city, extreme West of Rio Grande do Sul state, in the fluvial border between Argentina and Uruguay. The airport’s history began in the 40s, when in 1945, the Federal Airport of Uruguaiana was inaugurated at the old landing field. The aerodrome was opened to public traffic twenty years later, in 1965, being transferred to INFRAERO’s jurisdiction only in the 80s.

Regarding environmental regularity, the Airport of Uruguaiana is regular concerning the operating licensing of its current activities and infrastructure. The State Foundation of Environmental Protection (*Fundação Estadual de Proteção Ambiental - FEPAM*), the environmental agency of Rio Grande does Sul state, is responsible for the environmental licensing of the enterprise. Information on the Operating Licenses (OL) is detailed below.

Chart 3-1: Operating License Data

License	Issuing Agency	Process n.	Issue	Expiration	Status
1.383/2016-DL	FEPAM	6250-05.67/15.8	Mar. 18 2016	Mar. 18, 2020	Effective

Source: GCA Consortium.

The issue of OL n. 1.569/2020 is very recent. For this reason, the report detailed the compliance *status* of the previous Operation License (OL) n. 1.383/2016 (which was in force at the time of the visit), as well as the historical and relevant points of the processes.

By means of verification of FEPAM processes, it was possible to identify that the airport has an Operating License since 2001 that have been renewed over the years.

Besides of the environmental regularity, the effective OL present 21 specific constraints, described on item 13, for which the environmental agency defined a timeframe of 90 days for compliance and 15 to 120 days for answering 06 requirements. During the technical visit we identified the compliance with most of the constraints. However, there are still significative pending issues, especially related to effluent treatment.

Besides of the enterprise having received several enhancement constructions, no documents related to expansion constructions were found in the available *Data Room* and verification of physical and online processes of the environmental. The technical inspection revealed that the airport is receiving an expansion construction of the arrival area. This construction work is being executed by Commercial and Industrial Association of Uruguaiana (*Associação Comercial e Industrial de Uruguaiana – ACIU*), however with no environmental licensing.

The following documents were surveyed and reported, regarding the airport manager: authorizations, license agreements and other licenses, including those obtained by its concessionary enterprises. A list of ongoing agreements, with the activities susceptible to licensing, was also presented.

Regarding the regularity of the enterprise, notifications and non-compliances of the airport were surveyed and exhibited to several agencies, National Agency of Sanitary Vigilance (*Agência Nacional de Vigilância Sanitária -Anvisa*) and National Agency if Civil Aviation (*Agência Nacional de Aviação Civil -ANAC*).

No current occurrences were identified (notifications, infractions, nonconformities e others) applied by Anvisa to the current airport administrator, identified only 03 registers of 02 processes of old infractions notices (from 2006 to 2009) for the CNPJ of the Airport of Uruguaiana.

Regarding regularity before ANAC there are pending issues related to the presentation of the appropriate registers of PZR, IPF and PGRF in the regulation agency.

The information on past notices and fines do not oblige the next manager, which is not responsible for their payments. However, the current airport manager is responsible for eliminating the facts that originated such notices, as well as for managing ongoing mitigating or recovering actions.

A socio-environmental assessment of the Airport of Uruguaiana was performed and presented by means of the socio-environmental diagnosis in this report, considering the following aspects:

- Soil Use and Coverage including approaches to water resources, permanent preservation areas (APP) and vegetation;
- Irregular superficiaries and occupations in the airport assets area;
- Potential of Cave Occurrence;
- Mining rights;
- Fauna and Fauna Risk;
- Noise;
- Atmospheric Emissions;

- Energy;
- Basic Sanitation including approaches to water supply, effluents, solid waste and drainage system;
- Degraded areas, erosions and silting;
- Environmental Risks/Emergencies;
- Conservation Units, Protected Assets and Communities, including the analysis of heritage, archeological or pre-historical sites and traditional communities;
- Stakeholders engagement;
- Environmental Management System.

In this diagnosis, by means of visual analysis of the images, the mapping of the classes of the vegetal coverture and soil use and occupation with occurrence at the current patrimonial limits and the areas foreseen for future use. The soil use classification predominant in the airport is composed by Anthropic Field with Isolated Trees, occupying approximately 89.62% of the airport area. In the sequence, 8.94% of the areas are composed by the constructed area, 0.92% by wetlands and 0.51% by existing accesses.

The enterprise is located in the hydrographic basin of Ibicuí River and sub basins Uruguay and Quaraí. The Ibicuí River Basin has a Management Committee created by Decree n. 40.226/2000 e comprising 30 cities.

According to the survey made by geoprocessing, the absence of water bodies and springs was located in the airport site, however they were not visualized during the technical visit. The area is highly anthropized, and the springs may have been canalized and incorporated to the airport drainage system.

The airport region is characterized by formations of Grassy-Woody Steppe, Steppe and Steppical-Savannah (IBGE, 2004). In the surroundings of the airport there are portions of Steppe/Savannah, besides of Wetland, Reforestation, Anthropized Vegetation and Anthropic Field with isolated trees.

In the patrimonial site there are superficiaries who are not connected to the airport activities, it is important to notice that there is an area being explored with no contract for livestock, activity that increases the fauna risk in the aerodrome.

The potential occurrence of caves was assessed in an area with 5 km of radius from the center of Airport of Uruguaiana, and no caves were identified. The airport site and its surroundings are located in a region with low probability of cave occurrence.

The existence of mining titles was also evaluated in this study, and 03 issued titles were identified in the immediate surroundings of the Airport of Uruguaiana.

In relation to fauna risk, due to the airport's operational characteristics and the criteria established in RBAC 164/2014, it is necessary to elaborate and implement the IPF and PGRF as instruments for adequate management. Currently the airport has only one PGRF issued in 2014, however it was not submitted to ANAC for validation. For correcting this noncompliance, INFRAERO hired the company Sama Consultoria Ambiental Ltda - Me (Contract Term n 0451-PS/2018/0001) in January 2019, the goal being “Hiring a company to provide services of elaborating the Fauna Risk Identification (*Identificação do perigo da fauna - IPF*) and the Fauna Risk Management Programme (*Programa de Gerenciamento do Risco da Fauna - PGRF*) of INFRAERO’s airport”.

Besides of fauna risk evaluation to aviation safety, the airport activities and probable expansions on local fauna. Based on the Report of Sensitive Areas of Threatened Species Related to Airports,

developed by Chico Mendes Institute of Biodiversity Conservation (*Instituto Chico Mendes de Conservação da Biodiversidade*) (2016), it was identified that the patrimonial site is located in an area classified as "Very sensitive – Category 3" and its surroundings, besides of the already mentioned classification, also presents an area classified as *"Sensitive – Category 2"*.

Because the average annual movements of the last 3 (three) years was less than 7,000 movements, the elaboration of the Basic Noise Zoning Plan (PBZR) is applicable to the airport. The Uruguaiana Airport have a Basic Noise Zoning Plan (PBZR) registered with ANAC in 2020.

In the case of basic sanitation, it was found that the supply of drinking water to the airport is carried out by groundwater collection in two deep tubular wells presenting authorization grant of water use for such wells.

Solid waste is stored in 03 containers inside a shared and closed room for posterior removal by the municipal collection.

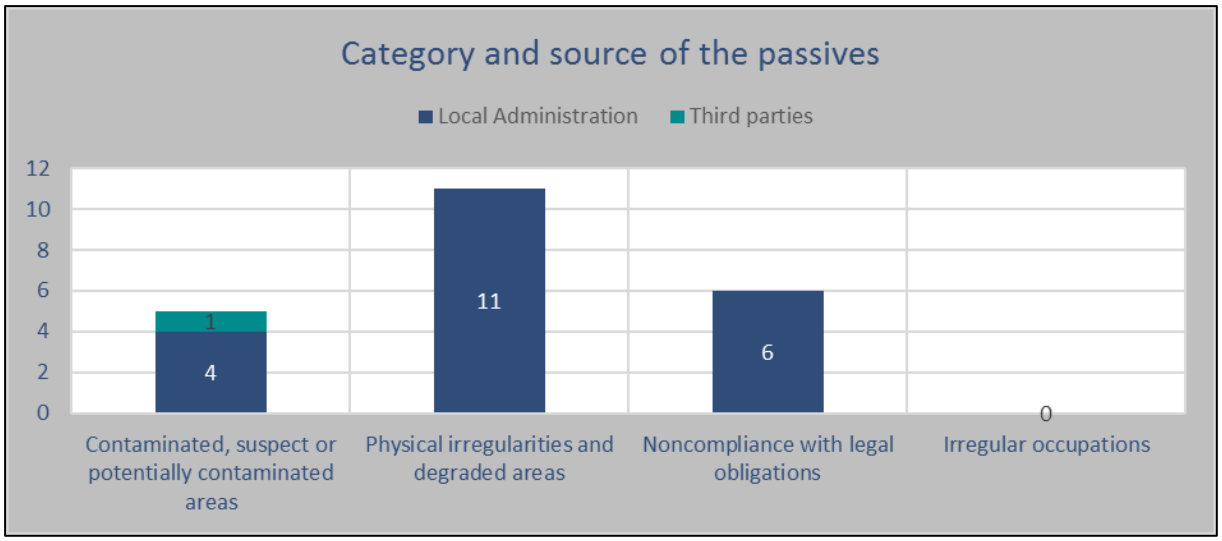
The airport does not have an effluent treatment plant, for sanitary sewage, septic tanks and sinkholes installed in buildings are used.

During a technical visit, a deficient drainage system was identified. The presence of flooding areas was observed, a condition that is attractive to fauna.

No Conservation Unit (*Unidade de Conservação - UC*) was identified, nor protected or heritage assets or traditional communities in the airport site and its surroundings, however 69 archeological sites with pre-historical records were identified in the city.

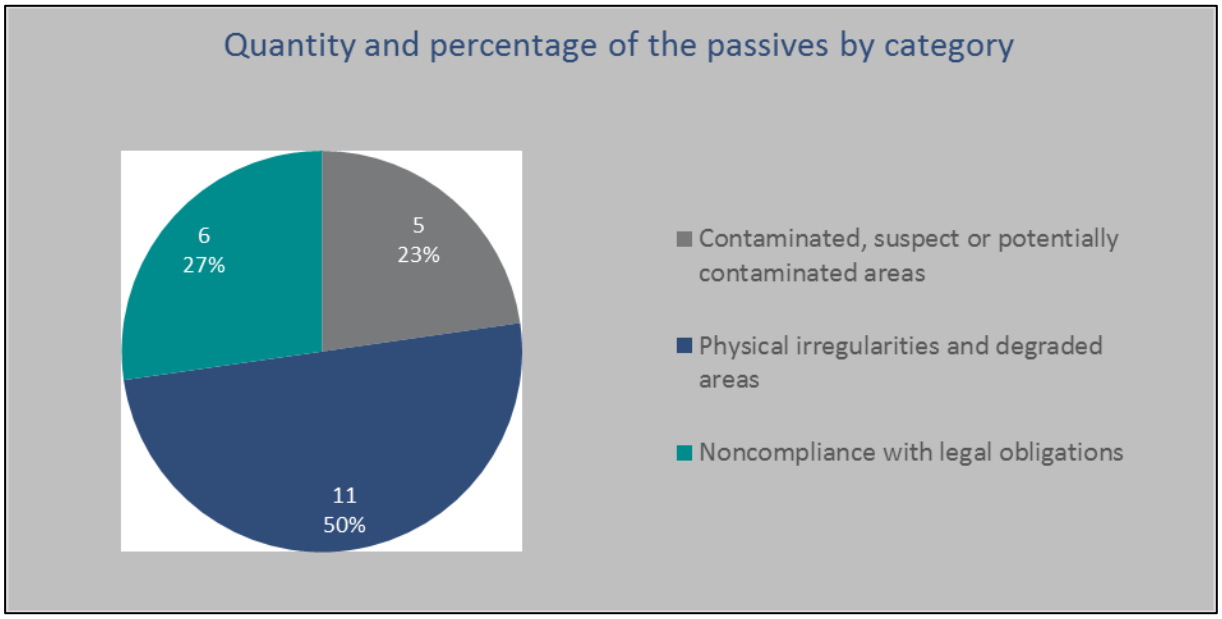
During the preparation of this document, existing socio-environmental passives were surveyed, evaluated and priced. For the Airport of Uruguaiana, 22 passives were identified, 21 originated by the local administration and only 01 by third parties. From this total, 23% are contaminated areas, 50% are physical irregularities and degraded areas and 27% are related to noncompliance with legal obligations. No passives related to irregular occupations were identified.

Figure 3-1: Category And Source Of The Passives



Source: GCA Consortium.

Figure 3-2: Quantity And Percentage Of The Passives By Category

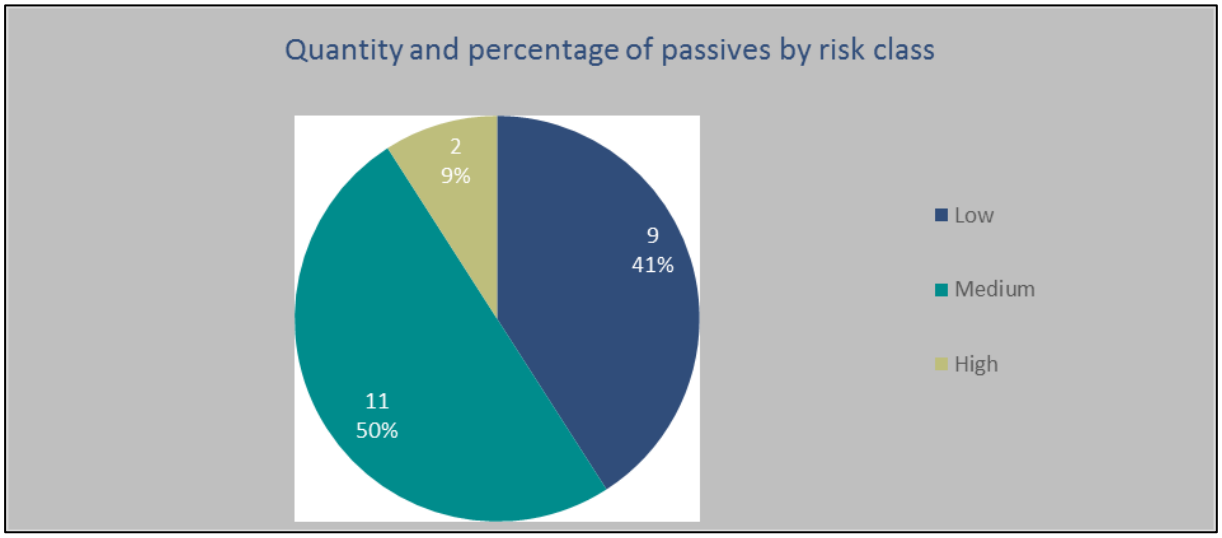


Source: GCA Consortium.

The classification of passives identified according to their Risk Class was assessed based on a methodology adapted from FMEA (*Failure Mode and Effects Analysis).*

Considering the current scenario, the Airport of Uruguaiana presents passives classified as of High, Medium and Low risks. The passives classified as of High risk shall be managed in the short run, and the passives classified as of Medium to Low risk may be managed according to their respective criticalities in short or medium term.

Figure 3-3: Quantity And Percentage Of Passives By Risk Class



Source: GCA Consortium.

The study includes a detailed analysis of current and future compatibility of the airport activities and soil use, dedicated to verify if the protection plan against obstacle, the noise zoning plan and airport

safety area were properly incorporated in the guidelines and legislation that regulates the occupation of the airport's neighboring areas.

In order to guarantee the good development of the enterprise, the neighboring areas shall continue to be compatible with the airport activities. To achieve this goal, the airport manager shall update and approve the appropriate plans, especially in case of meaningful alterations in operation and infrastructure.

With the simulation carried out in the study, it was identified that in the proposed future scenario, the Basic Air Protection Zoning Plan (PBZPA) and the Air Navigation Aid Zoning Plan (PZPANA) will remain covering the 02 current municipalities already affected, considering that the Passo de Los Libres city is located in Argentina, a neighbor country.

The study also verified, that for both the Current and Future Scenarios, the simulated 65 dB noise contours extrapolate the airport patrimonial limits. To evaluate the impact, the quantity of people affected by the noise levels of the aeronautic noise, according to the chart below, for both scenarios.

Chart 3-2: Aeronautical Noise Impacts On The Neighboring Population In Current And The Future Scenario

Area inside noise contours	Number of people living inside the contours		Number of residences inside the contours	
	Current Contours	Future Contours	Current Contours	Future Contours
65 -70dB	9	49	3	14
70 - 75dB	0	3	0	1
75 - 80dB	-	-	-	-
80 - 85dB	-	-	-	-

Source: GCA Consortium.

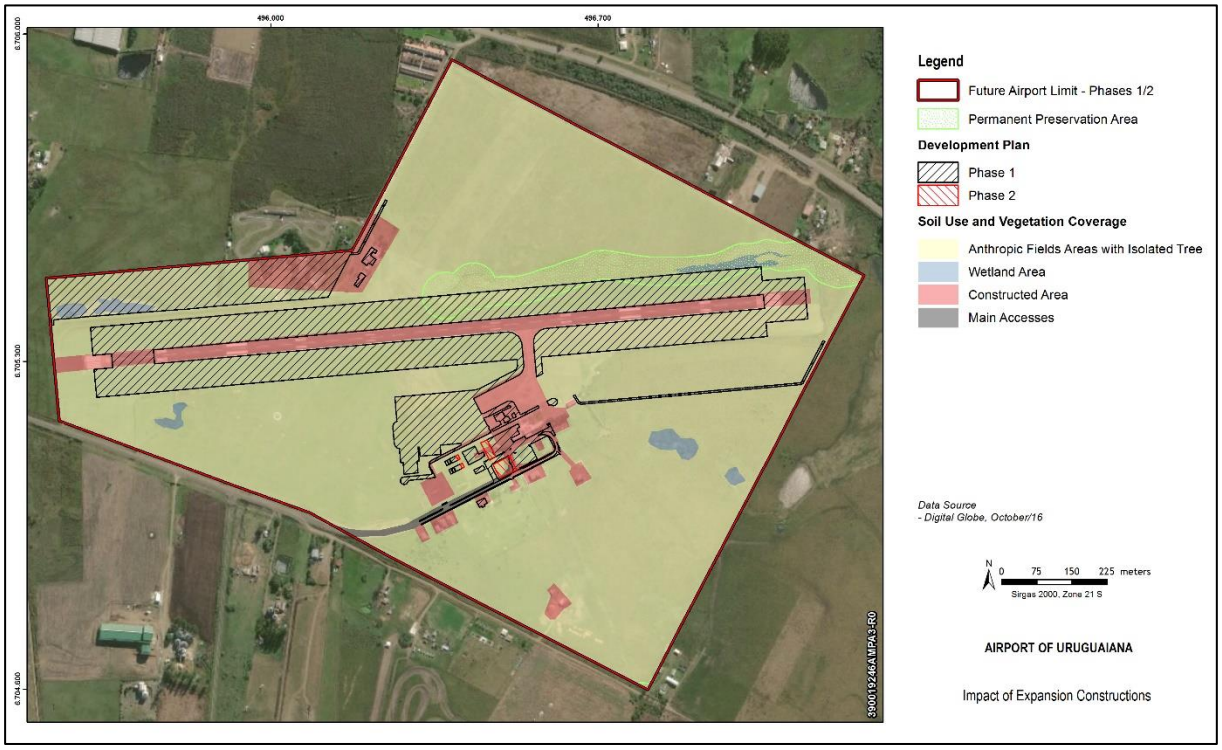
Besides of estimating the number of people living inside the contours, the Environmental Report also identified receptors affected by the aeronautic noise because of public activities (e.g. hospitals, schools and others) both for Current and proposed Future Scenario. For the Airport of Uruguaiana no sensitive receptors were identified for both scenarios.

Regarding risks to the Fauna, the study identified the main focuses of attraction inside the Airport Safety Area (ASA), a circular area with 20 km of radius, marked from the geometric center of the longest runway. We highlight the focus related to the presence of water bodies in the region. Thus, the airport manager shall help the municipality to monitor the focuses and to develop educational actions in order to avoid the appearance of new focuses.

Based on all these surveys, the main goal of the study was fulfilled, especially regarding the legal and environmental restrictions of the airport and its neighboring areas. Socio-environmental criteria to be incorporated to the project were identified and oriented the Development Plan in order to minimize environmental impacts.

Therefore, the Development Plan for the airport considered every restriction and environmental criteria surveyed in the study. The solution proposed is the one with the lowest environmental impact in the airport region and that allows its compliance with applicable legislation. The following figure shows the impact of expansion works on soil use and coverage.

Figure 3-4: Impact Of The Adequation Constructions On Soil Uses And Coverage



Source: GCA Consortium.

Evaluating the construction works impact on soil use and coverage in the Airport of Uruguaiana, we verified that 86.28% are in the Anthropic Fields areas with isolated tree individuals, 11.91% are in the already constructed areas, 1.54% are in wetland areas and 0.27% in existing accesses. In phase 1, 5.68% are interventions to be made in Permanent Preservation Areas (APP).

Concerning socio-environmental risks associated to the project, *i.e.*, situations that may impair or delay the execution of foreseen activities and constructions, three risk situations were identified and summarized below.

Chart 3-3: Risks And Their Respective Strategies To Minimization

Socio-environmental risk management at the Airport	
RISK SITUATION 1	Intense population density in the airport's surroundings
Identified risk	• Airport operations may affect the neighboring population with unpleasant levels of noise. • Conflicts between airport activities and surrounding soil use and occupations.

Socio-environmental risk management at the Airport	
Strategies to minimize the risk	• To establish technical partnership with Uruguaiana municipality to incorporate the Specific Noise Zoning Plan (PEZR) in municipal legislation and in the procedures of real estate approval in areas affected by the airport noise contours and other use and occupation restrictions concerning operational safety. • To perform educational and awareness activities with the surrounding Community on the importance of preserving and respecting the airport's property limits.
RISK SITUATION 2	Difficult on the expropriation of areas interfering in the runaway strip
Identified risk	• Delay in constructions execution; • Occasional legal conflicts, especially involving the aeroclub, related to the investments made locally; • Operational limitations caused by obstacle in the runaway strip;
Strategies to minimize the risk	• To inaugurate partnership with the municipality of Uruguaiana for issuing a new Decree of public utility (*Decreto de declaração de utilidade pública*), considering that the Decree n. 604/2017 revoked Decrees n. 119/2014 and 148/2014, that defined the areas for the airport's expansion (at the runaway ends and strip); • If the expropriations do not fully occur up to the IL issue, o concessionaire may request the issuing of a partial IL, authorizing the constructions only in areas effectively expropriated and under its domain.

Source: GCA Consortium.

Considering that the local availability of input and raw material suppliers, and of waste disposal sites required to implement the Development Plan are essential to the Project feasibility, the Environmental Report listed potential licensed suppliers to help estimating costs in the Report of Engineering and Related Issues.

The study also presents the licensing guidelines required for the entire concession period, accompanied by the respective schedules for the implementation and operation phases of the airport.

For the Operational phase, considering that the Airport of Uruguaiana renewed the license in 2020, the airport manager will receive the airport with an Operating License valid until 2025.

Based on these conditions, the chart below presents recommendations to the future airport manager, regarding the conduction of the airport's operating licensing:

Chart 3-4: Recommendations For Conducting The Airport's Operating Licensing

Recommendations for conducting the airport's operating licensing
Once you took over the airport's management, you must request the license titularity transference to your name and CNPJ.
During the airport operation, all the constraints of the future Regularization Operating License (or similar) must be addressed. Periodical reports on the activities' execution must be presented to the environmental agencies.
To request the OL renewal at least 120 days before its expiration date, according to paragraph 4th of article 12 of Complementary Law n. 140, from December 8, 2011.
After the end of each construction phase, if authorized by means of an Installation License, the entrepreneurship shall request these constructions to be included in the current operating license, avoiding the issuing of several OL for the same airport enterprise.

Source: GCA Consortium.

Besides of the operating environmental licensing of the airport, the airport operating activities will be regular by the issuing of authorizations, exemptions and complementary grants and documentation approval by regulatory public agencies. The chart below presents the estimated timeframes used in the present study.

Chart 3-5: Estimated Timeframes For Other Authorizations, Grants And Licenses

Description	Estimated timeframe	TOTAL
Regularization/Renewal/ Transference of Grant for water resources use (AA[1]) and Grant Issuing (OC[2])	2 months (AA[1]) 2 months (OC[2])	4 months
Regularization of Federal and State Technical Registration (AA[1])	2 months (AA[1])	2 months
Elaboration/Regularization/Renewal of IPF and PGRF (AA[1]) and validation in ANAC (OC[2])	15 months (AA[1]) 3 months (OC[2])	18 months
Elaboration /Regularization of noise contours and PZR (AA[1]) and validation and registration in ANAC (OC[2])	6 months (AA[1]) 3 months (OC[2])	9 months
Regularization of PBZPA and PZPANA(AA[1]) and validation in ANAC and DECEA (OC[2])	6 months (AA[1]) 4 months (OC[2])	10 months
Mining block request to DNPM (AA[1]) and mining block issue (OC[2])	2 months (AA[1]) 2 months (OC[2])	4 months

Notes:

[1] AA- Airport manager

[2] OC- Responsible agency

Source: GCA Consortium.

Regarding the expansion and adequation constructions phase, the Development Plan proposed for Airport of Uruguaiana will be implemented in two phases. The chart below summarizes the licensing assumptions for each phase.

Chart 3-6: Licensing Assumptions For The Expansion And Adequation Constructions Of Airport Of Uruguaiana

Evaluated aspects	Phase 1	Phase 2
Impact degree of the constructions	Medium	Medium
Licensing agency	FEPAM (State)	FEPAM (State)
Applicable licenses	PL and IL	LPIA
Studies to be performed	RAS and PCA	RAS and PCA
Maximum estimated timeframe for studies and licensing	**12 months**	**7 months**

Source: GCA Consortium.

Phases 1 and 2 of the Development Plan were classified as of medium environmental impact. For this reason, the elaboration of Simplified Environmental Report (*Relatório Ambiental Simplificado - RAS*) and the Environmental Control Plan (*Plano de Controle Ambiental – PAC*), aiming at obtaining Preliminary License (PL) and Installation License (IL) for Phase 1 and Preliminary License and Installation License for Alteration (LPIA) for Phase 2.

Chart 3-7: Estimated Timeframes For Licensing Constructions Of Medium Environmental Impact

Description	Estimated timeframe
RAS elaboration for PL issue	3 months (AA[1])
PCA elaboration for IL issue (simultaneous to RAS elaboration)	3 months (AA[1])
RAS analysis and new PL issue	4 months (OA[2])
PCA review and compliance with the constraints after the PL issue	1 month (AA[1])
Analysis and new IL issue	4 months (OA[2])
TOTAL	**12 MONTHS**

Notes:

[1] AA- Airport manager

[2] OA- Environmental Agency

Source: GCA Consortium.

Chart 3-8: Estimated Timeframes For Licensing Constructions Of Medium Environmental Impact For Phase2

Description	Estimated timeframe
RAS and PCA elaboration for LPIA issue	3 months (AA1)
RAS and PCA analysis and new LPIA issue	4 months (OA2)
TOTAL	**7 MONTHS**

Notes:

[1] AA- Airport manager

[2] OA- Environmental Agency

Source: GCA Consortium.

The airport manager should also analyze verify other authorizations required to enable the Development Plan, concerning the licensing of all its three phases. The chart below summarizes this evaluation for Airport of Uruguaiana.

Chart 3-9: Environmental Authorizations And Procedures Required For The Airport Of Uruguaiana

Authorization/Procedure	Applicability for the Development Plan
Municipality Opinion	Applicable
Authorization for Vegetation Suppression (ASV) and/or Intervention in APP	Applicable
National Institute of Historical and Artistical Heritage (*Instituto do Patrimônio Histórico e Artístico Nacional - IPHAN*) Opinion	Applicable
Grant of water resources use	Applicable
Mining Block	Applicable
Authorization from Conservation Units Managers	Not applicable
Authorization for intervention in traditional communities or its surrounding zones	Not applicable

Source: GCA Consortium.

To achieve excellence in socio-environmental management, this study presented mitigation measures, suggestions on Sustainability Guidelines, Environmental Management System, Environmental Plans and Programmes and Environmental Development Indexes to the future airport manager, considering all the environmental subjects assessed herein.

Finally, the study presents the socio-environmental cost budget foreseen for the expansion constructions (CAPEX) and for the airport operation (OPEX), summarized below:

Chart 3-10: Socio-Environmental Costs In R$ Estimated For The Airport Of Uruguaiana

Activity	Phase 1	Phase 2	TOTAL
Licensing and Analysis Fees	67,113.30	36,823.28	103,936.58
Environmental Studies	312,351.91	312,.351.91	624,703.83
Environmental Management of the Constructions	1,647,028.86	2,052,654.34	3,699,683.20
Vegetation Suppression and Forest Compensation	54,376.04	-	54,376.04
Confirmatory Investigation of Passives	194,973.78	-	194,973.78
Environmental Passives Recuperation	-	-	-
Environmental Compensation SNUC *	-	-	-
Total	**2,275,843.89**	**2,401,829.53**	**4,677,673.42**

* Not applicable in this case

Source: GCA Consortium.

Chart 3-11: Environmental OPEX Estimated For The Airport Of Uruguaiana

Item	Activity	Total Cost (R$)
2.1	Environmental Licensing Fees	905,962.74
	OL Renewal	210,355.14
	TCFA – IBAMA	695,607.60
2.2	Operation Environmental Management	3,572,471.16
2.3	Elaboration of PBZPA and PZPANA	205,678.91
2.4	Fauna Management Programme	2,854,361.15
	PF and PGRF Elaboration	2,494,361.15
	Fauna handling actions	360,000.00
2.5	Noise Management Programme	89,252.79
2.6	Energy and Air Emissions Management Programme	23,817.19
2.7	Water Resources and Effluents Management Programme	3,313,271.07
	Sampling Plan Elaboration	23,817.19
	Water Resources Monitoring	3,289,453.87
2.8	Solid Waste Management Programme	37,282.87
2.9	Social Communication, Environmental Education and Training	481,192.34
	TOTAL	**11,483,290.23**

Source: GCA Consortium.

The Environmental Studies maintained the innovations presented in the study is elaborated by GCA Consortium of the 5th Round of Airport Concessions from Federal Government, which culminated in the concession of 12 airports for private initiative. They are:

- Analysis of soil use and occupation inside noise contours, by means of identifying the quantity of residences and their respective areas, people and average quantity of people per residence based on census information (IBGE, 2010);
- Survey of focuses of fauna attraction, using criteria defined by specific aeronautical legislation;
- Survey and analysis of collision indexes involving aircrafts and fauna, according to data provided by CENIPA;
- Identification of areas vulnerable to the airport activities, since there are fauna and flora species of restrict distribution located in regions under the aerodrome influence, according to ICMBIO criteria;
- Risk evaluation of environmental passives based on a methodology adapted from FMEA (Failure Mode and Effects Analysis);
- Indexes proposition according to GRI Standards (version 2016) and GRI G4- Airport Operator Sector Disclosures (version 2013) references, correlating them to the Sustainable Development Goals (Objetivos de Desenvolvimento Sustentável -ODS), to the IFC Performance patterns, and with the guidelines of Global Pact.

In addition, with the participation of several professionals specialized in the environment area and with effective practice on airport operation, the flowing innovations were performed in the Environmental Studies:

- Identification of all kinds of irregular superficiaries and occupations in the property and the expansion area;
- Survey of potential cave occurrences in the airport area and its surroundings;
- Information on the existence of mineral deposits in the airport area and its surroundings;
- Evaluation of mining rights in the airport area and its surroundings;
- Amplification of identified classes of environmental passives and its respective results presented by an Excel spreadsheet, with friendly and intuitive interface;
- Survey on receptors sensitive to aircraft noise – public institutions, hospitals and schools – located inside the airport noise contours;
- Indication of licensed potential suppliers of inputs and raw materials, close to the airport, for the Development Plan constructions;
- Indication of licensed sites for adequate waste disposal, close to the airport;
- Evaluation of the airport position on the ranking of airports used for animal traffic, as well as proposition of actions to prevent traffic;
- Use of indicators from the Guide of Good Practices for Elaborating Indicators of Operational Safety elaborated by the Brazilian Group of Operational Safety in Airport Infrastructure (BAIST), published in August 2019;
- Quantification of the expansion construction impacts in Permanent Preservation Areas (APP) and proposition of differentiated forest compensation, according to local legislation;

- Use of data on water, obtained by SPT drilling performed by GCA, to guide the estimated budget of Confirmatory Investigations and sites with suspected contamination in the airport;
- Incorporation of sustainable proposals in the Development Plan;
- Definition of Sustainability guidelines for the airport operations, aligned with the policies adopted by the Ministry of Infrastructure.

4 ECONOMIC AND FINANCIAL EVALUATION

This section presents the Executive Summary of the Economic and Financial Evaluation for the 30-year concession of **Uruguaiana Airport – SBUG** modelled between 01/October/2021 and 30/September/2051. Currently, the airport's total revenue is R$0.5 MM and its EBITDA margin is -419% (considering 2018 data)[10].

Revenues

The economic and financial evaluation is based on revenue projections which include:

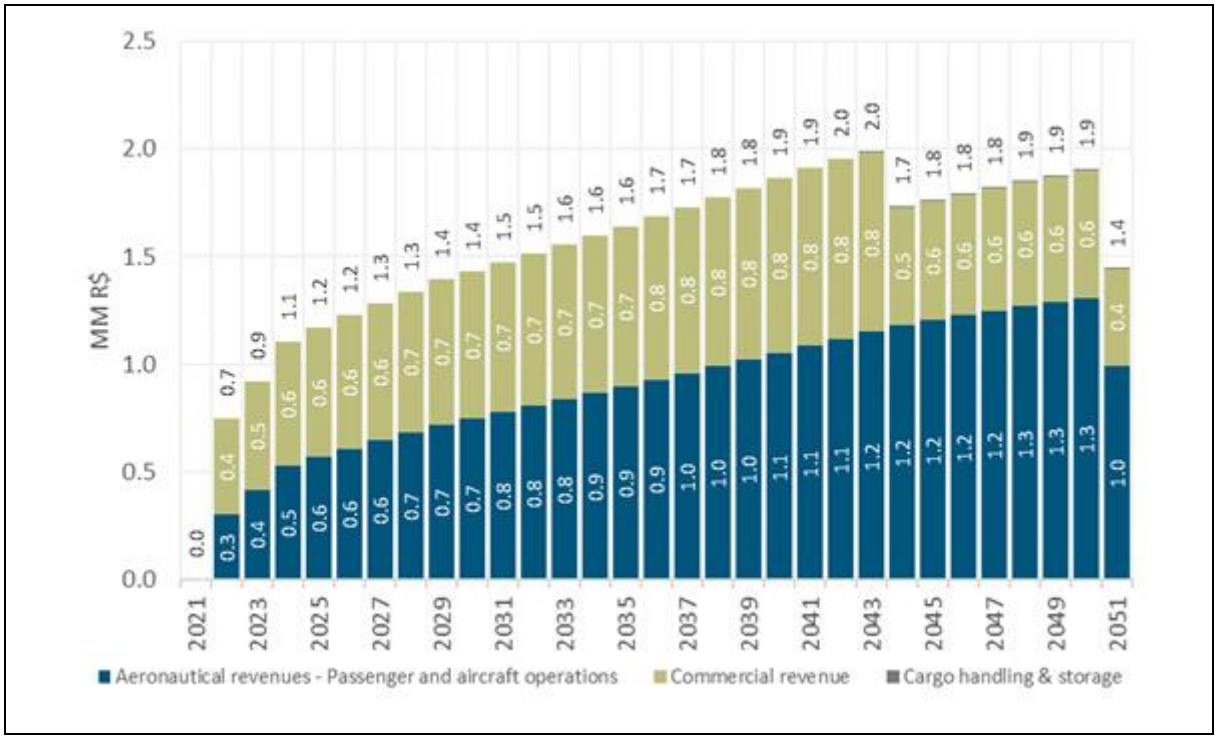
- Aeronautical revenues, resulting from regulated fees on the various operation types. These have been categorized as passenger and aircraft fees and cargo handling and storage fees;
    - Aeronautical revenues – passengers and aircraft operations: applicable to both passenger flows (domestic and international boarding or connection fees) and aircraft operation and parking, by operation type (domestic and international landing and parking fees, and landing and boarding and parking fees for general aviation);
    - Cargo handling and storage: due for cargo handling and storage services where rendered directly by the Airport operator at the air cargo terminal (TECA), and may divide into import, export and domestic cargo;
- Commercial revenues, related to services and goods provided to passengers, airlines and other business users, i.e. international air cargo terminal, retail, food & beverages, car parking, aircraft fuelling, car rental etc.

Forecasts for aeronautical revenues are based on expected Airport throughput, which include passenger flows, cargo, mix of aircraft types and aircraft operations, and their respective fees. Meanwhile, forecasts for commercial revenues consider not only expected demands and their respective impacts over each category of business, but also efficiency gains resulting from contract renegotiations between the concessionaire and the lessees of commercial areas, following market benchmarks.

Total revenues are expected to grow on an average of 2.7%p.a. between 2023 and 2050. Aeronautical revenues will increase during the concession period, from 45% in 2023 to 69% in 2050.

[10] All monetary value presented in this report is given in constant Real (R$) values based on January/2019 real prices, following SAC/MI guidance.

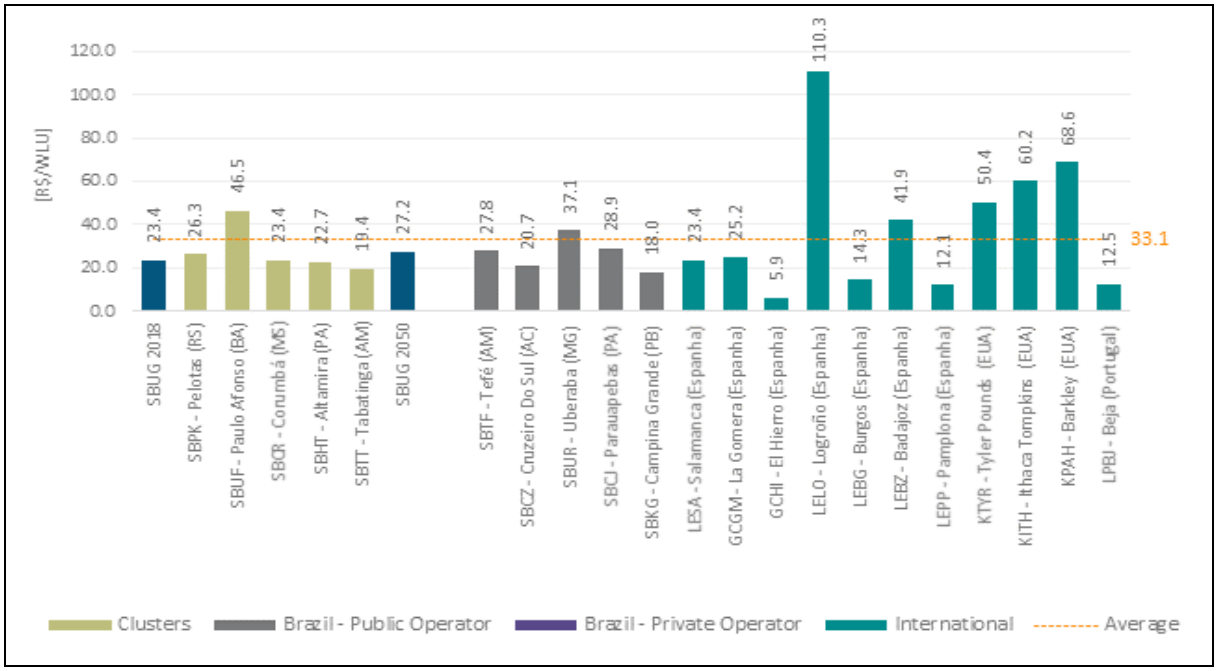
Figure 4-1: Total revenues during concession



Source: GCA Consortium.

In 2050, the Airport's revenue per WLU will be R$27.2. Airport indicators are below the average of comparable airports (Figure 4-2).

Figure 4-2: Revenue per WLU benchmark



Source: GCA Consortium.

Costs and expenses

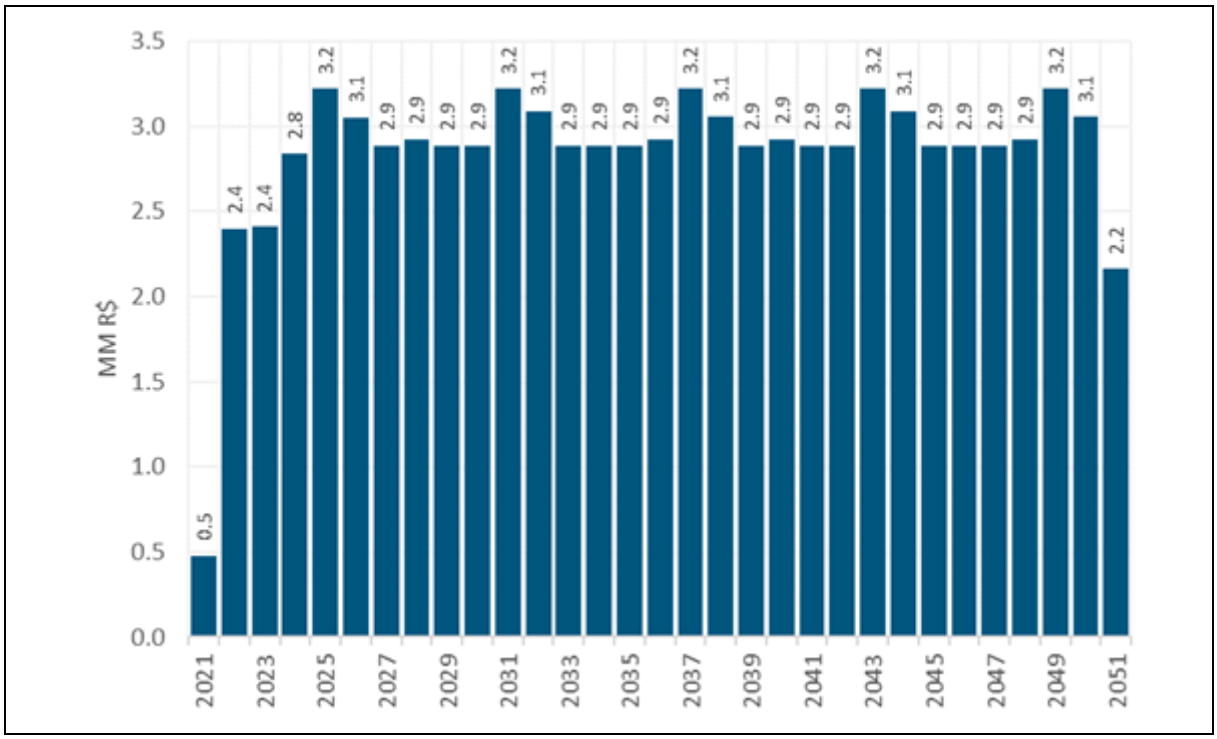
Airport operating costs and expenses are mainly related to personnel and outsourced services, in addition to utilities and public services and consumables.

After the concession, the concessionaire will take up new obligations, which include performance bond, socio-environmental expenses and property tax (IPTU). The concessionaire must also pay grants, applicable according to the feasibility of the concession and therefore not discussed under this item.

Costs and expenses forecast take into account the most appropriate forecast drivers for each item, that is, the variables that best explain the evolution of the observed costs. Additionally, costs and expenses forecasts were based on current values and considered initial efficiency gains derived from private management as well as economies of scale, determined from benchmark analyses.

Airport costs and expenses ranged around R$2.9MM over the concession period (Figure 4-3). Personnel and Outsourced services costs are the most significant, representing 35% and 22% of total costs in 2050, respectively.

Figure 4-3: Costs and expenses during concession (prior to grant values)



Source: GCA Consortium.

It is important to emphasize that, before entering into the concession agreement, the concession holder will be required to settle funds for Infraero's staff readjustment program, reimbursement to authors of the feasibility studies, and compensation to São Paulo stock exchange (B3) for holding the auction. (Table 4-1).

Table 4-1: Obligations to be met prior to signing the contract

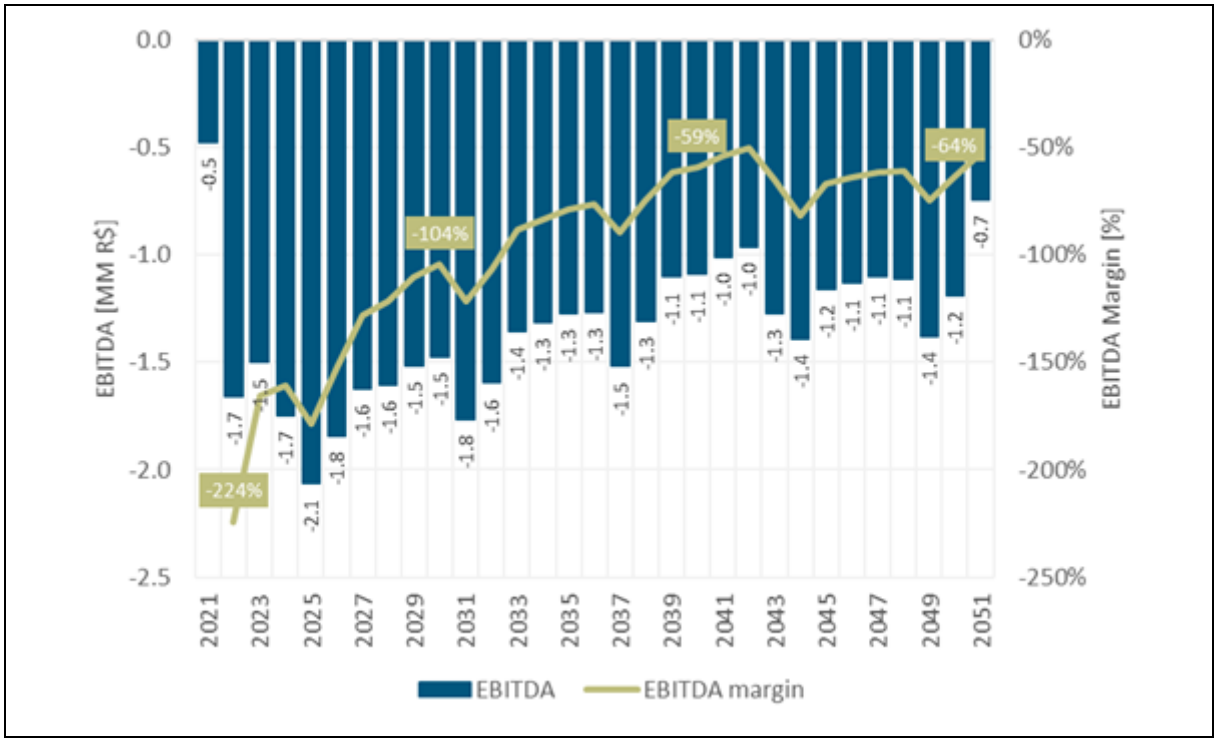
Values in MM R$	TOTAL
OBLIGATIONS TO BE MET PRIOR TO SIGNING THE CONTRACT	**(7.9)**
Funds for Infraero's staff readjustment program	(5.7)
Reimbursement to authors of the feasibility studies	(2.1)
Payment to B3 for holding the auction	(0.1)

Source: GCA Consortium.

EBITDA and margin

Net of grant payments, the concession EBITDA is forecast to be R$1.5MM negative in 2023 and to reach R$1.2MM negative in 2050 (Figure 4-4). EBITDA margins increase is forecast throughout the concession due to expected economies of scale.

Figure 4-4: EBITDA and EBITDA margins during concession



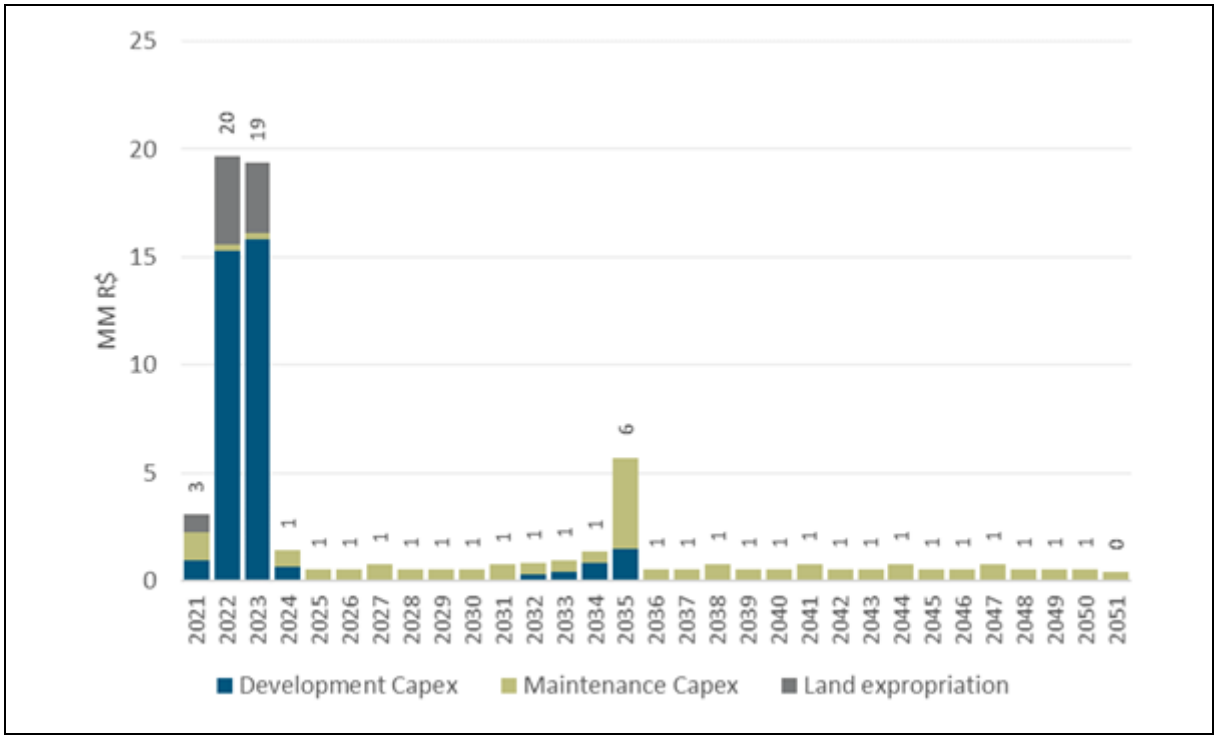
Source: GCA Consortium.

CAPEX

The development plan, expansion of airport assets to meet growing demands and ensure appropriate level of service, requires a total investment of R$66MM.

Development investments (topical and intended to expand airport assets, including expropriations) will be divided into different phases and amount to a total R$44MM. Maintenance investments (periodical and intended to maintain and replace assets, including re-paving cycles) add up to R$22MM throughout the concession period. (Figure 4-5).

Figure 4-5: CAPEX during concession

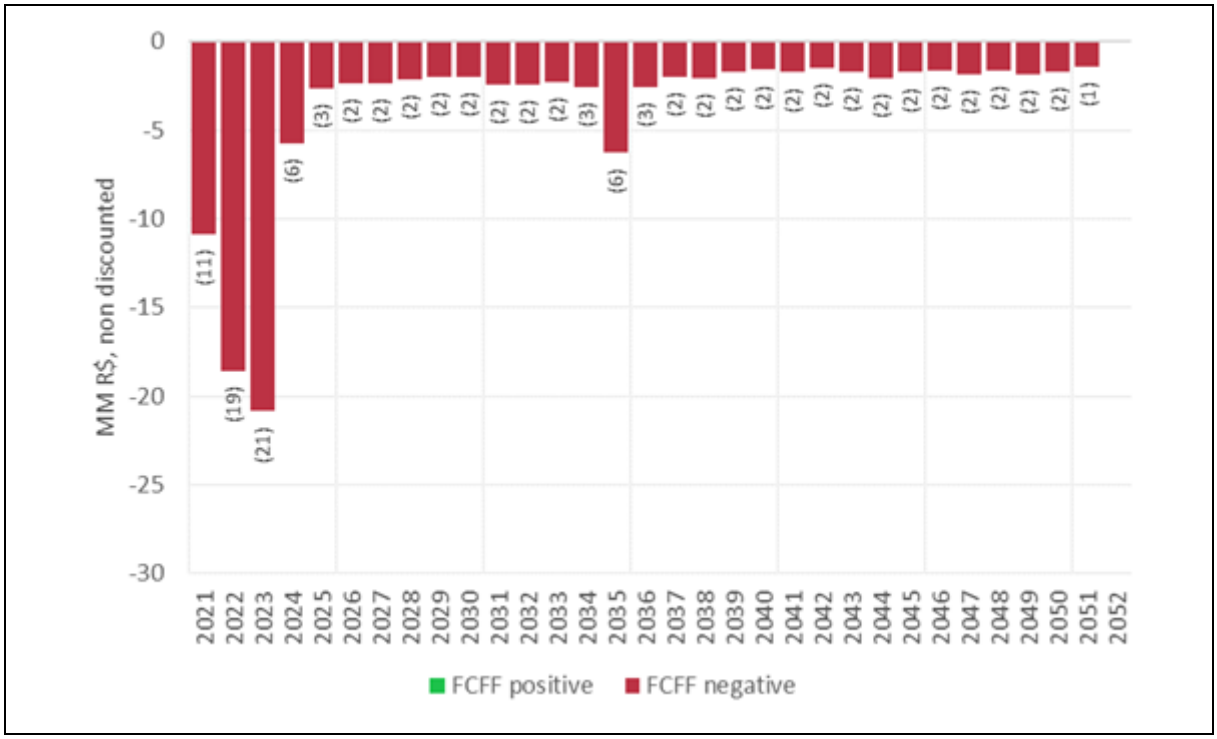


Source: GCA Consortium.

Evaluation of concession's financial feasibility

The project's forecasted free cash flow (FCFF) is presented in Figure 4-6, which shows the FCFF is negative throughout the concession. This being the case, it is not possible to compute either IRR or MIRR for the project, and the concession is not financially feasible.

Figure 4-6: Free cash flow to firm (non-discounted – prior to grant values)

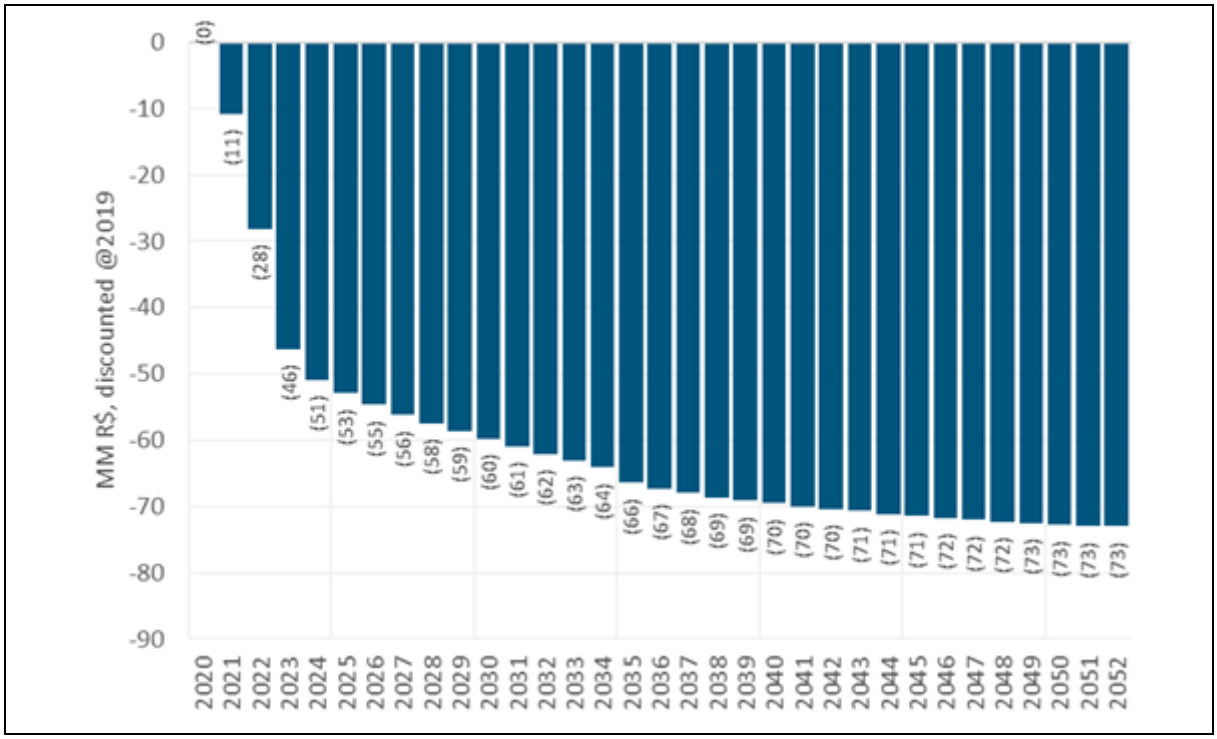


Source: GCA Consortium.

The cumulative discounted FCFF (given the referential weighted average cost of capital – WACC set at 7.23%p.a., real), from which the NPV net of grant payments is determined, is shown in Figure 4-7. Project does not offer a rate of return to its capital providers, consequently, the NPV is negative (**R$-73.0MM**). As such, the isolated concession of the Airport is not financially feasible and cannot support grant payments made out to the Government.

This result is mainly due to the high relevance of the initial investments to meet required airport's appropriate level of service, in addition to its inability to generate positive cash flow.

Figure 4-7: Cumulative discounted free cash flow to firm (net of grant payments)



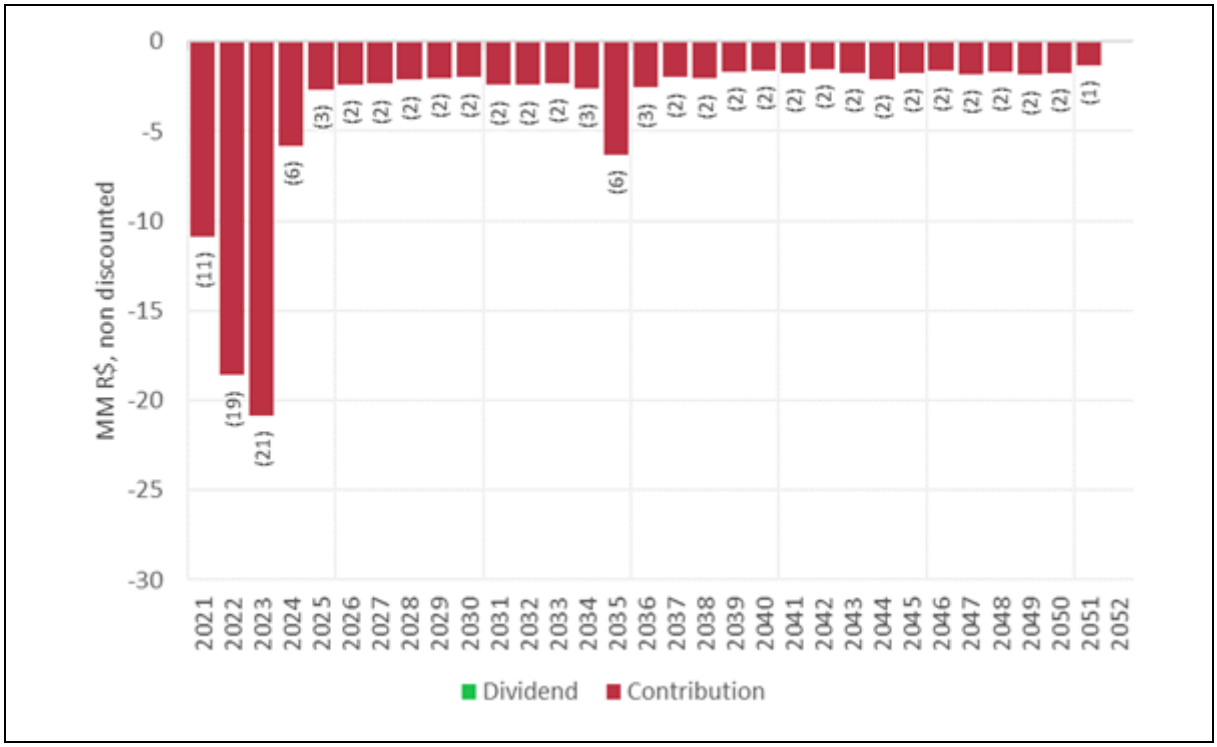
Source: GCA Consortium.

Attractiveness to shareholders

Analyses of the project's attractiveness to shareholders consider: (i) third-party funding (long term BNDES loan and issuing of debentures, given market conditions and minimum covenants); (ii) equity needs; and (iii) the possibility of dividend payments throughout the concession.

Figure 4-8 presents the forecast flows of capital injections and dividend distributions. The concessionaire needs to inject equity resources for the duration of the concession. The main contributions occur during the first two development phases, with equity needs decreasing as airport demand and efficiency gains increase. Given this scenario, there is no equity IRR.

Figure 4-8: Contribution and dividend flows, non-discounted (post-payment of grants)



Source: GCA Consortium.