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CH2MHILL
9191 S. Jamaica St.
Englewood, CO 80112

TANCREDO NEVES INTERNATIONAL AIRPORT

Airport Master Plan

PREPARED FOR
State Government of Minas Gerais Economic Development Secretariat
BELO HORIZONTE, BRAZIL

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Tancredo Neves International Airport

Airport Master Plan

Prepared for

State Government of Minas Gerais Economic Development Secretariat

Belo Horizonte, Brazil

June 2011

CH2MHILL
CH2M HILL, Inc.
9191 S. Jamaica St.
Englewood, CO 80112

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The following subcontractors performed work on this U.S. TDA Project:

BMEL Business Solutions, LLC

2008 Riverside Avenue
Suite 302
Jacksonville, FL 32204

Point of Contact:
Bingham L. Parkinson: Chief Executive Officer
Phone: 904.388.1418
Fax: 904.388.1416

Hirsh Associates

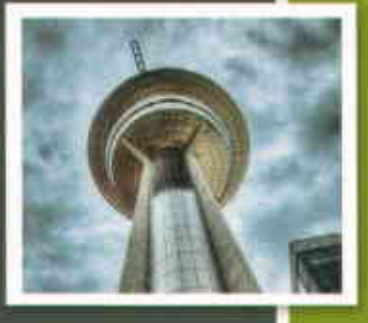
17 Clayton Place
Ridgefield, CT 06877

Point of contact:
Joel Hirsh, President
Phone: (203) 438-7886
Fax: (203) 438-4229

Nathan Associates, Inc.

2101 Wilson Boulevard
Arlington, VA 22201

Point of Contact:
Rafael Enriquez, Senior Consultant
Phone: (703) 516-7700
Fax: (703) 351-6162



Introduction

Introduction

This report presents the Airport Master Plan for Tancredo Neves International Airport (TNIA) in Belo Horizonte, Brazil. This report includes analysis of all airside, terminal and landside requirements for the 20-year phased airport development of the airport.

This Master Plan updates an airport master plan that was completed by Changi Airport Consultants (Changi) in August 2009. While the Changi master plan presented an analysis of the airport facility requirements for the airport, it was based on Year 2008 passenger demand (as a Base Year) and on historical aviation traffic from 1995-2008.

There has been significant growth in aviation demand at TNIA in 2009, 2010 and the first quarter of 2011. In fact, aviation demand at the airport has grown over 80 percent in the past 4 years. IN addition, there have been significant changes in airline route structures and airline fleet mixes since 2008. This current airport development plan presented in this report incorporates these recent growth factors into the long-range planning for TNIA airport.

This report is organized per the U.S. TDA Terms of Reference as follows:

Chapter 1 – Inventory Analysis. This chapter provides a summary of the data collection conducted as part of this Airport Master Plan.

Chapter 2 – Forecasts of Aviation Demand. This chapter describes the Changi forecasts that were used as input into this study.

Chapter 3 – Airfield Area Demand/Capacity and Facility Requirements. This chapter describes the future runway, taxiway, and navigational aids required for future airport development.

Chapter 4 – Terminal Area Demand/Capacity and Facility Requirements. This chapter describes the passenger terminal and other terminal area requirements for the phased airport development at TNIA.

Chapter 5 – Airport Alternative Concepts. This chapter describes the alternatives that were studied for future airfield and terminal area development.

Chapter 6 – Airport Security. This chapter includes analysis of current and future airport security requirements.

Chapter 7 – Order-of-Magnitude Project Cost/Phasing. This chapter includes a cost analysis of the phased airport development plan as presented in Chapters Three, Four and Five.

Chapter 8 – U.S. Export Potential. This chapter provides a list of potential U.S. suppliers of equipment and services for implementation of this Airport Master Plan.

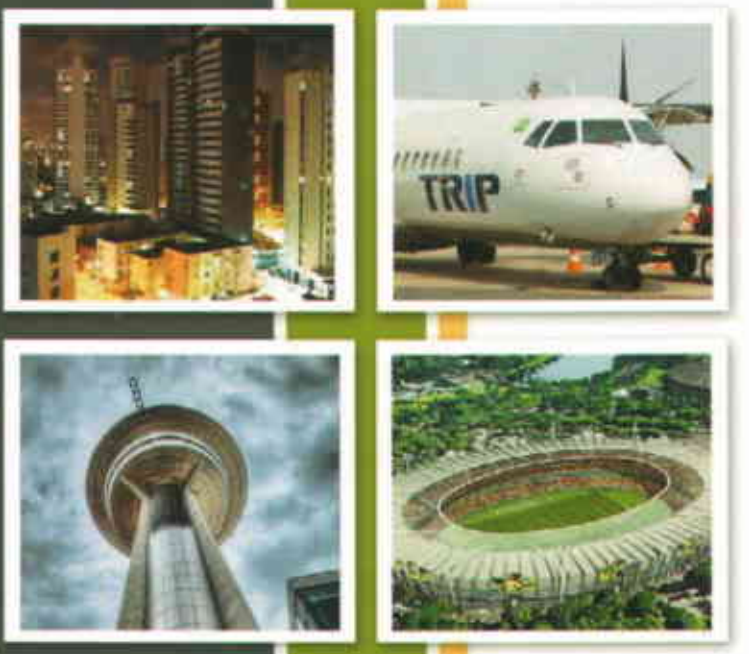
Chapter 9 – Industrial Plan. This chapter provides a detailed analysis of industrial plan development and recommendations for both on-airport and off-airport industrial and business development.

Chapter 10 – Airport Financial Analysis and Investment Alternatives. This chapter provides a conceptual financial analysis of the future TNIA implementation plan and also describes options for investment alternatives, including privatization and Public-Private partnership alternatives.

Chapter 11 – Environmental Impact Assessment. This chapter provides an overview of possible impacts on the environment and includes recommendations for future environmental impact analysis.

Chapter 12 – Developmental Impact. This chapter highlights the potential impact that the implementation of the TNIA airport development plan would have on infrastructure, industry, potential market-oriented reforms, human capacity building, and technology transfer.

Chapter 13 – Airport Plans. This chapter provides a summary of the plans that have been included in this report.



CHAPTER 1

Inventory Analysis

CHAPTER 1

Inventory Analysis

This chapter summarizes the data that was collected as part of the Tancredo Neves International Airport (TNIA) Airport Master Plan. A very large amount of data has been collected as part of this master planning project. Consequently, we are including a summary that incorporates the overall types of data, reports, and information that was collected.

A detailed preliminary list of data requirements was sent to SEDE on January 18, 2010. After review of the initial data supplied by SEDE, three subsequent data requests were sent to SEDE to cover additional technical, financial and economic development information and data.

The four separate data requests made by CH2M HILL from January 2010 through April 2010 are included as Attachment A to this section.

Data collected include:

- Previous airport master plan report and airport operations report completed by Changi Airport Consultants in August 2009 (Changi)
- Traffic statistics on passenger and cargo traffic
- Statistics on airport operations and fleet mix
- Statistics on air cargo demand
- Electronic drawings including airport development plans, highway plans, and aerial photographs
- Information related to environmental features and potential environmental impacts
- Economic development studies

It is important to note, however, that some important data requested by CH2M HILL were not available, including the following:

1. No airport cost accounting or revenue data were obtained from Infraero for Tancredo Neves International Airport. Infraero does not keep separate cost center accounting for each of their 67 individual airports. As such, it is not possible to determine the exact costs and revenues associated with TNIA airport as they are aggregated with all the other airports' costs and revenues. As discussed in Section 10, the financial plan developed as part of this project has been based on typical cost and income data from airports of similar size to TNIA.
2. While a significant number of drawings and graphics were obtained from SEDE, no accurate base mapping was available. As such, the drawings produced are based on the available drawings which are not tied to accurate planimetric and survey drawings. While this does not present a problem for this master plan study, it is important to note that future design and construction will need to incorporate accurate topographical survey data for all follow-on airport development projects. This has been noted on all plans and drawings presented in this master plan report.

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Attachment A
List of Data Requests

TANCREDO NEVES INTERNATIONAL AIRPORT MASTER PLAN PROJECT

PRELIMINARY LIST OF DATA

Revised: January 18, 2010

Below is a preliminary list of data requested for the Tancredo Neves International Airport Project. Once this data is reviewed our Project Team will develop a follow-on list of data, information, and questions that will be used in developing the Airport Master Plan.

- Changi Airport Master Plan, both hard copies and electronic copies of reports, drawings, and other information.
- The most recent planning documentation and data related to the Aerotropolis development and the adjacent Special Development Zone.
- Transportation studies from Minas Gerais and the Belo Horizonte region, including the study of the proposed rail connection to the airport.
- Studies related to cargo demand, cargo exports from Minas Gerais and TNIA, and exports of perishable goods.
- Detailed export data including current and forecast exports by mode (air cargo, rail, truck) and by type of export. In particular, exports of perishables (fruits, etc.) and high-value items which use air freight will be most important for this study.
- Current reports, documents and strategy being implemented by the State of Minas Gerais to attract Brazilian and foreign companies for direct investment on the airport or in the airport vicinity (Aerotropolis).
- Economic and demographic forecasts for population, employment, income and Gross Domestic Product for: Brazil, the State of Minas Gerais, and the metropolitan district of Belo Horizonte.
- Planned improvements to regional business infrastructure, including telecom and convention centers.
- Information and forecasts of tourist infrastructure and tourism demand including hotel rooms and new transportation infrastructure to accommodate the 2014 FIFA World Cup.
- Information, maps and drawings depicting both on-airport and off-airport environmental features, such as wetlands, drainage features, and noise contours.
- Data on local unit prices from previous airport and terminal development projects at TNIA or at other airports in Brazil.
- Technical studies on previous airport planning efforts at TNIA such as runway length analysis and calculations for the proposed runway extension. (Has INFRAERO completed any planning studies?). Environmental, topographical, and other engineering information related to the area that would be considered for the runway extension.
- Parallel runway related information, such as previous plans, justification, and environmental and engineering information.

- Airline communications regarding changes in fleet or service frequencies.
- The Brazil National Aviation System Plan that describes current and forecast demand/capacity and proposed airport improvements for the entire country of Brazil.
- Studies or analyses that have been completed regarding potential future international airline service from TNIA.
- Planning or communications related to new low-cost airline Azul and plans to expand service at TNIA.
- Current policy and strategy being implemented by the Government of the State of Minas Gerais to attract Brazilian and foreign companies for direct investment in facilities at the airport service area.
- Existing GIS data for Minas Gerais, including roadways, waterways and utilities. Also on- and off-airport environmental features including wetlands and drainage features.
- Airport data, including the following:
  - Historical passenger demand from 1995-2009, including international, domestic and non-scheduled (charter) passenger demand
  - Annual air cargo and mail volumes for 1995-2009
  - Peak hour passenger demand for domestic and international passengers for the period 2005-2009
  - Peak hour aircraft operations for the period 2005-2009
  - Inventory of airport facilities
  - Autocad drawings showing all existing airport facilities
  - Autocad or other electronic drawings of off-airport facilities
  - Autocad or other electronic drawings showing drainage features and environmental features
  - Autocad or other electronic drawings showing topographical features and elevations.
  - Obstruction charts of the airport and off-airport environs
  - Historical wind data and wind rose
  - Historical weather data for the airport including data on visibility and ceiling conditions

Forecast data for the period 2010-2030, including the following:

- Annual passengers – domestic and international
- Peak hour passengers – domestic and international
- Peak hour aircraft operations and peak hour aircraft fleet mix
- Additional peak demand anticipated from the 2014 World Cup
- Annual cargo volumes
- Vehicle volumes on airport access road

Financial statements and other financial information including but not limited to:

- Airport revenues by source
- Airport expenses by area or sector
- Information on debt and other data
- Financial statements

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TANCREDO NEVES INTERNATIONAL AIRPORT MASTER PLAN PROJECT

LIST OF ADDITIONAL DATA - REQUEST # 2

Revised: January 28, 2010

I. Aviation Sector Information

- Brazil's National Aviation Policy
- Air service agreements with USA, EU (or if still individual countries not replaced by EU joint agreement), South American countries, Central American countries, Mexico, etc. (only last MOU stating routes, capacity and fare regulation)
- Government reports or plans addressing airport expansion/improvement plans and feasibility studies for airports in Brazil and for airport system expansion and modernization (especially for Rio de Janeiro airport, Congonhas, and Guarulhos)

II. Market and Traffic Information

- Most recent flights schedules, with aircraft type
- From current or previous administration: performance reports, passenger surveys, management reports, etc.
- Information on competing airports, in particular Sao Paolo and Rio de Janeiro: available traffic forecasts, current traffic composition (by country of origin, by nationality, by carrier, by accommodation type)

III. Socio Economic Information

- Exchange rate data series & Inflation rate data series
- Major Trade Partners and major export/import products and markets
- Foreign investment data series (historic and forecast)
- Hotel industry: number of hotels rooms (and beds), by region (by hotel category, including hostels): data series and forecasts of new investments, data series of monthly occupancy rates per hotel category, average time spent in country, average spending per passenger
- Projected projects within the transport sector in general (roads & rail) in Brazil and in Minas Gerais
- Ministry of Tourism major upcoming projects (any available reports or project descriptions)
- Other tourism reports

IV. Financial Information

- Airport Company Annual Reports (last five years)
- Airport Company Audited Financial Statements (last five years) including detailed breakdown of operating revenues and operating costs (Please provide hard and electronic copies of financial information if available)

- Current and historic (last five years) personnel profile, headcount, and average labor cost per employee per category level (discriminating landside, airside and administration)
- Airport fees and charges (including adjusting mechanisms in place)
- Regulations in place on access charges (ramp handling, passenger services, use of counters/CUTE, airline offices, VIP lounges, fuel and catering) – including relevant charges
- All contracts with retailers (Duty Free Shops, F&B, general retailing, ground transportation, car parking, land leases, other service providers)

TANCREDO NEVES INTERNATIONAL AIRPORT MASTER PLAN PROJECT

LIST OF DATA REQUIREMENTS - REQUEST # 3

March 4, 2010

1) **CADD drawings from Changi study in Autocad format, including:**
   a. All CADD airport layout plan and airport alternatives drawings in the Changi report showing the proposed airport development by Phase
   b. Terminal area drawings
   c. Passenger terminal drawings
   d. Other drawings in the report including industrial park, land use, and technical drawings.
2) **CADD drawings of airport and off-airport characteristics** – topography, land use, environmental features, etc., covering all areas for future airport development, new runways, industrial park development, etc.
3) **Electronic files in MS Word and Excel** containing the master plan report documents in Microsoft Word format and spreadsheets (tables) in Excel format from the Changi airport master plan
4) **Engineering reports**: geotechnical reports, environmental reports, pavement design reports, etc.
5) **Terminal space program from Changi study** showing square meter allocation of areas for all terminal facilities (for example, areas for public area, check-in, security, departure lounge, baggage claim, baggage makeup, etc.):
   a. Terminal 1 (existing)
   b. Terminal 1 (with improvements)
   c. Terminal 2 – Phase 1
   d. Terminal 2 – Phase 2
   e. Terminal 3
6) **Cargo terminal space program** from Changi study describing space allocations for the existing and proposed cargo terminals
7) **Any descriptions or detailed information on the proposed terminal improvements** that will be undertaken in 2010/2011 by INFRAERO
8) **Unit prices for recent, similar airfield, terminal, and facilities projects in Brazil, including:**
   a. Earthwork on airfield (cut/fill) -- cost per cubic meter
   b. Airfield pavement (runways, taxiways) including subgrade preparation, base course, and pavement -- cost per square meter

c. Airfield drainage facilities including drainage pipes and other facilities: cost per meter or per unit installed

d. Passenger terminal facilities (cost per square meter)

e. Passenger terminal equipment – installed costs for loading bridges, baggage conveyors, security equipment, etc.

f. Hangar facilities (cost per square meter)

g. Commercial / industrial facilities (cost per square meter)

h. Office/retail facilities (cost per square meter)

i. Hotel/conference facilities (cost per square meter)

j. Airfield edge lighting – cost per meter or per each

k. Airfield apron lighting– cost per meter or per each

9) **Year 2009 airport statistics including;**

a. International passengers

b. Domestic passengers

c. International aircraft operations

d. Domestic aircraft operations

e. General aviation aircraft operations (corporate and GA aircraft)

f. Peak hour passenger demand

g. Percent share of domestic traffic by airline

h. Percent share of international traffic by airline

i. Air cargo traffic by type

10) **Economic Development and Business Data**

a. Listing of all TNIA tenants by type; i.e., ground lease, concessionaire, government, military.

b. Description of any existing airport marketing programs including incentives being offered.

c. Business listings for regional businesses including; industrial developers, aerospace/aviation businesses, aerospace support (component manufacturers, IT, logistics, etc.), Commercial/industrial finance providers.

d. Zoning maps for the TNIA area.

e. Electronic copy of the Aerotropolis plan, in English if possible.

f. Contact names and phone numbers for TNIA tenant/operators; Airlines, air cargo, freight forwarders, Maintenance repair/overhaul, Fixed Base operators and aerospace companies, if any.

g. Copies of all existing economic development plans for the region.

11) Copies of all available historical and forecast business statistics, including; gross regional product, regional disposable income growth, air cargo (broken down by airline belly cargo and all cargo carrier if possible), regional trucked cargo (by origin and destination of possible, also if possible, an indication of how much low weight/ high value cargo that might go by air if service were available), any statistics on the size, value, and growth potential of the overnight and parcel air cargo industry.

12) Any statistics on the commercial/industrial space demand and current vacancy rates in the TNIA area.

13) Copies of any existing governmental plans, policies, direction regarding industrial development, public/private partnership policy or direction; identification of target industry markets, statewide incentive programs, marketing materials, financial and employment goals. Copies or information on current and planned workforce training programs.

14) **Financial Data**

a. Copies of the basic TNIA expense information that Infraero showed us at our February 5 meeting at Tancredo Neves airport, but would not let us keep.

b. Copies of any available revenue and cost data for TNIA. Copies of any financial data that is airport specific for TNIA. Copy of the TNIA Operations and Maintenance cost budget if available.

c. Copies of Infraero organization charts for the TNIA staff showing the organization chart connection back to the main Infraero office in Brazilia. If possible, show the full staffing numbers for the Infraero operation at TNIA, by employee type if possible, i.e.; senior management, administrative, supervisory and primary worker in operations and maintenance. Also please include the same for Pampulia Airport.

d. Listing of all contracted third party vendors and operators at TNIA, i.e.; parking operator, fueling, ground service, etc.

e. Listing of all large assets at TNIA that belong to Infraero; i.e., buses, fuel trucks, fuel tanks, mowers, heavy maintenance equipment, etc.

f. Listing of any local guidelines for procurement of goods and services including the approval process for local contract award. Please document the process for award of any contract, Local signing authority for the superintendent, etc.

g. Listing of existing Information Technology (IT) systems and capabilities for airport administration; i.e., computerized maintenance management system, automated procurement system, properties management systems, basic financial management system, etc.

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TANCREDO NEVES INTERNATIONAL AIRPORT MASTER PLAN PROJECT

LIST OF DATA REQUIREMENTS - REQUEST # 4

April 29, 2010

Additional data needed for the Industrial Plan analysis includes the following:

1. Listing of all currently licensed air carriers in Brazil, broken down into legacy/traditional and Low cost carrier (LCC) categories
2. Listing of air parcel cargo statistics, if available
3. Listing of all air cargo importers/exporters, consolidators, and freight forwarders in the metro area
4. Listing of population in 2 hour, 4 hour, and 6 hour drive radius of Belo Horizonte
5. Any available statistics on high value/low weight (potential air cargo) annual or monthly shipped cargo in the Belo Horizonte metro area
6. Listing of all currently available industrial development incentives in Belo; (free trade zone, tax increment zones, training grants, tax incentives, etc.) Some explanation of how these incentives are used
7. Listing of any available air service development incentives at TNIA or Pamphulia; (tariff waivers, fuel incentives, etc.)
8. Listing of gross convention floor space in Belo Horizonte. Annual demand (number of conventions, attendees, etc.) Are there any current or short-term plans to add convention space?

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CHAPTER 2

Forecasts of Aviation Demand

CHAPTER 2

Forecasts of Aviation Demand

This Chapter summarizes the aviation demand forecasts obtained from the State of Minas Gerais which were developed as part of the Master Plan Report completed by Changi Airport Consultants in August 2009 (Changi Forecasts).

As stated in the USTDA Scope of Work for this project, the existing aviation demand forecasts from the 2009 Master Plan Report (Changi Forecasts) are to be used as input into the facility requirements and airport planning tasks for this project. *No aviation demand forecasting or analysis of the existing aviation demand forecasts was included as part of this airport master plan Scope of Services.*

CH2M HILL conducted a review of the Changi forecasts and compared these forecasts to actual 2009 traffic statistics, 2010 traffic statistics (through September 2010), airline trends, airline flight announcements in Brazil in the past year, meetings with local airlines in Brazil, and current global aviation statistics and forecasts.

Based on this review and on the significant discrepancies between the Changi forecasts and actual 2009/2010 traffic at TNIA, CH2M HILL concluded that the Changi aviation demand forecasts needed to be adjusted for the going-forward detailed master planning of TNIA airport. The major reasons for this include:

- *Changi forecast an almost 4,000 percent increase in international passenger demand* over the 30-year planning period in the Changi Master Plan. This represents an unrealistic level of growth for international passenger demand at TNIA.

Based on analysis of the current Infraero traffic statistics for 2010, **domestic demand is 40 percent greater** than the Changi forecasts demand for 2010, and **international demand is 50 percent less** than the 2010 Changi forecast. These are huge discrepancies in the forecast passenger levels which are used to size passenger facilities and other facilities at TNIA.

Based on current growth rates of domestic and international passenger demand at TNIA, it is possible that the 2015 demand levels may be 40-60 percent higher for domestic passengers and 50-70 percent lower for international passengers when compared to the Changi forecasts.

Six domestic and regional airlines have added new non-stop airline service from TNIA over the past year. This will continue to add to the domestic passenger growth rates and domestic airline operations at TNIA.

- Changi forecast an initial drop in domestic passenger demand in 2009 followed by stronger growth of domestic demand in the medium-term. In reality *domestic demand has increased by over 70 percent* from 2007 levels (based on 2010 statistics). This is a huge increase in such a short amount of time and has put a strain on airport facilities, in particular the passenger terminal and aircraft parking apron.
- Peak hour activity and peak hour forecasts contained in the Changi Master Plan are not consistent with current traffic at TNIA.

- These large discrepancies between the actual demand and the current forecast demand make it imperative that revised annual and peak hour forecasts be developed immediately in order to verify the size and timing of proposed future airport facilities at TNIA, in particular for the proposed Terminal 2 and new aircraft parking apron which are planned to be designed in 2011 and constructed in 2012-2014.

Based on this review of the Changi forecasts, CH2M HILL developed a detailed Memorandum on June 2, 2010, to address these issues with SEDE. Of particular importance is the fact that accurate annual and peak hour forecasts form the basis for all airside, terminal and landside planning. As such, the Changi forecasts could not be used for the current master plan.

This June 2, 2010 Memorandum is included as an Attachment at the end of this Section.

As a result of CH2M HILL's analysis, SEDE and CH2M HILL mutually agreed to the following:

1. While it is not within the Scope of Service of CH2M HILL to complete a detailed revision to the aviation demand forecasts, SEDE requested that CH2M HILL use current and anticipated future aviation demand as a basis for facility requirements for domestic and international terminal requirements, airside facilities, air cargo facilities, and landside facilities. The current traffic levels and types of traffic at TNIA have been incorporated into the current airport planning study.
2. CH2M HILL conducted numerous interviews with airlines, local companies, and government officials to determine the potential demand for airline service, air cargo, and future potential growth at TNIA. This input, in particular airline user input, has been incorporated into the facility planning in Tasks 3 and 4.
3. CH2M HILL coordinated closely with SEDE during this process to assure continuous input by SEDE into the detailed short-term and long-term planning for TNIA.
4. Given the significant changes in the aviation industry and traffic levels in Brazil in the past 2 years, SEDE will continue to monitor airline trends and growth in aviation demand at TNIA in order to adjust the timing of future development.

Based on the June 2, 2010 Memorandum and discussions with SEDE, and on recent strong growth in domestic passenger demand at TNIA, *it was mutually agreed that the focus of Phase 1 development, including the proposed Terminal 2, should be on improving and enlarging domestic passenger terminal facilities immediately to meet the strong demand growth for domestic passengers and domestic airlines.* Several airlines indicated that there is currently "latent" demand for domestic airline service that is not being served at TNIA due to a shortage of aircraft parking area and to inadequate passenger terminal facilities.

The facility requirements for airside (Task 3) and passenger terminal (Task 4) are based on the most recent traffic statistics, input by SEDE, and airline user input.

It is important to note that, as stated in CH2M HILL's June 2, 2010 Memorandum, CH2M HILL has recommended that any detailed planning, design and construction for future airport facilities be preceded by an update and revision to the annual and peak hour forecasts, as these forecasts are what will determine the required airside facilities and passenger terminal requirements at TNIA. This recommendation has been acknowledged by SEDE.

As such, CH2M HILL is recommending that SEDE update the annual and peak hour forecasts as part of the programming and preliminary design analysis for Terminal 2 and other facilities.

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Attachment A
Memorandum from CH2M HILL to Sede Regarding Aviation Demand Forecasts

MEMORANDUM

To: SEDE Airport Development Team
Tancredo Neves International Airport (TNIA) Master Plan Study

From: Chris Van Note

Date: June 2, 2010

Cc: Chip Snowden

This Memorandum is being provided to SEDE as a basis for discussion and ongoing planning related to the aviation demand forecasts contained in the Changi Airport Consultants Master Plan dated August 2009.

Our Scope of Work calls for use of the Changi forecasts for our TNIA airfield and terminal planning analysis. We have serious concerns, however, about the accuracy of the short-term and long-term passenger forecasts and the use of these forecasts for the design of Terminal 2, the new aircraft parking apron (patio), and landside facilities at TNIA.

Given the fact that the design of Terminal 2, the new patio, and landside facilities will be based on the annual and peak hour passenger forecasts for international and domestic passengers, it is imperative that accurate forecasts be used that reflect the following:

- current growth rates of domestic and international passenger demand at TNIA
- overall growth in domestic aviation demand in Brazil
- regional airline and domestic airline input regarding future aircraft fleet and airline route structures within Brazil
- impacts of competing airports (e.g., Guarulhos, Congonhas, Viracopos, Rio Galeao)
- international airline decisions and strategies related to new international airline service
- realistic, achievable forecasts in international and domestic passenger demand at Tancredo Neves International Airport (TNIA) based on the above inputs

We believe that planning and designing the proposed new airport facilities based on the existing Changi forecasts will result in the incorrect types and sizes of facilities for the future users of Tancredo Neves International Airport.

Given the significant levels of investment that will be involved for Terminal 2 and associated airside and landside facilities, we recommend that revised forecasts be completed for both international and domestic passenger demand. We also recommend that a detailed analysis of peak hour demand be completed prior to design of Terminal 2, the new aircraft parking apron, and associated landside facilities as described below.

Observations regarding the Changi International Passenger Forecasts

Table 1 below shows the Changi Base Year forecast for international passengers. This table has been revised to show the actual 2009 international passenger demand and an estimate of

the 2010 demand based on the Infraero international passengers for January-April 2010. Our observations related to these international forecasts include:

- The Changi international passenger forecast for calls for an increase from 183,900 passengers in 2009 to 825,600 passengers in 2011. *This would represent an increase in demand in two years of almost 350 percent.* Such an increase would require 35-40 additional international flights per week at TNIA (as contrasted to the current 14 flights per week in 2010) in order to provide the international seat capacity for this increase in demand. Based on our discussions with Infraero, however, no new international airline service has been added at TNIA in the past year (that is, during the second half of 2009 and first half of 2010). The first four months of passenger statistics from Infraero show a 9 percent increase in international passengers in 2010 when compared to 2009. Assuming no new non-stop international airline service is introduced in 2010, the 2010 international demand can be estimated at 268,000 passengers as shown in Table 1 (as contrasted to the Changi forecast for 2010 of 578,500 international passengers).
- International passenger demand is forecast to increase cumulatively almost **4,000 percent** over the planning period (through 2039).
- TNIA international passenger demand is forecast to grow **615 percent** in the next five years. This would require significant increases in new international airline service as described below.
- As a basis of comparison, Year 2039 international passenger demand at TNIA is forecast to be **27 percent higher** in than current (2009) international demand at Sao Paolo Guarulhos Airport, and Year 2020 international passenger demand at TNIA is forecast to be **30 percent higher** in than current (2009) international demand at Rio Galeao Airport.
- TNIA currently has 3 international non-stop destinations (Lisbon, Miami and Panama City). Based on the Changi forecasts, assuming new international destinations will be served by 767-300 aircraft with an average 70 percent load factor and five (5) flights per week, the number of new international non-stop destinations that would have to be added to provide the required seat capacity to meet the forecast increase in international demand would be as follows:
  - 20 new international destinations by Year 2015 (or 114 total international flights per week)
  - 41 new international destinations by Year 2030 (or 219 total international flights per week)
  - 128 new international destinations by Year 2039 (or 654 total international flights per week)

We believe these huge increases in airline service at TNIA are not achievable based on the realities of the international airline industry. Indeed, we do not believe that even 50 percent of the international passenger demands forecast by Changi would be realistic based on the corresponding increases in new international airline service that would be required to sustain such high levels of international passenger demand.

It should be noted that in 2009 Rio Galeao (Brazil's second busiest international airport) had only 16 international non-stop destinations, and Guarulhos airport (Brazil's busiest

international airport and the country's only international hub) had 40 international destinations. In 2009 international flights averaged 528 flights per week from Guarulhos, 136 flights per week from Rio Galeao, and only 14 flights per week from TNIA.

We also note that the majority of new international flight announcements in the past 6 months have been for new service to Guarulhos, with smaller numbers of new international flights announced for Rio Galeao and coastal tourist destinations. No new international flights have been announced for TNIA.

In the short-term, we believe that Guarulhos will continue to be the focus for the majority of international airline service in Brazil, based on the following:

- The significant population base of the Sao Paolo metropolitan region (almost 20 Million) as contrasted to the much smaller population base of Belo Horizonte
- The high volume of business traffic generated by the Sao Paolo metropolitan region
- the existing domestic and international flight frequencies at Guarulhos (1,526 commercial airline flights per week)
- the significantly greater network connectivity for international-domestic connections when compared to other airports in Brazil

In addition, it is likely that tourist destinations will add some additional non-stop international flights in both the short- and medium-term, especially if infrastructure improvements and/or new airports are constructed as currently proposed by the Federal Government.

TABLE 1
Changi Base Forecast for International Passengers

Year	Changi Base Forecast	Annual Increase	Cumulative increase
2009	245,580 (1)		
2010	268,000 (2)		
2011	825,600	208%	208%
2012	1,077,300	30%	302%
2013	1,340,300	24%	400%
2014	1,619,200	21%	504%
2015	1,917,500	18%	615%
2016	2,232,700	16%	733%
2017	2,567,700	15%	858%
2018	2,908,100	13%	985%
2019	3,255,000	12%	1115%
2020	3,613,000	11%	1248%
2021	3,978,000	10%	1384%
2022	4,349,000	9%	1523%
2023	4,736,000	9%	1667%
2024	5,132,000	8%	1815%
2025	5,541,000	8%	1968%
2026	5,956,000	7%	2122%
2027	6,383,000	7%	2282%
2028	6,823,000	7%	2446%
2029	7,274,000	7%	2614%
2030	7,720,000	6%	2781%
2031	8,125,000	5%	2932%
2032	8,520,000	5%	3079%
2033	8,903,000	4%	3222%
2034	9,271,000	4%	3359%
2035	9,619,000	4%	3489%
2036	9,948,000	3%	3612%
2037	10,254,000	3%	3726%
2038	10,536,000	3%	3831%
2039	10,792,000	2%	3927%

Notes: (1) 2009 international demand from Infraero statistics2010
(2) international demand estimated based on Jan-April Infraero statistics

Based on the above observations and on the socio-economic and demographic variables in the Belo Horizonte metropolitan region, we do not believe that international airline service and international passenger demand at TNIA will increase at the exponential rates forecast by Changi. We also do not think it likely that TNIA will become a major international hub airport in South America in the next 10-20 years as Guarulhos is today.

Most importantly for short-term planning and design (for Terminal 2 and associated facilities) we also do not believe that a short-term increase of 615 percent in international passenger demand is achievable in the next five years.

A more likely scenario for TNIA is that international airline service and international passenger demand will increase at a more moderate rate driven by the following:

- continued increases in domestic traffic and domestic service at TNIA
- potential for increase regional airline service at TNIA
- increase connectivity throughout Brazil and Minas Gerais as the domestic and regional airline networks expand at the airport
- completion of the significant local economic developments planned for the Belo Horizonte metropolitan region over the next ten years
- needed improvements in airfield and passenger terminal facilities

RECOMMENDATION: Given the importance of the international passenger forecasts in the space planning and design of Terminal 2, we recommend that the current international aviation demand forecasts be revised in order to plan and design for the appropriate mix of international and domestic traffic. These revised international passenger forecasts should incorporate airline user input, international airline fleet forecasts, analysis of competing airports in Brazil, and other variables mentioned above.

These revised international forecasts are a critical input into the detailed space planning and design for the proposed Terminal 2, the new aircraft parking apron, and landside facilities.

Observations regarding the Changi Domestic Passenger Forecast

Our observations relating to the Changi forecasts for domestic passengers are as follows:

- Domestic passenger demand in Brazil is growing at a much stronger overall rate in 2009 and 2010 than international demand. In the first four months of 2010, domestic demand in Brazil increased 32 percent while international demand increase was relatively flat (that is, no growth).
- Domestic demand at TNIA has increased 37 percent in the first four months of 2010 when compared to the same period in 2009.
- New domestic service has been announced from TNIA and is expected to be introduced in the next few months. This will further increase the short-term growth in domestic demand.
- Interviews with several airlines indicate a desire to further increase domestic airline service at TNIA in the near future. These airlines stated, however, that new service at

TNIA is currently limited by the lack of aircraft parking space and insufficient terminal facilities.

- Interviews with user airlines also indicated that airline service to smaller cities and regional cities throughout Minas Gerais and Brazil are likely to grow in the next few years using smaller turboprop and regional jet aircraft.
- Airlines indicated that it is likely that future domestic traffic will be diverted from Sao Paolo airports (Congonhas and Guarulhos) due to capacity constraints at those airports
- A number of airlines serving the Brazil market are acquiring new turboprop, smaller regional jet, and narrow body (B737 type) aircraft in anticipation of increased domestic demand in Brazil.
- Infraero is forecasting continued strong growth in Brazil's domestic demand for the next five years.

Based on the above information, we believe that TNIA has significant potential for continued strong growth in domestic passenger demand. Due to central geographic location of Belo Horizonte, the capacity constraints at Guarulhos and Congonhas airports, and expansion plans for domestic airlines in Brazil, we also believe that TNIA has potential to serve as both a regional airline hub and domestic airline hub for one or several airlines (assuming adequate capacity).

Table 2 below compares the recent 2009-10 statistics obtained from Infraero to the Changi domestic forecasts. This table shows that the actual 2009 domestic demand was **13 percent** above the Changi forecast for 2009. Based on the growth in traffic in the January-April 2010 period, the domestic demand can be estimated at 6,350,000 which would be almost **30 percent** above the 2010 Changi forecast for domestic passenger demand.

Given the new domestic routes that are schedule to begin in the second half of 2010, it is possible that domestic passenger demand may reach 6.5 Million passengers in the near future, which is the demand forecast by Changi for 2013.

TABLE 2
Comparison of Domestic Passenger Demand

Year	Changi Forecast	Actual Demand	Difference from Forecast (passengers)	Difference from Forecast (%)
2009	4,746,100	5,371,633 (1)	**+625,533**	(+13.2 %)
2010	4,897,600	6,350,000 (2)	**+1,452,400**	(+29.7 %)

Note:

(1) Actual Year 2009 demand obtained from Infraero.

(2) Estimate of 2010 demand based on growth in Jan-April demand of 36% over 2009.

Based on the meetings with user airlines at TNIA, the demand at TNIA is currently constrained by the lack of aircraft apron parking and adequate passenger terminal facilities. Once these facilities are expanded, we would expect domestic demand at TNIA may show further increases as new airline service is introduced.

RECOMMENDATION: Given the observations above, we recommend that SEDE update the domestic passenger forecasts based on 1) input from regional airlines; 2) input from mainline domestic airlines; 3) analysis of competing airports and potential for regional and/or domestic hub operations at TNIA; 4) the recent growth rates; and 5) local variables that may impact future domestic passenger demand. These revised forecasts will be critical for the detailed planning and design for Terminal 2 and the aircraft parking apron.

Peak Hour Forecasts:

Runways, aircraft parking aprons, terminal facilities and landside roadways are designed based on peak hour operations and peak hour demand. Given that the current demand and anticipated future demand for international and domestic passengers varies significantly from the Changi forecasts, it is critical that a detailed analysis of peak hour demand be done based on the revised forecasts for international and domestic passengers.

This revised peak hour demand forecasts will form the basis for detailed space planning and design for Terminal 2 and associated airside and landside facilities.

RECOMMENDATION: Complete a detailed peak hour analysis and forecast to incorporate the following:

- Revised international and domestic passenger forecasts (annual forecasts) as described above
- Analysis of current peak hour operations and aircraft fleet mix (2010)
- Analysis of the potential impacts of a regional airline hub and/or domestic airline hub on peak hour operations at TNIA
- Develop peak hour forecasts for 2020, 2030 and 2039 separately for the following components:
  - Regional airline operations
  - Domestic (mainline) operations
  - International peak operations for both short-haul international (South America, Central America, and Caribbean) and long-haul international (North America, Europe, Africa, etc.)
  - General aviation operations (including corporate jet operations)
  - Assess the potential future overlap of these peak hour operations to determine the most likely combined peak hour demand to be used as a basis for terminal design and for aircraft parking requirements. This assessment of combined peak hour operations should include a sensitivity analysis to address different potential scenarios for the above-mentioned demand components.
  - Develop airport ramp diagrams for both current and future peak hour operations to assess the aircraft parking requirements and impacts of overlaps in regional, domestic mainline, and international aircraft operations.
  - Develop a "Design Hour" to include total (combined) aircraft operations and fleet mix based for the various types of domestic operations. This Design Hour would be

then used for planning and design of the aircraft parking apron, passenger terminal facilities (for regional, domestic mainline, and international passengers), and landside facilities such as car parking and terminal curb requirements.

- Provide estimates of future connecting passengers to be used as input in terminal planning and design. This would include domestic-domestic connecting passengers and domestic-international connecting passengers.

Summary Observations:

Passenger terminal facility requirements are significantly different for different types of passengers. A regional airline hub may have large numbers of peak hour operations but require a relatively small amount of space in the passenger terminal due to use of smaller turboprop or regional jet aircraft and quicker turnaround times. International operations, on the other hand, require much larger amounts of passenger terminal space given the larger peak volumes and dynamics of this type of traffic. Similarly, aircraft parking space requirements also vary considerably by type of operation.

Given the strong growth in domestic demand at TNIA, the overall domestic aviation growth in Brazil, and the likely increase in regional aviation demand, we believe that it is important to revise the aviation demand forecasts and peak hour demand levels that will be used as input into the design of Terminal 2, the aircraft parking apron, and other facilities. *We note that current INFRAERO statistics indicate that over 95 PERCENT of the demand at TNIA is for domestic passengers and less than 5 percent for international passengers, and that domestic traffic at TNIA is currently growing at over three times the rate as international traffic.*

The major objective of these revised forecasts is to ensure the proper sizing of facilities in the proposed Terminal 2, in particular the proper allocation and types of facilities for regional passengers, domestic passengers and international passengers, and adequate sizing for the aircraft parking apron (patio) for the next 5-10 years.

In addition, given the significant growth in domestic demand and potential for future hub operations in the future, we believe that a flexible terminal design to Terminal 2 will be needed to allow for future changes in the mix of airlines and passengers at TNIA.

CHAPTER 3

Airfield Area Demand/ Capacity and Facility Requirements

CHAPTER 3

Airfield Area Demand/Capacity and Facility Requirements

3.1 General

This Chapter describes the demand-capacity analysis and facility requirements for the following facilities:

- Runways (including number of runways, runway lengths, and runway strength
- Taxiways
- Navigational Aids
- Visual Aids

3.2 Runway Requirements

Number of Runways

The key factor in determining runway requirements at TNIA is the forecast peak hour aircraft operations and peak hour fleet mix (i.e., the numbers and types of aircraft arriving or departing during the peak hour). While annual levels of aviation demand and aircraft operations provide a general indication of runway needs, peak hour demand will determine the need and timing for additional airfield capacity at TNIA.

According to the Changi Airport Master Plan, Infraero has assessed the existing peak hour runway capacity at a maximum of 36 aircraft operations per hour under visual flight rule (VFR) conditions, and 33 aircraft operations per hour under instrument flight rule (IFR) conditions.

The Changi report further states that an increase in the existing runway capacity to approximately 40 aircraft movements per hour under VFR, IFR or a mix of VFR and IFR is achievable with the improvement of both radar approach control systems and air traffic control procedures. These improvements would increase the runway capacity by allowing for closer in-trail spacing between arriving aircraft.

While the actual runway capacity at any airport is a function of a number of variables (peak hour fleet mix, percent arrivals vs. departures, location of exit taxiways, percent of VFR versus IFR conditions, a runway capacity of 35-40 operations at TNIA is consistent with single runway operations at other airports worldwide with similar weather patterns.

Based on flight schedules from 2010 and discussions with Infraero, the existing peak hour demand is in the range of 12-14 operations per hour (as of September 2010). There are two peaks, one in the morning between 7-9 a.m. and one in the early evening between 6-8 p.m.

Infraero historical statistics indicate that peak hour operations during these peak periods range from 10-14 operations. The Infraero operations manager indicated that peak operations rarely exceed 14 operations per hour. Given the current runway capacity of 33-36 operations per hour, the current runway is adequate to accommodate the existing and forecast peak hour demand in the short- to medium-term planning horizon as described below.

The need for a second runway will be based on the growth in peak hour operations. As described in Task 2, we believe that the long-term Changi forecasts are overly optimistic (in particular for international passenger forecasts) and we recommend revisions to these forecasts based on current growth rates at TNIA and on international and domestic airline trends.

In order to provide an estimate for airfield facility planning as part of this project, we suggest using the Changi low-growth forecasts for aircraft operations until such a time as a detailed revision to the annual and peak hour forecasts is completed (see Section 2 for discussion about forecasts). Using the low growth forecast of aircraft operations with a range of peak hour operations should give more reasonable estimates of future peak hour operations at TNIA compared to the base or high-growth forecasts.

As recommended in Task 2, however, a more detailed analysis of existing and forecast peak hour demand, peak hour fleet mix, domestic and international airline route structures, and overlaps in peak hour operations should be undertaken prior to completion of detailed planning and design for Terminal 2 and related airside (runway, taxiway and aircraft apron) and landside facilities.

Exhibit 3-1 shows an estimate of the potential future ranges of peak hour operations based on the Changi low-growth forecast. These estimates are shown for 2020, 2030 and 2039 to correspond to the anticipated future airport development plans described in Section 5.

The total peak hour operations shown in Exhibit 3-1 include international, domestic and general aviation operations during peak periods. (Note- almost all peak period operations are domestic operations with one or several international and/or general aviation operations during the peak period).

EXHIBIT 3-1
General Estimates of Future Peak Hour Operations (1)

	2020	2030	2039
Annual aircraft operations (2)	101,979	176,977	229,438
Potential range for peak hour operations (3)	20-30	40-50	55-65

Note:

(1) CH2M HILL recommends that detailed forecasts of peak hour operations be developed as part of the revised aviation demand forecasts that are required for airfield and terminal planning.

2) Based on Changi low growth forecast.

(3) Estimated range based on potential dispersion of the peak hour demand in the future and on the possibility for increased domestic hub activity at TNIA.

Given the unknowns in future international and domestic airline route structures at TNIA (for example, potential for domestic hub operations which could impact the peak demand), a potential range of peak hour operations is shown in Exhibit 3-1 to indicate the range of operations that may occur in future peak periods. In general, peaking patterns usually flatten or stretch into peak blocks somewhat as traffic and aircraft operations increase, however, introduction of hub-and-spoke operations by regional or domestic carriers could increase the future peak hour ratios.

As shown in Exhibit 3-1, ranges of potential peak hour operations are estimated to increase from an average of 10-14 peak operations in 2009 to 20-30 peak hour operations in 2020, 40-50 operations in 2030, and 55-65 operations in 2039). Assuming a peak hour runway capacity of 35-40 operations per hour for a single runway (per the Infraero and Changi analysis), a second runway may be required sometime in the 2020-2030 timeframe in order to ensure adequate runway capacity and to avoid airfield delays. Given the increases in flight frequencies in 2010 by a number of airlines at TNIA, however, peak hour operations may increase more quickly than expected, in particular if one or several airlines develop a hub operation at TNIA.

Given the strong increase in domestic airline service at TNIA in the past year, CH2M HILL recommends that the State of Minas Gerais proceed with detailed planning and preliminary design for the second runway to be completed in the 2011-2012 timeframe in order to begin the environmental review process. If in fact domestic airline operations continues to grow, the second runway may be needed at an earlier date in order to accommodate future peak hour operations.

Once the second runway has been constructed, the peak hour capacity with dual, independent runway operations would be would be approximately 70-80 operations per hour, depending on the future fleet mix and arrival/departure split during the peak hour. As such, the third runway will not likely be needed until after the 2039 planning horizon, as was concluded in the Changi Master Plan.

It is important to emphasize, however, that detailed planning, environmental analysis and permitting, design, and construction of the second runway is a major project which may take 5-10 years to complete, given the challenging site characteristics of the second runway and the need for environmental reviews and permitting.

The second runway at TNIA should be in place and operational several years before the existing runway reaches capacity since airfield delays can increase significantly once peak hour demand exceeds capacity, even for short periods of time during the day. A good rule of thumb is that additional airfield capacity (a new runway) should be in place when demand reaches approximately 80 percent of capacity on a regular basis.

Once the aviation demand forecasts have been revised and a detailed peak hour analysis completed for future international, domestic, regional and general aviation operations, the peak hour estimates provided in Exhibit 3-1 should be revised, and the anticipated timing of the second runway revisited based on this updated information.

We recommend that future detailed planning and implementation for the second runway include the following:

1. Closely monitor the growth in domestic and international demand and the drivers for these demand components in the next few years.
2. Adjust the annual and peak hour forecasts based on new (future) domestic and international airline service, future industrial park developments, regional economic developments, and national aviation trends and developments that may have an impact on demand at TNIA.
3. Proceed with early planning, preliminary design and environmental permitting for the second runway beginning in 2011-2012. It should be noted that there is a significant amount of clearing, cut/fill (earthwork), and site preparation that will be needed prior to constructing the new runway and ancillary facilities. In addition, the new Air Traffic Control Tower will have to be constructed and be fully operational prior to commissioning the new runway.
4. Incorporate all future facilities for long-term Phase 2 and Phase 3 development into the planning and design of the new runway to ensure future compatibility and to minimize long-term capital costs for all future development. These future facilities would include new passenger terminals, cargo terminals, industrial facilities, and ancillary facilities.

Runway Length

Existing Runway 16-34 is 3,000 m long. INFRAERO is planning to extend the runway to 3,600 m in the 2010/2011 timeframe in order to allow longer non-stop service from the Airport.

The Changi Master Plan included a general analysis of runway lengths for a wide range of aircraft, including runway lengths required for landing and takeoff at Maximum Landing Weight (MLW) and Maximum Takeoff Weight (MTW). This analysis accounts for the airport elevation of 827 m and a reference temperature of 30 degrees centigrade per the airport's aeronautical information publication.

As is common at most large international airports, the runway length requirement is driven by takeoff requirements of larger, long-haul aircraft under high-temperature conditions operating at the furthest stage-lengths (non-stop distances). Exhibit 3-2 shows the results of the Changi takeoff runway length analysis conducted as part of the Master Plan Study.

EXHIBIT 3-2

Takeoff Runway Length Requirements for Maximum Takeoff Weights (MTOW) at Elevation of 827 m AMSL and Airport Temperature of 30°C

Aircraft	Engine Type	Length (m)	Wing Span (m	MTOW (tonnes)	Takeoff Runway Length (m)
A319	CFM56-5B	33.54	34.10	70.00	2,424
A320-200	CFM56-5B	37.57	34.10	75.50	2,764
A321-200	CFM56-5B	44.50	34.15	93.50	3,600
B727-200	JT8D-17R	46.68	32.92	95.03	3,660
B737-300	CFM56-3B2	33.40	28.88	63.28	2,828
B737-500	CFM56-3B1	31.01	28.88	60.55	3,139
B737-600	CFM56-37B22	31.24	34.32	65.54	2,426
B737-700	CFM56-37B24	33.63	34.32	70.08	2,650
B737-800	CFM56-37B27	39.47	34.32	79.02	2,847
B737-900	CFM56-37B27	42.11	34.32	79.02	3,100
A310-300	CF6-80-C2	46.66	43.90	150.00	3,280
A310-200	CF6-80-A3	46.66	43.90	132.00	2,355
B757-200	RB211-535C	47.32	38.05	108.86	2,810
B757-300	RB211-535E4	54.43	38.06	122.47	3,444
B767-200	JT9D-7R4D	48.51	47.57	142.88	2,620
B767-300	CF6-80C2B2F	54.94	47.57	158.76	2,956
B767-300ER	CF6-80C2B7F	54.94	47.57	186.88	3,082
B777-300ER	GE90-115B1	73.86	64.80	351.53	3,772
B747-400	RB211-524G2	69.85	64.92	396.89	3,808
B767-400ER	CF6-80C2B8F	54.94	47.57	204.12	4,133
B777-300	GE 98K Engine	73.86	60.93	299.37	4,043
A380-800	Trent 970	72.57	79.75	560.00	3,968
A330-300	CF6-80-E1	63.69	60.30	233.00	4,574
A340-600	RB 211 Trent 556	74.77	63.45	365.00	4,476

Note:

Source: Changi Airport Master Plan, August 2009.

The current non-stop international routes from TNIA are shown in Exhibit 3-3 below. This exhibit confirms that the existing 3,000 m runway is sufficient to accommodate the existing flights of 5,000-8,000 km and that the aircraft being used have ranges in excess of the current non-stop destinations to Lisbon, Miami and Panama City. The Operations Manager at TNIA confirmed that there are currently no operational issues on the current 3,000 m runway.

EXHIBIT 3-3
Current non-stop international destinations from TNIA

Destination	Airline	Aircraft	Non-stop flight distance (km)	Non-stop range of aircraft at MTW (km)
Lisbon, Portugal	TAP	A330-200	7,934	11,850
Miami, Florida	American	B767-300	6,566	10,880
Panama City, Panama	COPA	B737-700	5,088	6,037

As shown in Exhibit 3-2, all of the current aircraft operating at TNIA will be able to operate without any weight penalties on the proposed 3,600 m runway. While the larger-capacity, longer-haul B777 and B747 aircraft would not be able to operate at MTOW from the proposed 3,600 m runway, they would still likely operate from TNIA without weight penalties given the potential non-stop stage lengths for flights to the United States and Europe.

It is important to note when considering runway length that aircraft rarely operate at Maximum Takeoff Weight (MTOW), even for long-range operations. In addition, Exhibit 3-2 shows calculations of runway lengths at MTOW during the hottest period of the year. It should be noted that many of the international flights to and from Brazil arrive in the early morning and depart in the evening when it is cooler, and as such would not require the full runway lengths shown in Exhibit 3-2 for the hottest temperatures and MTW conditions.

Given the long-term economic development plans of the State of Minas Gerais and the desire of the government to attract both international businesses, international investment, and new international airline service, the proposed runway length of 3,600 m should be sufficient to accommodate the operations of the current and anticipated aircraft fleet at TNIA for the next 5-10 years and likely beyond.

As a basis for comparison, Guarulhos has two runways of 3,700 m and 3,000 m, has a similar airport elevation to TNIA, and operates a large number of non-stop international flights whose stage lengths exceed 8,000 km, including London (9,479 km), Rome (9,459).It is unlikely that TNIA's international operations and long-haul destinations would exceed those of Guarulhos, at least in the short- to medium-term. This further supports the 3,600 m proposed runway length as described in the Changi plan.

Our experience at international airports throughout the world further supports the Changi conclusion to NOT construct a runway longer than 3,600 m in the short-term planning horizon. Similar runway length analysis at other international airports has shown that constructing a runway length for the most demanding aircraft under the most demanding operational conditions does not result in a positive Return on Investment (ROI) to the airport Owner, given the significant capital costs incurred and the very limited marginal benefits that may accrue to a relatively small number of aircraft operations over the course of a year.

It should be noted that if the need to serve the longer-haul international markets for TNIA change in the medium- to long-term, additional runway length can be added at that time if

justified by operational requirements and by specific payload-range benefits for any future long-haul international flights.

Regarding the proposed second and third runways for TNIA, we recommend the following runway lengths be used for general planning purposes until revised forecasts have been completed and a detailed airline route-analysis and runway length analysis with airline input be conducted (as described below). These general guidelines for future runway length are based on the high percentage of domestic operations at TNIA and on more limited operations for international flights:

- Proposed second runway: Plan for a 4,000 m ultimate runway length for long-term planning. The initial construction of the second runway, however, should be preceded by a detailed runway length analysis incorporating current and forecast long-haul international destinations with larger aircraft at TNIA.
- Proposed third runway: Construction of 2,500 m with no requirement for future extension.

The rationale for these runway lengths is as follows. The current runway, when extended to 3,600 m, will be adequate for anticipated long-haul destinations for the short- to medium-planning horizon.

The second runway may be in the range of 3,000-4,000 m which would be able to accommodate all domestic aircraft and some international flights (for example to South America and Central America,). If justified, the second runway could be constructed at a length of 4,000 m if the revised forecasts show significant demand potential for very long-haul international destinations with larger aircraft (for example, to Asia, Europe and the Middle East).

The third runway of 2,500 m would be adequate for domestic operations, regional airline operations, and general aviation operations (note that the Congonhas airport, the busiest domestic airport in Brazil, has a runway length of only 1,545 m and serves similar domestic markets).

This third runway would also serve as a primary arrival runway during peak hour operations in order to enhance the capacity of the future 3-runway system. Using the third runway for smaller aircraft also has the positive effect of increasing the runway capacity of the two longer runways which would be used by larger aircraft.

While the third runway will not likely be needed during the next 30 years based on anticipated growth in demand, land should be reserved and the approaches off the ends of the proposed future third runway protected in order to ensure long-term expansion capability for TNIA well beyond 2039 and also to ensure future compatible land uses off the ends of all proposed runways.

It is important to note that the Changi Master Plan shows two future runways of 4,000 m. We do not believe there would ever be an operational need for three long-haul runways at TNIA, as the percentage of long-haul operations would not justify the need for three runways at this length. As a basis of comparison, Guarulhos has one 3,700 m runway and a shorter 3,000 m runway and serves 40 international non-stop destinations worldwide.

There are significant potential benefits to planning and constructing shorter runways for the second and third runway in the future, including:

- There is significant clearing and grading required to construct the second and third runways.
- These runways will have potential environmental impacts to vegetation and habitat, and thus shorter runways will reduce any potential negative environmental impacts.
- Significant earthwork will be required (cut and fill) in order to construct the two future runways.
- Overall construction costs will be reduced significantly by constructing only the runway lengths needed to meet future airline operational requirements
- Long-term maintenance costs will be reduced.

Given the changing dynamics of the airline and aviation industry in Brazil, we recommend that the long-term runway length requirements at TNIA be reassessed in 3-5 years based on the growth in international service, changes in fleet mix, and changes in non-stop destinations from TNIA. As part of this analysis, the marginal benefits of any proposed runway extensions should be determined based on the future international airline service and fleet mix and a quantified benefit-cost analysis.

We recommend the following be considered as part of the long-term airport planning:

- Closely monitor the growth in international airline service over the next 3-5 years, not only in Belo Horizonte but also in Sao Paolo and other international destinations in Brazil.
- Monitor the airline route structures and fleet mixes of international airlines (including TAM and GOL) serving Belo Horizonte and other destinations in Brazil.
- Monitor trends in international-domestic connecting traffic in Belo Horizonte
- Once the revised aviation demand forecasts have been completed, conduct a detailed benefit-cost analysis of the various options for future runway lengths in the next few years as airline operations at TNIA evolve. This analysis should include calculations of payload benefits of longer runways for specific non-stop destinations from TNIA using a range of wide-body aircraft.

Runway Strength

As detailed in the Changi Master Plan, the existing runway has a bearing capacity (strength) which exceeds the Aircraft Classification Numbers (ACN) of all the aircraft analyzed by Changi with maximum takeoff weights listed except for the B777-300ER, A330, A340 and A380.

As stated in the runway length analysis, aircraft rarely operate at Maximum Takeoff Weight and as such the runway strength requirement would be less than that required at MTOW. Furthermore, there is currently no regularly scheduled airline service with the larger B777, A340 and A380 aircraft. These larger aircraft are usually reserved for higher-density international routes such as Guarulhos to major international destinations such as London, Paris, or New York.

Even if service with these larger aircraft were introduced in the future at TNIA, the relatively small percentage of operations of these aircraft would not likely impact the overall pavement design for the airfield pavement.

Based on the Changi analysis described above and on the short-term prospects for growth in domestic and international traffic, the existing runway strength is adequate for both current operations and near-term forecast operations.

If there is a significant increase in new international airline service in the next 5-10 years at TNIA, we recommend re-evaluation of the fleet mix, stage lengths, and resulting runway strength requirements to determine the future need for enhanced runway strength.

In addition, as part of the preliminary planning and design for a second runway, runway strength should be re-evaluated for the proposed new runway to ensure adequate strength for the long-term future aircraft fleet mix and operations as described in ICAO and FAA pavement design manuals.

3.3 Taxiways

The Changi phased airport layout plan includes phased expansion of the taxiway system to correspond to the proposed extension of Runway 14-32 and proposed second runway to be located on the north side of the existing airport access road. This proposed taxiway plan shows new exit taxiways to service the runway extension, bypass taxiways at each runway end, new high-speed exist taxiways for Runway 14-32 to, and new parallel taxiways and high-speed exit taxiways to serve the second runway and (ultimately) third runway. In addition, two sets of cross-taxiways are also provided in the Changi plan to provide for access to the second runway from both the south terminal area under the long-term development plan.

The Changi taxiway plan is adequate to serve the runway-taxiway systems for existing Runway 14-32 and the proposed new runways. Given that approximately 95 percent of aircraft operations are currently on Runway 16 (takeoffs and landings from the west), however, we recommend eliminating the very costly high-speed exits that would serve arrivals on the Runway 34 end (from the east) as there are very limited operational benefits to constructing these high-speed exits, both on the existing Runway 16-34 and for the proposed future runways.

3.4 Navigational Aids

The existing navigational aids at TNIA include a Category I precision approach capability for Runway 16 and both non-precision and visual approaches to Runway 16 and Runway 34. Other instrument approaches include NDB, VOR, and Area Navigation (Global Navigation Satellite System) or RNAV (GNSS). The existing navigational and visual aids at TNIA include:

- Instrument landing system (ILS) with localizer and glide path; and
- Middle marker (MM) and outer marker (OM).
- Very high frequency omni-directional range ground beacon with distance measuring equipment (VOR/DME).

- PAPI's for both runway ends
- Approach lighting systems for both runway ends

The Changi Airport Master Plan noted that a future upgrade of the CAT I ILS of Runway 16 to CAT II ILS, and installation of a CAT I ILS for Runway 34 are currently under study.

Based on discussions with INFRAERO, there are very infrequent occurrences of low visibility conditions at TNIA, and the existing Category I ILS is sufficient to serve the runway during in infrequent occurrences of low visibility conditions at the airport.

Any proposed future upgrades of the existing navigational aids should be preceded by a benefit-cost analysis which would include consideration of the types and levels of future airport activity and the frequency of low visibility conditions that would require a Category II approach.

The specific navigational aids for each runway end are described below.

A. Runway 16

Runway 16 has a Category 1 ILS which consists of the following:

- A localizer located approximately 300 m to the south of Runway 34 threshold which provides horizontal guidance
- A glide path located approximately 350 m to the south of Runway 16 threshold which provides vertical guidance
- A middle marker and an outer marker (both are Non-Directional Beacons or NDB) for identification of the distance from the runway, which are located 0.6 nautical miles and 5.1 nautical miles to the north of Runway 16 threshold, respectively

B. Runway 34

Runway 34 is equipped with two instrument approaches--VOR/DME and RNAV (GNSS using a VOR/DME (Very High Frequency Omni-Directional Range Beacon) with Distance Measuring Equipment (DME) for providing course and distance information.

Plan for the installation of a new Category I ILS for Runway 34 is being studied by the Department of Airspace Control (DECEA).

In addition, visual approaches to Runway 34 are also permitted with the same restrictions in place as described for Runway 16.

3.5 Visual Aids

Exhibit 3-4 shows a list of visual aids and airfield lighting at TNIA. These visual aids meet international standards and are adequate to enhance the operational safety at TNIA. INFRAERO did not indicate any plans to upgrade these visual aids.

EXHIBIT 3-4
Visual Aids and Airfield Lighting at TNIA

	Description
Runway 16	
Approach lighting system	Precision approach category I lighting system / white lights
VASI / PAPI	4 units, 3 degree slope, on the left side of the runway/ red and white lights
Threshold marking	White painting
Touchdown zone marking	White painting
Centerline marking	White painting
Edge marking	White painting
Stopway marking	White painting
Runway end lighting	Red lights
Threshold lighting	Green lights
Runway edge lighting	White/amber lights
Runway 34	
Approach lighting system	Simple approach lighting system, 300 m long with one cross bar / white lights
VASI / PAPI	4 units, 3 degree slope, on the left side of the runway/ red and white lights
Threshold marking	White painting
Touchdown zone marking	White painting
Centerline marking	White painting
Edge marking	White painting
Stopway marking	White painting
Runway end lighting	Red lights
Threshold lighting	Green lights
Runway edge lighting	White/amber lights
Taxiways	
Edge marking	Yellow painting
Edge lighting	Blue lights
Aprons	
Aircraft stand marking	Yellow painting
Apron flood light	White lights

Source: Changi Master Plan, August 2009

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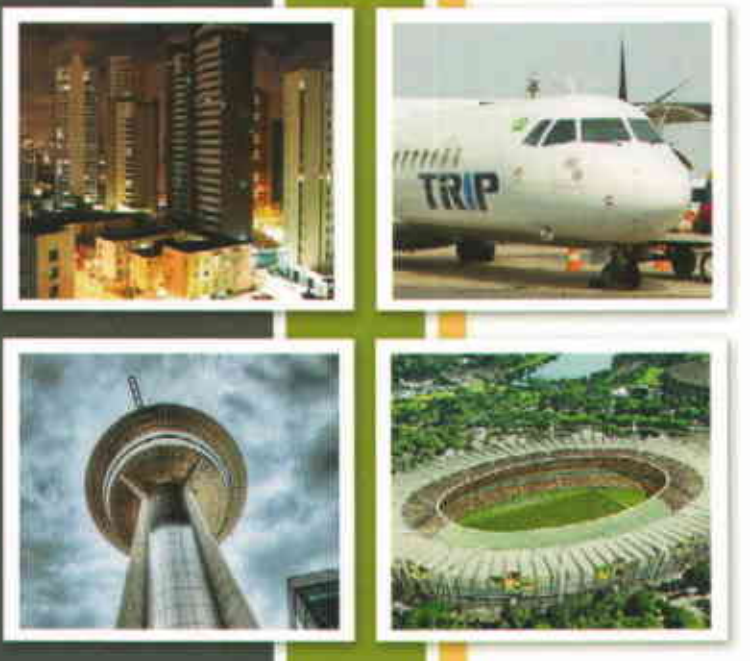


CHAPTER 4

Terminal Area Demand/ Capacity and Facility Requirements

CHAPTER 4

Terminal Area Demand/Capacity and Facility Requirements

4.1 Introduction

Developing terminal facilities requirements (the terminal space program) should be the first step in planning a new, expanded or renovated passenger terminal. Unless the planning team understands how much space of each type is required to meet targeted levels of activity and desired levels of service, a terminal plan cannot realistically be defined. The program typically does not refer to a specific terminal concept or gate configuration. The programming process can, however, run in parallel with the development of terminal concepts which may be constrained by the terminal site and/or existing facilities.

As the program is developed - especially the number and mix of gates - the terminal concept can be refined and the concept then used to better define certain elements of the program. Thus, programming is to some extent an iterative process, but ultimately should drive the size of the terminal building, rather than an architectural concept driving the terminal program.

Terminal facilities are a function of the specific unique characteristics of that airport. Each airport or terminal has its own distinct peaking characteristics which impact the peak hour demands on the passenger terminal (that is, the peak hour numbers of arriving and departing passengers). These distinct peaking characteristics include:

- differences in airline schedules
- business versus leisure travel
- long or short haul flights
- the mix of mainline jets and regional/commuter aircraft
- originating/terminating passenger activity or transfer (connecting) passenger activity
- international passenger peaks versus domestic passenger peaks

These passenger and peaking characteristics determine the size and type of most terminal facilities. Thus, two airports with similar numbers of annual passengers may have different terminal requirements, even if the Design Hour passenger volumes are approximately the same. The peak hours for different types of activity (domestic vs. international, etc.), or for different airline groups (hub vs. spoke carriers) may also occur at different times at the same airport.

Thus, it is important to determine which types of activity occur at an airport and which individual peaks need to be considered in developing terminal facilities. Ultimately these requirements reflect the primary processes supported by a passenger terminal – getting

passengers and their baggage from ground transportation to aircraft or from aircraft to ground transportation.

The concept of Level of Service (LOS) is also implicitly, if not explicitly, used in the areas and dimensions assumed for terminal programming. Unlike many airfield facilities, the capacity of each element of a terminal facility can vary depending on the level of crowding and/or processing time which is considered acceptable. A passenger traveling on business may be less tolerant of congestion or delay than a passenger traveling for pleasure, but in some cases the opposite may be true. In many cases the degree of acceptability itself may also vary depending on the configuration of the terminal space and the level of amenities provided. Thus, the "capacity" and "level of service" of a terminal can vary significantly.

Economic considerations, as well as the practical realities of airport terminal design, dictate that a good level of service be provided for the Design Hour passenger volumes. Level of Service would decline to adequate levels during the "super peaks" of the year, such as during holiday weekends. A well programmed and designed terminal would not decline to unacceptable levels of service even during these infrequent "super" peaks.

4.2 Design Hour Activity

As noted, airport terminal facilities are sized to accommodate the peak hour passenger volumes of a design day. While annual enplanements are an indicator of over-all airport size, it is the peak hour passenger volumes that determine the required sizing for airport facilities based upon the specific user patterns of a given airport.

The Design Hour measures the number of enplaned and deplaned passengers departing, or arriving, on aircraft in an elapsed hour of a typically busy (design) day. The Design Hour typically does not correspond exactly to a "clock hour" such as 7:00-7:59 but usually overlaps two "clock hours", i.e. 7:20-8:19 reflecting airline scheduling patterns.

The Design Hour is typically not the absolute peak level of activity, nor is it equal to the number of persons occupying the terminal at a given time. It is, however, a level of activity which the industry has traditionally used to size many terminal facilities. The number of persons in the terminal during peak periods, including visitors and employees, is also typically related to Design Hour passengers.

Design Hour passengers can be estimated from annual forecasts in a number of ways. In the Changi Master Plan, it was suggested that the 30th busiest hour be used as a design hour. This is an approach used by some airports. However, it requires that the Airport maintain detailed flight-by-flight passenger records so that this level of activity can be determined. If such data is available - and if the pattern of service is relatively stable - a peak hour to annual passenger ratio can be determined and applied to forecasts of annual passengers. Often this peak hour ratio is assumed to decline over time to account for peak spreading as the passenger demand at an airport continues to grow over time.

This approach was used by Changi, except that no statistical or other back-up was presented to establish the 30th busiest hour. Given the significant discrepancies in the actual passenger demand growth when compared to the Changi forecasts for domestic and international activity (see Chapter 2), these peaking factors should be re-evaluated before being used for detailed passenger terminal planning and design.

The peak percentages were presented in the Master Plan Report as follows in Exhibit 4-1.

EXHIBIT 4-1
Peak Hour Passenger Traffic as a Percentage of Annual Passenger Traffic

	Forecasted Annual Passenger Traffic		Peak Hour Passenger Traffic as a Percentage of Annual Passenger Traffic	
Year	Domestic	International	Domestic	International
2013	6,600,000	1,300,000	0.0310%	0.0249%
2018	9,800,000	2,900,000	0.0309%	0.0248%
2022	12,800,000	4,300,000	0.0308%	0.0247%
2029	20,100,000	7,300,000	0.0307%	0.0246%
2039	26,300,000	10,800,000	0.0306%	0.0245%

Source: Table 3-20 from the Tancredo Neves International Airport Master Plan Report, August 2009, Changi Airport Consultants.

The Peak Hour percentages were used by Changi to estimate two-way passenger flows. Very few terminal facilities are based on two-way passenger flows. Thus, directional (one-way) flows for enplaning and deplaning passengers are needed. The Changi Master Plan assumed that one-way flows would be 60 percent of the two-way flows. This is a common assumption used when no other data is available. However, it is the experience of CH2M HILL that enplaning and deplaning peak hour passengers are seldom equivalent. Thus, using the assumptions in the Changi Master Plan could lead to under- or over-sizing some terminal facilities.

The peak hour passenger forecasts were presented in the Master Plan Report (see Exhibit 4-2).

Peak Hour Passenger Traffic as a Percentage of Annual Passenger Traffic

EXHIBIT 4-2
Peak Hour Passenger Traffic Forecasts

	Domestic		International		Total	
Year	Two-Way	One-Way	Two-Way	One-Way	Two-Way	One-Way
2013	2,036	1,221	334	200	2,370	1,421
2018	3.044	1,826	721	433	3,765	2,259
2022	3,947	2,368	1,074	645	5,021	3,013
2029	6,181	3,708	1,789	1,074	7,970	4,782
2039	8,051	4,830	2,644	1,586	10,695	6,416

Source: Table 3-21 from the Tancredo Neves International Airport Master Plan Report, August 2009, Changi Airport Consultants.

4.3 Terminals 1 & 2 Facilities Requirements

Infraero is currently undertaking design and construction in 2010-11 to complete a number of internal improvements to Terminal 1. As such, our project team was directed to not conduct any analysis of Terminal 1 under the current project as the Terminal 1 design improvements will be completed in the very near term. It was not clear from the limited materials provided by Infraero whether these changes would provide the same capacity improvements as recommended by Changi and achieve their assumed capacity of 7.0 MPPA.

The Changi Master Plan included a terminal space program for Terminal 2 in two phases. The first Phase, projected to be completed in 2013 was to have a capacity of 6 MPPA. The second phase, to be completed in 2018, would increase the capacity to 10 MPPA. Added to the assumed 7.0 MPPA capacity of Terminal 1, this is a combined Airport capacity of 13 MPPA for Phase 1 and 17 MPPA at full development of Terminal 2.

Comparing these capacities to the airport forecasts of 7.9 MPPA in 2013 and 12.7 MPPA in 2018 implies that each phase would have approximately 5 MPPA of capacity growth on opening day although it is prudent planning to have sufficient capacity for future demand growth on opening day for typically 3-5 years, we recommend that the phasing of Terminal 2 be re-evaluated based on updated annual and peak hour forecasts as discussed below and in Section 2.

The Terminal 2 facilities requirements were presented in the Master Plan Report as follows.

EXHIBIT 4-3
Terminal 2 Facilities Requirements

Terminal Component	Units	Space and Facility Planning	
		Phase 1	Phase 2
Design Capacity	(mppa)	6.0	10.0
TPHP Capacity	(passengers)	2,100	3,500
Departure			
Curb Length	(m)	135	185
Departure Concourse[1]	(sq. m)	7,550	11,000
Check-in Area No. of Counters	(sq. m) (units)	3,850 56 + 16*	4,900 82 + 20*
Pre-boarding Security Screening (Centralized) No. of channels	(sq. m) (units)	900 10	1,250 14
Departure Immigration[2] No. of channels	(sq. m) (units)	450 6	600 8
Airside Common Lounge Area[3]	(sq. m)	4,800	7,050
Transfer Area No. of Transfer Counters	(sq. m) (units)	550 8	850 12
Gate Hold Area Total Gates	(sq. m) (units)	5,150 11	9,750 21
Arrival			
Arrival Immigration[2] No. of channels	(sq. m) (units)	1,150 12	1,550 16
Baggage Claim Area[4] No. of Baggage Claim Carousel	(sq. m) (units)	3,450 6	5,100 9
Customs Screening No. of channels	(sq. m) (units)	350 3	450 4
Arrival Concourse[3]	(sq. m)	5,550	8,150
Curb Length	(m)	110 (75 + 35^)	135 (80 + 55^)
Others			
Baggage Handling Area	(sq. m)	3,600	5,750
Amenities/ Toilets/ Offices/ Terminal Command Centre/ Utilities and M&E Services/ General Circulation Area/ Other Uses	(sq. m)	36,650	50,950
Total			
Estimated Overall Gross Floor Area (Minimum)	(sq. m)	74,000	107,350

Source: Table 6-1 from the Tancredo Neves International Airport Master Plan Report, August 2009, Changi Airport Consultants.

The program table suffers from a number of critical omissions which question its validity in the actual design of Terminal 2 as presented in the Changi Master Plan:

- The design capacity in terms of both annual and peak hour passengers do not differentiate between domestic and international passengers. This is critical in determining almost all passenger processing functions.

- Processing time and space criteria are not defined for any facilities. It could be assumed that similar criteria were used as for the existing Terminal 1 capacity evaluation (Chapter 4 of the Changi Master Plan report), however the lack of specific enplaning and deplaning passenger flows makes this impossible to validate.
- With the exception of total gates in this table (11 and 21 in Phases 1 and 2 respectively), the Changi Master Plan does not include detailed forecasts of aircraft gate requirements or future aircraft fleet mix . Chapter 3 of the Changi Master Plan discusses the use of fleet mixes, seating capacities and load factors in their development of annual aircraft movements, but no specifics are provided.

Without a forecast of gate requirements by aircraft size, the program for Terminal 2 cannot be reasonably developed and an appropriate terminal concept determined. While the implementation plan (Chapter 8 of the Changi Master Plan report) specifies gate mixes for each implementation phase, these mixes do not correspond to the gates in the program table.

As noted previously in Chapter 2 of this report, the annual and peak hour forecasts for both domestic and international passengers need to be revised to reflect the current traffic growth patterns and air service for TNIA. Revised annual and peak hour forecasts are critical as the Changi Master Plan forecasts, developed in August 2009, show significant discrepancies with the current growth trends at TNIA, including:

- Domestic passenger traffic has grown over 70 percent in the past 3 years, based on current Infraero statistics through September 2010. In addition, six domestic and regional airlines have announced a large number of new non-stop flights from TNIA in the past year. These types and levels of domestic demand are not adequately reflected in Changi's Terminal 2 concept which focuses on international traffic.
- Changi forecast a growth of 4,000 percent in international traffic, while in reality the potential for international passenger demand at TNIA in the short-term is much more limited, and a long-term international demand growth of 4,000 percent is unrealistic based on the market at TNIA.
- Based on current growth trends at TNIA and on market forces, it is likely that the domestic demand at TNIA in 2015 may be 40-60 percent greater than the Changi forecasts, and that international demand in 2015 will be 50-70 percent less than forecast.

Based on these significant discrepancies between the actual growth rates at TNIA and the Changi Master Plan forecasts, new annual and design hour forecasts are critical for adequate planning for Terminal 2 facilities. The new forecasts must also provide a realistic aircraft fleet and gate mix at each planning activity level in order to address future airline, gate, and terminal requirements.

As the officially adopted plan by Infraero, the Changi Terminal 2 concept is shown in this report and on the CH2M HILL plans shown in Section 5, Alternative Airport Concepts.

Given the significant growth in airline service at TNIA in the past 2 years, and the potential hubbing activity by both mainline and regional airlines, we believe that the current Terminal 2 plan should be reviewed once new peak hour and gate forecasts have been developed. These new forecasts may change the Terminal 2 facility requirements presented in the Changi Master Plan, given the growth of the regional and domestic market at TNIA.

The Airport should also consider what improvements will be made to Terminal 1; what its role (domestic, international or mixed use) will be; and what level of activity it can support as part of a two-terminal complex.

4.4 Terminal 3

As noted in the Changi Master Plan, Terminal 3 is planned for a capacity of 20 MPPA. This terminal capacity was estimated to be needed to support the master plan forecasts through 2039.

Changi did not, however, provide any analysis as to how a Terminal 3 would be sized to accommodate the 20 MPPA, or how much of Terminal 3 would be for domestic versus international activity.

As stated above, the annual and peak hour passenger forecasts need to be revised prior to conducting any detailed passenger terminal planning or design at TNIA. As such, the long term terminal capacity requirements of TNIA are not known at this time.

A master plan should provide a vision for how an airport would continue to grow beyond the time frame of the master plan's forecasts. This may vary from a simple block of space for "long term terminal expansion", to a general concept that can be implemented in stages as growth continues.

The potential long-term terminal complex should also be in reasonable balance with the potential runway capacity. Given the fact that there are three runways planned for TNIA, the future runway capacity will be significantly greater than it is today with only one runway.

The Changi plan for Terminal 3 provided a specific terminal concept on their plans which (as with Terminal 2) focuses on remote aircraft gates as compared to contact gates. The implementation plan (Master Plan Chapter 8) specifies the number and size of the gates in each of the two 10 MPPA phases. As with Terminal 2, there is no analysis within the report to explain how these aircraft gate demands were developed.

The purpose of our alternative concept for Terminal 3 is to present a long term vision for TNIA which would take the Airport well beyond the 2039 forecast time frame of the Master Plan and provide significantly greater terminal capacity to match the future runway capacity after construction of the second parallel runway.

The objectives of this Terminal 3 concept include:

- Accommodate a flexible mix of domestic and international aircraft.
- Accommodate potential airline hub activity.
- Allow for terminal expansion in phases to independently meet the future growth in demand for domestic and international passengers, as this approach will maximize the Return on Investment (ROI)/
- Provide for efficient aircraft movements at high levels of peak hour activity.
- Provide a high level of passenger service by minimizing walking distances and maximizing the number of contact gates.

- Maximize the utilization of the northeast quadrant of the Airport for terminal development in balance with other aeronautical and non-aeronautical uses.

As noted, this concept is not based on a detailed peak hour forecasts for passengers or aircraft gates. It is presented only to demonstrate an alternative long term future terminal concept which would provide a large amount of aircraft gate and terminal capacity beyond the 2039 time frame of the Master Plan. The major elements of this concept include:

- A single terminal processor (Main Terminal) with short, double loaded piers. This is connected to relatively small remote satellite concourses. The result is short walking distances for passengers, even if connecting to gates on different satellites. Multiple satellites also allow for phased development in reasonable increments.
- The gates on the Main Terminal and those on the west satellite would be sized for Code E aircraft (B777-300ER), and be for international or domestic use. Gates on the west side of the satellite could also accommodate Code F aircraft if required.
- The domestic satellites would each have 24 Code C narrowbody aircraft (B737-900)
- Dual taxilanes would be provided in all areas where there are aircraft on both sides of the taxilanes. Where gates push back toward a main taxiway of the airfield system, a taxilane/pushback zone is shown to prevent this activity from interfering with aircraft moving to and from the runway system.
- Underground automated people mover (APM) systems would connect the satellites to the main terminal. These would most likely be a simple shuttle to the west satellite (with separate cars for sterile international arrivals passengers), and a double loop system for the domestic satellites.
- The landside of the terminal complex would provide for support facilities for the complex (GSE storage and maintenance, central utilities plant, etc.); terminal access roads and parking garage; and a site for a hotel. Constructing an airport hotel on the Terminal 3 side of the airport would provide a potentially larger site than the constrained location between Terminals 1 and 2 as shown on the Changi Master Plan.

The total gate count shown on this concept is 96 Code C (737-900) and 34 Code E (777-300ER). There are many other combinations of aircraft types which could be accommodated in this general concept which would be dictated by revised forecasts and actual growth in activity.

This terminal concept should be revised and modified to be in balance with the long-term forecast levels of activity, once the new passenger forecasts have been developed.

The long-term concept for Terminal 3 described above is depicted on the CH2M HILL plans shown in Section 5, Alternative Airport Concepts.

CHAPTER 5

Alternative Airport Concepts

CHAPTER 5

Alternative Airport Concepts

This Chapter describes the alternatives for airfield, aviation use, aviation support, and non-aviation development areas. In development of these alternatives, land was prioritized to reserve developable land for aviation uses first, aviation support areas second, and non-aviation development areas third to ensure each type of land use has enough developable land to meet aviation demand in the short-term and in the long-term.

5.1 Airfield Alternatives

A number of different airport alternatives were considered as part of this Airport Master Plan. These alternatives were evaluated based on a number of criteria including:

- Operational efficiency and safety
- Costs of development
- Expansion capability
- Flexibility to accommodate future changes in the volumes and type of aviation demand
- Potential environmental impacts
- Opportunities for revenue enhancement, both on-airport and off-airport

Based on the long-term aviation forecasts, additional airfield capacity will be needed to meet future aviation demand at TNIA. In the near term, a second runway is needed to serve all domestic and international departures. By the ultimate airport development phase, a shorter third parallel runway at 2,500 m will be needed to help offset arrival demand by providing additional arrival capacity.

Due to extreme topographic constraints of the surrounding area, future airfield development is limited to the property to the northeast of Highway LMG 800.

The alternatives described below were evaluated based on available topographic mapping, environmental mapping, and other information provided by SEDE. These alternatives were reviewed together with SEDE in a working meeting in Belo Horizonte. The main alternatives analyzed for airfield development are as follows:

- Crosswind runway options: Gaining capacity through providing additional runways in a nonparallel orientation does not provide the maximum potential to capacity, in lieu of abandoning the existing orientation and orienting all future runways in a different orientation. The existing runway is oriented to maximize operations into the prevailing wind. Finally, due to the extreme topographic constraints and orientation of Highway LMG 800 crosswind runways would be cost prohibitive and were therefore not considered practical.

- Runways to the southwest: Due to extreme topographic constraints and the town of Confins immediately to the southwest, airfield expansion to the southwest is cost prohibitive and not a viable alternative for consideration.
- Closely spaced runway to the Northeast: Given the location of Highway LMG 800, the depth of the existing landside, terminal and associated ramp areas for Terminal 1, a closely spaced parallel runway would be situated through the existing terminal and airside ramp core area. Developing a runway with this separation would be cost prohibitive and not provide enough room to relocate airside facilities on the southwest side of Highway LMG 800.
- Widely spaced runway to the Northeast: To achieve independent parallel approaches in instrumental meteorological conditions, the minimum separation required between parallel runways is 1,035 m. However, at this distance, the runway environment would barely clear highway LMG 800 and not provide enough developable land for landside, terminal and associated apron a runway separation greater than the minimum would be required.

Due to the fact that airport expansion is not possible to the southwest, and highway LMG 800 transverses through airport property, a nonstandard widely spaced parallel runway was found to be the preferred option.

In order to provide enough space for landside access, future terminal development and airfield flow for the projected future aircraft fleet, a parallel runway separation of 1,829 m (6,000 ft) is recommended. From a airfield capacity standpoint, this exceeds the minimum required operational separation for independent parallel approaches and will provide the highest arrival and departure capacity gain as well reserve enough frontage on the northeast side of Highway LMG 800 for landside and terminal development.

Options considered for third parallel runway for the ultimate airport development include the following:

- Widely spaced runway: the minimum space required to meet simultaneous use under instrument meteorological conditions is 1,035 m. As you move further northeast of the airport, the topography becomes more dramatic making a third widely spaced parallel runway cost prohibitive. In addition, the third runway will primarily be used to offset peak hour arrival demand in the future.

  Given that the primary two runways will be able to serve independent instrument approaches, it is anticipated that the third runway will not need to serve a third stream of independent instrument approaches and therefore a closely spaced option was considered.

- Closely spaced runway: minimum space required to meet simultaneous use under visual meteorological conditions is 210 m. However, this distance does not allow for a parallel taxiway to be constructed in between the runways.

In order to provide additional flexibility to the future arrival demand, we recommend a minimal separation of 380 m. This runway separation will allow for simultaneous visual approaches and provide the flexibility to allow the air traffic control tower to utilize a

parallel taxiway to meter aircraft and closely coordinate runway crossings during the peak hour operations in the future.

5.2 Aviation, Aviation Support, and Non-Aviation Development Areas

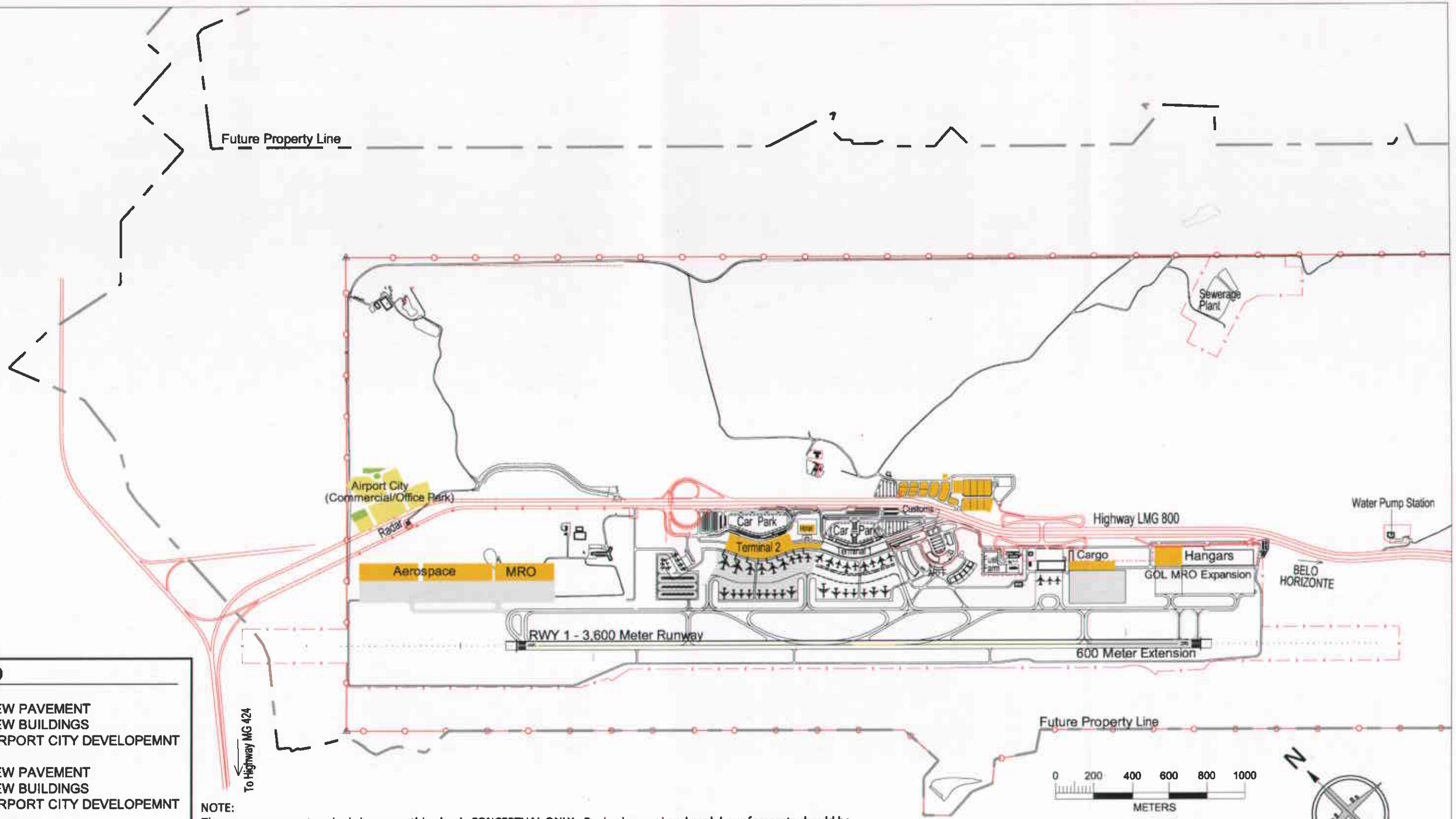
Once the land areas for the airfield and terminal development were considered to meet short-term and long-term development needs, alternatives for other Aviation uses, Aviation Support and Non-Aviation development areas were considered. Additional aviation uses considered include air cargo expansion, MRO expansion, Aerospace, and general aviation expansion. These areas were given the next highest priority and require close proximity to the airfield core and taxiway access. Considerations to topographic were given to maximize development of ramp areas.

Aviation support areas and similar facilities in general were given the next priority for developable land. These land uses benefit being situated in close proximity to other aviation uses however, do not need direct access to the airfield. They do require efficient ground access.

Non-Aviation development areas include the Airport City with commercial and office park development. These areas benefit from being in close proximity to the airport and airport businesses however, are viewed as the lowest priority in reserving developable land. The most important consideration for these areas is efficient roadway access.

5.3 Recommended Plan

The Recommended Airport Development Plan is shown in Figures 5-1 (Phase 1), 5-2 (Phase 2), and 5-3 (Phase 3). These three plans incorporate the preferred airfield layout based on the analysis described above, as well as the future airfield requirements described in Chapter 3 and the passenger terminal requirements described in Chapter 4. Future roadways, landside facilities, and off-airport development have also been incorporated into these phased airport development plans.



LEGEND

PHASE 1:
- NEW PAVEMENT
- NEW BUILDINGS
- AIRPORT CITY DEVELOPEMNT

PHASE 2:
- NEW PAVEMENT
- NEW BUILDINGS
- AIRPORT CITY DEVELOPEMNT

PHASE 3:
- NEW PAVEMENT
- NEW BUILDINGS
- AIRPORT CITY DEVELOPEMNT

NOTE:
The new passenger terminal shown on this plan is CONCEPTUAL ONLY. Revised annual and peak hour forecasts should be developed as input into a detailed terminal space program. The terminal concept shown on this plan should be reviewed against this revised terminal space program to ensure optimum sizing and configuration to meet forecast passenger demand and aircraft parking requirements. The sizing and location of the other proposed facilities shown on this plan should also be reviewed to meet the revised forecast requirements.

June 2011

CH2M HILL

TANCREDO NEVES INTERNATIONAL AIRPORT

PHASE 1
CONCEPTUAL AIRPORT PLAN

Exhibit 5-1

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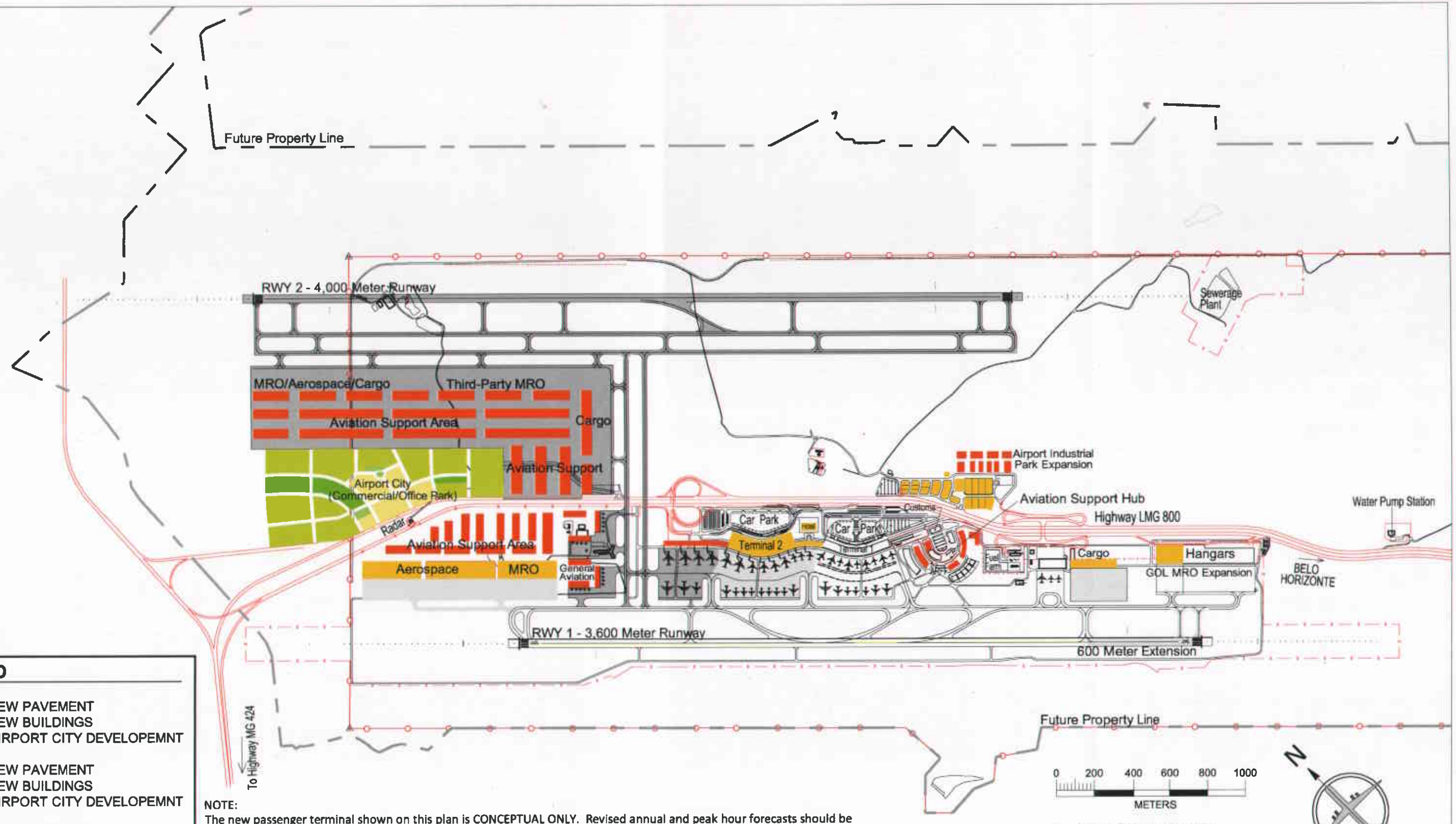


LEGEND

PHASE 1:
- NEW PAVEMENT
- NEW BUILDINGS
- AIRPORT CITY DEVELOPEMNT

PHASE 2:
- NEW PAVEMENT
- NEW BUILDINGS
- AIRPORT CITY DEVELOPEMNT

PHASE 3:
- NEW PAVEMENT
- NEW BUILDINGS
- AIRPORT CITY DEVELOPEMNT

NOTE:
The new passenger terminal shown on this plan is CONCEPTUAL ONLY. Revised annual and peak hour forecasts should be developed as input into a detailed terminal space program. The terminal concept shown on this plan should be reviewed against this revised terminal space program to ensure optimum sizing and configuration to meet forecast passenger demand and aircraft parking requirements. The sizing and location of the other proposed facilities shown on this plan should also be reviewed to meet the revised forecast requirements.

June 2011

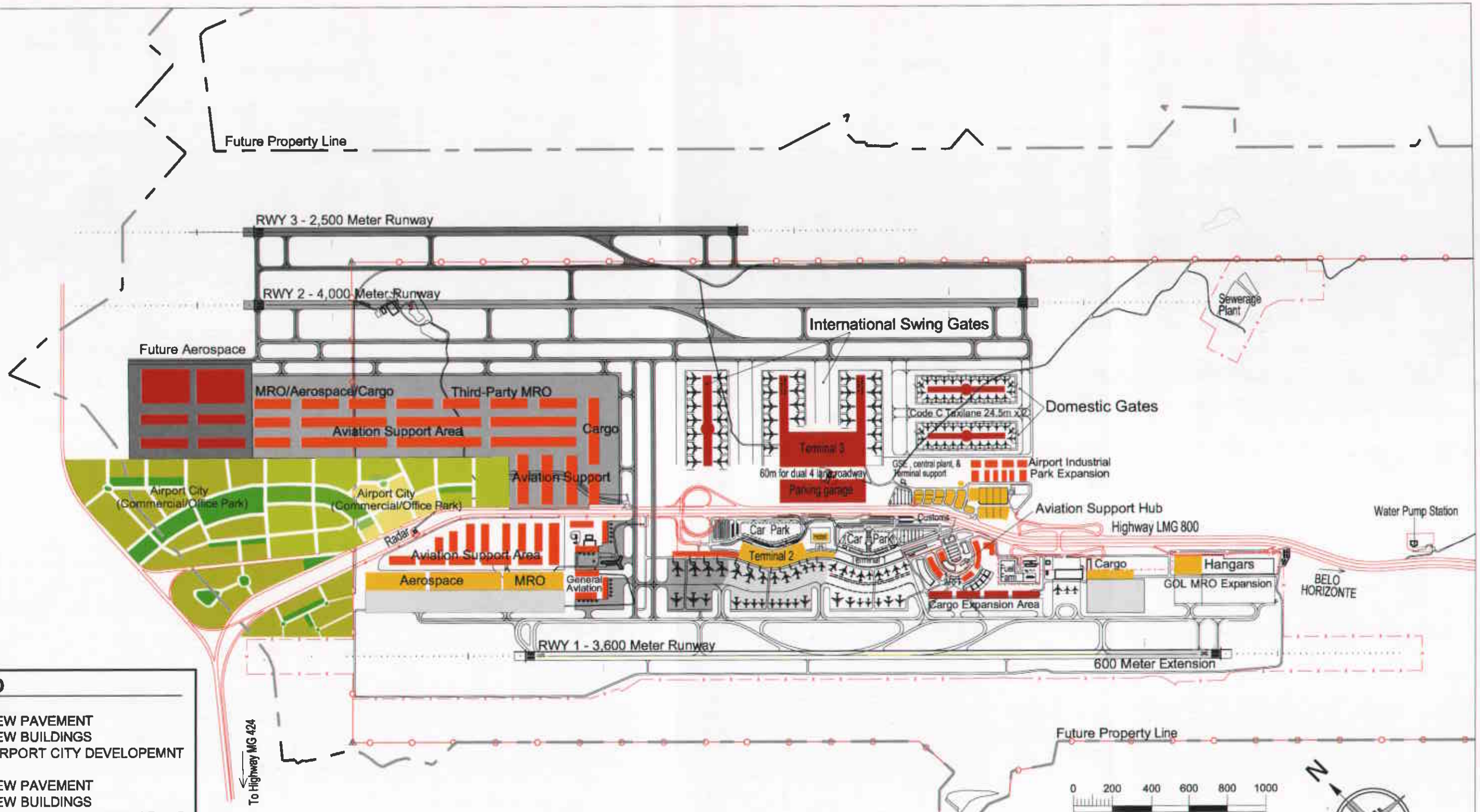
CH2M HILL

TANCREDO NEVES INTERNATIONAL AIRPORT

PHASE 2
CONCEPTUAL AIRPORT PLAN

Exhibit 5-2

File: C:\ERION\Erion_10\ARCHIVE\Brazil\Sharepoint_Organize\New_ModFiles\2010_0817-DraftComposite\TNIA Base_V21_EXH_FINAL.dwg | Layout: 1_10-PHASE-2



LEGEND

PHASE 1:
- NEW PAVEMENT
- NEW BUILDINGS
- AIRPORT CITY DEVELOPEMNT

PHASE 2:
- NEW PAVEMENT
- NEW BUILDINGS
- AIRPORT CITY DEVELOPEMNT

PHASE 3:
- NEW PAVEMENT
- NEW BUILDINGS
- AIRPORT CITY DEVELOPEMNT

NOTE:
The new passenger terminal shown on this plan is CONCEPTUAL ONLY. Revised annual and peak hour forecasts should be developed as input into a detailed terminal space program. The terminal concept shown on this plan should be reviewed against this revised terminal space program to ensure optimum sizing and configuration to meet forecast passenger demand and aircraft parking requirements. The sizing and location of the other proposed facilities shown on this plan should also be reviewed to meet the revised forecast requirements.

June 2011

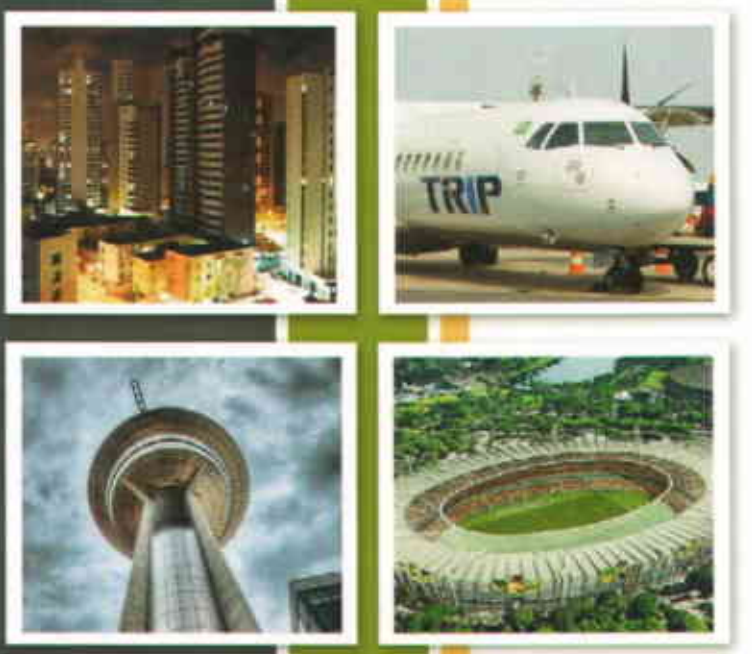
CH2M HILL

TANCREDO NEVES INTERNATIONAL AIRPORT

PHASE 3
CONCEPTUAL AIRPORT PLAN

Exhibit 5-3

File: C:\ERION\Erion_10\ARCHIVE\Brazil\Sharepoint_Organize\New_ModFiles\2010_0817-DraftComposite\TNIA Base_V21_EXH_FINAL.dwg | Layout: 1_10-PHASE-3



CHAPTER 6

Airport Security

CHAPTER 6

Airport Security

6.1 Background

Security practices and procedures at TNIA are governed by International Civil Aviation Organization, annex 17 (Annex 17 to the Convention on International Civil Aviation, Security – Safeguarding International Civil Aviation against Acts of Unlawful Interference). Annex 17 follows Federal Aviation Administration Regulation part 107 (14 CFR Part 107 – Airport Security) very closely, and prescribes security practices and procedures for securing airport perimeter areas. The provisions included in ICAO Annex 17 prescribe a baseline of procedures and practices that must be followed in order to operate an international airport in a safe and secure manner.

With the soccer World Cup coming to Brazil in 2014, and the Olympics in 2016, the focus of international security will be placed squarely on the host cities and on airports throughout the country. From that perspective, it is imperative that Brazil take every step necessary to improve their airport security process, protocol and technology. This year there have been several successful attempts by the international media to expose poor airport security in South Africa, as host to the 2010 World Cup.

Tancredo Neves International Airport currently operates within the baseline of acceptable international airport security standards. Meeting the standards for airport perimeter security at TNIA is the sole responsibility of INFRAERO. Security for passengers, air cargo and outbound baggage are shared responsibilities between Infraero, the airlines, and other airport tenants.

Following is an analysis of the current state of security operations, gaps and recommendations for TNIA with respect to ICAO requirements for; perimeter security; out bound passenger security; outbound baggage security; outbound cargo security; and technology:

6.2 Perimeter Security

Perimeter security is broken down into the areas of security fencing, vehicular access gates, and employee access to the airside secured area.

Security fencing at TNIA is currently undergoing a $2 million USD upgrade. As part of the upgrade, a new fence line is being established with dual angle barbed wire and of adequate height to provide good baseline perimeter security. The project will replace sections of fence line that are in poor condition and would be considered a poor level of perimeter security. Upon completion of the security fencing upgrade, TNIA will have a greatly increased level of perimeter security for many years to come. In many areas, the security fencing includes a double fence set up.

Vehicular access gates are required to have either physical inspection, or electronic card key capabilities, with a provision for establishing the identity of the driver, and including a

physical inspection of each vehicle for possible weapons or explosives. Additionally, airport tenants are required to provide the same level of security for vehicles entering their leasehold areas. Leasehold area perimeter security is the responsibility of the leaseholder, with discreet equipment, procedures and protocol to be approved by the Infraero security manager.

Currently, there are two primary vehicular access gates at TNIA. These gates meet ICAO Annex 17 standards for security. The gates operate with manual/physical inspections for each vehicle. These inspections include the required cross-verification of the access badge and identity of each person accessing the airfield, and also a physical inspection of each vehicle for contraband, explosives, and weapons. As previously stated, these gates operate within the acceptable parameters of ICAO perimeter security regulations.

ICAO recommendations for employees accessing secured areas call for badge and personal identification verification as well as an x-ray inspection for each access point. This requirement is accomplished at TNIA via one single employee access portal. The portal is a ground, or apron level access point, and is in a central area of the terminal.

In accordance with ICAO requirements, the portal is activated by badge/card key swipe, which activates a sterile access door. After gaining access through the door, the employee goes through a physical badge and identity verification performed by a guard. After identity verification, the employee is screened through a magnetometer, and all carried items are screened via x-ray machine. This process is repeated for 100 percent of every access to the sterile airfield area by each employee. In this respect, TNIA is somewhat ahead of much of the developed airports in the world. For example, the U.S. has not yet fully implemented 100 percent screening of employees for contraband, explosives, or weapons upon seeking access to the sterile airfield work areas.

Perimeter security at TNIA is acceptable, and meets ICAO requirements in every respect. From the standpoint of screening 100 percent of airport employees seeking access to their secured work areas, TNIA is ahead of the U.S. and much of the developed world. The only area of potential improvement at TNIA would be the future introduction of upgraded access control technology.

6.3 Passenger Security

Security for enplaning passengers is accomplished through two screening locations at TNIA. The screening process for both domestic and international enplaning passengers is generally in accordance with ICAO security standards.

The domestic passenger screening is accomplished with magnetometers, and X-ray equipment for carry-on baggage. The domestic screening process is very simple and straightforward with no apparent selectee advanced screening, and no wanding, or trace explosive detection equipment being used. The domestic operation, although limited in space, does not experience significant backups during peak periods. This is mostly due to the speed of the overall process itself.

The international passenger screening process is more involved. Unlike the domestic process, international screening employs random advanced screening, wanding, pat downs, and explosive trace detection technology. Additionally, American Airlines employs

100 percent screening of carryon baggage, and passenger pat down just prior to boarding for their flight to Miami.

Gaps in the current process are mostly found in the domestic passenger screening process. The process is acceptable by international standards, but it could benefit from improved processes and equipment. We recommend several enhancements to the current domestic passenger screening process; including:

- the need for personal identification validation at the point of entry into the checkpoint
- the need for trace explosive detection equipment and a protocol for use in the domestic screening process
- a secondary screening process and protocol utilizing pat downs and wanding

6.4 Baggage Security

Baggage security has undergone significant process and technological improvement worldwide over the last 9 years since the terrorist attack in the United States. Particularly, it is a firm practice in the U.S., and strongly recommended by ICAO that 100 percent of all outbound bags (both domestic and international) will be properly screened for possible explosives.

At TNIA, the outbound baggage screening process is 100 percent for outbound international baggage, and 0 percent for domestic outbound baggage.

The technology required for baggage screening is different than that of passenger screening. The passenger screening process utilizes a magnetometer which picks up on the metal content of the individual going through the portal. The baggage screening process is set up to detect atomic density that would resemble that of explosives, or a bomb. The technology utilized in the baggage screening process more closely resembles CAT scan technology, and is referred to as CTX technology.

Currently, TNIA employs two Heiman CTX scanners to process all outbound international checked bags. These machines are not in line, or automated, so they require an employee to manually load each bag from the outbound belt through the machine, and then the screened bag is placed on a baggage cart for movement to the aircraft. This manual screening process is very inefficient when considering the baggage volumes associated with the loading of one or more wide body aircraft at a time.

Regarding baggage screening gaps at TNIA, it is recommended that a program for the screening of 100 percent of domestic outbound baggage be implemented as soon as possible. Additionally, an inline, or automated screening process utilizing CTX technology should be undertaken for outbound international bags. If the international operation moves to the new Terminal 2 complex, this would be the time to implement a high volume outbound in line baggage screening system for all outbound bags.

6.5 Cargo Security

Cargo security has also undergone a significant process improvement in the last nine years worldwide. In the past, most cargo security programs relied on the "known shipper"

program. In this program, the regulatory agency would "pre-approve" shippers, and require that they screen the cargo when it comes into their possession, at their place of business. In the U.S. there has been a slow transition toward the physical screening of cargo at the air cargo facility prior to moving each piece of cargo to the aircraft cargo hold. In 2010 in the United States, a comprehensive 100 percent physical cargo screening mandate was enacted at all U.S. domestic airports.

The progression of increasing air cargo security has gone from known shipper programs, to random physical screening of cargo, to 100 percent physical screening of cargo. In keeping pace with air cargo security programs around the world, a workable current protocol would be; maintain the existing known shipper program, physically screen 100 percent of outbound international cargo, and randomly screen domestic cargo. The process of physically screening outbound cargo requires "large gauge" CTX screening equipment, as well as trace explosive detection equipment.

Currently at TNIA, domestic outbound air cargo relies on a known shipper program. Outbound international cargo utilizes a blend of known shipper security, and X-ray detection equipment for physical screening. Additionally, American Airlines physically screens 100 percent of the international cargo going on each of their flights through the X-ray detection equipment in the Infraero cargo building. As more international air carriers begin to access TNIA, a demand for additional cargo screening equipment and facilities will no doubt be required.

Gaps in the current air cargo screening process at TNIA would be; not screening 100 percent of all outbound international cargo through an acceptable CTX technology; and no random physical screening of domestic outbound cargo.

6.6 Security Technology

Technological advances in airport security have moved rapidly in the past 10 years. Current deployed technology in the U.S. is very different from that used just a decade ago. Improvements in passenger full body screening portals are now being deployed throughout the U.S. and developed world. Camera technology has undergone significant improvements; with long term video storage capabilities; the ability to go back in time with object video systems; and 360 degree constant view video systems.

Airport operational and security control centers have benefited from technologies that allow a single employee to be much more effective in detection and dispatch operations. Explosive detection technology for baggage and cargo has developed to the point of practical and cost effective application. Access control biometric systems are much more reliable than in the past. And finally, the very sophisticated and complex in line baggage screening conveyor systems have developed to a point of high reliability, and cost effectiveness.

Currently at TNIA airport, camera technology is adequate, with 112 cameras deployed and an additional 120 cameras being added in the short term. Storage for CCTV video files is 30 days, and could be improved. The security control center is adequate, however, a more technically efficient center would provide a higher level of security. Additionally, a shared

control center that would include; airport operations; maintenance; security; and a central dispatch function would be highly desirable for TNIA.

6.7 Findings and Recommendations

Based on the findings above, we recommend the following enhancements to airport security for both processes and equipment. These recommendations apply directly to the discreet areas of; perimeter security; outbound passenger security; outbound baggage security; outbound air cargo security; and security technology.

6.7.1 Findings-Perimeter Security

As previously stated, perimeter security is well handled at TNIA. With a dual perimeter fence arrangement, and a new outer security fence, the airport perimeter meets all current standards. Additionally, the screening of 100 percent of employees gaining access to the secured area is the highest possible level of security.

Enhancements in perimeter security can be made through the use of new technology. The technology would be in the form of access control biometrics, and a perimeter intruder detection system, (PIDS).

Access control biometrics can be used to further enhance the current card key and manual checking system that is now employed at TNIA. Earlier access control biometric technologies such as fingerprint, and facial recognition were not very reliable, and in some cases caused more concern than they resolved. The next generation of access control biometrics such as vascular biometrics has pushed the read rates and reliability levels to very near 100 percent. Access control biometrics should be used at each secured area access portal, and can also be used at the vehicular gates.

A Perimeter Intruder Detection System, (PIDS) can enhance the level of security for the existing perimeter fence. A PIDS system would be particularly useful in the southwest airfield area, where the airport shares a fence line with the city of Confins. The PIDS systems utilize electronic, and in some cases, laser technology to signal the security control center that an intruder may be present at the perimeter fence line.

6.7.2 Recommendations-Perimeter Security

Recommendations for improvements in the current level of perimeter security would be in the realm of technology

- An Access control biometric system to be used for primary secured area doors should be considered. The recommended biometric is vascular. This system can also be used to secure airfield gates, and vehicular gates.
- PIDS systems for the entire south airfield run which coincides with an airfield fence that represents a shared boundary with the city of Confins.

6.7.3 Findings-Outbound Passenger Security

The current outbound passenger security checkpoints operate within the requirements of the ICAO convention. The international checkpoint employs all current levels of technology and process.

The three primary outbound passenger security operations all have differing protocols and requirements. These three operations are; domestic, international and transfer.

The domestic checkpoints operate within the realm of acceptable security, however, they are lacking an important ID matching process at entry, and are also in need of trace detection technology and protocol. The domestic outbound checkpoints need magnetometer wands at each lane, and mobile trace detection equipment for each lane, with a suitable security protocol for use. Additionally, the domestic checkpoints are in need of a positive identification check prior to entering the checkpoint. This positive ID check should take place at the point where boarding passes are currently checked.

The international passenger checkpoint as previously stated operates within the realm of acceptable security. However, certain enhancements would improve both the level of security, and the efficiency of passenger flow. These enhancements are; additional mobile trace detection equipment, for each lane to speed up lane operations and improve security; and security for the international checkpoint could be greatly enhanced with a trace detection full body walk through portal, such as those that are now being installed in the U.S. This new portal equipment would require a discreet protocol for use in order to provide a higher level of security and efficiency.

Transfer passenger equipment and facilities being used for domestic transfer passenger security is inadequate, not sized properly, and may need to be moved to a location more in line with where small (non-secure) airport commuter passengers are deplaning at apron level in order to be more efficient.

The Transfer passenger security currently takes place in a small glass room on the enplaning level. Since most small airport, (non-secure) passengers arrive at ramp level, the function and equipment should be moved to the ramp level hold room on the east side of Terminal 1. This transfer passenger screening function should include magnetometer wands, and a mobile trace detection unit, with proper security protocol.

All aspects of the three primary outbound passenger security functions, (domestic, international, transfer) could immediately enhance security levels by utilizing state of the art security technology.

6.7.4 Recommendations-Outbound Passenger Security

- The domestic outbound checkpoints are in need of a positive passenger ID match protocol as soon as possible. The checkpoints are also needing mobile trace detection technology, (one for each lane), and wanding/pat down secondary check protocol.
- The international outbound checkpoint operation would be enhanced with additional mobile trace detection equipment, and one or more walk through explosive detection portals.
- The transfer passenger checkpoint should be moved to the eastern Terminal 1 apron hold room location. Additional equipment needed would be; a mobile trace detection unit and magnetometer hand wands.

6.7.5 Findings-Outbound Baggage Security

Outbound baggage security follows two separate security protocols, one for domestic, and one for international outbound bags. It is strongly recommended by ICAO convention that 100 percent of all outbound bags are screened for potential explosives. Since currently, only outbound international bags are screened, the domestic outbound baggage makeup room would require a physical retrofit, and enough CTX screening machines to handle peak domestic baggage loads. Additionally, a security protocol would need to be developed for the domestic baggage screening process.

Since an inline automated domestic baggage system would require an expensive baggage make up area retrofit, a manually loaded pod set up should be considered. The actual number of CTX machines needed to handle peak hour baggage loads should be the subject of a future study.

The outbound international baggage security currently is handled with two manually loaded CTX machines. This is a low volume set up, and is adequate for current operations, but will not be able to accommodate future growth. A high volume, automated inline baggage screening system should be considered for the new Terminal 2 complex to better address much higher demands that are anticipated for international operations in the future. Terminal 1 should be retrofitted with a straight run out belt manual baggage screening system.

6.7.6 Recommendations-Outbound Baggage Security

- For Terminal 1 outbound domestic baggage, it is recommended that the operation be modified to accomplish 100 percent explosive detection screening. This would be accomplished with utilizing from 5-8 CTX machines in a pod setting, at the end of the baggage run out conveyors. One mobile trace detection device for secondary screening would be required at each CTX pod. Primary and secondary screening protocols would need to be developed for this operation.
- For Terminal 2 outbound international and domestic baggage, a high volume automated inline baggage screening system is recommended. This will enable TNIA to handle projected demand growth in outbound international flights for the near and long term future. This baggage screening should be an automated, in line CTX system with explosive detection screening for 100 percent of all outbound bags. This system should operate on international outbound bag security screening protocols.

6.7.7 Findings-Outbound Cargo Security

Outbound cargo security at TNIA relies heavily on known shipper programs. Additionally, international outbound cargo is screened randomly for the non- U.S. carriers through X-Ray technology, with American Airlines screening 100 percent of their outbound international cargo. An improvement to the current operation would be to physically screen 100 percent of all international cargo through a large gauge CTX portal, and utilizing mobile trace equipment as back up.

The current outbound international cargo operation takes place in the cargo building operated by Infraero. At some point in the near future, as the volume of cargo demand continues to increase, this facility would be in need of renovation and expansion. The cargo

terminal renovation project should include the necessary space and explosive detection technology to accommodate a physical screening program for 100 percent of outbound international cargo.

The outbound domestic cargo operation currently takes place in the Infraero cargo facility as well as the temporary building being used by GOL, TAM and other domestic airlines. Currently, the domestic cargo operation relies on a known shipper program. An improvement to the current level of security would be the inclusion of mobile explosive trace detection equipment, with a protocol for random trace detection screening.

6.7.8 Recommendations-Outbound Cargo Security

- For outbound international air cargo, it is recommended that a protocol for 100 percent explosive detection screening be developed. Part of the new protocol would be utilizing the latest in large gauge CTX machines, with backup from mobile explosive trace detection equipment. This modification should be accomplished at the point where the Infraero facility is expanded.
- For outbound domestic air cargo, it is recommended that a random explosives detection screening protocol be developed to augment the known shipper program. This protocol would require the use of several mobile explosive trace detection devices.

6.7.9 Findings-Security Technology

Currently, TNIA operates a security operations center in the Infraero office space above the landside concessions area, just above a very public space. This operation incorporates security cameras, emergency dispatch, alarm resolution and other security related functions. The security technology being used in the facility is for the most part on par with the rest of the world.

Current best in class security technology and practices would dictate modifications to the current set up. It would be very beneficial to upgrade facilities and technology during the construction of the new T-2 terminal complex. A joint command and control center is highly desirable, and more on par with worldwide best practices.

The upgrade to security in the new T-2 construction would include the following best in class improvements; 1) a consolidated control room function that incorporates and includes; airport operations, airport maintenance, airport security, a central dispatch function for all departments, emergency response planning and incident response command center; 2) a secure location for the control and command center that is separated from all public, non secure areas;3) upgraded CCTV systems with event driven recording and response capabilities.

This new control center for TNIA would include state of the art communications, and closed circuit television monitoring for all secure access points. The new technology would all be fully incorporated into the new control center.

6.7.10 Recommendations-Security Technology:

- A new consolidated airport operations control center to be constructed as a part of the new T-2 terminal expansion project.

- The new control center would incorporate all operations functions including; gate assignment, maintenance dispatch, security, emergency dispatch, incident command, and emergency planning facilities.
- It is extremely important that the new control center be located in a secured, non-public area of either T-1 or the new T-2 that would not be susceptible to interference or threat from the general public.
- The security function of the control center should incorporate the latest in communications and security technology, including; satellite emergency phones, event driven closed circuit televisions with automatic event recording, and an incident command center that would accommodate all emergency response agencies.

6.8 Recommended Security Equipment Listing

6.8.1 Perimeter Security

1. Vascular Biometric access control system with card key system, minimum 10 portals.
2. PIDS system, minimum of 10,000 lineal feet of coverage.

6.8.2 Outbound Passenger Security

1. Domestic outbound checkpoints; minimum (6) mobile trace detection units; and (6) magnetometer wands.
2. International outbound checkpoint; minimum (2) mobile trace detection units; and (1) walk through explosives detection portal.
3. Transfer passenger checkpoint; (1) mobile trace detection unit; (1) magnetometer wand; and, retrofit screening space at ramp level location.

6.8.3 Outbound Baggage Security

1. Domestic baggage make up area space retrofit with minimum (5-8) manual CTX machines; (3) mobile trace detection units.
2. International baggage; develop fully automated in line baggage screening system in the new T-2 program. System needs; automated conveyors attached to all international outbound bag lines; a minimum of (4) automated CTX machines; and (2) mobile trace detection units.

6.8.4 Outbound Cargo Security

1. At the domestic cargo facilities a minimum of (2) mobile trace detection units per facility, (1) mobile X-Ray unit per domestic cargo facility.
2. International cargo facility - a minimum of (2-3) manual large gauge CTX machines; (1) mobile trace detection unit, facility space retrofit to accommodate growth and space for 100 percent screening operation.

6.8.5 Security Technology

1. Program space in the new T-2 project for a secured central consolidated control center, space needs; (1,500-2,500 sq. ft.) TBD by space program study. Incident command center within the new space will be equipped with state of the art communication technology

and space for all responding agencies. Dispatch function will include; security, operations, and maintenance functions.

2. Additional Closed Circuit Televisions; approximately (120). Software for cameras will be event driven, with automatic event recording capability. Software for extended recording storage will also be included. 360 degree constant view cameras will be considered for checkpoints.
3. Base unit satellite phones for the control center, (2); with (5-10) mobile units.

CHAPTER 7

Order-of-Magnitude Project Cost / Phasing

CHAPTER 7

Order-Of-Magnitude Project Cost/Phasing

7.1 Introduction

This Chapter presents order-of-magnitude (preliminary) cost estimates for the TNIA phased airport development plan. These preliminary estimates are based on technical data provided by SEDE and on similar INFRAERO airport development cost estimates from previous airport projects in Brazil. In addition, information contained in the Changi Airport Master Plan was used as input into the cost estimates presented herein.

These cost estimates are "order-of-magnitude" cost estimates based on the planning analysis described in Chapters 3, 4 and 5 of this report. These cost estimates are planning-level estimates only and are not based on any detailed design of the proposed airfield, terminal, and landside facilities. Detailed engineering cost estimates will be developed as part of follow-on design projects for both Phase 1 and Phase 2 airport development.

Contingencies are included in the cost estimates to account for the fact that these costs are based on planning inputs only and that certain design elements (such as earthwork, cut/fill, environmental mitigation costs, etc.) can only be determined based on follow-on design and environmental studies. Contingency amounts are provided for each Phase of estimates as described below.

This Chapter describes the estimated costs by development phase as shown on the plans in Section 5, including:

- Phase 1 development, including the proposed runway extension, new passenger Terminal 2, new aircraft parking apron, landside facilities, and industrial development.
- Phase 2 developments, including a second parallel runway, passenger and cargo terminal expansion, new aerospace and MRO facilities, and Aerotropolis and industrial park expansion.
- Phase 3 developments, including expanded passenger terminal and air cargo facilities, new aerospace and MRO facilities, and Aerotropolis and industrial park expansion.

Cost estimates are not provided in this report for all of the "ultimate" airport development as some of these facilities will not be constructed until after the 20-year planning horizon that is described in this report. Examples of this include the third parallel runway and the full build-out of the passenger terminal complex (Terminal 3).

All unit prices and costs contained herein are in constant U.S. dollars ($ U.S.) and constant Brazilian Reiais (BRL$) as of October 2010, independent of the development phase. Conversion has been done at the rate of ***BRL$100= $ 60 U.S.***

Contingencies are included for each cost item and each phase of development depending on the level of accuracy of each item. Some cost items (such as the access roadways or airside development) have smaller contingencies as the required cost elements are more easily

identified. Other cost items (such as cost for the second runway) include larger contingencies as the precise earthwork (cut/fill) quantities are not known at this time. For equipment such as loading bridges, no contingencies are included as these costs are well known in the marketplace.

The airport development cost estimates presented herein include estimates for design, environmental studies and environmental permitting costs, and construction services costs which have been applied to all of the applicable projects included in the Airport Development Plan.

The overall estimates reflect current unit prices from similar Infraero projects that our local Brazilian airport consultant (Aeroservice) maintains in their database for Brazil airport projects, as well as information provided by SEDE and by CH2M HILL.

7.2 Preliminary Estimates of Phased Airport Development Costs

This cost estimate presents the analysis of the cost items for each phase of development of TNIA, based on the qualitative and quantitative information for the proposed airport facilities contained in this Airport Master Plan. The application of unit prices to the estimated sizing and quantities for the proposed future airport development for each of the three phases of developments is described in detail below.

7.2.1 Phase 1

Phase 1 development includes the major projects listed below.

Phase 1 Development (2011-2015 timeframe)

- 600 m runway extension to the east, including 2 new exit taxiways.
- Terminal 2 (Phase 1) including new passenger terminal, aircraft parking apron, and 3-lane terminal access roadway on two levels, and new parking garage
- New taxiway to the west of the existing runway and new cross taxiway (north-south taxiway)
- New air cargo facilities
- Phase 1 Aviation/aerospace support development
- Phase 1 Airport City and Industrial Park development
- New landside roadway facilities

The Phase 1 aerospace development located in the southwest quadrant of the airport will require a significant amount of earthwork in order to level this area for construction of the proposed new facilities. These earthwork costs have been included in the estimates below which describe the unit prices, assumptions, and resulting costs for the Phase 1 Airport Development Program.

7.2.2 New Passenger Terminal 2

The Phase 1 program includes design and construction of Terminal 2 (TPS 2) which includes a two-level terminal and landside roadway system and connection of Terminal 2 to the existing Terminal 1. The Phase 1 program includes 74,000 m² with 9 new loading bridges for Terminal 2, with future extension of the terminal in Phase 2 as shown in the illustration.

The cost estimate for Terminal 2 is based on a unit price of R$6,000 ($ 3,600 U.S.) per m² and separate cost estimates for equipment. The unit price used herein is based on typical INFRAERO unit prices for similar terminal projects, and this unit price has previously been approved by INFRAERO for use on other projects. Loading bridges were estimated based on a unit price of R$ 1.500.000 ($ 900,000 U.S.)

7.2.3 Runway Extension and Overlay of the Existing Runway 16-34

Phase 1 includes a runway extension of 600 m on the Runway 34 end and an overlay of the existing runway. The cost estimates for this project include a flexible asphalt pavement overlay, rigid pavement for the Runway 34 threshold, and all excavation, sub-base material, drainage, marking and lighting required to meet ICAO standards.

Unit prices of R$ 250,00 per m² ($ 150.00 U.S./m²) for new asphalt pavement and R$ 310,00 per m² ($ 186.00 U.S./m²) for new rigid (concrete) pavement includes all excavation, sub-base and base material, pavement construction, and marking and lighting for the new taxiways. A unit price of R$ 65,00 per m² ($ 39.00 U.S./m²) was used for the asphalt overlay. These unit prices are based on typical INFRAERO unit prices for similar airport pavement projects

7.2.4 Taxiways

Several taxiways are included in the Phase 1 program, including:

- Two exit taxiways at the extended Runway 34 end
- Taxiway extension to serve the new MRO and Aerospace development areas
- New exit taxiway to serve the Terminal 2 parking apron
- A high-speed exit taxiway

The unit price of R$ 250,00 per m² ($ 150.00 U.S./m²) includes all excavation, subbase and base material, pavement construction, and marking and lighting for the new taxiways.

7.2.5 Aircraft Parking Apron

New aircraft parking aprons for Phase 1 will include a new 201.900 m² apron for Terminal 2 and a new 50.750 m² cargo apron. The unit price of R$ 310,00 per m² ($ 186.00 U.S./m²) includes all excavation, subbase and base material, pavement construction, and marking and lighting for the new taxiways.

7.2.6 GSE Expansion

The GSE area will be expanded to provide for additional area for storage of ground service equipment, including 4.150 m² of additional pavement and a 3.600 m² roof structure for protection of the equipment. Unit prices of R$ 220,00 per m² ($ 132.00 U.S./m²) and

R$ 1,800,00 per m² ($ 1,080 U.S./m²) were used for the rigid pavement and for the ground service equipment structure, respectively.

7.2.7 Cargo Terminal

Phase 1 includes a new cargo terminal to be constructed next to the existing terminal. The total area of the terminal will be 12,230 m², including a small mezzanine and office area. A new 14.740 m² car parking lot will also be constructed on the landside. Unit prices used for these new facilities include R$ 2000 ($ 1,200 U.S.) for the cargo terminal and R$ 220,00 ($ U.S. 132.00) for the parking lot. The cargo terminal unit price includes all handling equipment and is based on similar unit prices used by INFRAERO.

7.2.8 Air Traffic Control Tower and Support Building

The Phase 1 TNIA program includes a new air traffic control tower (ATCT) to be located on the east side of the airport. The exact location of the ATCT will be determined as part of a follow-on preliminary design phase for the East Airport Development Area in order to establish elevations for runways, taxiways, and apron areas and determine ATCT line-of-sight requirements for the new control tower.

This cost estimate assumes an ATCT height of 70 m and an overall area of 260 m². This estimate also assumes that the ATCT equipment will be transferred from the existing tower to the new tower, as such equipment costs are not included in Phase 1 costs.

A global estimate of R$ 12.000.000 ($ 7,200,000 U.S.) is included in Phase 1 for the new ATCT and includes civil works, elevators, consoles, air conditioning, and all other required support facilities. This estimate is based on a similar INFRAERO ATCT project in Brazil from 2010.

An initial estimate for the area of the DTCEA support building of 1,800 m² is based on INFRAERO reference documents for these facilities. It is possible, however, that the size of this building can be reduced somewhat. A unit price of $ 2.000 per m² ($1,200 U.S.) was used based on a recently completed study for a similar building.

7.2.9 Landside Roadways

The airport access roadway system will include the new roadway LMG-800, which will connect to the internal terminal access roadways and other roadways connecting air cargo facilities and other facilities for Phase 1 development.

Included in this estimate is a two-level terminal roadway for the new Terminal 2 which will serve arrivals and departures separately. This Terminal 2 roadway will tie into the existing at-grade roadway for airport egress.

The overall roadway system for Phase 1 includes the Terminal 2 access road and all other access roads and service roads required for access/egress to passenger terminals, cargo terminals, and other facilities to be constructed during Phase 1.

At-Grade Roadways

The total area of new roadways for Phase 1 development is estimated at 34.150,00 m². A unit price of R$ 150,00/m² ($ 90.00 U.S.) was used to include all construction items and signalization based on similar INFRAERO projects conducted in 2010.

Elevated Roadways

A total area of 16.400 m² was estimated for the elevated roadway for Terminal 2. A unit price of R$ 3.500/m² ($ 2,100 U.S.) was used which includes all civil and structural components for the elevated roadway based on referenced unit prices from the Brazil Federal Department of Transportation (DNIT).

7.2.10 Car Parking

Parking facilities for Phase 1 development were estimated as follows:

- Public parking garage in front of Terminal 2 totaling 46,500 m² to accommodate 1,500 vehicles.
- A taxi stand to serve Terminal 2 totaling 5,970 m².

The parking garage is planned as a 4-level garage with one level underground and three levels above ground. Each level is 155m x 75 m.

A unit price of R$ 150,00 per m² ($ 90.00 U.S. per m²) was used for construction of the at-grade parking based on similar unit prices used by INFRAERO and applied by Aeroservice on recent projects in Brazil. A unit price of R$ 1.980,00/m² was used for the three elevated levels for the parking garage, and a unit price of 2.520,00/m² was used for the below-grade level to account for additional costs of excavation and structural support.

7.2.11 Earthwork

Earthwork estimates for Phase 1 are a very significant cost item for the proposed areas designated for Maintenance, Repair and Overhaul (MRO) and for the Airport City. This area is located to the north of the new airport access roadway LMG-800 and includes an area of 720,000 m² with very challenging and irregular topography.

An initial estimate of earthwork for Phase 1 includes approximately 3,000,000 m³, based on an average volume of 4 m³ per m² (4 cubic meters of excavation per square meter of area). It should be noted that this estimated earthwork volume is based on an average volume of earthwork from the local topographic mapping and anticipated final grading elevations. This earthwork estimate includes a contingency of 20 percent given the unknowns in calculating the exact cut and fill volumes which will be determined during the design phase.

An average unit price of R$ 16,00/m³ ($ 9.60 U.S.) was used for earthwork based on average earthwork prices for similar INFRAERO airport development projects.

7.2.12 General Infrastructure Costs

Cost estimates for general infrastructure costs and site preparation costs are included for Industrial Development areas, Airport City development, and other airport support areas. These costs estimates are general estimates only based on the land use planning shown on the phased airport development plans in Chapter 5.

As a general basis for this cost estimate, general infrastructure costs were estimated to be 15percent of total development costs for the various types of land development based on similar projects and cost estimates at other airports. Certain items were added separately to this 15 percent cost amount for Phase 1, including air navigation facilities, aircraft rescue

and fire fighting (ARFF) facilities, and earthwork costs (estimated separately as described above).

While it is possible that some land development costs may vary based on final design and types of future facilities, the overall land development costs should cover the required infrastructure for these proposed future developments.

In general the following percentages were applied for "General Infrastructure and Land Development Costs":

• Water supply systems	2,20%
• Wastewater systems	2,00%
• Solid waste systems	0,50%
• Electrical supply	6,00%
• Telephone/communications	2,10%
• Site drainage	1,00%
• General land preparation	1,20%
Total	15,00%

7.2.13 Preliminary Studies and Design

All of the required studies and design projects required for the installation of the proposed Phase 1 facilities were based on overall construction costs as described above. The following percentages were applied for these studies and design costs:

• Preliminary studies	1,00%
• Preliminary Design projects	2,00%
• Final Design projects	2,50%
Total	5,50%

Costs for detailed environmental impact studies (Estudo de Impacto Ambiental e Relatório de Impacto no Meio Ambiente - EIA/RIMA) were applied to total project costs based on similar projects and estimates by INFRAERO.

7.2.14 Environmental Mitigation and Permitting Costs

Environmental mitigation and permitting costs were applied to the overall project costs and are based on similar INFRAERO project costs for these items. These costs were distributed over the three airport development phases based on total costs for each phase.

7.2.15 Construction Management

A percentage of 6 percent was applied to total project costs to cover construction management and construction inspection services for each phase of development.

7.2.16 Contingencies

Contingencies were applied to the various cost items based on the construction cost estimates described above. Contingency costs varied based on the potential for variation of costs for certain unknown items (such as the exact volumes of earthwork) that can only be calculated as part of follow-on design projects.

Cost Item	Contingency
Earthwork (cut/fill)	20%
Runway	5%
Taxiways	5%
Aircraft Parking Apron	10%
Ground Service Equipment (GSE)	10%
Landside Roadways	5%
Taxi parking stand	5%
Car Parking Garage	10%
Passenger Terminal 2	15%
Cargo Terminal (including aircraft apron and landside access road)	10%
Air Traffic Control Tower and support building (DTCEA)	5%
Airport Maintenance Building	10%
Basic infrastructure and land development costs	10%
Preliminary studies and design projects	5%
Environmental mitigation and licensing	15%
Construction management	5%

7.2.17 Phase 1 Cost Estimate

The following table summarizes the TNIA Phase 1 development costs, including contingency costs, planning and design costs, and environmental-related costs.

TANCREDO NEVES INTERNATIONAL AIRPORT (TNIA)
AIRPORT MASTER PLAN

Preliminary Cost Estimates (BRL$)

PHASE 1

Item	Description	Unit	Quant.	Unit Price (BRL$)	Total (BRL$)
1.	**Earthwork (****)**				**48.720.000,00**
1.1	General clearing	m^2	720.000	1,00	720.000,00
1.2	Earthwork (cut/fill)	m^3	3.000.000	16,00	48.000.000,00
2.	**Runway(*)**				**15.801.500,00**
2.1	Flexible Pavement				
2.1.1	Runway 34 extension - 600 m (*)	m^2	24.300	250,00	6.075.000,00
2.1.2	Overlay (*)	m^2	132.300	65,00	8.599.500,00
2.2	Rigid Pavement				
2.2.1	New threshold construction (45m x 60m) (I	m^2	2.700	310,00	837.000,00
2.3	Runway lighting	vb			290.000,00
3.	**Taxiways (*)**				**11.979.250,00**
3.1	Flexible Pavement				
3.1.1	Connecting taxiways (I	m^2	8.770	250,00	2.192.500,00
3.1.2	High speed exit taxiway (*)	m^2	12.835	250,00	3.208.750,00
3.1.3	Parallel runway extension (*)	m^2	14.800	250,00	3.700.000,00
3.1.4	Taxiway connection to apron (I	m^2	5.312	250,00	1.328.000,00
3.2	Taxiway lighting	LS			1.550.000,00
4.	**Terminal 2 Apron (**)**				**62.589.000,00**
4.1	Rigid Pavement	m^2	201.900	310,00	62.589.000,00
5.	**Cargo Terminal Apron (**)**				**15.732.500,00**
5.1	Rigid Pavement	m^2	50.750	310,00	15.732.500,00
6.	**Expansion of GSE area (**)**				**7.393.000,00**
6.1	Covered structure (civil works and installation)	m^2	3.600	1.800,00	6.480.000,00
6.2	Rigid Pavement	m^2	4.150	220,00	913.000,00
7.	**Roadway System (*)**				**56.647.500,00**
7.1	Flexible Pavement- roadways	m^2	34.150	150,00	5.122.500,00
7.2	Elevated Roadway Structures	m^2	16.400	3.000,00	49.200.000,00
7.3	Flexible Pavement (airport city)	m^2	15.500	150,00	2.325.000,00
8.	**Parking**				**92.965.500,00**

Item	Description	Unit	Quant.	Unit Price (BRL$)	Total (BRL$)
8.1	Taxi stand and roadway (*)	m^2	5.970	150,00	895.500,00
8.2	Parking Garage (**)	m^2	46.500	1.980,00	92.070.000,00
9.	**New Passenger Terminal 2**				**457.500.000,00**
9.1	Terminal 2 and equipment (installed)	m^2	74.000	6.000,00	444.000.000,00
9.1.1	Civil Works (***)				288.600.000,00
9.1.2	Systems				155.400.000,00
9.1.2.1	Air Conditioning				22.200.000,00
9.1.2.2	Plumbing / water supply (***)				26.640.000,00
9.1.2.3	Electrical (***)				66.600.000,00
9.1.2.4	HVAC				26.640.000,00
9.1.2.5	Building systems				13.320.000,00
9.2	Loading Bridges (installed)	Each	9	1.500.000,00	13.500.000,00
10.	**Cargo Terminal (**)**				**27.702.800,00**
10.1	Civil works and equipment	m^2	12.230	2.000,00	24.460.000,00
10.2	Parking and equipment area (rigid pavement)	m^2	14.740	220,00	3.242.800,00
11.	**Air Traffic Control (*)**				**15.600.000,00**
11.1	New Control Tower				
11.1.1	Civil works and installations	LS			12.000.000,00
11.2	DTCEA building				
11.2.1	Total	m^2	1.800	2.000,00	3.600.000,00
12.	**Support Infrastructure (**)**				**94.410.029,00**
12.1	Water supply	LS			15.050.874,00
12.2	Water treatment systems	LS			13.682.613,00
12.3	Solid waste systems	LS			3.420.653,00
12.4	Electrical systems	LS			41.047.839,00
12.5	Phone systems	LS			14.366.744,00
12.6	Drainage Systems	LS			6.841.306,00
13	**General land preparation (**)**				**8.209.568,00**
	Subtotal				915.250.647,00
14.	**Studies and Design projects (**)**				**53.338.785,00**
14.1	Preliminary studies	LS			9.152.506,00
14.2	Environmental Studies - EIA/RIMA	LS			3.000.000,00

Item	Description	Unit	Quant.	Unit Price (BRL$)	Total (BRL$)
14.3	Preliminary Design	LS			18.305.013,00
14.4	Final Design	LS			22.881.266,00
15.	**Environmental Mitigation and Permitting**	**LS**			**16.030.000,00**
16.	**Construction Management (*)**	**LS**			**54.915.039,00**
17.	**Total Contingency costs**				**110.864.508,00**
	TOTAL GENERAL				**1.150.398.979,00**

LEGEND
(*) 5% Contingency
(**) 10% Contingency
(***) 15% Contingency
(****) 20% Contingency

TOTAL PHASE 1 PRELIMINARY ESTIMATE (REAIS) $ 1,150,400,000

TOTAL PHASE 1 PRELIMINARY ESTIMATE ($U.S.) $ 690,240,000

7.2.18 Phase 2

The Phase 2 development program for TNIA includes the following items:

Phase 2 Development (2016-2030 general timeframe)

- Relocation of air traffic control tower to north side of airport
- New 4,000 m second runway with dual parallel taxiways
- Expansion of Terminal 2 and aircraft parking apron
- Two new cross taxiways on the east and west ends of the airport
- New general aviation taxiway and apron
- Phase 2 Aviation/aerospace support development (red buildings):
- Phase 2 Airport City and Industrial Park development:
- Airport support facilities

It should be noted that the areas for the Phase 2 East Airport Development, in particular for the second runway and parallel taxiway, involve a significant amount of earthwork. The following describes quantities, costs, assumptions, and contingencies for all of these Phase 2 cost items.

7.2.19 Expansion of Terminal 2

Phase 2 includes a 33,000 m² expansion of Terminal 2 to the north of the new Terminal which will be constructed in Phase I. Unit prices for this terminal expansion are the same as described for the Phase 1 terminal expansion.

7.2.20 New Runway 16L-34R

Phase 2 includes construction of a new 4,000 m x 45 m parallel runway to the east of the airport access road. This runway will total 174.600 m² of asphalt pavement and 5.400 m² of rigid pavement (for the two runway ends).

Dual parallel taxiways are included in the Phase 2 program for new Runway 16R-34L, as well as dual cross taxiways that will cross the airport access roadway in order to connect the East and West airfield areas of the airport.

Unit costs for these new facilities include: R$ 250,00 per m² ($ 150.00 U.S.) for asphalt pavement (R$/m²), R$ 310,00 per m² for rigid (concrete) pavement (R$/m²), and R$ 4.500 per m² ($ 2,700 U.S.) for the elevated structures (taxiway bridges). The unit price for taxiway bridges was based on similar unit prices obtained by the federal transportation agency in Brazil (DNIT-- Departamento Nacional de Infraestrutura de Transportes).

7.2.21 Aircraft Parking Aprons

New aircraft parking aprons will be constructed in Phase 2 for General Aviation parking, which will include 60.650 m² of new concrete pavement. As described in the Phase 1 cost estimate, a unit price of R$ 310,00 per m² ($ 186.00 U.S./m²) includes all excavation, subbase and base material, pavement construction, and marking and lighting for the new taxiways.

7.2.22 New General Aviation Terminal

A new 800 m² General Aviation Terminal will be constructed in Phase 2. A unit price of R$ 1.800 ($ 1,080 U.S.) per m² has been used for this terminal based on typical unit prices from Infraero.

7.2.23 Airport Maintenance Facilities

Expansion of airport maintenance facilities are included in Phase 2 to accommodate the additional maintenance equipment that will be required by the airport. An overall unit price of R$ 2.200 per m² ($ 1,320 U.S.) has been applied for this area based on Infraero unit prices.

7.2.24 Airport Rescue and Fire Fighting Facilities (AFFR)

Construction of the second runway in Phase 2 will require a new ARFF facility to meet ICAO response requirement for Category 9 operations. A new 1,000 m² building, including enclosed parking for the fire and rescue vehicles, is included in this phase. Per ANAC requirements, 3 new ARFF vehicles will be required for this new facility.

Unit prices of 2.200/m² ($ 1,320 U.S.) for the ARFF building and R$ 1.350.000 ($ 810,000 U.S.) for each ARFF vehicle were used based on Infraero and Comando da Aeronáutica unit prices.

7.2.25 Roadway System

Phase 2 includes development of the Airport City and includes roadways to support this proposed development. A unit price of R$ 150,00/m² ($ 90.00 U.S.) has been applied as described in the Phase 1 estimate.

7.2.26 Navigational Aids

The following navigational aids are included to support runway operations for the new Runway 16L-34R:

- Category I Instrument Landing System
- Approach Lighting System
- Precision Approach Path Indicator (PAPI)
- Airport surface meteorological equipment

Costs for this equipment are based on market costs and Infraero costs for similar airport navigational aid facilities.

7.2.27 General Infrastructure Costs

General infrastructure cost estimates are included for Phase 2 as described for these costs in the Phase 1 estimate. These costs include general infrastructure costs and site preparation costs are included for Industrial Development areas, Airport City development, and other airport support areas. These costs estimates are general estimates only based on the land use planning shown on the phased airport development plans in Chapter 5.

As a general basis for this cost estimate, general infrastructure costs for Phase 2 were estimated to be 8 percent of total development costs for the various types of land development based on similar projects and cost estimates at other airports. Certain items were added separately to this cost amount for Phase 2, including air navigation facilities, aircraft fire fighting and rescue (ARFF) facilities, and earthwork costs (estimated separately as described above.).

While it is possible that some land development costs may vary based on final design and types of future facilities, the overall land development costs should cover the required infrastructure for these proposed future developments.

In general the following percentages were applied for "General Infrastructure and Land Development Costs":

• Water supply systems	1,20%
• Wastewater systems	1,00%
• Solid waste systems	0,30%
• Electrical supply	3,00%
• Telephone/communications	1,10%
• Site drainage	0,80%
• General land preparation	0,60%
Total	**8,00%**

7.2.28 Earthwork

The area for earthwork for Phase 2 is substantial and covers 4 Million m^2, including areas for new runways, parallel taxiways, cross taxiways, MRO, cargo, aerospace and Airport City development.

Based on available topographic information, this planning-level estimate for earthwork for Phase 2 includes a volume of 11.650.000 m^3, based on an average of 2.5 m^3 of excavation per m^2 (m^3/m^2). A 20 percent contingency has been applied to this estimated earthwork volumes, given the unknowns of the final locations and elevations for runways, taxiways, and all other facilities in the East Airport Development Area.

It is important to emphasize that preliminary design of the East Airport Development Area will need to be undertaken in order to establish the optimum locations and elevations of the airfield and terminal facilities per ICAO and FAA airport design criteria. Once the locations and elevations have been established, more accurate earthwork quantities can be estimated as part of a preliminary design project.

7.2.29 Studies, Project Design, Construction Services and Other Costs

Costs for studies, design projects, environmental projects were included in the Phase 2 cost estimates using the same methodology and percentage costs as described in the Phase 1 estimate. In addition, costs for environmental mitigation and for construction management and construction services were also included per the Phase 1 description.

7.2.30 Contingencies

Contingencies were applied to the various cost items based on the construction cost estimates described above. Contingency costs varied based on the potential for variation of costs for certain unknown items (such as the exact volumes of earthwork) that can only be defined calculated as part of follow-on design projects.

Description	Contingency
Earthwork	20%
New Runway	5%
Taxiways	5%
Roadways	5%
Passenger Terminal	15%
General Aviation Ramp	10%
General Aviation Terminal	15%
Airport Maintenance	10%
SESCINC Building	5%
Basic Infrastructure	10%
Studies and Design Projects	5%
Environmental Permitting and Mitigation	15%
Construction Services	5%

7.2.31 Phase 2 Cost Estimate

The following table summarizes the TNIA Phase 2 development costs, including contingency costs, planning and design costs, and environmental-related costs.

TANCREDO NEVES INTERNATIONAL AIRPORT (TNIA)
AIRPORT MASTER PLAN

Preliminary Cost Estimates (BRL$)

PHASE 2

Item	Description	Unit	Quant.	Unit Price (BRL$)	Total (BRL$)
1.	**Earthwork (****)**				191.060.000,00
1.1	General clearing	m^2	4.660.000	1,00	4.660.000,00
1.2	Earthwork (cut/fill)	m^3	11.650.000	16,00	186.400.000,00
2.	**New Runway 16L-34R (*)**				47.802.000,00
2.1	Flexible Pavement				
2.1.1	Runway 16L-34R	m^2	174.600	250,00	43.650.000,00
2.2	Rigid Pavement				
2.2.1	Runway Thresholds	m^2	7.200	310,00	2.232.000,00
2.3	Runway lighting	LS			1.920.000,00
3.	**Taxiways (*)**				164.252.500,00
3.1	Flexible Pavement				
3.1.1	Connecting and exit taxiways	m^2	240.190	250,00	60.047.500,00
3.1.2	Apron access taxiways	m^2	15.700	250,00	3.925.000,00
3.1.3	Elevated taxiways	m^2	20.800	4.500,00	93.600.000,00
3.2	Taxiway lighting	LS			6.680.000,00
4.	**Roadways (*)**				6.600.000,00
4.1	Flexible pavement (airport city)	m^2	44.000	150,00	6.600.000,00
5.	**Passenger Terminal**				205.800.000,00
5.1	Passenger terminal and equipment (installed)	m^2	33.300	6.000,00	199.800.000,00
5.1.1	Civil works (***)				129.870.000,00
5.1.2	Systems				69.930.000,00
5.1.2.1	Air Conditioning				9.990.000,00
5.1.2.2	Plumbing / water supply (***)				11.988.000,00
5.1.2.3	Electrical (***)				29.970.000,00
5.1.2.4	HVAC				11.988.000,00

Item	Description	Unit	Quant.	Unit Price (BRL$)	Total (BRL$)
5.1.2.5	Building systems				5.994.000,00
5.2	Loading bridges (installed)	Each	4	1.500.000,00	6.000.000,00
6.	**Navigational Aids**				11.290.000,00
6.1	Equipment (installed)				
6.1.1	ILS-Cat.I	un.	1	6.000.000,00	6.000.000,00
6.1.2	ALS	un.	1	3.200.000,00	3.200.000,00
6.1.3	PAPI	un.	2	295.000,00	590.000,00
6.1.4	Meteorological Station	un.	1	1.500.000,00	1.500.000,00
7.	**General Aviation**				14.747.800,00
7.1	Aircraft Apron (**)	m^2	60.490	220,00	13.307.800,00
7.2	New Terminal Building (***)	m^2	800	1.800,00	1.440.000,00
8.	**Airport Maintenance (**)**				11.440.000,00
8.1	Airport Maintenance Building	m^2	5.200	2.200,00	11.440.000,00
9.	**Aircraft Fire Fighting and Rescue - SESCINC (*)**				6.250.000,00
9.1	Building	m^2	1.000	2.200,00	2.200.000,00
9.2	Equipment (CI's)	Each	3	1.350.000,00	4.050.000,00
10.	**Support Infrastructure (**)**				38.901.565,00
10.1	Water supply	LS			6.308.362,00
10.2	Water treatment systems	LS			5.256.968,00
10.3	Solid waste systems	LS			1.577.090,00
10.4	Electrical systems	LS			15.770.905,00
10.5	Communication systems	LS			5.782.665,00
10.6	Drainage systems	LS			4.205.575,00
11.	**General Land Preparation (**)**	**LS**			3.154.180,94
	Subtotal				701.298.046,00
12.	**Studies and Design Projects (*)**				41.571.392,00
12.1	Preliminary studies	LS			7.012.980,00
12.2	Environmental studies - EIA/RIMA	LS			3.000.000,00
12.3	Preliminary Design	LS			14.025.961,00
12.4	Final Design	LS			17.532.451,00

Item	Description	Unit	Quant.	Unit Price (BRL$)	Total (BRL$)
13.	Environmental Mitigation and Permitting	LS			20.610.000,00
14.	Construction Management (*)	LS			42.077.883,00
15.	Total Contingency Costs				85.677.743,00
	TOTAL GERAL				891.235.064,00

LEGEND

(*) 5% Contingency

(**) 10% Contingency

(***) 15% Contingency

(****) 20% Contingency

TOTAL PHASE 2 PRELIMINARY ESTIMATE (REIAIS) $ 891,240,000

TOTAL PHASE 2 PRELIMINARY ESTIMATE ($U.S.) $ 534,750,000

7.2.32 Phase 3

Phase 3 development includes long-term "ultimate" development of TNIA airport. Some of this Phase 3 development is likely to be beyond the 20-year planning horizon of this Airport Master Plan.

Cost estimates for some of the Phase 3 items are provided herein in order to give a general "order-of-magnitude" cost estimate for this future airport development. The third runway has not been included in this cost estimate due to the long-term nature of this runway.

The major items in Phase 3 are summarized below.

Phase 3 Development

- New 2,500 m third runway with parallel taxiway
- Terminal 3 complex and aircraft parking apron (to be developed in phases as determined by future growth in passenger demand)
- Phase 3 Aviation/aerospace support development
- Phase 1 Airport City and Industrial Park development:

7.2.33 New Passenger Terminal 3

Phase 3 envisions a large Terminal 3 complex as shown on the airport development plans. While this Terminal 3 development will be done over the long-term and in a phased manner, the total cost is included herein in order to give a general indication of the long-term terminal development costs at the airport.

This Terminal 3 complex includes a total area of approximately 85,000 m². Unit prices used for this terminal cost are as described in the Phase 1 cost description.

7.2.34 Aircraft Parking Apron

An area of 184.800 m² is included in the Phase 3 development costs for the initial Terminal 3 development. This new parking apron will accommodate 22 aircraft parking positions, including 18 contact gates (with loading bridges) and 4 remote gates. Unit prices for this apron are as described in the Phase 1 estimate.

7.2.35 Roadways

New roadways for Phase 3 include access roadways for Terminal 3 and for the Airport City expansion. Unit prices for roadways are as described in the Phase 1 cost estimate.

7.2.36 Car Parking

New Phase 3 car parking facilities include a large parking garage located directly west of the Terminal 3 complex and taxi stands for the terminal. A 1,400 vehicle car parking garage with an area of 43.500 m² is included in this estimate, including 3 above-grade levels and one below-grade level. Unit prices for above-grade and below-grade construction are as described in the Phase 1 estimate.

7.2.37 Earthwork

Estimates for Phase 3 earthwork include a volume of approximately 4.800.000 m³, with an average volume of 2,50 m³ per m² (m³/m²), as was estimated for Phase 2 earthwork. Given the long-term nature of this Phase 3 development, these earthwork volumes and costs can be more accurately determined once the Phase 2 preliminary design has been completed and the elevations established for future runways, taxiways and apron areas in the East Airport Development Area.

Unit prices have been applied as described in the Phase 1 cost estimate.

7.2.38 Support Infrastructure

Cost estimates for general infrastructure costs and site preparation costs are included for Terminal 3 and associated airside and landside facilities, Industrial Development areas, Airport City development, and other airport support areas. These costs estimates are general estimates only based on the land use planning shown on the phased airport development plans in Chapter 5.

As a general basis for this cost estimate, general infrastructure costs were estimated to be 15 percent of total development costs for the various types of land development based on similar projects and cost estimates at other airports. Certain items were added separately to this 15 percent cost amount for Phase I, including air navigation facilities, aircraft fire fighting and rescue (ARFF) facilities, and earthwork costs (estimated separately as described above.).

While it is possible that some land development costs may vary based on final design and types of future facilities, the overall land development costs should cover the required infrastructure for these proposed future developments.

In general the following percentages were applied for "General Infrastructure and Land Development Costs":

• Water supply systems	2,20%
• Wastewater systems	2,00%
• Solid waste systems	0,50%
• Electrical supply	6,00%
• Telephone/communications	2,10%
• Site drainage	1,00%
• General land preparation	1,20%
Total	15,00%

7.2.39 Studies, Project Design, Construction Services and Other Costs

Costs for studies, design projects, environmental projects were included in the Phase 2 cost estimates using the same methodology and percentage costs as described in the Phase 1 estimate. In addition, costs for environmental mitigation and for construction management and construction services were also included per the Phase 1 description.

7.2.40 Contingencies

Contingencies were applied to the various cost items based on the construction cost estimates described above. Contingency costs varied based on the potential for variation of costs for certain unknown items (such as the exact volumes of earthwork) that can only be defined calculated as part of follow-on design projects.

Item	Contingency
Earthwork	5%
Taxiways	5%
Roadways	5%
Passenger Terminal	15%
Aircraft Parking Apron	10%
Taxi Stand	5%
Car Parking Garage	10%
Basic Infrastructure	10%
Studies and Design	5%
Environmental Licensing	15%
Construction Services	5%

7.2.41 Phase 3 Preliminary Cost Estimate

The following table summarizes the TNIA Phase 3 development costs, including contingency costs, planning and design costs, and environmental-related costs.

TANCREDO NEVES INTERNATIONAL AIRPORT (TNIA)
AIRPORT MASTER PLAN

Preliminary Cost Estimates (BRL$)

PHASE 3

Item	Description	Unit	Quant.	Unit Price (BRL$)	Total (BRL$)
1.	**Earthwork (****)**				**49.200.000,00**
1.1	General clearing	m^2	1.200.000	1,00	1.200.000,00
1.2	Earthwork (cut/fill)	m^3	3.000.000	16,00	48.000.000,00
2.	**Passenger Terminal**				**528.000.000,00**
2.1	Passenger Terminal and equipment (installed)	m^2	85.000	6.000,00	510.000.000,00
2.1.1	Civil works (***)				331.500.000,00
2.1.2	Systems				178.500.000,00
2.1.2.1	Air Conditioning				25.500.000,00
2.1.2.2	Plumbing / water supply (***)				30.600.000,00
2.1.2.3	Electrical systems (***)				76.500.000,00
2.1.2.4	HVAC				30.600.000,00
2.1.2.5	Building systems				15.300.000,00
2.2	Loading Bridges (installed)	Each.	12	1.500.000,00	18.000.000,00
3.	**Aircraft Parking Apron (**)**				**57.288.000,00**
3.1	Rigid pavement	m^2	184.800	310,00	57.288.000,00
6.	**Roadways (*)**				**11.490.000,00**
6.1	Flexible pavement (access roadways and circulation)	m^2	35.000	150,00	5.250.000,00
6.2	Flexible pavement (airport city)	m^2	41.600	150,00	6.240.000,00
7.	**Parking**				**86.880.000,00**
7.1	Taxi stand and roadway (*)	m^2	5.000	150,00	750.000,00
7.2	Parking garage (**)	m^2	43.500	1.980,00	86.130.000,00
8.	**Support Infrastructure (**)**				**96.479.534,00**
8.1	Water supply	LS			15.380.795,00
8.2	Water treatment systems	LS			13.982.541,00

Item	Description	Unit	Quant.	Unit Price (BRL$)	Total (BRL$)
8.3	Solid waste systems	LS			3.495.635,00
8.4	Electrical systems	LS			41.947.624,00
8.5	Phone/communication systems	LS			14.681.668,00
8.6	Drainage systems	LS			6.991.271,00
9.	**General land preparation (**)**	**LS**			**8.389.525,00**
		•			
	Subtotal				837.727.059,00
10.	**Studies and Design Projects (*)**				**48.574.988,00**
10.1	Preliminary studies	vb.			8.377.271,00
10.2	Environmental Studies - EIA/RIMA	vb.			2.500.000,00
10.3	Preliminary Design	vb.			16.754.541,00
10.4	Final Design	vb.			20.943.176,00
11.	**Environmental Costs**	**vb.**			**9.160.000,00**
12.	**Construction Management (*)**	**vb.**			**50.263.624,00**
13.	**Total Contingency Costs**				**106.012.637,00**
	TOTAL GERAL				**1.051.738.308,00**

LEGEND
(*) 5% Contingency
(**) 10% Contingency
(***) 15% Contingency
(****) 20% Contingency

TOTAL PHASE 3 PRELIMINARY ESTIMATE (REIAIS) $ 1,051,738,000

TOTAL PHASE 3 PRELIMINARY ESTIMATE ($U.S.) $ 631,043,000

7.3 Summary of Order-of-Magnitude Cost Estimates

7.3.1 Phase 1

Item	Description	Total (BRL$)
1.	Earthwork	48.720.000,00
2.	Runway	15.801.500,00
3.	Taxiways	11.979.250,00
4.	Aircraft Parking Apron (Passenger Terminal)	62.589.000,00
5.	Aircraft Parking Apron (Cargo Terminal)	15.732.500,00
6.	GSE expansion	7.393.000,00
7.	Roadway Systems	56.647.500,00
8.	Parking	92.965.500,00
9.	Passenger Terminal	457.500.000,00
10.	Cargo Terminal	27.702.800,00
11.	Air Traffic Control	15.600.000,00
12.	Support Infrastructure	94.410.029,00
13.	General Land Preparation	8.209.568,00
14.	Studies and Design Projects	53.338.785,00
15.	Environmental Mitigation and Permitting	16.030.000,00
16.	Construction Management	54.915.039,00
17.	Total Contingency Costs	110.864.508,00
TOTAL COST ESTIMATE		**1.150.398.979**

7.3.2 Phase 2

Item	Description	Total (BRL$)
1.	Earthwork	191.060.000,00
2.	Runway	47.802.000,00
3.	Taxiways	164.252.500,00
4.	Roadway Systems	6.600.000,00
5.	Passenger Terminal	205.800.000,00
6.	Air Traffic Control/ Navaids	11.290.000,00
7.	General Aviation	14.747.800,00
8.	Airport Maintenance	11.440.000,00
9.	Aircraft Fire Fighting and Rescue - SESCINC	6.250.000,00
10.	Support Infrastructure	38.901.565,00
11.	General Land Preparation	3.154.180,94
12.	Studies and Design Projects	41.571.392,00
13.	Environmental Mitigation and Permitting	20.610.000,00
14.	Construction Management	42.077.883,00
15.	Total Contingency Costs	85.677.743,00
TOTAL COST ESTIMATE		**891.235.064**

7.3.3 Phase 3

Item	Description	Total (BRL$)
1.	Earthwork	49.200.000,00
2.	Passenger Terminal	528.000.000,00
3.	Aircraft Parking Apron	57.288.000,00
4.	Roadway Systems	11.490.000,00
5.	Parking	86.880.000,00
6.	Support Infrastructure	96.479.534,00
7.	General Land Preparation	8.389.525,00
8.	Studies and Design Projects	48.574.988,00
9.	Environmental Mitigation and Permitting	9.160.000,00
10.	Construction Management	50.263.624,00
11.	Total Contingency Costs	106.012.637,00
TOTAL COST ESTIMATE		**1.051.738.308,00**

SUMMARY TABLE – ORDER-OF-MAGNITUDE COST ESTIMATES

TNIA AIRPORT DEVELOPMENT PROGRAM

Development Phase	Cost Estimate ($BRL)	Cost Estimate ($U.S.)
Phase 1	1,150,400,000	$690,240,000
Phase 2	891,240,000	$534,750,000
Phase 3	1,051,738,000	$631,043,000
Total Program	$BRL 3,093,378,000	$1,856,033,000

7.4 Recommendations

Given the fact that these preliminary cost estimates are planning-level "order-of-magnitude" estimates only, and that there are significant unknowns related to the optimum locations and required elevations of the Phase 2 and Phase 3 proposed facilities (in particular the new runways), we recommend that a detailed engineering analysis be conducted for Phase 2 and Phase 3 development. This engineering analysis should include technical studies of different alternatives for runway, taxiway and terminal facility development that will minimize construction costs, avoid areas of environmental sensitivity to the extent possible, and meet the required ICAO and FAA airport design criteria.

Once this engineering analysis has been completed, more accurate construction quantities and cost estimates can be developed for the long-term TNIA airport development plan.

CHAPTER 8

U.S. Export Potential

CHAPTER 8

U.S. Export Potential

8.1 Scope and Objectives

This Chapter provides a list of potential U.S. equipment and service providers that can competitively offer the required equipment, services, and technologies for the long-term airport development implementation as described in this Master Plan report.

8.2 U.S. Export Potential

The U.S. Export potential is based on the long-term airport development program described in this report and includes the facilities and equipment shown in Exhibit 8-1 below.

EXHIBIT 8-1
Summary of Future Airport Facilities and Equipment

TNIA Airport Development Implementation Required Equipment
ARFF Equipment
Airfield Equipment
Automated Weather Systems
Baggage Handling Equipment
CNS/ATM, Meteorological, and ATC Related Equipment
Communications
Navigation Aids
LAAS (GPS)
Automatic Dependent Surveillance (ADS)
Fire Detection and Control Systems
Airfield Lighting
Communications
Safety Equipment
Security, Access and Surveillance
Telecommunications
VHF Radio Communications

8.3 List of Prospective U.S. Suppliers

Potential U.S. suppliers of this equipment include the following companies listed below.

ARFF EQUIPMENT

Envirofuel Inc/"E III" Envirofluid
1613 Kennedy Avenue
Blacksburg, VA 24060-5731
Mr. Ted DeBruyn, Chairman/CEO
Phone: (540) 5520001
Fax: (540) 552-0002
Website: www.cpchem.com/specialtychem

Oshkosh Truck Corporation
2307 Oregon St
Oshkosh, WI 54901
Mr. David Laurent
Phone: (920) 233-9442
Fax: (920) 233-9607
Website: www.oshkoshtruck.com
E-mail: dlaurent@oshtruck.com

Pro-Tec Fire Services Ltd
2129 South Oneida Street
Green Bay, WI 54304
Mr. Richard L. Watermolen, Vice President
Phone: (920) 494-8851
Fax: (920) 494-5384
Website: www.protecfire.com
E-mail: info@protecfire.com

AIRFIELD EQUIPMENT

Hi-Lite Markings, Inc
18249 Hi-Lite Drive
P.O. Box 350
Adams Center, NY 13606-0350
Phone: (315) 583-6111

Tiger Corporation
3301 North Louise Avenue
Sioux Falls, SD 57107
Mr. Randy Jensen, Marketing Manager
Phone: (605) 336-7900
Website: www.tiger-mowers.com
E-mail: rjensen@tiger-mowers.com

AUTOMATED WEATHER OBSERVING SYSTEMS

All weather, inc.
Sacramento California 95834 USA.
Phone: 1-916-928-1000.
Website: www.allweatherinc.com

Belfort Instrument Company
Baltimore, Maryland 21231 USA.
Phone: 1-410-342-2626.
Website: www.belfortinstrunent.com

Vaisala, inc.
Woburn Massachusetts 01801 USA.
Phone: 1-781-933-4500
Website: www.vaisala.com

BAGGAGE HANDLING EQUIPMENT

BAE Automated Systems
2525 Carter Drive
Carrollton, TX 75006
Phone: (972) 245-9411
Website: www.bae-inc.com
E-mail: purchasing@bae-inc.com

Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 64130
Mr. Randy D. Pope, P.E., Associate Vice President
Phone: (816) 822-3231
Website: www.burnsmcd.com
E-mail: rpope@burnsmcd.com

Cage inc.
1303 Walnut Hill Lane, Suite 140
Irving, TX 75038
Ms. Susan Prediger, Director of Business Development
Phone: (972) 550-1001
Website: www.cage-inc.com
E-mail: sprediger@cage-inc.com

Division Systems
3957 East Raines Road
Memphis, TN 38118
Mr. Steven R. Muccillo, President
Phone: (901) 366-4220
Website: www.divisionsystems.com
E-mail: muccillo@divisionsystems.com

G & T Conveyor Company Inc.
476 South Ridge Industrial Dr
Tavares, FL 32778
Mr. Ted Majewski, Vice President
Phone: (352) 343-1500
E-mail: gtconveyor@earthlink.com

IDmicro, LLC
1019 Pacific Avenue, 13th Floor
Tacoma, WA 98402
Roger C. Douglas, Vice President, Investor Relations
Phone: (253) 396-1479
Website: www.idmicro.com
E-mail: rdouglas@idmicro.com

Jervis B. Webb
34375 West Twelve Mile Road
Farmington Hills, MI 48331
Mr. Michael Loux, Director of Marketing Research
Phone: (810) 553-1000
Fax: (810) 553-1228
Website: www.jervisbwebb.com
E-mail: info@jervisbwebb.com

Professional Conveyor Service
P.O. Box 1118
Bristol, CT 06011-1118
Mr. Richard Bugryn, Director of Maintenance/Service
Phone: (860) 582-9816
Fax: (860) 589-9157

VIC Thompson Company
2738 SE Loop 820
Ft. Worth, TX 76140
Mr. Vic Thompson, President
Phone: (817) 293-7600
Fax: (817) 293-8856

CNS/ATM, METEOROLOGICAL, AND ATC RELATED EQUIPMENT

Controller Displays

Tech-Source
442 S. North Lake Boulevard
Altamonte Springs, FL 32701, USA
Phone: (407) 262-7100
Fax: (407) 339-2554
Email: info@techsource.com
Web: www.techsource.com

Communications (Recorders)

Advanced Integrated Recorders
121 Whittendale Drive
Building 1
Moorestown, NJ 08057, USA
Phone: (856) 234-5020
Fax: (856) 234-5242
Email: danc@air.formation.com
Web: http://air2000.formation.com/

Comverse USA
234 Crossways Park Drive
Woodbury, NY 11797, USA
Phone: (516) 677-7400
Fax: (516) 677-7197
Email: marketing@cominfosys.com
Web: www.cominfosys.com/usa

Dictaphone Corporation
3191 Broadbridge Avenue
Stratford, CT 06614-2559, USA
Phone: (203) 381-7000
Fax: (203) 386-8597
Web: www.dictaphone.com/index.htm

Lanier Worldwide
2300 Parklake Drive NE
Atlanta, GA 30345, USA
Phone: (770) 496-9500
Fax: (770) 491-1534
Web: www.lanier.com

Meteorological (Weather Systems)

Handar
1288 Reamwood Avenue
Sunnyvale, CA 94089, USA
Phone: (408) 734-9640
Fax: (408) 734-0655
Email: marketing@handar.com
Web: www.handar.com

Nova Lynx Corporation
PO Box 240
Grass Valley, CA 95945, USA
Phone: (530) 823-7185
Fax: (530) 823-8997
Email: Nova@NovaLynx.com
Web: www.novalynx.com

Qualimetrics
1165 National Drive
Sacramento, CA 95834, USA
Phone: (916) 928-1000
Fax: (916) 928-1165
Email: qual@qualimetrics.com
Web: www.qualimetrics.com

Rain Wise
PO Box 433
25 Federal Street
Bar Harbor, ME 04609, USA
Phone: (207) 288-5269
Fax: (207) 288-3477
Email: sales@rainwise.com
Web: www.rainwise.com

Systems Management Incorporated

10946 Golden West Drive, Suite 100
Hunt Valley, MD 21031-0238, USA
Phone: (410) 229 7539
Fax: (410) 229 7603
Email: petra@awi-smi.com
Web: www.awi-smi.com

Communications (Radios)

Arinc Incorporated
2551 Riva Road
Annapolis, MD 21401-7465, USA
Phone: (410) 266 4000
Web: www.arinc.com

Aydin Telemetry
47 Friends Lane
PO Box 328
Newtown, PA 18940-0328, USA
Phone: (215) 968 4271
Fax: (215) 968 3214
Email: telemetry@aydin.com
Web: www.aydin.com

Baker Audio-Telecom
2195 Norcross Tucker Road
Norcross, GA 30071, USA
Phone: (770) 441 2000
Fax: (770) 449 7719
Email: aamy@bakeraudio.com
Web: www.dispatchworks.com

Harris Corporation (RF Communications)
1025 West NASA Boulevard
Melbourne, Florida 32919-0001, USA
Phone: (321) 727 9207
Web: www.harris.com

Motorola
1303 E. Algonquin Road
Schaumburg, IL 60196, USA
Phone: (847) 576 5000
Web:
www.mot.com/GSS/SSTG/RSO/Air_Traffic.html

Rockwell Collins
400 Collins Road NE
Cedar Rapids, IA 52498, USA
Phone: (319) 295 1000
Email:mktgsvcs@collins.rockwell.com
Web: www.collins.rockwell.com

Sensis Corporation
5793 Widewaters Parkway
DeWitt, NY 13214, USA
Phone: (315) 445 0550
Fax: (315) 445 9401
Email: info@sensis.com
Web: www.sensis.com

Telephonics
815 Broad Hollow Road
Farmingdale, NY 11735, USA
Phone: (516) 755 7000
Web: www.telephonics.com/

NAVIGATION - WIDE AREA AUGMENTATION SYSTEM (WAAS)

Raytheon Company
141 Spring Street
Lexington, MA 02421, USA
Phone: (781) 862 6600
Web: www.raytheon.com

LOCAL AREA AUGMENTATION SYSTEM (LAAS)

Honeywell Airport Systems
5353 West Bell Road
Glendale, AZ 85308, USA
Phone: (602) 436 4808
Fax: (602) 561 4777
Email: Hilary.King@cas.honeywell.com
Web: www.cas.honeywell.com/airport_systems

Raytheon Company
141 Spring Street
Lexington, MA 02421, USA
Phone: (781) 862 6600
Web: www.raytheon.com

Surveillance -Radar

Northrup Grumman Corporation
1840 Century Park East
Los Angeles, CA 90067-2199, USA
Phone: (310) 553 6262
Web: www.northgrum.com

Telephonics
815 Broad Hollow Road
Farmingdale, NY 11735, USA
Phone: (516) 755 7000
Fax: (516) 755 7010
Web: www.telephonics.com/

SURVEILLANCE - AUTOMATIC DEPENDENT SURVEILLANCE (ADS)

Arinc Incorporated
2551 Riva Road
Annapolis, MD 21401-7465, USA
Phone: (410) 266 4000
Web: www.arinc.com

Harris Corporation
1025 West NASA Boulevard
Melbourne, Florida 32919-0001, USA
Phone: (321) 727 9207
Web: www.harris.com

Lockheed Martin ATM
9221 Corporate Boulevard
Rockville, MD 20850, USA
Phone: (301) 640 2460
Fax: (301) 640 3416
Web: www.lmco.com/atm/

Northrop Grumman Corporation
1840 Century Park East
Los Angeles, CA 90067-2199, USA
Phone: (310) 553 6262
Web: www.northgrum.com

Rayhteon Company
141 Spring Street
Lexington, MA 02421, USA
Phone: (781) 862 6600
Web: www.raytheon.com

Telephonics
815 Broad Hollow Road
Farmingdale, NY 11735, USA
Phone: (516) 755 7000
Fax: (516) 755 7010
Web: www.telephonics.com/

DISPLAY SYSTEMS

Aerogroup, LTD.
P.O. Box 14013
Research Triangle Park, NC 27709
David L. Rigsbee, President
Phone: (800) 672-8536
Fax: (919) 544-9224

Alpine Systems
RR 1 Box 3109
Killington, VT 05751
Mr. George Cone, Director of Sales
Phone: (802) 422-3008
Fax: (802) 422-7166
E-mail: alpinesy@vermontel.com

FIRE DETECTION, FIRE EXTINGUISHING, AND CONTROL SYSTEMS

Coserv Security
3501 FM 2181
Denton, TX 76205
Ray Coppock, VP/General Manager
Phone: (214) 747-6500
Fax: (214) 747-6555
Website: www.coserv.com

Halotron Inc
3770 Howard Hughes Parkway, Suite 300
Las Vegas, NV 89109
Mr. Jeff Gibson, Director, Support Operations
Phone: (702) 735-2200
Fax: (702) 735-4876
Website: www.halotron-inc.com
E-mail: jegibson@apfc.com

Information Technology
Advanced Management Tech., Inc.
1515 Wilson Boulevard, Ste. 1100
Arlington, VA 22209
703-841-2624
Ms. Sue Chodakewitz
President
Harpreet.singh@amti.com

Computer Sciences Corporation
15245 Shady Grove Road
Rockville, MD 20850
301-921-3036
Mr. Christopher M. Francis
Director, Business Development
Cfrancis3@csc.com

Prologic, Inc.
1000 Technology Drive, Ste. 3140
Fairmont, WV 26554
304-363-1157
Mr. Jay Reddy
CEO, Chairman
rdrain@prologic-inc.com

LIGHTING, AIRFIELD

ADB, A Siemens Company
977 Gahanna Parkway
Columbus, OH 43230
Mr. Elvis Jimenez, International Sales Manager
Phone: (614) 573-8225
Website: www.sas.siemens.com
E-mail: elvis.jimenez@sas.siemens.com

Airport Lighting Systems
10661 Shady Trail
Dallas, TX 75220
Mr. Steve Denny
Phone: (800) 962-6574
Website: www.airportlighting.com
E-mail: questions@airportlighting.com

Dinter Engineering
358 Gentry Way
Reno, NV 89502-4608
Mr. William N. Vandenberg, Executive Vice President and Principal
Phone: (775) 826-4044
Website: www.dinter.com
E-mail: bill@dinter.com

Flight Light Inc
3513 La Grande Blvd.
Sacramento, CA 95823
Mr. Dan Statum, Sales Manager
Phone: (916) 394-2800
Fax: (916) 394-2809
Website: www.flightlight.com
E-mail: dan.statum@flightlight.com

Honeywell Airport Systems
2162 Union Place P.O. Box 2167
Simi Valley, CA 93062
Mr. Peter H. Johnson, Vice President
Phone: (805) 581-5591
Fax: (805) 581-5032
Website: www.lblighting.com
E-mail: lighting.webrequest@honeywell.com

SAFETY EQUIPMENT

ESCO
10 Industrial Highway, MS No. 38
Lester, PA 19113
Mr. Michael G. Berquist, Airport Sales Engineer
Phone: (610) 595-2840
Fax: (610) 595-2842
Website: www.esco-usa.com
E-mail: mberquist@esco-usa.com

Globe Firefighter Suits
9216 Bellhaven Avenue N.E.
Albuquerque, NM 87112-3819
Mr. Karl Beeman, Product Support Representative
Phone: (800) 895-7540
Fax: (603) 435-6388
Website: www.globefiresuits.com
E-mail: globalsales@globefiresuits.com

Lumastrobe (Precisionmulticontrols)
33 Greenwood Avenue
Midland Park, NJ 07432
Mr. Peter Zecher
Phone: (201) 444-0600
Fax: (201) 445-8575
Website: www.precisionmulticontrols.com
E-mail: precision@precisionmulticontrols.com

Medprotect Inc
1900 Preston Road Suite #267
Plano, TX 75093
Mr. Glenn Miller, President/Vice President Sales
Phone: (800) 945-4158, (972) 612-1515
Fax: (972) 867-3063
Website: www.medprotect-inc.com
E-mail: medpro@medprotect-inc.com

Off The Wall Products LLC
P.O. Box 112303
Salt Lake City, UT 84147
Ms. Patricia Russell, Marketing Manager
Phone: (801) 363-7740
Website: www.multi-barrier.com
E-mail: patricia@multi-barrier.com

SATELLITE NAVIGATION RECEIVERS

Garmin International, Inc.
Olathe, Kansas 66062 USA.
Phone: 1-913-397-8200.
Website: www.garmin.com

Honeywell Aerospace.
Phoenix, Arizona 85034 USA.
Phone: 1-602-365-3099.
Website: www.honeywell.com

SECURITY, ACCESS CONTROL AND SURVEILLANCE SYSTEMS

B & B Electromatic Inc
14113 Main Street
Norwood, LA 70761
Mr. Trudy Greer, Director
Phone: (800) 367-0387, (225) 629-5234
Website: www.bbgates.com
E-mail: tgreer@bbgates.com

Brass Smith Inc.
3880 Holly Street
Denver, CO 80207
Chuck DeWitt
Phone: (800) 662-9595, (303) 331-8777
Website: www.brasssmith.com
E-mail: bsi@brasssmith.com

Coserv Security
3501 FM 2181
Denton, TX 76205
Ray Coppock, VP/General Manager
Phone: (214) 747-6500
Website: www.coserv.com

Counter Technology Inc
4733 Bethesda Ave Suite # 200
Bethesda, MD 20814
Mr. Rich Roth, Executive Director
Phone: (301) 907-0127
Fax: (301) 907-6997
Website: www.countertech.com
E-mail: cti01@countertech.com

Hy-Security Gate Operators
P.O. Box 31532
Seattle, WA 98103
Mr. Fred Witters, President
Phone: (206) 286-0933
Fax: (206) 286-0614
Website: www.hy-security.com

IDmicro, LLC
1019 Pacific Avenue, 13th Floor
Tacoma, WA 98402
Roger C. Douglas, Vice President, Investor Relations
Phone: (253) 396-1479
Fax: (253) 396-1478
Toll Free: (877) 395-1479
Website: www.idmicro.com
E-mail: rdouglas@idmicro.com

Intellikey Corporation
302 Carnegie Center
Princeton, NJ 08540
Mr. Michael V. Fufidio, Aviation Security Counselor
Phone: (800) 226-0703, (609) 750-0021
Fax: (609) 750-0906
Website: www.intellikey.com
E-mail: info@intellikey.com

ITS
1200 Crown Center
5005 Rockside Road
Cleveland, OH 44131
Mr. Robert A. Weitzel, President & CEO
Phone: (216) 642-4522
Fax: (216) 642-4539
Website: www.itsw.com

RCC Consultants Inc
100 Woodbridge Center Drive #1030
Woodbridge, NJ 07095-1106
Ms. Nancy Williams, Marketing Coordinator
Phone: (732) 404-2400
Fax: (732) 404-2580
Website: www.rcc.com
E-mail: info@rcc.com

Security Door Controls
3580 Willow Lane P.O. Box 6219
Westlake Village, CA 91359-6219
Mr. Richard G. Geringer, Vice President
Phone: (800) 413-8783
Fax: (800) 959-4732
Website: www.sdcsecurity.com
E-mail: sales@sdcsecurity.com

Coserv Security
3501 FM 2181
Denton, TX 76205
Ray Coppock, VP/General Manager
Phone: (214) 747-6500
Fax: (214) 747-6555
Website: www.coserv.com

Safeguards Technology Inc.
75 Atlantic St.
Hackensack, NJ 07601
Mr. Baruch Koren, V.P. Marketing
Phone: (201) 488-1022
Fax: (201) 488-1244
Website: www.safeguards.com
E-mail: marketing@safeguards.com

TELECOMMUNICATIONS

Coastcom
1151 Harbor Bay Parkway
Alameda, CA 94502-6511
Phone: 510-523-6000
Mark Packwood –Sales
4093 Nulty Drive
Concord, CA 94521
925-686-6169
Mpackwood@coastcom.com
www.coastcom.com

Automatic Terminal Information Systems Inc.
7110 Satsuma Dr
Houston, TX 77041
Phone: 713-937-4993
Fax: 713-937-6405
Sherry Allen Sales

Infax Incorporated
3400 Corporate Way, Suite D
Duluth, GA 30096
Phone: 770-209-9925
Fax: 7707-209-0671
www.infaxinc.com

Harris Corp (Computer Systems)
Gov't Communications Systems Division
P.O. Box 37
Melbourne, FL 32902
321-727-4000
Janice Lindsay
321-724-3881
jlindsay@harris.com
http://www.harris.com

VHF Radio Communications Systems

Alcatel-Lucent
Murray Hill, New Jersey 07974 USA.
1-908-508-8080
www.alcatel.com

ARINC
Annapolis, Maryland 21401 USA.
1-410-266-4000.
www.arinc.com

Mentor Radio Company
Cleveland, Ohio 44135 USA.
1-216-265-2315
www.mentorradio.com

Visual Aids
DeVore Aviation
Albuquerque, New Mexico
505-345-8713
www.devoreaviation.com

DME Corporation
Fort Lauderdale, Florida
954-975-22271
www.dmecorp.com

Quad-J, Inc. Avon
Indiana 46123 USA.
1-317-718-1430
www.quad-j.com

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CHAPTER 9

Non Aviation/ Aviation Industrial Plan

CHAPTER 9

Non Aviation/Aviation Industrial Plan

9.1 Background

The state of Minas Gerais has undertaken a very aggressive agenda for economic development within the state, and in particular in the Belo Horizonte metropolitan area. Embedded in this agenda is a focus on Tancredo Neves International Airport as the centerpiece of transportation infrastructure that is viewed as the premier cornerstone of economic development success.

Because the State of Minas Gerais is landlocked, development of a vibrant "airport city" at TNIA is viewed as vital to the economic future of the state and the city of Belo Horizonte. The movement of people and goods will be centered on the infrastructure at TNIA for the long term future. TNIA is viewed as the State's primary link to Latin and South America, and the rest of the world.

The State of Minas Gerais and particularly, the Secretariat for Economic Development, (SEDE) has developed detailed transportation and industrial development plans, with TNIA serving as the focus and hub. A listing of previous studies focused on TNIA is as follows:

- Aerotropolis concept for Belo Horizonte, Dr. John Kasarda, 2003
- Development of the International Airport of Belo Horizonte, Luftansa Consultants, 2007
- TNIA airport Master plan, Changi Airport Consultants, 2009
- Integrated transportation infrastructure study, Jurong Consultants, 2010

The aerotropolis concept developed for Belo Horizonte is similar to the planned developments that began in East Asia in the mid 1990's. Aerotropolis concepts that have been developed in; Hyderabad, Hong Kong, Singapore and Incheon have all developed significant core industries as well as significant private investment. Aerotropolis development in the east has been planned and actively managed, while similar development in the west has been incidental. Although the planned and managed aerotropolis is a relatively new concept, the early returns on the projects in Asia are very positive.

The aerotropolis concept is comprised of the following core concepts:

Defined as a spine or cluster of airport linked businesses connected along airport transportation corridors. Air, ground, highway and rail transportation are all logistically interrelated.

The overall size may vary, however, significant airport related development can span from 25 km to 90 km outward from the airport hub along the transportation corridors.

The concept is comprised of a central hub (at the airport), with spokes that follow the outward transportation links from the airport.

The concept includes all typical airport related businesses and land uses, with spoke commercial and residential development that is tied to the critical mass of employees and businesses centered on an airport.

Development in the transportation corridor spokes will include shopping, retail, entertainment, restaurants, and services in support of the residential node development.

Airport hub related development usually includes corporate offices, warehouse, conference centers, hotels, logistics, and high tech industry.

This plan will incorporate the aerotropolis concept to its fullest, and provide a planning link with the previously developed plan. The above aerotropolis definition and concept was derived from the definition conceived by Dr. John Kasarda, Director, Kenan Institute of Private Enterprises.

The study produced by Lufthansa consultants, keys primarily on air service development and industrial development at TNIA. The Lufthansa study offered very practical and common sense answers to air service development and industrial development issues.

The Lufthansa study produced very conceptual drawings for industrial development at TNIA. In addition to these drawings, the study offered numerous recommendations for the implementation of the industrial development program at TNIA. Many of these recommendations are very valid, and will be brought forward in this study.

The TNIA master plan done by Changi airport consultants was comprehensive in nature. The Changi plan recommended airfield, terminal and landside layouts for the 20 year planning horizon. In addition to traditional airport facility planning, the Changi plan included a conceptual airport industrial development plan. This plan appeared to use the Lufthansa plan as a baseline in which they further developed.

This study will incorporate various aspects of the Changi industrial development plan, and bring them forward for execution by the client.

The integrated transportation infrastructure study completed by Jurong consultants made broad regional transportation suggestions and recommendations in the northern Belo Horizonte metropolitan area. The study fully integrated the overall aerotropolis concept into its recommendations. In so doing, the Jurong study moved the aerotropolis concept forward with solid transportation recommendations that will support the long term goals of the client.

The Jurong study centered on highway, outer beltway, mass transit, industrial development nodes and inland port/logistical needs that relate directly back to TNIA. The study also recommended a final alignment of a roadway system that will serve TNIA for the long term future.

The findings of the Jurong study regarding the roadway system being proposed for TNIA will be incorporated and used in developing plans for the landside and industrial park developments at TNIA.

9.1.1 Task 9 Objective

The overall objective for this task 9 is to pull together the valuable information and recommendations from previous studies, and carry forward an implementation plan that is in a format that is easy to follow and execute.

From that perspective, it is vitally important that this TNIA plan for aviation and non-aviation industrial development is in complete alignment with the aerotropolis plan and concept. Additionally, this plan must also be in alignment with the Jurong plan for area wide transportation improvements, as well as any area wide industrial development plans that are as yet to be completed. Finally, the TNIA industrial planning that was completed by both Lufthansa and Changi consultants, served as a baseline for our layouts and overall plan.

This plan will bring forward information that was collected from site visits and interviews that were conducted in May of 2010. The background information will be set up with a full understanding of the six pillar industrial development target industries for Minas Gerais. These industries are:

1. High Tech Electronics
2. Information technology
3. Bio Tech/Life sciences
4. Aviation and aerospace
5. Medical tourism
6. Leisure /tourism

These primary pillar industries were considered when developing our list of companies and agencies to be interviewed. The plan for TNIA industrial development was further refined to look at industry sub segments that would need or want to locate in the TNIA "industrial airport and free trade zone". The sub group industries that would find the most benefit from locating at or very near the airport would be; Airlines, hotel and convention, biotech and high tech electrical (due to the high value/low weight nature of their cargo), Aircraft maintenance, perishable air cargo, and aircraft component manufacturers. Further, the logistical benefits of locating in near proximity of the airport will be taken advantage of by numerous other types of businesses. A properly functioning international airport with a high level of service would be an absolute pre-requisite for both Medical tourism, and Leisure tourism. From that standpoint, the passenger facilities at TNIA play a large role in the success of attracting pillars five and six.

TNIA Industrial Plan-Background Data and Gap analysis

As previously stated, the TNIA industrial plan should align perfectly with the area wide plans that are now taking place in Belo Horizonte. The TNIA industrial plan is organized around the list of sub group industries and business types that would benefit by being in the TNIA industrial airport. The plan is set up in the following order; 1) General background on each of the industry sub segments that were interviewed; 2) A discussion on the current conditions of each industry segment; 3) A gap analysis for each of the industry segments regarding their facility and process needs; 4) A list of recommendations for each industry

sub segment; 5) A marketing plan for the overall industrial development program at TNIA, and in particular for aviation/aerospace and airline service industries.

Aircraft Maintenance Repair and Overhaul, (MRO)

Background

Maintenance Repair and Overhaul operations are considered to be a cornerstone for long term aviation activity at any airport. The existing GOL MRO facility at TNIA is a major regional employer for high technology, high paying jobs. This type of industry carries with it discreet training requirements that will involve the local Universities. Once the local academic training programs are set up to accommodate this industry, it becomes much easier to attract additional MRO providers.

One of the most important aspects of having viable MRO facilities at an airport is the aspect of airline recruitment. Airlines are much more interested in making long term commitments to a market, when they know that they can schedule routine maintenance, or a breakdown can be easily accommodated. The GOL facility at TNIA is currently only set up to handle Boeing aircraft, but the company is interested in providing expanded services to a wide range of potential users in the future.

Current Conditions

The current GOL facility at TNIA offers state of the art mechanical repairs for the GOL fleet. The following items represent the current conditions for the GOL facility at TNIA:

- The new hangar can accommodate two 737's at one time. This hangar could also accommodate one wide body aircraft up to but not including the aircraft tail.
- It is capable of painting in full up to one 737 at a time.
- It has several paint shops that are used to finish aircraft components in proper environmental enclosures.
- The facilities, equipment and procedures currently accommodate only Boeing manufactured aircraft.
- Management's stated goal is to obtain the necessary certification to maintain other manufactured aircraft types.
- Management has also stated the interest in selling MRO services to other airlines besides GOL.
- Issues for being certified to maintain other than Boeing aircraft; tools, training, and ANAC certification can take from 6-9 months. The tools and training can usually be easily accommodated by the company.
- GOl has an immediate need for up to 300 trained MRO workers.

Gap Analysis

The current GOL MRO facility at TNIA offers exceptional long term aviation and airline business development opportunities for the region. Management's willingness to extend their business model to accommodate other aircraft types (other than Boeing), and to other airlines is a significant benefit to the airport, long term.

The existing gaps that would slow down, or impair the growth of the MRO industry at TNIA, are as follows:

- There is a lack of suitable airfield frontage development acreage in the area near the GOL complex. This would require any new MRO industry entrants to develop a section of the airport that may or may not have the adequate landside support facilities. This situation holds true for a potential new MRO operator at TNIA that is struggling to find a viable site.
- The current new project approval situation with Infraero is not conducive to providing quick answers to new business proposals.
- The length of time for ANAC certification of new aircraft types for the GOL operation, (6-9 months) will impact their ability to build their MRO business with other airlines.

Recommendations

Step 1: Identify a viable very short term MRO expansion site at TNIA.

Step 2: Work with Infraero to provide the necessary landside infrastructure in a short term capital improvement program.

Step 3: Work directly with Infraero and ANAC to develop streamlined project approval and aircraft certification approval processes.

Step 4: Conduct an industry workshop to ensure that the local Universities are producing the proper technical training to support the MRO industry.

Airlines

Background

In May of 2010 interviews were conducted with the following airlines; Azul, GOL and Trip. In these interviews, the consulting team was interested in gaining an understanding of; growth plans, aircraft delivery plans, strategic goals, growth impediments, and any other issues that might affect TNIA as a passenger market for them.

For the most part, the airlines were very candid regarding their plans and issues regarding TNIA and the Brazilian market in general. Due to issues of confidentiality, some of the following information has been generalized so that it will apply to all airlines, rather than only one:

- AZUL currently owns 15 Embraer aircraft. They plan on adding ATR turboprop aircraft to their fleet, and they will be going to 21 aircraft by year's end. Going forward their fleet will be comprised of Embraer and ATR aircraft only.
- Campinas will remain the AZUL focus city for the time being.
- All of the interviewed airlines see the potential for the domestic market to double in the next 5 years.
- All of the interviewed airlines agreed that the primary impediment to a doubling of domestic market growth will be and is the lack of adequate airport facilities.
- All of the airlines interviewed are considering making substantial long term market investments at TNIA.

- All of the airlines interviewed are watching very closely what commitments are being made by the other airlines at TNIA.
- All three of the airlines interviewed have issues with the time it takes to get Infraero approvals. One airline stated that a simple apron re-marking request has taken almost a year to be approved by Infraero.
- All of the airlines would be interested in having some flexibility in the terminal space allocation and operational usage of space at TNIA. This would entail having some "preferential" space that they could allocate to meet changing market demand. Current gate and hold room set up at TNIA is "common use space". Self control of operational "gate push backs" is also very important to the airlines.

Gap analysis

The Brazilian airlines want very much to operate in a market driven environment. They also would like more control over their operations and their ability to react quickly to market forces in each market. The lack of a true "low cost carrier" in Brazil may in fact be due at least in part to the inability of any airline to self manage most of their own operational requirements at the airports. True low cost carriers are able to keep their costs low, by being more efficient with their gates, space and operations than other carriers. This self management need is universal to all low cost carriers.

Of the airlines that were interviewed, all were in agreement that the lack of capital investment in airport capacity would greatly impact their growth plans. Additionally, all were in agreement that the length of time it takes to get approvals for facility needs and changes will also impact their ability to grow and meet market demands.

Gaps in the development of the TNIA airline market can be viewed in terms of two primary needs. These two primary needs are in order of priority or importance:

Adequate airport capacity, terminal/gate space, and the ability to exercise some amount of operational self control.

A detailed air service marketing program, with the ability to offer a local set of creative service incentives.

Recommendations

Step 1: Execute the apron expansion project at TNIA as soon as possible

Step 2: Set up the new Terminal 2 project with flexible airline gate and lease space to provide for easy entry for new airline service.

Step 3: Set up the vacated section of Terminal 1 in a flexible lease arrangement just as recommended for terminal 2.

Step 4: Work with the Belo Horizonte private sector businesses and State agencies to develop an enhanced air service incentive fund for identified target city pairs.

Step 5: Finalize, approve, and begin executing a detailed air service marketing plan.

Air Cargo

Background

Interviews were conducted with Infraero and GOL air cargo during the site visit in May of 2010. Additional information on air cargo was received from industry sectors that have a high level of air cargo shipping needs such as; bio technology, high tech/nano technology and perishable operators.

All those involved directly or peripherally with the air cargo business at TNIA were in agreement that there is great room for improvement. The primary categories for improvement are; facilities, process, and wide body service offerings.

The primary businesses involved in shipping via air are those that are involved in products that are high value and relatively low weight. Of these businesses, Clamper and the perishables business is the most representative of the needs in the air cargo realm. The May site visits resulted in very useful feedback from these and other TNIA air cargo interests.

Current Conditions

The following issues, comments and information regarding air cargo at TNIA were obtained during the May site visit:

- TNIA facility managed by Infraero handles 90 percent international air cargo and 10 percent domestic.
- Cargo storage tariffs for Infraero are the same throughout all Infraero airports.
- The Infraero cargo facility is at 90 percent capacity today, new facilities are needed immediately, and are being planned.
- Because of cargo building capacity issue, Infraero has implemented a pricing strategy that increases cargo storage turnover. The pricing allows the shipper to save 40 percent if their cargo is claimed within 1 day.
- Infraero facility will triple their frozen and refrigerated storage capacity this year, with new equipment that is on order.
- Domestic airlines continue to provide belly air cargo service through a temporary facility at TNIA.
- Many existing shippers are using the inland port bonded warehouse for international air cargo, rather than utilizing the Infraero facility which they consider to be too expensive.
- The current customs rules and process vary significantly from one airport to the next in Brazil.
- TNIA wide body lift is inadequate for the market. Some airlines are considering starting their own integrated air cargo transport business. Four wide bodies per week do not offer enough predictable lift capacity for the current market.
- All air cargo interests agreed that the industry is in its infancy with tremendous growth potential, with the need for more professionalism and stronger freight forwarding, brokering, and customs agent industry.

- An estimated 75 percent of potential air cargo volume is currently handled by trucking in the TNIA market due to poor aviation logistics infrastructure.

Gap Analysis

Air cargo gaps are substantial, however the positive view is that with not a considerable investment, substantial gains can be made quickly. The gaps are primarily in the following categories:

Wide body lift capacity is either not adequate or not predictable enough to serve the market.

Customs rules and procedures should be standardized, and provide for more speed and efficiency.

Physical facilities are temporary, inadequate, and lacking the flexibility to accommodate the rapid growth that will come in the short term. Specifically, bonded warehousing and frozen/refrigerated storage capacity is very inadequate to support growth.

The level of professional maturity of the air cargo support industry, agents, brokers and forwarders is in need of immediate improvement. The large international support providers such as Panalpina and Atlas are involved in the TNIA market; however, this is most likely supported remotely from Rio and Sao Paolo.

There is a current lack of service by all cargo freighters at TNIA.

Regarding the current state of air cargo facilities at TNIA, a significant investment will need to be made in the very short term, to resolve capacity problems. It is reasonable to say that with the substantial investment in airport terminals and runways anticipated to be made in the next 5 years by Infraero, that cargo facilities will not be a short term Federal funding priority. Because of this, it is logical that the State of Minas Gerais should look to the public sector for both innovation and investment in air cargo facilities in the short term.

Recommendations

Step 1: Develop a standing air cargo development committee that would meet on a continual basis. The committee would be comprised of; Infraero, ANAC, SEDE, airlines, third party logistics providers, CEASA, Inland port, and any private air cargo logistics providers. The committee should be chaired by SEDE, and should be empowered to make recommendations regarding improving; procedures, facilities, funding and incentive sources, support infrastructure, and developing a detailed air cargo marketing and development plan.

Step 2: Using the air cargo development committee structure, develop a detailed air cargo marketing and development plan.

Step 3: Working with Infraero, develop a memorandum of understanding that would allow SEDE to execute certain aspects of the air cargo marketing and development plan. Some aspects to consider for SEDE management would be; innovative air cargo incentives (wide body lift incentives, direct incentives to all cargo carriers), seeking private investment in air cargo facilities, and a focused branding program for the airport.

The most important aspects of these recommendations would be to; 1) Identify the areas of immediate need, and immediate benefit, 2) Develop the structure to actually make the

necessary changes and improvements, and 3) Develop a collaborative industry wide approach that will be able to address and implement changes that will benefit the entire air cargo industry strategically.

Perishables

Background

In May of 2010, an interview was conducted with representatives of CEASA which is the very large wholesale food and perishables center in Belo Horizonte. The CEASA operation encompasses 1,000,000 square meters of space, processes 130,000 tons of food per month, and employs over 15,000 workers. The CEASA concept is standard for large metropolitan areas in Brazil. The CEASA operation currently has aspects that are very synergistic with air cargo and warehousing operations at TNIA. In fact, the logistical synergy between the two facilities is substantial and should be the focus of any future cargo/logistics planning at the airport.

Current Conditions

Currently, the CEASA operation has expanded to the point of needing new facilities and infrastructure. The mega wholesale food clearinghouse concept offers substantial benefits to the Belo Horizonte metropolitan area in terms of; price, selection, and freshness. Current conditions include:

- Wholesale operation includes fruits, vegetables, flowers, rice, cereals and goods.
- Goods are brought in by local farmers, and are also trucked in from the local region.
- The primary connection to TNIA is via perishables that come to the CEASA cold warehouse, for air shipment to international destinations.
- Added wide body lift capacity at TNIA would most certainly open up additional perishables markets to the agricultural industry in Minas Gerais.
- Fresh cut flowers from the Zona Da Mata currently are trucked to Rio de Janiero for air shipment to the United States.
- CEASA is in immediate need of additional cold warehouse storage. Additional storage at TNIA could augment this need.
- Traders/brokers and third party logistics providers are primarily from the Sao Paulo region.

Gap Analysis

For this analysis, we will discuss the gaps that exist between the TNIA and CEASA operations. As mentioned previously, the two facilities operate synergistically on only a few fronts. The nature of the two facilities with both being logistically oriented infrastructure would lead to the logical conclusion that a more synergistic coexistence could be enjoyed by both.

This analysis will focus on those areas where additional synergies regarding perishables could be enjoyed by each, and they are:

Additional cold warehouse storage at both facilities would enhance the current trucking connections at both CEASA and TNIA. This would also allow both facilities to augment the cold perishable storage capacity of each.

Additional wide body cargo lift capacity would allow for more market access for; fresh cut flowers, fruit and vegetables, and other perishable food product. A predictable and improved wide body route structure could very well serve to reroute the flower and fruit business back to Belo Horizonte from Rio de Janiero.

Improvements in the trader, broker, forwarder, (third party logistics providers) industry in Belo Horizonte would begin to move the logistical focus back toward Minas Gerais from Sao Paulo.

Recommendations

The recommendations for improving the connectivity and synergy between TNIA and CEASA very closely parallel those that have already been developed for the overall air cargo business. The recommendations are as follows:

Step 1: Incorporate CEASA logistical connectivity and facility needs into the recommendations of the air cargo development committee. Include perishables as a discreet focus in the comprehensive air cargo marketing and development plan.

Step 2: Work through the air cargo development committee to facilitate and improve the professional trader/broker and forwarder industries that serve both CEASA and TNIA.

Hotel/Tourism & Convention Industries

Background

The State of Minas Gerais Secretary of Tourism is aggressively promoting the state's tourism market.

Currently, Brazil is a very popular international destination and the State of Minas Gerais is working to make their state the number one destination in Brazil. In April 2010, Minas Gerais "became the Destination of the Year" according to the Brazil Tour Operators Association (BTOA). The BTOA is an organization whose members specialize in promoting Brazil as a destination to travelers form the USA. The partnership agreement governing this initiative was signed by Daniel Marques, director of promotion and marketing support for the Minas Gerais State Tourism Office (SETUR), and the BTOA Board of Directors during the New York Times Travel Show held in New York City February 26-28, 2010.

As "Destination of the Year," Minas Gerais receives visibility and prominent coverage in BTOA's principal promotional catalogs, press events and the association's official Web site. Additionally Brazil gets priority treatment as a key destination in the promotional events and sales activities of the member operators. Speaking in New York, Marques stated that the partnership will lead to more business opportunities, greater visibility and expanded promotion for Minas Gerais in the United States. The U.S. is a strategic marketing priority ever since American Airlines introduced a direct flight between Belo Horizonte and Miami in 2008.

Over the past three years, SETUR has invested more than six million dollars in promotional and informational activities targeting national and international markets.

SETUR has also participated in major U.S. events in order to increase the visibility of Minas Gerais.

The State of Minas Gerais appears to be very well funded currently.

The Belo Horizonte CVB appears to be duplicating many of the same programs that the State of Minas Gerais Tourism Agency is also doing.

Current Conditions

On May 13, 2010, CH2M HILL met with the following representatives of the Governo do Estado De Minas Gerais, Secretaria de Estado de Turismo:

- Silvana Nascimento, Project Coordinator
- Isabela Rosa Sette, Assessora da Superintendencia de Politicas do Turismo
- Claudia Macedo Gil, Directora de Planejamento e Avaliacao do Turismo
- Maurilio Soares Guimaraes, Secretario Adjunto

During the meeting, the staff provided the following information:

- The goal of the Secretaria de Estado de Turismo is to make Minas Gerais the Brazilian destination for 2010.
- Minas Gerais has 853 cities between Rio and Sao Paulo with 70 regional airports.
- Minas Gerais has a Tourism Organization that includes 46 cities.
- Minas Gerais has the second largest economy in Brazil.
- Minas Gerais is the second most popular domestic tourism destination behind Sao Paulo.
- They are currently working on a new branding of Minas Gerais for the 2014 World Cup.
- Minas Gerais has 14 National Parks (for hiking, rafting, camping, horseback riding, etc.).
- Minas Gerais has over 2,000 caves for tourists to explore.
- Visitors by ranked by numbers are from: S. America, USA, Portugal, France, Spain, and Germany.
- Minas Gerais maintains statistics on visitors to Belo Horizonte by airport (TNIA or PAM) and business or pleasure.
- They currently have a budget of R$5 million to attract tourists to Belo Horizonte.
- They are a member of ECCA (an organization that promotes conventions).
- They are in discussions with the IOC to have the Opening Ceremony for the 2016 Summer Games in the Belo Horizonte Stadium.
- They are working with tour companies to develop All Inclusive Tour Packages for Minas Gerais.

On May 13, 2010, CH2M HILL met with the following representatives of the Belo Horizonte Convention and Visitor's Bureau:

- Roberto Filho, President
- Patricia Campos, Communications

During the meeting, they communicated the following information to us:

- Funding for the CVB comes from voluntary hotel bed tax payments by hotels in Belo Horizonte.
- In addition to the hotel bed tax payments, they also get some funding from the Federal, State and City governments.
- The Belo Horizonte CVB operates with only 10 employees.
- The Belo Horizonte CVB is the third CVB to be created in Brazil.
- The Belo Horizonte CVB is the second largest in Brazil behind the Sao Paulo CVB.
- The Belo Horizonte CVB's first priority is to promote Belo Horizonte's events.
- They have been very successful in attracting Medical Conventions.
- They also work to promote and sell the region for tourism.
- They also work with the National Organization for Tourism for International Events
- They are currently focusing on two campaigns:
  - "I Love BH"
  - "BH Awaits You"

Gap Analysis

Belo Horizonte lacks adequate convention space to enable it to aggressively market and grow its convention business.

The city also does not have enough hotel rooms available to grow its convention business or any major increases in tourism.

Recommendations

Recommendations for tourism improvements are outside of the project scope for CH2M HILL. The following suggestions would be relevant to needed improvement, and could be accommodated in the "Airport City" development at TNIA:

Step 1: Build a new convention center in the near proximity of TNIA. This convention center could accommodate north Belo Horizonte meetings, as well as those generated by aviation businesses at TNIA.

Step 2: Build a minimum of 3,000 new hotel rooms as soon as possible. However, no later than 2013, so they will be available for the 2013 FIFA Confederation Cup and the 2014 FIFA World Cup. (This is an overall Metropolitan Belo Horizonte requirement).

High Tech and Nano Tech Industries

Background

Brazil is the largest economy in Latin America, which collectively is about the size of China's economy. The state of Minas Gerais is Brazil's second largest state economy.

The State of Minas Gerais is working to attract business leaders and investors in the High Tech and Nano Tech Industries to locate and/or grow their businesses in the Belo Horizonte region.

The Minas Gerais government is taking steps to promote the expansion of the High Tech and Nano Technology Industries in the Belo Horizonte region.

Whereas India, China, Eastern Europe, and Russia get the most attention when it comes to outsourcing IT work, Brazil is fast becoming a competitive destination, offering top-quality IT talent. Furthermore, Brazil has a much lower worker turnover rate than India.

Brazil's IT professionals have a high degree of technical skills and business savvy. For example, São Paulo has the second-largest community of Java programmers outside of the United States. Brazil also has a "western" business culture, with a very large financial and banking industry footprint.

Current Conditions

On Monday May 10, 2010, CH2M HILL met with one high tech company in the Belo Horizonte area. The name of the company is Clamper and we interviewed the following company representative:

- Ailton Ricaldoni Lobo, President/Director.

Clamper is a high tech company that develops products for the domestic and international markets. Clamper was founded in 1991 and is located in Lagoa Santa, approximately 6km from TNIA.

Clamper is nationally recognized in the high tech industry for the manufacturing of anti-surge protective devices, systems which operate from continuous current to high frequencies.

During our meeting, Mr. Lobo communicated the following information to us regarding Clamper:

- Clamper develops products for many different industries.
- Clamper has no Brazilian competitor in the range and types of products that it offers.
- The company is recognized as an industry leader in Brazil.
- Clamper's current facility is at capacity, and there is no room to expand the size of the facility.
- Clamper will continue its expansion as a tenant at TNIA's Industrial Airport.
- Clamper currently exports its products to 14 countries.
- Clamper uses TNIA to export its products internationally.

- Clamper used the TNIA cargo facility for two years on a Customs/Infraero pilot project.
- Clamper owns its current office building and manufacturing facility, however, they would consider leasing a facility at TNIA.
- Clamper has experienced a rapid increase in its export business.
  - 2008 = 5 percent of company's total revenues
  - 2009 = 12 percent of company's total revenues
  - 2010 = projected 25 percent of company's total revenues
- Clamper's largest international markets are:
  - Mexico
  - USA
  - Columbia
  - Peru
  - Panama
- Clamper currently uses freight forwarders to ship its products to customers.
- Clamper currently stores its imported components at a third party warehouse because Infraero charges are too expensive to store the components at TNIA. Infraero charges are ten times (10X) more expensive than that of the third party warehouse operator.
- Clamper needs approximately 2,500 square meters of production space at TNIA for the planned expansion of its operations.

Gap Analysis

Currently there are no facilities available to accommodate High Tech and Nano Tech companies that are seeking to expand and/or relocate their operations at or close to TNIA. Warehousing for the industry is not currently available at all on airport property.

Furthermore, Infraero's high "per day" cargo tariffs are a major impediment to business operations and growth at TNIA.

There is minimal scheduled international wide body cargo air service available at TNIA which limits the ability for High Tech and Nano Tech companies to ship air cargo to international markets.

Recommendations

CH2M HILL recommends the following steps which will begin to close the gaps for the high technology and nano technology industry in Belo Horizonte:

Step 1: Develop the Industrial Airport at TNIA with a focus toward high tech and nano technology, to accommodate the demand for these types of industries. Utilize surveys and workshops to ensure this. Fully utilize the existing foreign trade zone tax abatement designation as the primary incentive for high tech and nano tech businesses. The industrial airport and airport city developments should focus on warehousing and manufacturing facilities to resolve current capacity gaps.

Step 2: Develop an aggressive strategy to expand international air service and wide body air cargo lift at TNIA.

Step 3: Develop an aggressive marketing plan to recruit High Tech and Nano Tech companies to the Industrial Airport, and "airport city" developments.

Biotech Industry

Background

Biotechnology (Biotech) is a term that encompasses a number of technological activities aimed to breed or modify biological organisms to address human needs. In general, Biotech combines biochemistry, molecular science and chemistry.

When looking at the global Biotech Industry from a cluster perspective, it shows that the major clusters are located in the United States and Europe. However, currently there is a presence of Biotech firms in emerging economies such as India and Brazil.

In Minas Gerais there is a small but growing cluster of Biotech businesses. The Minas Gerais Biotech Industry structure shows that 25 percent of the companies are young, with less than 4 years of experience. Also, 75 percent are small companies with less than 20 employees. Sixty six percent of the companies have close relationships with universities and many of these companies are being incubated by Biominas.

The Biotech cluster in Minas Gerais is mainly active in the following segments:

- Human Health
- Agribusiness
- Animal Health
- Environment

Minas Gerais has a much larger share of its Biotech companies concentrating in the environmental segment when compared to the other Brazil's other Biotech cluster located in Sao Paulo.

With the exception of equipment manufacturers, the Minas Gerais Biotech cluster is well developed. One of the strong characteristics of the cluster, and the reasons why it has developed in Minas Gerais is the presence of large and high-quality state financed universities. Research and Development is at the heart of Biotech in Minas Gerais. The Minas Gerais Government has been funding research institution, agencies, in addition to financing universities.

The Federal University of Minas Gerais (UFMG) alone has more than 160 Biotech experts. In addition to this, there are many other universities that offer courses in specialized Biotech fields such as Environmental Biotech, Plant Biotech, and Biotech Business Management.

Access to capital is still limited in the Minas Gerais Biotech cluster; however, venture capital is becoming increasingly available. The primary reasons for the scarcity of venture capital for Biotech in Brazil are the lack of understanding of the Biotech industry by Brazilian investors, the risk aversion of the local venture capital funds and liability risks for angel investors for companies' activities. All of this is exacerbated by Brazil's high interest rates,

which make investors reluctant to take high risks when investing in government bonds will yield high returns.

These restrictions have forced emerging companies to rely heavily on government funding or to generate fast revenues in order to sustain their operations. Companies have developed a "hybrid" business model where they fund internal development projects with cash flow that comes from selling services or products marketed from their very genesis. However, recent developments in the Brazilian venture capital industry have been promising. Firms such as Votorantim Ventures Capital, FIR Capital and Rio Bravo have created dedicated Biotech funds to invest in Minas Gerais Biotech companies.

Difficulty in obtaining equipment is a major hurdle for Biotech companies to grow in Minas Gerais. High import tariffs have posed a major problem for companies seeking to own their equipment. As a result, many Biotech companies have resorted to using university equipment when available. However, these are neither sufficient nor specific for the applications that many of the Biotech companies need.

Current Conditions

On May 13, 2010 CH2M HILL met with the following representatives of Biominas to discuss the current conditions of the Biotech industry in Minas Gerais:

- Eduardo Emirich Soares, President & CEO
- Guilherme Emrich, Chairman of the Board

During our meeting they communicated the following information to us:

- The State of Minas Gerais currently provides economic incentives to Biotech and Nano tech Companies in the state.
- Minas Gerais currently has 80 Biotech companies located in the state.
- Minas Gerais ranks second in Brazil's Biotech industry behind Sao Paulo.
- In Minas Gerais, the Biotech Industry enjoys a very good cooperation between private sector and the government.
- In 1995, a Biotech Incubator Program was started to provide support to start up Biotech Firms.
- Today, the Biotech Incubator Program is totally self-sufficient.
- The Incubator Program generates revenues by charging a fee to provide consulting services to it Biotech clients.
- TNIA is very important in the future growth of the Biotech Industry in the Belo Horizonte region.
- TNIA needs to develop facilities at the airport to accommodate Biotech research and development activities.
- Biominas' companies would be very interested in locating their operations in facilities at TNIA.

- International air service for both passengers and cargo is very important for the growth on the Biotech Industry in Belo Horizonte.

Gap Analysis

There are no facilities available at TNIA to accommodate Biotech companies that are seeking to expand and/or relocate their operations at or close to TNIA.

There is limited international air service available at TNIA which limits the ability for Biotech companies to access international markets.

Biotech companies find it very difficult to obtain the necessary equipment due to the government's high tariff on imported equipment.

Recommendations

In accommodating the needs of the Biotech industry, CH2M HILL recommends the following steps:

Step 1: Develop the Industrial Airport at TNIA to accommodate the demand for these types of industries. Utilize surveys, workshops and stakeholders meetings as a means of ensuring improvement. Using the stakeholders outreach as a guide for facility design, develop the industrial airport and airport city to better accommodate the growth needs of the industry. Utilize the existing foreign trade zone tax abatement program as an incentive for the bio technology industry.

Step 2: Develop an aggressive strategy to expand international air service at TNIA. Increased passenger and air cargo lift will improve bio tech market options.

Aviation and Aerospace

Background

The State of Minas Gerais is seeking to recruit aviation and aerospace companies to relocate or expand their operations in Minas Gerais at TNIA.

As aviation and aerospace continues to expand Brazil, Minas Gerais plans to aggressively recruit high aviation/aerospace companies, parts suppliers, and maintenance and repair businesses to develop an aviation/aerospace cluster at TNIA. Due to the size of the potential aviation and aerospace developments, and their need to access the TNIA airfield system, the airport city development would be the best future location for the industry.

The growth potential stemming from government provided tax abatements and incentives will encourage the establishment of regional entrepreneurial activities as well as other supply businesses to supply these and similar businesses within the industry cluster.

Current Conditions

Brazil considers aviation and aerospace industrial development to be a vital industry for national economic development goals. Due to the vast size of the country, air transportation is a critical link in Brazil's infrastructure. The country is vitally dependent upon its civil aviation system to link the sparsely inhabited areas with major economic centers. Brazil also sees it as important for long term economic growth. Combining this dependence on air transport with the national policy to establish a modern market economy, U.S. commercial aircraft and parts' manufacturers have excellent future market prospects in Brazil.

The Brazilian aerospace industry is dominated by Embraer and its suppliers, located in São José dos Campos, near São Paulo. Embraer is one of the world's 4 leading airplane manufacturers. Embraer manufactures a full line of military trainers and small narrow body commercial aircraft. Nieva (owned by Embraer) manufactures light aircraft for civil use.

Brazil's Helibras assembles the Eurocopter for the South American market. The internal aerospace market in Brazil is worth about US$300 million per year, including a demand for up to 20 new jets and propeller airplanes, as well as helicopters and second-hand aircraft. Brazil has the second largest fleet of business aircraft and the 7th largest fleet of helicopters in the world. São Paulo alone has over 200 heliports.

Brazil has a complete space program, building rockets, satellites and its own launch site. In aerospace, the leading research institute is the ITA, part of the CTA (Centro Técnico Aerospacial). ITA entry standards are exceedingly high and it is regarded as the best technical university in the country.

The aeronautic maintenance market is growing, and expansion is expected through the coming years. Currently, the global maintenance market is estimated to be more than US$100 billion. In Brazil, the MRO market (maintenance repair and overhaul) for commercial aviation alone is approximately US$1.5 billion annually.

The Brazilian Space Agency (abbreviated in Brazilian Portuguese as AEB) was established in 1994 as a civilian authority within the direct purview of the Executive Office of the President of Brazil. It is responsible for pushing forward Brazil's space activities and for coordinating the national and international co-operation necessary to help further the country's strategic goals in space. AEB also has a central role in coordinating the major activities carried out by the institutions of the National System for the Development of Space Activities (SINDAE). These include the Department of Research and Development of the Ministry of Aeronautics and the National Institute for Space Research (INPE). INPE falls under the aegis of the Ministry of Science and Technology and is very active, being responsible for satellite development and related technologies, and pursuing R&D in the field of space applications, Earth observation and space and atmospheric sciences.

The Institute of Aeronautics and Space, under the Ministry of Aeronautics, is responsible for the development of Brazil's satellite launchers and extensive sounding rocket program. This Ministry of Aeronautics is also responsible for the development of a fully operational launch range at the Alcantara Launch Centre (CLA), and for running the Barreira do Inferno Launch Centre and overseeing the Colonel Abner Propellants Utility. The private sector and Brazilian universities and research institutes are also involved in space related R&D projects and are contracted to develop and supply systems, equipment and services.

Brazil has built up a large network of regional and international airports, although many of these are small in size. The 66 largest, which are responsible for generating 97 percent of scheduled air transport movements, are administered by Infraero, the world's largest airport group. The company is wholly owned by the state as part of the Ministry of Defense, and runs passenger and freight terminals, as well as managing 81 air-navigation support units.

INFRAERO – Brazilian Airport authority, has announced that the Brazilian airports would receive approximately US$ 3 billion of investment over the next four years. The objective is to increase Brazil's annual airport capacity from 118 million passengers per year up to

158 million passengers per year. The volume of air cargo should also increase from 100 thousand tons up to 291 thousand tons per year.

The airport market in Brazil has been expanding over the last several years responding to the growth of the Brazilian economy, the modernization of major airports, and the increase of passenger demand. The airport modernization program has provided good long-term market prospects for U.S. manufacturers.

Brazil will be investing heavily in renovating or constructing new airports throughout the country, specifically in the regions of Piaui, Rio Grande do Sul, São Paulo, Recife, Maceió, Brasilia and Rio de Janeiro.

Embraer is Brazil's second-largest exporter and currently employs more than 19,000 people, 85.9 percent based in Brazil, and contributes to the creation of more than 5,000 indirect jobs. Overall, it accounts for over 80 percent of the revenue of 200 small and medium-sized businesses. Embraer exports hundreds of airplanes annually.

Embraer has 45 percent of the regional market of airplanes with 30-60 seats, with over 800 units in operation. It is one of the 2 world leaders in regional jets up to 120 seats. It has 130 customers in 30 countries and supplies to the air forces of more than 20 countries. Embraer is now facing both economic and political pressure to develop its domestic supply chain.

In June 2004, the Brazilian investment bank BNDES announced a US$222 million loan to Embraer for the export of 10 EMB170 jets to Alitalia, Lot and US Airways. As a condition of the loan, Embraer had to increase its local content of parts and components to 55 percent by 2006. EMBRAER dominates the Brazilian aerospace/space industry, other companies have established expertise in key areas and these include AVIBRAS (sounding rockets and missiles); Aeroeletrifica (avionics and other electronics); CENIC (composite materials); Elebra / NORCAL Group (Electronics); TECNASA (electronics for air navigation support, radar countermeasures); Mectron (defense systems); Digicon (transducers, precision mechanics); and AKROS (structural analysis and CAD).

Although a Brazilian was one of aviation's first pioneers, the aircraft industry in Brazil only began in earnest 30 years ago. Today, the success of planes wholly designed and manufactured in Brazil, mainly by Embraer, and exported to countries on every continent, makes Brazil's aircraft industry one of the largest in the world. Embraer was state founded in 1969 and privatized in 1994. It was Brazil's largest exporter from 1999 to 2001, and the second largest in 2002. Although in 2004, the company was the 4th largest producer of commercial aircraft, Embraer also produces military and corporate aircraft. The company has won significant orders since 2003 from airlines such as US Airways, Jet Blue and Air Canada. Most of Embraer's planes have been sold to customers in the United States and in Europe. Embraer's Tucano, a turboprop military trainer, is used by the Brazilian Air Force and in the air forces of twelve other countries, including France and the United Kingdom.

Embraer has been studying the possible development of a military transport aircraft. The new project will perform refueling, medical evacuations, and other missions. If it is actually launched, the EMBRAER C-390, as it is called, will be the heaviest airplane ever produced by the Company and will be able to transport up to 19 tons (41,888 pounds) of cargo. The

new project will incorporate a number of technological solutions developed for the successful EMBRAER 190 commercial jet.

As Brazil's aerospace market continues to expand, imports of aircraft, parts and components continue to increase, representing good business opportunities for U.S. suppliers. The products expected to have the most potential are:

- Offshore helicopters
- Parts and components for helicopters
- Avionics and systems
- Turbojet aircraft engines
- Aircraft control systems
- Aircraft propeller parts
- Aircraft accessories
- Passenger bridges
- Equipment for drug & explosive detectors
- Boarding bridges
- Baggage X-rays
- Air traffic control systems
- Radar systems
- Baggage handling equipment

Site Selection Considerations for Aviation and Aerospace Industry

Aviation and aerospace companies generally consider the following items when looking for a location for their operation:

- Sites and Infrastructure: They look for available sites that can accommodate facilities up to several hundred thousand or millions of square meters. These sites must have ample access to competitively priced utilities complimented by excellent air, road and rail. Most importantly, the sites must be proven to be easily permitted, and short-term developable. Shovel ready sites are usually given site selection priority over those that may or may not already have development permits.
- Incentives: These incentives include but are not limited to tax abatements, tax credits, worker-training grants and programs and infrastructure improvements.
- Location: An important consideration is that the aviation and aerospace cluster is located in an area that has good air service to attract customers from around the world.
- Workforce: The availability of skilled and semi-skilled workers in the region. An easily trained or already trained technical workforce is a very important aspect for site selectors.

Gap Analysis

TNIA lacks the specific site infrastructure to attract aviation and aerospace projects. The specific needs for relocations are; large site (some projects require 250 plus acres), on a taxiway, with permitting in place. Identifying a site that would be shovel ready for a high end aviation/aerospace project is a necessity. It is also unsure if Infraero could move quickly enough with needed capital improvements to ensure a successful bid for a significant aerospace project.

The Belo Horizonte region lacks available skilled and semi-skilled aviation and aerospace workers. This situation will improve, as new technical training programs are currently being developed.

It is uncertain if the incentives that can be offered by Minas Gerais are of the magnitude that would be required to compete in an international competition.

The time in which it takes to certify aviation and aerospace workers by ANAC will be an ongoing problem for those relocation projects that require quick turn key developments.

Recommendations

Step 1: Develop a list of incentives to offer companies to relocate at TNIA. Such incentives may include but not be limited to the following:

- Tax abatement
- Tax credits
- Worker-training grants and programs
- Direct government incentive payments for specified jobs
- Pre-paid infrastructure improvements; Public/Private Partnerships

Step 2: Continuously maintain a "large box" (up to 250 acres) area at TNIA for potentially very short term development for aerospace projects. The area should have access to the airfield and should preferably be shovel ready with site improvements. The large box area should be maintained continually over time so that any large aerospace project can always be accommodated in a very short time frame. Due to space needs, this large box should be established in the "airport city" development on the west side of the airport.

Step 3: Retain the services of an international aerospace/aviation site selection consultant. Engage the consultant to conduct a gap analysis regarding; incentives, site, market, education, and logistics conditions. The result of the gap analysis would be discreet recommendations to make TNIA more marketable as a location for large aerospace/aviation projects in the future.

Step 4: Continue to work directly with the local University system to refine and improve the current technical training that will keep Belo Horizonte in the forefront of technical aviation training.

The TNIA Property Development Concept Plan

The overall TNIA property development concept plan has been developed by bringing together inputs from the following sources; SEDE, Lufthansa Consultants, Changi airport

consultants, Jurong consultants, and Dr. John Kasarda. Additionally, many of the assumptions made in this concept plan are the direct result of the direct input that was gained from our industry interviews that were conducted in May of 2010.

Taking into account the various industrial development plans that are in existence, as well as direct industry feedback, CH2M HILL has developed a set of guiding principles that were utilized in the development of this concept plan.

The development of aviation industrial and non aviation industrial property at TNIA should always continue to consider the overall vision for economic development in the Belo Horizonte metropolitan region. From that perspective, it is important to continue to keep in mind the Pillar economic development industry sectors for Minas Gerais and for Belo Horizonte. The pillar industry sectors are;

1. High Tech Electronics
2. Information technology
3. Bio Tech/Life sciences
4. Aviation and aerospace
5. Medical tourism
6. Leisure/tourism

This and any future industrial development planning that takes place in Belo Horizonte must incorporate and take into account the needs of these pillar industries.

Industrial development at TNIA will follow very closely that of many international airports around the world. The drivers of this growth will be; continued airline domestic and international city pair service improvements and passenger growth; improved domestic and international air cargo lift capacity; growth in direct aviation related businesses; and continued growth in airport employees. This growing critical mass of airport users will provide an additional impetus for industrial and commercial development at TNIA. This concept of growth in direct airport users providing a significant driver for additional airport industrial and commercial development is one of the core drivers of aerotropolis and airport city development concepts.

A rough estimation of the current "critical mass" of airport users would be as follows;

- 2,000-3,000 direct airport employees
- 7,000,000 annual passengers
- 1,500,000-2,000,000 annual meeters and greeters

***(note: the above are 2010 estimates.)**

This critical mass of direct airport users will continue to grow over time. The resulting effect of this critical mass of airport users will provide a continued driver for commercial and industrial development in the airport city development area.

TNIA Property Development Guiding Principles

The following guiding principles were developed in order to tie together the various plans and information that are already in place for Belo Horizonte. They were also developed in order to ensure that the basic tenets of development around what will be a major international airport are maintained throughout the planning function. It should also be pointed out that as a concept plan, the following layouts will require detailed market demand analysis and additional site specific planning in the future to further refine and prepare the concept for actual implementation.

Land Development Guiding Principles

Direct aviation land use needs are at a premium at all airports. In all cases, development space for businesses that need direct access to the airfield will be maximized.

The character and land uses included in the "airport city" will be complimentary to the other development nodes created within the aerotropolis, supporting the incremental, coordinated development of the greater Belo Horizonte region.

Aviation support land use needs will be maximized in order to fully support the defined direct airfield access businesses of the future. Airport city land uses will be comprised of direct aviation and aviation support land uses.

Commercial and industrial land uses within the "airport city" will fully support the needs of the surrounding aviation/aerospace property at TNIA.

The property development revenue production capabilities of TNIA will in all cases be maximized to ensure that the airport will become and remain financially self sufficient for contributing to the Operating and Capital expense needs of the future.

In all three development phases, a "large box" area with direct airfield access will be reserved for the very short term or immediate accommodation of aerospace industrial development.

The proposed industrial development plan for TNIA is broken down into three primary development phases. These phases coincide directly with the planning phases of the terminal and airfield plans.

Aviation and Non Aviation Property Phasing Plans

Phase 1: For the first phase of industrial development at TNIA it is important to list the various touch points of immediate or short term need that were documented during the information gathering stage of this project. Following is a list of facility needs that were identified as a result of industry interviews, and are considered to be short term or immediate in nature.

- There is an immediate need for international and domestic air cargo facility expansion. This need can be accommodated on the existing Infraero air cargo site.
- There is a short term or immediate need for airline MRO expansion. This is due to market competitive issues between existing airlines serving TNIA. This potential immediate expansion need can be accommodated on a site just west of the existing VIP terminal and south of the existing control tower.

- There is an immediate need to accommodate high technology manufacturing and logistics needs in the industrial airport development. This demand is based on the need to have on site air cargo storage options, other than the Infraero facility.
- There is an immediate need for cold storage/perishables facility expansion, even beyond the Infraero facility expansion that is currently taking place. This demand could be accommodated as a speculation project in the industrial airport development.
- The existing east-west parallel taxiway needs to be extended to the west, to accommodate the new MRO and Aerospace development opportunities.
- VIP and General Aviation facilities will be expanded in their current location in Phase 1, and relocated in phase 2 from their current location, just east of the existing control tower, to their permanent location, just west of the new north/south connector taxiway. This will allow for needed space for Terminal 2 development program.
- A proposed "large box" site that is immediately developable by the aerospace industry is reserved for the area just north of the new access roadway, and just west of the first phase of the north/south cross field taxiway which will terminate in this location in phase 1.

Based on the above referenced immediate needs, the following development activities are depicted on the phase 1 drawing, Figure 9-1:

1. Short term/ immediate air cargo expansion on the existing Infraero air cargo site.
2. An additional MRO facility on the site just south west of the existing control tower
3. An aerospace development site just south west of the existing control tower.
4. High tech manufacturing and logistics in the phase 1 industrial airport development.
5. Cold storage/perishables facility in the phase 1 industrial airport development.
6. Existing parallel taxiway extension to the west, to accommodate immediate MRO and Aerospace development opportunities.
7. Initial phase Airport City development to begin along new access roadway alignment.
8. VIP and General Aviation facilities to be expanded in their current location in Phase 1.

Phase 2: The Phase two industrial development plan calls for the continued expansion of primary facilities at TNIA. In phase two, an expansion of aerospace and aviation facilities as well as aviation support facilities is envisioned. Following is a listing of the primary industrial development expansion needs and priorities for phase two development at TNIA:

- Further expansion of air cargo, Maintenance Repair and Overhaul, and aerospace facilities are expected in phase two. These facilities, which require direct airfield access will require substantial fill as they are developed toward the West. Because of the need to access airfield taxiways and runways, these facilities will need to be at or very close to existing airfield elevation.
- VIP and General Aviation facilities will be relocated in phase 2 from their current location, just east of the existing control tower, to their permanent location, just west of

the new north/south connector taxiway. This will allow for needed space for Terminal 2 development program.

- Further expansion to the North of Industrial Airport facilities is anticipated. Phase two industrial airport facilities should be developed North of phase one facilities, since this area is relatively flat, and will require less fill. Any further expansion to the east will require significant fill material, and may not be financially feasible.
- Airport City development is expected to take place throughout phase 2 development. Development demand to the West during phase 2 will require the purchase of additional property to the West of existing property line.
- Airport City development in phase 2 will support aviation related land uses, and will move in a pattern toward the West. The property west of the existing property line is well below that of the airfield. Because of the high incremental cost to develop this property, it is anticipated that this development will be tiered to a great extent, using the existing topographical contours and some site leveling to complete.
- Aviation support facilities which are primarily warehousing and logistics support for the direct aerospace, air cargo and MRO business will continue to show high demand in phase 2. This demand will be accommodated in the land that has been identified as "aviation support" which is for the most part, just behind the direct flight line businesses.
- A proposed "large box" aerospace development site should be maintained throughout phase 2. This site would most likely be located on the new east/west taxiway system, which will be parallel to the new second runway.

Based on the above described phase 2 development program, the following projects are proposed for phase 2 and depicted in Figure 9-2:

1. Continued industrial airport expansion to the north and to the east. Expansion to the east of phase1 development will require substantial fill material in order to address demand.
2. Airport City development will continue to the west, beyond the current airport boundary, and will require a property purchase to accommodate the expansion and demand needs.
3. General Aviation/Corporate aviation and VIP operations will continue to develop near the site of the current control tower. Corporate demand for space will require that a second site will be developed north of the phase 1 site.
4. Air Cargo, MRO and Aerospace development will continue to grow throughout phase 2. This growth demand will be accommodated along the north/south taxiway connector, and also along the east/west parallel taxiway to the new second runway. It is anticipated that the growth in demand for these facilities will push development to the west, and require additional property to be purchased.
5. Aviation support facilities will continue to develop and follow along with the direct aviation facility growth that will take place to the north, following the new north/south connector taxiway, and to the west, following the new parallel taxiway to the second runway.

6. The aviation support hub will continue to develop during phase 2, as depicted on the phase 2 plan.
7. VIP and General Aviation facilities will relocated in phase 2 from their current location, just east of the existing control tower, to their permanent location, just west of the new north/south connector taxiway. This will allow for needed space for Terminal 2 development program.

Phase 3: The phase 3 industrial plan calls for a longer term build out of the same facilities and land uses that developed during phases 1 and 2. In phase 3, a continued expansion of aviation and aviation support facilities is envisioned. The following are the primary growth and development considerations for Phase 3:

- The industrial airport development will continue to the east, and take advantage of the need for an east airport cross field taxiway, which will provide the fill material and leveling required to finish off industrial airport development.
- The east airport cross field taxiway will also provide additional opportunity to fill in with additional aviation related facilities that will meet longer term demand.
- The aviation support hub should reach build out in phase 3. The hub will accommodate numerous different administrative and operational uses that directly support the aviation operations activities at TNIA
- In phase 3 there may be a further need to accommodate air cargo development in the location just south of the aviation support hub. Phase 3 anticipates as many as 4 new air cargo facilities in this location based on future demand. It should be pointed out that future demand forecasts will better determine the highest and best need for the space just south of the aviation support hub. Because of its location, which is just east of Terminal 1, this space could be used for apron parking to support the Terminal 1 operation. This land is very valuable, and operational demand should be monitored closely throughout phase 2 to determine the highest and best use for this space.
- Airport City demand should begin to push development to the west all the way to the new north/south highway complex in phase 3. This land is very undulating and for the most part, it falls downward as it moves away from the airfield complex to the west. Development of this property for commercial and office park activities in support of the aviation activities on the airfield are anticipated in phase 3. Because of the undulating and steep nature of this property, only tiered developments in Airport City are considered feasible.
- Aviation facilities will continue to develop in phase 3 along the parallel taxiway to the new second runway. Because of the nature of this property which falls off substantially as you move toward the west, a substantial amount of fill material will be required to keep these facilities at airfield grade.
- A "large box" aerospace development site should always be reserved in phase 3. This space would be toward the west of existing development, and be bordered on the east/west taxiway system that is parallel to the new second runway.

Based on the above described phase 3 development plan, the following projects are proposed for phase 3, and shown in Figure 9-3:

1. Continued industrial airport expansion to the east up to future aviation facilities that will be located on the new north/south cross field taxiway.
2. Final build out of the aviation support hub in the central airport sector just adjacent to terminal 1.
3. Build out of air cargo facilities or possibly Terminal 1 support facilities in the area immediately east of terminal 1 and south of the aviation support hub.
4. Airport City development should reach build out in phase 3. The development pattern will continue to push to the west, and will move all the way to the north/south highway and airport interchange.
5. Aviation and aerospace facilities should also approach build out in phase 3. Aviation and aerospace facilities will also move in a westward direction. Western expansion of the aviation and aerospace facilities will require significant fill in order for them to remain at airfield elevation.

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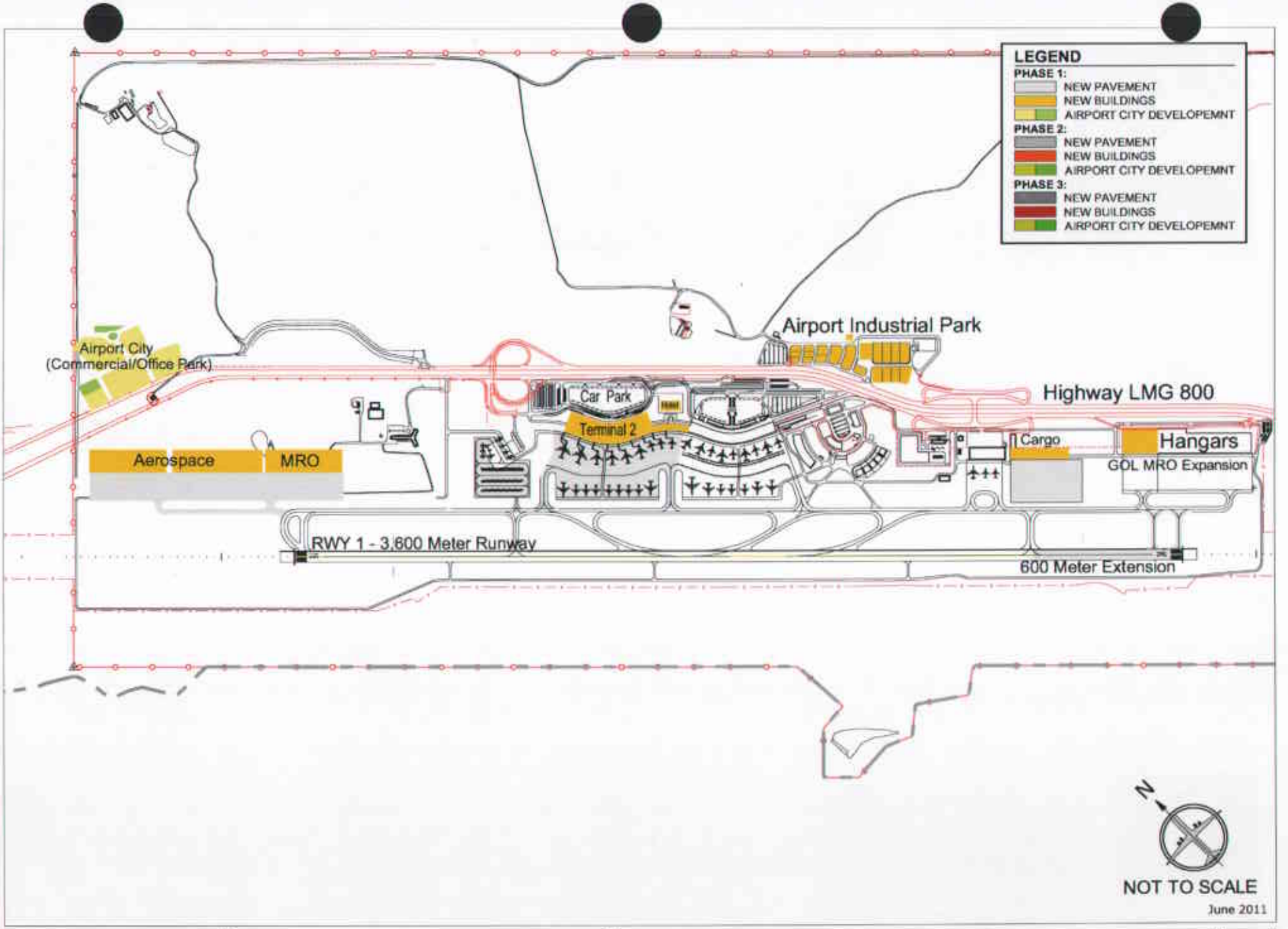

CH2M HILL	TANCREDO NEVES INTERNATIONAL AIRPORT	PHASE 1 INDUSTRIAL PLAN DEVELOPMENT	Exhibit 9-1

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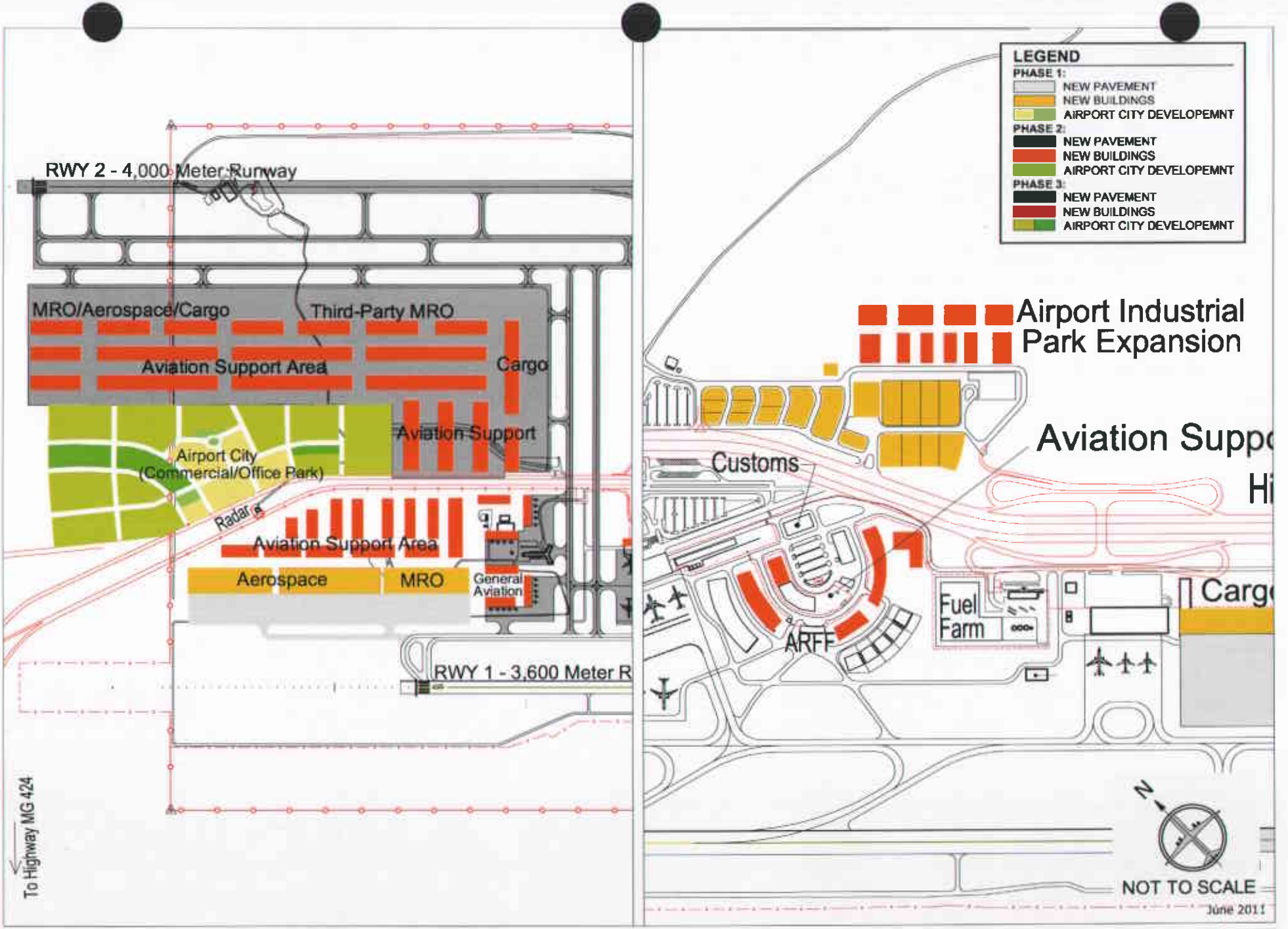

CH2M HILL	TANCREDO NEVES INTERNATIONAL AIRPORT	PHASE 2 INDUSTRIAL PLAN DEVELOPMENT	Exhibit 9-2

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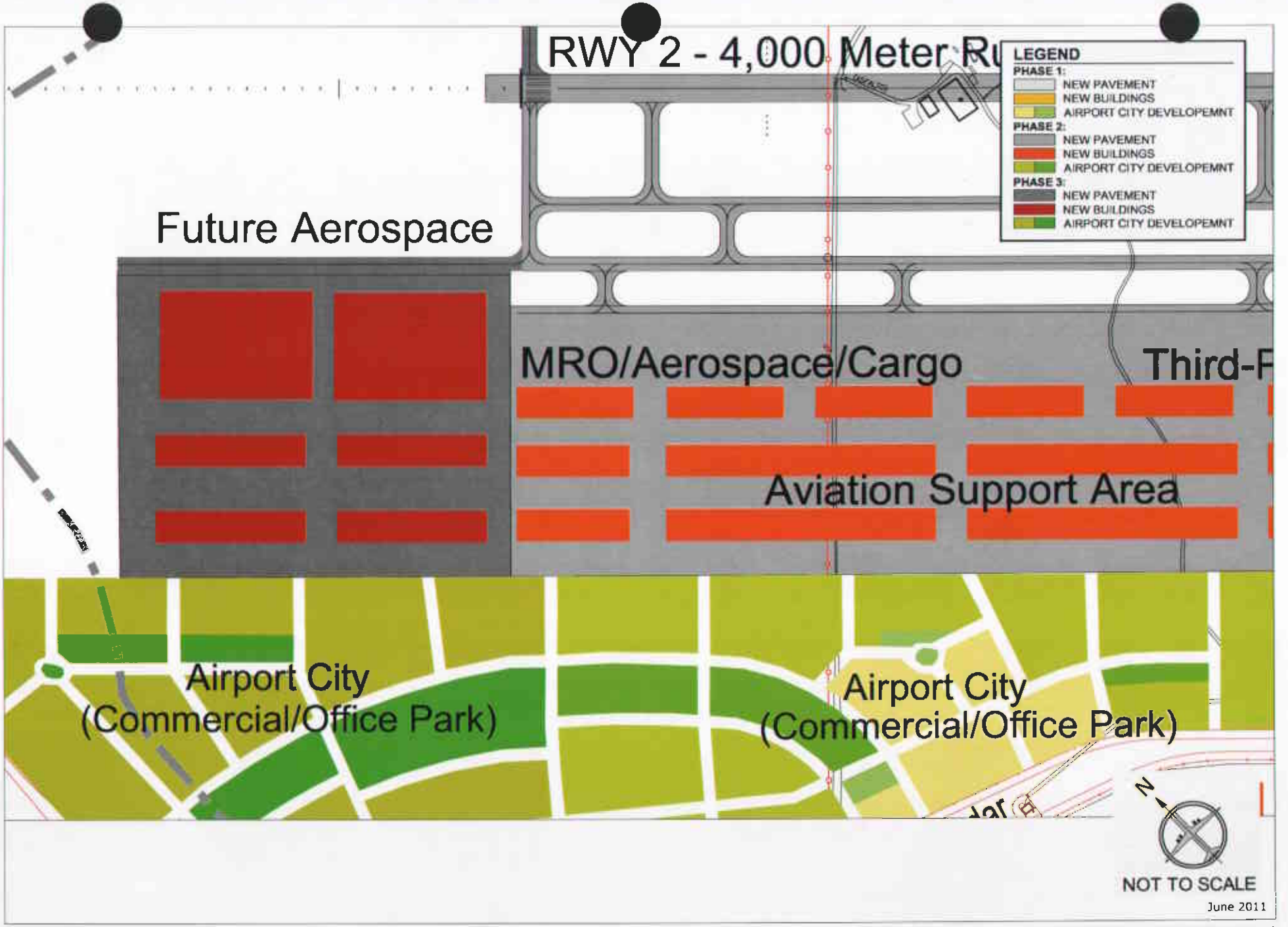

CH2M HILL	TANCREDO NEVES INTERNATIONAL AIRPORT	PHASE 3 INDUSTRIAL PLAN DEVELOPMENT	Exhibit 9-3

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9.2 TNIA Marketing Plans

The following section contains marketing plans for the primary industrial growth sectors at TNIA. The primary industrial growth focus areas for TNIA are; **Airport City/ Industrial Airport, Aerospace/Aviation, and Air service.** These plans include best management practices for marketing of airport facilities and recommendations for moving forward with successful programs for the three primary industrial focus areas for TNIA.

9.3 Airport City/Industrial Airport Marketing Plans

The following section deals with recommendations and steps for moving forward with the development of the Airport City and Industrial Airport areas of TNIA. Judging from the industry interviews that were conducted by CH2M HILL in the summer of 2010, both areas have a high potential upside, going forward.

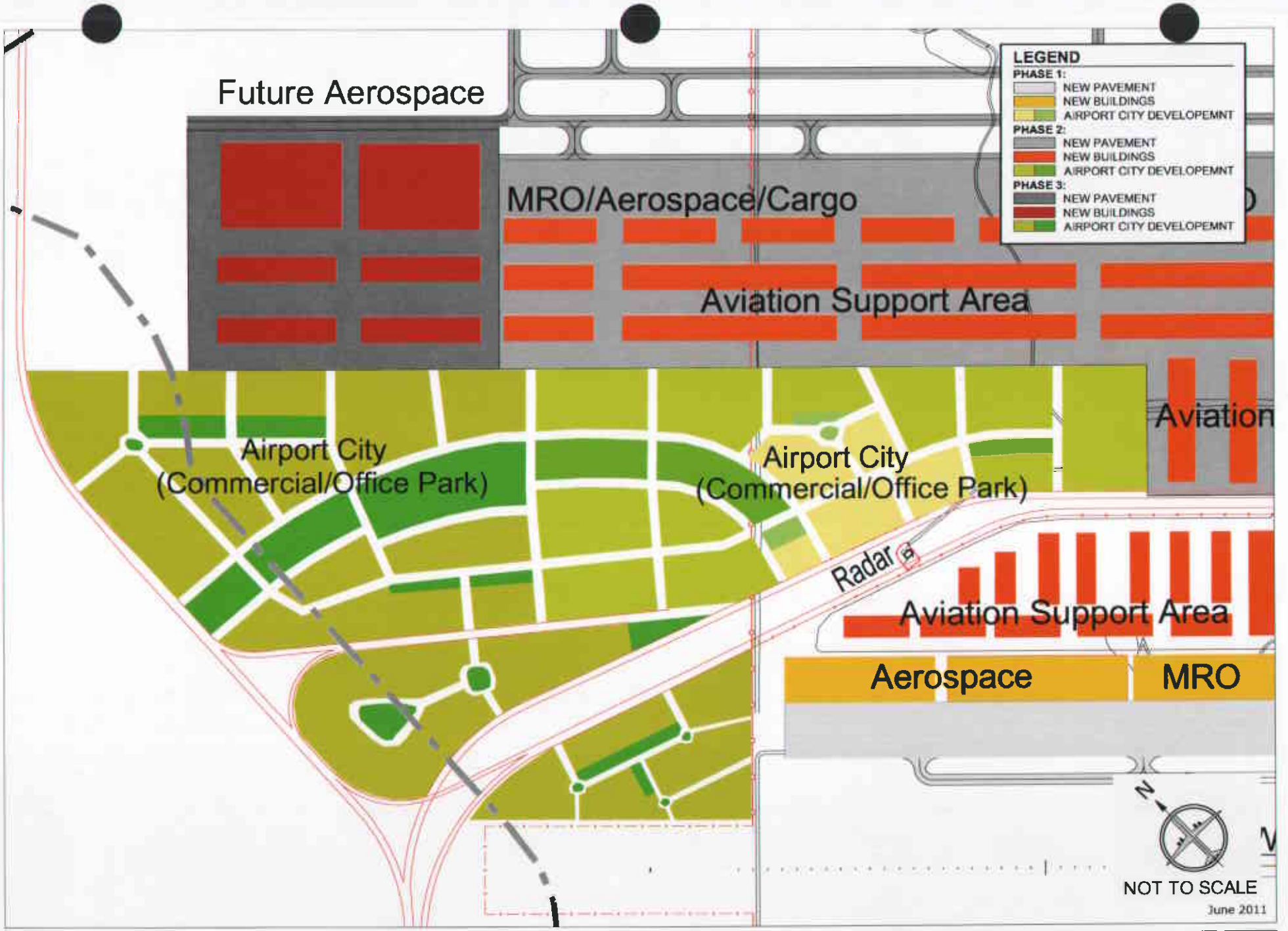
While both areas can take advantage of free trade zone tax benefits, they are very different beyond that. The Industrial Airport area will be built using government funding, and it is not currently directly connected to the airfield, so it will function more as a logistics and manufacturing site. The Airport City area will take advantage of a large linear area of direct airfield access, so it will function as an aviation/aerospace support development.

The other difference between the two areas is the development model that each will most likely employ. In the case of the Industrial Airport section, it will probably continue as a governmentally funded development that will most likely require a strong marketing program and perhaps the support of real estate brokers in order to realize success. In the case of Airport City, because of the size, costs and complexity of the development, one or more "master developers" would be needed to see the project through to success.

9.3.1 Airport City Marketing Plan

The Airport City development shown in Figure 9-4 is intended to capitalize on and take advantage of the rapid aerospace and aviation growth in Brazil and Minas Gerais. The concept utilizes the synergies that can be found between the direct aviation/aerospace businesses on the airfield and the need to accommodate the numerous types of support businesses that will want to be in close proximity to them. The Airport City development concept is in direct alignment with an overall aerotropolis concept that has already been planned for the Belo Horizonte metropolitan region. Further, if successful, the Airport City at TNIA will be the first planned cluster of aviation and aviation support land uses to be developed in a focused and comprehensive way, in the entire country.

The marketing plan for the Airport City development would rely heavily on developing a Public/Private Partnership, (P3) with one or more "master developers". The primary need for the P3 would be to spread out the financial burden of the multi phased project in order to make it more financially feasible. It is recommended that the State government take responsibility for such items as; site leveling, internal roadway development, and provision of utility corridors. The master developer would then be responsible for; primary building construction, landscaping, central environmental areas, provision of final utilities, ongoing maintenance, tenant management, and a comprehensive marketing and branding program.



CH2M HILL	TANCREDO NEVES INTERNATIONAL AIRPORT	PHASES 1-3 AIRPORT CITY DEVELOPMENT	Exhibit 9-4

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The initial steps recommended in order for the project to move forward would be; 1) Completion of a detailed demand analysis using survey information augmented with face to face meetings with potential tenants; 2) Engage a master developer, and allow the master developer to produce a micro level implementation plan for approval. The plan would then be the basis for the contract agreement with the master developer.

Following are some basic guidelines that will be helpful in selecting and engaging a master developer.

Master Developer Guidelines

The State of Minas Gerais plans to develop an Industrial Airport and Airport City at TNIA to grow the economic viability of the Belo Horizonte region.

Minas Gerais plans to utilize a master developer to develop and lease facilities to the end users of the TNIA Industrial Airport. The Industrial Airport concept is a very new concept for Brazil and thus will require significant public/private cooperation.

The master developer will be responsible for managing the development and disposition of the site from initiation to final build out, overseeing site preparation and infrastructure development, financing, marketing, and asset management.

The master developer may or may not be involved in construction of buildings. In some cases it may simply lease improved building sites to other builders or developers.

At TNIA, where the land asset is owned by the government, the development will involve a public/private process. The role of master developer should be carried out with varying degrees of public sector participation.

The State will require a competitive bidding process of some kind before entering into contract with the private sector. Minas Gerais has several options for the competitive bidding process, which includes, but is not limited to the following:

- Request for Qualifications:

  The Request for Qualifications (RFQ) resulting in an Exclusive Negotiating Agreement (ENA) with a master developer is often the preferred approach, especially when there is substantial uncertainty regarding, conveyance terms, future development potential, or other aspects of project development. In the RFQ process, the key objective is to identify a qualified developer, and the details of the terms and development program are worked out later.

- Request for Proposal:

  The Request for Proposals (RFP) method of selection is generally found to be a valuable tool for eliciting a competitive price and business terms, and for establishing a process to evaluate qualitative factors that determine how successful the developer relationship will be. To attract high-quality responses, the RFP must offer substantial certainty regarding the parameters of development, including entitlements, and development costs.

  An effective RFP process offers an opportunity for the project to be shaped through discussion and refinement of terms prior to the submittal of final proposals. This offers

the additional benefit of providing a chance to evaluate how well the prospective developer would work with Minas Gerais.

A well-written RFP will also go a long way toward securing the desired terms and conditions for the transaction.

Responsiveness to Minas Gerais' Goals; In order to ensure that the realization of the development plan will meet the states goals, it must be clear from the outset that the master developer understands and is committed to the Minas Gerais' objectives for the Industrial Airport and Airport City. Whether these include creating new jobs, strengthening of the tax base, or the creation of a vibrant economy, their long-term fulfillment must begin with a firm understanding of these objectives and their incorporation in the master developer's approach to the project. This is especially true if the master developer will have a great deal of flexibility in adapting the plan over time.

Financial Capacity; When a significant motivation for involvement of the private sector is the need for funding, the financial capacity of the proposing group must be a key criterion. The financial capacity of the master developer may be critical to its ability to carry the project forward through business cycle fluctuations.

Development Experience; Demonstrated experience with the proposed land uses is often a selection criterion. However, many airports found that it was not as important as experience and expertise in development generally. General management skills and the ability to raise financing and acquire entitlements are as important to success as physical construction and marketing.

Public Involvement Skills; The successful master developer must be able to work well with and gain the trust of public sector staff and the community. This will be critically important in gaining support for revisions to the plan that may be required in order to respond to changing market conditions and other obstacles.

Responsibility for Selection Decision; Responsibility for selecting the master developer should fall on several parties in order to ensure an effective long-term outcome:

- SEDE management and its staff who will work directly with the selected developer should be a part of the decision. This will give them a first-hand chance to evaluate how well they would likely work together.
- Consultants or in-house experts should be brought in to assist in the comparative evaluation of the price offers and risk/reward trade-offs implicit in each of the developer responses. They can also provide independent review of the financial and market assumptions.
- Inclusion of some community representation on the selection committee is also appropriate and will assist in gaining community buy-in to the development plan.

Recommendation for phasing the master development program; After the master developer is selected, it is recommended that SEDE enter into a two phase agreement with the successful proposer. The first phase of the master developer contract would require them to conduct a detailed implementation plan that would lay out expectations, capital improvement investment levels, specific type of space and industries to be accommodated, take down schedule on the property and the mutual financial basis for the long term

agreement to develop the site. The second phase of the contracting phase would utilize the information and business terms in the implementation plan to form the basis of the long term agreement with the master developer.

Industrial Airport Marketing Plan:

The Industrial Airport sector at TNIA is located just north and east of the terminal 1 complex as shown in Figure 9-5. The first phase industrial airport is currently under construction, and has a listing of tenants that will be leasing space as soon as buildings are completed. As described in the previous section, the primary selling points for the Industrial Airport development are; 1) Its free trade zone reduced tax status for imports, exports and finished products, and 2) It offers high tech businesses that rely heavily on the logistical movement of goods a less expensive option than the current situation of storing goods long term in the Infraero cargo building. These two cost related benefits have and will continue to make the development a preferable location for businesses that rely heavily on logistics and movement of their goods.

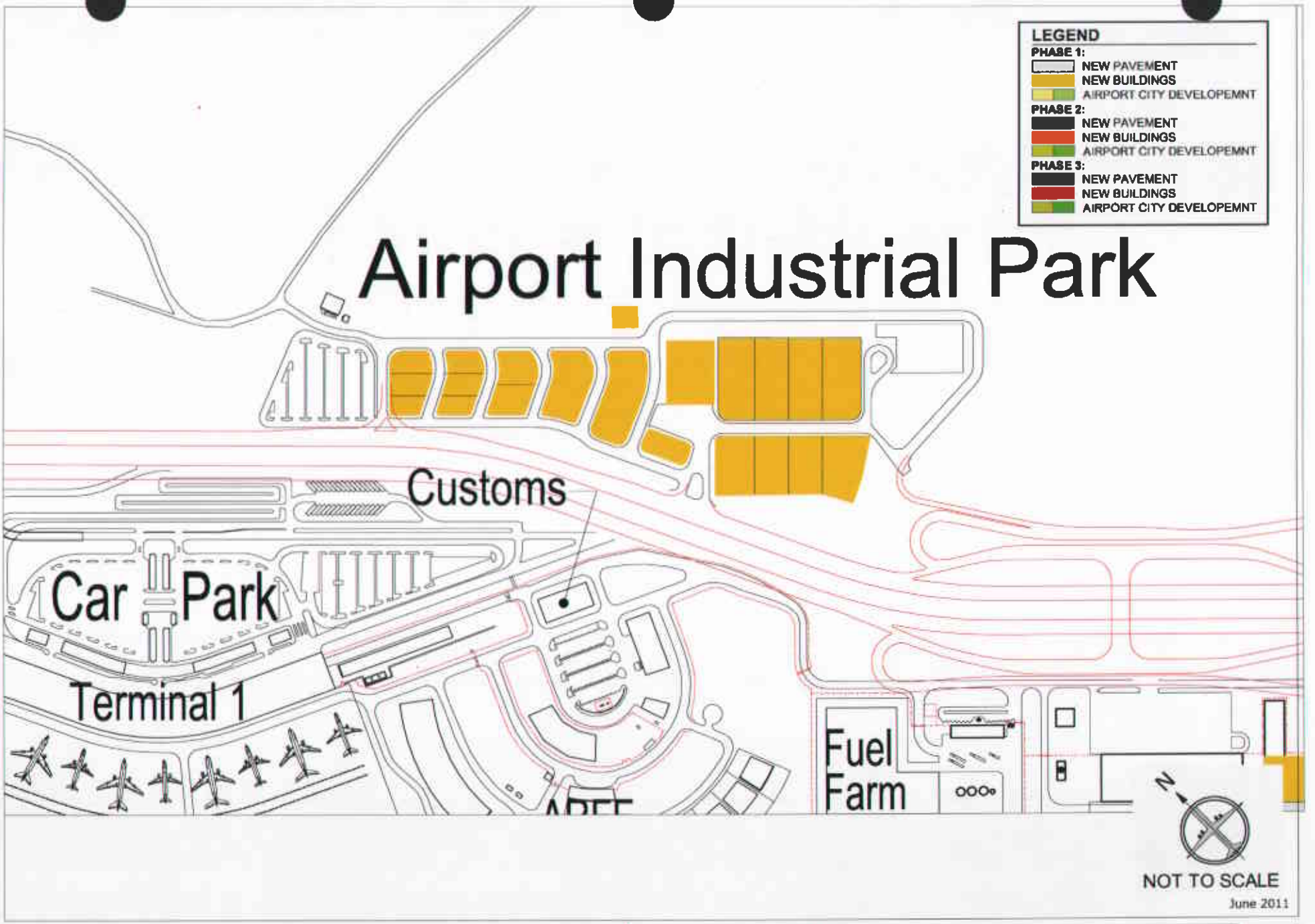
The development model being followed in the industrial airport sector is that of the State of Minas Gerais providing the funding for infrastructure and building construction, with the tenants signing building leases and providing their own fit out of the internal building space. This model will ultimately provide a high level of return on investment for the State Government, as long as demand for the building space remains relatively constant.

In order to ensure a high level of demand for building space a marketing plan is being proposed in this section. An additional recommendation is that the SEDE utilize a real estate Broker based marketing program to ensure a continued high level of demand. The following marketing plan and recommended steps is consistent with building strong brand awareness for the industrial airport sector, and utilizing commission based brokers to bring new leasing prospects to the State.

Industrial Airport Marketing Steps:

Step 1: Develop a website specifically for the Industrial Airport with information necessary to market its properties:

- Establish a registration process for potential customers by using the Registration Form
- Maintain a contact and potential customer file created by the on-line Registration Form
- Establish links to other relevant websites in the region
- Develop and update the Industrial Airport's contact information
- Include maps and documents as accessible website information
- Monitor the website for necessary information updates



CH2M HILL	TANCREDO NEVES INTERNATIONAL AIRPORT	INITIAL PHASE 1 DEVELOPMENT INDUSTRIAL DEVELOPMENT PLAN	Exhibit 9-5

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Step 2: Continually compile and update information for the website.

Step 3: Create an electronic newsletter to be distributed on a regular basis to inform the real estate brokers, developers and real estate agencies of available properties.

Step 4: Establish relationship with the real estate brokers and developers in the Belo Horizonte region.

- Establish a specific date to tour the Industrial Airport and announce the event to the real estate brokers and developers in the Belo Horizonte region.

Step 5: Continue to update the real estate broker and developer list and expand the list with additional contacts.

Step 6: Prepare articles and advertisements for the targeted periodicals and websites.

- Evaluate the results of the articles and advertisements and determine necessary changes

Step 7: Evaluate the results from articles and advertisements placed in targeted periodicals and websites. Determine the interest generated and make changes as appropriate in either the content of the articles or style of the advertisement.

Step 8: Join the relevant industry organizations as a group or with individual staff.

- After one year, determine feasibility of continuing membership with the organizations

Step 9: Physical improvements at the Industrial Airport

- Determine identifiable brand or moniker to be used for the Industrial Airport
- Create entryways based on and incorporating the identifiable brand or moniker.

Industrial Airport Marketing Plan Reference Material:

The following sections which are included in the report appendix are provided for reference and future use in executing a marketing plan for the industrial airport sector.

The Website Recommendation Section contains actual opportunities for listing properties available for leasing or development. The Section also provides opportunities for web links back to the Industrial Airport website. (The Website Recommendation section can be found in appendix A.

The Maps and Documents Section contains the printed version of all informational maps and relevant documents a potential site selector or developer may need to make a decision on the site. These will be made available by links to the Industrial Airport website. The files will be in PDF format to allow for easy replacement as new information is made available or as changes are made. (The Maps and Documents section can be found in appendix B.

The Real Estate Broker Commission Policy is the Industrial Airport policy for real estate broker participation in marketing properties and the resulting commissions for completed agreements. This will be included on the website via link once a potential client registers on the site. (The real estate broker commission policy can be found in Appendix C.

The Real Estate Broker List is an email listing of real estate brokers, mainly located in the Belo Horizonte region. The purpose of the list is to quickly disseminate information regarding the Industrial Airport for marketing purposes. An electronic newsletter will also be created to send announcements regarding special events at the Industrial Airport. (The Commercial Broker Listing document can be found in Appendix D.

The Commercial Real Estate Agencies Section includes those companies in the Belo Horizonte region that are considered leaders in commercial real estate marketing. These agencies will be sent the newsletters, announcements and special event notices that are sent to the real estate brokers on the list discussed above. (The commercial Real Estate Agencies Section can be found in Appendix E.

Also found in Appendix E is a proposed Broker Registration form. The Broker Registration form can be used to categorize broker interests, and to provide contact information for e-mails, newsletters and marketing mailings.

Aerospace/Aviation Marketing Plan:

The aerospace marketing plan will consist of strategic and tactical recommendations that have been previously mentioned in this section. This marketing plan is meant to be a comprehensive listing of all objectives, recommendations and action plans.

Strategic Goal:

Position TNIA as a long term preferred location for the establishment of aerospace and aviation industry business initiatives for both new business and for relocations.

The strategic goal will be realized through tactical improvement and innovation in the following areas; marketing/branding, establishing strategic relationships, market based incentive programs, staff requirements, capital improvements, focused training and education programs, and the ability to unilaterally develop the TNIA property.

Tactical Plan:

Marketing/branding; The TNIA brand needs further development, with a branding/logo for each area at the airport; i.e. the industrial airport and the airport city.

1. Theme related brands should be developed for each individual development area at TNIA.
2. Separate marketing packets should be developed and specifically tailored for each industry, i.e., MRO, Air Cargo, aviation component manufacturing, aircraft assembly, etc.
3. Develop a TNIA industrial development website. Through the electronic website data base, maintain a list of prospective customers; establish call back protocols; establish quick links to other Belo Horizonte organizations such as the visitors bureau and the chamber of commerce; establish a list of active brokers and potential master developers; establish a web based registration process
4. Strategic relationships; Long term strategic relationships need to be established with South American and North American aviation/aerospace site selection consultants. If necessary, SEDE should consider retaining a site selection consultant from both South

and North America to provide input on; levels of incentives required, site preparation needed, education and other workforce requirements, and the types of local businesses that would be required for support. STRATEGIC RELATIONSHIPS WITH THIRD PARTY LOGISTICS PROVIDERS. GAP ANALYSIS FOR THIRD PARTY LOGISTICS. PROVIDE PERIODIC FORUMS FOR AIR CARGO SHIPPERS/OPERATORS AND THIRD PARTY LOGISTICS PROVIDERS.

5. Market based incentive programs; The incentive programs offered to aerospace/aviation clients must be based on the financial realities of winning the business. To understand the level of local and state investment, the aviation/aerospace site selection consultants should be resourced for incentive benchmarks. It may be necessary to enact State legislation in order to bring the level of incentives to that which would be required to be successful in bringing in aerospace/aviation businesses.

Air Service Marketing Plan:

Air Service at TNIA is currently going through a significant modification. Annual growth rates are now double digit, and new service announcements are taking place on almost a daily basis. In the current growth climate, a marketing plan for TNIA seems to be without merit. However, there currently are air service city pair markets that are either underserved, or not served at all. The rapid expansion of airlines, airline fleets, and passenger demand in Brazil is a function of the overall economic growth in the country, and a growing middle class that is more and more mobile.

The significant growth curve being experienced in Brazil, and by association, TNIA should continue for at least the foreseeable future, and then begin to level off into a more predictable and manageable growth cycle. It is in the context of the longer term future, and the need to bring in service at underserved and unserved city pairs that a Marketing Plan is proposed for TNIA.

The air service Marketing Plan will recommend a step wise and logical approach for the long term benefit of TNIA. Additionally, the following air service Marketing Plan will include discreet recommendations for air cargo development. Wide body air cargo lift is considered to be one of the most immediate needs, with significant economic impact for the Belo Horizonte region. This belief was reinforced to the CH2M HILL team on numerous occasions during our industry interviews in Belo Horizonte this year.

Air Cargo Marketing Plan:

As previously mentioned, TNIA has immediate need for all cargo wide body cargo lift capacity. There is currently wide body passenger service to; Miami, Lisbon, and Panama City. This passenger service will be augmented by TAM airlines which will add service to Miami to complement that of American Airlines this fall. While wide body lift in passenger aircraft is important, dedicated wide body cargo lift is a pressing need.

In our discussions with the cargo business interests including those in need of lift capacity, it became very evident that wide body all cargo freighter service would begin to reverse the drive away cargo that typically leaves Belo Horizonte for Rio de Janiero and Sao Paulo. Further, an all cargo freighter could serve any major international hub such as; Miami, Dallas, New York, Houston, Madrid, Lisbon or London, and still provide the desired benefit. So from that standpoint, the location served is less important as the service itself. In

order to address the immediate needs of local shippers, scheduled all cargo wide body freighter service should be established in both the United States and Europe. This will give the current cargo shipping market in Belo Horizonte the needed access to their significant markets on both continents.

The air cargo marketing plan goal would be as follows; To establish scheduled all cargo wide body freighter service to international hub destinations in both the United States and Europe in the very near term.

Air Cargo Marketing Steps:

1. Conduct a comprehensive study to determine the amount, type and destination of drive away air cargo that both leaves and enters Belo Horizonte and Minas Gerais for Rio de Janiero and Sao Paulo to take advantage of the available inbound and outbound wide body cargo lift capacity in the larger markets. The information should be put in the context of market potential for use later in the marketing program.
2. Compile a list of all cargo freighter operators that currently operate between South America, the United States, and Europe.
3. Compile a list of third party air cargo logistics providers that are active in the Belo Horizonte, Rio de Janiero and Sao Paulo markets.
4. Begin a TNIA air cargo planning and development committee that will meet on a scheduled basis.
   - The committee should include; air cargo freighter operators, third party logistics providers, ground based cargo operators, local private sector industry representatives that ship goods internationally, and federal and state officials involved in TNIA air cargo marketing.
   - The information obtained with regard to drive away cargo will become the basis for the marketing program, and should be used to give all of the air cargo stakeholders a better understanding of the overall market potential.
5. Compile and categorize all air cargo market information. Develop marketing brochures and information packages that can be used for meetings with stakeholders, shippers and operators.
6. Set up the policy guidelines and administration for a market based incentive program for attracting and keeping all cargo wide body freighters for the long term at TNIA.
   - The administration should include the service desired, who would be eligible for both fuel tax and private sector fund incentives, how long the incentive will be in place, what level of incentives will be offered and for what service activity, and a means of collecting, disbursing and accounting for any private sector money to be used to incentivize air cargo operations.
   - With input from the air cargo planning and development committee, set the overall parameters for both the fuel tax, and private sector fund incentive programs.
7. Develop a market based incentive program that can be used to attract and keep all cargo wide body freighters at TNIA.

- The incentive program should take advantage of both the State fuel tax incentive and also include a private sector incentive fund.
- Utilize the air cargo planning and development committee to find those private sector industries that would benefit from improved and less expensive air cargo service. Those companies should have an interest in providing funding for the private sector air cargo incentive fund.
- The incentive program funds should be used only for those carriers that meet the basic goal of nonstop scheduled wide body all cargo service to an international hub in the United States and/or Europe.

8. Monitor and track the air cargo statistics and incentive programs for effectiveness and make modifications to the programs as necessary to keep the program in the forefront of bringing in new and improved air cargo freighter service to TNIA.

Air Service Marketing Plan:

As previously discussed, TNIA is currently going through a significant upward growth curve in terms of passengers and city pair service improvements. These changes are due primarily to an expanding economy that is driven by an expanding middle class. This expanding middle class is increasingly choosing air travel over rail and bus service, due to the fact that the price points for these competing forms of transportation are in many cases almost equal.

It is expected that this significant growth curve will slowly level off as the Brazilian aviation market moves toward maturity over the short term. It is the opinion of CH2M HILL that the most opportune time to develop a more comprehensive air service marketing program is right now. The access to aviation travel by the new emerging middle class, creates new service options to international destinations in; South America, Central America, North America and Europe, which are much more viable now than they were even a few years ago. Because of this, even greater service benefits can be realized right now with the implementation of a comprehensive air service development program. At this point in time, almost all North American and European legacy and charter carriers are watching the Brazilian market very closely.

Background:

The air service market at TNIA is composed of numerous components that add up to the whole of total annual passengers served. These components can be seen to be layered on top of each other, with critical mass synergistic positive effects of one upon the others. The components that must be considered in developing a marketing plan for air service at TNIA are; Minas Gerais originating and destination traffic that is currently going directly to Rio de Janiero or Sao Paulo for South American, Central American, North American, European, Asian, or other international connections without passing through TNIA; Belo Horizonte originating and destination traffic that is currently going directly to Rio de Janiero or Sao Paulo for South American, Central American, North American, European, Asian, or other international connections without using the direct international service offered at TNIA; and an understanding of how domestic service at Pampulia combined with that of TNIA offers Belo Horizonte an adequate service level to the most possible nonstop city pair destinations within Brazil.

In analyzing these various air service components, we can begin to establish a hierarchy of air service needs that would begin to reverse the market leakage that is currently taking place regarding TNIA. The priority listing of the most important air service development goals is difficult in that all of the listed goals would serve to reverse market leakage from TNIA. Without significant analysis, it is very difficult to say definitively what the priorities should be. But, a comprehensive air service marketing program should be based on solid statistics, and a strategic set of priorities. Otherwise, the entire program, and more importantly, the incentive program will suffer from a lack of strategic focus.

For the purpose of discussion, the following prioritization is proposed:

1. Establishment of additional non-stop international service to currently UN served primary hubs in; the United States, Europe and Asia.
2. Establishment of additional non-stop international service to currently UN served primary hubs in; South and Central America.
3. Establishment of additional non-stop city pair destinations from TNIA to un-served or underserved cities in Brazil.
4. Establish TNIA as the primary domestic and international connecting hub for all commercial service airports in the state of Minas Gerais.

All of the above service improvements would serve to reverse current air travel market leakage that is taking place today from TNIA. **Note: The final establishment of numeric priorities for TNIA air service development should be done under the auspices of an overall "strategic plan".**

In addressing the air service development priorities, it is very important to work from an ongoing and continually updated set of service level statistics. These statistics should be verifiable as valid, and should be tracked in the long term to monitor program efficiency and success. A short list of statistics that should be considered for long term analysis and tracking are:

1. The top 20 domestic Brazilian city pair destinations from and to TNIA
2. The top 20 international city pair destinations from and to TNIA from South and Central America
3. The top 20 international city pair destinations from and to TNIA from the US, Europe and Asia
4. The top 20 international destinations from Brazil
5. A verifiable O and D survey to the top 50 destinations from TNIA. (Note; this will provide actual originating and destination information for a sampling of actual passengers.)

The benefit of having the top 50 or so true Originating and Destinating cities from and to TNIA can be seen by the imperfections of the existing data. Example; Miami is one of the top 4 TNIA passenger destinations; however, without an O and D survey, it is hard to tell how many passengers are destined for Miami, versus those that are connecting in Miami to fly to other destinations.

The compilation and analysis of verifiable air service data is essential to having an effective and focused air service development program. This information will also be helpful in establishing solid market potential information for meetings with prospective airlines.

An example of valuable market data found in the Changi Airport Consultants report on TNIA, is as follows:

Top 10 O-D Domestic Cities served through TNIA, passengers, January-June, 2009

1.	Sao Paulo	CGH	388,674
2.	Brasilia	BSB	112,361
3.	Rio De Janiero	GIG	111,970
4.	Sao Paulo	GRU	96,556
5.	Vitoria	VIX	77,665
6.	Curitiba	CWB	54,402
7.	Campinas	CPQ	52,012
8.	Salvador	SSA	50,822
9.	Ilheus	IOS	41,586
10.	Rio De Janiero	SDU	33,653

Top 10 O-D International Cities served through TNIA, passengers, calendar year 2008

1.	Buenos Aires	EZE	53,952
2.	Lisbon	LIS	48,548
3.	New York	JFK	38,548
4.	Miami	MIA	30,993
5.	Paris	CDG	23,098
6.	London	IHR	15,413
7.	Boston	BOS	14,427
8.	Milan	XP	10,749
9.	Santiago	SCI	10,420
10.	Rome	FCO	7,725

Top 9 O-D South American Countries served through TNIA, passengers calendar year 2008

1.	Argentina	59,995
2.	Chile	11,698
3.	Peru	3,237
4.	Uruguay	2,494

5.	Venezuela	2,207
6.	Colombia	2,204
7.	Ecuador	1,083
8.	Paraguay	1,035
9.	Bolivia	406

As previously pointed out, the above data should be verified to make sure that it has taken into account all traffic bound for the above destinations from both TNIA and Pamphulia, and that all other market leakage data are validated before establishing a true Belo Horizonte market potential statistic.

Top 10 Sources of Brazilian Tourism Traffic in 2007 (source Ebratur annual report 2008)

1.	Argentina	920,210
2.	USA	699,169
3.	Portugal	280,438
4.	Italy	268,685
5.	Chile	260,430
6.	Germany	257,719
7.	France	254,367
8.	Uruguay	226,111
9.	Spain	216,373
10.	Paraguay	206,323

From the above compiled list of overall Brazilian Tourism data, some strategic decisions may be made with regard to which countries, and potentially which airlines might be interested in serving TNIA.

Air Service Marketing Program Components:

The primary components of a solid and effective air service marketing program are the same for most all commercial service airports, including TNIA. The primary components are as follows:

1. A dedicated full time air service development staff.
2. A dedicated full time research and statistical analysis staff within the air service department
3. An air service strategic plan that sets policy, goals and priorities for the department
4. A sophisticated air service marketing program that can meet with airlines continually and offer the right information in a format that will help them make their market based decisions.
5. A market based incentive program that will offer TNIA a competitive edge for air service improvements

6. An airport management function that is closely tied to the air service development function, and can move quickly to effect facility modifications that would be required to accommodate airlines operational start up and growth needs

The primary air service marketing program components are centered on best management practices, and are handled in a similar way throughout much of the world. A further explanation of the primary marketing program components is as follows;

- A dedicated full time air service development staff that is capable of producing meaningful research and analysis and marketing materials can be handled in a variety of ways. At many smaller airports, staffing of the air service development function can be handled by augmenting staff with an air service consultant. At larger airports, usually this function is handled by full time staff.
- An air service strategic plan that is approved at the policy making level of the organization is imperative. The approved strategic plan will; allow for a solid continual focus for the program; ensures that the incentive program is transparent and consistent for all airlines; defines type, magnitude and length of incentives to be offered; establishes the priorities of the air service development program; establish goals, and sets up a performance management system that ensures that the program is on track and meeting expectations. **Example: The strategic plan would have identified the highest priority for air service at TNIA as being the establishment of direct service to an additional international hub in the U.S., Europe or Asia. The strategic plan would identify the current top 10 international city pairs, (by passenger volume) with TNIA, as depicted in the previous table. The strategic plan would then develop the types, magnitude and length of incentives to be offered to airlines that would serve the top 10 potential destinations. And finally, the plan would define which carriers would be the most logical target to approach, for instance; Delta airlines for New York and Boston, Air France for Paris, British Airways for London, Alitalia for Rome. The plan would define what type of statistical and marketing information would be required for each marketing meeting, and which international meetings are the most beneficial.**
- The sophisticated airport marketing function goes together with the airport management function. The airport marketing group will be marketing facilities and operational space at TNIA for new and upgraded air service. It is imperative that the facilities and space can be modified and set up to meet the airline needs, in a time frame that offers the airline a market advantage over their competitors. It is therefore imperative that airport marketing and airport management work together closely in air service development.
- Consider the South American markets that are currently in the top 10 or top 20 Originating and Destination markets for TNIA. New and improved international service to Argentina and Chile represent high annual passenger numbers, and should be considered "low hanging fruit" for establishing and improving air service in the very short term.

<u>Air Service Marketing Plan Steps:</u>

1. Develop a comprehensive Air Service Strategic Plan for TNIA. The plan should be approved at the policy making level, and include at a minimum; staffing and resources,

recommend resources and tools for establishing research and analysis function, recommend air service development priorities and priority markets, recommend a comprehensive market based incentive program, recommend incentive priorities and type, magnitude and length of incentives, recommend a detailed marketing implementation plan, recommend a method for performance management that measures program effectiveness.

2. Implement staffing and set up for the air service development department in accordance with the strategic plan.
3. Implement hardware/software and tools needed to manage the research and statistical analysis function in accordance with the strategic plan.
4. Develop a comprehensive market based incentive program to include at a minimum the State aviation fuel sales tax incentive, and a privately funded and administered incentive program. The incentive program should be approved at the policy making level, and should include; types, magnitude of incentives and time frame for the incentives. The incentive types, magnitudes and time frames should be based on the air service priorities established in the strategic plan.
5. Implement the comprehensive TNIA air service development program utilizing; dedicated staff, statistical analysis, prioritized incentive programs, targeted marketing statistics and information, target market meetings, and close coordination with airport management.
6. Develop a tracking and performance management program for the TNIA air service development program to ensure; proper and transparent use of incentives, program effectiveness, and the need to make changes and modifications over time to the strategic air service plan.

Summary of Primary Recommendations for Task 9: Non Aviation/Aviation Industrial Plan

Land and Industrial development:

General

- Adopt and follow the land development guiding principles as detailed in this report.
- Develop and approve an overall land development strategic plan that will cover policy issues such as; Public private partnership guidelines and limits, master developer policy, broker policy, return on public investment, consultant policy, etc.
- Develop a professional meeting calendar for; the development community, the commercial finance community, master developers and real estate brokers

Aerospace and Aviation

- Follow the steps in the aerospace and aviation marketing plan in this report.
- Develop an annual professional aerospace and aviation meeting calendar that will bring international aerospace companies, site locator consultants, the MRO industry, and local industry representatives together in Minas Gerais.
- Consider retaining an aerospace site locator consultant to develop a market based aerospace strategy.

Airport City and Industrial Airport

- Develop a site specific plan for the Airport City development that will take into account; terrain, development costs, public/private partnership requirements, master developer considerations, demand forecasts by use category, and build out projections.
- Follow the steps in the Airport City and Industrial Airport marketing plans in this report.
- Develop a quarterly meeting schedule for an air cargo planning and development committee. This committee should include representatives from targeted industries such as; high tech electronics, and bio technology industries that utilize TNIA for cargo shipping. The committee should also include all cargo interests such as; airlines, all cargo airlines, large shippers, third party logistics providers, Ceasa, cold storage providers, truckers, bonded truckers, cargo building operators, etc.

Air Service Development:

Airline service

- Follow the steps outlined in the air service marketing plan.
- Develop a comprehensive air service strategic plan as described in the air service marketing section of this report.
- Develop policy level air service priorities that will begin to slow down the passenger market leakage that is now going to Rio De Janiero and Sao Paulo.
- As described in the air service marketing plan, develop a market based incentive program that will give TNIA and Belo Horizonte a competitive advantage for developing air service in Brazil.
- Consider a State of Minas Gerais incentive and marketing program that will bring Brazilian and International connecting traffic from the smaller airports in the State to TNIA rather than Rio de Janiero and Sao Paulo.
- In developing strategic air service priorities, look at the potential "low hanging fruit" for improved service to Argentina, Chile and any other South American International markets that are in TNIA's top 10 markets.

Air cargo service

- Follow the steps outlined in the air cargo marketing plan in this report.
- Develop a market based incentive program for direct international all cargo wide body carriers.
- Develop an air cargo planning and development committee comprised of all air cargo stakeholders as described previously.

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Appendix A

Website Recommendations

1. Develop a website to promote the Industrial Airport leasing and development opportunities.
2. Dedicate a section of the Industrial Airport website to include the following topics :

Corporate Relocation Information

- Regional overview
- Business environment
- Local work force
- Training and education
- Community analysis
- Virtual Library
  - Regional overview
  - Population
  - Income
  - Education
  - Labor, work force and wages
  - Cost of living

3. Add links to various websites providing and accessing demographics and general information.
   - www.desenvolvimento.mg.gov.br

     This link provides the following topics and related information regarding the State of Minas Gerais:
     - Financial support for companies locating in Minas Gerais
     - Operational System for Economic Development
     - Business Statistical Information
     - Government Rankings
     - Incentives (definitions of incentives, State and local)
   - www.exportaminas.mr.gov.br
   - www.turismo.mg.gov.br
4. Website Information Access
   - Establish a two tier system for information access

A. Tier One includes the following general information:

- Contact information for the Industrial Airport

  Name:_____
  Project Manager:_____
  Phone Number:_____
  Email:_____

  Mailing Address:
  Tancredo Neves International Airport
  _____
  _____
  _____

  Physical Address:
  _____
  _____
  _____

- Allowable uses of Industrial Airport properties.

  SEDE controls approximately _____ acres at the Industrial Airport.

  The allowable uses at the Industrial Airport include Hotels, Light Industrial, Retail/Service, Office, and Aviation Support.

- Links to Demographics, general City information (discussed under #2 above)

General City Information

- The City of Belo Horizonte

  Belo Horizonte is the capital of the state of Minas Gerais, located in the southeastern region of Brazil. It is the third-largest metropolitan area in the country. Belo Horizonte has a population of over 2.4 million, or almost 5.4 million in the official Metropolitan Area.

- Economy

  The Belo Horizonte economy is very much in tune with the major trends in the global market. Belo Horizonte is transforming the regional economy by generating new opportunities for its very active service sector.

  Currently, the service sector is responsible for more than 85 percent of the city's Gross Domestic Product (GDP), with the industrial sector making up almost all of the remaining 15 percent.

  Belo Horizonte is recognized for the technical excellence and knowledge of its institutions. As the capital of Minas Gerais, the city receives government and private resources, which has enabled it to become a hub of economic diversification.

  The Information Technology and Biotechnology sectors continue to experience rapid growth due to the cooperation between the private industry and the knowledge-based

institutions, including universities and institutes, associated with the municipal and state government sectors.

Especially important is the support given by the Belo Horizonte Municipal Government, through the incubators of technology of Furnsoft and Biominas. In operation since 1997, these incubators are a national reference as generators of successful companies and of jobs. The Belo Horizonte region is home to 16 percent of the country's biotechnology companies, with annual sales of over R$ 550 million.

Also, the Information sector has been growing local jobs at an annual rate of above 50 percent.

Finally, a move towards business tourism has transformed the Belo Horizonte into a national hub for this segment of the tourist industry. More than 3,000 national and international events are held each year. Modern, comfortable and well-structured space for fairs, congresses, cultural and sporting events provide excellent accommodation for business travelers.

- Educational institutions

  Several higher education institutions are located in Belo Horizonte which provide an excellent pool of well educated employees for area employers. These institutions including:

  - Universidade Federal de Minas Gerais (UFMG)
  - Pontifícia Universidade Católica de Minas Gerais (PUC-MG)
  - Centro Universitário de Belo Horizonte (UNI-BH)
  - Universidade do Estado de Minas Gerais (UEMG)
  - Centro Universitário (UNA)
  - Universidade FUMEC (FUMEC)
  - Universidade José do Rosário Vellano (UNIFENAS)
  - Centro Universitário Newton Paiva
  - Centro Federal de Educação Tecnológica de Minas Gerais (CEFET-MG)

- Transportation

  The transportation system in the Belo Horizonte region is well developed and very efficient. It includes airports, highways, as well as local transit operations.

- Airport

  Tancredo Neves International Airport (TNIA) is located in the municipalities of Lagoa Santa and Confins, 38 km (23 miles) from Belo Horizonte, and was opened in January 1984. Plans for expansion to meet growing demand is currently in progress at TNIA. TNIA has one of the lowest rates of shutdown for bad weather in Brazil. It ran at limited capacity until 2005, when a large proportion of the area's second airport (Pampulha Airport) air traffic was transferred to TNIA.

- Highways

The Belo Horizonte is connected to the rest of Minas Gerais and the country by a number of roadways. Minas Gerais has the country's largest federal highway network.

- BR-040 connects Belo Horizonte to Rio de Janeiro (going south) and Brasília (going northwest). It also links other cities in the state, such as Juiz de Fora, Conselheiro Lafaiete, Santos Dumont, Sete Lagoas, and Paracatu.
- BR-262 begins in Mato Grosso do Sul and ends in Espírito Santo, crossing Minas Gerais from west to east. It links Belo Horizonte to Pará de Minas, Araxá, Manhuaçu, Uberaba, and Vitória, the capital of Espírito Santo state.
- BR-381 is an important federal highway. It connects Belo Horizonte to São Paulo.
- MG-010 is a state highway that connects the capital to the Tancredo Neves International Airport, itself located in the municipalities of Confins and Lagoa Santa, which are part of the metropolitan area of Belo Horizonte. Starting in 2005, several flights were transferred from the Pampulha Regional Airport to the international airport. To improve access to the international airport, MG-010 is being expanded (effectively duplicating its lanes).

Belo Horizonte is also served by other minor roads such as state highways MG-020, MG-050, MG-030, and MG-433. There is also an East-West Express Way, which goes from Belo Horizonte to the nearby industrial centers of Contagem and Betim (together having a population of 900,000, and Anel Rodoviário, a kind of beltway that connects many highways.

- Bus system

  The bus system has a large number of bus lines going through all parts in the city, and is administrated by BHTRANS. Among the upcoming projects are the expansion of the integration between bus lines and the metro, with integrated stations, many already in use. And the expansion of bus corridors, with lanes and bus stops exclusively for the bus lines, keeping buses from traffic congestion, and making the trips more viable for commuters.

- Metro

  Belo Horizonte Metro or MetroBH started operating at the end of 1970s. There is one line, with 19 stations, from Vilarinho to Eldorado Station, in Contagem.

- Quality of Life and Culture

  Belo Horizonte is home to many cultural and sports events which add significantly to the region's quality of life. These events include but are not limited to the following:

  - Music

    Clube da Esquina is a musical movement that originated in the mid 1960s, and since that time their members have been considered influential in Minas Gerais culture and have important artists such as Tavinho Moura, Wagner Tiso, Milton Nascimento, Lô Borges, Beto Guedes, Flávio Venturini, Toninho Horta, Márcio Borges, Fernando Brant and 14 Bis, among others.

The band Uakti is known for their own musical instruments using materials like PVC, wood, metals and glass. The origin of their name is based in a myth by the Tukano Indians, and reflects the indigenous feeling present in their works.

- Museums

  Belo Horizonte has a number of museums, among them: Mineiro Museum, Abílio Barreto Historic Museum, Arts and Workmanship Museum, Natural History Museum and the UFMG Botanic Gardens, Telephone Museum, Pampulha Art Museum, Mineralogy Museum Prof. Taylor Gramke, and the UFMG Conservatory.

- Theater

  The International Theater Festival of Belo Horizonte attracts artists from all over Brazil and as well as many parts of the world.

  Also, every two years, the Belo Horizonte City Hall, through the Municipal Culture Office and the Association Movimento Teatro de Grupo of Minas Gerais sponsors a local production that includes street and stage shows as well as seminars, workshops, courses, talks, etc.

- Dance

  Several notable artistic groups originated in Belo Horizonte. Grupo Corpo, which is perhaps the most famous contemporary dance group in the Brazil, was formed in the city in 1975. In March and April of each year the performance program from FID promotes contemporary dance in Belo Horizonte.

- Food and drink

  The regional food and the "Cachaça", international drink from the State of Minas Gerais are the most popular and top rated of Belo Horizonte. Belo Horizonte hosts the "Comida di Buteco" festival, in which a panel selects 31 bars to judge which bar makes the best appetizers.

- Sports

  As in the rest of Brazil, football is the most popular sport among Belo Horizonte residents. Belo Horizonte has two of the most successful teams in the country, and the city also has one of the biggest football stadiums in the world, the Mineirão, opened in 1965. The older Independência Stadium hosted a legendary victory of the United States World Cup Team 1950 in a 1-0 triumph over England.

  Belo Horizonte is one of the host cities of the 2014 FIFA World Cup, for which Brazil is the host nation.

  Besides football, Belo Horizonte has one of the largest attendances at volleyball matches in the whole country.

A. Tier Two accesses the following types of information and maps (all maps are included in the Maps and Documents section):

   - Aerial and Boundary Maps
   - Environmental information and maps
   - Land use and zoning

Broker Registration Form

Registration Information:

Name: _____

Title: _____

Company: _____

Address 1: _____

Address 2: _____

City: _____

State: _____

Zip Code: _____

Country: _____

Telephone: _____

Fax: _____

Email: _____

In which kind of space are you interested:

_____ Office

_____ Manufacturing

_____ Warehouse Distribution

_____ Land

Building or Land Size: _____

Project Timetable:

_____ Immediate

_____ 12 Months

_____ 24 Months

_____ 36 Months

_____ Future Interest

Type of Business? (Check one category only):

_____ Manufacturing

_____ Transportation, Distribution & Warehouse

_____ Business Services

I would like to receive the Industrial Airport electronic updates of available properties:

_____ Yes

_____ No

How did you hear about us?

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Appendix B

Maps and Documents

These maps and documents will be PDF Files.

Maps	File Name
General Location Map identifying the location of Belo Horizonte	Belo Horizonte City Map
Aerial Map of TNIA	TNIA Airport Map
Aerial Map identifying the Industrial Airport boundaries	Industrial Airport Map
Proposed types of development and locations at the Industrial Airport	Industrial Airport Proposed Development
TNIA existing noise contours	TNIA Existing Noise
TNIA future noise contours	TNIA Future Noise

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Appendix C

Industrial Airport/Airport City

Real Estate Broker Commission Policy

Purpose

The purpose of this policy is to set forth the Industrial Airport's procedure regarding the payment of real estate broker commissions and to encourage broker participation in the leasing of property under control of SEDE.

Policy Scope

This policy applies to the payment of commissions on selected properties to eligible brokers who successfully procure tenants for the Industrial Airport.

Definitions

Affiliated Broker: A broker is "affiliated" with the prospect when the individual or firm has an ownership interest in the Prospect or is paid a commission or finder's fee by the Prospect. An Affiliated Broker is not eligible for a commission from the Industrial Airport.

Eligible Broker: An Eligible Broker is an individual or a firm that normally acts as an intermediary for negotiating contracts for facility rentals. An Eligible Broker must be a licensed real estate professional and accepts the Industrial Airport's terms and conditions contained in this policy, and present to the Industrial Airport, a Notice of Prospect, (see Exhibit A), stating in writing that the individual or firm has a Prospect, and obtain the signature of the Prospect acknowledging same. The Industrial Airport management must receive, and acknowledge by executing and returning the Notice of Prospect, prior to an individual or firm being declared an Eligible Broker.

The Industrial Airport's management reserves the right to reject the conferral of Eligible Broker status to any individual or firm, which in their judgment is not qualified to represent a Prospect's interest or to negotiate a lease, contract, or agreement with the Industrial Airport.

Gross Rentals: For the purpose of this policy, Gross Rentals shall mean the aggregate amount of base rent or minimum rent paid to the Industrial Airport on a monthly basis. Gross Rentals shall not include percentage rent, adjustments to rent, sales tax, maintenance charges, utility fees, or any other non-applicable payments. Gross Rentals shall not include rent accrued, but not received by the Industrial Airport.

Prospect: Prospect shall mean, any individual, firm, or other legal entity who has engaged an Eligible Broker to represent them in negotiations that are covered within the scope of this policy. A Prospect must sign the Notice of Prospect to be acknowledged as such by the Industrial Airport management. Within the context of the policy, a Prospect may also mean a tenant which has executed a lease with the Industrial Airport, and a commission has been paid in conjunction with the lease.

Operating Procedures

1. A prospective Eligible Broker shall, prior to the commencement of negotiations between the Industrial Airport and the Prospect, register the Prospect by submitting a notice to the Industrial Airport in substantially the form attached here to as "Exhibit A: Notice of Prospect". The Industrial Airport management shall sign and return the Notice of Prospect. Management's execution of the Notice of Prospect shall be evidence of conferral of Eligible Broker status on the individual or firm submitting the same.
2. The Eligible Broker shall initiate negotiations between the Industrial Airport and Prospect and maintain an active and continuing role in communications between the parties during negotiations.
3. Negotiations must be completed and an agreement approved and signed by the Industrial Airport and the Prospect within 6 months of receipt of the Notice of Prospect. This provision may be extended by the Industrial Airport, if in its sole judgment; negotiations have been delayed through no fault of the Prospect or the Eligible Broker.
4. The Industrial Airport management shall determine the amount of commission payable on the following basis:
    * 6 percent of Gross Rentals for the first year, plus 5 percent of the Gross Rentals for the second through the fifth year. No commission shall be payable from rent beyond five years. Commission shall be payable on a quarterly basis.
5. If the Prospect defaults on the lease, a commission will not be paid on any monies retained by the Industrial Airport in the form of a deposit of performance bond, or any awards obtained through litigation.
6. No additional commission will be paid to the Eligible Broker when a Prospect chooses to lease additional property after the initial agreement has been executed.

Industrial Airport's Responsibilities

1. The Industrial Airport, at its sole discretion shall determine what property may be eligible for lease by an Eligible Broker.
2. The Industrial Airport reserves the right to solicit and award exclusive listings for any particular property.
3. The Industrial Airport has the right to accept or reject any offers to lease and no commissions will be paid on a transaction which has been rejected.
4. All leases, contracts, or agreements will be prepared in a form, and on terms and conditions acceptable to the Industrial Airport, and shall be binding until executed by management. No Eligible Broker, or any other party has authority to execute a lease, contract, or agreement on behalf of the Industrial Airport.

NOTICE OF PROSPECT

Industrial Airport
Attention:_____
Address:_____
_____
_____

In accordance with the Industrial Airport's Real Estate Broker Commission Policy (Policy), _____ **(Individual or firm's name)** wishes to submit that the undersigned is/are representing the following Prospect(s) and leasehold areas:

Prospect	**Leasehold Areas/Facilities**
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____

I acknowledge the consent of the above Prospect(s) to negotiate with the Industrial Airport on their behalf, and wish to apply for Eligible Broker status with the Industrial Airport.

I understand that this is an open listing and that the Industrial Airport reserves the right to lease the property itself or through any other Broker without payment of any commission to use.

I acknowledge that I have received a read a copy of the Policy, and understand and agree to all its terms and conditions.

The above named Prospect(s) shall hereafter be considered acknowledged as such by the Industrial Airport with the meaning of the Policy upon signature by the Industrial Airport management. The Eligible Broker will have a right to receive commissions upon the execution of a lease with the Prospect within 180 days of the date of this Notice of Prospect, unless extended by written notice from the Industrial Airport.

The Policy and the Notice of Prospect contain the entire agreement between the Industrial Airport and the Eligible Broker relating to the subject hereof, and no other agreements or understandings relating to this subject exist between the Industrial Airport and Eligible Broker.

_____
Name of Eligible Broker
By:_____
Print name:_____
Title:_____
Date:_____

FOR THIS NOTICE OF PROSPECT TO BE VALID, IT MUST BE COUNTERSIGNED IN THE SPACE PROVIDED BELOW BY EACH OF THE PROSPECT(S) IDENTIFIED ABOVE, AND THE INDUSTRIAL AIRPORT.

Prospect(s):

_____
Name of Prospect
By:_____
Print name:_____
Title:_____
Date:_____

_____
Name of Prospect
By:_____
Print name:_____
Title:_____
Date:_____

_____
Name of Prospect
By:_____
Print name:_____
Title:_____
Date:_____

Acknowledged by:

_____
Name of the Industrial Airport's Representative
Title:_____
Date:_____

Appendix D

Real Estate Broker Contact Listing

Broker	Contact

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Appendix E

Commercial Real Estate Agencies

Business	Address	Phone	Fax	Website	Services

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CHAPTER 10

Financial Analysis and Investment Alternatives

CHAPTER 10

Financial Analysis, Business Plan and Investment Alternatives

The financial analysis presented in this Chapter is tied to the recommended long-term airport development plan presented in this report with various possible methods of private sector participation that could potentially finance the planned improvements.

Given the fact that the CH2M HILL Project Team had no access to Infraero Financial Statements or to TNIA current airport operating parameters or operating costs, it was necessary to use inputs into this financial model based on our experience and on operational parameters at airports similar in size to TNIA. As such, this financial plan is conceptual in nature as it was constructed based on our experience at other privately managed international airports.

With the above noted limitations of available data from Infraero, the financial analysis presented herein does not intend to simulate the current or future operations of TNIA under Infraero management but rather represents a conceptual financial model based on our experience at similar airports and on best international practices for private-sector managed airports.

10.1 Financial Plan Goal

This financial plan is intended to give a future potential airport operator an understanding of the potential stand-alone financial capabilities of TNIA. Additionally this analysis is intended to identify which, if any private sector participation models might be successful at TNIA, should the government decide to investigate those options.

This section then will analyze the financial implications of the proposed capital development costs by phase, and develop a conceptual financial plan that could conceptually at least, be implemented by a private airport operator.

10.2 Task Work Plan

The work plan for this Conceptual Financial Plan represents a logical process for accomplishing the above stated goal. The important steps in this process were as follows:

- conduct interviews and gather data from the legal, financial and managerial interests involved with TNIA
- develop several privatization concepts that may work for TNIA
- develop management best practices that will allow the airport to operate more efficiently as a business
- using the phased capital development plan for TNIA, develop a financial plan that defined how the capital improvement program can be implemented

This business plan focused on improving the commercial value of TNIA, so that the airport may ultimately operate in a financially self sufficient manner. Since the airport is currently under the control of Infraero, certain assumptions regarding which business improvements might be applicable in the case of TNIA will be made.

In May of 2010 the project team was in Belo Horizonte to gather the pertinent background data for this task. The background information that has been compiled is grouped in the following format; legal environment, financial, and managerial.

An analysis of the current legal environment in Brazil was made. By this analysis, the options and legal requirements that will impact commercialization, private sector involvement, and public finance will be better understood. The findings of this analysis were used in developing several commercialization and private participation options that were developed as a part of this conceptual plan.

The international and Brazilian finance sector has been contacted as part of this task. Information regarding levels of private participation, willingness to participate in public infrastructure projects and the procurement of equipment, and any impediments to participation were discussed. This information was used to formulate the private participation options developed as part of this plan.

Airport management considerations were also analyzed and documented as part of this project. International airport operators were contacted to determine the level of interest in any potential future privatizations. Additionally, a full analysis of the current Infraero structure was made from the perspective of delivering capital projects, and operating the airport as a standalone business entity. As a result of these analyses, recommendations are made regarding airport management best practices, and ways in which TNIA may operate as a standalone business entity in the future.

10.3 Legal Environment

This legal analysis is meant to acquaint the reader with the current regulatory environment that governs airports and their development in Brazil. This listing is not in any way intended to capture all laws and public policy dealing with airports, but rather it is a listing of just those laws that may govern, or regulate commercial development activity at TNIA.

1. Federal Law; 5,862 -1972 Created Infraero, to; Implement, operate and explore industrially and commercially airport infrastructure. Today, this applies to the top 67 airports in Brazil by passenger count. TNIA is one of the 67 airports currently under the care and control of Infraero. In 1972 when this law was enacted, it was decided that the Federal government would place Infraero under the Minister of Defense and more specifically, under the Air Force Commander Aeronautica. The current Federal organization dealing directly with the 67 largest civil airports is as follows, in descending order:
   - Minister of Defense, (cabinet level policy)
   - ANAC, (aviation policy, economic regulation, technology)
   - Air Force Commander Aeronautica, (airport and airspace operations)

- Infraero, (operations and management for top 67 airports)

Note: Newly elected president Dilma has made a proposal to add a minister of transportation to her cabinet. If this is enacted, ANAC and Infraero will no longer come under the military, but will now answer to a cabinet level civilian manager.

2. Federal Law; 6,009 -1973; established the Federal Government as being responsible for establishing Tariffs at the Infraero airports. This responsibility has since been delegated to ANAC.
3. Federal Law; 7,565 -1986; Brazilian code for aeronautics; article 36 states; Public Aerodromes will be built, maintained, and operated through and directly by the Federal Government, through specialized companies of the government, or indirectly by concession.
4. Article 21 to the Federal Constitution; 1988, states; It is the sole competence of the Federal Union to explore directly or through authorization, concession or permission, infrastructure for air navigation, airports, and airspace.
5. Article 22 to the Federal Constitution; 1988, states; It is the sole competence of the Federal Union to enact aviation legislation. States and municipalities cannot legislate regarding; air navigation, airports or airspace infrastructure.
6. Federal Law; 8,987 -1995; Concessions law; Petrobras and Infraero were set up as public companies. Petrobras was allowed 49 percent private ownership and procurement laws were loosened for them. Infraero was to maintain 100 percent public ownership, and follow Federal procurement laws.
7. Federal Law; 11,079 -2004; formally adopted Public Private Partnership model as acceptable under Federal Law.
8. Federal Law; 11,182 -2005; Created ANAC; Article 8 states; the competency of ANAC is to adopt necessary measures to develop civil aeronautics, airport infrastructure, and to approve a concession.
9. State Law, Minas Gerais; 14,868 -2003; established "Unidade PPP Minas Gerais." Further established a PPP council and full administration to evaluate projects and analyze incoming private sector proposals for the development of public infrastructure.

Legal considerations:

From the listing of Federal and State legislation, it is clear that Federal jurisdiction has been and will continue to be the overriding factor that will impact future decisions regarding airport management, finance and development. Federal law is very specific with regard to responsibilities and duties regarding all public airports. From the above list of regulations, the following principles for going forward have been developed:

- State and Local municipalities will not be able to exercise control over their local airport assets in Brazil, without substantial modifications to current Federal laws.
- Although P3's have a specific guiding law, the potential for private financial participation in public airports is not entirely clear. It is anticipated that more specific P3 legislation at the Federal level will be necessary in order to open the door for private participation.

- For the time being, it may be easier for private financial participation in airport Greenfield sites, than for existing airport facilities.
- Regardless of any future modifications to Federal P3 law, it is anticipated that ANAC will continue to exercise regulatory and public policy oversight over the aviation and airport industry for the long term.
- The State of Minas Gerais has already established the necessary administrative oversight necessary to manage any potential future airport private financial projects, if given the leeway to do so, by the Federal Government.
- For the time being, airport management, operations and development for TNIA are clearly the responsibility of Infraero. Aviation policy and regulation affecting TNIA are now, and will probably continue to be the responsibility of ANAC.
- Liberalizing current legal restrictions related to private sector financing of airport infrastructure is a stated goal of the new federal government and would be required for participation by the large international infrastructure funds.
- Current capital improvement procurement regulations are closely governed by Federal law. These laws which include competitive cost provisions, and require local consultant certifications have effectively kept international design companies from competing in the Brazilian market. It is also a stated goal of the new administration to liberalize these laws in order to allow for needed international airport planning and design expertise into Brazil. The legal structure for an airport PPP has now been established with the approval of the airport concession in Natal, Brazil. In this project which is a; finance, build and operate concession, the capital improvement requirement will be entirely privately funded. This established PPP legal blueprint will certainly be applied in the near future to Greenfield projects and stand alone terminal projects, but it will need to be modified to allow for some form of public investment in order for Brazilian airport projects to be truly financially viable.

The future of airport management and development policy will be dictated by the changes taking place in Brazilian national politics. The election of president Dilma may have a great impact on how airports are developed in ensuing years, leading up to the 2014 World Cup, and the 2016 Olympics.

To sum up the current legal environment for airport PPP public/private/partnerships in Brazil, the following items are offered for consideration:

- PPP law applying to airport development is in its infancy in Brazil.
- Other industry sectors which are not so heavily regulated by the Federal Government already enjoy liberal PPP laws with many successful projects.
- Because of the legal situation governing airport PPPs, the primary short term projects will most likely be new Greenfield projects and stand alone terminal development projects.
- Liberalization of airport PPP laws will open up the market to international finance, design and airport operations.

- The very significant airport infrastructure needs in Brazil will drive the public policy changes that will be needed to open up the Brazilian airport concession market, and make it financially viable.

The analysis and subsequent recommendations of this task will be keyed to the following basic assumptions regarding future public policy:

1. Modifications in Federal law will allow for a format that will allow some form of private financial participation in Brazilian airport development.
2. P3 law in Brazil will undergo the changes necessary to allow for private financial participation by the large international infrastructure funds, but also for a reasonable rate of return that would be appropriate for the level of investment.
3. Airport management in Brazil will undergo modifications necessary to allow for some amount of local control of the airport assets.
4. The previous three changes will be driven by an increasing need for the provision of adequate and timely airport infrastructure projects.

10.4 Airport Management Considerations

As mentioned, the current airport management for the 67 top airports in Brazil, including TNIA is provided by Infraero. In the Infraero management scheme, the local management team is responsible for the day to day management of activities at TNIA.

From our interviews with Infraero management at TNIA, we understand that business management considerations such as; negotiating leases, capital development, collection of fees and tariffs, are done on a centralized basis in Brasilia. Further, many of the final internal policy decisions, such as; deployment of new staff, budgetary issues, planning and design, and capital project phasing are done in Brasilia as well.

As noted, capital project development for the Infraero airports is primarily a centralized function taking place in Brasilia. This function most likely takes into account local preferences and needs, however, it is largely driven by the availability of funding. It is our understanding that Infraero does not debt finance for capital improvement either at all, or to any great extent. From this perspective, all capital development at the 67 airports is dependent upon Federal funding allocations in the annual budgeting process.

Project delivery for Infraero falls under federal procurement rules. Regarding the procurement of professional services, the rules stipulate that the selections will be made on the basis of 60 percent cost, and 40 percent qualifications. According to Infraero planning and engineering staff, this procurement process has almost assured that no architectural/engineering resources outside of Brazil can be competitive.

Infraero has in the past used the military to design civil works at their airports. This process has been very successful, and has allowed them to have easy access to professional design without the burdens of a public tender. Construction seems to be primarily via a fast track design/build process that goes through a public tender.

The Infraero professional staff has shown themselves to be very capable and very engaged in the full time management of their airports. It is the opinion of CH2M HILL that the local

Infraero staff at TNIA is as capable and professional as any group that would be found throughout the world.

The difficulty for local staff is found in the centralized management scheme employed by Infraero. This centralized management has taken almost all the higher level decision making away from the local staff. These problems are manifested in many ways that lead to operational inefficiency and misallocation of resources.

10.5 Financial Plan for Public-Private Partnership Alternatives

10.5.1 Purpose and Scope

This document indentifies the Public-Private Partnership ("PPP" or P3) alternatives for proposed development program at the Tancredo Neves International Airport (TNIA) and presents the results of the assessment and financial implications of the three main PPP alternatives under different scenarios.

In February 2010, a technical visit was conducted to Belo Horizonte to inspect the Tancredo Neves International Airport to review current operations and review the conditions of the existing facilities at the Airport and interview top management and other major stakeholders.

In August 2010, a working document was circulated with the Private Sector Participation alternatives for comments and feedback from the working group. After these comments and feedback, the alternatives and financial model was developed to test the financial feasibility and to identify the key success elements of each case.

A Q&A session and telephone conversations were also held with representatives of SEDE whom also provided additional information.

Historical financial statements and operating parameters of TNIA were not examined for this task. Besides historical aviation activity at TNIA, other historical operating statistics at TNIA were not available.

Our analysis was based on information provided by SEDE. Additional data from various public official and other non-official sources has been incorporated into the analysis. These sources are considered reliable; however, the results of our analysis could vary significantly if some of these sources of information prove to be inaccurate or incomplete.

The basis of our projections was the Changi traffic projections and the development plan and cost estimates provided by this study. We used relevant operating parameters at similar airports under private sector management as a benchmark to project Operating Revenues and Expenses at the different business units of TNIA.

The projected Operating Revenues and Operating Expenses are consistent with the typical provisions of a PPP-concession contract. This report includes a summary of the main assumptions for the projected operating revenues and operating expenses of TNIA and the different business units assessed for PPP.

Our expertise and experience was used to model a reasonable and consistent Business Plan promoted and implemented by a private sector commercial oriented management; however

the future cannot be predicted, nor can a guarantee be made regarding the expected financial performance of the airport company or any of its main business units, which is subject to the typical risks of the airport business, the risks of the local economy, the risks of the tourism sector , the risks of the economies of the main sources of tourists into the region, and the risks of doing business in Brazil in general and in Minas Gerais in particular.

10.5.2 Project Background

The Tancredo Neves International Airport (TNIA) is the main airport in Minas Gerais serving approximately 7.1 million[1] passengers annually and offering international connections to the USA and some Latin American countries. TNIA is expected to become the international gateway of that region and the third busiest airport in the country.

During the first nine months of year 2010, domestic passenger traffic at TNIA had a very positive behavior. According to Infraero statistics, Domestic Traffic at TNIA during first 9 months of 2010 was 33.6 percent higher than traffic during the same period of 2009 and International Traffic was 26.4 percent higher than traffic during the same period of 2010.

Last official Traffic Forecast for TNIA was prepared by Changi Airport Consultants (Changi) at the end of 2008. Important changes have taken place in the Brazilian aviation sector during the last couple of years, most notably in the domestic traffic arena. Although the long term forecast of Changi seems to be adequate, the short and midterm forecasts presents some material differences from actual and expected traffic in the near future. The original forecast was projecting 6.1 million total passengers for 2011 and, based on Infraero statistics for the first 9 months of the year, 2011 is estimated to finish at around 8.4 million total passengers.

Currently international traffic statistics prepared by Infraero only account for 5.6 percent of total traffic. However, this statistics do not consider the group of international passengers traveling from/to Sao Paulo or Rio de Janeiro to/from Belo Horizonte in a domestic flight after/before taking an international flight. Eventually, when a certain critical mass is reached at TNIA, international carriers will indentify Belo Horizonte as a direct attractive origin/destination (different from Sao Paulo and Rio) and will initiate direct service to/from TNIA.

It is difficult to estimate accurately the number of passengers in this group of travelers, especially if we do not have access to Infraero records. However, according to our experience in similar markets, our estimation is that the number of international passengers flying in domestic fights in/out of TNIA should be at around 10 percent of total passengers. As a reference, international passengers at Sao Paulo and Rio were 39 percent and 22 percent in 2009 respectively. Top 7 Brazilian airports, not including TNIA, Santos Dumont and Congonhas, have 16.7 percent of total passengers being international in origin or destination.

Our scope of work does not include preparation of new traffic forecast for TNIA. However, the results and conclusion of our financial analysis depends on an accurate traffic forecast. Therefore, to conduct our financial analysis, we prepared a new traffic scenario that incorporates the new available market information we called the New Adjusted scenario.

[1] Estimated passengers for 2010 using January-September Infraero statistics.

The new adjusted forecast assumes a future target of international passengers of about 15 percent, actually flying on international flights, versus our current assumption of 10 percent. This 15 percent assumption is consistent with current international statistics for major Brazilian cities, and assumes a continued prominent growth for Belo Horizonte.

Note: This new adjusted traffic scenario is being developed solely for the purposes of developing financial and private sector participation funding scenarios. This is not intended to replace or supplant any current or future operational forecasts.

Changi Base Case and the New Adjusted Traffic scenario are presented in Exhibits 10-1, 10-2, 10-3 and 10-4.

The Institutional and Regulatory Framework:

The current aviation sector institutional and regulatory framework in Brazil is in general terms in accordance with international best practices. However, further institutional reform is needed to separate aviation policy making, planning, technical regulation, and operations (service provision). In general terms, as previously stated, a continued liberalization of airport concession policy, regulations and laws will make private finance, design and ownership more viable in Brazil in the near term.

EXHIBIT 10-1
New Adjusted Scenario

Year	Domestic	International	Total	Domestic	International	Total	Int/Total
2008	5.03	0.16	5.19	16.8%	382.7%	19.6%	3.1%
2009	5.37	0.25	5.62	6.8%	53.4%	8.2%	4.4%
2010	7.18	0.31	7.49	33.6%	26.4%	33.3%	4.1%
2011E	7.89	0.47	8.36	10.0%	50.0%	11.7%	5.6%
2012	8.49	0.70	9.18	7.5%	50.0%	9.9%	7.6%
2013	9.12	0.91	10.03	7.5%	30.0%	9.2%	9.0%
2014	10.03	1.09	11.12	10.0%	20.0%	10.9%	9.8%
2015	10.79	1.31	12.09	7.5%	20.0%	8.7%	10.8%
2016	11.60	1.57	13.16	7.5%	20.0%	8.9%	11.9%
2017	12.47	1.73	14.19	7.5%	10.0%	7.8%	12.2%
2018	13.40	1.90	15.30	7.5%	10.0%	7.8%	12.4%
2019	14.41	2.09	16.49	7.5%	10.0%	7.8%	12.7%
2020	15.49	2.30	17.78	7.5%	10.0%	7.8%	12.9%
2021	16.65	2.47	19.12	7.5%	7.5%	7.5%	12.9%
2022	17.90	2.65	20.55	7.5%	7.5%	7.5%	12.9%
2023	18.79	2.85	21.64	5.0%	7.5%	5.3%	13.2%
2024	19.73	3.07	22.80	5.0%	7.5%	5.3%	13.5%
2025	20.72	3.30	24.01	5.0%	7.5%	5.3%	13.7%
2026	21.75	3.54	25.30	5.0%	7.5%	5.3%	14.0%
2027	22.84	3.72	26.56	5.0%	5.0%	5.0%	14.0%
2028	23.98	3.91	27.89	5.0%	5.0%	5.0%	14.0%
2029	25.18	4.10	29.28	5.0%	5.0%	5.0%	14.0%
2030	26.44	4.31	30.75	5.0%	5.0%	5.0%	14.0%

Note: 2010 estimations are based on Infraero January-September figures

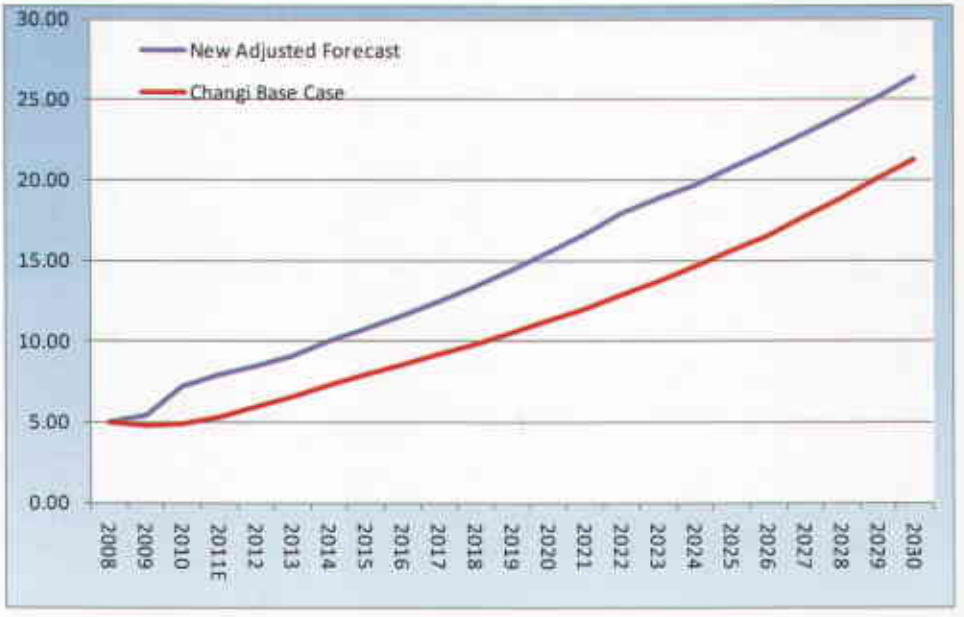


EXHIBIT 10-2
New Adjusted Scenario - Domestic Passenger Forecast

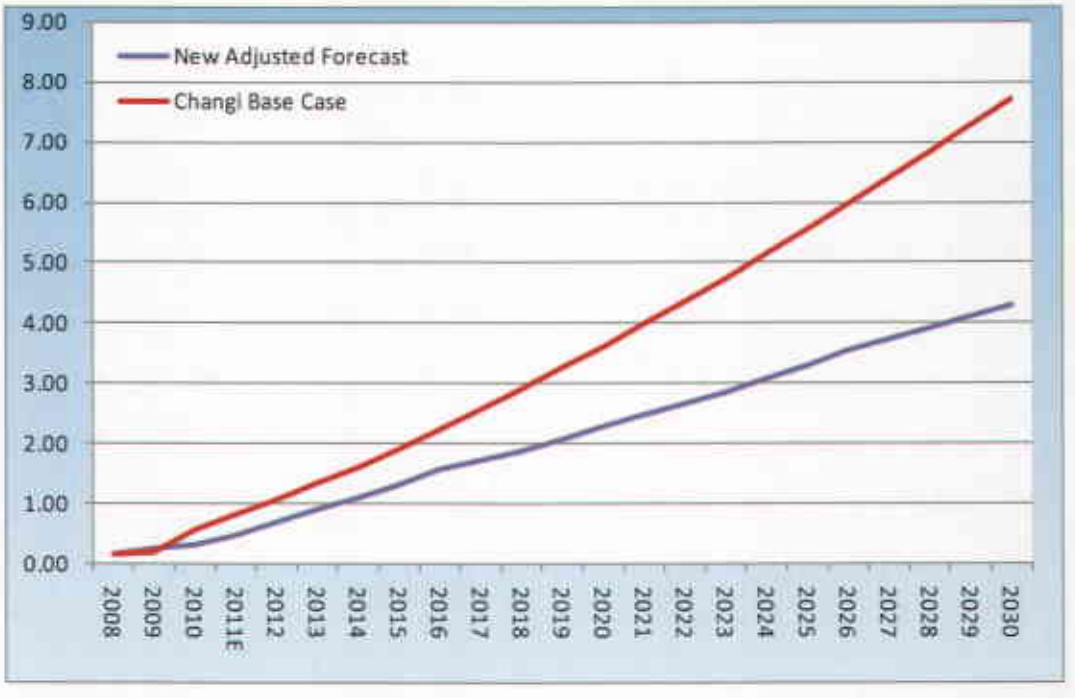


EXHIBIT 10-3
New Adjusted Scenario – International Passenger Forecast

EXHIBIT 10-4
New Adjusted Scenario -- Total Passenger Forecast

10.5.3 Capital Expenditures (CAPEX)

The TNIA development plan was prepared by CH2M HILL in consultation with SEDE.

The development plan for TNIA considers a total investment of USD 2,055 million[2] in 3 phases. Each Phase has 3 different components: Landside, Airside, and Real Estate. Exhibit 10-5 presents a summary of Capital Expenditures for TNIA for the period 2011-2030.

The proposed development plan includes expected total design, construction, environmental studies, and all pre-operating costs as well as "soft and hard cost contingencies" and working capital.

[2] Total Investment is estimated at 3,180.5 million Reais and was converted to USD at an exchange rate of 1.7 Reais per 1 USD.

EXHIBIT 10-5

Capital Expenditures (CAPEX) Summary (Constant 2010 Million U.S. Dollars)

Capital Expenditures	Total	Phase I	Phase II	Phase 3
		(2011-2014)	(2020-2023)	(2026-2030)
Landside	1,375.0	581.4	197.9	595.7
		(2011-2014)	(2016-2020)	(2026-2030)
Airside	488.1	89.9	303.4	94.8
		(2011-2014)	(2017-2020)	(2024-2027)
Real Estate (Including Airport Hotel)	192.1	81.1	34.8	76.2
		(2011-2014)	(2016-2023)	(2024-2030)
Total Capital Expenditures	2,055.2	752.4	536.1	766.7

Phase I

The capital costs for Phase 1 are estimated to be USD 752.4 million, which includes USD 581.4 million investment for Landside for the Passenger Terminal at TNIA (Terminal 2 first stage); USD 88.9 million investment for Airside which include enhancement of the existing airfield and construction/expansion of some cargo related facilities; and USD 81.1 million investment for Real Estate projects as well as 500-room airport hotel. Phase 1 Expansion is projected to start on year 2011 and finish in 2014.

Phase 2

The capital costs for Phase 2 are estimated to be USD 536.1 million, which includes USD 197.9 million Landside investment for the second stage of Passenger Terminal 2 at TNIA; USD 303.4 million for Airside investment which include construction of a second runway system; and USD 34.8 million investment for Real Estate projects. Phase 2 Expansion is projected to start on year 2016 and finish in 2023.

Phase 3

The capital costs for Phase 3 are estimated to be USD 766.7 million, which includes USD 596.7 million Landside investment for Passenger Terminal 3; USD 94.8 million for Airside investment which include construction of a third runway system; and USD 76.2 million investment for Real Estate projects. Phase 3 Expansion is projected to start on year 2026 and finish in 2030.

10.5.4 Preliminary PPP Alternatives

Modern Airports, like TNIA, are very complex multi-service organizations; however, for the purpose of our analysis we have identified three basic business units:

- Landside (passenger terminal, car parking, ground transportation, boarding bridges, etc.)
- Airside (runways, taxiways, aprons, cargo facilities, etc)
- Industrial/Commercial Real Estate opportunities

These business units do not include Air Traffic Control (ATC)

We have analyzed the range of private sector participation options that have been successfully used by other countries to modernize their airports. Some of these approaches may not be appropriate for TNIA or for SEDE objectives. Therefore, we considered in greater detail the following options that, at this stage of the analysis, we believe are relevant to the general conditions of TNIA and the Brazilian legal, regulatory, and political environment:

- Landside Concession
- Landside + Airside Concession (Does not include ATC)
- The Airport Company (including Industrial/Commercial Real Estate opportunities but not ATC)

Considerations of the Landside Alternative

This "PPP" alternative is visualized as a long-term concession for construction, development, commercialization, and management of the landside facilities at TNIA with a BOT (or similar) type mechanism.

The primary assumptions of this alternative are the following:

- The Concession will include the new terminal building and the existing terminal building.
- The "Concessionaire" will design, construct, maintain, and commercially develop the new terminal building as well as enhance, maintain, and commercially develop the existing terminal building at TNIA.
- Concession Contract term 20 years.
- All Assets, equipment, construction, and future improvements of the new terminal building will be the sole property of the Government of Brazil.
- All Capital Costs required to develop the new terminal and to enhance the existing terminal building will be the responsibility of the Concessionaire.
- The Concessionaire will be required to provide the financial resources (debt and capital contributions) to execute the construction of the new terminal and to enhance the existing terminal in accordance with the investments and expansion program specified in the Contract.
- The Concession Agreement includes Landside only: passenger terminals, boarding bridges, car parking, and ground transportation concessions.
- All Operating Cost required to operate, maintain, promote, and manage both terminals will be the responsibility of the Concessionaire.
- The Government will be responsible to operate, at its own cost, all other areas of the airport, including air traffic control, meteorology, security, passenger screening, passport control, customs, agricultural inspection, general health services, policing, fire and rescue, and all airside infrastructure such as runway, taxiways, aprons, cargo hangers, general aviation, navigational aids; etc. The Concessionaire will provide the required space to provide such services.

- Ground, cargo, and aircraft handing at the airport will be provided by airlines directly or by qualified third parties they hire. These service providers will pay a rent to the Concessionaire for the used space within the Concessionaire's facilities.
- The Concessionaire shall receive a percentage of:
  - Passenger departure fees[3]
  - Revenues from the boarding bridge fees (this can be part of passenger fee)
  - Rent of space to airlines and other users
  - Commercial revenues (duty fee, other retail, F&B, VIP lounge, banks, advertisement, etc
  - Revenues obtained from provision of services provided by third parties
- ANAC and Infraero will permanently supervise the quality of the services in both terminals
- Tariffs for services rendered at the Airport and the Passenger Terminals (when applicable) will be established by the Government. A clear economic regulation mechanism is required to minimize uncertainty to private sector investors and users.
- The Concessionaire will have the exclusive right to operate (exploit), directly or indirectly, the commercial areas in both terminals.
- The government can be a "partner" of the "Concessionaire" receiving a Concession Fee (cannon + variable payment linked to results) or receiving a percentage of the capital stock of the Concessionaire's Company or SPV (Special purpose vehicle).
- For the purpose of Financial Analysis we assumed that the Airport's Landside (both terminals) is a standalone business unit (profit center) with its own management, operating revenues, operating costs, CAPEX, taxes, etc. The Concessionaire will pay a concession fee to the Airport. This helped us to evaluate the financial feasibility of the entire airport.

Considerations of the Landside + Airside Alternative

This "PPP" alternative is envisioned as a long-term concession for construction, development, commercial development, and management of landside and airside facilities at TNIA with a BOT (or similar) type mechanism.

The basic elements of this alternative are the following:

- The "Concessionaire" will design, construct, maintain, and exploit the new Landside and Airside infrastructure as well as enhance, maintain, and exploit the existing Landside and Airside infrastructure at TNIA.
- The Concession Agreement includes Landside (passenger terminal, boarding bridges, car parking, and other ground transportation concessions) and Airside (runway, taxiways, aprons, cargo hangers, etc).
- Concession Contract term >20 years.

[3] Tarifa de Embarque Internacional-Domestica.

- All Assets, equipment, construction, and future improvements of the new infrastructure are the sole property of the Government of Brazil.
- All Capital Cost required to develop the Project are responsibility of the Concessionaire.
- The Concessionaire is required to provide the financial resources to execute the construction of improvements and installations in the new Landside and Airside infrastructure in accordance with the investments and expansion program specified in the Contract.
- The Government will be responsible to operate, at its own cost, all other areas of the airport, including air traffic control, meteorology, security, passenger screening, passport control, customs, agricultural inspection, general health services, policing, fire fighting and rescue, etc. The Concessionaire will provide the required space to provide such services.
- Ground, cargo, and aircraft handing at the airport will be provided by airlines directly or by qualified third parties they hire. These service providers will pay a rent for the used space within the Concessionaire's facilities.
- Fuel storage and fueling at the airport will be provided by a third party service provider. This business unit is not considered as part of the concession.
- The Concessionaire will receive a percentage of:
  - Landing fees
  - Aircraft parking fees
  - Passenger (departure) fees
  - Revenues from the boarding bridge fees
  - Rent of space to airlines and other users
  - Commercial revenues (duty free, other retail, F&B, VIP lounge, banks, advertisement, etc.
  - Revenues obtained from provision of services provided by third parties.
- ANAC and Infraero will permanently supervise the quality of the services and compliance with international safety and security standards at the Airport.
- Tariffs for services rendered at the Airport will be established by the Government (A clear economic regulation mechanism is required to minimize uncertainty to private sector investors and users).
- The Concessionaire will retain the value of the commercial services, which will have the exclusive right to operate, directly or indirectly, the commercial areas according to the commercial plan approved by ANAC.
- As in the previous case, the government can be a "partner" of the "Concessionaire" receiving a Concession Fee (cannon + variable payment linked to results) or receiving a percentage of the capital stock of the Concessionaire's Company or SPV (Special purpose vehicle).

- For the purpose of Financial Analysis we assumed that the Airport's Landside-Airside is a standalone business unit (profit center) with its own management, operating revenues, operating costs, CAPEX, taxes, etc. The Concessionaire will pay a concession fee to the Airport. This helped us to evaluate the financial feasibility of the entire airport.

Considerations of the Airport Company

An option that has been effective in other countries in airports comparable to TNIA includes the Corporatization of the entire airport. This includes continuation of government ownership but as standalone, independent, and autonomous entity. The company would be managed by a board of directors (with a combination of public officers and industry representatives as board members) and operated as a private sector company with commercial incentives.

This alternative may consider financing recourses from the Federal or State Government complemented by credit provided by a group of international development financial institutions to meet the required investments.

The basic elements of this alternative are the following:

- This mechanism can be promoted as a preparatory stage preceding an Initial Public Offering (IPO) in the international capital markets.
- For the purpose of Financial Analysis we assumed that the entire Airport (Landside, Airside, and Commercial/Industrial Real Estate development) is a standalone business unit (profit center) with its own management, operating revenues, operating costs, CAPEX, taxes, etc.
- Elements to define:
  - Implementation in accordance with the Brazilian P3 policies and regulations.
  - Required legal structure;
  - Required regulatory framework and independent regulating entities

10.5.5 Financial Analysis

As part of the financial analysis, the Project Team was not able to examine historical financial statements of TNIA. Besides historical aviation activity at TNIA, other historical operating statistics at TNIA were not available. However, we used some relevant historical operating parameters at similar airports under private sector management as a benchmark to project Operating Revenues and Expenses at the different business units of TNIA.

The approach and methodology utilized by the Project Team to structure the Model are consistent with industry best practices.

The methodology used in our revenue projections takes into account the appropriate drivers and assumptions. Future operating revenue growth is fundamentally tied to the evolution of passenger traffic, terminal tariffs under the Concession Contract, and an effective commercial strategy.

Commercial Revenues represent the up-side of the Project. In our opinion the Commercial Projections proposed by the Project Team are reasonable and consistent with opportunities

of the market. Based on the assumption of a properly structured private sector concession contract, on the profile of the passenger at TNIA, and on a benchmark analysis of similar airports, we believe that the Commercial Revenues projected in our model are in general achievable and in some areas conservative.

Our methodology used in the operating expenses projections, is based on our experience in similar airports, and in our opinion it is reasonable and realistic, and it takes into account the appropriate drivers and assumptions as well as the intended level of service (IATA "C").

Our assumptions include an experienced airport operator capable of operating the airport through periods of increased demand and at higher quality levels.

Our analysis was based on information provided by SEDE. Additional data from various public official and other non-official sources has been incorporated into the analysis. These sources are considered reliable; however, the results of our analysis could vary significantly if some of these sources of information prove to be inaccurate or incomplete.

The consulting team has applied all its expertise and experience to model a reasonable and consistent Business Plan promoted and implemented by a private sector commercial oriented management. However, the consulting team cannot guarantee the expected financial performance of the airport company or any of its main business units, which is subject to the typical risks of the airport business, the risks of the local economy, the risks of the tourism sector, the risks of the economies of the main sources of tourists into the region, and the risks of doing business in Brazil in general and in Minas Gerais in particular.

CAPEX Allocation and Proposed Financial Structure

The development plan for TNIA considers a total investment of USD 2,055.2 million[4] in three phases that shall be financed through:

1. Private Public Partnership (PPP) vehicle with expected market rates of return for similar projects
2. Credit to be structured by private banks and international development agencies at commercial rates
3. Public funds provided by Infraero or the State of Minas Gerais. I case of basic infrastructure investments no direct expected financial return or repayment is expected

Different scenarios were created to allocate total CAPEX into the before mentioned three categories.

After detailed examination, nine scenarios were preliminary selected for financial feasibility analysis. These scenarios are presented in Exhibit 10-6.

[4] Constant 2010 U.S. Dollars. In Reais Total Investment is estimated at 3,180.5 million Constant 2010 Reais at an exchange rate of 1.7 Reais per 1 USD.

EXHIBIT 10-6

Selected Scenarios for Financial Feasibility Analysis (Constant 2010 U.S. dollars)

Scenarios	Full CAPEX (Million USD)	Full Phase 1 & II CAPEX (Million USD)	Selected CAPEX (Million USD)
Landside Scenario			
Landside	1,375.0	779.3	573.0
Total PPP Investment	**1,375.0**	**779.3**	**573.0**
Public Funds	-	595.7	802.1
Landside + Airside			
Landside	1,375.0	779.3	573.0
Airside	488.1	393.3	292.8
Total PPP Investment	**1,863.1**	**1,172.6**	**865.7**
Public Funds		690.5	997.4
Entire Airport Company			
Landside	1,375.0	779.3	573.0
Airside	488.1	393.3	292.8
Real Estate	192.1	192.1	192.1
Total PPP Investment	**2,055.2**	**1,364.7**	**1,057.8**
Public Funds		690.5	997.4

The PPP vehicle financial structure is assuming 30 percent equity and 70 percent commercial credit. Equity contribution assumptions consider 66.7 percent private sector participation and 33.3 percent public sector participation. This last mix can vary but in any case private sector participation should be a minimum of 51 percent.

The Financial Model

The consulting team developed a computerized financial model for analyzing the financial feasibility of the proposed development plan of the entire Airport and the mentioned PPP alternatives. Our financial model is capable to evaluate the mentioned PPP alternatives, execute sensitivity analysis, and test various financing concepts.

General Assumptions

- A projection horizon of 20 years from 2011 to 2030
- Design-Construction period 48 months (new terminal building)
- First year of operations of phase one: fiscal year 2014
- Revenues and costs assume 2010 as the base year
- Projection years are fiscal years beginning on 1st of January and ending the 31st of December
- Currency: Nominal USD dollars (including inflation)
- Cost of equity (15 percent) and cost of debt (9 percent)
- US inflation (3.0 percent)
- Local inflation (4.5 percent)

- USD/Local Currency (Reais) exchange rate (difference of inflation rates)
- The currency used in this financial plan is US dollars. Where revenues are collected and expenses incurred in local currency, it is assumed that these are all priced in US dollars and converted to local currency at the conversion rate applicable at the time of the respective transactions.

Operating Revenues

The methodology used in our revenue projections is realistic and it takes into account the appropriate drivers and assumptions. Future operating revenue growth is fundamentally tied to the evolution of passenger traffic, terminal tariffs and airside tariffs under the current Infraero tariffs policy, and an effective commercial strategy.

Landside Revenues

The main concepts for Landside Revenue projections include:

- Revenues from Passenger Departure Fee: 41.5 percent[5] of the fee will be collected by the terminal operator per departing passenger as follows (not adjustable by inflation).

Concept	Unit	Total Tariff	Operator Share	Operator tariff
International Passenger Departure Fee	USD	36	41.5%	14.94
Domestic Passenger Departure Fee	Reais	19.62	41.5%	8.14

- Revenues from commercial activities related to the Passenger terminal. This include Duty Free, Other Retail Stores; Food & Beverage; Office Space Rental; VIP Lounge; Bus, Taxi, Limo Operation and Car Parking; Car Rental, Tour Operator, Hotel Service Desks; Banking and Foreign Currency Exchange; Advertising. All these concepts were priced at market conditions.

Main Landside Revenue Projection Assumptions

Following is presented a summary of the main revenue assumptions used by Nathan to Project Operating Revenues during the concession period: (Exhibit 10-7).

- All operating revenues fixed by the Government were projected following the official established parameters.
- The operator will act as a Land Lord sub-concessioning to a professional international retail operator for the space within the terminal building to provide services such as duty free, retail shops, food and beverage, etc.
- Duty Free Shops Revenues were projected per departing international passenger, indexed annually to inflation.
- Retail Stores Revenues and Food & Beverage were projected separately per international departing passenger and per domestic departing passenger, indexed annually to inflation.

[5] This is the percentage that Infraero is currently receiving form Passenger Departure Fee collected at TNIA.

EXHIBIT 10-7

Main Landside Revenue Projection Assumptions

DESCRIPTION (all numbers are in USD per passenger)	2011	2015	2020	2025	2030
REVENUES FROM PASSENGER TARIFF					
International Passenger Departure Fee	7.47	7.47	7.47	7.47	7.47
Domestic Passenger Departure Fee	4.07	4.07	4.07	4.07	4.07
Total	4.33	4.48	4.51	4.55	4.55
COMMERCIAL REVENUE (RENTS + ROYALTIES)					
Duty free Shops	0.08	0.26	0.34	0.45	0.55
Retail Stores, other than Duty Free	0.70	0.87	1.06	1.30	1.58
Food & Beverage Sale	0.39	0.59	0.75	0.92	1.12
Office Space Rental	0.09	0.16	0.15	0.17	0.18
VIP Lounge	0.02	0.04	0.05	0.06	0.08
Bus, Taxi, Limo Operation and Car Parking	0.11	0.15	0.18	0.23	0.27
Car Rental, Tour Operator, Hotel Service Desks	0.13	0.17	0.21	0.27	0.32
Banking and Foreign Currency Exchange	0.06	0.08	0.11	0.13	0.16
Advertising	0.05	0.07	0.08	0.10	0.13
Other Miscellaneous Revenues	0.46	0.53	0.64	0.77	0.93
Total	2.09	2.91	3.58	4.40	5.33
Total Landside Revenues	6.42	7.38	8.09	8.95	9.88

Commercial Revenues

Commercial Revenues include revenues from Duty Free Shops, Retail, sales of Food and Beverage, Office Space rental, VIP Lounge, Rent-a-Car outlets, Financial and Banking, Advertising, and Other Services.

Generally Commercial Revenues are escalated based on two drivers, passenger traffic and revenue per passenger. Commercial revenue escalation using passenger traffic as the driver assumes organic growth of the Airport. Additionally, revenue growth will come from a better use, mix and merchandising of airport floor space. When incorporating the merchandising and floor space factors as additional drivers, we would expect that additional retail space will allow for the selling of more goods (and services) on a per passenger basis.

One of the important reasons for introducing the private sector into the management of airports is the development of the commercial areas of the airport. Private operators have developed strategies that improve the commercial segments of the airport, finance infrastructure and pay them their required return. In airports at a similar starting point as TNIA, commercial revenue improvement has been dramatic for the private sector.

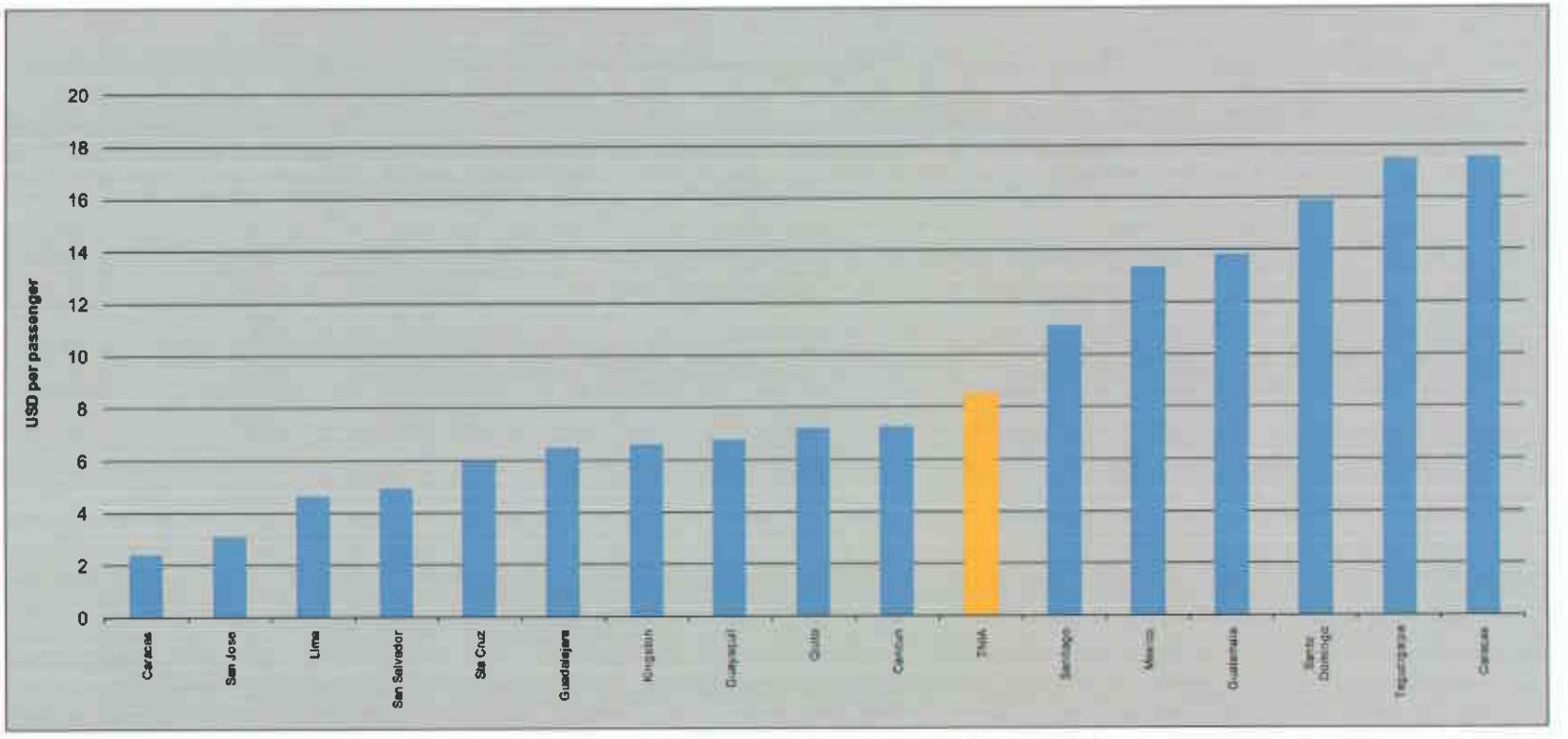
With the current passenger profile and terminal layout, our analysis would suggest that the required conditions for enhanced commercial upside exist for TNIA. Based on this, we are recommending two scenarios, a conservative scenario and a more aggressive commercial revenue scenario.

The consulting team is projecting airport revenue of USD 2.91 per passenger in 2015 just after the new terminal initiates operations, which is equivalent to consumption per passenger of around USD 8.92 per passenger[6]. As we can see in Exhibit 10-8 projected commercial revenues are consistent with actual revenues in comparable airports in the region.

Exhibit 10-8 presents a Benchmark analysis of Spending per Passenger at selected airports using 2008 data (Pre-economic crisis). The comparison shows the significant potential for growth at TNIA, given relevant airports within the region.

[6] According to our experience USD 2.91 revenue per passenger is equivalent to USD 8.92 consumption per passenger.

EXHIBIT 10-8
Benchmarking of Spending per Passenger at selected airports –
2008 data (Pre-economic crisis)



Source: Prepared by Nathan based on information obtained from The Generation Group: "World's Top 500 Airports 2008".

Airside Revenues Assumptions

The main concepts for Airside Revenue projections include:

- Revenues from Landing: 41.5 percent of the Fee[7] is collected by the airport operator per landing per ton as follows (not adjustable by inflation).

Concept	Unit	Total Tariff	Operator Share	Operator tariff
International Landing Tariff	USD per ton	5.66	41.50%	2.35
Domestic Landing Tariff	Reals per ton	1.67	41.50%	0.69

- Revenues from Parking: 41.5 percent of the Fee[8] is collected by the airport operator per parking hour per ton as follows (not adjustable by inflation).

Concept	Unit	Total Tariff	Operator Share	Operator tariff
International Parking Tariff Apron	USD per ton/per hour	1.13	41.50%	0.47
International Parking Tariff Other	USD per ton/per hour	0.23	41.50%	0.10
Domestic Parking Tariff Apron	Reals per ton	0.33	41.50%	0.14
Domestic Parking Tariff Other	Reals per ton	0.07	41.50%	0.03

- RevRevenues from cargo handling and cargo storage is about USD 93 per ton.

Main Airside Revenue Projection Assumptions

Following is presented a summary of the main revenue assumptions used by Nathan to Project Operating Revenues during the concession period:

- All operating revenues fixed by the Government were projected following the official parameter established.
- MTOW is estimated at 123 tons per international landing and 54 tons per domestic landing.
- Parking is estimated at 5 hours per international landing and 0.75 hours per domestic landing.

Exhibit 10-9 presents a summary of the main revenue projection assumptions.

[7] This is the percentage that Infraero is currently receiving form landing fees collected at TNIA.
[8] This is the percentage that Infraero is currently receiving form landing fees collected at TNIA.

EXHIBIT 10-9
Main Airside Revenue Projection Assumptions

DESCRIPTION (all numbers in USD per passenger)	2011	2015	2020	2025	2030
REVENUES FROM LANDING					
International	0.07	0.12	0.12	0.13	0.12
Domestic	0.18	0.17	0.17	0.17	0.16
	0.26	0.30	0.29	0.29	0.28
REVENUES FROM AIRCRAFT PARKING					
International	0.04	0.06	0.06	0.06	0.06
Domestic	0.03	0.03	0.03	0.03	0.03
	0.07	0.10	0.09	0.09	0.09
REVENUES FROM CARGO HANDLING AND STORAGE					
International Cargo	0.40	0.51	0.55	0.58	0.60

Real Estate Revenues Assumptions

Following is presented a summary of the main revenue assumptions used by Nathan to Project Real Estate Revenues during the concession period:

- Real Estate business considers development of Land for Aviation Supports Activities and for Commercial Related Activities inside the airport boundaries but outside the operational area.
- Land for Aviation Supports Activities was projected as 2.9 million square meters in 3 phases.
- Land for Commercial Related Activities was projected as 1.1 million square meters in 3 phases.
- The airport hotel considers 500 rooms at USD 100,000 Capital Investment per room, and using a projected tariff of USD 100 per room per night, an occupation factor of 80 percent, and an operating margin of 65 percent.

Exhibit 10-10 presents a summary of the main revenue projection assumptions.

EXHIBIT 10-10
Main Real Estate Revenue Projection Assumptions

REAL ESTATE	Total	Phase I 2011-2014	Phase II 2017-2020	Phase III 2024-2027
Aviation Support Available Land (sqm)	2,900,000	800,000	800,000	1,300,000
Net/Total Area		75%	75%	85%
Occupation factor		80%	80%	80%
Rent per month per square meter		2.00	2.10	2.20
Development cost per square meter (urbanization)		25.00	25.00	35.00
Commercial Available Land (sqm)	1,100,000	200,000	300,000	600,000
Net/Total Area		75%	75%	80%
Occupation factor		80%	80%	80%
Rent per month per square meter		3.00	3.15	3.30
Development cost per square meter (urbanization)		30.00	30.00	40.00

Source: Prepared by Nathan Associates based on experience in comparable cases. Rent and Development costs are shown in Constant 2010 U.S. dollars.

10.5.6 Operating Expenses

Operating Expenses ("OPEX") include Personnel, Professional Services, Repairs and Maintenance, Other Services and Supplies, Utilities, Insurance, Marketing and Promotion, Other Additional Expenses and Operator Fee.

Historical Operating Expenses statistics at TNIA were not available. Operating Expenses were projected based on experience in other similar airports. In the case of Landside alternative, operational responsibilities are confined to the operation of the new and current passenger terminal building and the associated car parking lot and the Government will be responsible, at its own expenses, to operate all other areas of the airport. The PPP operator will not undertake ground, cargo and aircraft handing at the airport, these activities will be performed by third parties and paid for by the air carriers directly. Expenses related to commercial activities within the terminal building such as duty free, retail shops, food and beverage etc., will be the responsibilities of the tenants.

Typically operating expenses incurred by a terminal operator are directly related to the provision terminal maintenance and support for operations. Terminal operating expenses are principally tied to the cost of local labor, materials, and services. Operating costs are somewhat influenced by the level of activity at the terminal and increase with the size of facilities, but the correlation is not perfect.

Operating Expenses in the Model are projected using the projected staff headcount, real increase in salaries, a traffic growth factor, a terminal area growth factor, and inflation. The development plan of TNIA assumes to keep a relatively high Level of Service (i.e. IATA Level of Service - Category B and C) which in our opinion is reflected in the projected operating expenses. Exhibit 10-11 presents a summary of the operating expenditure projections for the Airport Company Alternative.

EXHIBIT 10-11

Operating Expenditure Projections Summary

DESCRIPTION (all numbers in USD)	2011	2015	2020	2025	2030
OPERATING EXPENSES					
Total Landside Operating Cost and Expenses	5,646,898	13,456,251	19,873,127	34,452,461	47,745,947
Total Airside Operating Cost and Expenses	6,144,400	10,110,316	15,350,542	21,567,687	27,563,922
Total Real Estate Land Lease/Rent Operating Expenses	1,465,635	9,036,370	12,508,063	16,771,515	22,454,849
Total Operating Expenses	13,256,933	32,602,936	47,731,732	72,791,663	97,764,718
CONCESSION FEE					
Concession Fee	6,564,064	14,205,477	23,510,773	32,909,754	43,894,261
MANAGEMENT AND OPERATOR FEE					
Management and Operator fee	3,282,032	7,102,739	11,755,387	16,454,877	21,947,130
Total Expenses	23,103,029	53,911,151	82,997,892	122,156,294	163,606,109

Source: Prepared by Nathan Associates based on operating expenses in comparable cases at similar sized airports to TNIA. All numbers in Nominal USD dollars.

10.5.7 Financial Analysis

As part of our work we conducted a financial feasibility analysis of different scenarios including the most relevant variables of the different PPP alternatives. For that purpose, the Model was constructed to permit running different scenarios.

After several simulations, the following were identified as the most critical factors for the future financial performance of TNIA and its selected PPP alternatives:

- Traffic Demand
- Capital Expenditures (CAPEX)
- Commercial Revenues per passenger

Then, such critical factors were analyzed to evaluate the Present Value[9] performance of the following most relevant financial parameters: Operating Revenues, Operating Expenses (OPEX), EBITDA, Available Cash Flow for Stockholders, and DSCR for the evaluation period 2011-2030 as well as the IRR (20 years) and the NPV of Available Cash Flow for Stockholders of the PPP vehicle (20 years).

The objective of this analysis was to assess the sensitivity of the mentioned key financial parameters on the typical variations of the level of the critical factors. Consequently, these critical factors were affected (independently and in combination) within reasonable ranges to create relevant scenarios. We also created some extreme scenarios to test the robustness and consistency of the Financial Model.

Based on the mentioned analysis we selected 2 Traffic Scenarios; 3 CAPEX scenarios; 3 PPP Scenarios; and 2 DF/Retail/F&B scenarios. These relevant scenarios are as follows:

- Traffic scenarios:
  - Changi Base Case Scenario

[9] Present Value at a 15% discount rate

  - New Adjusted Scenario
- CAPEX Scenarios:
  - Full CAPEX
  - Phase 1 and 2 CAPEX
  - Selected CAPEX
- PPP Alternatives
  - Landside
  - Landside + Airside
  - Entire Airport Company
- Duty Free, Retail, and Food & Beverage Scenarios:
  - Most Feasible
  - Commercial Upside

For purpose of the financial analysis, we created 9 Valuation Scenarios prepared with the combination of the above mentioned variables, reflecting a logical combination of some of the critical factors determined previously. In addition, all of these 9 scenarios were analyzed with 2 commercial performance scenarios.

Relevant Valuation Scenarios:

Scenario 1. Landside, Full CAPEX, New Adjusted Traffic Scenario

Scenario 2. Landside + Airside, Full CAPEX, New Adjusted Traffic Scenario

Scenario 3. Entire Airport, Full CAPEX, New Adjusted Traffic Scenario

Scenario 4. Landside, Phase 1 and 2 CAPEX, New Adjusted Traffic Scenario

Scenario 5. Landside + Airside, Phase 1 and 2 CAPEX, New Adjusted Traffic Scenario

Scenario 6. Entire Airport, Phase 1 and 2 CAPEX, New Adjusted Traffic Scenario

Scenario 7. Landside, Selected CAPEX, New Adjusted Traffic Scenario

Scenario 8. Landside + Airside, Selected CAPEX, New Adjusted Traffic Scenario

Scenario 9. Entire Airport, Selected CAPEX, New Adjusted Traffic Scenario

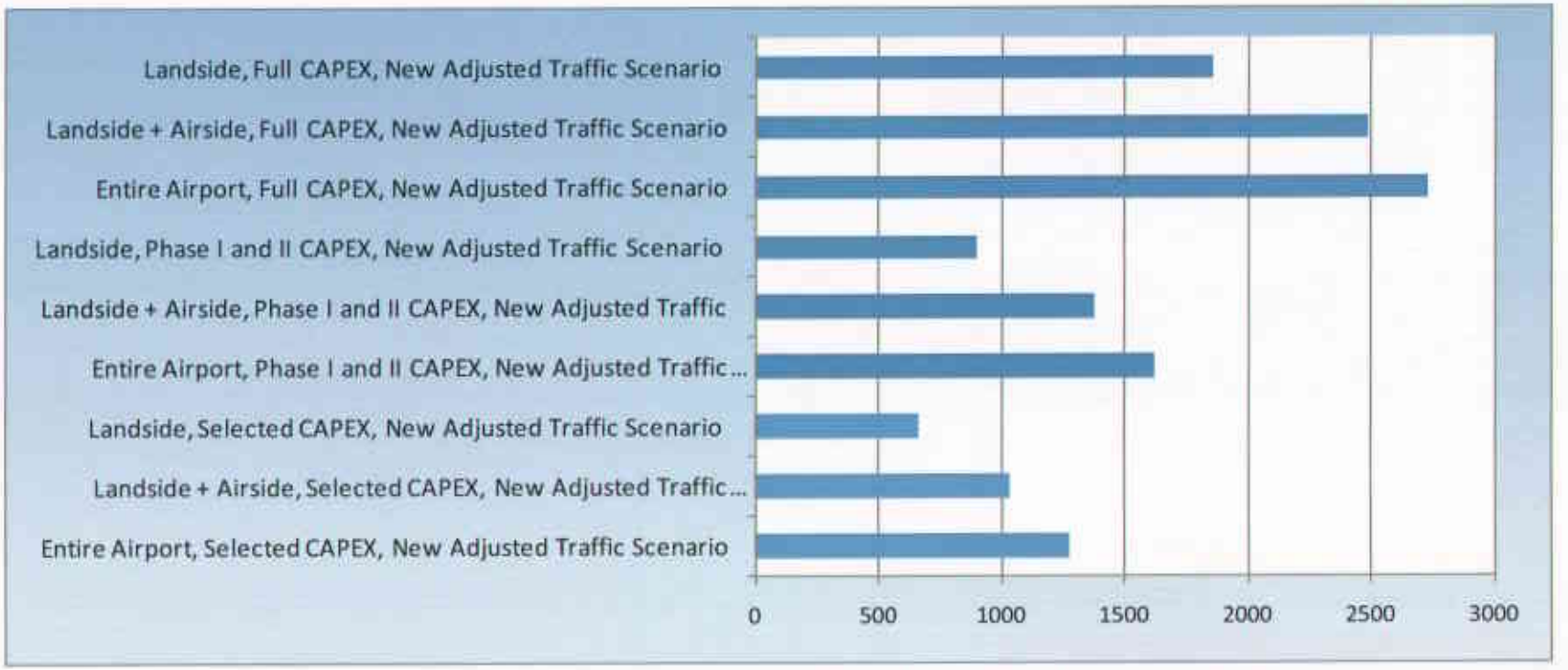
Using the model we simulated the mentioned scenarios to assess the changes of the key financial parameters due the specific variations of the critical factors. Exhibit 10-12 presents a summary of the results of the key financial parameters of the relevant Valuation Scenarios. Exhibits 10-13 to 10-15 present graphically the results of each of the main financial parameters of the different scenarios.

EXHIBIT 10-12
Financial Feasibility Analysis Summary

	EBITDA	IRR 20.00 yrs	PPP Total Cash Flow NPV	Private Sector Cash Flow NPV	Gov. Cash Flow NPV
Landside, Full CAPEX, New Adjusted Traffic Scenario	529.0	13.5%	-15.4	-10.3	-5.1
Landside + Airside, Full CAPEX, New Adjusted Traffic Scenario	527.1	4.2%	-145.6	-97.1	-48.5
Entire Airport, Full CAPEX, New Adjusted Traffic Scenario	669.2	5.7%	-124.4	-82.9	-41.5
Landside, Phase I and II CAPEX, New Adjusted Traffic Scenario	529.0	15.0%	-0.4	-0.3	-0.1
Landside + Airside, Phase I and II CAPEX, New Adjusted Traffic	517.5	7.5%	-120.1	-72.1	-48.0
Entire Airport, Phase I and II CAPEX, New Adjusted Traffic Scenario	669.2	8.1%	-104.3	-69.5	-34.8
Landside, Selected CAPEX, New Adjusted Traffic Scenario	529.0	30.7%	97.8	65.2	32.6
Landside + Airside, Selected CAPEX, New Adjusted Traffic Scenario	527.1	16.6%	10.4	6.9	3.5
Entire Airport, Selected CAPEX, New Adjusted Traffic Scenario	669.2	20.6%	46.9	31.2	15.6

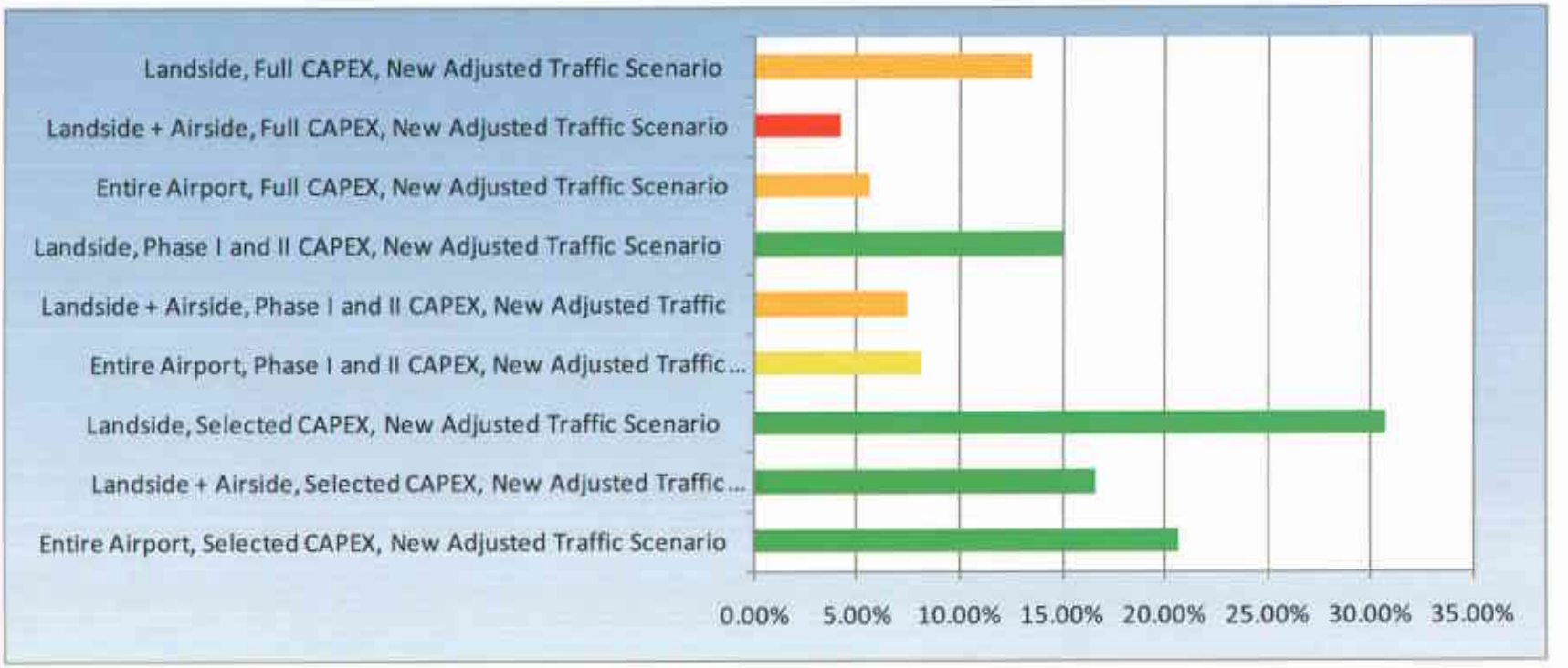
Source: Nathan estimations using the financial model. Cash flow figures are presented in nominal USD million discounted at a 15 percent discount rate.

EXHIBIT 10-13
CAPEX (20 years) Summary (USD millions)



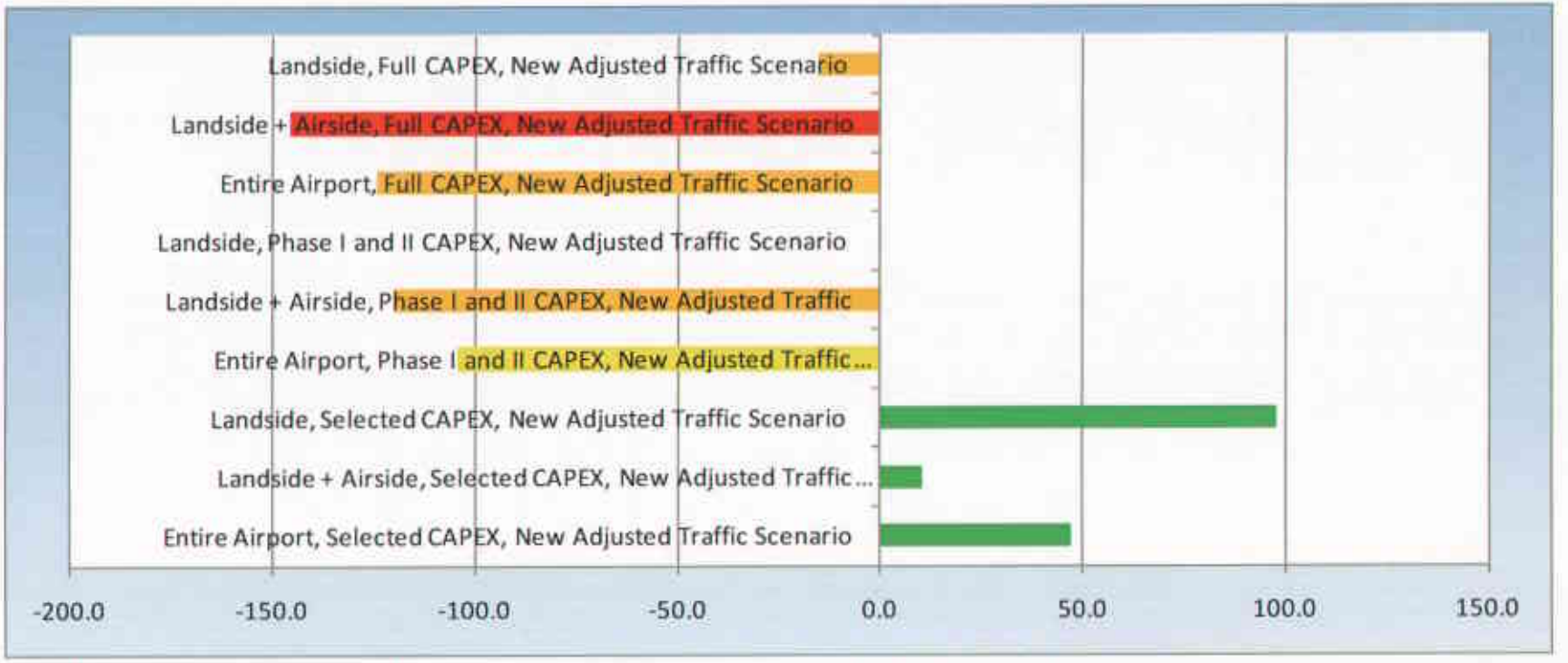
Source: Nathan estimations using the financial model. Figures are presented in nominal USD million at a 15 percent discount rate.

EXHIBIT 10-14
IRR Summary (percent)



Source: Nathan estimations using the financial model.

EXHIBIT 10-15
Cash Flow Summary (NPV of USD millions)



Source: Nathan estimations using the financial model. Figures are presented in nominal USD million at a 15 percent discount rate.

After analyzing the different scenarios, Nathan selected a set of three scenarios that are recommended for further PPP analysis:

- Scenario 7. Landside, Selected CAPEX, New Adjusted Traffic Scenario
- Scenario 8. Landside + Airside, Selected CAPEX, New Adjusted Traffic Scenario
- Scenario 9. Entire Airport, Selected CAPEX, New Adjusted Traffic Scenario

Exhibits 10-16 to 10-18 show a summary of the financial results of the above mentioned scenarios. A Summary of Financial highlights for all the scenarios is included in Appendix B.

EXHIBIT 10-16

Landside, Selected CAPEX, New Adjusted Traffic Scenario Summary

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Real Estate Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Total Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Operating Costs/Passenger	1.6	2.1	2.3	2.7	3.0		
EBITDA/Passenger	4.8	5.3	5.8	6.2	6.9		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	59.0	97.2	154.6	226.3	312.9	730.8	3,404.8
Expenses	-14.5	-28.0	-43.1	-68.4	-94.7	-201.9	-983.6
EBITDA	**44.5**	**69.2**	**111.5**	**157.9**	**218.2**	**529.0**	**2,421.1**
Depreciation	-3.8	-28.7	-27.7	-45.3	-41.3	-155.9	-662.1
Operating Income	**40.6**	**40.5**	**83.8**	**112.6**	**176.9**	**373.1**	**1,759.1**
Financing Expenses	-4.8	-22.8	-10.9	-9.4	-1.3	-91.7	-242.3
Taxes	-12.6	-6.2	-25.5	-36.1	-61.5	-98.5	-530.9
NET INCOME	**23.3**	**11.5**	**47.4**	**67.1**	**114.1**	**182.9**	**985.9**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**44.5**	**69.2**	**111.5**	**157.9**	**218.2**	**529.0**	**2,421.1**
Taxes	-12.6	-6.2	-25.5	-36.1	-61.5	-98.5	-530.9
Operating Cash Flow	**31.9**	**63.0**	**86.0**	**121.8**	**156.8**	**430.5**	**1,890.3**
Capex	-76.9	-	-35.5	-	-	-360.8	-662.1
Public Sector Equity Contributions	15.4	-	7.1	-	-	72.2	132.4
Private Sector Equity Contributions	7.7	-	3.6	-	-	36.1	66.2
Commercial Debt Financing (CAPEX)	53.8	-	24.9	-	-	252.6	463.4
Free Cash Flow Before DS	**24.2**	**63.0**	**82.5**	**121.8**	**156.8**	**394.4**	**1,824.1**
Interests (commercial debt)	-4.8	-22.8	-10.9	-9.4	-1.3	-91.7	-242.3
Amortization (commercial debt)	-3.5	-25.6	-41.4	-14.8	-19.1	-132.7	-463.4
Debt Service	-8.3	-48.4	-52.2	-24.2	-20.4	-224.4	-705.7
Free Cash Flow	**15.97**	**14.56**	**30.21**	**97.58**	**136.36**	**169.95**	**1,118.33**
Net Cash Flow						97.79	985.92293
DSCR	2.93	1.30	1.58	5.03	7.69	Min	0.9

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	14.6%	9.2%	7.7%	5.1%		
EBITDA Margin	75.4%	71.2%	72.1%	69.8%	69.7%		
Net Income Margin	39.5%	11.8%	30.7%	29.6%	36.5%		
IRR for PPP Stockholders	30.7%						
PPP Total Cash Flow Net Present Value	97.8						
Private Sector Cash Flow Net Present Value	65.2						
Government Cash Flow Net Present Value	32.6						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT 10-17

Landside+ Airside, Selected CAPEX, New Adjusted Traffic Scenario Summary

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.7	0.9	0.9	1.0	1.0		
Real Estate Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Total Revenue/Passenger	7.1	8.3	9.0	9.9	10.8		
Operating Costs/Passenger	2.4	3.0	3.2	3.7	4.0		
EBITDA/Passenger	4.8	5.3	5.8	6.2	6.8		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	65.6	109.1	172.6	250.7	343.5	815.0	3,777.8
Expenses	-21.6	-39.9	-61.1	-93.6	-126.8	-287.9	-1,368.2
EBITDA	**44.0**	**69.1**	**111.5**	**157.0**	**216.7**	**527.1**	**2,409.6**
Depreciation	-3.8	-28.7	-56.4	-74.0	-70.0	-214.4	-1,027.1
Operating Income	**40.2**	**40.5**	**55.0**	**83.1**	**146.7**	**312.7**	**1,382.5**
Financing Expenses	-4.8	-22.8	-10.9	-9.4	-1.3	-91.7	-242.3
Taxes	-11.7	-5.7	-15.4	-25.8	-50.9	-74.7	-394.6
NET INCOME	**23.7**	**12.0**	**28.8**	**47.9**	**94.5**	**146.3**	**745.6**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**44.0**	**69.1**	**111.5**	**157.0**	**216.7**	**527.1**	**2,409.6**
Taxes	-11.7	-5.7	-15.4	-25.8	-50.9	-74.7	-394.6
Operating Cash Flow	**32.3**	**63.5**	**96.1**	**131.3**	**165.8**	**452.4**	**2,015.0**
Capex	-76.9	-	-95.9	-	-	-479.5	-1,027.1
Public Sector Equity Contributions	15.4	-	19.2	-	-	95.9	205.4
Private Sector Equity Contributions	7.7	-	9.6	-	-	47.9	102.7
Commercial Debt Financing (CAPEX)	53.8	-	67.2	-	-	335.6	719.0
Free Cash Flow Before DS	**24.7**	**63.5**	**86.5**	**131.3**	**165.8**	**404.4**	**1,912.3**
Interests (commercial debt)	-4.8	-22.8	-30.4	-18.1	-1.3	-122.0	-379.6
Amortization (commercial debt)	-3.5	-25.6	-61.1	-45.4	-19.1	-176.1	-719.0
Debt Service	-8.3	-48.4	-91.5	-63.5	-20.4	-298.2	-1,098.6
Free Cash Flow	**16.39**	**15.03**	**-5.06**	**67.76**	**145.41**	**106.28**	**813.62**
Net Cash Flow						10.39	608.19394
DSCR	**2.98**	**1.31**	**0.94**	**2.07**	**8.13**	**Min**	**0.9**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	14.4%	9.0%	7.5%	5.0%		
EBITDA Margin	67.0%	63.4%	64.6%	62.7%	63.1%		
Net Income Margin	36.2%	11.0%	16.7%	19.1%	27.5%		
IRR for PPP Stockholders	16.6%						
PPP Total Cash Flow Net Present Value	10.4						
Private Sector Cash Flow Net Present Value	6.9						
Government Cash Flow Net Present Value	3.5						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT 10-18

Entire Airport Company, Selected CAPEX, New Adjusted Traffic Scenario

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.7	0.9	0.9	1.0	1.0		
Real Estate Revenue/Passenger	0.0	1.1	2.1	2.0	2.0		
Total Revenue/Passenger	7.1	10.8	12.3	13.0	13.9		
Operating Costs/Passenger	2.5	4.1	4.3	4.8	5.2		
EBITDA/Passenger	4.6	6.7	8.0	8.2	8.7		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	65.6	142.1	235.1	329.1	438.9	1,052.4	4,925.8
Expenses	-23.1	-53.9	-83.0	-122.2	-163.6	-383.1	-1,805.4
EBITDA	**42.5**	**88.1**	**152.1**	**206.9**	**275.3**	**669.2**	**3,120.5**
Depreciation	-5.7	-33.3	-64.4	-89.3	-100.5	-256.1	-1,271.8
Operating Income	**36.9**	**54.8**	**87.7**	**117.6**	**174.8**	**413.1**	**1,848.6**
Financing Expenses	-4.8	-22.8	-10.9	-9.4	-1.3	-91.7	-242.3
Taxes	-9.8	-9.6	-25.7	-36.5	-60.4	-103.1	-536.9
NET INCOME	**22.3**	**22.4**	**51.2**	**71.7**	**113.1**	**218.3**	**1,069.5**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**42.5**	**88.1**	**152.1**	**206.9**	**275.3**	**669.2**	**3,120.5**
Taxes	-9.8	-9.6	-25.7	-36.5	-60.4	-103.1	-536.9
Operating Cash Flow	**32.8**	**78.5**	**126.4**	**170.4**	**214.9**	**566.2**	**2,583.6**
Capex	-110.5	-	-107.3	-24.0	-	-572.2	-1,271.8
Public Sector Equity Contributions	22.1	-	21.5	4.8	-	114.4	254.4
Private Sector Equity Contributions	11.0	-	10.7	2.4	-	57.2	127.2
Commercial Debt Financing (CAPEX)	77.3	-	75.1	16.8	-	400.5	890.3
Free Cash Flow Before DS	**21.7**	**78.5**	**115.7**	**168.0**	**214.9**	**508.9**	**2,456.4**
Interests (commercial debt)	-6.9	-25.9	-33.6	-22.0	-2.1	-141.4	-439.5
Amortization (commercial debt)	-5.0	-29.9	-70.0	-53.2	-31.1	-206.2	-854.3
Debt Service	-11.9	-55.8	-103.6	-75.1	-33.2	-347.6	-1,293.7
Free Cash Flow	**9.82**	**22.75**	**12.04**	**92.88**	**181.71**	**161.30**	**1,162.68**
Net Cash Flow						46.86	908.321
DSCR	1.83	1.41	1.12	2.24	6.48	Min	1.0

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	11.9%	10.3%	6.7%	4.8%		
EBITDA Margin	64.8%	62.0%	64.7%	62.9%	62.7%		
Net Income Margin	34.0%	15.8%	21.8%	21.8%	25.8%		
IRR for PPP Stockholders	20.6%						
PPP Total Cash Flow Net Present Value	46.9						
Private Sector Cash Flow Net Present Value	31.2						
Government Cash Flow Net Present Value	15.6						

Source: Prepared by Nathan based on information provided by the Model.

10.5.8 Conclusions and Recommendations

Our preliminary financial analysis presented herein was based primarily on information provided by SEDE. Additional data from various public official and other non-official sources has been incorporated into the analysis. These sources are considered reliable;

however, the results of our analysis could vary significantly if some of these sources of information prove to be inaccurate or incomplete.

Our Project Team has applied all its expertise and experience to provide consistent and sound assumptions. Because of a lack of historical and background data, we cannot guarantee the projected financial performance of TNIA. This level of uncertainty in the selected PPP scenarios would also be a function of any future laws and policies in Brazil, as well as regulatory considerations that would set future tariffs for the airport industry.

The CH2M HILL Project Team has not identified any major regulatory issue that may potentially affect in a material way the immediate performance of the aviation sector of Brazil. New policy and regulation regarding private sector participation in airports has to be defined and enacted, however, to be able to implement the recommendations included in this report.

Important developments have taken place in the Brazilian aviation sector during the last couple of years especially related to the strong growth domestic traffic and airline growth within the Brazilian market. Therefore, to conduct our financial analysis, we prepared a new traffic forecast that incorporates the new available market information.

Our Project Team was not able to examine historical financial statements and operating parameters of TNIA. Besides historical aviation activity at TNIA, other historical operating statistics at TNIA were not available. Therefore, we used relevant historical operating parameters at similar airports under private sector management as a benchmark to project Operating Revenues and Expenses of the different business units at TNIA.

We projected Operating Revenues and Operating Expenses consistent with those that are typical for a standard PPP-concession contract. The results of the financial analysis are summarised in Exhibit 10-19

EXHIBIT 10-19

Financial Analysis Summary

New Traffic Scenario+ Commercial Upside	Full CAPEX (Million USD)	Phase I & II CAPEX (Million USD)	Proposed PPP CAPEX (Million USD)
CAPEX			
Landside	1,375.0	779.3	573.0
Airside	488.1	393.3	292.8
Real Estate	192.1	192.1	192.1
Total	**2,055.2**	**1,364.7**	**1,057.8**
Landside Scenario			
IRR	13.5%	15.0%	30.7%
Net Present Value	-15.4	-0.4	97.8
Landside + Airside			
IRR	4.2%	7.5%	16.6%
Net Present Value	-145.6	-120.1	10.4
Total Airport			
IRR	5.7%	8.1%	20.6%
Net Present Value	-124.4	-104.3	46.9

CAPEX figures in Constant 2010 U.S. dollars.

The financial analysis demonstrates that full CAPEX project delivery can NOT be executed via a traditional model of Private Sector Participation[10] at TNIA. The model also indicates that the potential for the private sector to take on the full CAPEX requirement on its own would at best be marginally successful. A private sector only funded project in a form close to the above documented scenarios would most likely not attract financially sound bidders.

Based on the results of our financial analysis under the broad assumptions used, we have identified the following financially feasible scenarios [11].:

- **Scenario 7**. Landside, Selected CAPEX, New Adjusted Traffic Scenario
- **Scenario 8**. Landside + Airside, Selected CAPEX, New Adjusted Traffic Scenario
- **Scenario 9**. Entire Airport, Selected CAPEX, New Adjusted Traffic Scenario

This finding then suggests that that the best possible format for Private Sector Participation for TNIA would be via a Public Private Partnership (PPP) and that the Government of Brazil or Minas Gerais would need to maintain an equity stake in TNIA. This is the case because the retaining of a minority of shares of the Special Purpose Vehicle (SPV) could augment the financial viability of the project. The public participation within the capital structure of the SPV could reduce the amount of private equity requirements for the project development as well as allow the implementation of creative mechanisms for risk sharing within the capital structure of the SPV

In this equity scenario, the government would be a partner with the private sector operator, and also would benefit financially from the potential upside of airport operations. However, in addition to this equity stake in the PPP vehicle, the Government of Brazil would have to provide supplementary funding for certain CAPEX requirements during the term of the public private partnership.

> ***Based on this preliminary financial analysis and on our experience in comparable successful cases, we recommend the implementation of the development plan of TNIA under a PPP scheme considering the entire airport (Scenario 9) as the preferred alternative.***

In this preferred alternative the Federal and State Governments will share with the private sector investor/operator some of the investment obligation as well as some of the benefits and risk of the entire project. Considering the entire airport as a unit will generate important synergies, will promote a more transparent and practical airport management and operations, and will generate the critical mass to attract premium class international private sector airport investors/operators.

Recommendations for Project Implementation and Future Analysis:

If the State of Minas Gerais or the Federal Government of Brazil decide to pursue a PPP option for TNIA, it is recommended that they retain the services of the International PPP

[10] The traditional molde is a privatization scheme where the private sector provides all the required investment and takes in exchange all the benefits and risks of the project.

[11] NPV is positive and IRR >= to the cost of money established at a rate of 15%.

consulting community to affect the necessary legal, policy and regulatory changes that would make such a project viable. Below, is described the basic criteria for selecting suitable private sector partners to help move the privatization process forward.

Based on the financial analysis described above and on the desire of the State of Minas Gerais and the federal government to implement the Phase 1 and Phase 2 airport improvement program, we believe that follow-on financial analysis should be done in the next year or two based on updated information, including:

- Updated air traffic forecasts for domestic and international passengers.
- Updated investment costs that will result from the ongoing design projects for Phase 1 implementation projects and the preliminary cost estimates of Phase 2 implementation projects based on the future preliminary design project for Phase 2 as described in this report.
- Actual TNIA operating cost data, which will allow for the development of a more accurate financial analysis to better model the transition from public sector airport management to private sector management.

Criteria for identifying suitable private sector partners:

If the state of Minas Gerais has interest in a future full or partial privatization at TNIA, the following criteria should be used to conduct seller side due diligence:

- Financial due diligence should be conducted by preferably a financial consultant with significant experience in the international privatization arena. The proper consultant will have experience in; concession valuations, capital improvement finance, operational evaluations, airline lease negotiations, and the airport budget. American companies well suited to this type of work would be; Nathan Associates, Leigh Fisher, Landrum and Brown, or Infrastructure Management Group, to name a few.
- Investment due diligence is most often conducted by infrastructure fund management groups. To avoid a conflict the group chosen would not be able to ultimately bid on the concession. American companies capable of performing this type of work would be; Morgan Stanley, Citi group, or JP Morgan Chase, to name a few.
- Capital improvement due diligence should be conducted by an experienced international engineering company. American companies that are well experienced in this sort of evaluation would be: CH2M HILL, Jacobs, or AECOM to name a few.
- Operational due diligence is typically conducted by the companies actively bidding on the airport concession. Since the Infraero airports do not have a history of local administrative management and control, the state of Minas Gerais should consider engaging an international airport operating group to advise them on aspects of the TNIA operation, administration and management. The primary American companies that could perform this work would be; The Houston airport system, and AFCO/AVPorts or CH2M HILL.

Successful Airport PPPs:

Since the mid 1980's when the first United Kingdom airports were privatized, there has been a history of strong operational and financial performance on behalf of almost all

private airports. There are certain projects that would be very similar to that of TNIA from the standpoint of numerous airports in a given region being privatized together in one batch. The projects that standout in this way, and may even provide a blueprint for the State of Minas Gerais would be three of the regional privatizations that took place in Mexico, those being; ASUR (Grupo Aeroportuario d el Sureste), GAP (Grupo Aeroportuario del Pacifico), and OMA (Grupo Aeroportuario del Centronorte). All of these privatization projects have been successful on every level, and they include all of the primary airports in their given region of Mexico.

Appendix C lists airport privatizations that have concluded since the mid 1980's.

Appendix A
Traffic Scenarios

EXHIBIT A1

Changi Scenario

Changi Scenarios

	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
International Passeng	Changi Low	179,100	405,000	577,800	754,100	938,200	1,133,400	1,342,300	1,568,000	1,797,400	2,036,200	2,276,600	2,529,200	2,784,500	3,044,000	3,314,800	3,592,000	3,879,000	4,170,000	4,468,000	4,775,000	5,092,000	5,405,000	
	Changi Base	183,900	578,500	826,800	1,077,300	1,340,300	1,619,200	1,917,500	2,232,700	2,567,700	2,908,100	3,255,000	3,613,000	3,978,000	4,349,000	4,736,000	5,132,000	5,541,000	5,956,000	6,383,000	6,823,000	7,274,000	7,720,000		
	Changi High	186,500	752,100	1,073,300	1,400,600	1,742,500	2,104,400	2,488,800	2,877,000	3,293,000	3,724,000	4,165,000	4,620,000	5,082,000	5,553,000	6,042,000	6,543,000	7,059,000	7,583,000	8,121,000	8,676,000	9,246,000	9,821,000		
Domestic Passenger	Changi Low	4,621,200	4,894,800	4,880,200	5,201,000	5,557,800	5,914,100	6,248,600	6,617,400	6,999,000	7,066,900	7,391,300	7,820,800	8,405,500	8,971,000	9,561,100	10,233,000	10,923,000	11,595,000	12,377,000	13,210,000	14,092,000	14,804,000	
	Changi Base	4,748,100	4,997,800	5,329,600	5,913,100	6,566,300	7,249,600	7,941,700	8,534,300	9,178,300	9,849,900	10,559,000	11,315,000	12,007,000	12,815,000	13,687,000	14,619,000	15,604,000	16,585,000	17,662,000	18,871,000	20,132,000	21,292,000	
	Changi High	4,871,000	5,104,800	5,779,800	6,651,400	7,632,500	8,691,600	9,678,400	10,652,000	11,729,000	12,804,000	13,726,000	14,710,000	15,610,000	16,660,000	17,793,000	19,005,000	20,286,000	21,535,000	22,887,000	24,533,000	26,172,000	27,679,000	
Total Passengers	Changi Low	4,800,300	5,099,800	5,458,100	5,955,100	6,496,000	7,047,500	7,590,900	8,085,400	8,597,400	9,172,100	9,670,100	10,450,000	11,190,000	12,015,000	12,896,000	13,825,000	14,802,000	15,765,000	16,845,000	17,985,000	19,184,000	20,209,000	
	Changi Base	4,930,000	5,476,100	6,151,200	6,990,400	7,906,600	8,868,800	9,859,200	10,767,000	11,746,000	12,758,000	13,814,000	14,928,000	15,985,000	17,164,000	18,423,000	19,751,000	21,145,000	22,521,000	24,045,000	25,694,000	27,408,000	29,012,000	
	Changi High	5,057,500	5,856,700	6,853,200	8,051,800	9,375,000	10,796,000	12,166,000	13,529,000	15,022,000	16,528,000	17,891,000	19,330,000	20,692,000	22,213,000	23,835,000	25,548,000	27,345,000	29,118,000	31,108,000	33,209,000	35,418,000	37,500,000	

	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
International Cargo	Changi Low	19,240	26,130	31,210	36,330	41,670	47,410	52,980	58,440	63,910	69,360	74,980	80,600	86,120	91,730	97,430	103,210	109,460	115,640	121,990	128,360	134,750	141,250	
	Changi Base	19,450	31,630	39,180	46,840	55,000	63,260	71,620	79,740	87,880	96,210	104,600	113,150	121,580	130,050	138,730	147,520	156,380	165,280	174,230	183,320	192,600	201,900	
	Changi High	19,650	37,120	47,160	57,400	68,180	79,260	90,480	101,380	112,580	123,750	135,300	146,980	158,110	169,140	180,340	191,760	203,350	214,900	226,600	238,400	250,400	262,500	
Domestic Cargo	Changi Low	20,440	21,270	23,400	25,700	27,270	29,010	30,920	32,850	34,980	37,240	39,720	42,400	45,180	48,170	51,370	54,790	58,440	62,260	66,310	70,600	75,150	79,950	
	Changi Base	20,880	22,020	24,660	27,580	29,640	32,360	35,180	37,980	41,020	44,360	48,100	52,150	56,320	60,650	65,770	71,080	76,820	82,620	89,270	96,180	103,500	111,400	
	Changi High	21,410	22,880	25,830	29,410	32,420	35,840	39,720	43,510	47,740	52,450	57,700	63,520	69,490	76,050	83,260	91,140	99,750	107,800	116,000	125,000	134,600	144,900	
Total Cargo	Changi Low	39,680	47,400	54,610	62,030	68,140	76,420	83,900	91,290	98,870	106,600	114,700	123,000	131,300	139,900	148,800	158,000	167,900	177,900	188,300	198,900	209,900	221,200	
	Changi Base	40,430	53,650	63,840	74,420	84,640	95,620	106,800	117,700	128,900	140,600	152,700	165,300	177,900	190,900	204,500	218,600	233,200	248,100	263,600	279,500	296,100	313,300	
	Changi High	41,060	59,780	72,990	86,810	100,600	115,100	130,200	144,900	160,300	176,200	193,000	210,500	227,600	245,200	263,600	282,900	303,100	322,600	342,600	363,400	385,000	407,400	

	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
International Operatio	Changi Low	1,499	2,446	3,768	5,332	7,116	8,313	9,869	11,130	12,582	14,017	15,374	16,807	18,136	19,631	21,020	22,498	23,998	25,485	26,998	28,533	30,095	31,474	
	Changi Base	2,142	3,495	5,412	7,617	10,166	11,978	13,813	15,900	17,974	20,024	21,982	24,010	25,909	28,044	30,028	32,157	34,283	36,408	38,569	40,782	42,993	44,982	
	Changi High	2,785	4,543	7,036	9,901	13,215	15,439	17,957	20,670	23,366	26,031	28,551	31,213	33,682	36,457	39,037	41,779	44,568	47,328	50,140	52,990	55,891	58,451	
Domestic Operations	Changi Low	35,485	36,435	39,421	43,478	48,203	52,911	57,847	62,065	66,702	71,511	76,265	81,815	86,452	92,117	97,977	104,528	111,446	118,135	125,940	134,205	142,992	150,549	
	Changi Base	50,652	52,050	56,315	62,111	68,881	75,568	82,839	88,664	95,289	102,158	108,950	116,595	123,517	131,595	139,988	148,326	158,208	168,765	178,915	191,721	204,274	215,071	
	Changi High	65,900	67,666	73,210	80,745	89,518	98,264	107,431	115,264	123,879	132,805	141,635	151,571	160,572	171,074	181,958	194,124	206,971	219,394	233,889	249,236	265,557	279,592	
GA Operations	Changi Low	3,316	3,334	3,351	3,368	3,384	3,401	3,418	3,435	3,453	3,470	3,522	3,557	3,593	3,629	3,666	3,702	3,739	3,776	3,814	3,852	3,890	3,948	
	Changi Base	3,251	3,401	3,452	3,504	3,556	3,609	3,664	3,719	3,774	3,831	3,888	3,966	4,046	4,126	4,209	4,293	4,379	4,467	4,556	4,647	4,740	4,858	
	Changi High	3,384	3,468	3,555	3,644	3,735	3,828	3,924	4,022	4,122	4,226	4,331	4,461	4,595	4,733	4,875	5,021	5,172	5,327	5,487	5,651	5,821	6,024	
Total Operations	Changi Low	40,302	42,215	46,560	52,178	58,703	64,625	70,934	76,630	82,737	88,998	95,161	101,979	108,191	115,377	122,662	130,728	139,183	147,396	156,752	166,590	176,977	185,972	
	Changi Base	56,186	58,946	65,179	73,232	82,583	91,073	100,116	108,283	117,037	126,013	134,820	144,569	153,472	163,765	174,225	185,756	197,870	209,838	223,040	237,130	252,007	264,891	
	Changi High	72,069	75,677	83,801	94,290	106,469	117,531	129,312	139,956	151,363	163,062	174,517	187,245	198,849	212,264	225,870	240,924	256,711	272,049	289,516	307,879	327,269	344,067	

EXHIBIT A2

New Adjusted Scenario

	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
International Passeng	Mid Domestic.	310,284	465,426	698,138	907,580	1,089,096	1,306,915	1,568,298	1,725,128	1,897,640	2,087,405	2,296,145	2,468,356	2,653,483	2,852,494	3,066,431	3,296,413	3,543,644	3,720,826	3,906,868	4,102,211	4,307,321	4,438,541	
Domestic Passenger	Mid Domestic.	7,175,210	7,893,832	8,485,869	9,123,309	10,034,540	10,787,130	11,596,165	12,485,878	13,400,818	14,406,680	15,486,321	16,647,795	17,898,380	18,791,198	19,730,758	20,717,296	21,753,161	22,840,819	23,982,860	25,182,003	26,441,103	27,234,336	
Total Passengers	Mid Domestic.	7,485,494	8,359,257	9,184,007	10,029,889	11,123,636	12,094,045	13,164,463	14,181,005	15,298,459	16,493,284	17,782,466	19,116,151	20,549,862	21,643,692	22,797,189	24,013,709	25,296,805	26,561,645	27,889,728	29,284,214	30,748,425	31,670,878	

	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
International Operations		2,566	3,560	4,576	6,417	8,261	9,566	11,297	12,285	13,264	14,373	15,492	16,403	17,282	18,394	19,442	20,642	21,925	22,744	23,607	24,507	25,456	26,439	
Domestic Operations		75,539	83,093	89,325	96,024	105,627	112,472	120,668	129,510	139,127	149,410	158,791	171,544	184,102	192,954	201,774	211,617	221,948	232,703	244,028	255,838	268,291	275,995	
		78,125	86,673	93,901	102,441	113,887	122,058	131,964	141,795	152,411	163,783	175,284	187,947	201,384	211,358	221,216	232,260	243,873	255,447	267,634	280,345	293,749	300,934	
Passengers per Operation																								
International Operations		120	130	153	141	132	126	139	140	143	145	148	150	154	155	158	160	162	164	165	167	169	172	
Domestic Operations		95	95	95	95	95	96	96	96	96	96	97	97	97	97	98	98	96	98	98	98	98	99	

Source: Nathan forecasting model.

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Appendix B
Financial Analysis Summary

EXHIBIT B1 – SCENARIO 1

Landside, Full CAPEX, New Adjusted Traffic Scenario, Commercial Upside

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Real Estate Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Total Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Operating Costs/Passenger	1.6	2.1	2.3	2.7	3.0		
EBITDA/Passenger	4.8	5.3	5.8	6.2	6.9		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	59.0	97.2	154.6	226.3	312.9	730.8	3,404.8
Expenses	-14.5	-28.0	-43.1	-68.4	-94.7	-201.9	-983.6
EBITDA	**44.5**	**69.2**	**111.5**	**157.9**	**218.2**	**529.0**	**2,421.1**
Depreciation	-5.5	-38.2	-38.2	-61.0	-547.5	-277.2	-1,856.9
Operating Income	**39.0**	**31.0**	**73.3**	**96.9**	**-329.2**	**251.8**	**564.3**
Financing Expenses	-6.9	-31.7	-14.8	-11.9	-2.6	-128.3	-343.9
Taxes	-11.2	-	-20.5	-29.7	-	-56.0	-242.4
NET INCOME	**20.9**	**-0.6**	**38.0**	**55.2**	**-331.8**	**67.5**	**-22.0**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**44.5**	**69.2**	**111.5**	**157.9**	**218.2**	**529.0**	**2,421.1**
Taxes	-11.2	-	-20.5	-29.7	-	-56.0	-242.4
Operating Cash Flow	**33.3**	**69.2**	**91.1**	**128.2**	**218.2**	**473.0**	**2,178.8**
Capex	-110.6	-	-46.7	-	-226.5	-573.5	-1,856.9
Public Sector Equity Contributions	22.1	-	9.3	-	45.3	114.7	371.4
Private Sector Equity Contributions	11.1	-	4.7	-	22.7	57.4	185.7
Commercial Debt Financing (CAPEX)	77.4	-	32.7	-	158.6	401.5	1,299.8
Free Cash Flow Before DS	**22.2**	**69.2**	**86.4**	**128.2**	**195.6**	**415.6**	**1,993.1**
Interests (commercial debt)	-6.9	-31.7	-14.8	-11.9	-2.6	-128.3	-343.9
Amortization (commercial debt)	-5.0	-35.7	-57.6	-18.8	-37.8	-188.1	-685.0
Debt Service	-11.9	-67.4	-72.4	-30.8	-40.4	-316.3	-1,028.8
						-	-
Free Cash Flow	**10.29**	**1.82**	**14.01**	**97.39**	**155.18**	**99.28**	**964.23**
Net Cash Flow						-15.42	592.85189
DSCR	**1.86**	**1.03**	**1.19**	**4.16**	**4.84**	Min	0.7

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	14.6%	9.2%	7.7%	5.1%		
EBITDA Margin	75.4%	71.2%	72.1%	69.8%	69.7%		
Net Income Margin	35.4%	-0.7%	24.6%	24.4%	-106.0%		
IRR for PPP Stockholders	13.5%						
PPP Total Cash Flow Net Present Value	-15.4						
Private Sector Cash Flow Net Present Value	-10.3						
Government Cash Flow Net Present Value	-5.1						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT B2 – SCENARIO 2

Landside + Airside, Full CAPEX, New Adjusted Traffic Scenario, Commercial Upside

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.7	0.9	0.9	1.0	1.0		
Real Estate Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Total Revenue/Passenger	7.1	8.3	9.0	9.9	10.8		
Operating Costs/Passenger	2.4	3.0	3.2	3.7	4.0		
EBITDA/Passenger	4.8	5.3	5.8	6.2	6.8		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	65.6	109.1	172.6	250.7	343.5	815.0	3,777.8
Expenses	-21.6	-39.9	-61.1	-93.6	-126.8	-287.9	-1,368.2
EBITDA	**44.0**	**69.1**	**111.5**	**157.0**	**216.7**	**527.1**	**2,409.6**
Depreciation	-5.5	-43.7	-73.5	-96.2	-92.2	-296.8	-1,372.7
Operating Income	**38.5**	**25.5**	**38.0**	**60.8**	**124.4**	**230.3**	**1,036.9**
Financing Expenses	-6.9	-31.7	-14.8	-11.9	-1.6	-126.9	-328.6
Taxes	-10.3	-	-8.0	-17.1	-43.0	-40.1	-254.7
NET INCOME	**21.3**	**-6.2**	**15.2**	**31.8**	**79.8**	**63.4**	**453.6**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**44.0**	**69.1**	**111.5**	**157.0**	**216.7**	**527.1**	**2,409.6**
Taxes	-10.3	-	-8.0	-17.1	-43.0	-40.1	-254.7
Operating Cash Flow	**33.7**	**69.1**	**103.4**	**139.9**	**173.7**	**487.1**	**2,154.9**
Capex	-110.6	-	-109.3	-	-	-686.3	-1,372.7
Public Sector Equity Contributions	22.1	-	21.9	-	-	137.3	274.5
Private Sector Equity Contributions	11.1	-	10.9	-	-	68.6	137.3
Commercial Debt Financing (CAPEX)	77.4	-	76.5	-	-	480.4	960.9
Free Cash Flow Before DS	**22.6**	**69.1**	**92.5**	**139.9**	**173.7**	**418.4**	**2,017.6**
Interests (commercial debt)	-6.9	-36.9	-37.4	-20.9	-1.6	-174.8	-508.0
Amortization (commercial debt)	-5.0	-41.0	-86.3	-50.6	-24.1	-251.9	-960.9
Debt Service	-11.9	-77.9	-123.7	-71.5	-25.8	-426.7	-1,468.9
Free Cash Flow	**10.70**	**-8.82**	**-31.21**	**68.42**	**147.93**	**-8.31**	**548.70**
Net Cash Flow						-145.58	274.15537
DSCR	**1.90**	**0.89**	**0.75**	**1.96**	**6.74**	Min	0.5

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	14.4%	9.0%	7.5%	5.0%		
EBITDA Margin	67.0%	63.4%	64.6%	62.7%	63.1%		
Net Income Margin	32.4%	-5.7%	8.8%	12.7%	23.2%		
IRR for PPP Stockholders	4.2%						
PPP Total Cash Flow Net Present Value	-145.6						
Private Sector Cash Flow Net Present Value	-97.1						
Government Cash Flow Net Present Value	-48.5						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT B3 – SCENARIO 3

Entire Airport, Full CAPEX, New Adjusted Traffic Scenario, Commercial Upside

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.7	0.9	0.9	1.0	1.0		
Real Estate Revenue/Passenger	0.0	1.1	2.1	2.0	2.0		
Total Revenue/Passenger	7.1	10.8	12.3	13.0	13.9		
Operating Costs/Passenger	2.5	4.1	4.3	4.8	5.2		
EBITDA/Passenger	4.6	6.7	8.0	8.2	8.7		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	65.6	142.1	235.1	329.1	438.9	1,052.4	4,925.8
Expenses	-23.1	-53.9	-83.0	-122.2	-163.6	-383.1	-1,805.4
EBITDA	**42.5**	**88.1**	**152.1**	**206.9**	**275.3**	**669.2**	**3,120.5**
Depreciation	-7.4	-48.3	-81.4	-111.5	-689.9	-415.4	-2,731.1
Operating Income	**35.2**	**39.8**	**70.7**	**95.4**	**-414.6**	**253.8**	**389.3**
Financing Expenses	-6.9	-31.7	-14.8	-11.9	-2.6	-128.3	-343.9
Taxes	-8.4	-1.3	-18.4	-27.8	-	-50.8	-217.2
NET INCOME	**19.9**	**6.9**	**37.5**	**55.6**	**-417.2**	**74.8**	**-171.7**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**42.5**	**88.1**	**152.1**	**206.9**	275.3	**669.2**	**3,120.5**
Taxes	-8.4	-1.3	-18.4	-27.8	-	-50.8	-217.2
Operating Cash Flow	**34.1**	**86.9**	**133.8**	**179.1**	**275.3**	**618.5**	**2,903.2**
Capex	-144.2	-	-120.8	-24.0	-260.6	-865.5	-2,731.1
Public Sector Equity Contributions	28.8	-	24.2	4.8	52.1	173.1	546.2
Private Sector Equity Contributions	14.4	-	12.1	2.4	26.1	86.6	273.1
Commercial Debt Financing (CAPEX)	101.0	-	84.5	16.8	182.5	605.9	1,911.8
Free Cash Flow Before DS	**19.7**	**86.9**	**121.7**	**176.7**	**249.3**	**531.9**	**2,630.1**
Interests (commercial debt)	-8.9	-40.0	-40.6	-24.8	-3.5	-195.8	-585.6
Amortization (commercial debt)	-6.6	-45.3	-95.2	-58.3	-52.0	-287.4	-1,163.4
Debt Service	-15.5	-85.3	-135.8	-83.2	-55.5	-483.2	-1,749.0
Free Cash Flow	**4.14**	**1.56**	**-14.11**	**93.54**	**193.72**	**48.70**	**881.17**
Net Cash Flow						-124.41	334.94693
DSCR	**1.27**	**1.02**	**0.90**	**2.12**	**4.49**	Min	0.6

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	11.9%	10.3%	6.7%	4.8%		
EBITDA Margin	64.8%	62.0%	64.7%	62.9%	62.7%		
Net Income Margin	30.3%	4.9%	16.0%	16.9%	-95.0%		
IRR for PPP Stockholders	5.7%						
PPP Total Cash Flow Net Present Value	-124.4						
Private Sector Cash Flow Net Present Value	-82.9						
Government Cash Flow Net Present Value	-41.5						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT B4 – SCENARIO 4

Landside, Phase I and II CAPEX, New Adjusted Traffic Scenario, Commercial Upside

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Real Estate Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Total Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Operating Costs/Passenger	1.6	2.1	2.3	2.7	3.0		
EBITDA/Passenger	4.8	5.3	5.8	6.2	6.9		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	59.0	97.2	154.6	226.3	312.9	730.8	3,404.8
Expenses	-14.5	-28.0	-43.1	-68.4	-94.7	-201.9	-983.6
EBITDA	**44.5**	**69.2**	**111.5**	**157.9**	**218.2**	**529.0**	**2,421.1**
Depreciation	-5.5	-38.2	-38.2	-61.0	-57.0	-210.9	-895.9
Operating Income	**39.0**	**31.0**	**73.3**	**96.9**	**161.2**	**318.1**	**1,525.2**
Financing Expenses	-6.9	-31.7	-14.8	-11.9	-1.6	-126.9	-328.6
Taxes	-11.2	-	-20.5	-29.7	-55.8	-69.4	-423.0
NET INCOME	**20.9**	**-0.6**	**38.0**	**55.2**	**103.7**	**121.8**	**773.6**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**44.5**	**69.2**	**111.5**	**157.9**	**218.2**	**529.0**	**2,421.1**
Taxes	-11.2	-	-20.5	-29.7	-55.8	-69.4	-423.0
Operating Cash Flow	**33.3**	**69.2**	**91.1**	**128.2**	**162.4**	**459.5**	**1,998.1**
Capex	-110.6	-	-46.7	-	-	-498.9	-895.9
Public Sector Equity Contributions	22.1	-	9.3	-	-	99.8	179.2
Private Sector Equity Contributions	11.1	-	4.7	-	-	49.9	89.6
Commercial Debt Financing (CAPEX)	77.4	-	32.7	-	-	349.2	627.1
Free Cash Flow Before DS	**22.2**	**69.2**	**86.4**	**128.2**	**162.4**	**409.7**	**1,908.5**
Interests (commercial debt)	-6.9	-31.7	-14.8	-11.9	-1.6	-126.9	-328.6
Amortization (commercial debt)	-5.0	-35.7	-57.6	-18.8	-24.1	-183.4	-627.1
Debt Service	-11.9	-67.4	-72.4	-30.8	-25.8	-310.3	-955.8
Free Cash Flow	**10.29**	**1.82**	**14.01**	**97.39**	**136.60**	**99.34**	**952.74**
Net Cash Flow						-0.44	773.55117
DSCR	**1.86**	**1.03**	**1.19**	**4.16**	**6.30**	Min	0.7

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	14.6%	9.2%	7.7%	5.1%		
EBITDA Margin	75.4%	71.2%	72.1%	69.8%	69.7%		
Net Income Margin	35.4%	-0.7%	24.6%	24.4%	33.1%		
IRR for PPP Stockholders	15.0%						
PPP Total Cash Flow Net Present Value	-0.4						
Private Sector Cash Flow Net Present Value	-0.3						
Government Cash Flow Net Present Value	-0.1						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT B5 – SCENARIO 5

Landside + Airside, Phase I and II CAPEX, New Adjusted Traffic, Commercial Upside

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.2	7.8	8.5	9.3		
Airside Revenue/Passenger	0.7	0.9	0.9	1.0	1.0		
Real Estate Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Total Revenue/Passenger	7.1	8.1	8.8	9.5	10.2		
Operating Costs/Passenger	2.3	3.0	3.1	3.5	3.7		
EBITDA/Passenger	4.8	5.2	5.7	6.0	6.5		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	65.5	107.3	167.8	240.5	324.4	794.8	3,641.0
Expenses	-21.5	-38.8	-58.6	-88.3	-117.5	-277.3	-1,298.3
EBITDA	**43.9**	**68.4**	**109.2**	**152.2**	**206.8**	**517.5**	**2,342.6**
Depreciation	-5.4	-40.3	-63.5	-79.5	-76.7	-261.8	-1,172.6
Operating Income	**38.6**	**28.1**	**45.7**	**72.7**	**130.2**	**255.6**	**1,170.0**
Financing Expenses	-4.8	-20.9	-9.4	-6.2	-0.9	-82.7	-205.1
Taxes	-11.3	-2.2	-12.6	-23.3	-45.3	-58.9	-334.9
NET INCOME	**22.5**	**5.0**	**23.6**	**43.2**	**84.1**	**114.1**	**629.9**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**43.9**	**68.4**	**109.2**	**152.2**	**206.8**	**517.5**	**2,342.6**
Taxes	-11.3	-2.2	-12.6	-23.3	-45.3	-58.9	-334.9
Operating Cash Flow	**32.6**	**66.3**	**96.5**	**128.9**	**161.6**	**458.6**	**2,007.7**
Capex	-107.4	-	-83.4	-	-	-613.0	-1,172.6
Equity Contributions	53.7	-	41.7	-	-	306.5	586.3
Commercial Debt Financing (CAPEX)	53.7	-	41.7	-	-	306.5	586.3
Free Cash Flow Before DS	**32.6**	**66.3**	**96.5**	**128.9**	**161.6**	**458.6**	**2,007.7**
Interests (commercial debt)	-4.8	-24.4	-22.5	-11.3	-0.9	-111.6	-310.8
Amortization (commercial debt)	-3.5	-27.2	-55.2	-28.1	-12.5	-160.6	-586.3
Debt Service	-8.3	-51.6	-77.7	-39.4	-13.4	-272.2	-897.1
						-	-
Free Cash Flow	**24.35**	**14.65**	**18.85**	**89.53**	**148.21**	**186.40**	**1,110.55**
						-120.10	
DSCR	**3.95**	**1.28**	**1.24**	**3.27**	**12.09**	Min	1.2

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	13.9%	8.8%	7.2%	4.7%		
EBITDA Margin	67.1%	63.8%	65.1%	63.3%	63.8%		
Net Income Margin	34.3%	4.7%	14.1%	18.0%	25.9%		
IRR for PPP Stockholders	7.5%						
PPP Total Cash Flow Net Present Value	-120.1						
Private Sector Cash Flow Net Present Value	-72.1						
Government Cash Flow Net Present Value	-48.0						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT B6 – SCENARIO 6

Entire Airport, Phase I and II CAPEX, New Adjusted Traffic Scenario, Commercial Upside

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.7	0.9	0.9	1.0	1.0		
Real Estate Revenue/Passenger	0.0	1.1	2.1	2.0	2.0		
Total Revenue/Passenger	7.1	10.8	12.3	13.0	13.9		
Operating Costs/Passenger	2.5	4.1	4.3	4.8	5.2		
EBITDA/Passenger	4.6	6.7	8.0	8.2	8.7		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	65.6	142.1	235.1	329.1	438.9	1,052.4	4,925.8
Expenses	-23.1	-53.9	-83.0	-122.2	-163.6	-383.1	-1,805.4
EBITDA	**42.5**	**88.1**	**152.1**	**206.9**	**275.3**	**669.2**	**3,120.5**
Depreciation	-7.4	-48.3	-81.4	-111.5	-122.8	-338.5	-1,617.4
Operating Income	**35.2**	**39.8**	**70.7**	**95.4**	**152.6**	**330.7**	**1,503.0**
Financing Expenses	-6.9	-31.7	-14.8	-11.9	-1.6	-126.9	-328.6
Taxes	-8.4	-1.3	-18.4	-27.8	-52.5	-63.6	-388.5
NET INCOME	**19.9**	**6.9**	**37.5**	**55.6**	**98.4**	**140.2**	**785.9**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**42.5**	**88.1**	**152.1**	**206.9**	**275.3**	**669.2**	**3,120.5**
Taxes	-8.4	-1.3	-18.4	-27.8	-52.5	-63.6	-388.5
Operating Cash Flow	**34.1**	**86.9**	**133.8**	**179.1**	**222.8**	**605.6**	**2,732.0**
Capex	-144.2	-	-120.8	-24.0	-	-779.0	-1,617.4
Public Sector Equity Contributions	28.8	-	24.2	4.8	-	155.8	323.5
Private Sector Equity Contributions	14.4	-	12.1	2.4	-	77.9	161.7
Commercial Debt Financing (CAPEX)	101.0	-	84.5	16.8	-	545.3	1,132.2
Free Cash Flow Before DS	**19.7**	**86.9**	**121.7**	**176.7**	**222.8**	**527.7**	**2,570.2**
Interests (commercial debt)	-8.9	-40.0	-40.6	-24.8	-2.5	-194.2	-567.9
Amortization (commercial debt)	-6.6	-45.3	-95.2	-58.3	-36.1	-282.0	-1,096.2
Debt Service	-15.5	-85.3	-135.8	-83.2	-38.6	-476.2	-1,664.0
Free Cash Flow	**4.14**	**1.56**	**-14.11**	**93.54**	**184.23**	**51.50**	**906.17**
Net Cash Flow						-104.31	582.68243
DSCR	**1.27**	**1.02**	**0.90**	**2.12**	**5.78**	Min	0.6

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	11.9%	10.3%	6.7%	4.8%		
EBITDA Margin	64.8%	62.0%	64.7%	62.9%	62.7%		
Net Income Margin	30.3%	4.9%	16.0%	16.9%	22.4%		
IRR for PPP Stockholders	8.1%						
PPP Total Cash Flow Net Present Value	-104.3						
Private Sector Cash Flow Net Present Value	-69.5						
Government Cash Flow Net Present Value	-34.8						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT B7 – SCENARIO 7

Landside, Selected CAPEX, New Adjusted Traffic Scenario, Commercial Upside

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Real Estate Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Total Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Operating Costs/Passenger	1.6	2.1	2.3	2.7	3.0		
EBITDA/Passenger	4.8	5.3	5.8	6.2	6.9		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	59.0	97.2	154.6	226.3	312.9	730.8	3,404.8
Expenses	-14.5	-28.0	-43.1	-68.4	-94.7	-201.9	-983.6
EBITDA	**44.5**	**69.2**	**111.5**	**157.9**	**218.2**	**529.0**	**2,421.1**
Depreciation	-3.8	-28.7	-27.7	-45.3	-41.3	-155.9	-662.1
Operating Income	**40.6**	**40.5**	**83.8**	**112.6**	**176.9**	**373.1**	**1,759.1**
Financing Expenses	-4.8	-22.8	-10.9	-9.4	-1.3	-91.7	-242.3
Taxes	-12.6	-6.2	-25.5	-36.1	-61.5	-98.5	-530.9
NET INCOME	**23.3**	**11.5**	**47.4**	**67.1**	**114.1**	**182.9**	**985.9**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**44.5**	**69.2**	**111.5**	**157.9**	**218.2**	**529.0**	**2,421.1**
Taxes	-12.6	-6.2	-25.5	-36.1	-61.5	-98.5	-530.9
Operating Cash Flow	**31.9**	**63.0**	**86.0**	**121.8**	**156.8**	**430.5**	**1,890.3**
Capex	-76.9	-	-35.5	-	-	-360.8	-662.1
Public Sector Equity Contributions	15.4	-	7.1	-	-	72.2	132.4
Private Sector Equity Contributions	7.7	-	3.6	-	-	36.1	66.2
Commercial Debt Financing (CAPEX)	53.8	-	24.9	-	-	252.6	463.4
Free Cash Flow Before DS	**24.2**	**63.0**	**82.5**	**121.8**	**156.8**	**394.4**	**1,824.1**
Interests (commercial debt)	-4.8	-22.8	-10.9	-9.4	-1.3	-91.7	-242.3
Amortization (commercial debt)	-3.5	-25.6	-41.4	-14.8	-19.1	-132.7	-463.4
Debt Service	-8.3	-48.4	-52.2	-24.2	-20.4	-224.4	-705.7
Free Cash Flow	**15.97**	**14.56**	**30.21**	**97.58**	**136.36**	**169.95**	**1,118.33**
Net Cash Flow						97.79	985.92293
DSCR	**2.93**	**1.30**	**1.58**	**5.03**	**7.69**	Min	0.9

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	14.6%	9.2%	7.7%	5.1%		
EBITDA Margin	75.4%	71.2%	72.1%	69.8%	69.7%		
Net Income Margin	39.5%	11.8%	30.7%	29.6%	36.5%		
IRR for PPP Stockholders	30.7%						
PPP Total Cash Flow Net Present Value	97.8						
Private Sector Cash Flow Net Present Value	65.2						
Government Cash Flow Net Present Value	32.6						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT B8 – SCENARIO 8

Landside + Airside, Selected CAPEX, New Adjusted Traffic Scenario, Commercial Upside

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.7	0.9	0.9	1.0	1.0		
Real Estate Revenue/Passenger	0.0	0.0	0.0	0.0	0.0		
Total Revenue/Passenger	7.1	8.3	9.0	9.9	10.8		
Operating Costs/Passenger	2.4	3.0	3.2	3.7	4.0		
EBITDA/Passenger	4.8	5.3	5.8	6.2	6.8		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	65.6	109.1	172.6	250.7	343.5	815.0	3,777.8
Expenses	-21.6	-39.9	-61.1	-93.6	-126.8	-287.9	-1,368.2
EBITDA	**44.0**	**69.1**	**111.5**	**157.0**	**216.7**	**527.1**	**2,409.6**
Depreciation	-3.8	-28.7	-56.4	-74.0	-70.0	-214.4	-1,027.1
Operating Income	**40.2**	**40.5**	**55.0**	**83.1**	**146.7**	**312.7**	**1,382.5**
Financing Expenses	-4.8	-22.8	-10.9	-9.4	-1.3	-91.7	-242.3
Taxes	-11.7	-5.7	-15.4	-25.8	-50.9	-74.7	-394.6
NET INCOME	**23.7**	**12.0**	**28.8**	**47.9**	**94.5**	**146.3**	**745.6**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**44.0**	**69.1**	**111.5**	**157.0**	**216.7**	**527.1**	**2,409.6**
Taxes	-11.7	-5.7	-15.4	-25.8	-50.9	-74.7	-394.6
Operating Cash Flow	**32.3**	**63.5**	**96.1**	**131.3**	**165.8**	**452.4**	**2,015.0**
Capex	-76.9	-	-95.9	-	-	-479.5	-1,027.1
Public Sector Equity Contributions	15.4	-	19.2	-	-	95.9	205.4
Private Sector Equity Contributions	7.7	-	9.6	-	-	47.9	102.7
Commercial Debt Financing (CAPEX)	53.8	-	67.2	-	-	335.6	719.0
Free Cash Flow Before DS	**24.7**	**63.5**	**86.5**	**131.3**	**165.8**	**404.4**	**1,912.3**
Interests (commercial debt)	-4.8	-22.8	-30.4	-18.1	-1.3	-122.0	-379.6
Amortization (commercial debt)	-3.5	-25.6	-61.1	-45.4	-19.1	-176.1	-719.0
Debt Service	-8.3	-48.4	-91.5	-63.5	-20.4	-298.2	-1,098.6
Free Cash Flow	**16.39**	**15.03**	**-5.06**	**67.76**	**145.41**	**106.28**	**813.62**
Net Cash Flow						10.39	608.19394
DSCR	**2.98**	**1.31**	**0.94**	**2.07**	**8.13**	Min	0.9

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	14.4%	9.0%	7.5%	5.0%		
EBITDA Margin	67.0%	63.4%	64.6%	62.7%	63.1%		
Net Income Margin	36.2%	11.0%	16.7%	19.1%	27.5%		
IRR for PPP Stockholders	16.6%						
PPP Total Cash Flow Net Present Value	10.4						
Private Sector Cash Flow Net Present Value	6.9						
Government Cash Flow Net Present Value	3.5						

Source: Prepared by Nathan based on information provided by the Model

EXHIBIT B9 – SCENARIO 9

Entire Airport, Selected CAPEX, New Adjusted Traffic Scenario, Commercial Upside

Operating Parameters	2011	2015	2020	2025	2030	NPV	SUM
International Passengers	698	1,568	2,468	3,544	4,437		
Domestic Passengers	8,486	11,596	16,648	21,753	27,234		
Total Passengers	9,184	13,164	19,116	25,297	31,671		
Landside Revenue/Passenger	6.4	7.4	8.1	8.9	9.9		
Airside Revenue/Passenger	0.7	0.9	0.9	1.0	1.0		
Real Estate Revenue/Passenger	0.0	1.1	2.1	2.0	2.0		
Total Revenue/Passenger	7.1	10.8	12.3	13.0	13.9		
Operating Costs/Passenger	2.5	4.1	4.3	4.8	5.2		
EBITDA/Passenger	4.6	6.7	8.0	8.2	8.7		
USD Million	**2011**	**2015**	**2020**	**2025**	**2030**	**NPV**	**SUM**
Revenues	65.6	142.1	235.1	329.1	438.9	1,052.4	4,925.8
Expenses	-23.1	-53.9	-83.0	-122.2	-163.6	-383.1	-1,805.4
EBITDA	**42.5**	**88.1**	**152.1**	**206.9**	**275.3**	**669.2**	**3,120.5**
Depreciation	-5.7	-33.3	-64.4	-89.3	-100.5	-256.1	-1,271.8
Operating Income	**36.9**	**54.8**	**87.7**	**117.6**	**174.8**	**413.1**	**1,848.6**
Financing Expenses	-4.8	-22.8	-10.9	-9.4	-1.3	-91.7	-242.3
Taxes	-9.8	-9.6	-25.7	-36.5	-60.4	-103.1	-536.9
NET INCOME	**22.3**	**22.4**	**51.2**	**71.7**	**113.1**	**218.3**	**1,069.5**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
EBITDA	**42.5**	**88.1**	**152.1**	**206.9**	**275.3**	**669.2**	**3,120.5**
Taxes	-9.8	-9.6	-25.7	-36.5	-60.4	-103.1	-536.9
Operating Cash Flow	**32.8**	**78.5**	**126.4**	**170.4**	**214.9**	**566.2**	**2,583.6**
Capex	-110.5	-	-107.3	-24.0	-	-572.2	-1,271.8
Public Sector Equity Contributions	22.1	-	21.5	4.8	-	114.4	254.4
Private Sector Equity Contributions	11.0	-	10.7	2.4	-	57.2	127.2
Commercial Debt Financing (CAPEX)	77.3	-	75.1	16.8	-	400.5	890.3
Free Cash Flow Before DS	**21.7**	**78.5**	**115.7**	**168.0**	**214.9**	**508.9**	**2,456.4**
Interests (commercial debt)	-6.9	-25.9	-33.6	-22.0	-2.1	-141.4	-439.5
Amortization (commercial debt)	-5.0	-29.9	-70.0	-53.2	-31.1	-206.2	-854.3
Debt Service	-11.9	-55.8	-103.6	-75.1	-33.2	-347.6	-1,293.7
Free Cash Flow	**9.82**	**22.75**	**12.04**	**92.88**	**181.71**	**161.30**	**1,162.68**
Net Cash Flow						46.86	908.321
DSCR	**1.83**	**1.41**	**1.12**	**2.24**	**6.48**	**Min**	**1.0**

USD Million	2011	2015	2020	2025	2030	NPV	SUM
Revenue Increase	0	11.9%	10.3%	6.7%	4.8%		
EBITDA Margin	64.8%	62.0%	64.7%	62.9%	62.7%		
Net Income Margin	34.0%	15.8%	21.8%	21.8%	25.8%		
IRR for PPP Stockholders	20.6%						
PPP Total Cash Flow Net Present Value	46.9						
Private Sector Cash Flow Net Present Value	31.2						
Government Cash Flow Net Present Value	15.6						

Source: Prepared by Nathan based on information provided by the Model

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Appendix C
Airport Private Sector Participation (PSP) Alternatives

Workshop

Identifying PSP Alternatives for Airport Infrastructure

Belo Horizonte Brazil
August 27, 2010

Contents

- Introduction
- Overview of Airport Privatization Worldwide
- Privatization Hurdles and Benefits
- Generic Airport PSP Model
- Preliminary Conclusions

Introduction

Introduction

- Economic globalization.
- Air transport industry deregulation.
- Growing Traffic Demand.
- New Services.
- Infrastructure Expensing and Modernization.
- Changes in priorities for spending tax funds or the lack of capacity of governments to finance the capital expenditures needed to expand and modernize airport infrastructure.
- The participation of private investors has become increasingly important in financing the expansion and modernization of airport infrastructure.

Introduction

- PSP is not a new concept.
- The airport operations and management has changed significantly throughout the world over the past 25 years.
- Airports have emerged as attractive investments for the private sector.
- The new private .management philosophy is transforming the traditional concept of a "cost recovery and airside service oriented airport organization" to a "profit and commercially oriented airport organization."

Airport Privatization vs Airport Concession

- Airport privatization is the injection of private sector capital to gain total or partial control over an airport's facilities and services in various degrees and forms.
- Airport concession is the partial or total transfer of administration, management, operation, maintenance, modernization, and expansion of facilities and services from the public sector to the private sector, governments retain the ownership of assets.

Overview of Airport Privatization Worldwide

Overview of Airport Privatizations Worldwide

Year	Europe	North America	Latin America	Asia/Pacific	Africa and M. East
1987	BAA (100% IPO)				
1989		Toronto (Lockheed)			
1990	Liverpool (B. Aerospace) Southampton (BAA)				
1991			Cancun BOT Charter Terminal (local group)		
1992	Vienna I (IPO) Prestwick (local group)	Pittsburgh (BAA)			
1993	East Midlands (N. Exp)				Cameroon (ADP)
1994	Copenhagen I (IPO) Southend (Regional Airports)				
1995	Cradiff (TBI) Bournemouth (N. Exp) Vienna II (PO) London City (Desmond)	Indianapolis (BAA)	Bogota, Col (Dragados) Mex City BOT Int. Terminal (local group)		
1996	Belfast (TBI) Copenhagen II (PO) Athens (Hochtief)	JFK (Schiphol)	Bolivia (AGI/TBI) L. Cabos BOT Charter Term. (local group)		
1997	ADR (IPO) Birmingham (A. Rianta) Dusseldorf (A. Rianta) Naples (BAA) Bristol (FirstGroup) Istanbul (Vienna) Liverpool II (Peel Airports)	Harrisburg (BAA) Orlando S. (TBI)	Barranquilla, Col. (AENA) Chile (YVR)	Australia Phase I: Brisbane (Schiphol) Melbourne (BAA) Perth (AGI/TBI)	

Overview of Airport Privatizations Worldwide

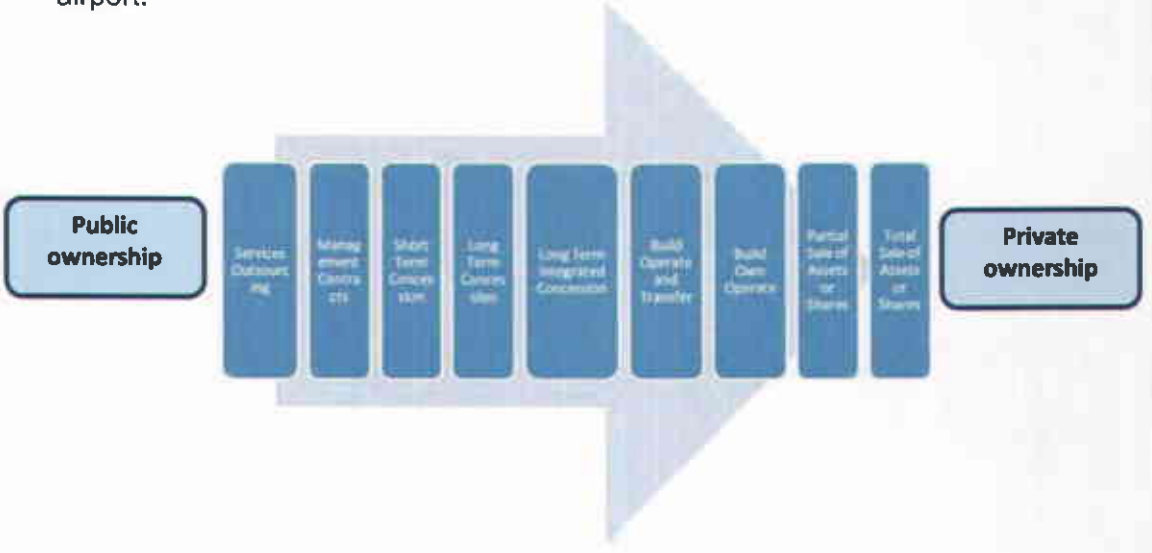
Year	Europe	North America	Latin America	Asia/Pacific	Africa and M. East
1998	London Luton (TBI) Stockholm Skavsta (TBI) Brussels (local group) Berlin (IVG)	Steward (N. Exp) Newark (BAA)	Argentina (SEA- CAS-Ogden) Mex. Southeast I (CPH) Cartagena, Col. (AENA)	Auckland I (IPO) Australia Phase II Wellington, NZ	S. Africa (ADR) (9 airports)
1999	Humberside (Man) Liege (ADP) Venice (local group)	Niagara Falls (AENA)	Mex. Pacific I (AENA) Costa Rica (AGI/TBI) Cali, Col. (AENA)	Auckland II (Changi) Malaysia (IPO) Beijing (IPO/ADP) Cochin (local group) Jakarta	Mauritius (BAA)
2000	ADR II (Leonardo G.) Zurich (IPO) Hamburg (A. Rianta) Copenhagen III (PO) Vienna III (Buy back) Rygge (CPH) Bristol II (CINTRA)	Boston (BAA) Stewart (NEG)	Dominican Rep. (YVR) Mex. N. Central I (ADP) Mex Southeast II (IPO) Cayo Coco, Cuba (AENA)		
2001	Florence (IPO) Frankfurt (IPO) Newcastle (CPH) AGI (TBI) London Luton II (TBI) East Midlands II (Man) Bournemouth II (Man) Liverpool III (Peel Airports)	JFK (BAA) LGA (BAA)	Lima (Frankfurt) Uruguay (YVR) Providenciales (YVR) Montego Bay, Jamaica (YVR)	Subic Bay (N. Exp) Oman (BAA) Bangalore (Zurich) Xiamen (IPO) Philippines (Frankfurt) TBI sold Perth and N Territory airports to BAA	Egypt (YVR)
2002 to 2011	Yerevan & Gyumri (Armenia) Burgas & Varna (Bulgaria) Pristina (Kosovo) (LIMAK)		Quito, Ecuador (HAS) Guayaquil, Ecuador (AA2000) OMA Mexico (IPO) GAP Mexico (IPO) Aerodom(Change Hands: Advent) San Jose (Change Hands: HAS) Liberia Costa Rica (HAS) Small Airports in Colombia Small Airports in Peru Panama City (AeroTocumen)	New Delhi, India (GMR) Calcutta, India Mumbai (India) (GVK-SA) Sydney (Hochtief- Macquaire) 2002	Cairo (Fraport)

Expected Privatizations

Year	Europe	North America	Latin America	Asia/Pacific	Africa and M. East
Expe cted	Aer Rianta Schiphol Group ADP (France) AENA (Spain) ANA (Portugal) Milan Manchester	Chicago Midway (exp next 12- 15months)	Mexico City (DF and Texcoco) La Habana Cuba Cancún II (Tulum) Punta Colonet (Mexico) Bahamas Peru-Cusco	Inchon, Korea Changi, Singapore Hong Kong, China Manila, Philippines	

The level of private sector participation

The level of private sector participation (PSP) that can be achieved depends on the strategic goals of the government and the business opportunities at each airport.



Level of Airport Privatization

Level of Airport Privatization/Concession				
Role	None	Limited	Partial	Full
Policymaking	Government	Government	Government	Government
Regulation	Government	Government	Government	Government
Ownership	Government	Government	Government	Private Sector
Planning	Government	Government	Government/ Private Sector	Private Sector
Investments	Government	Government	Government/ Private Sector	Private Sector
Management and Operations	Government	Government	Private Sector	Private Sector
Government Role	Full Responsibility	Contract	Partnership	Regulation and Oversight
Private Sector Role	None	Contract	Partnership	Full Responsibility
Type of Transaction	Some Service Outsourcing	Concession and Management Contract	BOT Type Contract	Trade Sales or IPO

Privatization Hurdles and Benefits

Definition of Airport Concession

A government or airport authority transfer the exclusive rights to a private operator or investor through a development contract (Build Operate Transfer-BOT or similar), a concession contract, a management contract, or other type of contract to develop and/or operate the airport or airport facility under certain conditions for a fixed period. For this privilege, the operator/investor charges tariffs to users or collects other revenue to recoup its investment.

The Motivation for Airport Concessions

- to obtain capital to modernize and expand infrastructure;
- to recover public funds invested on an operating asset (monetization);
- to obtain the flexibility of a non-governmentally operated entity;
- to achieve the efficiency improvements and innovations typically associated with private sector management; or
- to achieve clearer separation among policymaking, regulation, Investment, and operations.

Some Advantages of Private Sector Participation in Airport Operations

- Get capital investment;
- Reduce operating costs;
- Improved marketing and ability to attract more airline services and develop new routes;
- Improve the competitive position of an airport within its region;
- Higher labor productivity;
- Flexibility to attract and properly compensate competitive top management;
- Ability to increase concession revenues from commercial operations;
- Flexibility in procurement and operating procedures;
- Flexibility to structure innovative financing strategies and attract institutional investors; and
- Consideration of innovative designs and more cost-saving approaches in construction programs.

Some Risks and Costs of Private Sector Participation in Airport Operations

- Difficult to identify and rank strategic objectives.
- Require stakeholders consultation and public consensus.
- Lack of adequate legal and regulatory framework.
- Lack of capacity to oversee and regulate.
- Natural conflict between the interests of private investors and those of the public at large;
- Need for economic regulation;
- Lack of flexibility to react to unexpended economic downturns due to inflexible concession contracts;
- Complex, long, and costly bidding processes to ensure transparency;
- Good strategies but poor implementation;
- The bidding process may not result with the selection of the most desirable operator/investor;
- Governments are temptated to maximize short term benefits and cash flow;
- Frequently benefits are not captured by users.

Lessons Learned from Airport Privatization Experiences

- Governments must plan strategically—defining and ranking their objectives and understanding the consequences of private sector participation.
- Each privatization is structured differently, reflecting different government objectives, stage of development of the aviation sector, and local context. Nevertheless, lessons can be drawn from their collective experience:
- The private sector can bring innovation, efficiency, and capital to the airport sector but can also create risks and costs. One of the main risks is the natural conflict between the interests of private investors and those of the public at large.

Lessons Learned from Airport Privatization Experiences

- Many countries' failure to succeed in private sector participation in infrastructure projects is often attributed to ill-conceived strategies and shortcomings in policy and institutional and regulatory frameworks.
- Private sector participation in smaller airports requires more creative, or hybrid, options such as management contracts emphasizing benefit-sharing and risk-sharing between the private and public sectors, or the involvement of not-for-profit development organizations or donors.
- Private sector participation in airport development is still an evolving process—many new approaches can be used.

Private Sector Participation Alternatives

Preliminary Private Sector Participation Alternatives

Modern Airports are very complex multi-service organizations; however, for the purpose of our analysis we have identified three basic business units:

- Landside (passenger terminal, car parking, ground transportation, boarding bridges, etc.)
- Airside (runways, taxiways, aprons, cargo, etc)
- Industrial/Commercial Real Estate opportunities

These business units do not include Air Traffic Control (ATC)

Private Sector Participation Options

- Landside Concession
- Landside + Airside Concession (Does not include ATC)
- The Airport Company (including Industrial/Commercial Real Estate opportunities but not ATC)

Considerations of the Landside Alternative

- The Concession include new and the existing terminal building.
- Design, construct, maintain, and exploit the new terminal building as well as enhance, maintain, and exploit the existing terminal building.
- Concession Contract term 20 years.
- Assets will be the sole property of the Government.
- All Capital Costs will be the responsibility of the Concessionaire.
- The Concessionaire will be required to provide the financial resources to execute the construction of the new terminal and to enhance the existing terminal.
- The Concession Agreement includes Landside only: passenger terminals, boarding bridges, car parking, and ground transportation concessions.
- All Operating Cost will be the responsibility of the Concessionaire.

Considerations of the Landside Alternative

- The Government will be responsible to operate, at its own cost, all other areas of the airport. The Concessionaire will provide the required space to provide such services.
- Ground, cargo, and aircraft handing at the airport will be provided by airlines directly or by qualified third parties they hire. These service providers will pay a rent to the Concessionaire for the used space within the Concessionaire's facilities.
- The Concessionaire shall receive a percentage of:
  - Passenger (departure) fees;
  - Rent of space to airlines and other users;
  - Commercial revenues (duty fee, other retail, F&B, VIP lounge, banks, advertisement, etc;

Considerations of the Landside Alternative

- The Concessionaire shall receive a percentage of:
  - Passenger (departure) fees
  - Rent of space to airlines and other users
  - Commercial revenues (duty fee, other retail, F&B, VIP lounge, banks, advertisement, etc
  - Revenues obtained from provision of services provided by third parties.
- Regulating Agency will permanently supervise the quality of the services in both terminals.
- Tariffs will be established by the Government.
- A clear economic regulation mechanism is required to minimize uncertainty to private sector investors and users.
- The government will receive a Concession Fee (cannon + variable payment linked to results) or receiving a percentage of the capital stock of the Concessionaire's Company or SPV (Special purpose vehicle).
- We will assume that the Airport's Landside will be considered as a standalone business unit.

Considerations of the Airside Alternative

- The airside is added to the concession.
  - Runways,
  - Aprons,
  - Hangars,
  - Cargo
- Revenues
  - Landing
  - Aircraft parking
  - Cargo Handling and Storage

Considerations of the Real Estate

- Real Estate
  - — Industrial Land,
  - — Commercial Land,
  - — Warehouses,
  - — Multimodal Facilities
- Revenues
  - — Rents

Generic Airport PSP Model

Relevant Assumptions

- Debt to Equity 1/1 (50% -50%)
- Cost of Capital15%
- Cost of Debt 9%
- 20 years
- Concession fee 5% revenues
- Traffic: 2 scenarios (Base and Low)
- Commercial Revenues: 2 scenarios (Base and Up-side)
- Standalone Businesses
- Pay Taxes at 32%

Landside CAPEX

Uses of Funds		TOTAL	2011	2012	2013
CAPEX Construction Costs		250,000,000	80,000,000	85,000,000	85,000,000
Engineering and Project Management Costs	10%	25,000,000	8,000,000	8,500,000	8,500,000
Contingency	5%	12,500,000	4,000,000	4,250,000	4,250,000
Subtotal		287,500,000	**92,000,000**	**97,750,000**	**97,750,000**
Equipment, Vehicles, Sofware, Furiture		12,500,000	2,500,000	5,000,000	5,000,000
Total		**300,000,000**	**94,500,000**	**102,750,000**	**102,750,000**

Airside CAPEX

Uses of Funds		TOTAL	2015	2016
CAPEX Construction Costs		100,000,000	50,000,000	50,000,000
Engineering and Project Management Costs	10%	10,000,000	5,000,000	5,000,000
Contingency	10%	10,000,000	5,000,000	5,000,000
Subtotal		120,000,000	**60,000,000**	**60,000,000**
Equipment, Vehicles, Sofware, Furiture		8,000,000	0	8,000,000
Total		**128,000,000**	**60,000,000**	**68,000,000**

Real Estate CAPEX

			Phase I				Phase II			
Uses of Funds		TOTAL	2011	2012	2013	2014	2020	2021	2022	2023
Development Plan (sqm)										
New Infrastructure Aviation Support Land (Phase 1)		800,000	100,000	100,000	200,000	400,000	-	-	-	-
New Infrastructure Aviation Support Land (Phase 1)		800,000	-	-	-	-	100,000	100,000	200,000	400,000
Required New Land		800,000	-	-	-	-	800,000	-	-	-
New Infrastructure Commercial Land (Phase 1)		400,000	100,000	100,000	200,000	-	-	-	-	-
New Infrastructure Commercial Land (Phase 2)		400,000	-	-	-	-	100,000	100,000	200,000	-
Required **New Land**		400,000	-	-	-	-	400,000	-	-	-
CAPEX										
Cost of New Land Aviation Support		56,000,000	-	-	-	-	56,000,000	-	-	-
Cost of New Commercial Land		28,000,000	-	-	-	-	28,000,000	-	-	-
Subtotal		84,000,000	-	-	-	-	84,000,000	-	-	-
Construction Costs Commercial Land		40,000,000	2,800,000	2,800,000	6,800,000	10,000,000	2,800,000	2,800,000	6,800,000	10,000,000
Construction Costs Aviation Support Land		24,000,000	3,000,000	3,000,000	6,800,000	-	3,000,000	3,000,000	6,800,000	-
Construction Costs of Land		76,800,000	6,800,000	6,800,000	13,200,000	12,000,000	6,800,000	6,800,000	13,200,000	12,000,000
Engineering and Project Management Costs	10%	6,400,000	680,000	680,000	1,100,000	1,000,000	680,000	680,000	1,100,000	1,000,000
Contingency	10%	6,400,000	680,000	680,000	1,100,000	1,000,000	680,000	680,000	1,100,000	1,000,000
Subtotal		76,800,000	6,800,000	6,800,000	13,200,000	12,000,000	6,800,000	6,800,000	13,200,000	12,000,000
		160,800,000	6,800,000	6,800,000	13,200,000	12,000,000	90,800,000	6,800,000	13,200,000	12,000,000
Equipment, Vehicles, Sofware, Furiture		1,700,000	1,700,000	0	0	0	0	0	0	0
Total		162,500,000	8,500,000	6,800,000	13,200,000	12,000,000	90,800,000	6,800,000	13,200,000	12,000,000

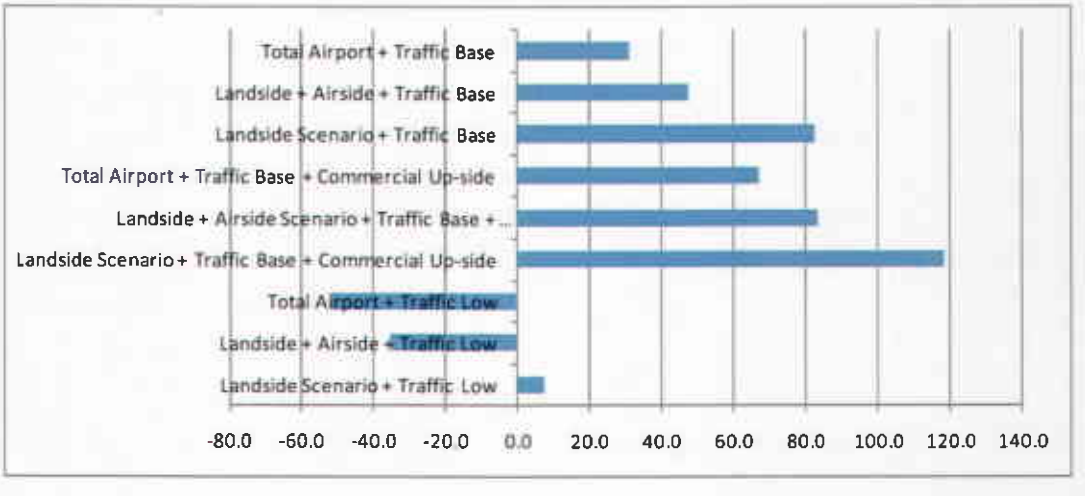
Initial Scenarios

- Landside + Traffic Base
- Landside + Airside + Traffic Base
- Total Airport + Traffic Base

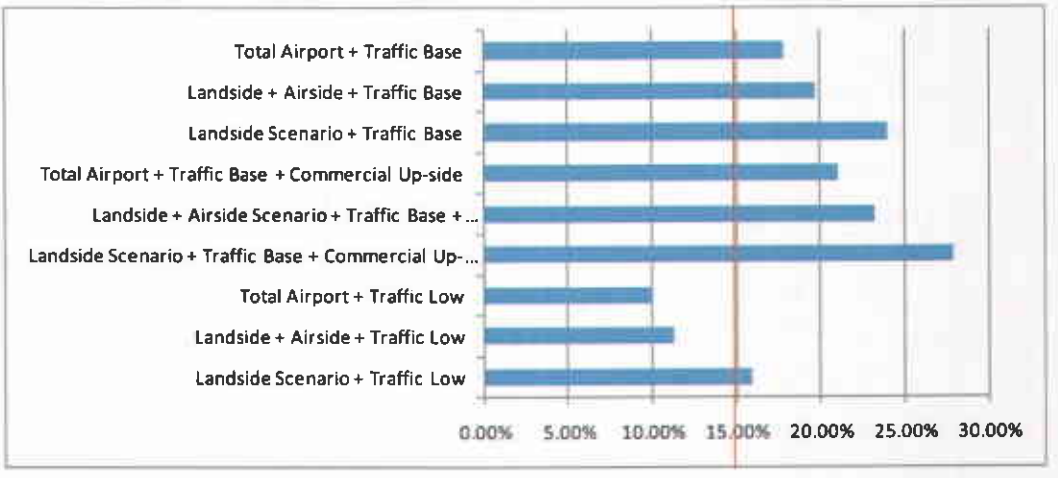
- Landside + Traffic Low
- Landside + Airside + Traffic Low
- Total Airport + Traffic Low

- Landside + Traffic Base + Commercial Up-side
- Landside + Airside + Traffic Base + Commercial Up-side
- Total Airport + Traffic Base + Commercial Up-side

Total Cash Flow Net Present Value



Internal Rate of Return (IRR)



Preliminary Conclusions

Preliminary Conclusions

All Base Case traffic scenarios assumptions in terms of tariff structure, operating expenses, and financing structure are sufficient to pay

- CAPEX,
- pay operating expenses,
- repay debt,
- pay taxes and
- generate enough profit to attract a world class private sector operator/investor.

Preliminary Conclusions

All the Low Traffic scenarios assumptions in terms of tariff structure, operating expenses, and financing structure are sufficient to pay

- CAPEX,
- pay operating expenses,
- repay debt,
- pay taxes;
- But does not generate enough profit to attract a world class private sector operator/investor.
- Some financial engineering is required to avoid tariff increase or to lower level of service.

Preliminary Conclusions

- A strategic planning process to see if PSP is in harmony with the country objectives
- Start defining and ranking stregic objectives
- Develop as sound long term strategy
- Develop coherent policy and regulation
- Promote sector stakeholders' consultation and in-house lobbying
- Enact the appropriate legal and regulatory framework
- Build institutional capacity to oversee and regulate
- Choose a flagship
- Define implementation strategy
- Prepare tendering documents
- Consult the market
- Launch project

Workshop

Thanks

Belo Horizonte Brazil
August 27, 2010

CHAPTER 11

Environmental Impact Assessment

CHAPTER 11

Environmental Impact Assessment

This Chapter presents a preliminary assessment of potential environmental impacts related to the Tancredo Neves (TNIA) airport development plan presented in Chapters 3, 4, and 5. This preliminary assessment is described separately for the proposed Phase 1 projects and for the longer-term Phase 2 and Phase 3 airport development as shown on the airport development plans in Chapter 5.

This Chapter presents a preliminary environmental impact assessment including the following:

- Overview of possible impacts on the environment from the proposed airport improvements at TNIA
- Compatibility of the potential environmental impacts with local regulations and the regulations of potential lending agencies such as the World Bank, International Finance Corporation (IFC), and Inter-American Development Bank (IDB).
- Preliminary assessment of how any potentially significant environmental impacts may be minimized
- Description of local agency expectations and priorities
- Provide preliminary input into plans for any potential full environmental assessments in anticipation of the longer-term proposed airport improvement projects moving forward to the implementation stage

This preliminary assessment provided below is based on the following information:

- Meetings held with SEDE staff including Julio César Diniz de Oliveira, Thais Helena Semionato Bernardes and Peter Robbe.
- Meetings held at TNIA airport with the Infraero Environmental Manager and airport maintenance manager.
- Information obtained from SEDE regarding existing environmental features in the areas of proposed new facilities
- Aerial photographs and environmental mapping
- Meetings between SEDE and the Deputy Secretary for Environmental Affairs, Mr. Shelley de Souza Carneiro
- Meetings held with Roberto Coelho de Alvarenga, Manager of the Sumidouro Park - State Institute of Forests (IEF-MG)
- Site visit to the airport vicinity including visits to several caves near the airport
- Site visit to areas of future airport development, including the north airport development area where the proposed second runway will be constructed
- "General Environmental Assessment Report of TNIA Expansion Plan" by Praxis Projetos E Consultoria, LTDA (October 2009)

- "Preliminary Map Information of Existing Noise Contour Map", by Praxis Projetos E Consultoria, LTDA (May 2009)

11.1 Overview of Potential Environmental Impacts

This Chapter describes the potential environmental impacts from the proposed airport improvements shown in Exhibit 11-1. These environmental impacts focus on the Phase 1 and Phase 2 airport improvements given that these improvements include all of the proposed airport improvements to be completed over the next 20 years, while the Phase 3 improvements describe the longer-term "ultimate" airport development that is likely to occur in the post-planning period.

It should be noted that the majority of the potential environmental impacts are associated with the Phase 2 airport development, given the fact that the Phase 1 development is primarily focused on the south portion of the airport (south of the airport access road). This south area is largely developed and graded and does not have any areas of significant environmental sensitivity.

The north development of the airport, located north of the airport access road, includes a second and (ultimately) third runway, major aerospace and industrial and Airport City developments, and other major airport developments. This area may have significantly greater potential impacts on the environment as it includes native forest areas, streams and drainage basins, and vegetation and habitat areas.

This Chapter provides an overview only of the potential environmental impacts. As described below, the State of Minas Gerais is already in the process of coordinating these potential impacts with local and State environmental agencies. As such, the State of Minas Gerais has proactively begun the environmental review processes including meetings with State authorities and Infraero.

TNIA is located at a federally protected area, namely the APA CARSTE environmental preservation area, due to the numerous caves and archeological findings in the area. A general overview of the potential environmental impacts of the long-term TNIA airport development plan include the following:

- Potential impacts to the nature reserve, including
  - Impacts to existing vegetation, including native forecast to the south of the proposed second runway
  - Impacts to habitat
  - Potential impacts to natural features including rivers, lakes, streams, and springs that may be caused by the significant earthwork required for the second runway and north airport development
- Potential impacts to the existing caves
- Potential noise impacts, in particular in areas of the ends of the current and future runways
- Potential water quality impacts
- Potential noise impacts to surrounding communities

TABLE 11-1
Proposed Airport Improvement

PHASE 1 DEVELOPMENT (2011-2015 general timeframe)
• 600 m runway extension to the east, including 2 new exit taxiways
• New Terminal 2 including new passenger terminal, aircraft parking apron, 3-lane terminal access roadway on two levels, and new parking garage
• New taxiway to the west of the existing runway and new cross taxiway (north-south taxiway)
• New general aviation facility including aircraft parking apron, buildings and landside facilities
• Phase 1 Aviation/aerospace support development
• Phase 1 Airport City and Industrial Park development
PHASE 2 DEVELOPMENT (2016-2030 general timeframe)
• Relocation of air traffic control tower to north side of airport
• New runway with dual parallel taxiways
• Expansion of Terminal 2 and aircraft parking apron
• Two new cross taxiways on the east and west ends of the airport
• New general aviation taxiway and apron
• Phase 2 Aviation/aerospace support development (red buildings)
• Phase 2 Airport City and Industrial Park development
PHASE 3 DEVELOPMENT (Long-term, ultimate airport development)
• New 2,500 m third runway with parallel taxiway
• Terminal 3 and aircraft parking apron
• Phase 3 Aviation/aerospace support development
• Phase 1 Airport City and Industrial Park development

11.2 Compatibility of the Potential Environmental Impacts with Regulations

A summary of the local regulations relating to the potential environmental impacts described in Section 11.1 above can be found on the link http://www.siam.mg.gov.br/siam/login.jsp. The State environmental regulations are listed in Exhibit 11-2 below:

EXHIBIT 11-2
Minas Gerais Environmental Regulations

Description	Number	Date	Level
Deliberação Normativa COPAM	74	09/09/2004	State
Deliberação Normativa COPAM	130	14/01/2009	State
Deliberação Normativa COPAM	134	28/04/2009	State
Deliberação Normativa COPAM	135	19/05/2009	State
Deliberação Normativa COPAM	137	21/07/2009	State
Resolução SEMAD	1004	27/07/2009	State
Resolução Conjunta SEMAD/FEAM/SEPLAG	1003	27/07/2009	State
Lei	18.365	01/09/2009	State
Deliberação Normativa COPAM	140	28/10/2009	State
Deliberação Normativa COPAM	142	20/11/2009	State

Phase 1 projects are described in Exhibit 11-1 and are categorized below based on the current environmental review process being undertaken by the State of Minas Gerais, including:

Environmental Review Process 1- environmental review projects for immediate implementation (2011-12):

- 600 m extension of Runway 16-34
- Improvements to the current runway
- Improvements to the existing Terminal 1
- Improvements to the current aircraft parking apron
- Construction of a new aircraft parking apron
- Rapid exit taxiways
- Elaboration of the executive project and environmental studies for the second MRO complex

Environmental Review Process 2 -- environmental review projects for near-term implementation (2012-2015):

- Construction of a new passenger terminal (Terminal 2)
- Roadway improvements and new parking garage
- New control tower
- New power substation
- Improvements to the general aviation apron
- Elaboration of the executive project and environmental studies for the second runway, its taxiways and third apron

- Construction of the apron and taxiways to the second MRO complex
- Construction of an airport hotel

The Process 1 projects are currently undergoing the required environmental review process as the scheduled implementation for these projects is in 2011-12.

The projects shown under "Process 2" will undergo a more detailed environmental review process given the nature of the new terminal and landside facilities and the need for public input and public meetings. Infraero and SEDE have already started the coordination process with the Minas Gerais Subsecretary of the Environment for all the projects shown above.

Phase 1 projects will be constructed on relatively flat, clear areas to the south of runway 16-34 (for the runway extension) and to the northeast of existing Terminal 1. These areas are already graded and include no significant vegetation or known habitat areas. As such, no significant environmental impacts are anticipated to vegetation or habitat from these proposed projects. In addition, there are no anticipated changes to airport operations as a result of these proposed Phase 1 projects.

It is expected, however, that there will be potential impacts during construction activities including potential water quality, air quality, and erosion impacts. These impacts will need to be mitigated using standard best practices during construction, as required by local construction contracts in Minas Gerais It is expected that the required construction permit for these projects will include such measures in addition to monitoring requirements during construction.

Phase 2 projects:

Phase 2 projects are described in Exhibit 11-1 and include a new 4,000 m runway, associated taxiways, relocation of the air traffic control tower, new air cargo and industrial park facilities, new Aerotropolis facilities, , and ancillary support facilities. These Phase 2 projects are expected to be implemented in the 2016-2025 timeframe, depending on the rates of growth in aviation demand for these different airport facilities.

Given the large extent of this proposed Phase 2 development, it is expected that a detailed, full Environmental Impact Study and Report will be required per Federal and State requirements

Based on discussions with SEDE staff, Infraero staff, and environmental experts, it is expected that all of the proposed airport improvement projects shown in Exhibit 11-1 will be compatible with local environmental regulations. The State of Minas Gerais is fully committed to avoiding impacts wherever possible, minimizing impacts where feasible, and mitigating those environmental impacts that need to be mitigated per Brazil's current environmental regulations.

The State is proactively working with the environmental agencies in an ongoing manner to ensure that the projects proceed within the requirements of the federal and state environmental regulations, and working meetings between these agencies have been very positive and productive to date.

By complying with the detailed Federal, State, and local environmental regulations and requirements, it is expected that this will result in compliance with international lending agencies such as the World Bank, International Finance Corporation (IFC), and Inter-American Development Bank (IDB).

11.3 Preliminary Assessment of Minimization of Potential Environmental Impacts

Potential environmental impacts are described in Section 11.1 above. A number of measures are being considered by the State of Minas Gerais and Infraero in order to avoid and/or minimize these potential environmental impacts. Some of these measures may include:

- Shifting the location of the proposed second and third runways to the northwest in order to minimize impacts to the existing native forest and also to minimize the volumes and extent of earthwork required to construct the new runway and to grade other development areas north of the airport access road
- Shifting the proposed new runways to the northwest will also reduce potential noise impacts to the communities of Lagoa Santa, Pedro Leopoldo and Confins to the southeast.
- Implement the land use and noise compatibility zones foreseen in the local Municipality Master Plans, in accordance to the TNIA Master Plan
- Development/maintenance of a "green buffer zone" between the future proposed airport development and surrounding communities.

It is important to state, however, that detailed engineering and environmental analysis will need to be conducted during the project implementation phase in order to better define potential environmental impacts and to establish clear plans for avoiding and/or minimizing these potential environmental impacts. These detailed studies should also address compensation measures that may be required to meet federal and local environmental regulations.

These follow-on technical studies should include a detailed noise analysis (including noise monitoring sites if applicable) of the proposed future airport development, in particular the location of the second runway. This noise analysis should be done only after the updating of the annual and peak hour forecasts has been completed as recommended in Chapter 2 of this report. This noise analysis should incorporate the revised long-term 20-year forecast of aircraft operations and aircraft fleet mix.

The results of this noise analysis will include future noise contours which should be used to develop an airport compatible land use plan to guide the long-term land use adjacent to the airport and in particular off the ends of the current and future runways.

11.4 Local Agency Expectations and Priorities

The expectations and priorities of SEDE, the State environmental review agency, and Infraero include avoiding potential environmental impacts wherever possible by adjusting the planned development. Avoidance of areas of environmental sensitivity has already been included in this Airport Master Plan as large areas of future development located in the northeast quadrant of the airport have been eliminated from the current plan in order to avoid sensitive forest, habitat, and water quality areas.

Where potential environmental impacts cannot be completely avoided (for example, for the second runway), the State is already working to minimize these impacts as much as possible. It

is expected that for Phase 2 projects the State will be required to mitigate some potential impacts as required by environmental regulations.

A summary of the current environmental review processes is provided below:

- Infraero is proceeding with the renewal of their airport operational license. This license includes requirements for environmental impact analysis and environmental measures that the airport needs to take to meet local and national environmental regulations. This operational license is scheduled to be reviewed by the end of 2010.
- Both Infraero and the State of Minas Gerais are working together on the required environmental reviews and permitting required for the proposed 600 m runway extension and new aircraft parking apron as these are immediate, short-term projects that are scheduled to be designed and constructed in the 2011-2012 timeframe. It is anticipated that this will be a Class 4 environmental review. This process is expected to take 6-9 months to complete.
- The State of Minas Gerais is also proceeding with preliminary coordination of the Phase 2 projects including the second runway. This is likely to be a Class 6 analysis. This process is expected to take 2 years to complete as it involves more detailed environmental studies, two public meetings during the environmental review process, and a more thorough review by the federal and state agencies.

As previously mentioned, Infraero and SEDE have already started the environmental review process for Phase 1 projects. Based on initial consultation with the Minas Gerais Environmental Secretariat and on our experience on other projects, we expect that the requirements and expectations of the Environmental Secretariat will include mitigating strategies for the foreseen environmental impacts, after their analysis and license issuing.

As such, we recommend continued coordination of the Phase 1 projects as the detailed planning and preliminary design work is completed in 2010 and 2011 for these projects. This up-front coordination will allow for identification of any environmental issues and concerns and will allow Infraero to address these concerns early in the process.

Given the nature of the Phase 2 projects, we recommend that environmental coordination of these proposed Phase 2 projects continue during detailed planning and preliminary engineering for these proposed long-term projects. Given the long lead-time for preliminary design, environmental analysis, and environmental reviews and permitting, we recommend that the Phase 2 technical studies be conducted in the 2011-2012 timeframe as input into the required environmental analysis.

11.5 Preliminary Input for Plans for Future Full Environmental Assessments

As described above, it is expected that the Phase 2 projects will require full environmental assessments given the nature and extent of the proposed developments (new runway, new taxiways, new industrial development, etc.). It is expected that the short-term Phase 1 projects will not require a full environmental assessment.

For Phase 2 proposed projects, detailed technical and environmental information and analysis will need to be conducted in order to fully understand the potential environmental impacts of

the proposed airport development and also to determine requirements for mitigation of these potential impacts. A few of the more important elements of any full environmental assessment project should include the following:

- Detailed preliminary engineering and grading analysis to determine future limits of cut and fill
- Detailed water quality and groundwater analysis including current conditions and any future (proposed) water quality measures that would be included as part of the Phase 2 development
- Detailed studies of current habitat areas
- Studies of cultural resources in and around the airport
- Analysis of any wetland areas and habitat related to such areas
- Noise analysis including current and future noise contours
- Full technical analysis of the potential environmental impacts of the items described above
- Inclusion in the full environmental assessment of the "cumulative impacts" of the long-term airport development on these environmental features. This cumulative impact analysis would include the aggregated potential environmental impacts from the various types and areas being developed (including airfield development, terminal development, Airport City, industrial development, etc.)
- Follow-on (or iterative) environmental impact analysis which would incorporate any changes to the airport development plan that may be required to avoid or minimize potential environmental impacts. This may include changes to the sizing or location of proposed future airport facilities.
- Detailed mitigation plans that may be required as part of the environmental permitting process.

CHAPTER 12

Developmental Impact

CHAPTER 12

Developmental Impact

This Chapter describes the direct and indirect benefits which will result from the implementation of the Airport Development Plan for TNIA. The proposed long-term development plan is significant both in airside, terminal, landside, and "off-airport" development and includes:

- A new Terminal 2 and aircraft parking apron in Phase 1
- Additional passenger terminal and apron capacity in Phases 2 and 3
- A new parallel runway
- New air cargo facilities
- New aviation-related development and MRO facilities
- Long-term development of the Aerotropolis / Airport City
- Long-term expansion of the industrial park

Given this significant expansion of both on-airport and off-airport facilities and other related State government initiatives such as required highway and rail transportation improvements, educational and training initiatives, and regional economic development in the Belo Horizonte metropolitan region, the potential benefits of this long-term airport development plan will be substantial. Below are descriptions of the potential benefits in four areas:

1. Infrastructure and Industry
2. Market Oriented Reform
3. Human Capacity Building
4. Technology Transfer

Infrastructure and Industry:

Implementation of the Airport Development Plan for TNIA will have a significant impact on the airport infrastructure and airport capacity at TNIA. The long-term plan would more than double the airfield and terminal capacity at TNIA.

In addition, given the significant runway capacity constraints at Guarulhos and Congonhas airport in Sao Paulo and the strong growth in aviation demand in Brazil in the past 4 years, this increase in airport capacity at TNIA will have the additional benefit of increasing the overall airport system capacity in Brazil. This system-wide increase in capacity is urgently needed given the significant airport delays that have been worsening over the past few years in Brazil as the overall passenger demand has increased.

Increased capacity at TNIA will have additional economic and other benefits for airport users and businesses. As an example, increased airport capacity at TNIA will allow the domestic airlines to bypass Congonhas airport which is currently the only major domestic hub for Brazil but has significant limitations to future growth in demand.

As one example of this, AZUL and TRIP have announced new direct non-stop service from TNIA which previously was served only through Congonhas (as one example, the new Belo Horizonte-Porto Alegre direct service introduced in 2010). A large number of new non-stop flights have been introduced at TNIA in the past 18 months. These new flights include new regional destinations, domestic destinations, and several new international destinations.

The resulting increased connectivity between regional, domestic, and international passengers provides more efficient service for many passengers and decreased travel times on specific origin-destination routes. As has been the case at many airports throughout the world, increased connectivity has the additional positive impact of increasing passenger demand and attracting even more new flights and frequencies in the future as overall demand and load factors increase.

Once Terminal 2 is constructed, the level-of-service for both domestic and international airport passengers will be significantly increased, including improvements to passenger processing and efficiency of operations for regional passengers, domestic passengers, and international passengers.

Construction of the second parallel runway in Phase 2 will result in a significant increase in runway capacity at TNIA. Assuming domestic airlines such as TAM, GOL, AZUL, TRIP and other airlines continue to increase their flight frequencies at TNIA, the second runway will allow for more efficient airfield operations without delays for many years to come. This efficient 2-runway system is in contrast to the very limited runway capacities at both Guarulhos and Congonhas airports in Sao Paulo which can experience significant airfield delays during busy peak hour periods and during bad weather.

The increased connectivity at TNIA in the future will make TNIA a more attractive alternative airport for international connecting passengers in Brazil. Indeed, TNIA is more centrally located than Sao Paulo/Guarulhos airport to serve central and northeastern destinations in Brazil including Brasilia, Fortaleza, Natal, Recife, and other cities.

Given the growth trends described above, the TNIA airport improvement program will result in continued growth in passenger and cargo traffic at TNIA over the next 10 years and beyond. With the introduction of additional passenger and cargo terminal capacity, it is likely that new passenger and cargo activity and airline service will continue to be attracted to TNIA airport.

As one example, some of the current air cargo demand currently bypasses TNIA as it is serviced via truck directly to Guarulhos Airport in Sao Paulo. Additional cargo facilities and increased international flight frequencies at TNIA will likely lead to capture of a higher percentage of this locally-generated air cargo traffic due to the increases in belly cargo capacity as new flights are added at TNIA. As described below, this additional passenger and cargo traffic will lead to increased local business creation in the Belo Horizonte metropolitan area, including businesses related to agriculture, air cargo and freight forwarding companies, and industrial development.

A modern and efficient TNIA airport will also help to attract future aerospace, industrial development and new businesses to the airport vicinity and the Belo Horizonte metropolitan region. This type of business development is a major focus of the long-term airport development plan for TNIA.

Finally, the local employment market in the Belo Horizonte region will experience increases in employment in the design and construction fields given the large design and construction projects that will be implemented during the Phase 1 and Phase 2 airport development.

Market Oriented Reform:

The aviation market in Brazil is currently undergoing a period of re-structuring within the federal government. This restructuring is related to current and pending federal and state regulations and also to potential changes in methods of project delivery.

Airport privatization, concessions, and PPP models are being increasingly discussed and are just now starting to be implemented in Brazil. As of February 2011 there is one ongoing airport privatization (Natal) and a recent announcement by the federal government of 3 upcoming airport terminal concessions (Sao Paulo-Guarulhos, Sao Paulo Viracopos, and Brasilia). While this Chapter does not discuss in detail the current regulatory trends and changes, it summarizes some of the potential benefits of these market reforms for the aviation sector in Brazil.

Given the significant level of investment at TNIA and also the need to complete the runway, apron and Terminal 2 projects as quickly as possible (given the 80 percent increase in demand at TNIA over the past 4 years and the upcoming 2014 World Cup), it is possible that a concession-type model may be considered for implementation of the Phase 1 or Phase 2 airport improvement projects. This could potentially include all Phase 1 construction projects or perhaps be limited to concession of the new Terminal 2.

Some potential benefits of concessions or privatization would include the ability to execute fast-track projects not only for the 2014 World Cup and 2016 Olympics but also where additional airport capacity (such as aircraft parking or terminal improvements) are needed just to keep up with the rapid growth in aviation demand.

These types of market-oriented reforms can potentially bring new technologies, new airport management and marketing approaches, increased airport revenues, and a higher level-of-service for both airport users (passengers) and the airlines at TNIA.

Airport privatization and airport concessions have had positive impacts in other countries throughout the world where significant levels of infrastructure investment and private capital were needed in order to upgrade airport capacity, airport safety and security, and level-of-service. Some of these benefits may be realized within the Brazil aviation system if these market-oriented reforms are implemented in the future.

Also, the creation of Airport City would not only be a source of jobs and exports, but will create additional public private partnership opportunities, thereby strengthening the market-sector reforms and local experience toward greater private sector participation in projects which would have been borne exclusively with public sector funding in the past.

Human Capacity Building:

Implementation of the TNIA Airport Development projects will result in considerable opportunities for human capacity building in the design, construction, and operation of the new airport and industrial facilities. These opportunities may include teaming with international companies who may provide new technologies or new services such as Program Management, Design Management, Facility Management, and other technical capabilities which can be transferred to local companies and local technical experts in Brazil.

In addition, demand for skilled airport management and technical support staff will increase in the future as a result of implementing the recommendations contained in this Airport Master Plan.

The implementation of the various projects under consideration will require filling high skill set positions, most of which can be done by experienced Brazilians. Some of these potential future opportunities may relate to future aircraft maintenance, aerospace, and manufacturing jobs that will result from the long-term TNIA airport development program.

Specific airport-related opportunities may also include training in new air cargo handling systems, new airport security systems, and even Facility Management programs or systems that may be brought to TNIA by the private sector.

Technology Transfer:

There will be many opportunities for technology transfer as part of the long-term TNIA airport development program. With construction of new facilities (such as new passenger and cargo terminals, a new air traffic control tower, etc.), there will be opportunities to introduce new information technologies, facility maintenance technologies, communications technologies, and upgraded airport security systems not only in the new facilities but also airport-wide (for example, airport perimeter security).

New air traffic control procedures based on GPS technologies will also likely be part of the future development program.

Technology transfer may also occur during planning, design, and construction of the new facilities if there are international teaming partners that are involved with local Brazilian companies. These international partners may bring in Project Management and Project Controls systems on large, complex projects which can include on-the-job training for local engineers and construction staff.

Tourism:

While Minas Gerais is not a major tourist destination as compared to Rio de Janeiro and other international tourist centers, Minas does possess a number of tourist attractions including caves, parks and outdoor leisure activities throughout the State of Minas Gerais. The State is currently developing this tourist infrastructure. In addition, there are historic cities such as Ouro Preto and Tiradentes which draw tourists from Minas Gerais and other regions of Brazil.

As international and domestic air transportation continues to grow at TNIA, it is likely that there will be future increases in tourism in the greater Belo Horizonte region. This increased tourism will be boosted by the two upcoming major international events in Brazil, the 2014 World Cup and the 2016 Olympics, which are both going to require significant new investments in hotels and other tourist-related infrastructure, as Belo Horizonte will be one of the main host cities for the 2014 World Cup.

CHAPTER 13

Airport Plans

CHAPTER 13

Airport Plans

This Chapter summarizes the Airport Plans included as part of this Airport Master Plan. These plans have been developed in an integrated manner to show the proposed phased development of all airside, terminal and landside facilities (including new airport access roads, terminal access roads, and interior access roads). In other words, all of the Phase 1 development is shown together on the Phase 1 plan, including new airfield facilities, passenger and cargo terminal facilities, new access roadways, and off-airport development.

The plans are referenced to the respective Chapters and Exhibits as found in this report and include the following:

Conceptual Airport Development Plan – Phase 1 (Exhibit 5-1). This plan includes the following:

- Runway extension of 600 meters
- New exit taxiways
- Taxiway extension for aerospace and MRO development
- New aircraft parking aprons
- New passenger terminal (Terminal 2) and cargo terminal
- New Aerospace/MRO development
- New airport access road
- New terminal access roadway system for Terminal 2
- Expansion of the Industrial Park and associated roadways
- Initial development of Airport City commercial development

Conceptual Airport Development Plan – Phase 2 (Exhibit 5-2). This plan includes the following:

- New parallel runway and associated taxiways
- New cross-taxiways to connect the north and south airport development areas
- airfield facilities including runway extension, new taxiways, and new aircraft parking aprons
- New passenger terminal and cargo terminal
- New Aerospace/MRO development
- New terminal access roadway
- New airport access roadway
- Expansion of the Industrial Park
- Initial development of Airport City commercial development

Conceptual Airport Development Plan – Phase 3 (Exhibit 5-3). This plan represents the "ultimate airport development plan" and, as such, goes beyond the 20-year planning horizon for this Airport Master Plan. This long-range planning is included herein for the purposes of long-term land use planning and land use controls that will result in the future compatible land use around the airport. In addition, this plan represents balanced airfield and terminal capacity that will serve growth in aviation demand at TNIA far into the future. The long-term development plan includes the following:

- Third parallel runway
- New parallel taxiway
- Large new passenger terminal complex to the east of the airport access road
- Expansion of cargo facilities
- Additional Aerospace/MRO development
- Additional Airport City development

As the Phase 1, 2 and 3 Airport Development Plans described above integrate the full airside, landside and roadway future developments, these 3 plans have been included in this Chapter also.

In addition to the phased airport plans, we have included plans showing the industrial, aerospace and Airport City developments, given the large size and scale of these proposed developments. These plans are provided in Chapter 9 and include the following:

Industrial Plan Development– Phase 1 (Exhibit 9-1). This plan shows the overview of the Phase 1 expansion of the Industrial Park and Phase 1 Airport City commercial development.

Industrial Plan Development– Phase 2 (Exhibit 9-2). This plan details of the Phase 2 expansion of the Industrial Park and Phase 2 new development areas for aviation support, aerospace, and Airport City commercial development.

Industrial Plan Development– Phase 3 (Exhibit 9-3). This plan details of the Phase 3 expansion for aviation support, aerospace, and Airport City commercial development.

Airport City Development– Phases 1- 3 (Exhibit 9-4). This plan shows the full build-out of the Airport City commercial development and how it is integrated with the aerospace and other developments.

Industrial Plan Development– Phase 1 (Exhibit 9-5). This plan details the the Phase 1 expansion of the Industrial Park.