

The Arab Republic of Egypt

Egyptian Holding Company for Airports and Air Navigation (EHCAAN)

Egyptian Airports Company (EAC)

The Arab Republic of Egypt

**Special Assistance for Project Implementation
(SAPI)**

for

**Borg El Arab International Airport
Modernization Project**

(Summary)

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Japan International Cooperation Agency (JICA)

Japan Airport Consultants, Inc.
Narita International Airport Corporation (NAA)
Joint Venture

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1. Introduction

1.1. Preface

Japan International Cooperation Agency (JICA) extended an ODA Loan to the Government of Arab Republic of Egypt, in the amount of Japanese Yen 5,732 million to facilitate the Borg El Arab International Airport Modernization Project (the “Project”).

The Project facilities were completed in October 2010, and the airport operations commenced in December 2010. The Project now falls in a Defect Liability Period when any defects for which the Contractor is liable shall be remedied by him not later than November 2011.

Air traffic in the region has kept increasing and nominal capacity initially designed for the Project (1 million passengers) has been reached. In response to the request from Egyptian Airports Company (EAC), JICA decided to dispatch a Study Team to update air traffic demand forecast, to study how the Project facilities can be utilized to their maximum extent possible, and to assess the capacity limit of the completed facilities (the “Study”). If the air traffic demands and requirements in the foreseeable future are assessed to surpass the capacity limit of the completed facility, further airport development will be considered through this Study.

1.2. Outline of the Study

Objectives of the Study are to identify chronological changes (from 2004; SAPROF Study) in socio-economic and industrial conditions at Alexandria, Egypt or in neighboring Middle-East countries, analyze whether the said changes have resulted in the change in the surrounding conditions (from SAPROF Study) being the basis of the Project, and analyze possible option for future direction, toward which Borg El Arab International Airport is recommended to develop.

1.3. Work Procedure of the Study

Organization of the Study Team is shown in Figure 1.3-1.

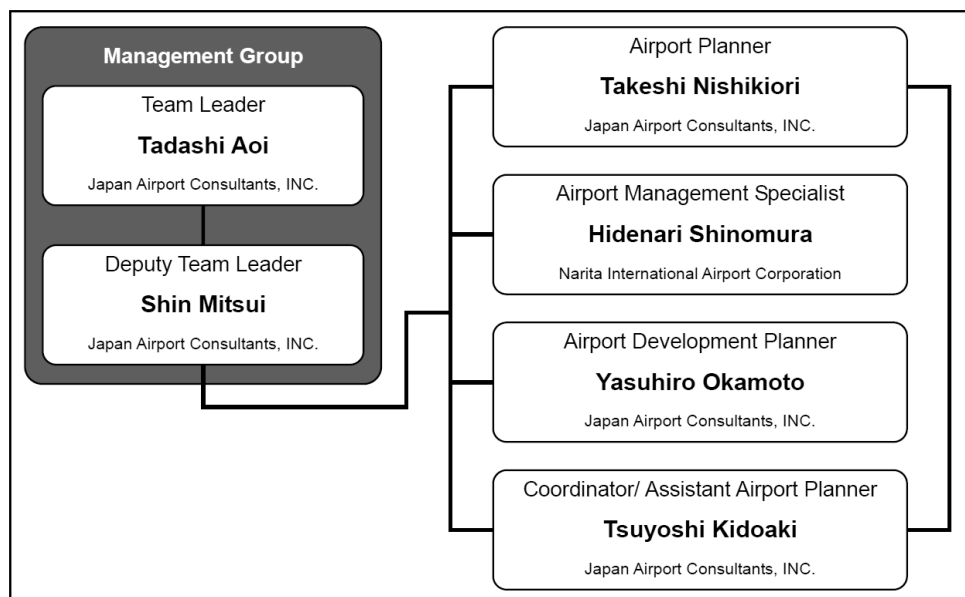


Figure 1.3-1 Organization of Study Team

Work Flowchart for the Study is shown in Figure 1.3-2.

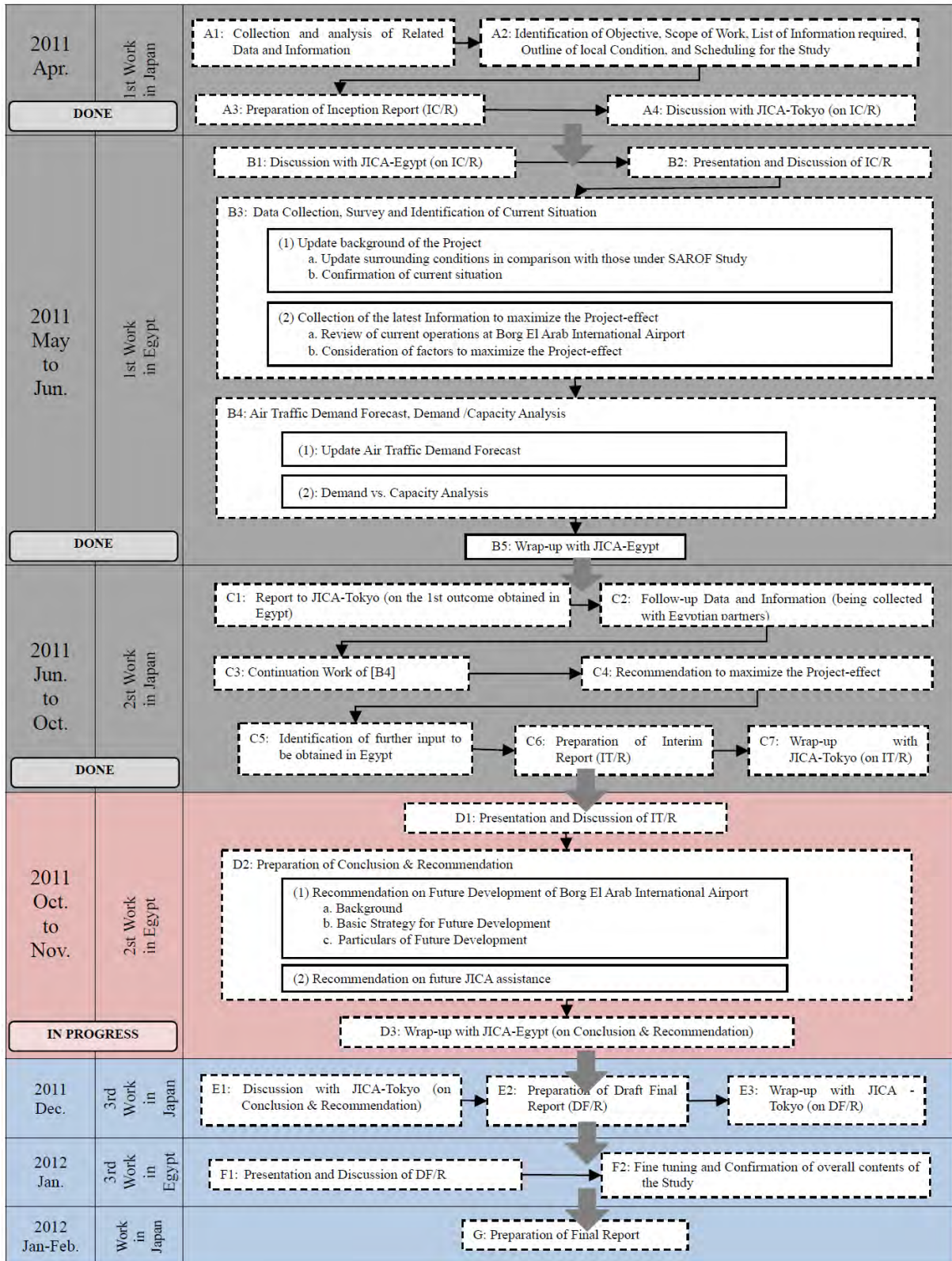


Figure 1.3-2 Work Flowchart for the Study

2. Background of the Project

2.1. History of the Project

2.1.1. Necessity of the Project

Borg El Arab International Airport (the “Airport”) is located 45 km to the west from Alexandria city center. Property of the Airport is sub-divided into two premises, namely of 2,260 ha for Ministry of Defense (MOD) and 1,220 ha for Egyptian Airports Company (EAC).

The Airport was established in 1990s originally to cater for a joint-use by military and civil aviation, with its 3,400-m long runway, apron, control tower, fire station, a primary passenger terminal (2,500 m²), road and car parks, and other infrastructures built by EAC in the premise of MOD. The Airport commenced its initial civil aviation operations from 2000, so as to alleviate traffic congestion and hence to reduce a risk of aircraft accident at Alexandria-Nozha International Airport.

In 2004, EAC requested technical and financial assistance from the Government of Japan, to construct a new civil aviation facility complex in the premises of EAC. In response to the request from EAC, JICA (formerly JBIC) dispatched its Study Team for the Special Assistance for Project Formation (SAPROF).

2.1.2. SAPROF Study in 2004

SAPROF Study was conducted in 2004, based on the data and information on the surrounding conditions available for Alexandria region and/or entire Egypt, as of 2002, consisting of the following:

- Socio-economic indices;
- Industrial products’ data;
- Tourism data (numbers of visitors, origin and destination) and development plans;
- Road, railway and sea transportation network;
- Aviation industries, network and traffic volumes (passengers, cargos, aircraft movements, by airports); and
- Airport Development Plan as of 2002.

Based on the SAPROF Study, a Loan Agreement in the amount of Japanese Yen 5,732 Million for the Borg El Arab International Airport Modernization Project (the “Project”) was signed in March 2005 between MCA and JICA.

2.1.3. Design and Completion of the Project

After signing of the Loan Agreement, the consulting services for Detailed Design, Assistance in Bidding and Construction Supervision was conducted by a group of consultants, namely Japan Airport Consultants, Inc. (JAC), Engineering Consulting Group S.A (ECG), and Netherlands Airport Consultants B.V (NACO) Joint Venture (JENJV).

After the successful Bidding Process, construction of the Project was entrusted to Besix-Orascom Joint Venture (BOJV).

The facilities completed through the Project in the premise of EAC by the end of 2010 are, passenger and cargo terminal buildings, control tower, fire fighting & rescue station, administration building, taxiway and apron pavements, airfield lights and signs, power supply, water supply, telecommunication, sewage treatment system, among others. Fuel farm, catering building, ground handlers’ maintenance yards were built by private sectors.

The changes in the master plan from SAROF Study are summarized as follows:

1) 1st revision

During the detailed design of the Consulting Services in 2006, location of Fire Station was changed to comply with ICAO regulation for the response time of fire fighting vehicle, but locations of Passenger Terminal Building (PTB) and Cargo Terminal Building (CTB) were maintained as proposed in the SAPROF Study.

Passenger Terminal Building

The 20,840 m² gross floor area which was studied in SAPROF(2004) has been modified due to the introduction of an Inline Baggage Security System at basement (713 m²) and additional Air Handling Unit area at rooftop (870 m²). In addition a Utility tunnel is incorporated into the design to facilitate access for maintenance of all main services (1,444 m²). Totally 3,027 m² has been added to the original SAPROF designed floor area.

Cargo Terminal Building

The 890 m² gross floor area which was studied in SAPROF(2004) has been modified due to increased administration area and storage area to allow for sufficient movement of handling equipment. Further outdoor storage area on the left and right sides of the building with high walls and a visitors waiting area were added.

2) 2nd revision

During early stage of the construction process due to the then instruction from higher Authority, the locations of PTB and CTB were moved to the north by 600 -700 m, as a result, those were situated at northern end of the existing runway. Also, entry direction of the access road was changed perpendicularly, due to a land acquisition problem with the local government.

Capacity of the PTB originally planned through SAPROF Study was 1million passengers per annum to sum up the air traffic in the existing 2 airports (Alexandria-Nozha and Borg El Arab) for the year 2014. Meanwhile, the number of actual passengers handled dramatically increased, and exceeded 1.7 million in 2010.

2.2. Socio-Economic Situation in Egypt

2.2.1. General

Egypt has a vast territory of 995,867.77 km² (including Sinai Peninsula, according to the Statistical Year Book 2010, CAPMAS) and is situated at the northeast extremity of the African Continent along Mediterranean. It has been playing an important role as entry to Africa and as center of trade and culture in the Middle East and North Africa.

In April 2008, the governorate territories of Cairo Metropolitan (Cairo and Giza) were divided into Cairo, Giza, Helwan and 6th of October governorates. Egypt has 29 governorates (provinces). A governorate is further sub-divided into four tiers; namely "Region", "City", "District" and "Village".

The territory of Egypt is divided into 5 major regions, namely, Lower-Egypt, Middle-Egypt, Upper-Egypt, Canal and Sinai.

2.2.2. National Economy

Steady growth of the Gross Domestic Products (GDP) of more than 5 % has been continued since 1995 and the GDP in 2010 reached 1,207 Billion Egyptian Pounds (equivalent to US\$ 218 billion) in the current price, which is the highest value among African countries. This is due to the revenues from Suez Canal and the booming cultural heritage tourism industry. GDP per capita(2010) in the

current price was 15,509 Egyptian Pound (equivalent to USD 2,800).

2.2.3. Population

The population of Egypt has increased from 57 million in 1995 to 78 million in 2010. The great majority of it is living along the Nile Delta. Because of the rapid population growth (i.e. average annual growth rate of 2.2 %), about 50 % of the Egyptian population is under 30 years old. 90% of the population is distributed along the Nile River (including the Nile Delta) and the majority (38 million) is living in Lower Egypt.

According to the latest forecast of future population of Egypt by CAPMAS (Central Agency for Public Mobilization and Statistics), the population of Egypt would steadily grow. In the medium-case of estimation, the total population is expected to be 84.9 million in 2015, and 91 million in 2020. This growing speed is expected to keep for the coming 10 years at an annual average growth rate of 1.55% by 2020, against the current annual average growth rate of 2.2% for the last 10 years.

2.2.4. Employment

The people in Alexandria work in a fairly diversified group of services but mainly in the manufacturing, construction, transportation and communication businesses. This is explained because large numbers of industries located in the area and the large population that lives in the city.

Current labor force of Egypt is 26.2 million. According to the latest labor force statistics, un-employment rate in Egypt is 9.0 %. Due to the recent economic growth in Middle-East and Arab regions and the present unfavorable situation of labor market in Egypt, it has been estimated that approximately 6.5 million Egyptians are working abroad, especially in Arab countries (4.8 million).

The Gulf countries such as Qatar, UAE, Kuwait, Bahrain, Jordan and Saudi Arabia are popular destinations of Egyptian migrants for finding job opportunities. These countries are facing at shortage of labor force to maintain economic growth thereby receiving huge number of foreign workers and their families. For example, the ratio of immigrants against the total national populations in 2005, in Qatar was 75.9% in UAE. 71.4%, in Kuwait 62.11 %, and in Saudi Arabia 25.25 %, respectively according to the latest estimation of international statistics.

2.2.5. Housing

The city of Alexandria is well known to be the major tourism destination for people living in the Cairo Region. Many visitors from Cairo own their houses and/or apartments in the city that they use only during the summer vacation. Between 25 and 30% of houses and apartments in Alexandria remain vacant for 8 months through the year.

Population is said to be almost doubled in Alexandria during the summer months adding strain to public utilities and roads.

2.2.6. Industry and Trade

1) Agriculture

The agricultural industry in Egypt has been developed and enhanced Egyptian economy as an important industry since long time ago. The agriculture industry has been generally developed in whole Egypt, but major agricultures are developed in the Nile Delta area.

According to the statistics for agricultural industry in Egypt, in total 123.6 million tons of crop production were grown amounting to a value of 108.7 billion Egyptian Pounds in 2009. For other agricultural products, 18.2 million heads of live stocks exist and producing 5.6 million tons of milk

production.

Fishery is also having important impact on Egyptian economy, by 1.1 million tons of catch of fish with earnings of 11.7 billion Egyptian Pounds.

Total value of agriculture production, including plant, livestock, insect and fish, has reached 189.4 billion Egyptian Pounds (equivalent to 2.46 trillion Japanese yen) in 2009.

2) Petrochemical

Petrochemical is one of the most important industries that boost Egyptian economy. Oil refinery and gas mining are widely spread in Egypt, but a large number of petrochemical establishments (factories) for oil refining are concentrated in the north-coast of Egyptian territory such as Alexandria and Port Said. The latest statistics shows that an amount of 114 billion Egyptian Pounds was earned at 33 mining sites in 2008/09.

2.2.7. Transportation

1) Railways

Egypt has the oldest history of railway developments in Africa and Middle-East regions since 1854. The first railway development started from Alexandria and reached Cairo in 1856. After the first development of railways in Egypt, its network expanded quickly, and more than 3,000km of the network was established by 1940. Further expansion of the rail network has been made mainly in the Nile Delta area from Cairo. Almost all railway networks in Egypt are being operated by Egyptian National Railways (ENR), a governmental transportation management organization. At present, ENR is in services with 5,138 km, and its network includes major traffic line from Aswan in south (upper-Egypt) to Alexandria in north (lower-Egypt). Since railway network developed, railways have been taking a role of major transportation in Egypt until now. According to the latest statistics by ENR, they carried 291.2 million passengers in 2008/09 and 7.9 million tons of freight in 2006/07, accounting for about 40% of total domestic passenger movements and about 10% of total domestic cargo movements.

The nationwide railway network is playing an important role of domestic transportation since the fares are set in an affordable level for local citizens, however modernization of the facilities has not well progressed. This situation and slow developments are caused by serious accidents and various related problems on scheduled operations, train facilities, passenger services and comfort.

Aside from the ENR network, several Street-Cars (Trams) are in service in Cairo metropolitan area and Alexandria city, and 2 lines of Subways (Cairo Metro) are also available in Cairo city. The Cairo Metro is the only Subway developed in African region, operated by Cairo Metro Organization under ENR. Other new 2 lines (Lines 3 and 4) are being implemented to be ready in services. Line 3 will open its phase-1 section in 2011 and Line 4 has just started the construction recently.

2) Road

The road system in Egypt consists of the National Roads including major highways and the Local Roads managed by local governorates. Total length of the road network, paved and unpaved, in Egypt reached 113,451km. 89.1% of the total national road network is paved but the ratio of paved roads in Alexandria region does not reach the national average.

6,741 km of national roads are composed of national major routes such as highways which have a width of 12 m or more. Most highway networks are intensively developed in the Nile Delta area between Cairo and surrounding local cities and a part of highways are consisting of Egyptian section of North-African International Highway which connects Egypt and Morocco. The road traffic for

domestic passenger movement recorded 12.8 billion passengers/km in 2008 according to the statistics of the World Bank.

Total of 5.7 million vehicles were registered in whole Egypt in 2010. For the latest 5 years from 2005 to 2010, the total number of licensed vehicles has increased by 56.0%, and individually 5-year growth of private cars was 60.5%, buses 43.9%, trucks 27.4%, and motorcycles 137.4%. Half of the total licensed vehicles in Egypt are registered in Cairo, Giza and Alexandria governorates.

Recently, the route network and pavement condition of the roads have been improved gradually, however its pace has fundamentally not caught up with the rapidly growing traffic and increasing vehicles. The developments of road network and alternative transportations to solve current chronic traffic congestions in major cities are expected.

3) Air

Domestic air traffic in Egypt has been growing year by year, and it reached 6.2 million passengers in 2009. Since the commencement of air traffic network development in Egypt in the 1920s, air transportation has been one of major means of domestic transportation.

For the past decade, the total number of international and domestic air passengers carried in Egypt has been almost doubled from 20.5 million in 2000 to 40 million in 2010, with an average annual growth of some 7 %. Especially, the growth of air traffic in the Red Sea area (Sharm El Sheikh and Hurghada) and Alexandria area (Alexandria-Nozha and Borg El Arab) is remarkable.

4) Sea and River

Major seaports in Egypt are Red Sea Port, Damietta, Port Said & El Arish, and Alexandria and Dekhiela. Red Sea Port is located in the eastern coastal side of Egyptian territory and used as multi-purposes port base of cargo and passenger services in this area. About 18.5 million tons of cargo and 2.1 million passengers were handled at Red Sea Port in 2010. The other three (3) seaports are located in the Mediterranean coast of northern Egypt and handling more than 80% of international marine cargo in Egypt. The largest sea port is Alexandria and Dekhiela seaport which handled 49.5 million tons of cargo and 508 thousands passengers per annual in 2010.

Passengers handled at these seaports are mostly tourists from European region. Red Sea port is focused for internal tourism movement between the Sinai Peninsula and the Red Sea, and Alexandria port is used for tourist from abroad such as Greece, France, Italy and other international origins including global cruise.

2.2.8. Tourism

Egypt is one of the most popular tourism destinations in the world. Since long years ago, Egypt has been developed as the tourism attractive place and received huge number of tourists from all over the world. The number of international tourist arrivals was 4.4 million in 2001 and increased to 11.9 million in 2009, with an average annual growth rate of some 13 %. Through various sectors on tourism industry, total receipts on tourism has taken important position of national industrial revenues, and recoded 11.8 billion USD.

The majority of tourists enter Egypt by air as popular transportation mean. Currently, 85.6% of the international passengers used air transportation to access Egypt.

Annual average occupancy rate of hotels in Egypt in 2007 was 63% (the figures in 2008 are neglected because of the then economic crisis). Occupancy rate at Alexandria was 58 %, while those at Cairo, Giza, South Sinai (Sharm El Sheikh) and Red Sea (e.g. Hurghada) were remarkably higher (more than 70 %).

3. Update of Surrounding Conditions for the Project

3.1. Outline of Civil Aviation Sector in Egypt

3.1.1. General

Egypt has been playing an important role as an “hub” of transportation and trade in Middle East and North Africa region ever since. Now, Cairo International Airport is one of the most important air transportation gateways to North Africa, and the second largest airport in African continent, next to Johannesburg at South Africa.

Lately, volumes of air transportation in Egypt have increased owing to successful business model expansion of Low Cost Carriers (LCCs) from Middle East and Europe. Concerting with this situation, several airports in Egypt have started various developments to establish, expand or renovate their own facilities.

3.1.2. Air Transportation Statistics for whole Egypt

Nation’s premier airport, the Cairo International Airport, handled 16.15 million air passengers (13.22 million international and 2.92 million domestic) in 2010. In terms of the air passenger volume, the Cairo International Airport is the 2nd busiest airport in Africa, next to Johannesburg (18.38 million), and the 3rd busiest in the Middle East next to Dubai (47.2 million) and Jeddah (17.9 million). The Cairo International Airport is recognized worldwide as a foothold for the both regions. The next busiest airports in Egypt are the Sharm El Sheikh International Airport (8.69 million) and Hurghada International Airport (8.06 million) in 2010.

The most remarkable increase in passenger volumes for the past decade has been observed in the two (2) Alexandrian airports, namely at Alexandria - Nozha and Borg El Arab. Combined number of passengers in 2000 was 350 thousand, which has sharply grown to 1.68 million in 2010 with an annual average growth rate of 17%.

Table 3.1-1 Overview of Air Traffic at the Major Airports in Egypt (2001 to 2010)

Airport	Annual Passengers										Aircraft Movement in 2010	Average annual growth of Pass			
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009			2010		
	Combined Total (International and Domestic Passengers)												Total	International	Domestic
(1) Cairo	8,942,539	8,318,643	8,392,670	8,337,152	9,534,069	10,218,369	10,778,097	12,577,456	14,360,029	14,378,842	16,135,898	13,215,914	2,919,984	155,298	6.08%
EAC Airports															
(1) Sharm El Sheikh	2,100,393	2,068,866	2,915,532	3,418,808	4,590,778	4,750,089	5,052,705	6,415,017	7,747,422	7,419,467	8,682,379	7,633,500	1,048,779	64,336	15.25%
(2) Hurghada	3,186,339	2,926,148	3,040,457	3,396,354	4,574,531	4,524,022	4,832,530	5,945,254	6,741,017	6,728,291	8,059,849	7,478,488	581,361	56,526	9.72%
(3) Aswan	2,355,531	1,080,700	833,766	843,357	1,167,276	1,032,398	874,014	979,034	1,106,809	863,795	954,287	32,734	921,553	13,032	-8.64%
(4) Luxor	2,269,691	1,893,221	1,635,421	1,631,924	2,123,898	2,256,729	2,032,790	1,976,152	2,160,462	1,847,201	1,934,547	946,129	988,418	24,223	-1.59%
(5) Alex/Borg El Arab	91,623	169,622	117,907	138,645	79,091	119,773	230,225	233,762	187,598	371,154	709,961	706,833	3,128	7,312	22.72%
(6) Alex / Nozha	254,905	195,809	303,898	310,445	412,276	489,439	572,817	728,630	1,102,497	1,097,905	972,022	886,949	85,073	19,364	14.32%
(7) Assut (Assiut)	25,317	31,668	47,033	43,840	62,046	72,367	88,691	130,718	327,918	257,122	312,964	287,931	30,033	4,014	28.59%
(8) Taba	2,731	10,821	40,764	67,279	102,744	149,760	209,953	305,577	452,592	340,147	437,443	413,301	24,142	4,777	66.13%
(9) Marsa Matrouh	22,300	16,183	28,332	18,921	19,255	20,661	41,592	50,019	42,294	71,479	114,923	94,409	20,514	1,278	17.82%
(10) Sohag															
(11) El Arish	2,628	24,210	15,101	14,494	11,931	23,588	15,122	3,256	389	5,024	10,055	9,708	347	661	14.36%
(12) Shark El Owainat	1,722	4,138	3,134	3,210	3,076	3,950			380					266	
(13) Saint Catherine	1,627	842	161	82	598	1,440	921	861	746	744	796	21	775	123	-6.90%
(14) Abu Simbel	1,238,585	828,131	346,540	541,224	759,161	650,286	498,573	537,091	632,942	448,576	489,309	249	489,060	5,683	-8.87%
(15) Port Said	18,427	17,790	18,746	26,570	36,228	51,144	53,779	51,806	42,746	30,196	39,108	49	39,059	9,537	7.82%
(16) El Tor	1,323	6,163	1,738	8,945		11,926								146	
(17) El Dakhla	6,224	2,773		804	33				82	576	1,326		1,326	34	-14.33%
(18) El Kharga	11,648	10,273	10,217	9,591	174		1,762	3,431	4,388	4,277	6,223		6,223	290	-6.08%
(19) 6th of October														984	
(20) Marsa Alam		2,239	169,600	270,927	430,014	435,300	500,155	642,807	819,885	938,858	1,182,256	1,141,771	40,485	9,722	
(21) El Alamein						226	17,723	28,800	39,228	31,092	23,889	22,571	1,318	643	
Total of EAC Airports	11,391,014	9,289,597	9,728,347	10,765,420	14,373,110	14,593,098	15,023,352	18,032,215	21,409,395	20,455,904	23,931,237	19,649,643	4,281,594	221,967	7.52%

3.1.3. Government Sector and Airport Operators

Ministry of Civil Aviation (MCA) consists of five (5) major organizations, namely Egyptian Civil Aviation Authority (ECAA), Egyptian Holding Company for Airports and Air Navigation (EHCAAN), Egypt Air Holding Company (EGYPT AIR), Egyptian Meteorological Authority (EMA) and National Civil Aviation Training Organization (NCATO).

EHCAAN has four subsidiary companies, namely Cairo Airport Company (CAC), Egyptian Airports Company (EAC), National Air Navigation Service Company (NANSC) and Aviation Information Technology (AVIT).

Main functions of these companies under EHCAAN are,

- CAC operates Cairo International Airport,
- EAC operates the other 21 airports in Egypt,
- NANSC provides air navigation and air traffic control services in the airports for civil aircraft, which are operating in whole Egypt,
- AVIT provides air traffic information related to civil aircraft operations by IT technology.

3.1.4. Airports in Egypt

Currently 22 airports are in operations for the civil aviation in Egypt.

The Cairo International Airport is owned and operated by the Cairo Airport Company (CAC). The Egyptian Airports Company (EAC) is operating and in possession of 19 airports. Two other airports are consigned to private investors under BOT contract.

Moreover, 16 airfields are owned and operated by private companies, and two of them are jointly used for private and military purpose. In general these private airfields have only short and narrow runways with length less than 2,000 m and basic and primitive facilities

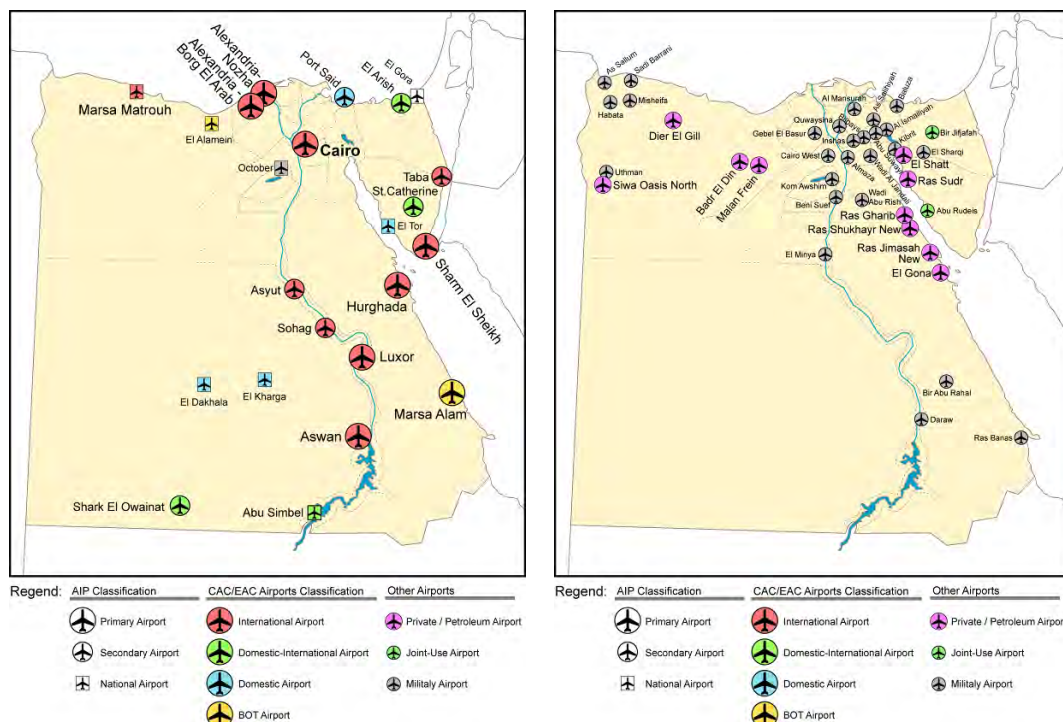


Figure 3.1-1 Location of Civil Airports (Left) and Private/Military Airports (Right) in Egypt

3.2. Current Situation of Civil Aviation Sector

3.2.1. Airports in Alexandria Region

1) Comparison of Flight Schedules in Alexandria Region

Air traffic demand in Alexandria region has rapidly grown after the SAPROF study was conducted in 2004. In comparison of the air traffic volumes at the 2 Alexandria airports in 2003 (i.e. basis of SAPROF study) with that in 2010, the passengers have increased by 375% and so with the aircraft movements by 529%.

The total number of flight per week has increased from 134 to 358, the number of airlines has increased from 7 to 19, and the number of origins / destinations from Alexandria region has increased from 16 to 27 cities between 2003 and 2010. This is closely related to the fact that LCCs started their flight services since 2005.

2) Alexandria – Nozha International Airport

Alexandria - Nozha International Airport, which commenced its operations in 1945, is conveniently located in Alexandria downtown, however is situated at 2 m below water level of the adjacent Lake Maryut, which results in its entire subsoil saturated and a large amount of ground water (1,000 tons/hour) pumped up for 24 hours a day. This made the pavement of either Runway 04/22 (2,200 m in length) or Runway 18/36 (1,800 m) very weak, where only small jet (e.g. A-320, B737 or less) can barely make regional international flights with payload restriction. This airport is surrounded by roads, canals (of higher water levels), and residential areas all around, so no way to expand.

3) Borg El Arab International Airport

Borg El Arab International Airport is located at 45 km west from Alexandria city center. The airport was established in 1990s originally to cater for a joint-use by military and civil aviation, with its 3,400m long runway, a primary passenger terminal, and other facilities built by EAC in the premise of MOD.

The Airport commenced its initial civil aviation operations from 2000, so as to alleviate traffic congestion and hence to reduce a risk of aircraft accident at Alexandria - Nozha International Airport. In 2004, EAC requested technical and financial assistance from the Government of Japan, to construct a new civil aviation facility complex in the premises of EAC. The facilities completed through the Project by 2010 are, passenger and cargo terminal buildings, control tower, and others related facilities.

Old terminal building was initially established as a part of military property and rented for commercial flight operations by EAC since 2000. EAC plans to return its facilities to the Military of Defense in near future based on the original condition of airport development.

4) El Alamein International Airport

El Alamein International Airport has been established in 2006, at 70 km west from Borg El Arab International Airport and 20 km south of Alamein city. The Airport has a 3,500-m long runway, aircraft parking apron of 60,000 m² to accommodate 9 medium-sized aircraft including A300 series. A single-story passenger terminal building has floor area of 3,750 m². The Airport is owned by EAC but operated by a private investor based on BOT contract.

3.2.2. Other Airports in Egypt

1) Cairo International Airport

As of April 2011, Cairo International Airport is accommodating 48 airlines as scheduled flight operators. The network from/to Cairo is expanding to 11 domestic and 83 overseas destinations.

Several developments including new 4th runway and establishment and renovation of terminals to enlarge its capacity has been completed. CAC opens seasonal terminal building in September 2011, to accommodate seasonal demands such as pilgrimage travelers, however, CAC does not plan to accommodate LCCs due to the governmental regulation.

CAC executed a contract in 2004 with Fraport for assistance in operation and management of the airport. The contract with Fraport contains delegation of 3 executives from Fraport to assist airport operation and management throughout the contract duration of 8 years.

2) Sharm El Sheikh International Airport

Sharm El Sheikh Airport is located at Sinai Peninsula, where popular beach resort is extended along the coastal apex of Red Sea and Aqaba Bay. The airport has 2 runways, 3 passenger terminals, and 46 aircraft stands. Air traffic demand at the airport has been growing 8 times for the past 5 years.

The Terminal 1, opened in 2007, has a floor space of approximately 44,000 m², where Egypt Air (and Egypt Air Express) is handling all international and domestic passengers. The Terminal 1 was financed by the World Bank, designed by a Lebanese consultant and constructed by a Saudi Arabian contractor. The Terminal 2, opened in 1997 and renovated in 2004, has a floor area of 21,000 m², where all the rest of airlines are operating mainly their international flights.

3) Hurghada International Airport

Hurghada International Airport is located along the Red Sea coast on the opposite side of Sharm El Sheikh. The Airport has currently only one terminal building in which more than 8 million passengers were busily handled in 2010, more than 90 % of which were international passengers.

The Airport has been developed and expanded by EAC continuously. Since 2008, the existing terminal facilities were expanded and the developments have been completed in 2010 with the cost of 155 million US Dollars, and the capacity of the airport increased up to 7.5 million passengers per annum through these developments.

4) Luxor International Airport

The Airport is located on the east bank of the Nile River and at 10 km from the city center. Among the total number of passengers, British accounted for 19 %, French 15 %, Germany and Spanish 7 %.

The airport facility includes a runway of 3,500 m in length and 45 m in width, full-length parallel taxiway, 2 aircraft parking aprons and passenger terminal building of approximately 50,000 m² in floor area. The passenger terminal building is designed for handling international and domestic tourism passengers with spacious check-in hall and large area of commercial facilities.

5) Aswan International Airport

Aswan International Airport is located on the west side of Aswan city, near the Temple Philae, Aswan dam and High dam. The Airport has a 3,400m long runway with full-length parallel taxiway, 2-story passenger terminal building of approximately 34,000 m² floor area, 5 aprons of open stands, control tower, fire and rescue station, among others.

Nowadays most international tourists to Aswan used to arrive by domestic flight, but take Nile River Cruise to return to Luxor, after luxury cruise ship with heritage hopping services have been developed. In comparison, the number of passengers once reached 2.36 million in 2000 but decreased to 0.95 million in 2010.

3.2.3. Airlines in Egypt

The Egypt Air Holding Company (EGYPT AIR) has seven subsidiary companies including Egypt Air

Express, which is flying short-haul international and almost all domestic routes by small jets, Egypt Air Cargo for cargo freighter operations, Egypt Air Catering for servicing in-flight or in-airport meals, and two companies related to Egypt Air flight operations. As of August 2011, 18 Egyptian civil commercial airlines were in operations, which consisted of six scheduled commercial service airlines (including three Low Cost Carriers and one paper airline), one private business jet service airlines, nine charter flight service airlines and two cargo airlines.

3.2.4. Recent Trend of LCC services

Recently, Low Cost Carriers (LCCs) are drastically expanding their market worldwide. Egyptian aviation market is not an exception and a large number of LCC are in operation between Egypt and Europe as well as Middle East. It is not clearly defined “which airline is LCC?” at present, but LCCs are generally prohibited to land at Cairo International Airport due to air traffic congestion.

At present, LCCs flying from/to Egypt are generally differentiated into two categories; namely, European LCCs on chartered basis mainly flying from Europe and Russia to the Red Sea beach resorts, and the other is Middle-Eastern LCCs on scheduled basis mainly flying from Middle East to Cairo’s outskirts and other Egyptian cities with large population, such as Alexandria and Asyut.

Currently, at 2 Alexandria airports, 20 airlines are in service, 9 of which are LCCs. The number of flights by those 9 LCCs accounted for 50% of the total flights operated at these 2 airports.

3.2.5. Challenges of Civil Aviation Sector in Egypt for the Future

Currently, the civil aviation sector in Egypt is facing several issues, however generally it has been developed year by year. Current issues and concerns are mostly attributable to the rapidly increasing passengers. These situations could impact on the capacity of related facilities in the airports directly. Due to the fact that Egypt has been playing a role of regional base of air traffic since long time ago, the network of airports were well developed in the entire state. However, current growth of air traffic is becoming a cause of several difficulties, such as on the capacity of the airports.

Airport Developments to solve the capacity constraints

The recent unexpected increase in air traffic is basically owing to the growing economy in Egypt and surrounding countries. This recent changes have already impact on the civil aviation sector in Egypt. The situation is expected to continue in future according to related economic forecasts. To be ready to accommodate growing demand is priority challenges of the airports and the civil aviation sector in Egypt, and Borg El Arab International Airport is also not an exception.

Strategy to be a “Hub” of the region

Currently, airports in the Middle-East region such as Dubai, Abu Dhabi and Doha have been developed rapidly as the hub of the region with establishments of new airport or new terminal buildings. Although Egypt is still playing a role as the air traffic base of the region, these airports in the Middle-East region could be taking a place of the hub in North-Africa region in near future due to the economic growth and rapid development speed.

3.3. Development Projects of Civil Aviation Sector in Egypt

3.3.1. Airports in Alexandria Region

1) Alexandria – Nozha International Airport

EAC plans to rehabilitate the runway, for which official announcement for the closure of Alexandria – Nozha International airport was published by the Minister of Civil Aviation as a NOTAM (Notice to Air Men) on AIP (Aerodrome Information Publication) in November 2011 and the airport was closed from 1 January 2012 till the beginning of 2013.

Now, all commercial airlines have already transferred to Borg El Arab International Airport. Egypt Air, the major airlines in Alexandria airports, has also moved its all operations to Borg El Arab International Airport on 1st of December, 2011.

2) Borg El Arab International Airport

All developments were completed by October 2010, and new facilities including the passenger terminal building, aircraft parking apron, taxiways connected to the existing runway, air traffic control tower, approach road and related facilities at the Airport have become operational, being a new base of commercial air traffic in Alexandria to take place of the former Nozha International Airport..

3) El Alamein International Airport

The demand catchment area of the airport is just narrow and concentrated to focus on the demand of the tourists who visit El Alamein beach resort from European countries by charter flights. At the north of the airport, several developed resorts exist. Considering the fact that the airport handles only chartered flights for small numbers of European tourist, the impact on the passenger's demand for Borg El Arab International Airport is considered to be negligible.

3.3.2. Cairo International Airport

Cairo International Airport has been continuously developed, expanded and renovated to accommodate growing air traffic demand, as follows:

- 4th runway (opened in 2010 / 4,000 m long x 60 m wide / US\$ 79 million)
- New Terminal 3 (completed in 2009 / 185,000 m² / 11 million pax. / US\$ 542 million)
- New control tower (opened in 2010 / 120 m elevation)
- New multi-story car park building (completed in 2010 / 3,000 parking spaces)
- Terminal 1 Upgrade (to be completed in 2011)
- Inter-terminals people mover (under construction for completion by 2012)
- New cargo city (planned to be developed by 2013)
- Terminal 2 Renovation (the project will finish by 2014 / accommodate A380 / 8 million pax.)
- New Seasonal Terminal Building (opened in September 2011 / 3.2 million pax.)



New Terminal 3



Image – Terminal 2 Renovation



Image – Inter-terminal rail-link

Figure 3.3-1 Ongoing Development at Cairo International Airport

3.3.3. Major EAC Airports

1) Sharm El Sheikh International Airport

In order to cater for the future demand, Sharm El Sheikh International Airport is planned to have the new terminal building and 3rd runway to the opposite side of the existing facilities. The new terminal building will be capable of accommodating 7.5 million passengers per annum. The construction cost is estimated to be 350 million US Dollars in total and will be started by 2012 as originally scheduled. The development will be financed by African Development Bank (AfDB) however its process is slightly on hold due to the Egyptian national elections.

2) Hurghada International Airport

Although several expansions of Hurghada International Airport were carried out, the air traffic demand on this area has been growing faster than expected. To cope with the situation, construction of the new passenger terminal building is ongoing as of 2011. The new terminal will be capable of accommodating additional 7.5 million passengers, the cost of which is estimated to be US\$ 300 million to be completed in 36 months. The development of new passenger terminal building was financed by the Kuwait Bank.

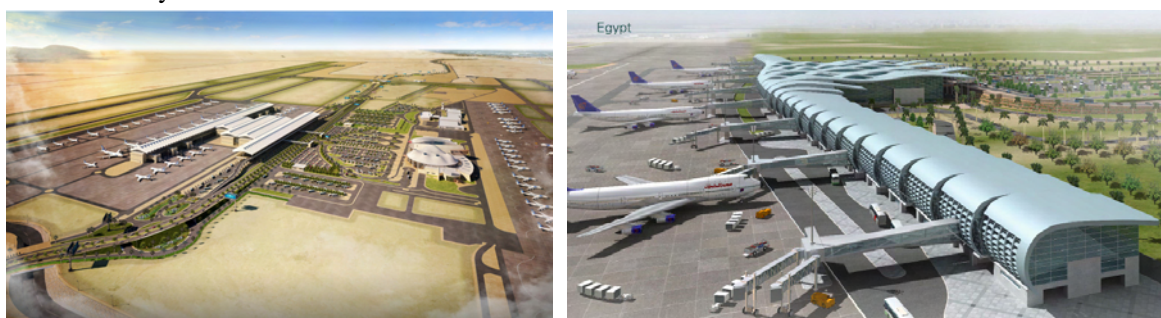


Figure 3.3-2 Design Image of New PTB at Sharm El Sheikh (Left) and Hurghada (Right) Airports

3.4. Tourism Industry in Alexandria Region

3.4.1. Accommodations

In Alexandria region, there are currently 4,000 rooms at 43 hotels, in which 167 rooms are located within 15 km from Borg El Arab International Airport. Random interviews conducted by JICA Study Team revealed that great majority (more than 75%) of the hotel guests who visited Alexandria were for business purposes.

3.4.2. Tourism Attractions

Since the 1990's the government of Egypt and archaeologists have discovered a wealth of historic sunken treasures in the bay of Alexandria and Abukir Bay. Over 2000 objects including sphinxes, statues and other objects have been mapped including pieces from the famous Alexandria Light House and Cleopatra's Palace.



Figure 3.4-1 Sunken Treasures at Alexandria

In 2006, UNESCO funded a study to look into the feasibility of developing an underwater museum near the New Library in Alexandria that would provide tourists with a direct underwater view of many of these objects. The proponents state that if the museum is materialized, it would provide Alexandria with a much needed unique tourist attraction that could add as many as one million annual new tourists to the city.

3.4.3. Current Development Projects for Tourism

Currently there are two major residential and commercial development projects in the proximity of the cities of Alexandria and Borg El Arab.

The city of Alexandria is not as well-known and of the interest to foreign tourists as other cities throughout Egypt like Cairo, Luxor and Aswan having historical heritage resources and Hurghada, Sharm El Sheik and Marsa Alam having marine tourism resources. Even though the city is frequently visited by foreign tourists because of its historical and cultural attractions (library, roman ruins, museums) they rarely stay in the city for more than a day or rarely spend the night.

Alex West Development Project

The first major development “Alexandria West” is located just 20 minutes from Borg El Arab International Airport and includes hotels, schools, conference center, a university, an 18 holes golf course, malls and shops and movie theaters and several hundreds of high-end houses, villages and townhouses. Currently the Alexandria West is less than 35% completion. Its full development is expected to house over 15,000 people.

North Coastal Development

One of the booming tourism spots in the vicinity of Alexandria is the north coast beach resort development between Alexandria and Marsa Matrouh, more specifically the area spreading over 45 km between Alexandria and El-Alamein.

It is speculated that as many as 3,000 new hotel rooms will be built in this area in next two to three years. This development will have a major impact on the view tourists have today of Alexandria.

3.5. Infrastructure in Alexandria Region

3.5.1. Current Situation of Infrastructure

Alexandria is the 2nd largest city in Egypt having a population of 4 million. Between Cairo and Alexandria, 6th October City exists having a population of 3 million. Between Cairo and Alexandria (through 6th October), several modes of transportations are in services including rail, road and air.

A railway link connects Cairo and Alexandria in 2 and half hours by express train. The Desert Road connects the cities in 3-hour drive, where 50-seater buses or 15-seater micro-buses are main mode of transportation for Egyptian citizens between the 2 cities.

The traffic between the cities in summer peak season is really heavy because Alexandria is a popular destination as a summer resort for Egyptian citizens. The same number as Alexandria’s population (about 4 million Egyptian citizens) is staying in peak season for their long vacation.

3.5.2. Air Traffic Developments

In the area around Alexandria, aside from Nozha and Borg El Arab International Airports, El Alamein International Airport is in service. The status of the El Alamein Airport is the 3rd airport after Alexandria - Nozha and Borg El Arab, and not a big competitor of Borg El Arab International Airport due to such remote location, non-availability of regular access, less flight frequency, as of now.

For other airports, Port Said Airport is located at 250 km east from Alexandria, and Marsa Matrouh Airport is located at 400 km west from Alexandria. Those airports are in service however their destinations and frequencies of flight are limited.

For domestic air traffic between Cairo and Alexandria, Egypt Air and Egypt Air Express are serving domestic flights from Alexandria to Cairo. As of 2011, domestic flights between Cairo and Alexandria are operated just once or twice a day.

3.5.3. Road Infrastructure Developments

Alexandria area is connected with other regions via 3 major national highway networks. “Agriculture Road” and “Desert Road” connect with Cairo, and “Mediterranean Coastal Road” connects east and west of north coast of Egypt along the Mediterranean Sea.

Agriculture Road starts from the center of Cairo to the east area of Alexandria city passing through Nile Delta area. The Road is handling vast demand of cargo transport to carry agricultural products from major agricultural production areas in Nile Delta area to Cairo, the biggest consumption market in Egypt, or Alexandria, the largest exporting hub port.

Desert Road is the most important trunk line in Egypt, connecting between the west end of Cairo/Giza area, the west part of Cairo metropolitan, through 6th October City, and the west of Alexandria, that pass through the east end of Sahara Desert. Current development includes expansion of traffic lanes from 3 to 4 on both directions, pavement rehabilitation, and construction of flyover for U-turn traffic, replacing the existing U-turn lane on grade. The Desert Road has currently a small entry gate, located some 5 km to the east of the entrance gate of Borg El Arab International Airport, thus, it may become a part of access route to the Airport in future.

Mediterranean Coastal Road was developed from east to west of Egyptian north coast. The Road is starting from Port Said, north-east of Egypt, up to Marsa Matrouh, north-west of Egypt, passing Alexandria and El Alamein. This Road handles surface cargo and trade demand transported between Alexandria and various cities of petroleum and mining production situated along Mediterranean coast. And the Road will constitute a part of “North-Africa International Highway” which will become an inter-state connecting road along Mediterranean cities between Egypt and Morocco.

3.5.4. Railway Developments

Alexandria has been traditionally developed as the base of transportation of people, trade and industry for long time. The first railway network in Egypt was developed in Alexandria to handle these demands. To date, the railway network has been continuously playing an important role in the area.

ENR Network in Alexandria

The main railway station in Alexandria is “Mahatet Masr Station” where services for various directions by Egyptian National Railways (ENR) are originated or destined. Sidi Gabel Station located in the new city center at eastern Alexandria, is under renovation to be the new main station in Alexandria to serve higher quality of service and comfort. The rail link of ENR between Cairo and Alexandria is known as the most important trunk line in Egypt. At present, ENR is providing frequent express train service between Cairo and Alexandria every 1 hour, with an introduction of new rolling stocks imported from European countries.

Tram Network in Alexandria

Several street car (Tram) lines are in service in Alexandria city. The Tram network has been expanded throughout the city lengthwise and crosswise in the past, and is utilized by Egyptian citizens at low fare. As of 2011, the Tram network connects between the old downtown and the new

downtown area in Alexandria, with 2 different operation lines, however, the other lines have been gradually abolished upon development of bus service network and private cars.

Future Development of Railways

Modernization of the rail-link between Cairo and Alexandria with an introduction of a new high-speed rail link is under study. The feasibility study to connect the 200 km distance between the two cities within 1 hour has been assisted by Italian Government.

New Line to New Borg El Arab City

The new ENR line development project is on-going in the west area of Alexandria as of 2011. The new line would connect Alexandria city with New Borg El Arab City where new industrial areas and University were developed. This line is expected to be utilized for the access to Borg El Arab International Airport since it is located only 5 km away from the Airport.



Figure 3.5-1 New Rail line to New Borg El Arab City

3.5.5. Water Transport Developments

The Ministry of Transport of Egypt is planning to utilize the Nile River for establishing a water transportation network. According to the plan, the network would be established from Cairo to Alexandria (220 km), Cairo to Damietta, Cairo to Aswan and Aswan to Wadi Halfa. After completion of this development, the total network of water transportation will reach 1,850 km.

At present, Ather El Nabi Port at the suburb of Cairo and Nhafa Port at the south edge of Alexandria are under development. Ather El Nabi Port would have about 57,000 m² area and Nhafa Port would have 14,840 m² area facilities. Once the development completed, a part of agricultural products from mass farming area located between Cairo and Alexandria would be transported by this water transportation network instead of road traffic.

3.5.6. Sea Port Developments

Alexandria is the 2nd largest city in Egypt and the largest trade base city in Egypt at the same time. Great majority of export and import freights in Egypt are handled at two (2) international gateway seaports, namely, “Alexandria Port” and “Dekhiela Port”. These 2 seaports in Alexandria are handling 74% of the total international trading amount in Egypt as of 2009, creating 58 billion US Dollars in total tax amount, and 5.58 billion US Dollars in port revenue. The number of annual ships handled is approximately 6,000.

Although main function is for cargo handling and trading, the Alexandria Port is also accommodating a large demand of passenger ship service. The new passenger terminal accommodated about 200 thousand passengers in 2009. At present, other major port facilities are being renovated or rehabilitated step by step, which will contribute to enhancing the functions of Alexandria Port.

3.6. Industrial Development in Alexandria Region

3.6.1. Current Situation of Industry and Trade in Alexandria Region

The city of Alexandria is well known as being the main location of major industries in Egypt. Alexandria and its immediate surrounding area account for nearly 40% of Egypt's industry and 60% of its foreign trade. Alexandria is producing 60% of Egyptian total textile industry, 40% of its petroleum and petrochemical industry, 35% of its food processing industry, 30% of its plastic, 16% of telecommunication, 15% of information technology, and 15% of its pharmaceutical industry.

3.6.2. Industrial Development Plans at Borg El Arab

In the airport surrounding area of the City of Borg El Arab, several industrial development projects have been planned since about 20 years ago. Borg El Arab City Area is located 45 km to the west of Alexandria City and playing a role of new industrial base in Alexandria region. However several development projects are planned or implemented or completed in whole Alexandria region, currently, the position of Borg El Arab City is becoming more important in the industrial sector of the region.

The city is located about 10 km to the west of the Airport and people can access to the Airport in about 15 minutes from the city. The north of the area is called Borg El Arab City, and the south of the area has been developed as New Borg El Arab City.

The new urban development at New Borg El Arab City is implemented within 15,200 acres (approx. 61.5 km²) of land. The new city would consist of industrial, commercial, residential and educational establishments. Currently, more than 600 factories are located in this area, and major categories of industry include the followings.

- Petrochemical / Steel and Metal processing / Machine parts manufacturing / Fertilizer and Agricultural Chemicals / Institute and research / Agriculture and Food processing

3.6.3. New Borg El Arab Industrial Park

The government recently added another 172 acres of land to the east of the original 15,200 acres in the vicinity of Borg El Arab International Airport. This new area is to be used mainly for industrial development. The new city is about 25% built, its 4 industrial areas and 2 of its eight residential areas are complete. It also houses the Science Research and Technology Applications (C-SAT) within a 250 acre area, including proposed assembly of 12 research institutes directed to the development and renovation of industry.

3.6.4. Free Trade Zones in Alexandria Region

The city and its surroundings host several industrial zones. The Alexandria Free Trade & Special Investment Zone (AFTSIZ) located in El-Amreya 20 km east of Borg El Arab International Airport and the enhancements to the mass agricultural and farming areas between Tanta and Alexandria.

The AFTSIZ hosts over 250 industrial and warehousing companies. Located in an area of about 890 acres of land, it boasts various industries including textile and apparel, petrochemical, chemical, food processing, liquid gas and companies that provide support and equipment to oil exploration companies. The AFTSIZ continues to expand and attract new businesses.

3.6.5. Other Major Industrial Developments in the Catchment Area of the Airport

1) 6th of October City and Around

6th of October City (or called as October 6 City) is newly developed urban cosmopolitan city in the east end of Sahara desert. The city is located 20 km to the west of Giza and 40 km to the west from Cairo downtown and the city is placed as the capital of 6th of October governorate. The city has been developed by each divided district to specific developers and investors. As major developed areas in 6th of October City, following developments were established:

➤ Sheikh Zayed City / SODIC West Cairo Land / Dreamland / Smart Village / Other developments

These development districts are connected with Cairo through Cairo-Alexandria Desert Road. It could be possible to reach Cairo in 1 to 1.5 hours and to Alexandria in about 2 hours. Most of developments are considered based on their advantageous location to access to the Desert Road and the Ring Road which are connected to Cairo or to Alexandria.

2) Overview in Across of the Country

Currently, several huge developments are on-going in whole areas of Egypt. Especially the developments regarding transportation, urban as well as water treatment and energy are being implemented to provide adequate services. A large number of urban developments are also being implemented in whole Egypt. These developments are basically carried out by private sectors with financing by foreign investors especially from the Middle-East countries. The developments in 6th of October City, as stated above, is one of these urban developments.

Regarding other developments, wastewater treatment plants and energy infrastructures are being developed across the country. As recently trend, the developments for wind farm and solar power generation plant are increasing due to the global needs on renewable energy from ecology viewpoints.

3.7. Egypt-Japan University of Science and Technology (E-JUST)

3.7.1. General

The New Borg El Arab City will also house the Egypt-Japan University of Science and Technology (E-JUST), a major technical cooperation project created in close coordination between the governments of Egypt and Japan. The university new campus will be constructed within a 150 acre plot of land adjacent to City for Science research and Technology (C-SAT) and will cater to 1,120 undergraduate, 420 master and 210 doctorate degree students and a 168 faculty in the Faculty of Engineering and a 1,250 business school students and 132 faculties for a grand total of 3,000 students and 300 faculties in the future.

3.7.2. Footsteps of E-JUST Project

The project to establish E-JUST was commenced through collaboration between Japan and Egypt in year 2005. Since starting preparation for the project, E-JUST has been watched by educational society in Japan and Egypt with interest as one of the important and innovative projects for the higher education in Egypt and Arab region. And the project was expected to improve current situation and problem on higher education in Egypt.

3.7.3. Current Situation of E-JUST

Since February 2010, E-JUST has started to receive the students on master and doctor courses in the graduated school and the number of students in E-JUST has increased to 70 to date. All classes of

E-JUST are currently opened at City for Science research and Technology (C-SAT) central building and surrounding dormitory houses in New Borg El Arab City as their temporary campus.

Currently, E-JUST has already opened 6 engineering departments under 3 schools in the Faculty of Engineering however totally 7 departments will be established in February 2012. The operations and educational programs of E-JUST are fully supported by the government, universities and private industry sectors of Japan. This project is placed as one of high priority cooperation projects in Japanese society, which is fully educational international cooperation project between Japan and developing country, and all related sectors are collaborating to assist in implementing the project.

3.7.4. On-going Developments and Future Plans

New Campus Developments

The new campus building development is still under process to receive the approval of the state council for contacting basic design of new building. In 2009, E-JUST launched an international competition for architectural concept design of their new campus, 75 participants from Japanese and Egyptian architectural firms applied to this competition.



Figure 3.7-1 Awarded Concept Design Perspective of E-JUST New Campus

Related Development Projects

Currently, JICA is conducting the development of solar-power generation facility in adjoining land of new E-JUST campus through JICA environmental grant aid scheme. This solar generation facility will be developed in the area of E-JUST Club and Mall (commercial facilities for the students and teachers of E-JUST), which is located 1km away from the new E-JUST campus and nearby dormitory house area.

Educational Program Developments

E-JUST is providing all educational opportunities in line with Japanese lecture system, i.e. stratified-structural education scheme. At present, E-JUST has already established a graduated school and received about 70 students. After completion of new campus facilities, E-JUST will establish departments for bachelor's degree courses.

3.7.5. Social and Economic Impact from E-JUST Project

Currently, the developments of new E-JUST campus and related facilities such as dormitory houses are under process or construction in various places in New Borg El Arab City. However present population of E-JUST campus is still small in number, once the project complete, the number of population related to E-JUST will increase to around 5,000 to 6,000 including 3,000 to 3,600 students. Consequently, related commercial area should be developed to catch the demand on their life activities.

On the other hand, the educational programs and schemes of E-JUST are really unique unlike usual Egyptian universities. It could take an advantage of industries in the area over surrounding regions. In the future, if these activities could be realized smoothly, the area would become one of the innovative models as a science research city in the Middle-East region.

4. Air Traffic Demand Forecast

4.1. Review of SAPROF Study

In the previous SAPROF study two different approaches, namely, Top-down analysis and Bottom-Up analysis, were applied for air traffic demand forecast. Both analyses were computed with data available only until the year 2002.

Through review of the air traffic demand forecast in the SAPROF study, the following principal conclusions have been obtained which are relevant to the air traffic demand forecasting process in this study:

- The actual passenger number in 2010 at Alexandria was 55% higher than the Low Case forecast of the Bottom-up analysis which was used for facility planning of the Borg El Arab International Airport;
- Principal factors behind the difference between the actual number of passengers at Alexandria and the forecasted demand in SAPROF are
 - Egyptian economy has grown more than expected;
 - The Low Cost Carrier (LCC) business has been expanded especially at Alexandria; and
 - The air passenger demand elasticity against Egyptian GDP growth for entire Egypt after SAPROF study (after 2003) was higher than that before SAPROF.
- The amount of Egyptian GDP converted to the USD equivalent fluctuated greatly after SAPROF study due to introduction of floating exchange rate system into Egyptian pound from January 2003. This suggests that Egyptian GDP of the national currency (EGP) is suitable for the explanatory variable of forecast models.
- Average annual air passenger growth rate in Alexandria has drastically increased after the SAPROF study, i.e. the rate between 1995 and 2002 was 8% per annum, while the rate after 2003 to 2010 was 21% per annum. The growth rate at Alexandria was the highest among Egyptian airports. In order to incorporate such trend into the revised traffic forecast, it is necessary to carefully observe the trend of air traffic movements specific to each of the Egyptian airports.
- Especially, the analysis of LCC business expansion trend is one of the most important issues for revising the future air traffic.

4.2. Forecasting Parameters

In air traffic demand forecasting, it is extremely important to observe the relationship between the trend (or feature) of air traffic and socio-economic indices as well as the level of aviation services. Information being collected should include qualitative information as well as quantitative information for the definition of issues and the consideration of the possibility of the future demand.

Key forecasting parameters for Alexandria summarized as follows.

- Average annual growth rate of air passenger at Alexandria airports from 2003 to 2010 was 21%, the highest among all Egyptian airports.
- Air passenger characteristics in each Egyptian airport were individually different. Air passengers at Alexandria airports were mainly Egyptian, while almost of those at Sharm El-Sheikh and Hurghada were tourists from Europe. Such difference could have affected instantly the variation of air passengers when internal turmoil such as the outbreak of the Egyptian Revolution in 2011

occurred. The traffic demand in Alexandria haven't much decreased (almost same as the previous year)

- The residence of Egyptian using Borg El Arab International Airport was distributed over the Nile Delta.
- The population in Lower Egypt, the catchment area of Borg El Arab International Airport, was 38 million in 2010. This was nearly half of Egypt's entire population.
- 45% of the purpose of Egyptian travelers was for Pilgrimage. The 2nd largest share of travelers was overseas contract workers, whose destination was Middle East and Istanbul.
- Since LCC started its operations at Alexandria's airports from 2004, the number of LCC flights has been increasing gradually and reached approximately 45% of the total flights in 2010 (as far as the international flights are concerned, the current ratio of LCC is 50%). The air fare of LCC was 40% cheaper than that of Legacy carrier in average.

4.3. Annual Passenger Demand Forecast

The methodology of air passenger forecast in this study follows two different approaches, namely a Top-down and a Bottom-up analysis, which are the same as SAPROF study.

The Top-down analysis, which can be seen as "Egypt driven", focuses on the trend of aviation activity for entire Egypt. The role (ratio) of Alexandria within Egypt was forecasted considering the difference of air passenger growth rates in each Egyptian airport.

The Bottom-up analysis, which can be seen as "Alexandria driven" focuses on the feature of air passengers in Alexandria region. Air passenger demand has been forecasted in respect of the three groups of passengers, namely, International Egyptian, International Tourist, and Domestic. International Egyptian who was the main user of Alexandria airport has been forecasted considering the probability of selecting Alexandria airport. The probability has been computed through comparison on the level of aviation service (air fare price and frequency) between Alexandria and Cairo airport.

Table 4.3-1 Result of Air Passenger Forecast

(Thousand. person)

	Top-down Analysis			Bottom-Up Analysis		
	High	Medium	Low	High	Medium	Low
2010	1,682	1,682	1,682	1,682	1,682	1,682
2015	2,513	2,316	2,125	2,581	2,358	2,175
2020	3,743	3,246	2,791	4,006	3,611	3,259
2025	4,891	4,122	3,421	5,333	4,755	4,239
2030	6,072	5,016	4,058	6,708	5,942	5,270

Annual Average Growth Rate

2010-2015	8.4%	6.6%	4.8%	8.9%	7.0%	5.3%
2015-2020	8.3%	7.0%	5.6%	9.2%	8.9%	8.4%
2020-2025	5.5%	4.9%	4.2%	5.9%	5.7%	5.4%
2025-2030	4.4%	4.0%	3.5%	4.7%	4.6%	4.5%
2010-2030	6.6%	5.6%	4.5%	7.2%	6.5%	5.9%

The Top-down Analysis is a traditional method and can be used to reflect the trend of demand for entire Egypt. This method is usually applied when the characteristic is similar, but in case of Egypt's airports it is not the case. The following table shows monthly passenger traffic at Egyptian airports in 2011. The fluctuation of air traffic demand varied from airport to airport after the outbreak of the Egyptian Revolution. The traffic demand for example in Alexandria didn't much decrease, because

most of the air passengers were Egyptian. On the other hand, the demand of the airports, where the passengers were mainly foreign tourists such as Sharm El-Sheikh and Hurghada, sharply decreased,.

Table 4.3-2 Year-on-Year of Passenger traffic in the year 2011

	Cairo	Red Sea	Alexandria	ALY	HBE	etc	Total
Jan	7%	9%	24%	28%	21%	12%	9%
Feb	▲ 54%	▲ 74%	▲ 17%	▲ 30%	▲ 4%	▲ 80%	▲ 66%
Mar	▲ 39%	▲ 71%	▲ 9%	▲ 33%	18%	▲ 63%	▲ 57%
Apr	▲ 26%	▲ 48%	1%	▲ 24%	31%	▲ 44%	▲ 37%
May	▲ 23%	▲ 44%	1%	▲ 32%	58%	▲ 51%	▲ 36%
Jun	▲ 11%	▲ 32%	▲ 20%	▲ 34%	3%	▲ 35%	▲ 23%
Jul	▲ 9%	▲ 21%	▲ 7%	▲ 36%	41%	▲ 36%	▲ 16%
Aug	▲ 13%	▲ 16%	2%	▲ 39%	61%	▲ 36%	▲ 16%
Sep	▲ 15%	▲ 10%	▲ 3%	▲ 41%	61%	▲ 41%	▲ 16%
Oct	▲ 25%	▲ 22%	▲ 4%	▲ 33%	33%	▲ 45%	▲ 26%
Nov	▲ 32%	▲ 20%	▲ 9%	▲ 37%	26%	▲ 46%	▲ 28%
Dec							
Total	▲ 21%	▲ 32%	▲ 4%	▲ 32%	33%	▲ 43%	▲ 28%

[Source] Egyptian Holding Company of Airports and Air Navigation website

In the case of applying the Top-down analysis, the estimation of the passenger distribution to each airport is important especially to forecast the air traffic demand in Egypt. The airport demand cannot be represented appropriately if the explanatory variables used for the forecast model depend specifically on each airport demand. It means that allocation of the total air traffic demand in Egypt to each of the airports cannot be made constantly but should be carried out considering variety of characteristics specific to the airport, which is almost equivalent to the bottom up analysis.

For those reasons, the result of the Bottom-up Analysis, which focuses on the characteristics of the air passengers in Alexandria, has been adopted as the planning basis of this Study.

In the Bottom-up analysis, the ratio of the number of LCC International flights at Alexandria's airports in the International Egyptian forecast, and the future Egyptian GDP growth rate in the International tourist forecast, have been assumed with its sensitive analyses of three cases (High, Medium, Low).

Air passengers handled in Alexandria airports were estimated to increase to 2.2 to 2.6 million (2.4 million in medium case) in 2015 from 1.7 million passenger in 2010. Furthermore, in 2020 the air passengers would increase to 3.3 to 4.0 million (3.6 million in medium case). The estimated average annual air passenger growth rates in medium case were 7.0% from 2010 to 2015, and 8.9% from 2015 to 2020 respectively.

4.4. Annual Air Cargo Demand Forecast

Almost all air cargo traffic in Egypt has been handled at Cairo International Airport. For the air cargo traffic in Alexandria, chronological data to develop a forecast model was not available.

Current situation of air cargo in Alexandria and its outskirts are summarized as follows.

- Most export cargoes in Egypt have been produced in Cairo and Alexandria with their outskirts. But the air cargoes in Alexandria and its outskirts have been transported to Cairo International Airport, because of the availability of quick delivery system and good customer services.
- In 2010/2011, 5,653 tons of air cargoes were handled at Alexandria-Nozha International Airport (ALY). At Borg El Arab International Airport, the volume of air cargo was not identified. But there were a few charter flights by Antonov (the largest all-cargo aircraft with its maximum payload of 150 t) for the transport of special machines by a petroleum company.
- Items of Air Cargo: It has been assumed that share of general cargoes are 60%, vegetables are 30%,

and textiles are 10%. General cargoes are mainly machine parts.

Considering the current situation of air cargo and the future possibility of air cargo in Alexandria airport based on an interview survey, the prediction of the future air cargo demand and the facility requirement are shown in below.

- At present it is difficult to quantitatively forecast air cargo demand even though air cargo demand tends to increase obviously. Through the interview survey, it has been confirmed that there should exist strong air cargo demand in Alexandria and its outskirts.
- Air cargo demand at Borg El Arab International Airport may increase in future; considering the fact that Egypt Air Cargo has been planning to launch their business to the airport and the recent growth rate of 10% per annum.
- The current cargo terminal building at Borg El Arab International Airport has still vacant space for further cargo to be handled. Then as a consequence, the Study Team recommends that the planning and design of the cargo terminal be examined later again, when the cargo business significantly increases or decision of higher authority is made to develop Borg El Arab International Airport to be cargo hub.

4.5. Annual Aircraft Movement Forecast

The future aircraft movement is linked to the future air passenger demand and the aircraft fleet configuration.

Aircraft of 150 seats (ICAO Code C) has been the major type of aircraft being used at two Alexandria airports because of the LCCs business model unifying the aircraft type (i.e. A320 series) for the purpose of reducing operation and maintenance costs.

Accordingly, it has been expected that only Legacy carriers would introduce a larger aircraft whereas an aircraft for LCCs maintain the current situation in the future.

The number of aircraft movements in Alexandria airports were predicted to increase from 20 to 24 thousand (22 thousand in Medium Case) in 2015 from 17 thousand in 2010. Further, in 2020 the aircraft movements would increase from 30 to 37 thousand times (33 thousand in medium case). The average annual growth rate in the medium case has been estimated to be 5.0% from 2010 to 2015, and 8.4% from 2015 to 2020.

Table 4.5-1 Result of Passenger Aircraft Movement Forecast

	Top-down Analysis			Bottom-Up Analysis		
	High	Medium	Low	High	Medium	Low
2010	17,260	17,260	17,260	17,260	17,260	17,260
2015	24,275	22,375	20,559	24,129	22,074	20,397
2020	34,920	30,146	25,841	36,627	32,997	29,777
2025	44,884	37,497	30,951	48,284	42,988	38,291
2030	54,570	44,463	35,657	59,978	52,975	46,886

(Times)

Annual Average Growth Rate						
2010-2015	7.1%	5.3%	3.6%	6.9%	5.0%	3.4%
2015-2020	7.5%	6.1%	4.7%	8.7%	8.4%	7.9%
2020-2025	5.1%	4.5%	3.7%	5.7%	5.4%	5.2%
2025-2030	4.0%	3.5%	2.9%	4.4%	4.3%	4.1%

2010-2030	5.9%	4.8%	3.7%	6.4%	5.8%	5.1%
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*Figures from Top-down Analysis are for Reference purpose.

4.6. Peak Air Traffic Demand Forecast

The peak day ratios are determined to forecast the peak-day air traffic. The daily traffic ratios have been computed by the following formula:

$$\text{Daily traffic Ratio} = \frac{\text{Monthly Traffic} / \text{The number of days}}{\text{Annual Traffic}}$$

Peak day ratios and assumed daily traffic ratios on the second peak month are shown in the Table below.

Table 4.6-1 Daily traffic ratio by month in past 3 years in Alexandria region

Day ratio by Month
Passenger

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
International	2008	1/ 500	1/ 455	1/ 550	1/ 422	1/ 430	1/ 319	1/ 275	1/ 257	1/ 304	1/ 356	1/ 395	1/ 353
	2009	1/ 483	1/ 428	1/ 508	1/ 407	1/ 437	1/ 319	1/ 267	1/ 273	1/ 291	1/ 368	1/ 389	1/ 405
	2010	1/ 562	1/ 430	1/ 478	1/ 408	1/ 469	1/ 325	1/ 250	1/ 266	1/ 263	1/ 414	1/ 343	1/ 471
	Average	1/ 515	1/ 438	1/ 512	1/ 412	1/ 445	1/ 321	1/ 264	1/ 266	1/ 286	1/ 379	1/ 375	1/ 410
Domestic	2008	1/ 361	1/ 351	1/ 396	1/ 361	1/ 370	1/ 325	1/ 338	1/ 295	1/ 453	1/ 347	1/ 431	1/ 413
	2009	1/ 552	1/ 420	1/ 600	1/ 434	1/ 441	1/ 363	1/ 289	1/ 298	1/ 314	1/ 277	1/ 329	1/ 332
	2010	1/ 534	1/ 382	1/ 459	1/ 375	1/ 422	1/ 363	1/ 262	1/ 407	1/ 302	1/ 322	1/ 288	1/ 439
	Average	1/ 482	1/ 384	1/ 485	1/ 390	1/ 411	1/ 350	1/ 296	1/ 333	1/ 356	1/ 316	1/ 349	1/ 395

Aircraft Movement

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
International	2008	1/ 492	1/ 477	1/ 498	1/ 381	1/ 399	1/ 342	1/ 298	1/ 293	1/ 308	1/ 341	1/ 365	1/ 339
	2009	1/ 466	1/ 442	1/ 439	1/ 413	1/ 406	1/ 326	1/ 279	1/ 278	1/ 315	1/ 359	1/ 402	1/ 391
	2010	1/ 475	1/ 451	1/ 440	1/ 412	1/ 452	1/ 336	1/ 277	1/ 282	1/ 289	1/ 370	1/ 348	1/ 409
	Average	1/ 477	1/ 457	1/ 459	1/ 402	1/ 419	1/ 335	1/ 285	1/ 284	1/ 304	1/ 357	1/ 372	1/ 380
Domestic	2008	1/ 345	1/ 335	1/ 363	1/ 419	1/ 395	1/ 379	1/ 392	1/ 374	1/ 304	1/ 371	1/ 349	1/ 380
	2009	1/ 480	1/ 420	1/ 465	1/ 418	1/ 391	1/ 396	1/ 337	1/ 297	1/ 301	1/ 300	1/ 337	1/ 356
	2010	1/ 384	1/ 394	1/ 418	1/ 410	1/ 433	1/ 422	1/ 321	1/ 371	1/ 314	1/ 314	1/ 310	1/ 358
	Average	1/ 403	1/ 383	1/ 415	1/ 416	1/ 406	1/ 399	1/ 350	1/ 347	1/ 306	1/ 328	1/ 332	1/ 365

Daily traffic ratios on the second peak month according to the tables above have been adopted:

Table 4.6-2 Peak Day Ratio (Adopted Ratio)

	International	Domestic
Passenger	1/ 285	1/ 315
Aircraft Movement	1/ 300	1/ 330

The peak hour ratios have been estimated by a forecast model developed using daily traffic data in Alexandria airports. A forecast model was developed for two-way traffic (departure + arrival) and one-way traffic (departure or arrival).

$$\text{Peak Hour Ratio} = a + \frac{b}{\text{Daily Aircraft Movement}} \quad a, b : \text{Coefficient}$$

The peak hour ratio computed by the forecast model is shown in Figure 4.6-1. The below graph includes, for reference, the model published by Japan Civil Aviation Bureau for domestic flights (J-CAB model: as expressed in blue dotted line), which had been applied in the previous SAPROF study. Presumably, at the time of the previous SAPROF study, flight data at Borg El Arab International Airport had not been sufficient enough and therefore the J-CAB model was only applied until such time that its reproducibility would have been confirmed. However, the peak-hour ratio based on the J-CAB model are generally higher than that forecasted in this study (expressed in red bold line). This is because in Japan the operations from midnight to early morning are restricted due to

noise pollution, and also because more than half of domestic passengers are traveling for business purpose (of mostly one-day trip) hence they tend to select their trip in morning and evening time.

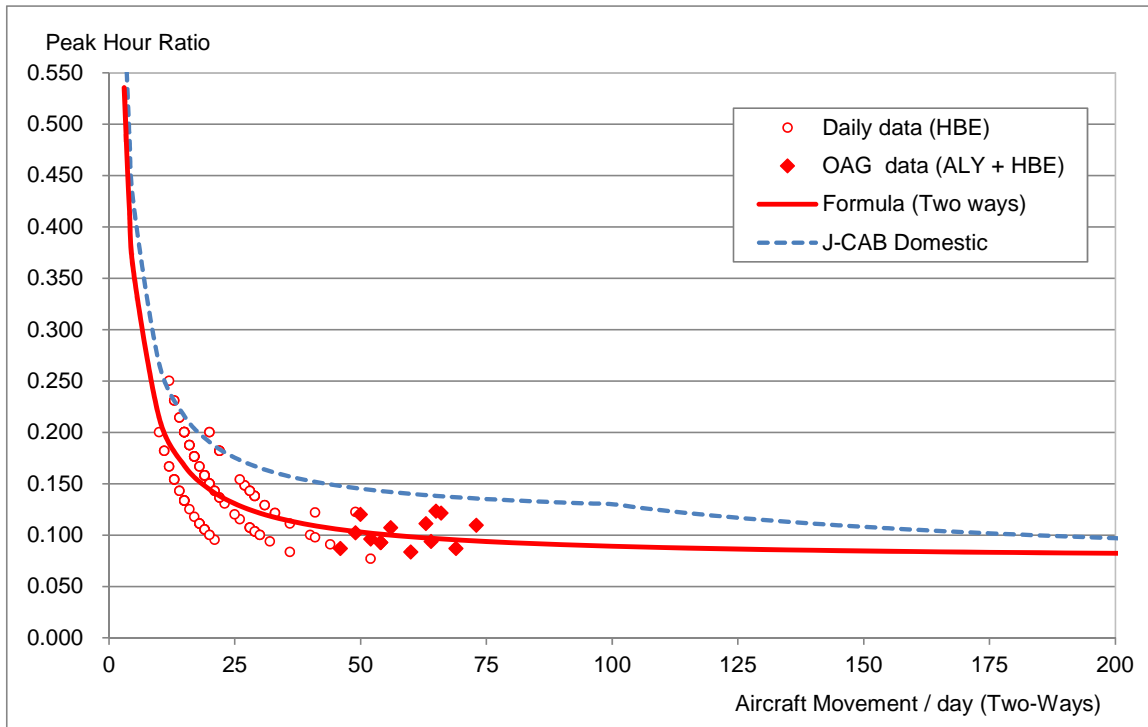


Figure 4.6-1 Peak Hour Ratio (Two-ways)

Two-way peak hour ratio of International flight has been estimated to decrease to 0.096 (9.6%) in the medium case in 2015 from 0.102 (10.2%) in 2010. In 2015, one-way peak hour ratio would decrease to 0.067 (6.7%) corresponding approximately to 65% of two-way ratio. Furthermore these ratios in 2020 would be further decrease to 0.089 (8.9%; two-way) and to 0.054 (5.4%; one-way).

4.7. Summary of Air Traffic Demand Forecast

Medium		All flight move to HBE						
		(HBE)	(ALY+HBE)	(HBE)				
		Actual	Actual	Forecast				
FACTOR		2010	2010	2015	2020	2025	2030	
Annual								
Passenger		709,961	1,681,983	2,357,758 (7.0%)	3,610,715 (8.9%)	4,754,833 (5.7%)	5,941,699 (4.6%)	
	International	706,833	1,593,782	2,251,054 (7.1%)	3,449,723 (8.9%)	4,528,945 (5.6%)	5,654,166 (4.5%)	
	Domestic	3,128	88,201	106,704 (3.9%)	160,992 (8.6%)	225,888 (7.0%)	287,533 (4.9%)	
Aircraft Movement		6,836	17,260	22,074 (5.0%)	32,997 (8.4%)	42,988 (5.4%)	52,975 (4.3%)	
	: E			1,212	2,440	3,156	3,882	
	: C	6,836	17,260	20,862	30,557	39,832	49,093	
	International	6,703	15,264	20,202 (5.8%)	30,501 (8.6%)	39,452 (5.3%)	48,527 (4.2%)	
	: E			1,212	2,440	3,156	3,882	
	: C	6,703	15,264	18,990	28,061	36,296	44,645	
	Domestic : C	133	1,996	1,872 (-1.3%)	2,496 (5.9%)	3,536 (7.2%)	4,448 (4.7%)	
			Estimate		Forecast			
Typical Busy Day								
Passenger			2,490	5,872	8,237	12,615	16,608	20,752
	International	1/ 285	2,480	5,592	7,898	12,104	15,891	19,839
	Domestic	1/ 315	10	280	339	511	717	913
Aircraft Movement			22	57	73	110	143	175
	: E				4	8	11	13
	: C		22	57	69	102	132	162
	International	1/ 300	22	51	67	102	132	162
	: E				4	8	11	13
	: C		22	51	63	94	121	149
	Domestic : C	1/ 330	0.4	6	6	8	11	13
Peak Hour Ratio (Two ways)	International		0.138	0.102	0.096	0.089	0.086	0.084
	Domestic		1/7	1/10	1/10	1/11	1/12	1/12
			3.527	0.305	0.305	0.248	0.201	0.182
			1/0	1/3	1/3	1/4	1/5	1/6
Peak Hour (Two ways)								
Passenger			378	659	862	1,203	1,508	1,831
	International		343	573	758	1,076	1,364	1,665
	Domestic		35	86	104	127	144	166
Aircraft Movement			4.4	7.0	8.2	11.1	13.5	16.0
	: E				0.4	0.7	0.9	1.1
	: C		4.4	7.0	7.8	10.4	12.6	14.9
	International		3.0	5.2	6.4	9.1	11.3	13.6
	: E				0.4	0.7	0.9	1.1
	: C		3.0	5.2	6.0	8.4	10.4	12.5
	Domestic : C		1.4	1.8	1.8	2.0	2.2	2.4
Peak Hour Ratio (One way)	International		0.103	0.067	0.061	0.054	0.051	0.049
	Domestic		1/10	1/15	1/16	1/19	1/20	1/20
			3.470	0.269	0.269	0.212	0.165	0.146
			1/0	1/4	1/4	1/5	1/6	1/7
Peak Hour (One way)								
Passenger			290	452	572	761	927	1,104
	International		255	377	481	653	809	971
	Domestic		35	75	91	108	118	133
Aircraft Movement			3.7	5.0	5.7	7.2	8.5	9.8
	: E				0.2	0.4	0.5	0.6
	: C		3.7	5.0	5.5	6.8	8.0	9.2
	International		2.3	3.4	4.1	5.5	6.7	7.9
	: E				0.2	0.4	0.5	0.6
	: C		2.3	3.4	3.9	5.1	6.2	7.3
	Domestic : C		1.4	1.6	1.6	1.7	1.8	1.9

Note : Aircraft Movements is only Commercial Aircraft

5. Current Conditions of Borg El Arab International Airport

The following is a report on the major changes in operations at Borg El Arab International Airport commencing after the period to be incorporated in the study (ending in December 2011) until the final report is submitted in February 2012.

Closure of El Nozha Airport

El Nozha will be closed for major renovation of its runways for 12 to 18 months from January 2012. Therefore, all services at El Nozha, including international and domestic services by Egypt Air, have been transferred to Borg El Arab International Airport. When reopened, El Nozha is scheduled to operate as an airport mainly handling corporate jet flights.

Destinations and No. of Flights (As of December 2011)

As of December 2011, there are 128 flights a week to 16 cities from the new terminal. There are 3 airlines operating in the old terminal and, combined, there are 153 flights a week from the two terminals. With the closure of El Nozha, there are now more destinations and flights.

Old Terminal

With the closure of El Nozha for runway renovations and the resumption of services to Libya, the old terminal is currently used by 3 airlines (Libyan Airlines, Air Libya and AlMasria Universal Airlines).

Use of the New Terminal

A relatively large number of customers are unaccustomed to using airports and this can pose a problem in operating the terminal safely. For this reason, entry to the terminal is restricted to passengers only and other visitors to pick up or see off passengers are refused access. Because these customers are unable to enter the landside area which is normally open to the general public, there are hardly any customers in the landside shops. It seems measures such as the collection of an entry fee are being considered to allow non-passenger visitors into the terminal.

5.1. Current Air Transport at Borg El Arab International Airport

1) Current Flight Schedule at Borg El Arab International Airport

The number of flights has gradually increased since the new terminal was commissioned in December 2010. As of September 2011, 14 destinations were being serviced from the airport and 96 flights a week were using the new terminal. One company continues to use the old terminal, which brings the number of flights per week to 113 for both terminals combined. The political situation in Egypt has been unstable since the uprising of February 2011 as has the situation in neighboring Libya. Undoubtedly this has affected demand for air transport, resulting in little growth in the number of flights and destinations compared to the projections in 2004.

Comparison of the traffic recorded in 2010 and 2009 is made in Table 5.1-1, in which the number of passenger in 2010 has increased by 91% from 2009, and aircraft movements in 2010 increased by 97% from 2009 at Borg El Arab International Airport. The air traffic at Alexandria-Nozha International Airport has not much changed presumably because it has surpassed the physical capacity since long time ago.

Table 5.1-1 Passenger and Aircraft Traffic at Alexandria's Two Airports

Passenger and Aircraft Traffic at Borg El Arab International Airport (2009, 2010)

	2009	2010	Growth Rate
Aircraft Movements	3,717	7,312	196.7%
Passengers	371,154	709,961	191.2%

Passenger and Aircraft Traffic at Alexandria- Nozha International Airport (2009, 2010)

	2009	2010	Growth Rate
Aircraft Movements	19,405	19,364	99.7%
Passengers	1,097,905	972,022	88.5%

[Source] ACI World Airport Traffic Report 2010

2) LCCs (Low Cost Carriers) at Borg El Arab International Airport

There are currently four (4) LCCs operating at Borg El Arab International Airport. Air Arabia Egypt, one of the four, operates 26 flights a week to seven destinations using Borg El Arab International Airport as its hub. The airline plans to increase its fleet and will probably expand its network further from Borg El Arab International Airport.

With LCCs expanding rapidly throughout the world, this expansion has not yet reached Egypt to the same extent as other regions. Therefore, further growth can be expected when this global trend reaches Egypt. Given the particularly close-knit links in the Middle East, as the LCCs continue to expand here, there is every possibility that they will have an influence on growth at the Airport.

3) Old Terminal

After the opening of the new terminal, the airlines transferred over in stages. As of September 2011, one airlines (NAS Air) operates in the old terminal and the other 12 are now operating in the new terminal. NAS Air also plans to begin operating in the new terminal as soon as all of the conditions are in place.

4) Aircraft Time (Turnaround Time) at the Airport per Flight

According to the August 2011 schedule, the average aircraft time (turnaround time) at the Airport per flight using the new terminal was about 50 minutes (excluding Hajj flights and other non-scheduled flights and overnight stays).

The primary reason for the shorter turnaround time is that all of the aircraft are small models, which require less time to complete the preflight preparations. The second reason is that there are an increasing number of LCCs. LCCs minimize their turnaround time at the airport between arrival and departure and carry more passengers in their business models. Therefore, as LCCs grow in number, the average aircraft turnaround time at Borg El Arab International Airport becomes shorter.

5.2. Current Operational Status of Airport Facilities at Borg El Arab International Airport

The current operational status of these airport facilities, which are considered to affect efficient airport operation in the future are assessed and possible strategy for the future is identified.

	<p>[Airside Facilities]</p> <ul style="list-style-type: none"> ● Runway ● Parallel Taxiway ● Taxiways to New Terminal ● Follow-me car Operation ● Aircraft Stands
	<p>[Passenger Terminal Building Facilities]</p> <ul style="list-style-type: none"> ● Boarding Bridges ● International - International Transit Facilities ● Departure Bus Gate ● Inbound passport control ● Baggage claim ● Check-in counters ● Outbound passport control.

Some of key facilities are analyzed as below.

1) Runway

- As before, the airport continues to share the existing single 3,400-meter long runway with the military after the opening of the new terminal.
- The runway's handling capacity is sufficient for 40 to 60 flights an hour under ICAO specifications. The airport currently handles 3 flights an hour at most so capacity is not a problem.
- The runway must be closed when emergency repairs are required or in the event of an aircraft accident. With a single runway operation, no aircraft can land or take off. This paralyzes the airport and poses a major hindrance to the operation of many aircraft. The airport might be, therefore, unable to contribute to punctuality that airlines require.
- Runway solely for the use of civil aviation will be essential for providing safe, efficient operations at all times, and improving and sustaining the airport's competitive edge. However, this will need an in-depth analysis and study on safety, punctuality, convenience, construction timing, construction period, cost and demand

2) International - International Transit Facilities

- As of September 2011, there is no transit passenger.
- There is no route after security screening in the transit area to the departure gate lounges on the 2nd floor.
- Therefore, in future transit passengers will temporarily be required to travel against the inbound passenger flow led by airline or EAC staff, through a fixed bridge and into the departure lobby.
- It is normally not accepted practice for transit passengers cleared by security and sent to the departure lobby via the arrival passenger flow. Therefore, if it is possible to provide a route to the departure lobby that does not threaten security and does not pass through the inbound passenger flow, it should be implemented as soon as possible.

3) Departure Bus Gate

- Only 1 bus gate with not enough space is available, passengers should wait at pre-departure lounge in the 2nd floor, and guided by airline in sequence to the ground floor for boarding.
- When the number of flights does increase, there will not be enough fixed gates, particularly during peak hours and there will be more frequent use of the bus gate. Therefore, passengers should be guided safely with customer service staff, playing a central role as well as the airline staff.
- The bus gate should not be simultaneously used for international and domestic services.
- When switching over between international and domestic use, all gate areas must be checked to prevent illegal entry to the country and terrorist hijacking.
- Bearing in mind that the gate is to be used for international and domestic flights, from an operations point of view, schedules should be thoroughly checked before assigning stands. Due consideration should be given to the time required to switch the gate from domestic to international or vice versa so as to avoid overlapping flights on the gate. Care should also be taken to ensure that the switch does not take an unreasonable amount of time.

4) Inbound Passport Control

- It is found that average processing time is approximately 75seconds per passenger.
- It is observed that, since currently 2 booths only are made available at peak hour, queuing lines used to stretch out of the passport control area into the arrivals concourse.
- Unlike outbound passport control, all passengers rush to the inbound passport control upon their arrival at once. Effort must be devoted for the police to timely assign more officers to open another booth, and for EAC to assist passengers while waiting to complete their procedures.
- An important step is to encourage the different groups and agencies to work together through frequent sharing of information among the organizations, including the EAC, airlines and police, and the designation of a liaison system and cooperative framework.

Terminal and Apron (Airside) Congestion

The hourly distribution of aircraft movements at Borg El Arab International Airport is graphically shown based on the September 2011 schedule to verify the level of terminal and airside congestion.

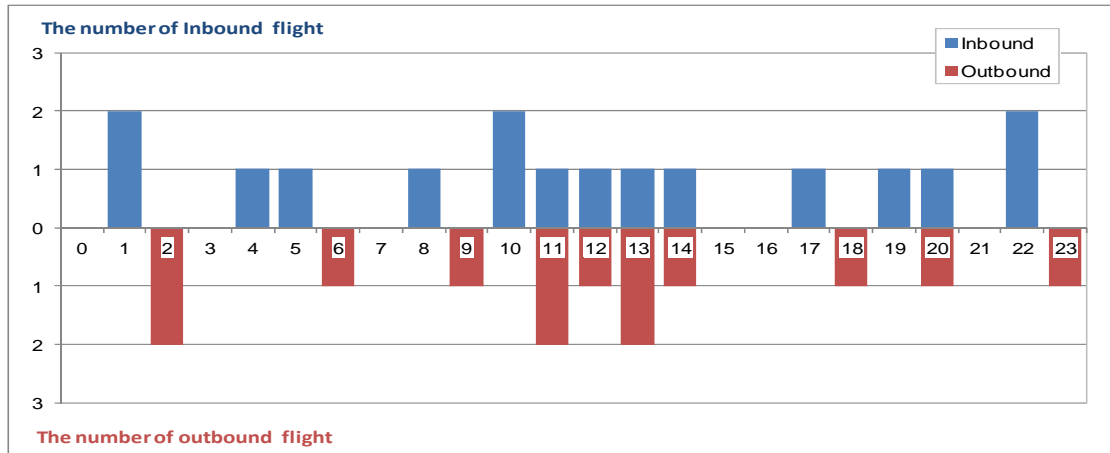


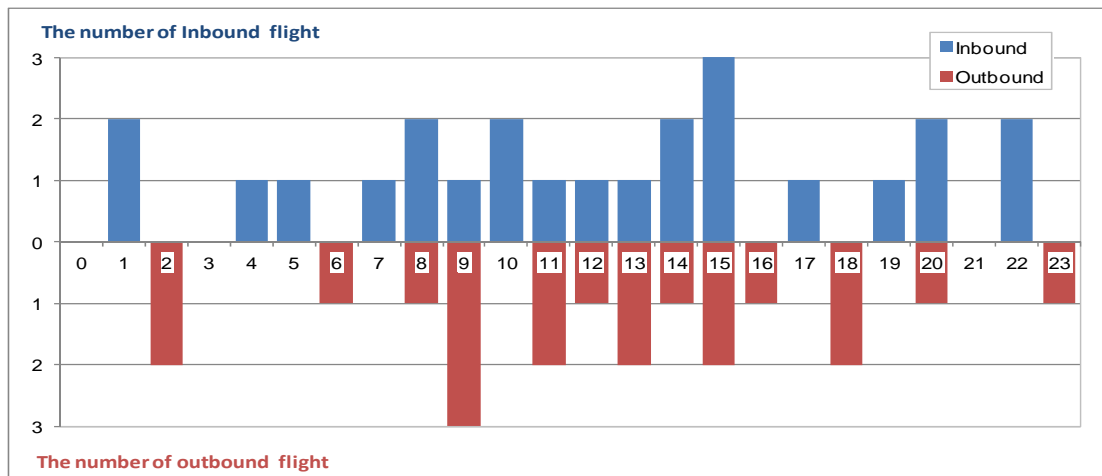
Figure 5.2-1 Flights per Hour (Inbound, Outbound) at Borg El Arab International Airport

The main findings are:

- Generally, there is not a big difference in the number of flights between peak and off peak periods. Therefore, the present schedule can be described as having a uniform traffic volume.
- Current peak operations have no polarization in daily schedules, and plenty of rooms within the airport capacity.

5.3. Analysis on Egypt Air Relocate to Borg El Arab International Airport

A study was conducted into the level of congestion should El Nozha close and Egypt Air, which, as of September 2011, intends to remain at Alexandria- Nozha, relocates to Borg El Arab.



**Figure 5.3-1 Hourly Number of (Inbound, Outbound) Flights
Combined Hourly Distribution of Flights at Borg El Arab and Nozha**

The study produced the following key results:

- On the assumption that Egypt Air operates at Borg El Arab International Airport, there would be up to 3 arriving and 3 departing flights an hour.
- There would be a total of 5 inbound and outbound flights an hour.
- This would be an increase over the current situation (in which Egypt Air does not operate any flights at Borg El Arab) but it would be possible to further expand the airport's capacity.

5.4. Mode of Access to / from the Airport (Type of Transportation)

Mode of access to / from Borg El Arab International Airport which are provided at present for the passengers are as follows:

- Car / Taxi / Bus / Hired Car (Chauffeur driven limousine services)

Like other airports in Egypt, a toll is collected when entering Borg El Arab International Airport.

Table 5.4-1 Number of Vehicles Entering Airport and Charges Collected

Item	No. of Units (Dec 2010 - Jul 2011)	Daily Vehicle Avg.	Airport Entry Toll (Per Vehicle, EGP)	Total (EGP)	Remarks
Bus	1,670	6.9	15	25,050	
Mini bus (Share Ride Vehicles)	9,500	39.5	10	95,000	From Jun 2011
Car	153,835	640	5	769,175	

[Source] EAC Data

As possible strategy of airport access for the future, information on hire cars and taxis, etc should be collected to obtain a more accurate understanding of the data. This will enable the airport operator to expand its facilities more efficiently to suit the number cars, taxis, hire cars, buses and other vehicles in the future and it will also help to construct facilities economically.

5.5. Non-Aeronautical Revenue at Borg El Arab International Airport

Current situation of non-aeronautical businesses are identified, and a few suggestion for the future are made.

- Non-aeronautical revenue at the Airport comprises airport entry vehicle tolls, proceeds from food and beverage, retailing and duty-free sales, advertising and rental charges for offices, etc
- As the air transport demand is expected to grow, the aeronautical revenue is also expected to increase, however, within the framework of tariff system the Government approved.
- It is important to ensure a source of revenue that is relatively unaffected by demand for air transport in order to sustain stable operations and management of the airport. More precisely, proactive expansion of non-aeronautical revenue is essential.

Table 5.5-1 Breakdown of Major Charges at Borg El Arab International Airport

Aeronautical Revenue	Non-aeronautical Revenue
Landing fees	Airport entry vehicle tolls (parking)
Aircraft parking charge (up to 5 hours)	Food & beverage outlets, merchandising, duty free
Aircraft layover charge (5 hours or more)	Advertising
Firefighting facility charge	Rent for offices, etc.
Follow-me car charge	Others
Fixed boarding bridge charge	
Others	

[Source] SAPI Study Team Survey

1) Food & beverage outlets, merchandising, duty free

- There are six food and beverage outlets operating at present and two duty-free shops—one in the departures lobby (using two shop spaces) and the other in the arrival baggage claims area. There are no merchandise stores.
- Most of the concessions are cafes with no merchandise shops. The number of closed shops is striking.
- The cafes and restaurants differ to one another but are all operated by the same company in a

situation that is close to a monopoly. Consequently, it is difficult for the principle of competition to work and this could lead to problems with efficiency and service quality, etc.

- The duty-free shops are operated by one duty free operating company “Dufry, and this could work against the principle of competition.
- In order to present more attractive retail facilities, the monopolies should be abandoned and at least two companies should be in operation to compete each other in terms of the service quality and product line up.
- It is also important to eliminate any tendency towards certain types of business and to respond more to the diversified passenger needs. With the exception of one restaurant, all of the food and beverage outlets are cafes. There is not one merchandise store where passengers can buy souvenirs. At Hurghada International Airport, for example, an area resembling an Egyptian market has been set up which offers a great selection of souvenirs.
- Full use of customer satisfaction surveys and feedback boxes at the airport to collect information on opinions concerning tenants and customer needs can be one method that will result in producing a more attractive retail area.



Cafes (Different shops but the same operator)

Closed restaurants

Duty-free shops

Figure 5.5-1 Shops at Borg El Arab International Airport

2) Advertising

- Advertising is one of the main pillars of non-aeronautical revenue along with shop rental.
- There are a lot of spaces ideal for surface advertisements but almost none are under contact and they are filled with tourism pictures.



Figure 5.5-2 Advertising under Contract (Right) and Vacant Space (Left)

3) Rent for offices, etc

- Offices are rented to airlines and airport businesses and this becomes revenue. No details are available because data were not disclosed. However, the rental of offices is contracted by EAC head office, therefore, we assume that head office also oversees the tenant selection method and revenue details.

4) Possible strategy for the future

- Even if EAC head office continues to keep majority of authorities to handle any contracts, some authority should be transferred to the Airport as incentive so that more productive business environment can be created at each of the airports, thus enabling expansion of the

non-aeronautical revenue.

- First and foremost, EAC head office and the airport should continually share information on monthly turnover figures, customer numbers and value of purchases per passenger, etc. This will enable staff at the airport to be conscious of goals in their work. With close communication between EAC head office and the airport departments, they should be able to work together to produce schemes for improvement.

5.6. Airport Marketing Activity at Borg El Arab International Airport

- Airport sales is under responsibility of the Commercial department in EAC head office.
- The main activities for airport sales generally are that EAC head office attend conferences worldwide or regionally, such as “Routes Development Forum”, which provides airports with opportunities to promote its airports and be able to negotiate with many airlines at once to expand its routes network.
- It seems that there are strategic airport marketing plan, for EAC’s regional airports, such as Sharm El Sheikh and Hurghada, which includes incentive plan for airlines to launch new routes.
- However, at the moment, such incentive plans are not applied to Borg El Arab International Airport since the number of passengers in Alexandria region is almost reaching its capacity.
- As the marketing activities are done by EAC head office, most of activities seem to be applied equally to all airports managed by EAC. However, as there are different characteristics among the airports managed by EAC, individual marketing plan for each airport based on each airport’s specialty should be introduced.
- Marketing airport individually will create more responsible mind for each airport, and encourage each airport’s autonomy. Creating a sense of ownership of the airport by each member of staff is one of the most important factors for pursuing further development of the airport.

5.7. Management of Borg El Arab International Airport

- The organization of Borg El Arab International Airport is structured in accordance with the stipulations of EAC head office. Please refer to the figure below for the organization chart. Figures in parentheses show the number of staff.
- Currently, there are 250 personnel at Borg El Arab International Airport. Approximately 42% are maintenance staff and about 30% are operations staff.
- And main activities and possible strategy for the future for each department are identified.
- Observations concerning the approach to the future by all organizations are analyzed as below.
 - It will be important to look at the personnel requirements for an increase in flights resulting from greater demand.
 - The present organization remains the same as when it was put together by EAC headquarters and staff carries out their work on the basis of individual responsibilities. However, as mentioned previously, the operation of an airport requires a diverse array of activities. Therefore, although it is important to have responsibilities for individual organizations and for those to be discharged as deemed appropriate, working together with other organizations at the same time makes it possible to achieve safer and more efficient airport operations.
 - Many of the staff at Borg El Arab International Airport was recruited when it opened. It has

been only 10 months since then and they are still not experienced. Therefore, it would be advantageous to continue with human resources development, including training on the job and off.

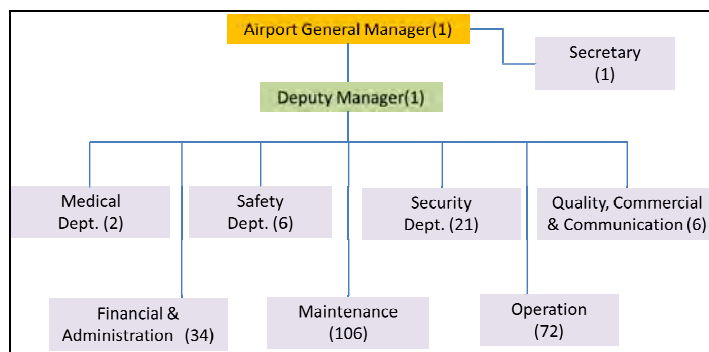


Figure 5.7-1 Organization Structure of Borg El Arab International Airport, EAC

5.8. Existing Assistance by Narita International Airport

Borg El Arab International Airport has received the assistance of Narita International Airport Corporation (NAA) in airport management for 2 and half years since new facility construction stage in 2009. The Airport has been assisted in airport operation and management by the specialists from NAA and worked on preparation and proficiency before and after the opening of newly developed airport facilities. Moreover, the Airport dispatched about 100 staff to Japan, and NAA provided the training opportunities on airport operation and management of global standards at Narita International Airport.

The following are the main items of assistance provided.

- Assistance with start-up preparations before the opening of the new terminal
- Assistance with maintenance and management of runways taxiways and other primary airport facilities as well as mechanical facilities (BHS,EDS,PBB, elevators and escalators, etc.).
- Assistance was provided with aviation and airport security through preparation of manuals etc.
- Assistance with Passenger Service Improvements
- Assistance with Day-To-Day Operations
- Staff Training Courses at Narita International Airport have been held.



Classroom Lecture

Airport Facility Inspection

On-site Lecture

Training on Customer Service

Figure 5.8-1 EAC Airport Staff Training in Japan

Main effects of Assistance Project are as follows:

- Improvements in Staff Knowledge of Airport Operations
- Many of the staff at Borg El Arab International Airport were recruited right before the opening of the new terminal and had little fundamental knowledge of airport management. However, they were able to acquire the essential basic knowledge in airport operation and management through the assistance provided at Borg El Arab International Airport and the courses at Narita International Airport. This could be attributed to the system of providing comprehensive assistance with all airport operations and management. That is to say, it was the integrated

management assistance in particular, which provided the knowledge and skills that needed to be acquired by all staff while simultaneously improving the knowledge and skills in the individual specialist fields. This made it possible to improve airport operations skills overall in a more organized and effective way.

- Smooth Startup and Trouble-Free Airport Operation
- Although there were several problems with facility maintenance and management, the smooth startup could be attributed to the assistance provided with advance preparations for operations and other essential items when the new terminal opened.
- Airport Staff Motivation Improvement
- Staff motivation was improved by being able to come into direct contact with advanced airport operations through the courses at Narita International Airport. For example, following the courses, staff were observed cleaning up themselves, something they had not done before, and using their experience in the courses to deal with customers with more care. There has also been a change in staff thinking concerning the importance of aviation security and facility maintenance and management. Not only was there a greater feeling that many of the staff were proud of the Airport, they expressed that sentiment in their work on site and got better each day.
- Understanding the Japanese way of Airport Operation and Management
- Direct exposure to Japanese culture as well as a course in airport management, enables the individual to offer the high quality airport management elements that are unique to Japan through such as passenger services conceived from the customer's perspective, greater care in daily maintenance and management to prevent trouble beforehand, and the recognition of the need for improvements in the pursuit of offering the best at all times.



Passenger Assistance at Immigration Counter



Guidance at Information Counter

Figure 5.8-2 Customer Care by EAC Airport Staff at Borg El Arab International Airport

6. Demand vs. Capacity Analysis

6.1. Summary of Air Traffic Demand Forecast

Previously, air traffic demand was forecasted through SAPROF study in 2004 when numbers of passengers to Alexandria were heavily concentrated in summer time (July and August). The forecast number of passengers for the year 2014 was 1 million, which was set as a nominal capacity of the passenger terminal at Borg El Arab Airport.

The number of passengers recorded at the 2 Alexandria's airports (at Alexandria-Nozha and Borg El Arab) in 2010 was 1.7 million, and upon closure of Nozha Airport in January 2012, such increasing volume of passengers, which has become almost double the nominal capacity, are being handled at Borg El Arab International Airport. This is mainly owing to the fact that heavy passengers' concentration originally observed has gradually been evenly distributed through the year and through the day.

6.2. Facility Requirements

Facility requirements had been originally established through the SAROF study.

Through the course of detailed design stage, the design of passenger terminal building was revised in consideration of segregation of departing and arriving passengers for security reason as encouraged by ICAO/IATA.

Also, for the sake of effective use of entire building floor, common check-in area and swing pre-departure halls were provided, so that the whole areas could flexibly be utilized either for all international or domestic operations.

6.3. Demand vs. Capacity Analysis

Theoretical future requirements for major airport facility are summarized in Table 6.3-1.

Table 6.3-1 Theoretical Facility Requirements for Borg El Arab International Airport

Item	As-constructed	Future Requirements				
		2015	2020	2025	2030	
1) Annual Pax	Table 6.1-1	1,681,983	2,357,758	3,610,715	4,754,833	5,941,699
A Passenger Terminal	24,277 m ²	24,820 m ²	34,820 m ²	43,800 m ²	53,270 m ²	
A.1) International	3.1) x 30m ²	22,740 m ²	32,280 m ²	40,920 m ²	49,950 m ²	
A.2) Domestic	3.2) x 20m ²	2,080 m ²	2,540 m ²	2,880 m ²	3,320 m ²	
B Check-in Counter	4) x 2 / 60 x 1.1	20	20	28	34	41
C Security Check						
C.0) Entrance	4) x 12/3600 sec	2	1.9	2.5	3.1	3.7
C.1) International	4.1) x 12/ 3600 sec	2	1.6	2.2	2.7	3.2
C.2) Domestic	4.2) x 12/ 3600 sec	1	0.3	0.4	0.4	0.4
D Passport Control						
D.1) Departure	4.1) x 1/60 min x 1.1	8	8.8	12.0	14.8	17.8
D.2) Arrival	4.1) x 1/60 min x 1.1	10	8.8	12.0	14.8	17.8
E Customs Desks	4.1) x 1/60 min	6	4	5.4	6.7	8.1
F Baggage Claim	8) x 30/60 min.	3	2.9	3.6	4.3	4.9
G Apron Spot (for all SJ)	8) x 90/60 min +1	12	9.6	11.8	13.8	15.7
H Runway (m)						
Runway 14R/32L	If 8) < 8	3,400 m	3,400 m	3,400 m	3,400 m	3,400 m
Runway 14L/32R	If 8) > 8	none	none	2,500m	2,500 m	3,400 m

The Table implies that the major airport facilities constructed during the Borg El Arab International Airport Modernization Project would theoretically cover the requirements up to the year 2015 when

the number of annual passengers is 2.35 million.

There are some rooms to shorten the processing time for each function from time to time by applying the latest models of CPU, scanner, or software (e.g. for immigration, check-in counter, CUTE, etc) or improved skills of airport staff, therefore it is hoped that the above-mentioned overall terminal capacity could be somehow improved.

At a moment, it is expected that those major facilities would be gradually congested as illustrated in Figure 6.3-1 and Figure 6.3-2.

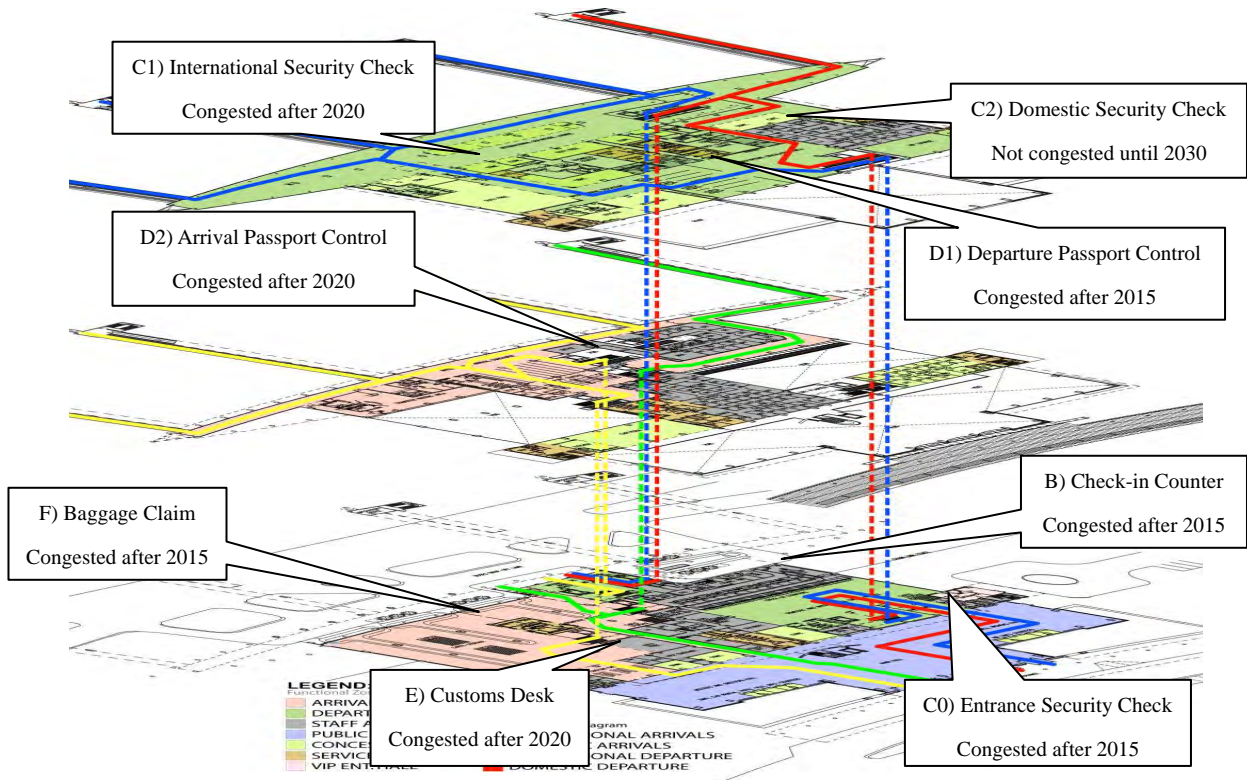


Figure 6.3-1 Years of Theoretical Congestion of Passenger Terminal Facilities

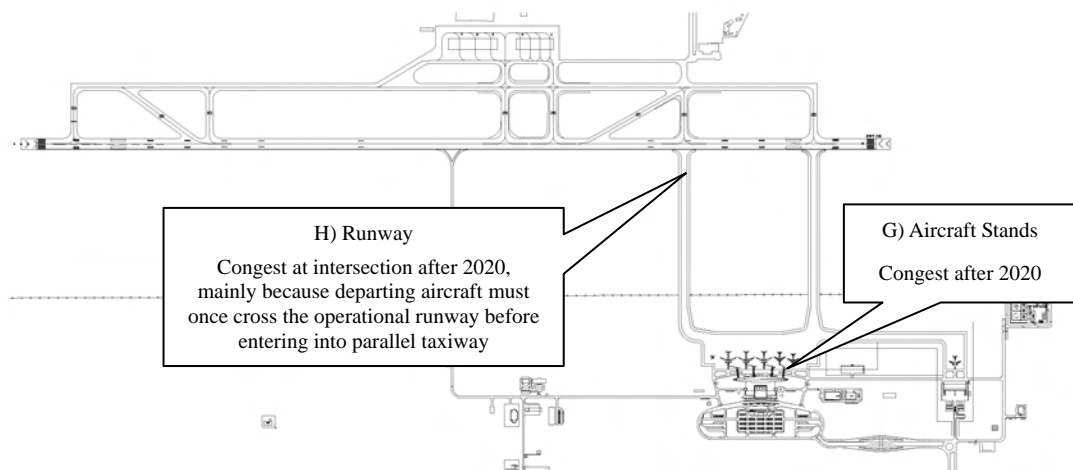


Figure 6.3-2 Years of Theoretical Congestion of Airfield Facilities

One major concern that may limit the practical capacity of the present runway operations at Borg El Arab International Airport is, that the existing parallel taxiway is inconveniently located on the opposite side of the runway (in MOD premise). Since prevailing wind (95%) is from north direction, main runway operations are made from the south, i.e. Runway 32.

In this circumstance, operational bottleneck is departing aircraft that crosses the active single runway. Approaching aircraft should be held in the air due to the two (2) deferent activities of the departing aircraft, i.e. crossing the runway in addition to normal taking off from the runway. When 2 minutes are assumed to accomplish the individual activities, i.e. 1) to cross the runway, 2) to take-off the runway, and 3) to approach/landing/ exit the runway, then aircraft operations are made in 6-minute cycle time (i.e. 10 takeoffs, 10 landings, 10 crossing the runway, in an hour). Therefore, it is assumed that the existing runway could accommodate 10 arrivals and 10 departures, or 20 aircraft operations in total during peak hour.

In the past, the runways at the two (2) Alexandria Airports (Alexandria-Nozha and Borg El Arab) were alternately closed for maintenance and rehabilitation, during the time all flight operations of the one closed have transferred to the other airport and vice versa, as if maintenance of the two (2) runways is made synchronically. From January 2012, Alexandria-Nozha International Airport is closed for more than a year for the purpose of substantial repair and rehabilitation of the swampy runway. In case of emergency or accident that might happen on the single runway at Borg El Arab International Airport there is no alternate runway to land in Alexandria region.

6.4. Future Strategy for Maximum Utilization of Existing Facilities

80 % of the passengers at Borg El Arab International Airport are Egyptian, and their great majority is pilgrims or seasonal contract workers who would spend longer life in the Middle-East countries, consequently volume of baggage or behaviors are somewhat unexpected in the international practice. Those unique issues e.g. passengers' behaviors or numerous well-wishers for Hajji-flight passengers rushing at public lobby at the Airport are based on historical and cultural backgrounds.

To materialize such capacity that the Airport should possess to its maximum extent possible, or to maximize the effect upon the Project implementation, the careful attention should be paid to following issues by all staff at the Airport:

- Manage facility maintenance troubles due to passenger's manners;
- Improve service quality through cleaning and facility maintenance in the passenger terminal building;
- Manage passenger's stagnation due to passenger's lack of travel experience;
- Train the know-how, technical quality and service attitude of airport staff;
- Coordinate with airlines to secure smooth process and movement for the passengers;
- Minimize queuing of passengers through coordination with immigration, customs and police;
- Prevent delay of aircraft operation due to inefficient operation on the apron;
- Systemize aircraft operations and airport operation plans in coordination with NANSO;
- Establish clear trouble shooting procedures;
- Clearly establish responsible area of each airport staff; and
- Improve operational organizations for efficient operation.

7. Recommendations on Future Airport Development

7.1. Basic Strategy

Upon closure of Alexandria - Nozha International Airport, all scheduled flights have been transferred to Borg El Arab International Airport. It has been evaluated that the Airport should be theoretically capable of accommodating the future air traffic demand of the entire Alexandria region until around year 2015 to 2020. To this end, maximization of airport capacity should be the first priority and necessary measures therefore need to be implemented.

For the purpose of clear definition of each phase of the entire development for the Borg El Arab International Airport, the Modernization Project completed in year 2010 is hereby referred to as the Project Phase-1 Stage 1, and subsequent measures for maximization of its effect proposed herein are defined as the Phase-1 Stage 2 respectively. Further developments necessary to accommodate the medium to long-term future air traffic demand are defined as the Phase-2 and Phase-3.

Phase-1 Stage 2 Project consists of the following two parts:

- Addition of three (3) Passenger Boarding Bridges (PBBs) to the completed Passenger Terminal Building; as originally envisaged will improve the passenger handling capacity and service grade.
- Technical Assistance for Airport Operation and Management; as strengthening of the human resources as well as improvement of the passenger handling procedures, etc. through technical assistance by qualified service provider will enhance the capacity development and upgrading of passenger services.

Further developments to accommodate the medium to long-term future traffic demand are discussed in the end of the Report

7.2. Addition of Three (3) Passenger Boarding Bridges (PBBs)

In the history of the Project, number of PBBs to be installed has been discussed, chronologically as follows:

- In 2004, 7 PBBs in total had been originally proposed in the SAPROF study to be installed, 2 each to the planned 3 Large Jet (LJ; e.g. B 777) and 1 to Small Jet (SJ; e.g. A320) so as to efficiently manage passengers' embarkation or disembarkation operations.
- In 2006 it was decided that the installation of the 2nd PBB at each gate was deferred because it was anticipated that the Bid price might have exceeded the budgeted foreign portion.
- Therefore, the new passenger terminal building is currently provided with 4 Passenger Boarding Bridges (PBBs), 1 each to the 4 fixed gates.
- When number of air passengers was rapidly grown and wide-bodied aircraft (e.g. of Emirate, Kuwait) were operated at Borg El Arab International Airport in 2008, EAC once decided to procure additional 3 PBBs, but deferred installation due to the then economic crisis.
- The terminal building has only one (1) common departure bus-gate for domestic and international flight operations, it is anticipated to encounter certain risk to mingle the international and domestic passengers as Egypt Air would operate regular frequent flight services by using numbers of SJ (e.g. E-170 of Egypt Air Express) for both domestic and regional international flights.
- Addition of 3 PBB is now essential when the 7 PBBs can handle the departing passengers for

maximum 7 flights at departure level (all at 2nd floor), it would alleviate the congestion at the common departure bus-gate (at ground floor), thus minimize the risk of possible smuggling

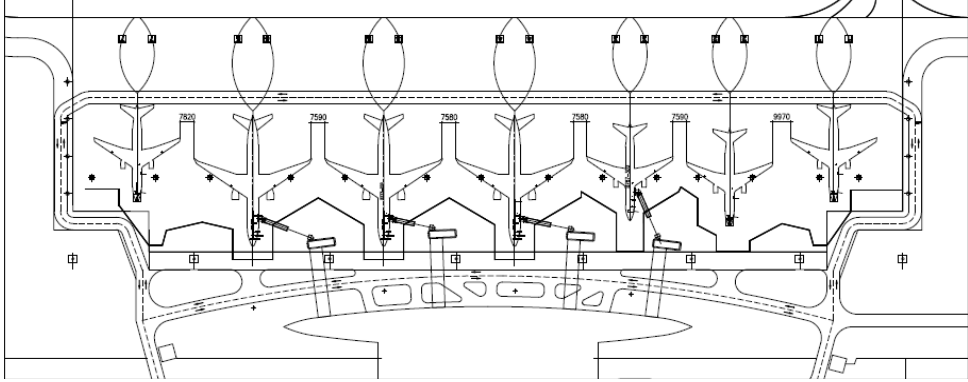
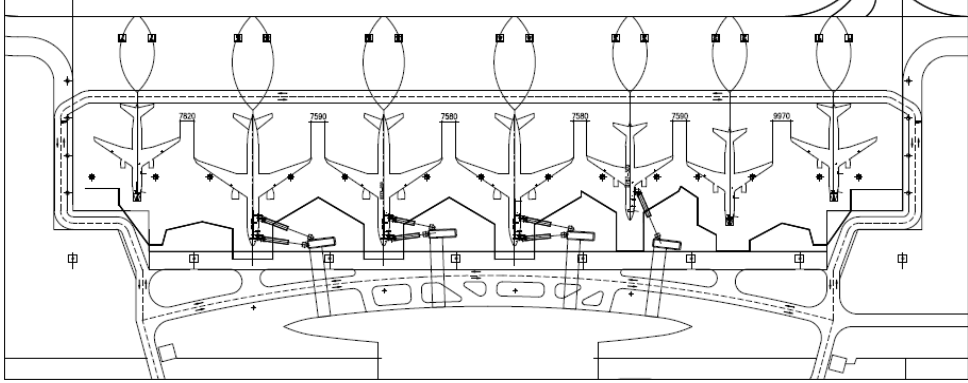
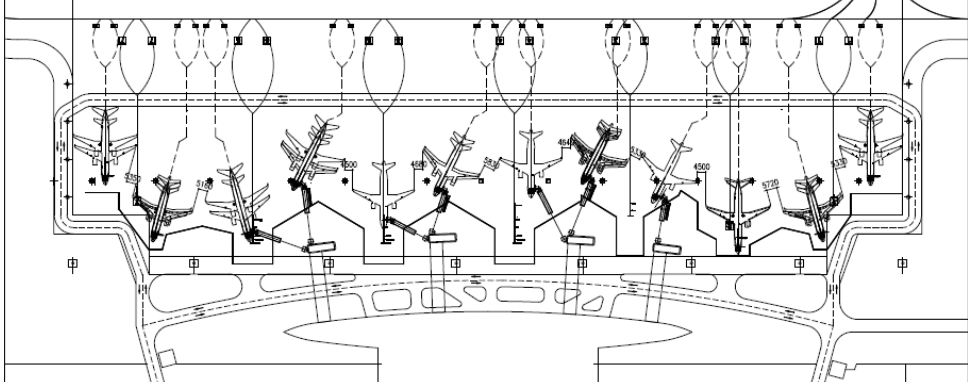
Pattern	Aircraft Parking Configuration / Layout of PBB
<p>Current Position of 4 PBBs; 1 each for 4 gates</p>	 <p>The Project includes 4 PBBs (1 each to the 4 fixed gates) to keep minimum required service level.</p>
<p>Proposed Position of 7 PBBs; 2 for 3 LJ, and 1 for 1 SJ</p>	 <p>2 PBBs to 1 LJ, i.e. the 1st PBB to serve first or business class and the 2nd PBB to serve economy class door, as being a common practice, had been aimed in the SAPROF study.</p>
<p>Proposed Position of 7 PBBs; 1 each for 7 SJ</p>	 <p>When a fixed gate for LJ is used by 2 SJ (i.e. A320 or smaller), the 2 PBBs can individually contact either of the 2 flights separately</p>

Figure 7.2-1 Position of the PBBs

7.3. Technical Assistance for Airport Operation and Management

The assistance to be provided to EAC has been programmed in two (2) steps as shown hereunder.

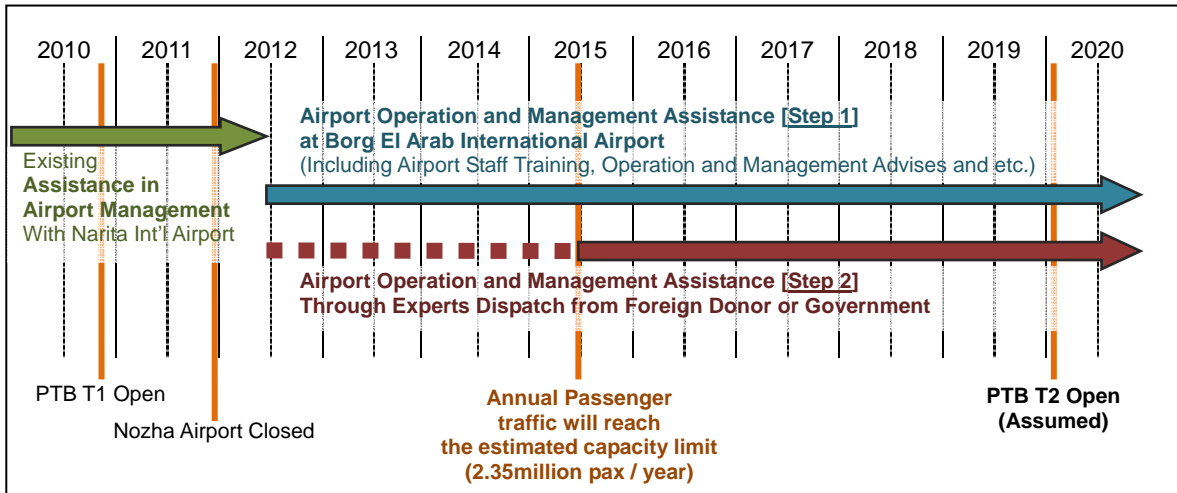


Figure 7.3-1 Proposed Schedule of Technical Assistance

1) Technical Assistance - Step 1

Table 7.3-1 shows an example of Technical Assistance program for enhancing the specialist skills and knowledge of the organization leaders.

Table 7.3-1 Example of Assistance Plan of Leader Training Course

Overview of a Training Course	
<ul style="list-style-type: none"> ✓ A training course consists of <u>two-week training in Japan and one week training at Borg El Arab International Airport.</u> ✓ One training course should be held for one field each. ✓ The number of course will depend on the field of assistance (Possible fields are listed below.) ✓ A maximum of only two training courses will be held at the same time because it is important that high quality, intensive courses are provided, which will lead fruitful outcome for trainees. 	
Possible Participants	Leaders or potential leaders in the individual fields which mentioned below. ✓ Number of trainee of each field will be one or two staff.
Possible Fields of the Course	1. Customer Services 2. Aviation Security, 3. Airport Safety 4. Operations (Airside & Passenger Terminal Building) 5. Maintenance
Outline of the Course	<ul style="list-style-type: none"> ✓ A training course will consist of A) two weeks training in Japan and B) one week training at job site in Borg El Arab International Airport. <div style="border: 2px solid green; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><u>A training Course for each specialized field (3weeks in total)</u></p> <ul style="list-style-type: none"> ✓ One or two specialists will be in charge of each course. <div style="border: 1px solid red; padding: 5px; margin: 5px 0;"> <p>A) Training in Japan (2weeks)</p> <p>More specialized training at a major airport in Japan related to the various activities of the individual fields. (Example: classroom lectures and site inspection)</p> </div> <p style="text-align: center; font-size: 24px; margin: 10px 0;">+</p> <div style="border: 1px solid blue; padding: 5px; margin: 5px 0;"> <p>B) Training at Borg El Arab International Airport (1week)</p> <p>On-site training at the Airport by experts in individual specialist fields (Example: hold working groups and conduct on-the-job training)</p> </div> </div>

**2) Technical Assistance - Step 2
Through Expert Dispatch from Foreign Donor or Government**

Even after the year 2015 when the traffic demand exceeds the estimated capacity limit of the passenger terminal building, the existing airport facilities will need to accommodate the traffic since development of the second runway and new passenger terminal building (tentatively called as Terminal 2), etc. would not be completed by then.

In this situation where significant capacity constraints are expected, it is suggested that appropriate specialists should be dispatched to provide direct advices and recommendation for safe and efficient airport operations as the Step 2 assistance.

Specifically, the following challenges are deemed necessary so as to accommodate passengers of more than the physical capacity:

- Continue the assistance in the capacity development of airport staff, and facility maintenance and management;
- Conserve energy and utilities volumes (i.e. power and water consumptions in the entire Airport);
- Assist in restructuring of organization from time to time of the Airport itself and EAC; and
- Keep regular collaboration between the relevant sub-organizations in the Airport.

Especially for solving passenger stagnation at bottle-necked key essential facilities, the coordination with governmental organizations in the airport including security police, immigration and customs officers is considered imperative. It is suggested that such assistance be implemented through JICA specialist dispatch program up to the completion of the new passenger terminal building.

JICA expert technical assistance team is suggested to be organized by following specialists.

Table 7.3-2 Suggested JICA Expert Technical Assistance Team

Specialty	Number	Target Issue
Airport Organization	1	Organization building
Terminal Operation	1	Passenger service / PTB operation / Customer's Satisfaction
Airside Operation	1	Aircraft operation / Gate planning / Coordination with Airlines
Airport Management	1	Trouble shooting procedure
Facility Management	1	Civil / Mechanical engineering
Capacity Building	1	Airport staff training
Airport Finance	1	Financial analysis
Airport Marketing	1	Commercial activity
Passenger Inspection	1	Coordination with Police (Immigration/ Security Check)
Baggage management	1	In-line Screening / Baggage Reconciliation / Lost Baggage

7.4. Future Development - Construction of Additional Facilities

1) Facility Requirements for Phase-2 Development

The completed Phase-1 passenger terminal building has an adequate floor space (about 24,000 m²) and internal functions to theoretically handle the forecast annual passengers of 2.35 million for the year 2015. Annual passengers are expected to be doubled (4.75 million) by 2025, therefore Phase-2 passenger terminal (Terminal 2) of similar floor space is necessarily to be constructed in a period from 2015 to 2020.

There are 7 aircraft parking stands (to accommodate 3 LJs and 4 MJs), or 12 stands (when all aircraft are SJ) in the existing aircraft parking apron. This dimension of apron may be able to cope with the parking of aircraft up to 2020, if all flights are of short-time turn-around flights. In line with the construction of the Terminal 2, additional aircraft parking apron should be constructed also in a period from 2015 to 2020.

Chronological summary of air traffic demand forecast and corresponding requirements of airport facilities are given in Table 7.4-1.

Table 7.4-1 Chronological Facility Requirements for Passenger Terminal

Item		SAROF	actual	Air traffic demand forecast				
		2014	2010	2015	2020	2025	2030	
Passengers	1) Annual Pax ('000)	991	1,682	2,358	3,611	4,755	5,942	
	2) Peak-day (2-way)	3,980	5,872	8,237	12,615	16,608	20,752	
	3) Peak-hour (2-way)	567	659	862	1,203	1,508	1,831	
	4) Peak-hour (1-way)	500	452	572	761	927	1,104	
Aircraft Movements	5) Annual Flights	9,101	17,260	22,074	32,997	42,988	52,975	
	6) Peak-day (2-way)	36	57	73	110	143	175	
	7) Peak-hour (2-way)	9.3	7	8.2	11.1	13.5	16.0	
	8) Peak-hour (1-way)		5.0	5.7	7.2	8.5	9.8	
Passenger Terminal (m²)	3) x 30 m ²	20,840	24,277	24,820	34,820	43,800	53,270	
Phase 1 (Terminal 1)	Completed by 2010		24,000 m ²					
Phase 2 (Terminal 2)	To complete another 24,000 m ² by 2020					Total 48,000 m ²		
Apron Stand	8) x 90/60min + 1(Extra)	8	7	9.6	11.8	13.8	15.7	
Phase 1	Completed by 2010		7 (or 12 if all SJ)					
Phase 2	To complete another 9 stands by 2020					Total 17 stands		

2) Airport Layout Plan for Phase-2 Development

In case of emergency or accident that might happen on the single runway at Borg El Arab International Airport there would be no alternate runway to land in Alexandria region because Alexandria-Nozha International Airport was closed. Therefore, Ministry of Civil Aviation (MCA) has placed a priority to construct the 2nd runway, and announced in AIP its intended location to form an open parallel runway system with the 1st runway to enable simultaneous landing and takeoff.

The 2nd runway should possess the takeoff runway length for current aircraft fleet flying to the main furthest destinations. Currently, main destinations are Middle East, and to North Africa.

At present, almost all international flights at the Airport are made for short-range destinations to Middle East (mostly within a range of 2,500 km), North Africa and Europe, the current longest destination, i.e. Casablanca, is 3,600 km, and to London is 3,800 km. Great majority of the type of aircraft is SJ (small jet, such as A320, B737-800, and E-170), which were able to land at Nozha Airport, generally requiring the takeoff runway length of some 2,000 m.

Upon transferring all operations from Alexandria-Nozha international Airport to Borg El Arab International Airport, numbers of Legacy Airlines are expected to mobilize MJ (e.g. B767) or LJ (e.g. A330 or B777) because the runway could become sufficient in length and strength for their landing and takeoff.

The runway length for the 2nd runway is therefore assumed to be at least 2,500 m for B777 flyable to London, or the same effective length as the existing runway, i.e. 3,027 m.

The Phase-2 Development scheme is wholly depending on where or how long the 2nd runway is constructed, for which the following two (2) Options could be considered for initial assessment.

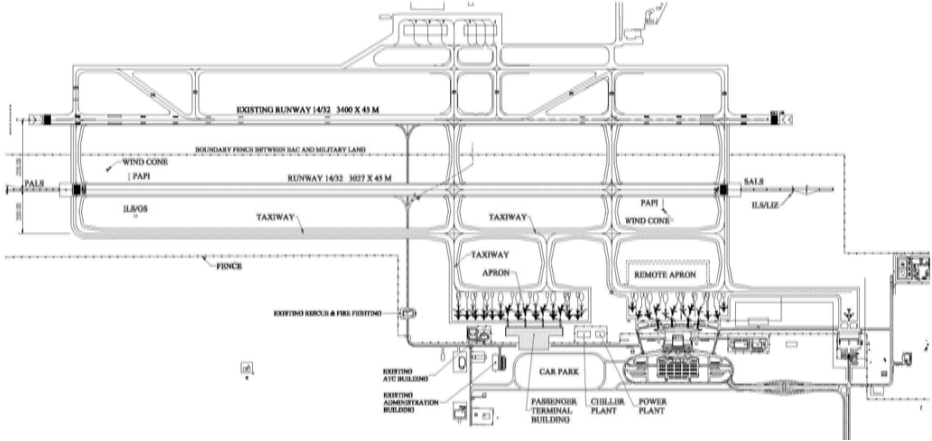
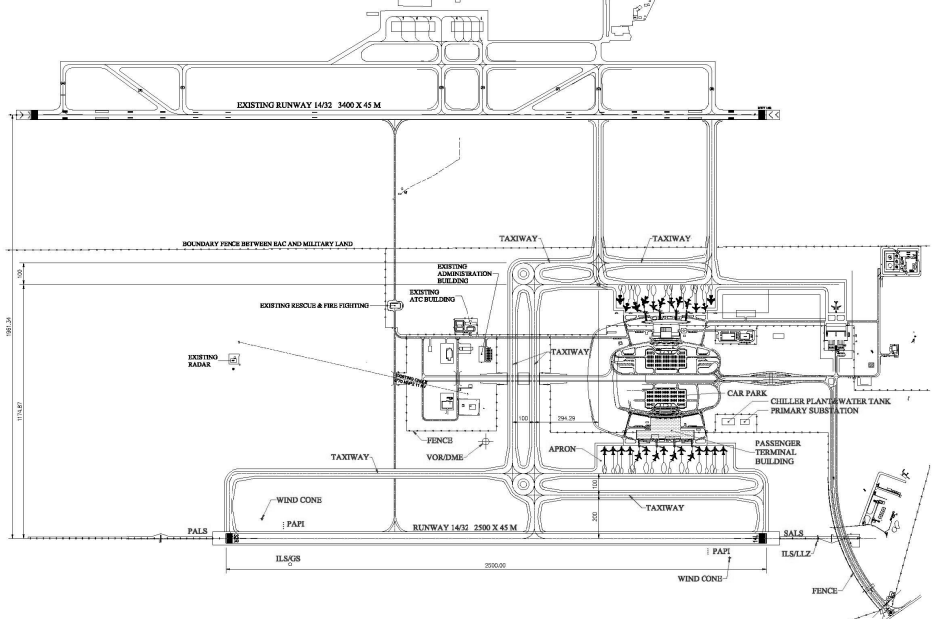
Option	Airport Layout Plan
<p>Option 1 Closed Parallel 2nd Runway (3,027-m long) in MOD Premise</p>	 <ul style="list-style-type: none"> ➤ The 2nd runway is set at a distance of 320 m from the existing runway, with a provision of parallel taxiway at a distance of 200 m and another parallel taxiway at a distance of 100 m or remote aircraft parking stands. ➤ Earthwork volumes are roughly computed at 3.8-million m³ excavation and 3.8-million m³ embankment.
<p>Option 2 Open Parallel 2nd Runway (2,500-m long) in EAC Premise</p>	 <ul style="list-style-type: none"> ➤ The 2nd runway is set at a distance of 1,960 m from the existing runway, which can satisfy the ICAO's requirements for simultaneously-operational runways. ➤ Earthwork volumes are roughly computed at 7.8-million m³ excavation and 7.7-million m³ embankment.

Figure 7.4-1 Options for Location of the 2nd Runway

Areas for either option are highly undulating terrain, where vast volumes of earthwork are necessary to make the airfield pavement smooth enough within the tolerance required by ICAO.

The Option 2 would necessitate construction of road tunnels of 260 m in total length, because access road should be laid under the connecting taxiways and fire vehicle access road.

Construction Cost for the Options 1 and 2 for Phase 2 Development is estimated as shown in Table 7.4-1.

Table 7.4-2 Construction Cost Estimate for Phase 2 Development

Description	Unit	Option 1: Closed Parallel Runway				Option 2: Open Parallel Runway			
		Runway Length: 3,027 m				Runway Length: 2,500 m			
		Qty	Amount ('000 L.E)	Amount ('000 Yen)	Total ('000 L.E)	Qty	Amount ('000 L.E)	Amount ('000 Yen)	Total ('000 L.E)
Exchange rate : Japanese Yen = EGP 0.0769									
A: Construction									
Part 1 General Requirements		1	11,894	70,077	17,285	1	11,894	70,077	17,285
Part 2 Civil Works			396,812	86,178	403,441		536,947	86,400	543,593
Earthwork			0	0	0		0	0	0
Excavation	m3	3,800,000	67,470	0	67,470	7,750,409	137,610	0	137,610
Embankment	m3	3,800,000	69,852	0	69,852	7,665,595	140,910	0	140,910
Pavement			0	0	0		0	0	0
Runway	m	3,027	44,228	0	44,228	2,500	36,830	0	36,830
Taxiway	m	5,690	64,979	0	64,979	7,488	78,332	0	78,332
Apron	Sum	1	73,108	0	73,108	1	56,525	0	56,525
Road and Car park	Sum	1	12,010	0	12,010	1	13,816	0	13,816
Other roads, marking and subgrade for pavement	Sum	1	24,368	0	24,368	1	18,758	0	18,758
Stormwater Drainage			0	0	0		0	0	0
Manholes, inlets, pipes and open ditches	Sum	1	13,723	1,921	13,871	1	16,803	1,921	16,951
Miscellaneous			0	0	0		0	0	0
Tunnel	m		0	0	0	260	11,332	0	11,332
Fences, Gates, road signs and flag poles	Sum	1	6,631	2,588	6,830	1	4,731	2,588	4,930
Landscaping	Sum	1	20,443	81,669	26,725	1	21,300	81,891	27,599
Part 3 Utility Works			51,305	763,571	110,042		51,305	763,571	110,042
Power Supply	Sum	1	43,322	362,851	71,233	1	43,322	362,851	71,233
Water/ Chiller Plant	Sum	1	3,766	298,702	26,743	1	3,766	298,702	26,743
Fire Fighting Facility	Sum	1	1,146	99,524	8,802	1	1,146	99,524	8,802
Sewage Treatment	Sum	1	3,071	2,493	3,263	1	3,071	2,493	3,263
Part 4 Building Works			207,970	3,559,916	481,810		207,970	3,559,916	481,810
Passenger Terminal Building (PTB)	Sum	1	185,628	3,448,613	450,906	1	185,628	3,448,613	450,906
Other Buildings	Sum	1	22,341	111,304	30,903	1	22,341	111,304	30,903
Primary substation(PSS)			0	0	0		0	0	0
Chiller Plant & Water Tank Building (CHT)			0	0	0		0	0	0
PTS Substation (PTS)			0	0	0		0	0	0
Guard House(GDH)			0	0	0		0	0	0
Part 5 Nav Aids Works	Sum	1	1,173	221,013	18,174	1	1,173	221,013	18,174
Part 6 Aeronautical Ground Lighting Works	Sum	1	19,734	127,580	29,548	1	18,272	117,916	27,342
Part 7 Road & Car Park Lighting Works	Sum	1	3,860	76,651	9,756	1	3,860	76,651	9,756
Subtotal of Construction works (Part 1 to 7)			692,749	4,904,985	1,070,055		831,422	4,895,544	1,208,002

3) Project Implementation Scheme

Borg El Arab International Airport is currently wholly owned and operated by the Egyptian Airports Company (EAC) which is a company of self-accounting principle though for the moment organized wholly under the Government. The staff at the Airport are being trained to possess necessary knowledge to operate, maintain and manage the Airport by themselves.

Considering the magnitude of this particular Airport where LCCs and Egyptian pilgrimage passengers are main end-users, it is considered not profitable if private sector would undertake the project by means of PPP or BOT schemes. It is further anticipated that transfer of any part of the airport revenue (e.g. from Terminal 2) to private sectors could negatively affect the overall manner of airport operations or the EAC's cash-flow as a whole.

Hence, it is considered desirable for EAC to implement the Phase-2 development in near future with an financial assistance from foreign donor country.