SAN DIEGO
International Airport

AIRPORT MASTER PLAN
SAN DIEGO INTERNATIONAL AIRPORT

SECTION 7.4

Airport Support Facility Requirements

HNTB

SAN DIEGO INTERNATIONAL AIRPORT

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7.4 Airport Support Facility Requirements

The airport support facilities, particularly cargo, at SDIA are in high demand and require enhancements. At 600 acres, SDIA is approximately the same acreage size as John Wayne Airport in Santa Ana, but SDIA serves three times as many passengers and will have significantly more cargo volume than John Wayne in the future. Accommodating the required cargo facilities at SDIA is a challenge for the planners. Improvements to increase the ability for SDIA to handle a larger volume of cargo traffic safely and efficiently are critical for SDIA.

7.4.1 Air Cargo Facilities

Cargo Building Requirements

Building utilization rates are the standard measures to define the capacity of freight facilities, and this rate is expressed in square feet per annual ton of freight. SDIA currently has 69,750 square feet of cargo building and office space. The 2001 Master Plan reported the 1996 building utilization rate was 0.96 square feet per ton. If the calculation was for 2003, the utilization rate would have been 0.45 square feet per ton. However, FedEx and Emery Worldwide cargo is sorted and containerized at off-airport sites and do not use airport freight facilities; hence, a different factor should be considered when calculating the final utilization rate.

The HNTB Team's experience indicates that the average building utilization rate at U.S. airports is 1.5 square feet per ton. The Team's experience also suggests that the range of adequacy for an airport is between 1.0 and 2.5 square feet per ton. A utilization rate of 1.0 square feet per ton typically indicates the facilities are well utilized and some near-term expansion is required. The higher 2.5 square feet per ton indicates existing tenants have ample space or cargo-related tenants, such as freight forwarders that occupy space in the cargo buildings. The building utilization rate analysis for SDIA indicates cargo facilities are over-utilized and additional facilities are needed.

The majority of cargo operators surveyed at SDIA indicated a current need for additional ramp and building space. Due to the types of operations carried out in the sorting buildings, the operators require structures with greater depth than width. The existing structures are 30 years old and are not configured for efficient cargo operations.

In the 2001 Master Plan cargo analysis, the national average building utilization rate of 1.5 square feet per ton, was adjusted downward to 1.25 square feet per ton at SDIA as a result of historically higher building utilization. This appears to be a reasonable adjustment and will be retained for analysis in this section.

Table 7.4-1 quantifies the existing and projected building space and projected deficiencies for the high constrained aviation activity forecast. Given the age and configuration of existing cargo structures, it is assumed the structures will be replaced. The existing demand of 193,258 square feet is theoretically short 123,508 square feet, reflecting the fact that FedEx and Emery sort and containerize off-airport. This demand will grow to 777,676 square feet of building space by 2030. **Table 7.4-2** quantifies the projected building requirements for the low forecast requiring 608,890 square feet by 2030.

Table 7.4-1

Air Cargo Building Requirements High Forecast

Year	Air Cargo (Tons)	Building (SF[1])	Deficiency (SF)
2003 - Existing	154,606	69,750[2]	--
2003 - Requirement		193,258	123,508
2010	233,284	292,330	222,580
2015	322,863	403,580	333,830
2030	622,141	777,676	707,926

[1] SF - Square Feet
[2] To be replaced

Source: HNTB analysis

Table 7.4-2

Air Cargo Building Requirements Low Forecast

Year	Air Cargo (Tons)	Building (SF[1])	Deficiency (SF)
2003 - Existing	154,606	69,750[2]	--
2003 - Requirement		193,258	123,508
2010	215,152	268,940	199,190
2015	269,439	336,800	267,050
2030	487,106	608,890	539,140

[1] SF - Square Feet
[2] To be replaced

Source: HNTB analysis

The 2001 Master Plan assumed 80 percent of SDIA cargo demand would be diverted to other airports, primarily Los Angeles International (LAX) and Ontario International (ONT) in the future. LAX is forecast to reach its cargo capacity by 2015, and ONT is forecast to reach its cargo capacity by 2030. With the region-wide air-cargo capacity nearing its limits, fewer opportunities for cargo diversions will exist. This possibility contradicts previous assumptions about air cargo demand and traffic at SDIA.

Cargo Apron Requirements

The 2001 Master Plan reported SDIA has approximately 270,000 square feet of existing cargo apron, including aircraft hardstands. The main cargo apron is congested during peak periods and often blocked by support equipment. Apron size is often a function of available land and airport layout. However, the accepted planning criterion for cargo apron is five square feet of apron per square foot of cargo building space.

Table 7.4-3 and **Table 7.4-4** present SDIA's cargo apron requirements for the high and low aviation activity forecasts. The existing apron square footage is shown in row one and compared to the existing demand for apron square footage. The existing deficiency during peak periods (demand less capacity) is 696,240 square feet.

Table 7.4-3

Air Cargo Apron Requirements High Forecast

Year	Apron Area (SF[1])	Deficiency (SF)
2003 - Existing	270,000	--
2003 - Requirement	966,240	696,240
2010	1,479,600	1,209,600
2015	2,017,890	1,747,890
2030	3,888,360	3,618,360

[1] SF - Square Feet

Source: HNTB analysis

Table 7.4-4

Air Cargo Apron Requirements Low Forecast

Year	Apron Area (SF[1])	Deficiency (SF)
2003 - Existing	270,000	--
2003 - Requirement	966,240	696,240
2010	1,344,690	1,074,690
2015	1,683,990	1,413,990
2030	3,044,430	2,774,430

[1] SF - Square Feet

Source: HNTB analysis

In the high forecast, cargo apron demand increases to 2,017,890 square feet in 2015 and to 3,888,360 square feet in 2030. The low forecast apron requirement is about five years behind the high forecast. Even with the low forecast, it is estimated the airport's existing property would be insufficient to meet the 2030 demand for on-airport cargo apron facilities.

All Cargo vs. Belly Cargo

The aviation activity forecasts quantify cargo carried in all-cargo aircraft and cargo carried in passenger airliners, known as belly cargo. In the high forecast for 2030, belly cargo accounts for 15.3 percent of the

total cargo tonnage, and in the low forecast it accounts for 15.9 percent of total. These percentages should be applied to building requirements. It is important to distinguish belly cargo due to the unique facility requirement required. Belly cargo facilities would ideally be located near the passenger terminals, while all-cargo facilities tend to benefit from being separated from the terminal area.

7.4.2 General Aviation (GA) Facilities

GA activity at SDIA has experienced a steady decline since the late 1970s when changes were made to the surrounding airspace and when instrument approaches were installed at local reliever airports, such as Montgomery Field. An accident at SDIA between a PSA 727 and a Cessna 172 in 1978 resulted in the establishment of a Terminal Control Area (TCA) at SDIA as well as the prohibition of practice instrument approaches at SDIA. The current GA activity at SDIA is primarily business jet traffic of both personal and fractional ownership. This is evidenced by the high percentage of turbojet GA traffic at nearly 75 percent.

SDIA currently accommodates only 2 percent of all GA traffic in the San Diego region according to the 2004 aviation activity forecast. According to the FAA Terminal Area Forecast, SDIA will see slower annual GA traffic growth (0.8 percent) than the San Diego region (1.1 percent) as a whole. Furthermore, recent operations counts show that overall operations at SDIA were up 5.2% from 2004 to 2005 while GA operations were down 1.1% from 2004 to 2005.

Growth in corporate jet activity is expected to be modest. The SDIA high constrained aviation activity forecast predicts 17,963 annual GA operations for 2015. This is an increase of approximately 3,500 annual operations versus the baseline year of 2003. However, the forecast assumes that growth in GA operations at SDIA would cease after 2015 due to the capacity constraints of the single runway airfield.

The existing FBO operator, Jimsair, has expressed interest in increasing their leasehold from 11.4 acres to as much as 14 acres at the current location to accommodate a proposed expansion. However, it is recommended that the existing GA facility be relocated and expanded at a different location at SDIA and new facilities be constructed for two reasons:

1. The existing GA facility's 11.4 acre site is poorly organized and reduces the efficiency of the facility's operation. Jimsair has expressed the desire for additional hangar and terminal space, which could be accommodated at another location while providing a modest increase in total airport acreage utilized for GA. Due to the aforementioned potential that SDIA will be unable to meet the facility requirements for cargo facilities between 2015 and 2030, it is recommended that GA facilities be expanded by no more than an acre. This increase would provide suitable facilities to meet the forecast demand for GA operations with an improved level of service relative to today's SDIA GA facilities.
2. The existing location of the GA facility prevents the realignment of Taxiway C to provide for standard separation from Runway 9-27. The location of the existing GA facility is at the east end of Taxiway C. Taxiway C, in this location, has a non-standard separation from Runway 9-27 and a non-standard separation from the service road parallel to Taxiway C, separating the GA leasehold from Taxiway C. The Authority's Capital Improvement Program (CIP) has earmarked a plan for reconstructing Taxiway C and relocating the centerline to the standard separation from the runway by moving Taxiway C north 37.5 feet. In this scenario, the GA area leasehold would be impacted. Further, as described in Section 7.1, Airfield Facility Requirements, a departure hold pad, constructed near the Runway 27 end, would allow a safe, unobstructed location for aircraft to hold prior to departure from Runway 27.

These factors suggest that overall airport efficiency and safety could be improved by relocation of the GA area to different location at SDIA. A well planned and more efficient GA area layout would enhance the efficiency of the GA area while minimizing airport acreage dedicated to GA facilities. The operator of the reconstructed facility will have some authority to determine the type and size of facilities that will be developed within the GA leasehold area. The aforementioned forecast of operations as well as the characteristics of the GA market at SDIA must be considered together in determining GA facility requirements. In addition to the forecast increase in GA operations, the existing GA operator has a

waiting list of customers interested in hangar storage for corporate aircraft. The following factors influence the determination of GA facility requirements:

Primary GA Services

Apron Area

The GA Apron area is a paved surface capable of accommodating the most demanding GA aircraft type expected at SDIA. Due to its runway length, SDIA handles the largest GA aircraft that are based in, or visiting the region including the, Boeing Business Jet and Gulfstream V. The GA apron area required for itinerant operations at SDIA is estimated to be approximately 5,950 square feet per operation on an average weekday during the peak month.

The existing FBO currently provides apron area for DHL cargo airlines. It is anticipated that the future GA facility will cater exclusively to general aviation and cargo aircraft will be accommodated at another location at SDIA. The GA facility requirements do not include additional apron area to accommodate any cargo operations.

Hangar Capacity

Hangars are used for storage and maintenance of aircraft. Typically, the demand for aircraft hangars is partially influenced by the local climate. However, in spite of the mild climate in San Diego, the demand for aircraft hangar space is high because of the type of GA operations at SDIA. As noted above, more than 75% of GA operations at SDIA are turbojet aircraft, and the remainder is almost exclusively multi-engine turboprop aircraft. The owners of these aircraft have invested millions or even tens of millions of dollars in the aircraft and prefer them both secured and protected from the weather in private hangars.

There are currently eight based aircraft at SDIA: four turboprop aircraft and four turbojet aircraft. The FBO operator has stated that they currently have a waiting list of approximately seven to ten additional customers. The operations and passenger forecast for SDIA does not include based aircraft. However, for the purpose of the facility requirements calculations, a ratio of based aircraft to GA operations was used to estimate a total of 21 based aircraft in 2015 (and beyond). Facility requirements are estimated at 5,000 square feet per based aircraft.

Terminal/Office/Maintenance

The GA operator maintains a management office, a terminal facility, and a small maintenance facility. These facilities currently total approximately 20,000 square feet and are considered to be of adequate size to accommodate future demand.

Fueling

The GA facility currently utilizes an underground storage tank for Jet-A fuel and dispenses fuel utilizing fuel tank trucks. In order to best manage the transport and storage of aviation fuel at SDIA, it is anticipated that future fuel storage at SDIA will be handled exclusively through the airport's fuel farm and delivered to the GA facility by one of three methods:

1. The FBO would continue to maintain a fleet of fuel trucks but would refill them at the airport's fuel farm.
2. An underground pipe would deliver fuel from the fuel farm directly to a fuel pump at the FBO facility where the FBO fuel trucks would refill.
3. All fueling at SDIA, including GA, would be handled by the airport's fuel consortium, and the FBO would not independently operate any fuel trucks.

Because the FBO is not anticipated to provide fueling services for any airlines in the future, fuel storage requirements and fuel tanker vehicle storage requirements are equal to or less than they are today.

Secondary GA Services

Additional Services

Though, the existing FBO operated a restaurant until 2002, there is no provision for a restaurant in the facility requirements because the operation of a restaurant is secondary to the operation of an FBO or GA facility. Catering facilities for providing in-flight meals to flights is assumed to be included in the GA terminal facility requirements.

Aircraft Maintenance Facility

The existing FBO does not provide heavy maintenance for aircraft. The facility requirements do not provide additional acreage to accommodate the addition of major aircraft maintenance facilities.

Vehicle Parking

Jimsair operates a parking lot within their lease that provides long term vehicle parking to the general public. The parking lot has approximately 150 parking stalls. A shuttle van transports parking customers between the parking lot and the SDIA terminal facilities. The parking lot is located along the west side of Pacific Highway, south of the Jimsair entrance at the intersection of West Palm Street.

Total Area

In order to determine the total area necessary, including parking and circulation, fueling vehicles, and buffers, the combined facility requirements are multiplied by 1.15. See **Table 7.4-5** below.

Table 7.4-5

SDIA GA Facility Requirements

Terminal	Square Feet
Terminal	11,000
Office	6,000
Maintenance	3,000
Subtotal	**20,000**
Apron	345,080
Hangar	105,000
Subtotal	**470,080**
Multiplier	1.15
Total GA Area	**540,592 (12.4 Acres)**

7.4.3 Aircraft Rescue and Fire Fighting (ARFF) Facilities

SDIA is a Part 139 airport; hence, it must comply with specific ARFF operational requirements that were developed by the FAA and the International Civil Aviation Organization (ICAO) Rescue and Fire Fighting Panel. Five airport classes, referred to as indices, and their corresponding ARFF equipment requirements are identified in **Table 7.4-6**. The applicable airport index is determined by the length of the longest aircraft operated by an air carrier performing an average of five scheduled departures per day.

Response time requirements for ARFF vehicles specify that at least one ARFF vehicle at its assigned post should be able to reach the midpoint of the farthest runway serving air carrier aircraft within three minutes from the time of alarm to the time of initial agent application. All other required vehicles shall reach this same point within four minutes of the time of alarm.

Table 7.4-6

ARFF Index Classifications

Airport Index	Required No. of Vehicles	Aircraft Length	No. of Departures[1]	Agent + Water For Foam
A	1	<90'	>1	500 lbs. DC or HALON 1211 or 450 lbs DC + 100 Gal H_2O
B	1 or 2	>90', <126' >126', <159'	<5	Index A + 1,500 Gal H_2O
C	2 or 3	>126', <159' >159', <200'	>5 <5	Index A + 3,000 Gal H_2O
D	3	>159', <200' >200'	>5 <5	Index A + 4,000 Gal H_2O
E	3	>200'	>5	Index A + 6,000 Gal H_2O

[1] Daily departures

Source: Federal Aviation Administration.

SDIA is currently classified as an Index D airport. As indicated in the inventory update and in **Table 7.4-1**, Rescue One is the Airport's rapid intervention vehicle and has a response time of less than three minutes. Each of the three other ARFF vehicles has response times of less than four minutes. These response times meet the current Federal Aviation Regulation (FAR) Part 139 requirements. The described ARFF vehicles have a combined capacity of approximately 10,500 gallons of water and approximately 1,500 gallons of foam. These combined capacities meet fire fighting "Index E" as established by FAR Part 139. The ARFF vehicles may need to be modified or replaced during the planning period, but they meet current requirements for "Index E."

The ARFF building is a one-story, 9,570-square-foot facility located to the west of the existing Remain Overnight (RON) parking area as depicted in Figure 3.5-2. This building is located north of Runway 9-27 near the midpoint of the runway which enables the Airport to meet response time requirements. The ARFF building was constructed in 1969 and is known as the Crash and Rescue Equipment Building. This facility houses an apparatus room for storage of fire fighting and paramedic vehicles and equipment, a dormitory with showers, a kitchen/dining room, training room and control room. The dormitory was

remodeled in 1993. The 2001 Master Plan indicated that the Port District planned a replacement of the ARFF building due to its age.

7.4.4 Aircraft Fuel Storage Facilities

Commercial Carriers

As noted in the inventory, a new airport fuel storage facility was completed in 1996. It consists of two above-ground storage tanks for Jet A fuel, each with a capacity for one million gallons. There is room at the facility to add a third one-million-gallon tank for Jet A fuel. The facility also includes two underground tanks, one of which holds 15,000 gallons of automotive gasoline and the other which holds 15,000 gallons of diesel fuel.

The 2001 Master Plan used a planning criterion of 1,175 gallons of fuel consumed per commercial aircraft departure during an average day in the peak month. This amount was considered low relative to comparable airports. The lower relative consumption is likely due to the higher percentage of commuter departures, their associated short-haul nature, and the competitive fuel market (airlines prefer to purchase fuel at locations where pricing is more competitive than in Southern California).

Table 7.4-7 displays fuel consumption per day and the four-day supply requirement. Only the high forecast is used to present a worst-case situation. Compared to the 2001 Master Plan, the fuel consumption estimates are lower and reflect primarily the effect of 9/11 on commercial operations.

The data provided in the table infers ample jet storage capacity well into the interim future forecast (2010) period and the addition of a third one-million-gallon storage tank for jet fuel would not be necessary until some time after 2015. Sensitivity analysis suggests the third tank should be installed between 2020 and 2025. The four-day requirement is 1,875,300 gallons in 2020 and 2,110,000 gallons in 2025.

Table 7.4-7

Average Daily Fuel Consumption For Commercial Aircraft High Forecast

Year	Daily Departures[1]	Consumption Jet A (gallons)	Requirements 4-Day Supply (gallons)
2003 - Existing	260	305,500	--
2003 - Requirement	260	305,500	1,222,000
2010	309	363,651	1,454,604
2015	355	417,125	1,668,500
2030	464	545,200	2,180,800

[1] Average day, peak month commercial departures

Source: HNTB analysis

General Aviation

The 2001 Master Plan indicated Jimsair FBO has an unused 2,400-gallon 100LL (low lead) underground tank. Due to the ban on aircraft training activity, the volume of AvGas used at the airport is extremely limited. Presently, the FBO stores aviation gasoline (AvGas) in a single, mobile fuel-dispensing truck.

AvGas use has declined steadily in recent years, and it is anticipated this trend will continue. Therefore, AvGas requirements are not addressed.

Jimsair has a 15,000-gallon underground Jet A storage tank and another 90,000-gallon capacity in its mobile fuel dispensing trucks. The 2001 Master Plan indicated capacity for a five- to seven-day fuel storage supply; extrapolating to 2030, the storage capacity will remain sufficient.

7.4.5 Airline Maintenance Facilities

Airline maintenance hangars and facilities are typically built by airlines based on corporate business decisions and are not necessarily related to the volume of air traffic at a given airport. It is, therefore, difficult to forecast the construction of such facilities. The factors that typically influence construction of such facilities include airline headquarters location, hubbing characteristics, fleet size, maintenance scheduling, climate, and location of terminating flights.

As noted in the inventory of Airport Support facilities, there is a 21,000 square foot maintenance facility operated by Aircraft Service International Group (ASIG). ASIG previously indicated a need for as much as 50,000 square feet of additional space in the future. The previous master plan recommended preserving 4.5 acres for future airline maintenance operations.

At the current time, there are three closed military air bases in Southern California soliciting airline maintenance activities. These facilities provide alternatives to SDIA for the location of new or expanded airline maintenance facilities in the Southern California region. It is recommended that an area equal in size to the existing ASIG facility should be preserved for minor aircraft maintenance. The highly constrained environment at SDIA dictates that major maintenance facilities would find a more suitable airport at another location within the Southern California region. The prioritization of improved ground transportation, terminal, cargo and general aviation facilities over airline maintenance facilities is consistent with the goals and objective set forth in the master plan.

7.4.6 Airport Office and Maintenance Facilities

Increasing passenger traffic and operations levels at SDIA will require an increase in Authority employees in the areas of operations and airport maintenance. Though the primary administrative staff will generally remain equal in number it is expected that sufficient future area should be preserved to accommodate additional Authority staffing in future years.

The Commuter Terminal currently could provide over 90,000 square feet of office space if the Authority were to finish the second floor. This would provide an additional 15,000 square feet of office space relative to current conditions assuming the West Wing, the temporary facility at North Harbor Drive and Stillwater Road, were removed upon completion of the Commuter Terminal second floor.

Based on planning factors utilized at other Southern California airports, approximately 172,700 additional square feet would be required for all airport maintenance by the end of the planning period.

7.4.7 Other Airport Support Facilities

Other airport support facilities have been assessed for future requirements. These include the ATCT and Administration Base Building, GSE facilities, United States Postal Service (USPS), Wash Rack, and general aviation (GA) facilities.

ATCT and Administration Base Building

The Air Traffic Control Tower (ATCT) and the Administrative Base Building were completed in 1996 and are located to the north of Runway 9-27. These buildings comprise a combined 12,950-square-foot facility, replacing the vacated old ATCT directly to the west. The new ATCT itself is 136 feet tall and

contains 7,000 square feet of space. It is assumed these facilities are adequate during the planning period aside from periodic upgrades of facilities and equipment.

Ground Support Equipment (GSE) Facilities

There are two Ground Support Equipment (GSE) facilities located next to the cargo terminals on the south side of the airport. One facility, operated by American Airlines, contains 12,500 square feet in a one-story structure. The other, operated by ASIG, contains 10,400 feet. There is another GSE area north of the ATCT, which is primarily used by FedEx. With more than a doubling of commercial operations during the planning period, the space needed for GSE will need to double.

United States Postal Service (USPS)

The USPS facility is located east of the commuter terminal and occupies a two-story, 42,000-square-foot building. The ground level is used for mail sorting, and the second story is used for administrative offices. The 2001 Master Plan indicated the USPS would require 40,000 to 50,000 square feet to enable consolidation of some operations located off-site, such as Express Mail. In addition, USPS needs parking space for employee vehicles and delivery trucks and needs ramp space adjacent to their facility.

Flight Kitchen

As noted in Section 3.5.7, Other Airport Support Facilities, of the Inventory, an airline catering service provider is not currently operating at SDIA. This is primarily due to the financial conditions of the airlines and their associated attempt to reduce costs through reductions in passenger amenities. This condition is also influenced by the current bankruptcy proceedings of four major airlines, the experimental phase of controlling costs the industry is currently facing, and the lack of trans-oceanic international flights from SDIA. As air traffic continues to recover and trans-oceanic flights return to SDIA, it is anticipated that in-flight catering demand will return. Though these services may be provided by an off-site facility, sufficient on-airport facilities should be planned for. The existing 58,300 square foot facility would need to be expanded by 23,880 square feet to 82,180 square feet, to serve demand levels anticipated in the aviation activity forecast.

Wash Rack

The Wash Rack is located south of the Fuel Dispensing Apron. It is leased to and operated by ASIG and is used for washing aircraft. Few airlines use the Wash Rack on a regular basis, so additional wash racks are unnecessary. However, the wash-rack is located in a location that would be better utilized for terminal or air-cargo facility development. Installing a new wash rack with the latest fluid retention and recycling capabilities would provide an appropriate upgrade.