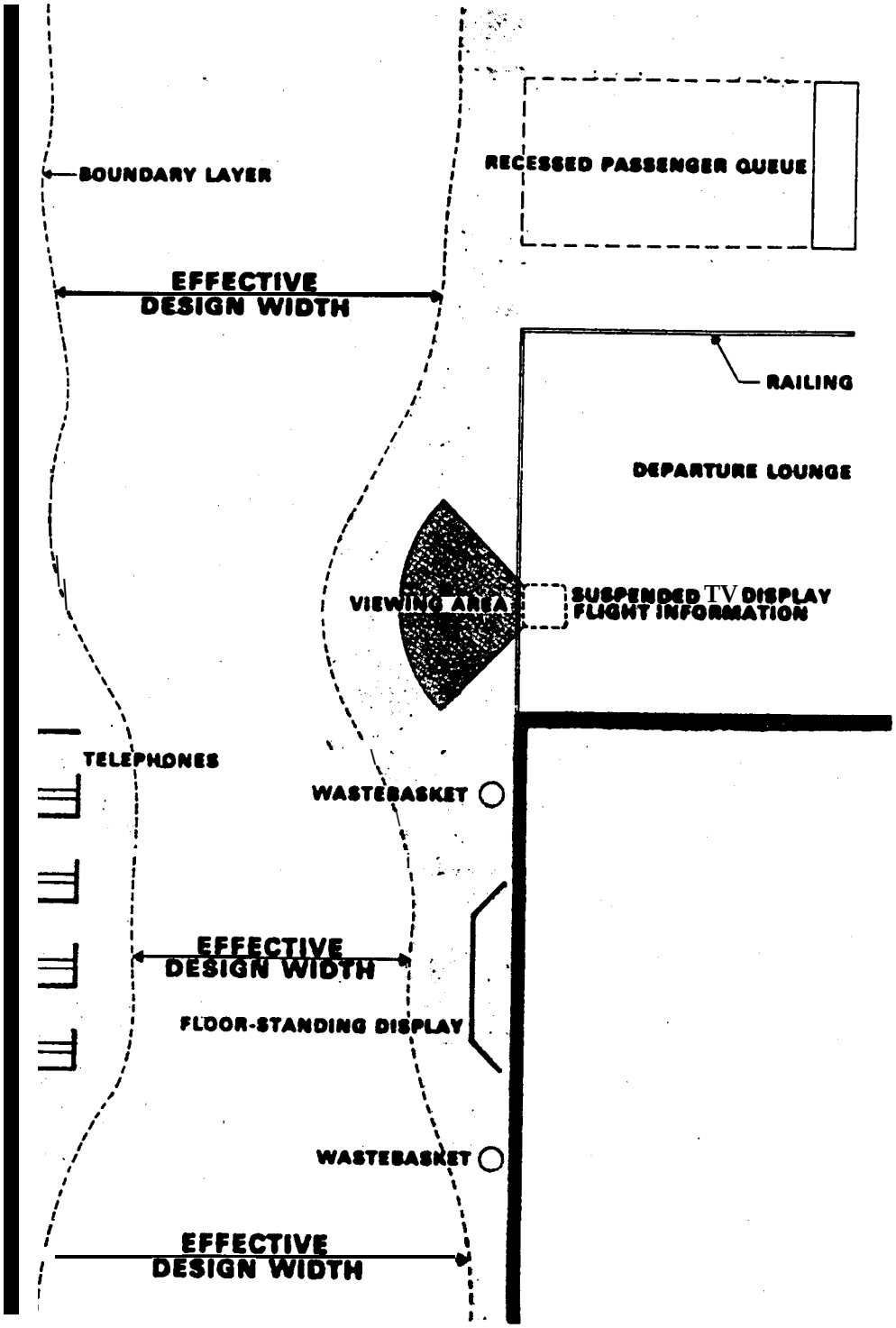


Figure S-20. Public Corridor Effective Desip Width

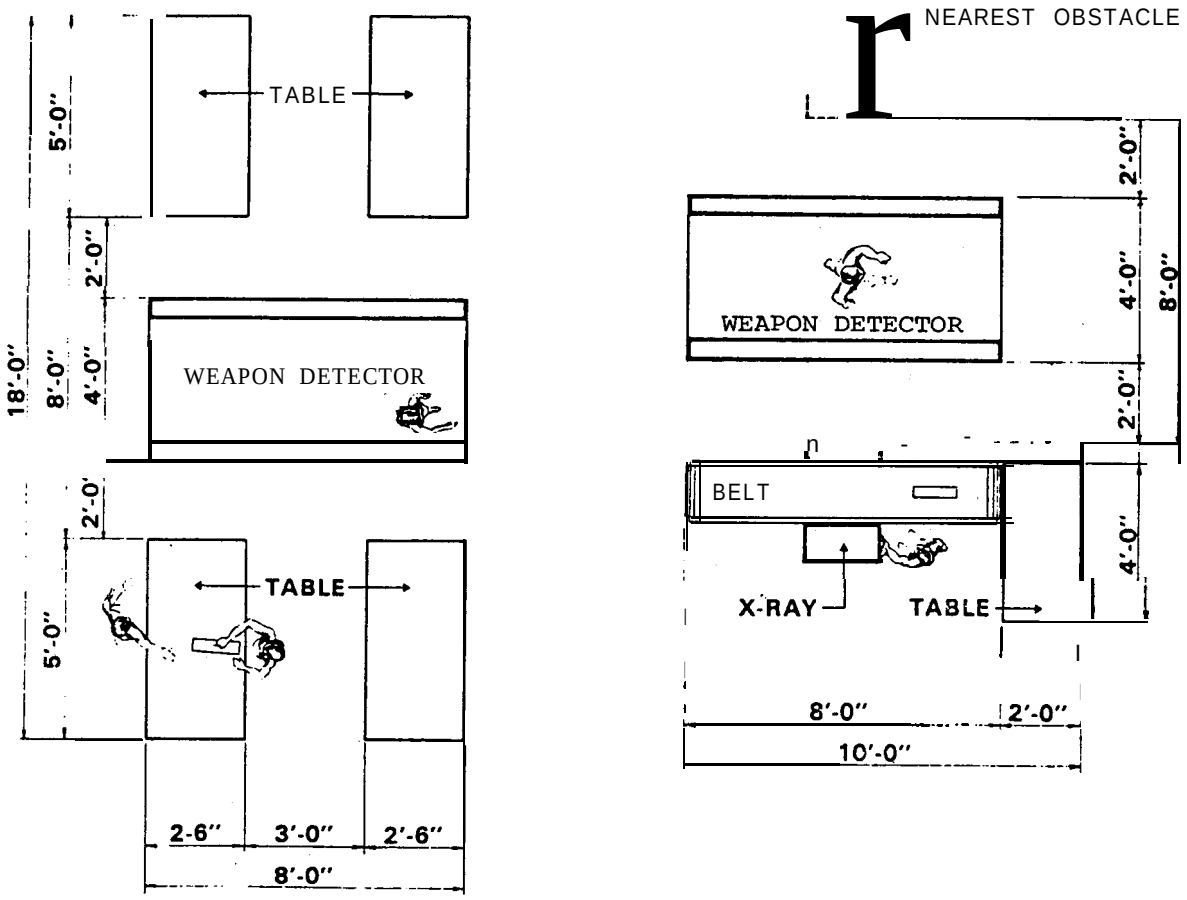


Figure 5-21. Security Inspection Station Layouts

f. Space leading to the security inspection station should allow room for queuing as the flow of passengers through security is often interrupted when a passenger requires a rescreening or physical search. Queuing space should not extend into or block other circulation elements.

g. The boarding area beyond a security screening checkpoint, whether a holding area concourse or departure lounge, requires a design which will enable security to be maintained. In this respect, the design and location of entrances, exits, fire doors, concessions, etc., require special consideration.

h. Other security considerations are discussed in Chapter 8.

74. DEPARTURE LOUNGES.

a. The departure lounge is the waiting or holding area for passengers immediately prior to boarding an aircraft. At most airports (excepting some low activity airports), departure lounges are normally included in the space leased and controlled by individual airlines.

b. The departure lounge normally includes: space for one or more airline agent positions for ticket collections, aircraft seat assignment, and baggage check-in; a seating and waiting area; a queuing area f aircraft boarding; and an aisle or separate corridor for aircraft deplaning. Figures 5-22, 5-23, 5-24, and 5-25 illustrate typical departure lounge layouts.

c. The number of agent positions/desks is determined by the user airlines on the basis of individual airline standards for passenger waiting, processing, and boarding procedures. A queue length of at least 10 feet (3 m) in front of agent positions should be provided in departure lounges at larger airports.

d. The departure lounge area is a function of the number of passengers anticipated to be in the lounge 15 minutes prior to aircraft boarding. Table 5-3 presents information for estimating departure lounge areas on the basis of aircraft seating capacity and load factors. The average depth of lounge area generally considered to be reasonable is 25 to 30 feet (8 to 9 m).

Table 5-3. Departure Lounge Area Space Requirements

Aircraft Seating Capacity	Departure Lounge Area Square Feet (Square Meters)		
	Boarding Load Factors		
	35-45 percent	55-65 percent	75-85 percent
Up to 80	350 (33)	515 (48)	675 (63)
81 to 110	600 (56)	850 (79)	1,110 (102)
111 to 160	850 (79)	1,175 (109)	1,500 (139)
161 to 220	1,200 (111)	1,600 (149)	2,000 (186)
221 to 280	1,500 (139)	2,000 (186)	2,500 (232)
281 to 420	2,200 (204)	3,000 (279)	3,800 (353)

e. When a lounge area serves more than one aircraft gate position, the estimated total lounge area shown in Table 5-3 may be reduced 5 percent for each aircraft gate position, up to a maximum of six gates.

f. Departure lounge seats are not generally provided to accommodate all passengers boarding an aircraft. A number of passengers will elect to remain standing in the waiting area while others will only arrive shortly before or during the boarding process. Between 15 and 20 square feet (1.4 to 1.9 m^2), including aisle space, is required per seat.

g. The deplaning area is generally a roped aisle or separate corridor directly leading deplaning passengers from the loading bridge or apron gate to a public corridor. Separation from the rest of the departure lounge is provided to avoid interference and congestion between deplaning passengers and those waiting to board the aircraft. Six feet (2 m) is an acceptable width for this area.

75. BAGGAGE CLAIM FACILITIES.

a. Inbound baggage handling requires both public and nonpublic building areas. The public space (claiming area) is that in which passengers and visitors have access to checked baggage displayed for identification and claiming. Nonpublic space is used to off-load bags from carts and containers onto claim devices or conveyor systems for moving into the public area.

b. The claiming area should be located adjacent to a deplaning curb and have convenient access to ground transportation service and auto parking facilities. Passenger access from arriving flights should be direct and avoid conflicting with enplaning passengers. The claim area should also be readily accessible from the aircraft apron by means of carts, tractors, or mechanical conveyors for quick and direct baggage delivery.

c. At low activity airports, a simple claim shelf is the most common baggage claim scheme. As passenger activity increases, several types of mechanical claim devices, as illustrated in Figure 5-26, may be utilized to help reduce the overall required claim area length. A discussion of the more common claim schemes follows.

(1) The simple shelf or counter is merely a shelf or counter provided in a public area on which baggage from an arriving aircraft is placed for passenger identification and retrieval. Width of the shelf is generally 30 to 36 inches (75 to 90 cm). Passengers merely move laterally along the shelf until their baggage is located and claimed.

(2) Flat-bed plate devices are particularly applicable when direct feed loading areas are immediately adjacent and parallel to the claiming area and on the same floor level.

(3) Sloping-bed devices are somewhat more adaptable for remote feed situations where the loading area cannot be immediately adjacent to the claiming area or must be located on a different floor level. In some cases, the width of the sloping bed is sufficient to provide storage of two rows of bags.

d. At low volume airports, exclusive-use facilities are not usually economically justified and claim facilities are shared or assigned preferentially to several airlines. The use of a Design Day Activity Analysis (see paragraph 24) is recommended to size baggage claim facilities. In this analysis, passenger arrivals in periods of peak 20 minutes are used as the basis for sizing. However, when exclusive facilities are planned, each airline determines its baggage claim frontage and space requirements according to its own criteria for sizing space, systems, and staffing.

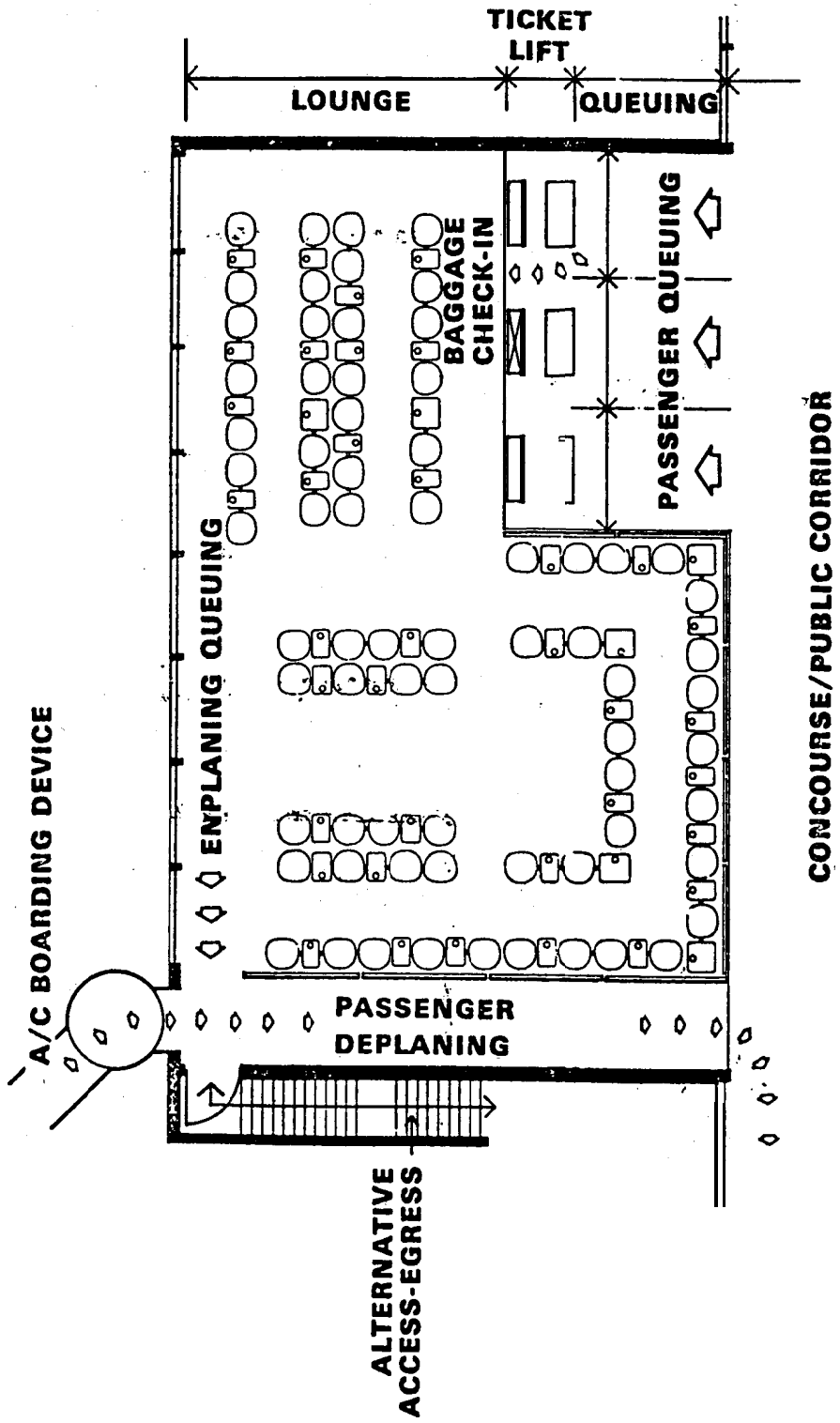


Figure 5-22. Typical Departure Lounge Layout

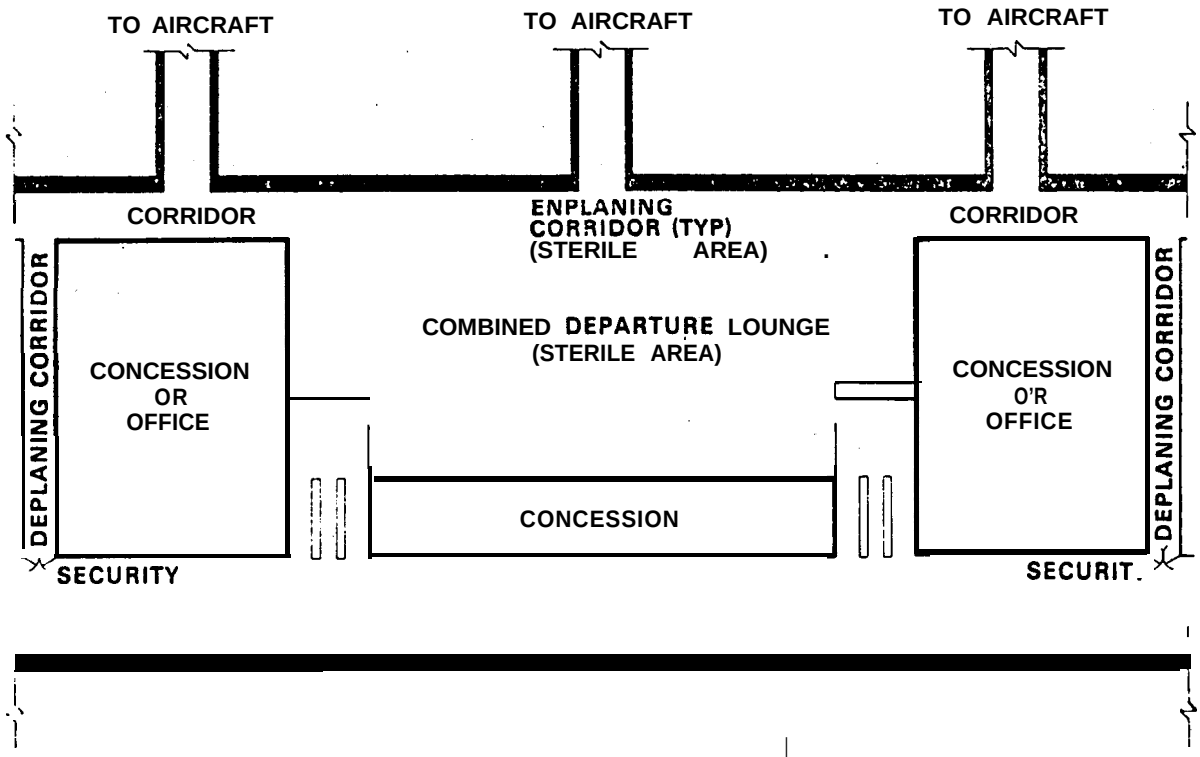


Figure S-23. Typical Combined Security/Departure Lounge Layout

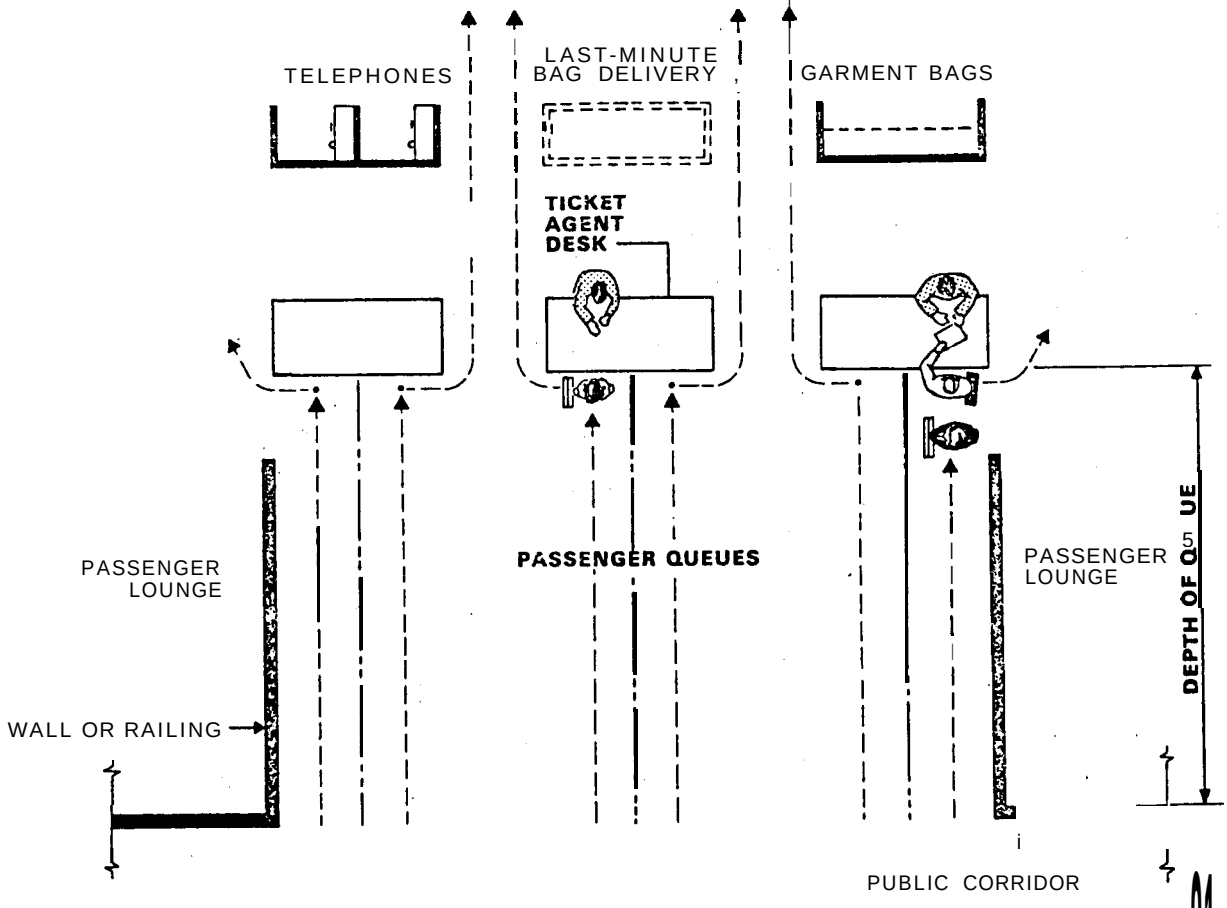
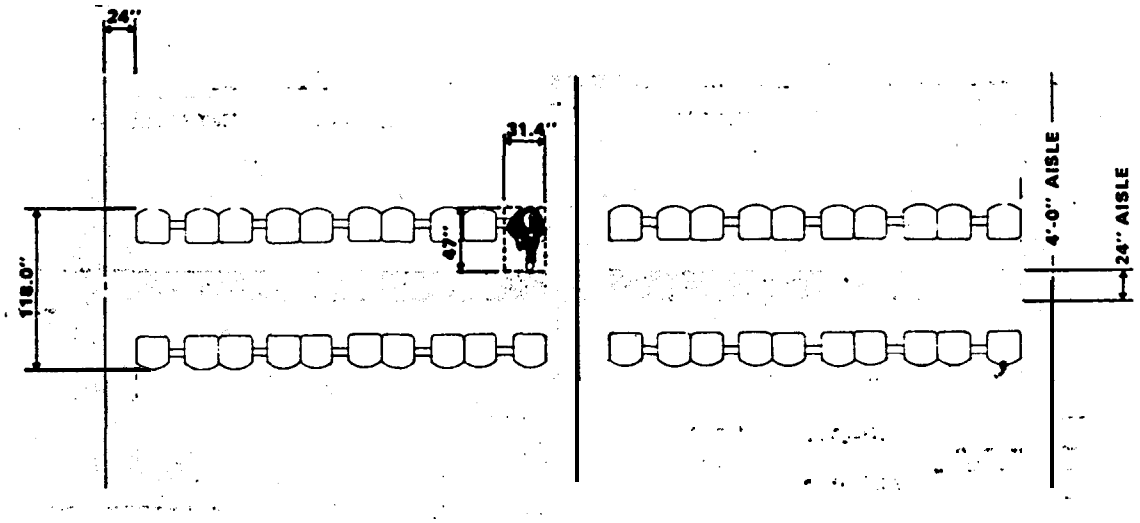


Figure S-24. Departure Lounge Passenger Processing Area



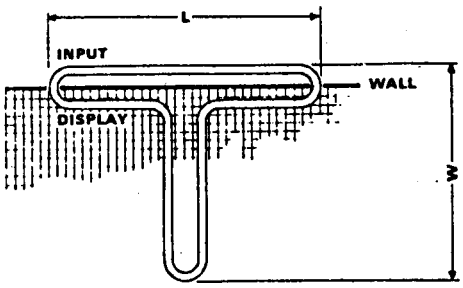
AREA/PASSENGER = 12.87 SQ FT

AREA/AISLE = $\frac{48 \text{ IN.} \times 118 \text{ IN.}}{144 \text{ SQ IN.} \times 20^{*}} = 1.97$ SQ FT

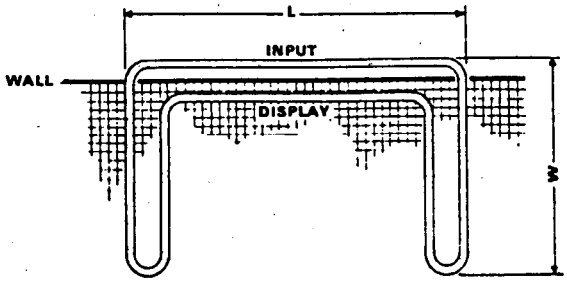
TOTAL AREA/SEATED PASSENGER = $\frac{(118 \text{ IN.} \times [illegible] 10 \bullet [illegible] \text{ PAIRS}) + (48 \text{IN} \times 118 \text{IN.}) = 14.83 \text{ SQ FT.}}{114 \text{ SQ. IN.} \times 20 \bullet 88 \text{elom8}} = 15$ SQ. FT./PASS.

*ONE UNIT LENGTH OF AISLE
4'-0" WIDE WILL SERVE
20 SEATED PASSENGERS

Figure 5-25. Departure Lounge Typical Seating/Aisle Layout

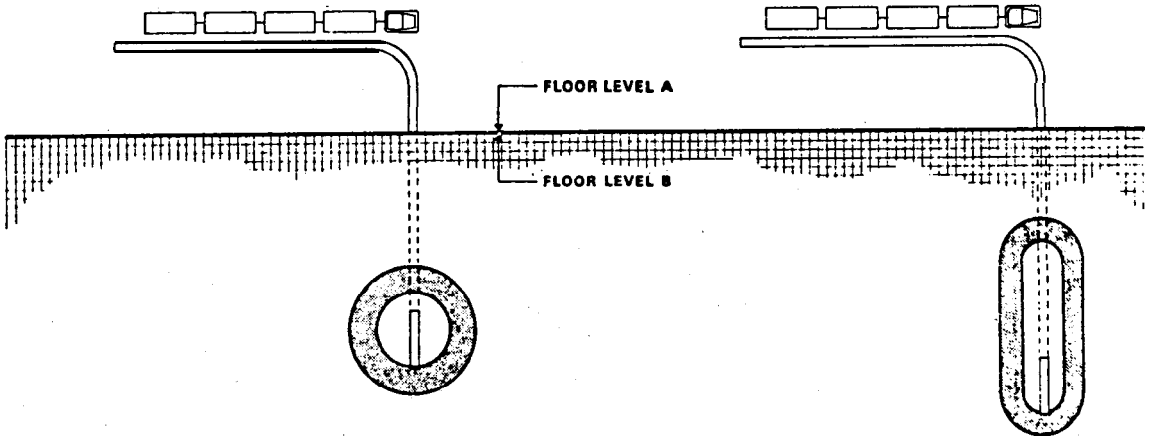


FLATBED — DIRECT FEED



FLATBED — DIRECT FEED

SHAPE	L&W (FT)	CLAIM FRONTAGE (FT)	BAG STORAGE*
OVAL	65 x 5	65	78
	85 x 45	180	216
	85 x 65	220	264
	50 x 45	190	228



CIRCULAR
REMOTE FEED SLOPING BED

OVAL
REMOTE FEED SLOPING BED

DIAMETER (FT)	CLAIM FRONTAGE (FT)	BAG STORAGE*
20	63	94
25	78	132
30	94	169

L&W (FT)	CLAIM FRONTAGE (FT)	BAG STORAGE*
36 x 20	95	170
52 x 20	128	247
68 x 18	156	318

* THEORETICAL BAG STORAGE—PRACTICAL BAG STORAGE CAPABILITY IS 1/3 LESS

Figure S-26. Mechanized Claim Devices

e. A public claiming area may require railings or similar separation from other public space and controlled egress to enable inspection of removed baggage for assurance of "positive claim." At some terminals, additional space may be needed adjacent to the claiming area for storage and security of unclaimed baggage and for airline baggage service facilities (lost and found).

f. For planning purposes, claim display frontage can be estimated by the use of either Figure 5-27 or 5-28. These nomographs utilize "Equivalent Aircraft Arrivals" (see paragraph 28) to approximate deplaning passengers in a 20 minute peak period, assuming an average of 1.3 bags per deplaning passenger. The claiming frontage requirements may be converted to baggage claim facility area requirements by, using Figure 5-29. The value presented includes: space for public circulation; area normally required within a controlled "positive-claim*' facility; and space for airline baggage service facilities. It should be recognized that considerable variance in space requirements occurs between airports due to airline company policies and the number of airlines using a claim area.

g. Figure 5-30 can be used to approximate the nonpublic space required to input and load bags onto claim devices. The figure assumes a 22 foot (7 m) depth, 20 feet 6 m) for the fixed shelf, behind the input section or belt for offloading carts and for passing/maneuvering. At many airports in mild climates, the nonpublic baggage input area may be satisfied without complete enclosure in the'terminal building through use of overhead canopies. This can also apply to the public baggage claim area at some low volume airports.

h. The area approximations developed from Figures 5-29 and 5-30 assume a relatively efficient use of building space. At existing terminals being modified to accept a claim device installation, additional space per foot of claim display may be required because prior column locations limit the efficient area use.

i. The baggage claim lobby area for public circulation and passenger amenities and services is discussed in paragraph 69c.

76. AIRLINE OPERATIONS AREAS.

a. Airline operations areas are those areas occupied by airline personnel for performing the functions related to aircraft handling at the gate. Composition of functions will vary among individual airports. The following areas are most commonly required:

(1) **Cabin Service or Commissary –** an area for the storage of immediate need items for providing service to the aircraft cabin.

(2) **Cabin Service and Ramp Service Personnel –** an area for training facilities and a ready/lunch room.

(3) **Aircraft Line Maintenance –** for supplies, tools, storage, personnel, etc.

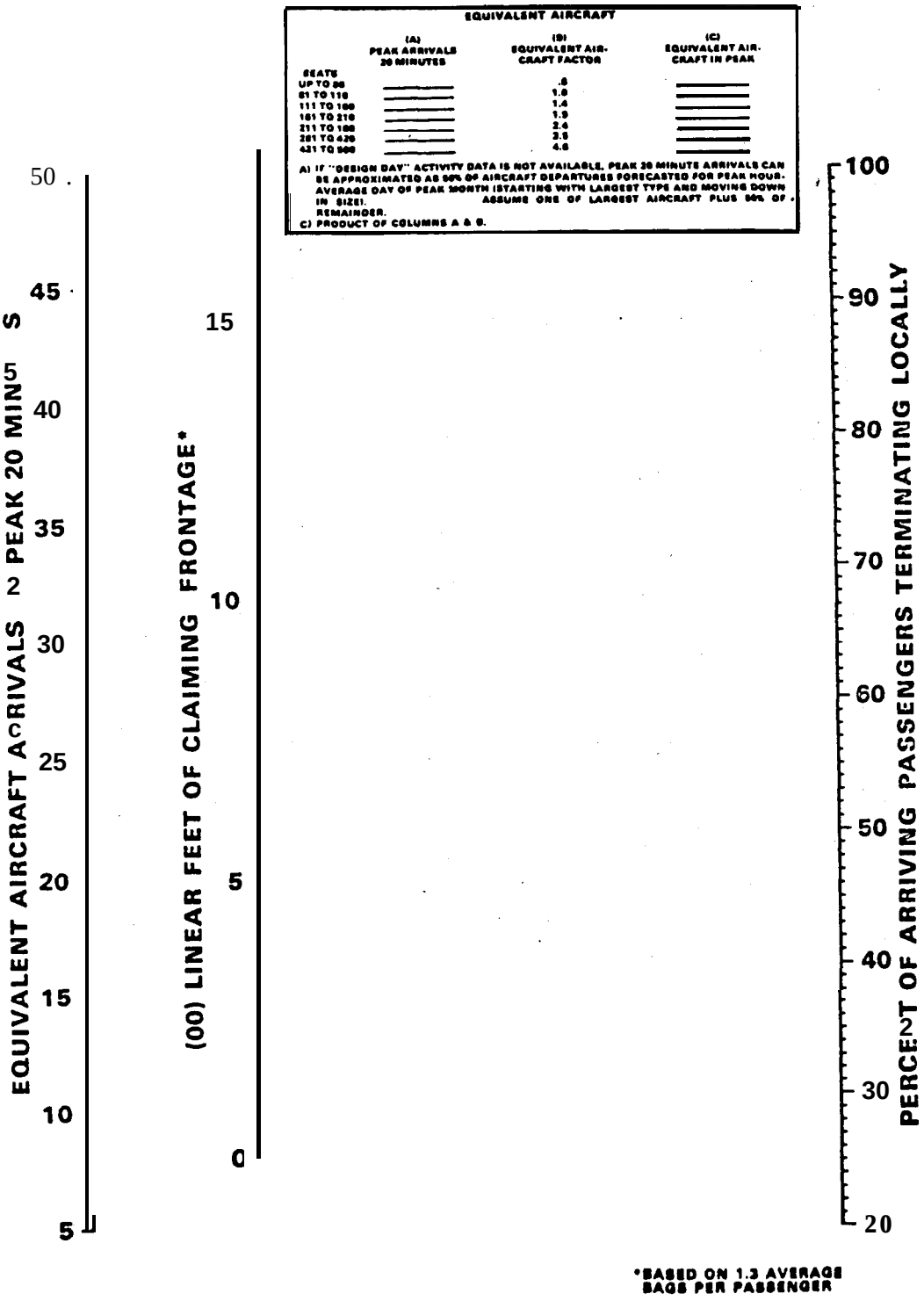


Figure 5-27. Inbound Baggage Claim Frontage - Less than Five EQA Arrivals in Peak 20 Minutes

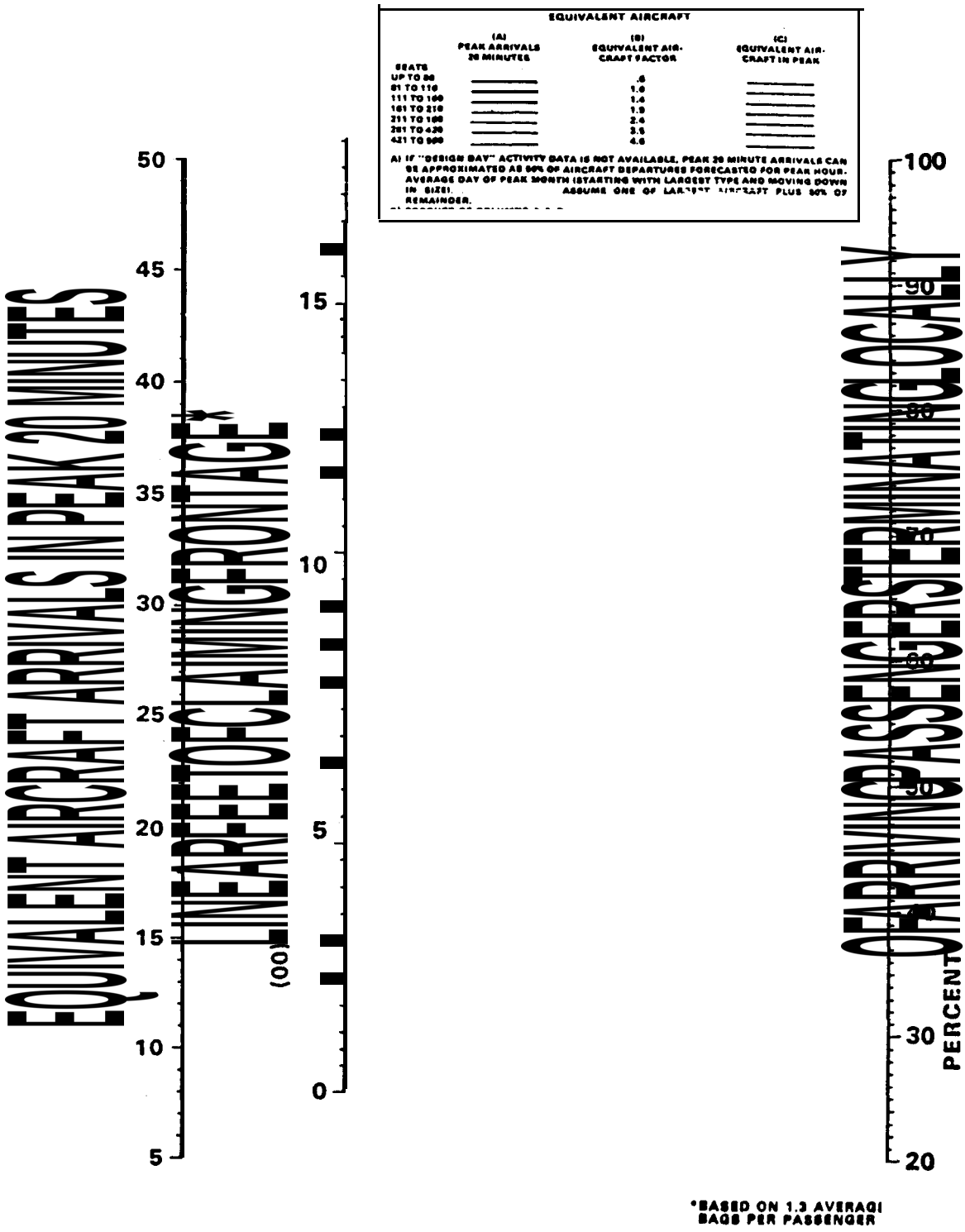
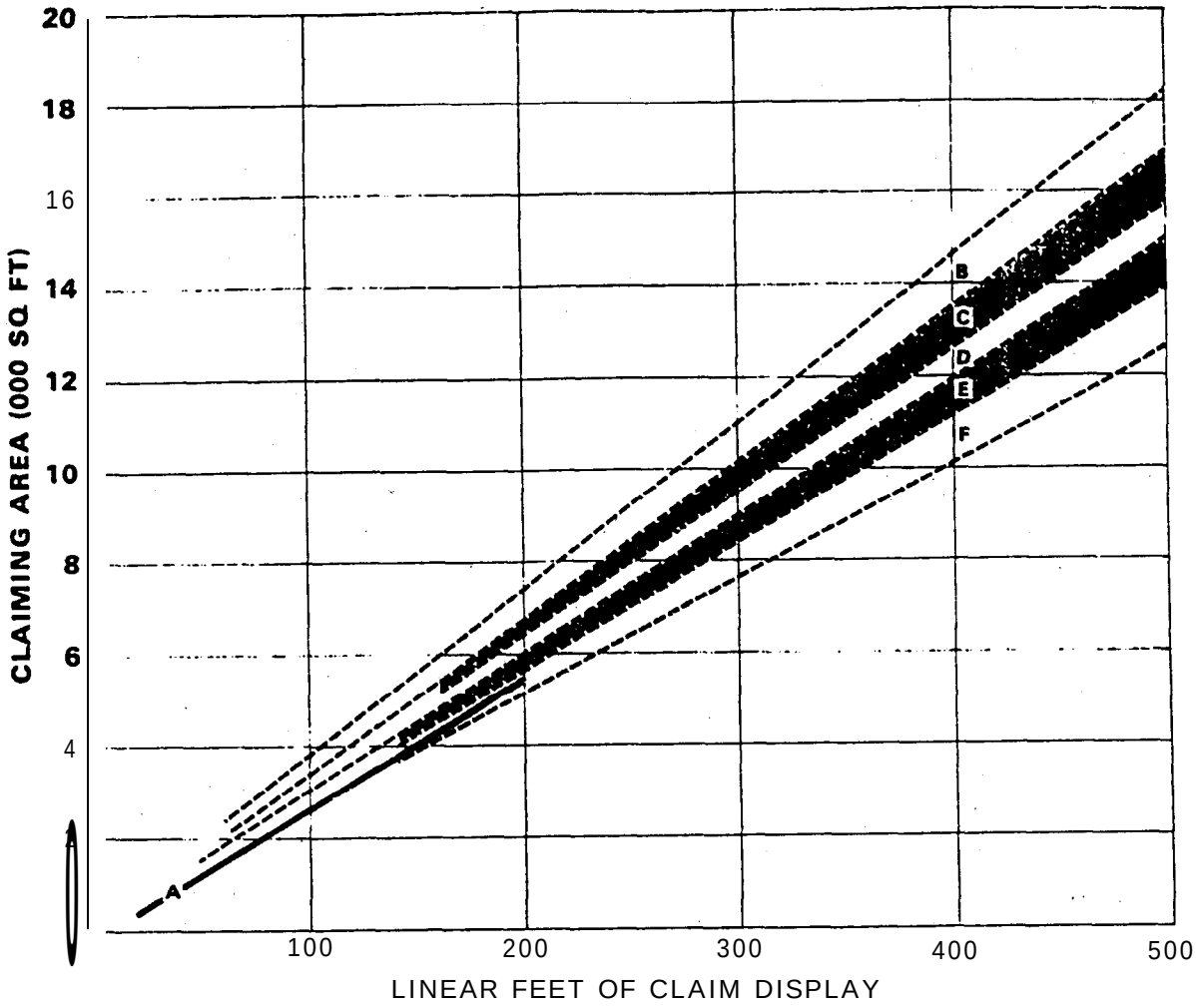


Figure 5-28. Inbound Baggage Claim Frontage - Five or More EQA Arrivals in Peak 20 Minutes



AREAS' FOR OPTIMUM CONFIGURATIONS OF:

A FIXED SHELF

B **ROUND** — SLOPING BED/REMOTE FEED
TEE — FLAT BED/DIRECT FEED

C TEE AND U-SHAPE ALTERNATING @ 75'
(FLAT BED/DIRECT FEED)

0 OVAL — FLAT BED/DIRECT FEED
OVAL — SLOPING BED/REMOTE FEED

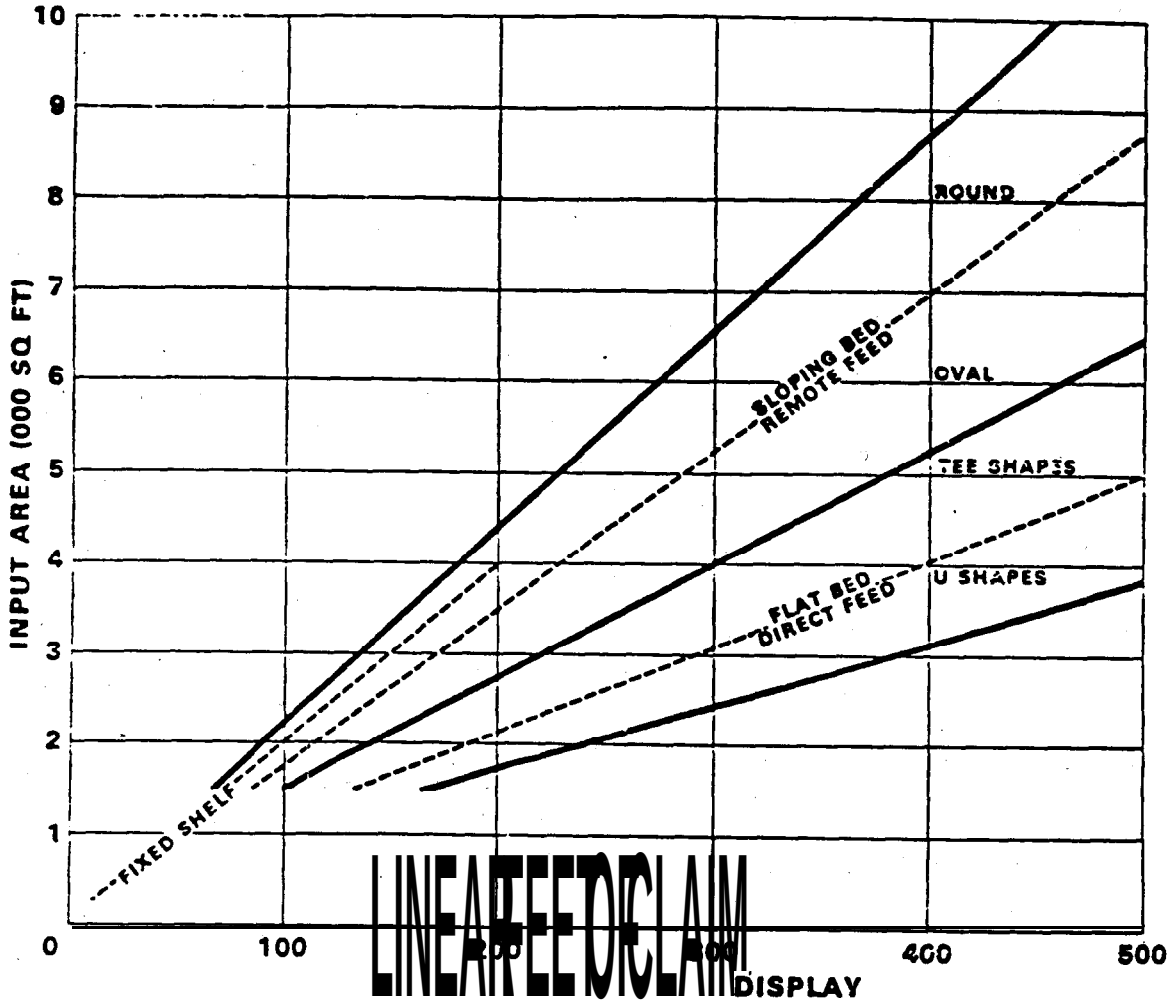
E TEE-AND U-SHAPE ALTERNATING @ 60
(FLAT BED/DIRECT FEED)

F ⊥⊥ -SHAPE **FLAT** BED/DIRECT FEED

* INCLUDES INPUT SECTION
Of FLAT BED DEVICES

NOTE: FIND DISPLAY LENGTH FROM FIGURES 5-27 OR 5-28.
THEN SELECT DEVICE AND READ RANGE OF REQUIRED AREA.

Figure 5-29. Baggage Claim Area



NOTES: WERE INTERIOR JOINT-USE DRIVES ARE REQUIRED, INCREASE OUTPUT AREA BY 35%.

FIND DISPLAY LENGTH FROM FIGURES 5-27 OR 5-28. THEN SELECT DEVICE AND READ RANGE OF REQUIRED AREA.

Figure 5-30. Non-Public Baggage Claim Input Area

(4) Office Area – for managerial personnel and clerks.

(5) **Flight Operations Facilities –** includes a message center, area for meteorological data and flight plans, and flight operations personnel.

(6) Flight Crew and Flight Attendant Facilities – includes an area for resting, toilet facilities, and personal grooming area.

(7) Secure Area Storage – for items requiring secure storage because of either the value or fragility of the items.

(8) Volatile Storage – for items requiring extra precautionary storage due to instability in handling and storage.

b. Storage and administrative areas often can and are combined. Depending on flight schedules, flight crew and flight attendant facilities may not be required or can be combined with facilities for other airline personnel. Similarly, facilities for flight operations and administrative personnel can be combined.

c. The area required for airline operations may be estimated for planning purposes on the basis of 500 square feet (46.5 m^2) per equivalent peak hour aircraft departure. This factor includes all of the operations areas previously described. However, at some airports one or more airlines may use additional terminal space for regional or airline system functions and/or other support services beyond those functions common to daily airport operations.

77. FOOD AND BEVERAGE SERVICES.

a. These s&vices include snack bars, coffee shops, restaurants, and bar lounges. The basic service offered at small airports is the coffee shop, although separate restaurants at some smaller city airports can be successful, depending on the community and restaurant management. Large airports usually can justify several locations for snack bars, coffee shops, bar lounges, and restaurants. Requirements for more than one of each type are highly influenced by the airport size and terminal concept involved. Unit terminals, for instance, may require coffee shops and/or snack bars at each separate terminal.

b. Generally speaking, a coffee shop seating less than 80 is considered an uneconomical operation at airports enplaning over one million passengers annually. At smaller airports, the seating capacity minimum may be somewhat lower, depending on such factors as local labor costs and concessionaire lease arrangements.

c. The following ranges appear representative for food and beverage services:

(1) Turnover rates: 10 to 19 average daily per seat. Some operators appear satisfied averaging 10 to 14 daily.

(2) Space per seat: 35 to 40 square feet (3.3 to 3.7 m^2) per coffee shop/restaurant seat, including support space.

(3) Snack bars: 15 to 25 percent of coffee shop/restaurant overall space requirements.

(4) Bar lounges: 25 to 35 percent of coffee shop/restaurant overall space requirements.

d. The sizing of food and beverage services involves applying "use factors." Use factors are determined by dividing the average daily transactions by average daily enplanements. Figure 5-31 shows ranges of food and beverage service areas for coffee shop and restaurants, snack bar, bar lounge and kitchen sup: port space for various "use factors."

e. For estimating and for initial planning purposes, the following average daily use factors are suggested:

(1) 40 to 60 percent at terminal airports with a high percentage of long-haul flights;

(2) 20 to 40 percent at transfer airports and through airports; and,

(3) 15 to 25 percent at terminal airports with a low percentage of long-haul flights.

78. CONCESSIONAIRE AND BUILDING SERVICES. The following building and concessionaire services are provided at airport terminals as appropriate for the size and activity of the airport. General area ranges for many of these services are presented for planning purposes. Larger areas may be required. Figure 5-32 provides a nomograph for approximating total area requirements for those services discussed in subparagraphs a. through s. The requirements presented in paragraphs t. through v. are determined separately on a case-by-case basis.

a. News and tobacco are physically separate at most airports where annual enplanements exceed **200,000** per year, and may be combined with other services at airports with lesser traffic. Space allowance: 150 square feet minimum, and averaging 600 to 700 square feet (56 to 66 m^2) per million annual enplanements.

b. Gift and apparel shops operations are combined with a newsstand at smaller airports. Separate facilities normally become feasible when annual enplanements exceed one million. Space allowance: 600 to 700 square feet (56 to 66 m^2) per million annual enplanements.

c. **Drug store,** including sale of books, cards, and liquor, may be feasible as separate operation when annual enplanements exceed 1.5 million. Space allowance: 700 square feet (66 m^2) minimum and averaging 600 to 700 square feet (56 to 66 m^2) per million enplanements.

d. Barber and shoe shine operations at some large airports allow one chair per million annual enplanements. The most successful operations range from three to seven chairs. Space allowance: 110 to 120 square feet (10.2 to 11.2 m^2) per chair with 150 square feet (14 m^2) for a minimum facility.

e. Auto rental counters vary according to the number of companies. Space allowance: 350 to 400 square feet (33 to 37 m^2) per million annual enplanements.

f. Florist shop operation as a separate function may become feasible when annual enplanements exceed 2 million. The usual space allowed is 350 to 400 square feet (31.5 to 32 m^2) per terminal.

g. Displays (including courtesy phones for hotels). Space allowance: 90 to 100 square feet (8.4 to 9.3 m^2) per million annual enplanements.

h. Insurance (including counters and machines). Space allowance: 150 to 175 square feet (14 to 16 m^2) per million annual enplanements.

i. Public lockers require in the range of 70 to 80 square feet (6.5 to 7.4 m^2) per million annual enplanements.

j. Public telephones space requirement is 100 to 110 square feet (9.3 to 10.2 m^2) per million annual enplanements.

k. Automated post offices may be found desirable to the extent of providing one station, 125 square feet (11.6 m^2) for each terminal serving at least 2.75 million annual enplanements.

l. **Vending machine** items supplement staffed facilities, especially when extended hours of operation are not justified by low volumes or multiplicity of locations. When vending machines are provided, they should be grouped and/or recessed to avoid encroaching upon circulation space for primary traffic flows. Space allowance: 50 square feet (4.7 m^2) minimum or 150 square feet (14 m^2) per million annual enplanements.

m. Public toilets are sized for building occupancy in accordance with local codes. Space allowances applied at airports vary greatly. They range from 1,500 to 1,800 square feet (140 to 167 m^2) per 500 peak-hour passengers (in and out) down to 1,333 square feet (124 m^2) per million annual enplanements at large hub airports.

n. Airport management offices' space requirements vary greatly according to the size of staff and the extent to which airport authority headquarters are located in the terminal. Accordingly, Figure 5-32 excludes space requirements for airport authorities and includes only such space as is representative of an airport manager and staff.

o. Airport Police/Security Office space needs vary according to based staff and nature of arrangements with local community law enforcement agencies.

p. Medical aid facilities' space requirements range from that needed for first-aid service provided by airport police to that for branch operations at off-airport clinics.

q. USO/Travelers Aid facilities vary considerably. Space requirements are relatively minor, 80 to 100 square feet (7.4 to 9.3 m^2), except at airports with annual enplanements of over one million.

r. Nursery facilities for travelers with small infants have been provided at airports with annual enplanements of over 1 million. The most practical solutions include a private toilet room of 50 to 60 square feet (4.7 to 5.6 m^2) with facilities for changing and feeding. The number of such facilities may range from two up, depending upon terminal size and configuration.

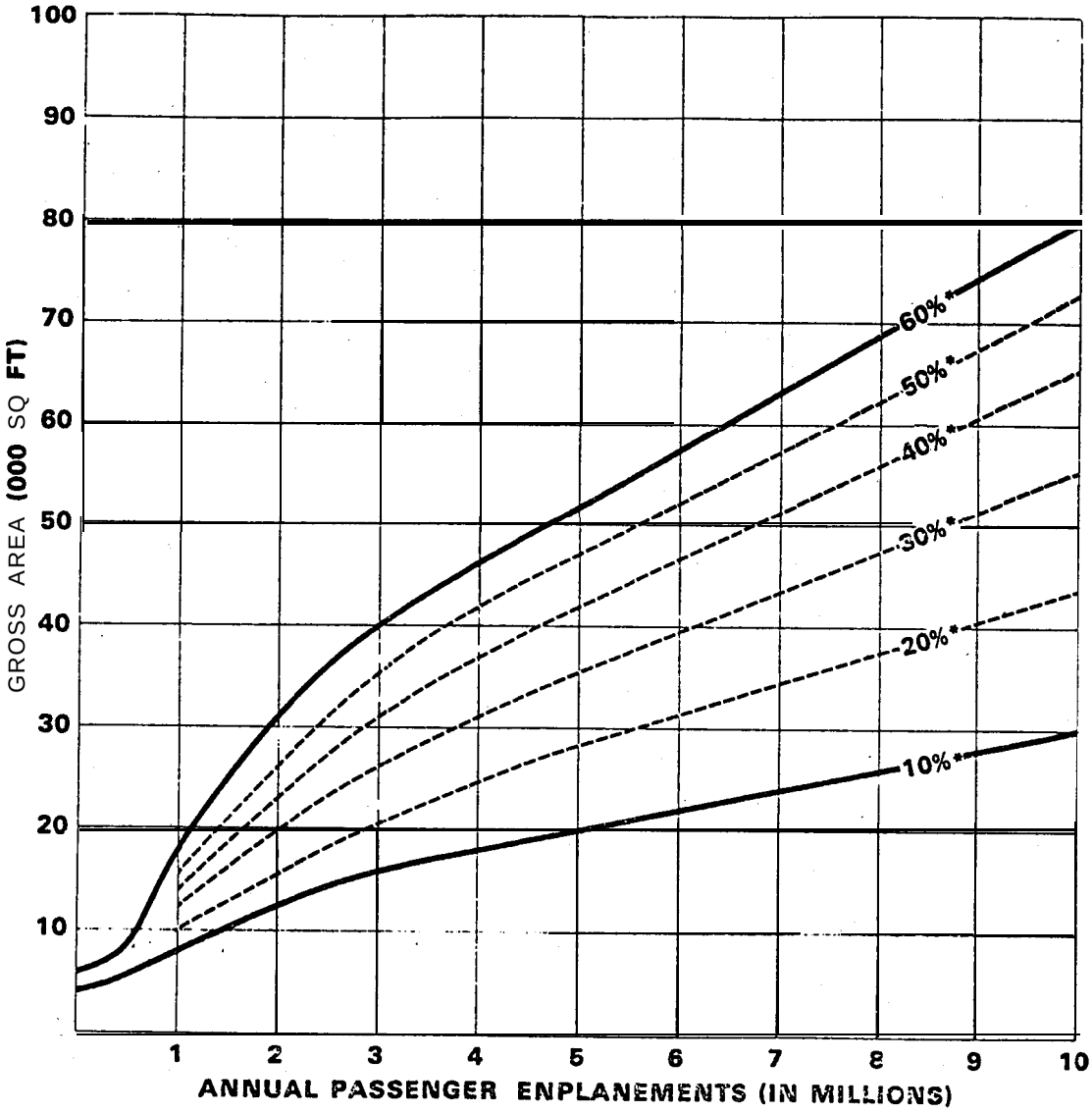
s. Building maintenance and storage varies, depending upon the types of maintenance (contracted versus authority operated) and storage facilities available in other authority-owned buildings.

t. Building mechanical systems (HVAC) space ranges from 12 to 15 percent of the gross total space approximated for all other terminal functions. A value of 10 to 12 percent is used in relation to the connector element space. This allowance does not cover separate facilities for primary source heating and refrigeration (H&R plants).

u. Building structure space allowance for columns and walls is 5 percent of the total gross area approximated for all other functions.

v. Other space, as determined on a case-by-case basis, may be required at some airports for information services, government offices, contract service facilities and the like.

79. - 90. RESERVED.



* AVERAGE DAILY USE FACTOR FOR COFFEE SHOP AND RESTAURANT

NOTES:

1. SPACE FOR EMPLOYEE CAFETERIA IS INCLUDED WHEN ENPLANEMENTS EXCEED 0.8 MILLION/YEAR
2. FOR AIRPORTS WITH ENPLANEMENTS OVER 10 MILLION TO 20 MILLION /YEAR, USE 50% ENPLANEMENTS AND MULTIPLY AREA BY 2
3. FOR DECENTRALIZED (UNIT) TERMINALS OR SATELLITE CONCEPTS WITH MULTIPLE COFFEE SHOPS, CALCULATE AREAS PER UNIT TERMINAL

Figure 5-31. Food and Beverage Services

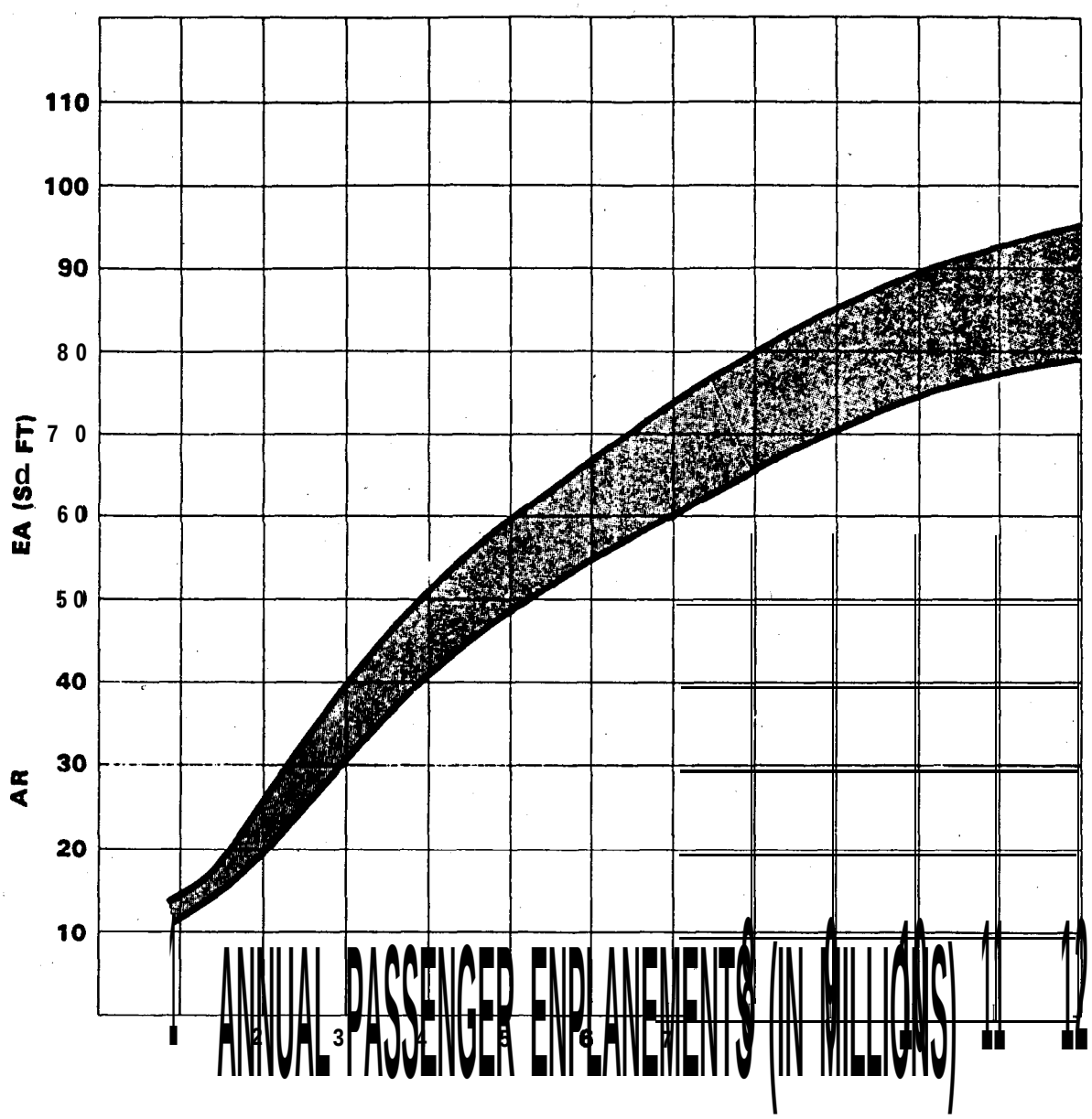


Figure 5-32. Concessions and building Services

CHAPTER 6. FEDERAL INSPECTION SERVICES (FIS) FACILITIES

91. **GENERAL.** Airports with international traffic require space for Fcdcral inspections (Immigration, Customs, Agriculture, and Public Health Service) of passcngcrs, aircraft, crew members, baggage, and cargo. The area rcquircd for these proccdurcs is designated as the Fcdcral Inspection Scrviccs (FIS) facility. This facility is generally located either in the main terminal building, within the terminal connector element, or in a separate international arrival building. The U.S. Customs Scrvicc publishes a document entitled "Airports--U.S.A. and Prcclcarance Facilities-- Guidclincs for Federal lnspcction Scrviccs," which contains guidance on space and facility requirements for FIS facilities. This chapter summarizes the more important aspects and material contained in that document. In using these guidelines, it should be recognized that variations in local conditions may require special facility considerations at one airport, but not at another. Consultation with FIS and airline rcprcscutatives in the early stages of terminal design is necessary to assure meeting all FIS rcquiremcnts.

92. **FEDERAL INSPECTION SERVICES.** Governmental proccdurcs applicable to the clcaraucc of passengers, baggage, and cargo arriving at designated international airports are the outgrowth of legislation, law, administrative regulations, bilateral treaties and experience. The following paragraphs describe the statutes establishing applicable inspection requirements and the Fcdcral services designated to administer them.

a. Immigration and Naturalization Scrviccs (INS). The Immigration and Naturalization Service, Departmeut of Justice, examines all persons arriving in the United States to dctcrminc their admissibility under the provisions of the Immigration and Nationality Act (66 Stntutc 163). Section 239 of the Act (Title 8, U.S. Code 1229) and Part 239, Title 8, Code of Fcdcral Regulations, pertain specifically to aircraft and airports of entry.

b. Customs Service (USCS). The U.S. Customs Scrvicc, Department of the Treasury, controls the entrance and clearance of aircraft arriving in and departing from the United States and inspects the crew, passengers, baggage, slorcs, and cargo carried thereon (Tariff Act of 1930 and Section 1109 of the Federal Aviation Act of 1958). The baggage of any person arriving in the country may bc inspected in order to view the contents. A determination can be made on items which arc subject to duty, free of duly, or prohibited.

c. Public Health Scrvicc (PHS). The U.S. Public Health Service, Department of Health and Human Services, mnkcs and enforces such regulations rcquircd to prevent the introduction, transmission, or spread of communicable diseases from foreign countries into the United Stntcs or its possessions. (Scctiou 361, Public Law 410, 78th Congress.)

d. Animal and Plant Health Inspection Service (APHIS). The Animal and Plant Health lnspcction Scrvicc, U.S. Department of Agriculture (USDA), provides inspection service at all airports with scheduled or unscheduled passenger aircraft arrivals from forcigii couiitries. The purpose is to protect American agriculture by preventing the introduction of injurious plant and animal pests and diseases (Plant and Animal Quarantine Acts - 21 U.S.C. 111. 7 U.S.C. 151 et seq.).

e. U.S. Fish and Wildlife Scrvicc (FWS). The U.S. Fish and Wildlife Service, Department of the Interior, in accordaucc with the Lnccy Act (Title 16 USC 3372) and other legislation dealing with the illegal trafficking of protected fish, wildlife and plants, is responsible (Public Law 93-205, Title 16 USC 1540(e)) for inspecting packages, crates, or other containers, including contents and all accompanying documents, upon importation or exportation.

93. PASSENGER FLOW SEQUENCE.

a. The internal FIS facilities layout should recognize passenger convenience by providing simple and direct passenger and baggage flow routes. Figure 6-1 provides a schematic diagram depicting passenger flow and functional adjacency rcquiremeuts and sequences for areas at a typical FIS facility.

b. Deplaning international passengers move through a sterile corridor to the INS primary inspection queuing area. All foreign nationals and resident aliens arc rcquircd to present themselves to an INS officer for primary screening. U.S. citizens proceed to dedicated U.S. citizen queuing areas for processing. Passengers who require additional INS/PI-IS processing arc rcfcrrcd to the INS/PHS secondary iuspcction area for further examination prior to luggage rctricval.

c. Upon completion of INS processing, passengers move to the baggage claim area for luggage retrieval. Passengers then move to the USCS primary inspection queuing area for USCS/APHIS primary screening. Passengers requiring additional USCS or APHIS processing arc referred to the appropriate secondary counter. After all necessary screening/processing is complete, passengers go directly to the cashier and/or exit.

94. PRECLEARANCE FACILITIES. The FIS staff operate predcparture (preclearance) inspection facilities in certain foreign countries for flights destined to the U.S. However, these prcclearance facilities differ in certain aspects of the inspection sequence and required facilities from those in the U.S.

a. Passengers processing through a prcclearance facility flow through the terminal area not controlled by the FIS to the airline check-in counters. After check-in, all passengers and their baggage should be directed toward the USCS counters in the FIS controlled area for primary screening.

b. Passengers not requiring additional USCS/APHIS processing go directly to the cashier or the baggage drop-off area, which is immediately adjacent to the USCS processing area. Passcngcrs requiring additional USCS/APHIS processing arc directed to the appropriate secondary counter located immediately behind the primary inspection area. After this processing, passengers proceed to the cashier or baggage drop-off area,

c. After Customs processing, passengers deposit their baggage onto baggage conveyors for transport to a sterile holding area until ready for loading onto their aircraft. The baggage is dchvcrcd to the aircraft under such physical and procedural controls required by the USCS to ensure its sterility.

d. From baggage drop-off, passengersprocecd to the INS primary counters for primary screening. Passengers not requiring additional screening proceed to the stcrilc departure area.

e. Those passengers requiring additional INS/PHS processing are directed to the INS secondary inspection area. Upon completion of all INS/PI-IS processing, passengers admitted to the U.S. go to the stcrilc departure area.

f. All FIS cleared passengers are required to remain in a sterile waiting area until boarding the aircraft. No downstream concessions or unauthorized personnel arc allowed in this area. The enplaning of passengers and loading of baggage requires a procedure which prohibits contact with unauthorized persons or objects when in transit from their respective sterile areas to the aircraft. Loading bridges (jetways) and corridor security requirements are the same as those for FIS facilities located in the United States.

h. Figure 6-2 provides a schematic diagram showing passenger flow and functional adjacency requirements aud sequences at a typical preclearance FIS facility.

95. GENERAL DESIGN CONSIDERATIONS AND REQUIREMENTS.

a. Passenger routings should bc as short and straight as possible and unimpeded by any form of obstruction, including crossflow traffic.

b. Strict segregation of deplaning passengers between the aircraft and the exit from the FIS is required. This is done to eliminate the possibility of items being passed from international passengers to the waiting public or the bodily substitution of a disembarking passenger by a member of the waiting public. Two flow routes for deplaning passengers are required; one for international traffic and one for domestic traffic. To the extent possible, flow routes for international traffic deplaning through each carrier's gate should funnel into a common passageway before entering the FIS area. Passenger routing should be so designed that there is no possibility of a crew member or passenger being able to bypass the inspection area.

c. Multilingual signs and pictorial (international) signs to direct traffic arc required. (Refer to AC 150/5360-12, Airport Signing and Graphics.)

d. The Federal inspection area requires separation by a physical barrier from domestic passenger facilities. In the case of prcclearance operations, the FIS area also requires segregation from other international traffic.

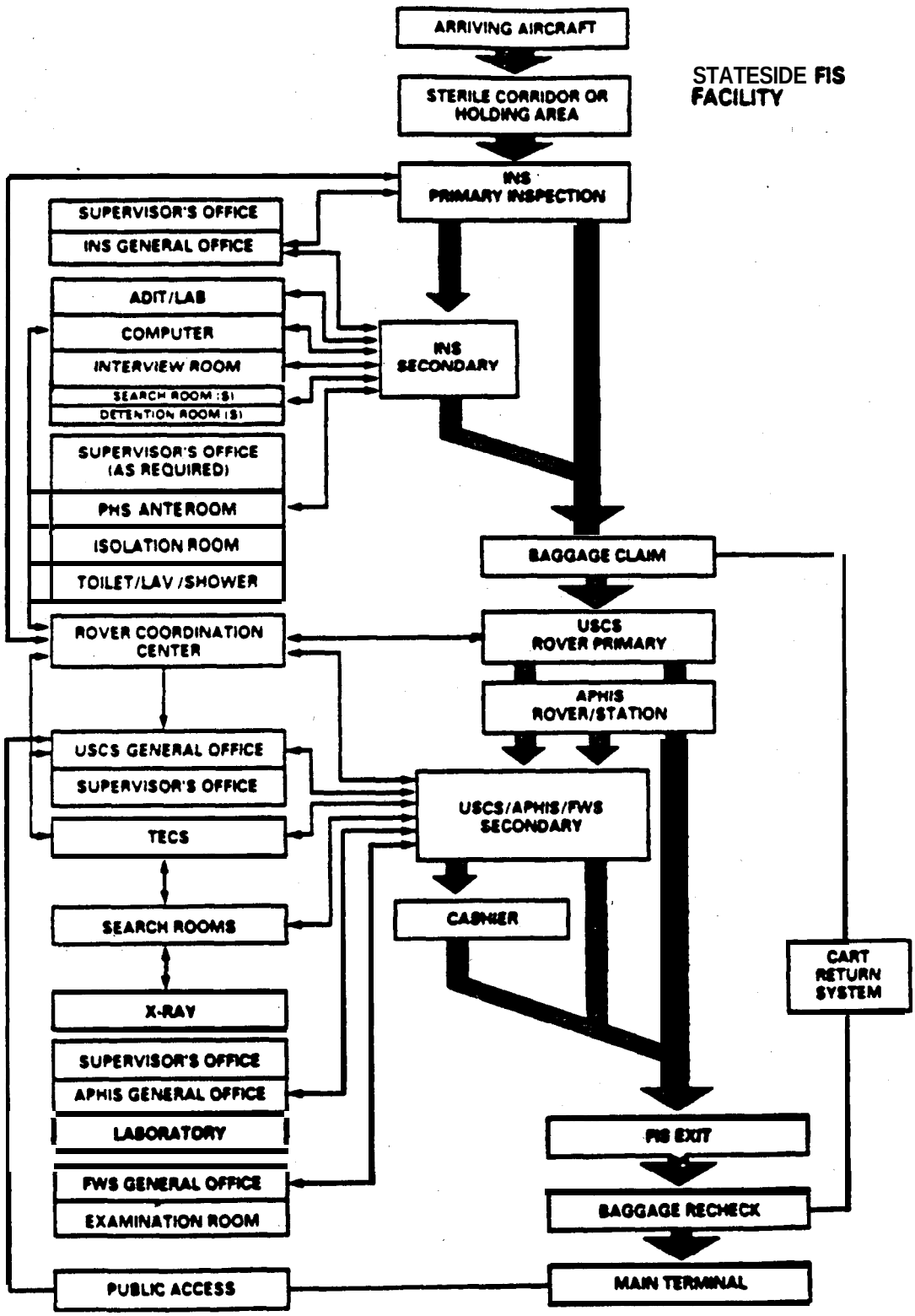


Figure 6-1. FIS Facility Functional Adequacy Diagram

e. Entrances and exits in the FIS area require controlled status. Adequate security precautions, including the installation of alarm devices on unlocked windows and doors, are required. Alarms sounding at a central point within the FIS complex are required.

f. At airports with sizable continuing passenger traffic (in-transit) to a foreign country or an onward U.S. port of entry (progressive clearance), a sterile waiting area should be provided to avoid needless congestion around the baggage claim area. The sterile area requires a design which will prevent co-mingling of in-transit passengers with domestic or previously cleared passengers.

g. It is necessary that baggage be delivered from the aircraft to the claim area in a manner which precludes access by unauthorized personnel and/or mixing with domestic or interline baggage. A secure, temporary storage facility close to the FIS area is required for baggage awaiting USCS inspection.

h. The arrival of baggage and deplaning passengers in the baggage claim area should coincide as nearly as possible. Only those passengers terminating at this facility should be in the area.

i. The baggage claim area should be of ample dimensions to prevent impediment in the flow of passengers from baggage claim to the FIS area.

j. In the FIS area, airline activities such as on-line or inter-line baggage processing, ticketing, etc., are not authorized.

k. Baggage carts should be made available for passenger use to facilitate movement through the inspectional process.

l. Glare-free lighting is required at inspection points and in examination rooms. Indirect lighting of at least 90 foot candles (972 lux) is preferred. The FIS should be appropriately heated and air conditioned.

m. FIS facilities should normally be confined to one floor of the terminal building, preferably on the same level where the passengers deplane. Convenient access to the ground transportation vehicle loading platform on the landside of the terminal is highly desirable.

n. The cashier's booths need to be located so that they will not obstruct the general flow of passengers from the FIS area.

o. All doors leading out of the FIS area are required to be opaque to prevent visitors from observing the inspection process.

p. The main passenger exits need at least one set of double outward opening doors, preferably of an automatic type, located to facilitate the flow of passengers out of the area. Also, the area immediately outside the exit doors should be kept clear from congregation of persons so that passenger egress is not hindered.

q. All doors not designated for passenger use iri the FIS area require automatic door closers ahd dead bolts.

r. Those doors in the FIS area which serve as emergency exits require: alarm exit lockswith a crowd release bar, a loud gong alarm when the release bar is activated; and a mortise cylinder key lock which will deactivate the gong but will register on a remote indicator panel. Battery operated alarms are not acceptable on emergency alarm exit locks. ***A capability for evacuating non-cleared passengers from the FIS area to a nearby holding area until resolution of an emergency should be considered in the building design process.***

s. If a visitors waiting room is provided, it should be at a sufficient distance from the FIS exit(s) so that passenger egress is not restricted. The room should be sized to house the normal volume of visitors. As visitor/passenger ratios vary among airports, a visitor/passenger ratio study should be accomplished before a waiting room is designed.

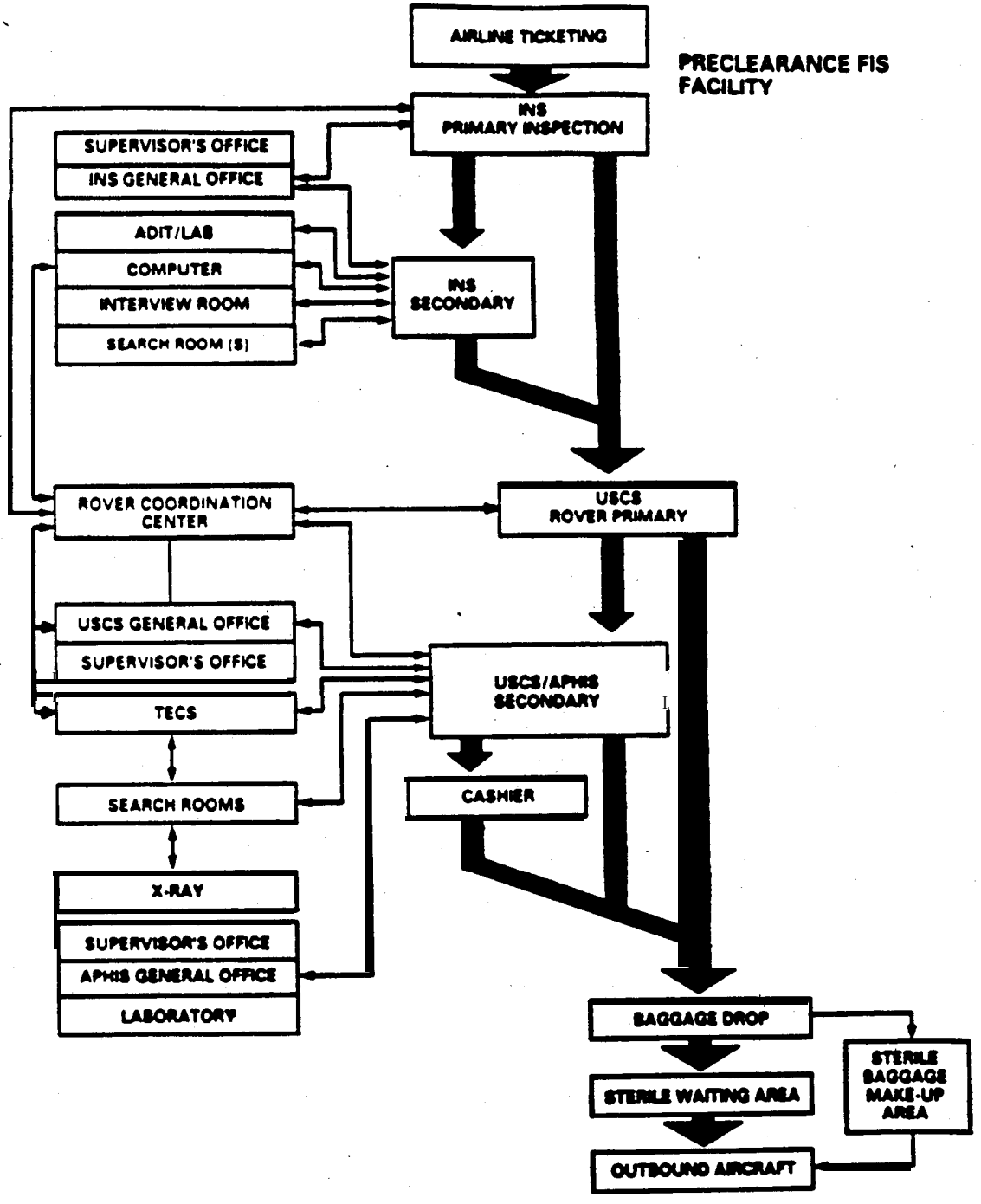


Figure 6-2. FIS Preclearance Facility Functional Adequacy Diagram

t. A closed circuit television system should be installed with cameras placed in all areas of concern to FIS agencies. These areasinclude loading bridges, sterile concourses, baggage delivery areas, the apron, and the entire FIS inspection area. Monitors should be located in an elevated command module.

u. Public telephones are not authorized in the FIS area.

v. Public toilets provided for deplaning passengers are required to meet FIS security standards and to be located prior to the INS inspection area.

96. INS REQUIREMENTS.

a. Off-Line Secondary Inspection Waiting. Secondary inspection counters, an interviewing room or rooms, and a waiting area are required.

b. General Office. Office space to accommodate inspectors when not at inspection counters is required. The minimum need is for one desk space per primary inspection booth and secondary position.

c. Automated Equipment Room. A lockable room with conduit connections for computer terminals to the primary and secondary inspection booths is required.

d. Supervisor's Office. The supervisor's office requires a location to permit the supervisor to view the primary inspection area through a clear glassed wall.

e. Other Rooms. Primary inspection booths, detention rooms, and lab equipment rooms are required. The INS should be consulted for details.

97. USCS REQUIREMENTS.

a. Treasury Enforcement Communications System (TECS) Room. The primary work station houses a cathode ray tube (CRT) unit connected to TECS. The rear of the secondary work station houses a high-speed printer which is connected to the CRT. This equipment is supplied, installed, and maintained by the USCS. However, provision for electrical/signal line hook-ups is required, free of charge, as part of the facility construction.

b. Baggage Inspection Belts/Counters.

(1) The USCS secondary inspection counters are located directly behind the USCS primary inspection area. The use of stainless steel counters is acceptable.

(2) A visual signaling system, able to be activated by the inspector, is required in a conspicuous location which is also visible from the exit side of the secondary inspection counters.

(3) At preclearance sites, a call button or similar arrangement for FIS officers to summon assistance from airport/local police is required.

(4) Provision of an intercom to facilitate communication between FIS primary, secondary areas, supervisors' offices and the command module is recommended.

c. **Searchrooms.** At least two windowless searchrooms are required within the USCS office area. These rooms require a minimum of 80 square feet (7.4 m^2) each and a location beyond the baggage inspection area. For the safety of the USCS officers, each room needs: a push button to actuate a trouble buzzer and a call-light; outward opening doors; and a table (without drawers) and a bench both anchored or bolted to the floor or wall. The room cannot contain unsecured objects which can be used as weapons. The room's interiors should be aesthetically in keeping with other airport facilities.

d. Cashier Booths. At airports with USCS cashiers, a booth is required near the exit door positioned to not cause congestion at the exit area. The booth should be large enough to accommodate two cashiers and have proper heating ventilation, and lighting.

e. Office Area for USCS Supervisors. The principal supervisors' office should be so located in the USCS inspection area as to permit observation of the baggage inspection counters and the entire USCS area from the office. Space is required for an audio/visual indicator panel linked to USCS primary and secondary inspection areas. There should be no means of access to this office by, the general public (as distinguished

from arriving passengers). At high-volume airports, with an airport director or officer-in-charge, additional office space is necessary for this person and a secretary.

f. General Office Area. There should be some means of access by the general public (as distinguished from arriving passengers) to the USCS office without passing through the inspection area. This is to facilitate claiming of unaccompanied baggage, registration of personal effects, requests for USCS information, and providing for the entrance and clearance needs/requirements of the airlines.

g. Vault. A security vault is required in the USCS office area at major airports. The vault's walls, floor, and ceiling require a minimum of 8 inches (20 cm) of steel-reinforced concrete, or structural equivalent thickness, with a steel door and combination lock. The door and frame unit have the following specifications:

(1) Thirty man-minutes against surreptitious entry;

(2) Ten man-minutes against forced entry;

(3) Twenty man-minutes against lock manipulation; and

(4) Twenty man-minutes against radiological techniques;

At small general aviation airports, a steel safe with combination lock is required.

h. Agent Space. At airports with assigned Customs agents, office space commensurate with the number of officers assigned is required and should include lockable cabinetry to store service weapons.

i. Security Requirements. The security of the area is essential for protecting the integrity of baggage inspection. Structural treatment to support this need is required. Basic security requirements are as follows:

(1) Visual or physical contact between waiting friends and relatives with arriving passengers is not authorized until after FIS processing. Glass partitions are not authorized in new facilities. Glass partitions in existing facilities are required to be painted, frosted, or otherwise covered, to ensure privacy of the baggage examination.

(2) Appropriate measures to screen the processing area should be taken to eliminate visual or physical contact by friends or relatives of enplaning or deplaning passengers.

(3) The FIS area is a restricted area and may be used only for processing passengers. No airline interline counters, baggage return belts or other counters for commercial transactions are authorized within this area. Baggage carts should be provided by the airport since skycaps are not allowed in the area.

(4) A visual signaling system is required to enable the inspector to signal for assistance. These lights should not be readily visible to passengers.

98. PHS REQUIREMENTS.

a. The PHS requires office space and an isolation area. It is imperative that the PHS office, especially the isolation area, be located contiguous to the FIS inspection area. The isolation area consists of an anteroom with a lavatory and shower, an isolation room, and an adjacent private toilet with shower, water closet and lavatory. The office area and the entire isolation area may have their air supply (heating and cooling) needs met by the facility ventilation system. However, exhausted air from this area is required to be vented directly to the outside (without recirculation within the area or facility) by a separate exhaust system. The isolation area requires an area of not less than 160 square feet (14.9 m^2) and the capability of accommodating a hospital bed, bedside stand, and chair.

b. The PHS requires primary inspection booths, similarly constructed to INS booths, in the INS primary inspection area at all airports which receive refugees.

c. PHS approval of proposed projects concerns the availability of adequate human waste removal and disposal from international aircraft arrivals. The PHS should be contacted for specific definition of requirements.

99. APHIS REQUIREMENTS.

a. APHIS inspection personnel examine cargo and aircraft for pests and for items of agricultural interest and cooperate with the USCS in the inspection of passengers' baggage. The space and facilities from which they operate require a location adjacent to the USCS baggage inspection area, with both physical and visual access to that area. The office and laboratory are ordinarily separated with a full partition and a door. Adequate lighting and electrical outlets are required. A clear glass panel (not floor to ceiling) with Venetian blinds is required in the wall between the office and baggage examination counters. Additional space for first line and higher level supervisors and administrative staff, as well as a small climated controlled room for detector dogs, may be required on a case-by-case basis.

b. The special equipment to be provided as part of the APHIS laboratory space consists of the following:

(I) Double drainboard and stainless steel sink;

(2) Undercounter storage cabinets;

(3) Commercial type, heavy-duty garbage disposal unit (the size requirement based on peak hour passenger criteria);

(4) Toilet facilities with shower (male and female); and

(5) Counter top work space for microscopes and other such equipment.

c. APHIS requires secondary 'inspection counters in conjunction with Customs' secondary inspection counters. At some designated locations, their configuration will require a design to support secondary x-ray screening systems. A work counter is required in the USCS/APHIS baggage inspection area at those locations where 400 or fewer passengers per hour are processed. Diagrammatic details for the work counter are available from the APHIS.

d. APHIS approval of proposed projects is subject to availability of adequate international aircraft garbage and refuse disposal facilities. Adequate facilities consist of either an incinerator, garbage cooking or sterilizing apparatus, or equipment that grinds garbage and refuse for discharge into an approved sewage system. The system or combination of systems selected requires a capability of handling all the garbage and refuse from arriving international carriers on a daily basis. The sewage system utilized by the airport, as well as the method of collection and transport of the garbage and refuse, require APHIS approval. Disposition of any part of foreign garbage at landfills is not-authorized unless it has first been processed in an acceptable manner. Without approved garbage handling facilities, galley cleaning or recatering is not permitted, and, after passenger disembarkment, aircraft are required to fly either to an approved U.S. airport or a foreign destination.

e. A predeparture clearance for agriculture purposes only is presently carried out in Hawaii, Puerto Rico, and the U.S. Virgin Islands. This clearance includes examination of passengers' baggage, cargo, and the aircraft's quarters, stores, and cargo pits. Such inspections in Hawaii and Puerto Rico are conducted by APHIS personnel. At airports where this predeparture inspection is performed, adequate examination counters (configured to support x-ray systems, as required) queuing space, checked baggage security, and accompanying office and laboratory facilities are required. Details regarding these requirements can be obtained from the APHIS.

100. JOINT FIS EMPLOYEE REQUIREMENTS.

a. Employee Locker Rooms. Rooms of sufficient size to permit one locker for each full-time inspectional employee assigned to passenger processing are required for male and female employees.

b. Employee Toilets. Men's and women's toilets are required for employees and should not be accessible to the public.

c. **Lunch/Break Room.** The area provided for inspection personnel requires a counter type sink and space for the installation of a stove and refrigerator. It is recommended that this room be in close proximity to the passenger processing area to minimize passenger processing delays.

d. Conference/Training Room. A conference training room should be provided at major airports for meetings and the training of inspection personnel.

101. SPACE AND FACILITY REQUIREMENTS. Table 6-l depicts space and facility requirements for typical FIS facilities at international airports. These requirements are based on one inspection area in a terminal and one terminal at an airport. Detailed drawings and specifications for all work stations, inspection belts, and electrical requirements are available through the respective FIS national headquarters.

102. **APPROVAL OF FIS FACILITY PLANS.** Approval of FIS facility plans and specifications is the joint responsibility of the USCS, APHIS, and INS. INS approves for INS and PHS. Approvals for FIS plans may only be obtained from the national headquarters. Addresses and phone numbers of the national headquarters of the FIS are listed in appendix 3.

103. - 115. RESERVED.

Table 6-1. FIS Space and Facility Requirements at International Airports

FEOERAL INSPECTION SERVICES
SPACE AND FACILITY REQUIREMENTS AT INTERNATIONAL AIRPORTS

• Passengers Per Hour	800	1400	2000
U.S. INMIGRATION & NATURALIZATION SERVICE			
# OF PIGGYBACK BOOTHS	7	12	17
GENERAL OFFICE SPACE	1300	2150	3000
CONFERENCE/TRAINING	200	250	300
BREAK/LUNCH ROOM	200	200	300
SECONDARY INSPECTION AREA	250	375	600
INTERVIEW ROOM(S)	80(1)	80ea.(2)	80ea.(3)
SUPERVISOR'S OFFICE(S)	150(1)	150ea.(2)	150ea.(2)
PORT DIRECTOR'S OFFICE	200	200	225
CLERK/RECEPTION	160	160	160
EMPLOYEE LOCKER & TOILET	as required	as required	as required
ADIT/LAB	150	150	150
STORAGE	100	100	100
HOLD ROOM'S W/TOILET FACILITIES	225	225	225ea.(2)
COMPUTER ROOM	100	100	100
U.S. PUBLIC HEALTH SERYICE			
SUPERVISOR'S OFFICE	200	200	200
CLERK/RECEPTION	150	150	150
GENERAL OFFICE SPACE	400	400	400
ISOLATION AREA	160	160	160
U.S. CUSTOMS SERVICE			
# OF PIGGYBACK BOOTHS	7	12	17
CUSTOMS SUPERVISOR	300	400	500
CUSTOMS OFFICE	800	1400	2000
IN-BONO ROOM (not required for preclearance)	200	400	500
CASHIER(S)	as required	as required	as required
TECS ROOM (lockable room)	150	200	200
SEARCH ROOMS	80 square feet. Should be located near the front of baggage modules. Minimum 2 per FIS facility		
PUBLIC SPACE W/COUNTER	150	200	250
STORAGE ROOM	150	200	200
AIRPORT DIRECTOR ANO SECRETARY	350	350	350
CONFERENCE AND TRAINING ROOM	400	500	600
CUSTOMS PATROL	300	400	500
EMPLOYEE LOCKER & TOILET	as required	as required	as required
ANIMAL 6 PLANT HEALTH INSPECTION SERVICE			
OFFICER IN CHARGE	200	200	200
INSPECTOR'S OFFICE	440	750	1200
LABORATORY	220	400	450
GARBAGE DISPOSAL UNIT (HP)	5	10	10 or larger
SUPERVISOR'S OFFICE	150	250	300
CLERK-STENOGRAPHER	-	150	250
STORAGE	100	100	100
CONFERENCE/TRAINING	150	200	200
BREAK/LUNCH ROOM	150	200	200

Laboratory requirements: Stainless steel or formica counter top and drainboard stainless steel double sink, garbage disposal unit, under-counter cabinets, counter space for microscope and identification work, lockers, and at least two 220Y outlets. At locations not having or expecting scheduled service office-laboratory space size requirements will vary from above requirements depending upon expected volume of charter traffic. Space requirements under these conditions will usually be less than shown and will be negotiated with the headquarters office of the Animal and Plant Health Inspection Service noted on frontispiece.

* This ratio can only be achieved under optimum conditions. Factors such as baggage delays, origin of flight, passenger mix. etc. are key determinants which could possibly mitigate against achieving these figures. These issues must be considered during early planning phases.

CHAPTER 7. ACCESSIBILITY TO INDIVIDUALS WITH DISABILITIES AND SPECIAL NEEDS USERS

116. GENERAL. This chapter summarizes the requirements imposed on airport terminal fncilitics to assure full accessibility to individuals with disabilities. Thcsc rcquircmcnts nre contained in the Americans with Disabilities Act (ADA) of 1990. 14 CFR Part 382, Nondiscrimination on the Basis of Handicap in Air Travel, which implements the Air Carrier Access Act of 1986, and 49 CFR Parts 27, Nondiscrimination on the Basis of Handicap in Programs and Activities Receiving or Benefitting from Federal Financial Assistance, which implements the Rehabilitation Act of 1973, as amended, and the ADA, and 37, Trnnsportntion Services for Individualswith Disabilities(ADA), which implcmentsthc ADA within the air transportationindustry, include conditions applicable to airport terminal buildings.

117. MINIMUM BUILDING DESIGN STANDARDS. ADA requirements apply to any facility occupied after January 26, 1993 for which the last application for a buikding permit or pcrmit extension is certified as complete nfter January 26, 1992. 49 CFR Part 27 requires new airport terminal fncilitics designed nnd constructed with Federal funds to meet the ADA standards set forth in Appendix A of 49 CFR Part 37.

118. SPECIFIC REQUIREMENTS FOR AIRPORT TERMINALS. In addition to mccting minimum ADA building standards, 49 CFR Part 27 imposes the following facility nnd equipment rcquirementsfor new airport terminals:

a. That the basic tcrminnl design shall pcrmit efficient cntrnnce and movement of persons with disabilities, while at the snmc time giving consideration to their convenience, comfort, and safety. It is essential that the design, especially concerning the location of elevators, escalators, and similar devices, minimize any extrn distance that wheelchair users must travel compnrcd to persons without a disability, to reach ticket counters, waiting areas, baggage handling areas, and boarding locations.

b. That the international ncccssibility symbol is displayed at accessible cntrnnccs to terminal buildings.

c. That the ticketing system is designed to provide persons with disabilities with the opportunity to use the primary fare collection area for purchasing tickets.

d. That baggnge areas arc accessible to persons with disnbilitics, and the facility is designed to provide for efficient handling and retrieval of baggage by all persons.

e. That boarding by jctwnys and by passenger lounges are the preferred methods for movement of persons with disabilitiesbetwecn terminal buildings and aircraft. Whcrc this is not practicable, operators may accommodate this rcquircmcnt by providing lifts, ramps, or other suitable devices not normally used for movement of freight, which are available for enplaning and deplaning whcclchnir users.

f. That at each public t&phone ccntet in a tcrminnl, at least one clearly mnrkcd t&phone is equipped with a volume control or sound booster device nnd with a device available to persons with disabilities, which makes telephone communication possible for persons with hearing impairment and/or using wheelchairs.

g. That each airport ensures that there is sufficient teletypewriter (TTY) service to permit hearing-impaired persons to communicate readily with nirlinc nnd other airport personnel.

h. That several spaces ndjnccnt to the tcrminnl building entrance, separated from the main flow of traffic, and clearly marked, are made available for the loading and unloading of passengers with disabilities from motor vehicles; and that the spaces allow individuals in whcclchnirs or with brnccs or crutchcs to get in and oui of automobiles on to a level surface suitable for wheeling and walking.

i. That curb cuts or ramps with grades not exceeding 8.33 percent are provided at crosswalks between parking areas and the terminal.

j. That with multi-level parking, ample and clearly marked space is reserved for ambulatory and semi-ambulatory individuals with disabilities on the level nearest to the ticketing and boarding portion of the terminal facilities.

k. That in multi-level parking areas, elevators, ramps, or other devices which can accommodate wheelchair users are easily available. [Note: AC 150/5220-21, Guide Spccificntions for Lifts Used to Board Airline Passengers with Mobility Impairments, should be consulted for additional information in this matter.]

I. That the environment in the waiting area/public space of the airport terminal facility gives confidence and security to the person with a disability using the facility. This means that not only is the space to be designed to accommodate individuals with a disability, but that it is also to contain clear directions for using all passenger facilities.

m. That airport terminal information systems take into consideration the needs of individuals with disabilities. Although the primary information mode required is visual (words, letters, or symbols), using lighting and color, coding, airport terminals arc also required to have facilities providing oral information.

n. That public service facilities, such as toilets, drinking fountains, telephones, travelers nid, nnd first-aid medical facilities are designed in accordance with the Uniform Federal Accessibility standards (UFAS), as supplemented or superseded by the ADA Accessibility Guidelines (ADAAG) set forth in 49 CFR Part 37, Appendix A.

119. EXISTING TERMINALS. The ADA of 1990 requires all existing tcrminnls to have incorporated the required non-structural accessibility features by January 26, 1992. Structural changes should be accomplished as soon as practicable, but no later than January 26, 1995.

120. OTHER USERS WITH SPECIAL NEEDS. Some airport terminals may serve significant numbers of older travellers, families trnvelling with infants or young children, or others, not normally considered having a disability, but having special facility and services requirements.

a. Higher proportions of older travellers may warrant more seating in gate lounge and terminal waiting areas than otherwise provided. Mobility aids such as moving walkways or airline courtesy carts may be more frequently justified, and may require wider concourse designs. However, slightly slower moving rates may be necessary to facilitate access and egress, and keeping anxiety at a minimum. Emphasis on appropriate lighting, high visibility signing nnd other public information systems may also be warranted.

b. Airports serving major tourism areas are likely to accommodate increased numbers of children. Passengerwaiting areas may be designed with space for children to plny. Public lavatories, drinking fountains, and other amenities should be easily accessible by children. The provision of diaper changing, baby bottle warming, and private infant feeding facilities should be considered.

121. - 130. RESERVED.

CHAPTER 8. MISCELLANEOUS DESIGN CONSIDERATIONS

131. AIRPORT SECURITY. FAR Part 107, Airport Security, imposes aviation security requirements on operators of the scheduled passenger operations of a certificated holder (airline) required to have a security program by FAR Part 108 or a foreign carrier required to have a security program by FAR 129.25. FARs 121.538 and 129.25 impose certain security responsibilities on air carriers operating into U.S. airports. These require the screening of passengers and baggage before entering an aircraft or areas accessible to an aircraft. The terminal designer should take these requirements into account in developing an effective terminal design. Some important aspects of airport security are discussed in succeeding paragraphs.

a. Security Inspection **Stations.** Requirements for security inspection stations are discussed in paragraph 73. Although primarily the responsibility of the individual airlines, their location and impact on terminal operations requires consideration by the terminal planner.

b. Access to Air Operations Area. The Air Operations Area (AOA), as per FAR Part 107, is that portion of an airport designed and used for landing, taking off, or surface maneuvering of airplanes. Airport operators have the responsibility to secure this area and prevent access by unauthorized persons and vehicles. This can be done by installing security fencing, and limiting and controlling the use of gates, doors, and passageways providing direct or indirect access to the AOA. Passengers are permitted access to the AOA only after undergoing screening. Vehicles using service roads are required to pass through controlled gates.

c. Doors. Doors leading from unsecured areas of the terminal to the AOA which are not under the visual control of authorized personnel are required to be locked or equipped with alarms signalling unauthorized use. Fire codes usually permit the locking of emergency exits provided they contain panic knockout devices.

d. Security **Fencing.** Security fencing can vary in design, height, and type, depending on local security needs. Generally, it is recommended that the fencing be, as a minimum, No. 10 gauge, galvanized steel, chain link fabric installed to a height of 8 feet (2.5 m), and topped with a three strand (12 gauge) barbed wire overhang. The latter should have a minimum 6-inch (15 cm) separation between strands and extend outward at a 45 degree angle from the horizontal. Fence posts should be installed at no greater than IO-foot (3 m) intervals and be located within 2 inches (5 cm) of any wall or structure forming part of the perimeter. It is suggested that a 10 to 20 feet (3 to 6 m) wide cleared area be provided adjacent to and immediately outside of the perimeter fencing. Gates should be constructed with materials of comparable strength and durability and open to an angle of at least 90 degrees. Hinges should be such as to preclude unauthorized removal. Gates providing access to and from public roads require controlled use procedures to prevent unauthorized access to the AOA. Additional guidance is available in AC 150/5370-10, Standards for Specifying Construction of Airports.

e. Observation Decks. Terminal observation areas or decks should be enclosed or contain effective barriers to deter and prevent unauthorized AOA access or the hurling of dangerous objects at parked aircraft.

f. Security Lighting. Security lighting of airports and terminal areas is generally an inexpensive means of providing additional deterrence/protection against unauthorized intrusion into aircraft operating areas. Lighting requirements are dependent on the local situation and the areas to be protected. For perimeter lighting, lighting units should be located within the protected area and above the perimeter fence to light areas on both sides of the fence. Light units should be oriented and shielded to prevent an unwanted glare safety hazard to aircraft operations and adjacent vehicular roadways and unnecessary irritation to nearby residences. It is recommended that security lighting systems be connected to an emergency power source.

g. **Lockers.** Coin-operated lockers provide a valuable and desired service to the traveling public. However, they can be a convenient place for the storing and detonation of bombs and incendiary devices. From a security viewpoint, the best location for these lockers is within sterile areas beyond the security screening station area. If such sterile areas are not practicable, the lockers should be so located in public areas to minimize the deleterious effects of an explosion. The construction of blast-proof barriers around the locker area is advisable and should be considered.

h. Security Office. Lockers, toilets, and rest rooms should be provided for security screening personnel. In addition, an area for a security/police office and a detention/interrogation room is recommended. At large airports, those facilities may be a part of the airline leased space; at small airports the use of common facilities may make an area under direct airport control preferable.

i. General Aviation Access. Airport legislation requires that passengers using general aviation aircraft be provided access to the terminal building if Federal funds were utilized for terminal development. For security reasons, such access also requires control so that the screening system within the terminal building is not circumvented. Separate general aviation parking areas adjacent to the terminal building with controlled terminal building access can satisfy the access requirement and maintain security of the AOA. FAA security personnel should be consulted in designing the terminal building and aircraft parking aprons to satisfy this requirement.

j. Guidance. FAA regional aviation security personnel should be contacted for advice on the location and design of security facilities. In addition, the following publications, current editions, as applicable, should be reviewed:

(1) AC 107-1, Aviation Security-Airports;

(2) AC 108-1, Air Carrier Security;

(3) AC 129-3, Foreign Air Carrier Security; and

(4) Technical Report, Recommended Security Guidelines for New Airport Construction and Major Renovation.

132. ARCHITECTURAL TREATMENT.

a. It is Federal policy to support projects which contribute to the architectural and cultural heritage of local communities. In accordance with this policy, airport sponsors are encouraged to develop, use, and incorporate design, art, and architectural treatment to reflect local customs and community history. This can be accomplished in conjunction with a functional, safe, and efficient airport terminal facility.

b. Architectural treatments for the exteriorsof terminal buildings and structures should avoid materials and configurations which can interfere with the airport's operational activities. For example, the use of mirrored exterior glass walls on or adjacent to airports may adversely affect airport operations. The thin metallic coating used in mirrored glass can reflect back signals from various airport navigational and communications equipment and cause inaccuracies in their use. Mirrored glass walls facing aircraft operational areas can also cause undesirable and unsafe glare and reflections to a pilot's vision. By selective siting, orientation, and shielding, these adverse effects can be. eliminated.

c. The Department of Transportation publication "A Study of Airports - Design, Art, & Architecture" is directed at those airport operators and their architects who are considering the design and construction of new and expanded airport terminal facilities. Concepts related to design, art, and architecture in public airports are illustrated and discussed.

133. ENERGY CONSERVATION. Airport terminals require higher energy consumption than most public buildings; This is primarily due to their generally unprotected locations, the high heat loss/gain resulting from the movement of people and baggage through the building, and their usual 24 hours a day operation. The designer should consider energy conservation early in the planning of a terminal building in order to reduce dependence on increasingly costly fossil fuels. AC 150/5360-11, Energy Conservation for Airport Buildings, provides guidance in promoting energy conservation measures for airport buildings. As a minimum, the following suggested considerations should be made in designing a terminal facility with energy conservation in mind:

a. For terminal additions, the existing mechanical systems should bc analyzed to determine whether replacement systems or improvement to the present system can bc made to make the system more energy efficient.

b. Ample insulation and select building materials, system components, and design/construction techniques which place a low demand on energy consumption and require minimal maintenance should be utilized.

c. Building design should incorporate vestibule automatic doors and wind shields, as appropriate, at building cntranccs, loading/unloading areas, and, openings for baggage conveyors and carts.

d. The use of large window arcs should bc limited, particularly at localities which arc subject to temperature extremes.

e. Adequate controls for heating, cooling, and lighting to permit varying the USC of these systems and the implementation of energy conservation measures should bc provided.

f. The potential and cost/benefits for designing and installing an active or passive solar system for heating and/or cooling the building should bc analyzed. Such systems can bc used effectively to provide primary or supplemental heating/cooling and thereby reduce operational costs.

134. SEISMIC SAFETY. Airport terminal buildings should be structurally designed to appropriate seismic standards. With respect to Federally owned, lcascd, assisted, or rcgulnted buildings, Exccutivc Order (E.O.) 12699, Seismic Safety of Fcdcrally Assisted or Regulated New Building Construction, January 5, 1990, under the authority of The Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7701 *et seq.*) requires the use of nationally recognized private sector seismic safety standards and practices. A rule under 49 CFR Part 41, implementing E.O. 12699 in the U.S. Department of Transportation, was issued on June 14, 1993. The rule states that any building constructed with Federal financial assistance after July 14, 1993, must be designed and constructed in accordance with seismic standards approved by the Federal Aviation Administration under 49 CFR 41.120.

135. - 145. RESERVED.

CHAPTER 9. AIRPORT GROUND ACCESS AND CIRCULATION SYSTEMS

146. GENERAL. Ground access systems serve passengers, employees, and other airport users traveling to and from the airport. Circulation systems within the airport boundaries should minimize congestion and support efficient access to the passcngcr terminal. Ground access systems extend beyond the airport boundaries and must function within the context of regional transportation systems and the policies of government agencies typically unrelated to the airport's operation. A thorough analysis of motor vehicle traffic flows associated with current and projected future air passenger demand is essential to assure that ground congestion does not become an unanticipated constraint on a passenger terminal's performance.

147. PLANNING STUDIES.

a. Ground access facilities--including access roads and interchanges, transit links, parking facilities, staging areas for taxis and other public transport scrviccs, and the terminal curb--arc generally addressed as a major element of overall airport master planning or terminal building design (see Chapter 1). The assumptions about demand that guide access system decisions must bc consistent with those used for airport master planning and terminal building design.

b. Ground access systems generally depend upon regional highway and transit facilities that carry traffic unrelated to the airport. Periods of peak demand and resulting congestion on these regional facilities may not correspond to those for the airport, but may influence airport facilitiesplanning and design. Accordingly, local add regional transportation authorities, as well as private and public operators of ground transport services, should bc included in the planning and design process.

c. Figure 9-l outlines the process typically followed in ground access systems planning and design. This process may be followed in parallel with planning and design of other elements of the passenger terminal, or as an independent activity when ground access problems are faced at an otherwise adequate airport facility.. The inventory phase collects data on projected air transport demand, airline schcdulcs, airport operating policies, and ground transport facilities and scrviccs. Demand forecasting uses these data to develop projections of motor vehicle traffic, passcngcr demand, and parking demand on annual, seasonal, monthly, daily, hourly, and peak hour bases. Demand-capacity analyses determine the facilities required to accommodate these demand forecasts and identify alternate facilities feasible for application at the airport. Evaluation of the service quality of facility alternatives and their comparison to performance and cost standards leads to the selection of the optimum altcrnntivc.

148. CIRCULATION SYSTEM CONFIGURATIONS. The layout and types of terminal concepts at an airport determine the integration of the components to form the airport circulation system. The following paragraphs discuss some of the more typical airport circulation configurations:

a. **Centralized Layout.** When the terminal complex consists of a single building or a contiguous series of buildings, the ground transportation system usually consists of sequentially and centrally located components. Except for vertical or horizontal separation, which may exist for originating and terminating passenger vehicles, all passenger-related vehicles normally pass through the same series of roadways. Also, public parking and car rental facilities are centrally located. Many commercial service airports in the United States use this type of system, known as the centralized ground access concept. Some example airports are Chicago O'Hare, San Francisco International, Los Angeles International, Atlanta Hartsfield, Washington National, and Fort Lauderdale-Hollywood International. Figure 9-2 schcmaticallyprescnts this concept. This concept permits terminal unit expansion along the existing terminal area access road without loss of the original ground access system concept.

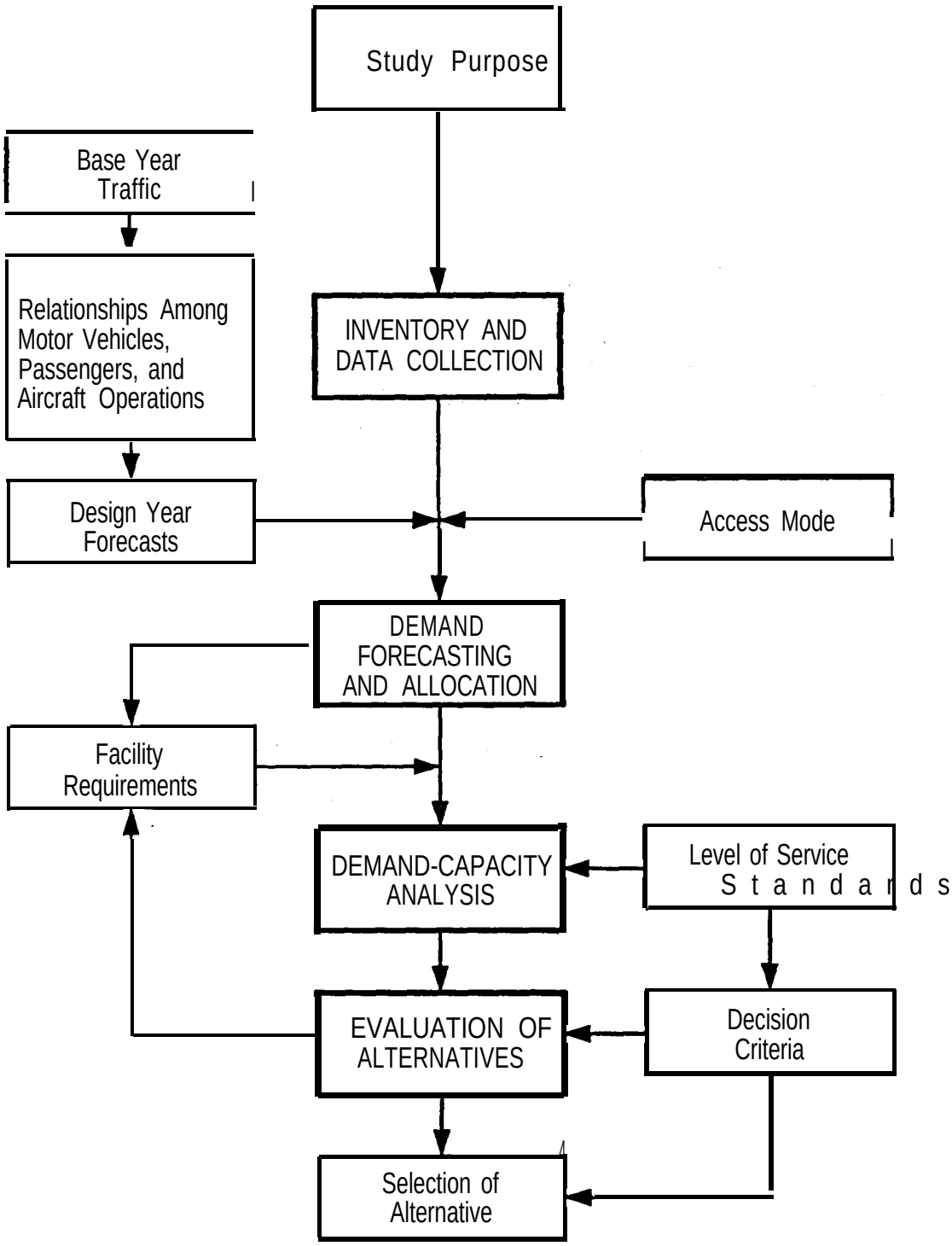


Figure 9-1. Outline of Ground Access System Planning Process

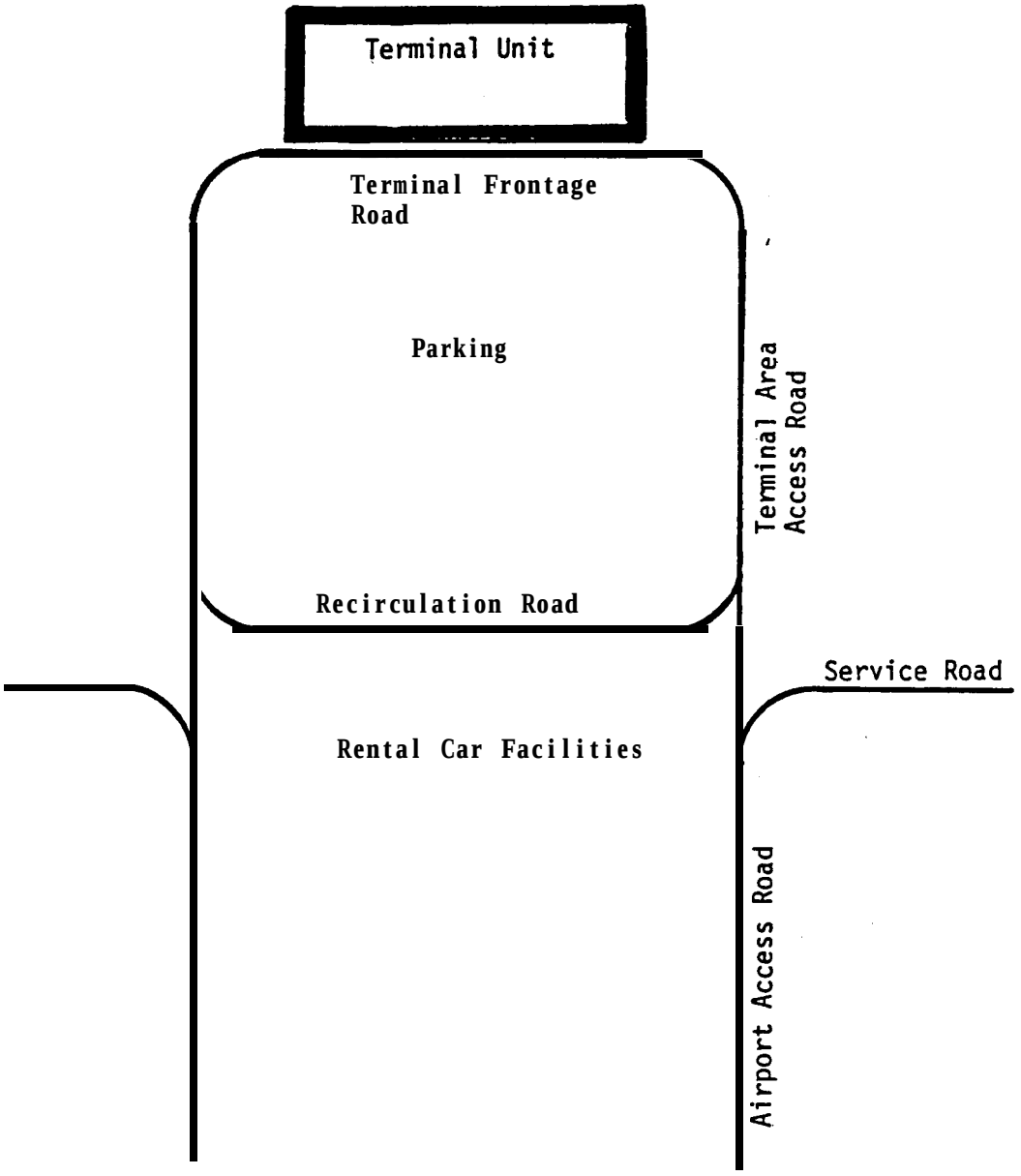


Figure 9-2. Centralized Ground Access Concept

b. Segmented Layout. Division of the terminal building into originating and terminating passenger sides or grouping of airlines on either side of the building achieves flow separation on a horizontal basis. Originating passengers use one set of terminal frontage roads.and terminating passengers the other; or specific airlines may group themselves on either side of the terminal unit. Orlando International, Jacksonville, and Greater Cincinnati airports use this type of ground access system layout called the segmented ground access concept. (See Figure 9-3.) This layout also permits expansion through terminal unit extension with retention of the same ground access system concept.

c. Decentralized Layout. When the terminal complex consists of unit terminal buildings, vehicle flow separation on terminal access and frontage roads is possible. Airport access and terminal. access roads funnel traffic to and from separate terminal facilities. Parking and car rental facilities are grouped on a terminal unit basis. Examples of this type of system use, the decentralized ground access concept, include Kennedy International and Kansas City International airports. (See Figure 9-4.) Expansion of the system is by addition of terminal units around the terminal access road with separate terminal frontage roads.

d. Unitized Layout. In some cases, the terminal system' may consist of a series of terminal building located in linear fashion. Access is from a centrally 'located roadway. Dallas-Fort Worth International and Houston Intercontinental airports use this type of system, the unitized ground access system concept. (See. Figure 9-5.) System expansion is usually accomplished by adding terminal units between terminal area access roads.

149. AIRPORT ROADS. The four types of airport roads are primary airport access roads, terminal area access roads, terminal frontage roads, and service roads.

a. Primary airport access roads provide access to the airport from the neighboring community road system. A capacity per lane of 700 to 800 vehicles per- hour should be provided for at-grade interrupted flow conditions. This value approximates the flow relationship for urban arterial highways with signalized intersections; average speed range of 20 to 25 miles per hour (30 to 35 km/h); and, a demand volume to capacity ratio of approximately 0.80. For limited access highways with grade separations under uninterrupted flow conditions, the recommended design is one lane for each 1,200 to 1,600 vehicles per hour. This value approximates the flow relationship for urban freeways; average speeds from 40 to 50 miles per hour (60 to 80 km/h); and a demand volume to capacity ratio approximating 0.60. A lane width of 12 feet (3.6 m), with a minimum of two lanes in each direction, is recommended.

b. Terminal area access roads service airport passengers, visitors, and employees and connect primary airport access roads with terminal buildings and parking facilities.

(1) These roads should be sufficiently long to permit smooth channeling of traffic into appropriate lanes for safe access to terminal curbs, parking lots, and other public facilities. To avoid driver confusion, ample separation should be provided at locations where drivers must make directional choices. Not more than two choices should be required of a driver at any location. Traffic circulation in front of the terminal should, normally, be one-way and counter-clockwise for convenience of right-side loading and unloading of vehicles. Recirculation of vehicles to the passenger terminal should be permitted by providing road sections to link the ingress and egress lanes of the access road. When several buildings exist, it may be advisable to provide more than one terminal road.

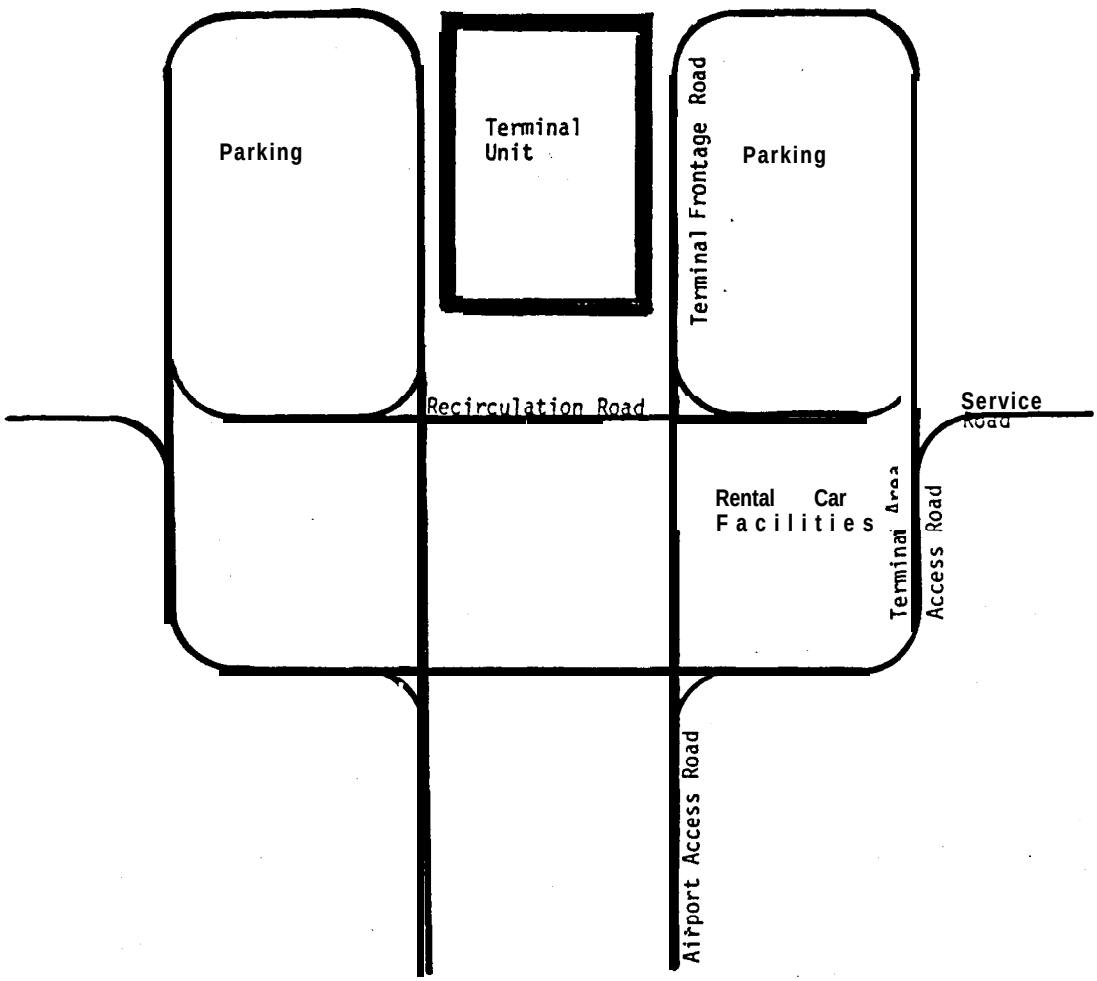


Figure 9-3. Segmented Ground Access Concept

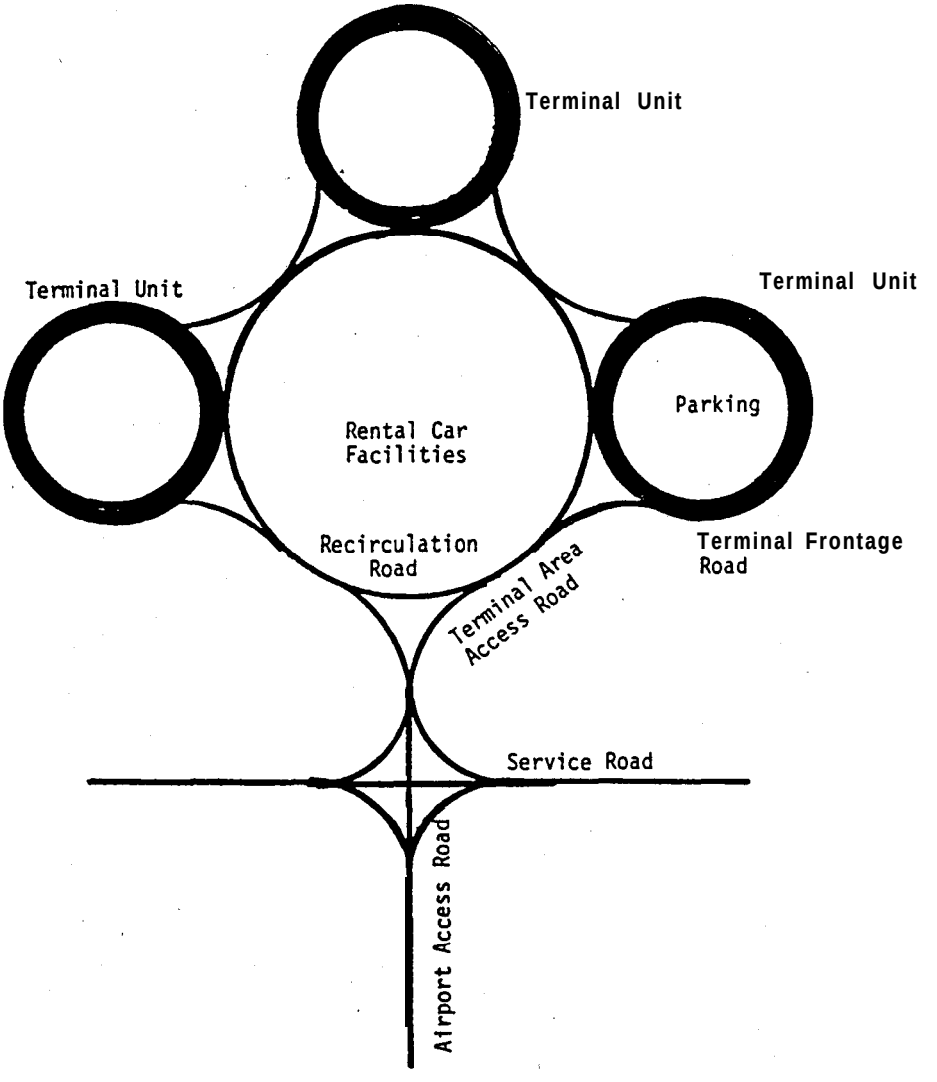


Figure 9-4. Decentralized Ground Access Concept

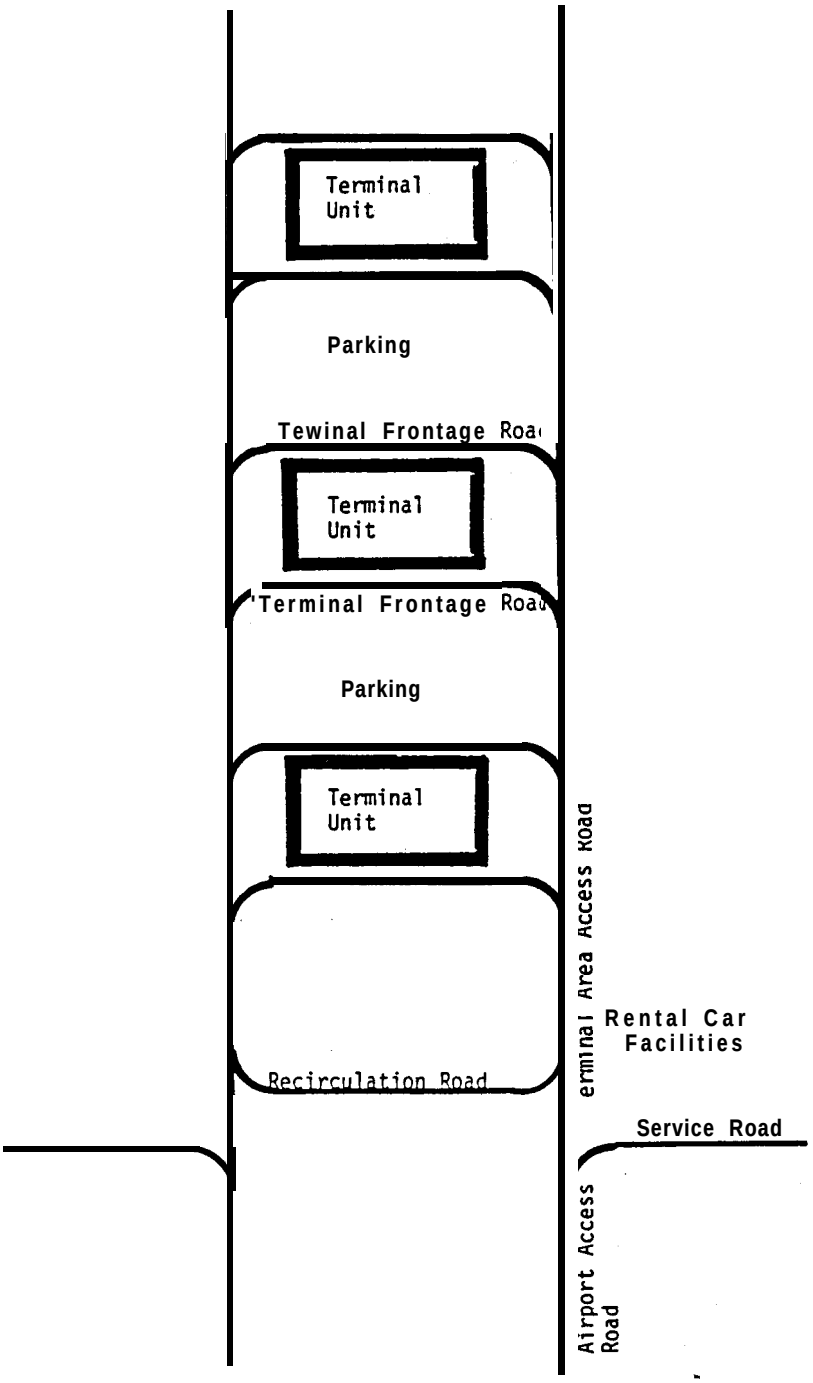


Figure 9-5. Unitized Ground Access Concept