UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WESTERN-PACIFIC REGION
Hawthorne, California

AIRSPACE DETERMINATION

PROPOSED CIVIL AVIATION REUSE OF MARINE CORPS AIR STATION EL TORO Orange County, California

August 29, 2001

Analysis of Revised Arrival and Departure Procedures for Proposed Civil Aviation Reuse of the Former Marine Corps Air Station El Toro Orange County, California

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Background

Orange County, California, as the Local Redevelopment Authority (LRA) for Marine Corps Air Station (MCAS) El Toro has presented the Federal Aviation Administration (FAA) with a draft proposal to re-open the closed installation for civil aviation. For the purpose of this document the abbreviation "ELB" shall refer to the proposed civilian airport at MCAS El Toro. The FAA is responsible for "evaluating the proposal from the standpoint of safe and efficient use"[1] of the airport and the surrounding airspace. FAA requested that MITRE Corporation's Center for Advanced Aviation System Development (CAASD) to assist this effort by performing a quantitative analysis of the current traffic around the proposed airport, modeling the proposed traffic at ELB, and estimating the impacts of the proposed traffic.

An analysis was conducted based upon arrival and departure procedures developed by the LRA and reviewed by FAA. Since that time, these procedures have been reviewed and formalized by the FAA's Office of Aviation System Standards. This document presents these formalized procedures for the proposed civilian aviation reuse of MCAS El Toro and discusses likely impacts on the airspace and current traffic flow impacts.

Assumptions

Radar tracks were provided by the FAA's Southern California Terminal Radar Control Facility (SCT -TRACON) for 13 April 2000. Proposed traffic, 156 flights per day, was provided by the LRA in a letter from Alan L. Murphy to FAA, dated 3 February 2000. Plans for runway usage were also provided by LRA in the draft Airport System Master Plan, dated June 1999. Arrival and departure procedures were developed by SCT based on input from LRA and charted by FAA. Traffic levels were not altered to reflect future growth — this is a study of the short term impact on air traffic control. Delay estimates

[1] FAA Order 7422.2D, Part 3, "Airport Airspace Analysis".

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due to airspace congestion were not calculated. (The LRA plan contains a SIMMOD study of delays due to airport volume. These delays would be in addition to any delays that might occur in the airspace.)

Procedures

Arrival Procedures

Three arrival procedures are defined for the proposed civil aviation reuse of MCAS El Toro. The **RNAV (GPS) RWY 17** procedure is an arrival procedure from Seal Beach (SLI), Pomona (POM) and Paradise (PDZ) Very High Frequency Omni Radio Range (VORs) to the BIGSE fix. After passing through BIGSE, all arrivals on this procedure continue through the Final Approach Fix (FAF) CAKOP to the Missed Approach Point (MAP) DEKTE and then land on runway 17. This arrival procedure is depicted in figure 1 as an overlay on existing radar tracks for SCT arrival flows.

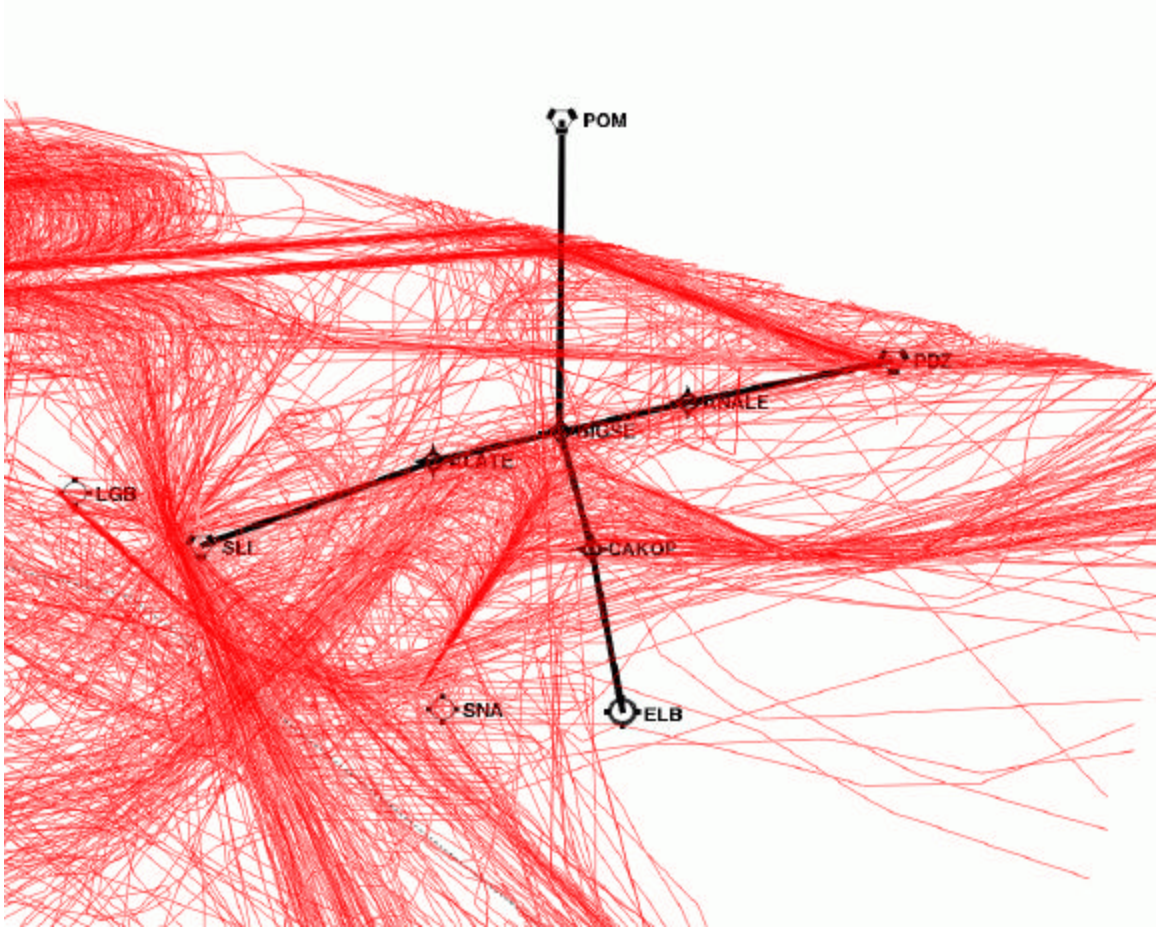

Figure 1. RNAV (GPS) Arrival for Runway 17 at ELB

The **RNAV (GPS) RWY 35** procedure is an arrival procedure from the Santa Catalina (SXC) and Oceanside (OCN) Very High Frequency Omni Radio Range (VOR)s to the AKIKE fix. After passing AKIKE all arrivals on this procedure continue on to the BEDGE fix and land on runway 35. This arrival procedure is depicted in figure 2 as an overlay on existing SCT arrival radar tracks.

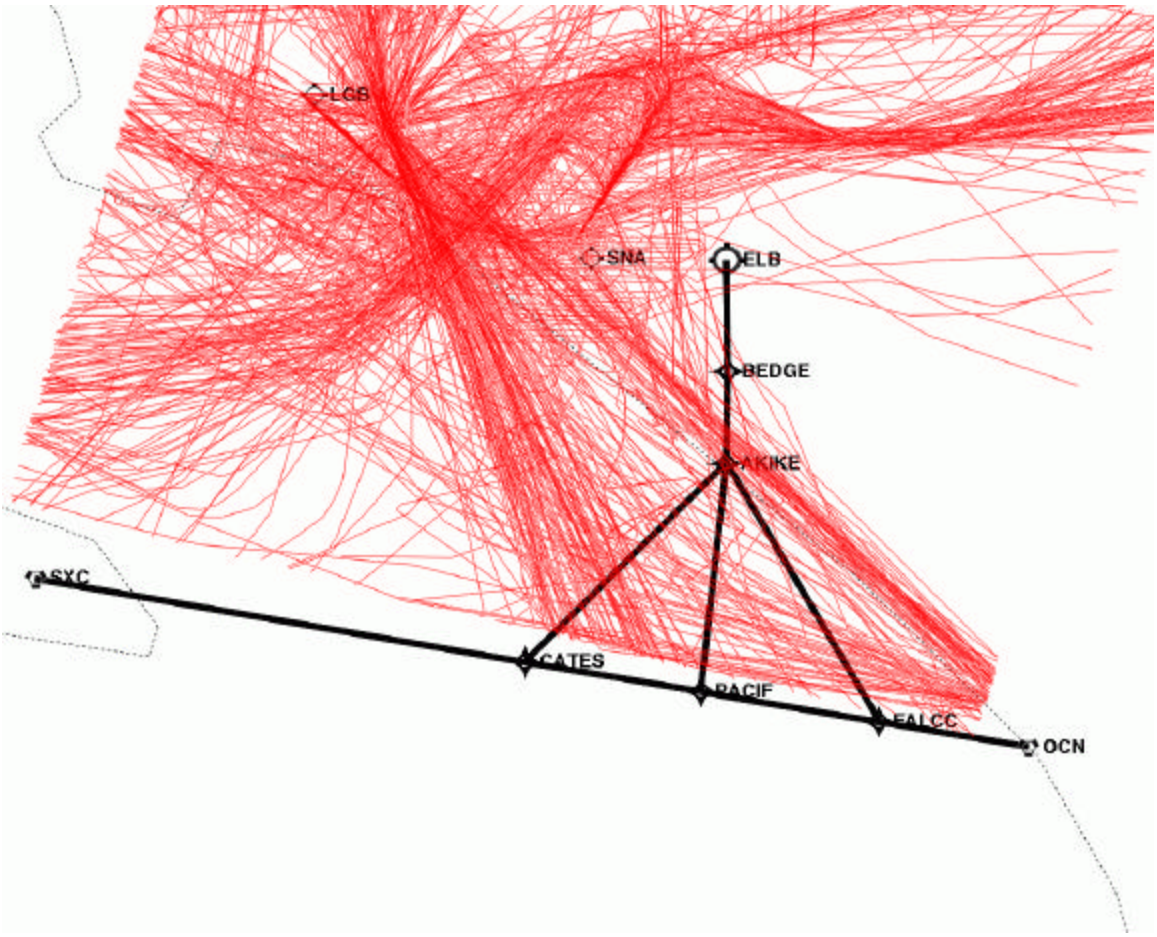

Figure 2. RNAV (GPS) Arrival for Runway 35 at ELB

The **ILS RWY 35** procedure is a precision approach procedure utilizing ELB's Instrument Landing System (ILS). This is an arrival procedure from Santa Catalina (SXC) and Oceanside (OCN) VORs to the PACIF fix. After passing PACIF all arrivals on this procedure intercept the ELB runway 35 localizer and land on runway 35. This arrival procedure is depicted in figure 3 as an overlay on existing SCT arrival radar tracks.

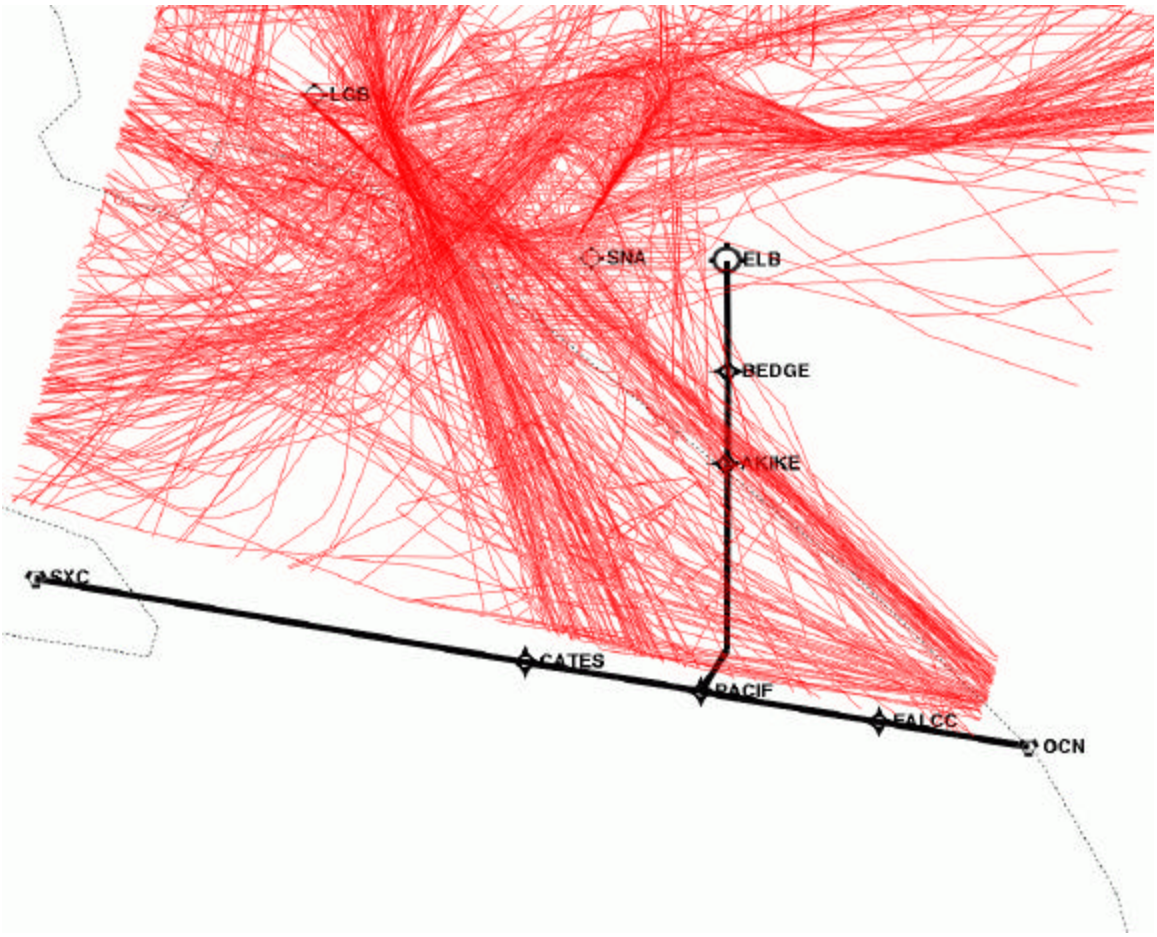

Figure 3. ILS Arrival for Runway 35 at ELB

Departure Procedures

Two departure procedures are defined for ELB. The **TANNR ONE DEPARTURE** procedure is a departure procedure from runway 08 to the PDZ, Thermal (TRM), and POGGI (PGY) transitions. Departures climb on runway heading until reaching 1000ft, turn to a 130 heading and intercept the 099 radial to TANNR intersection. After passing TANNR, departures proceed to the filed transition as indicated in the published procedure. This departure procedure is depicted in figure 4 as an overlay on existing departure radar tracks from SCT.

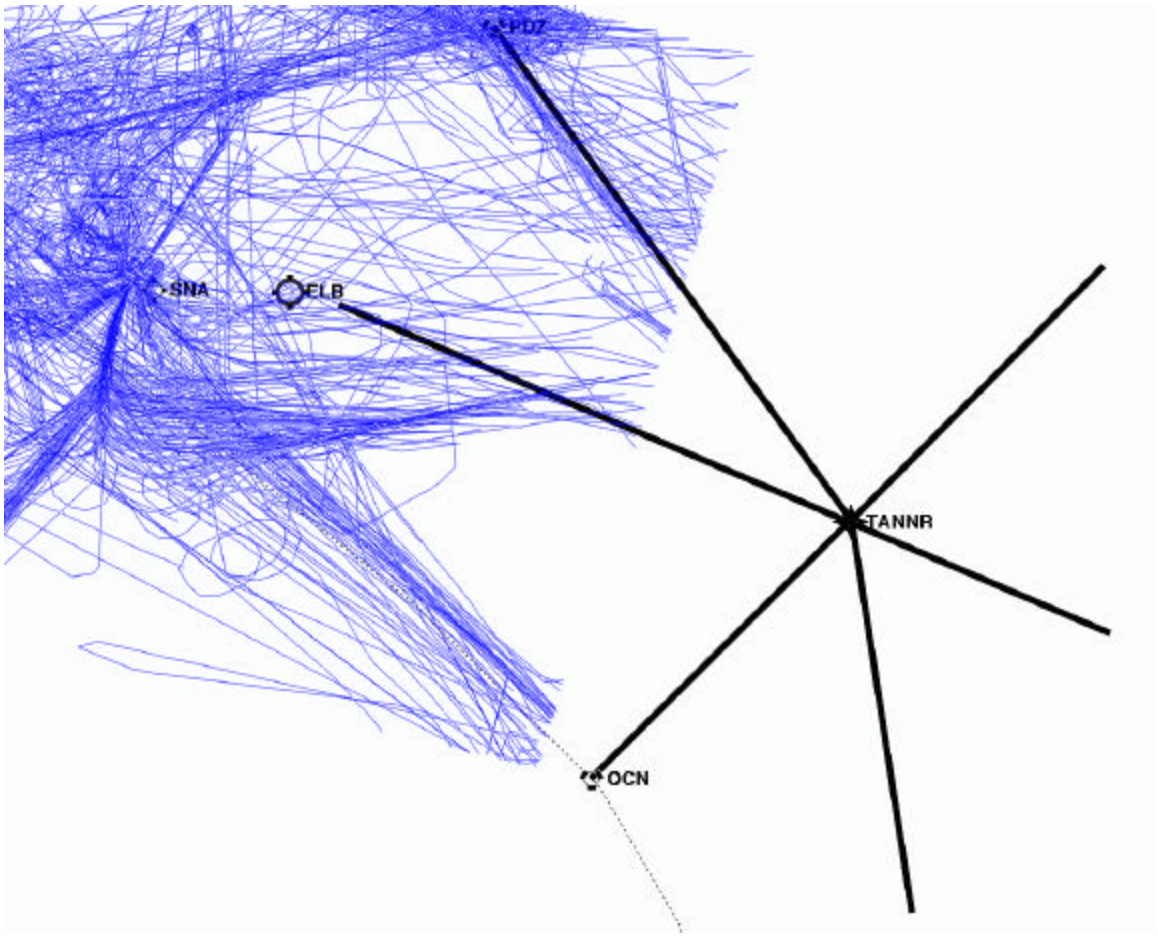

Figure 4. TANNR ONE Departure at ELB

PACIF ONE DEPARTURE procedure is a departure procedure from runways 08, 17 and 35 to the OCN and SXC transitions. Departures proceed to the filed transition as indicated in the published procedure. This departure procedure is depicted in figure 5 as an overlay on existing departure radar tracks from SCT.

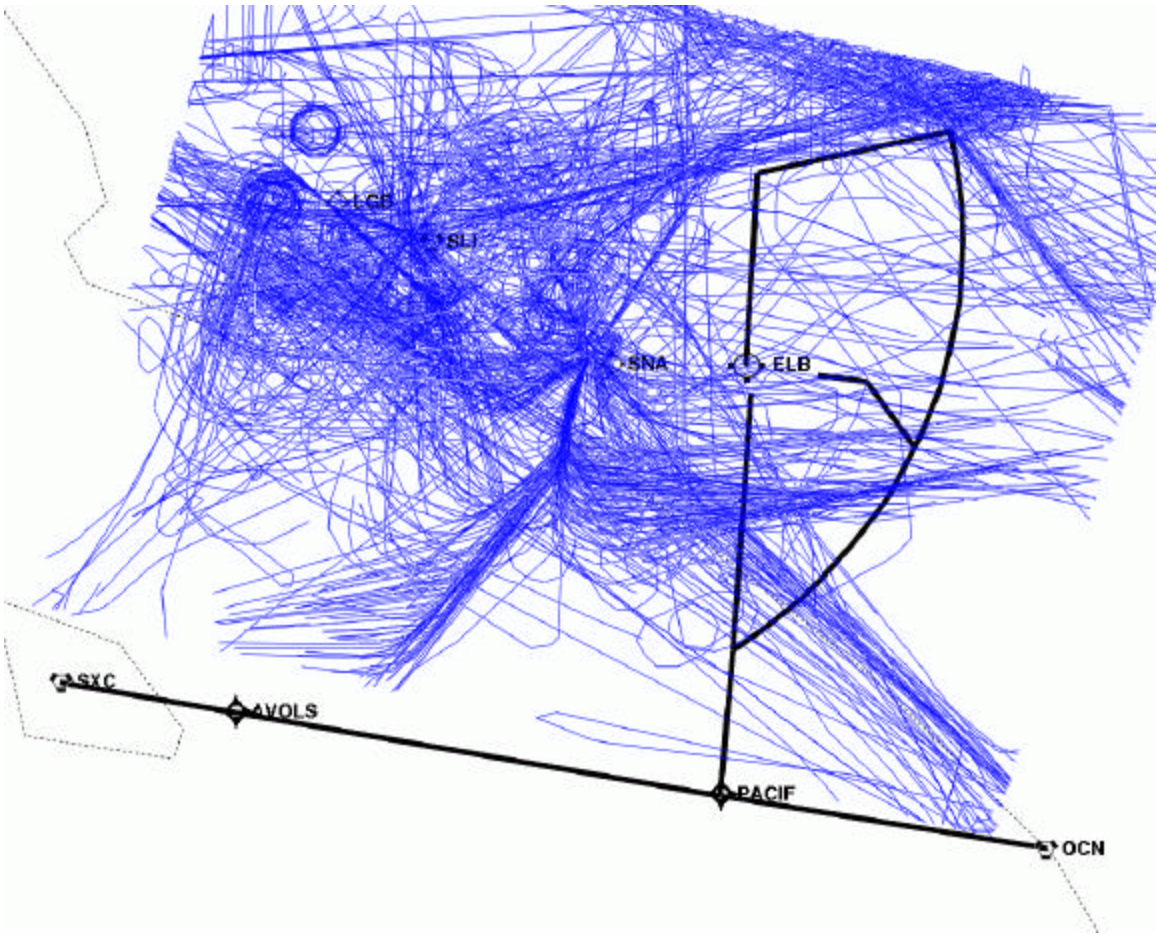

Figure 5. PACIF ONE Departure at ELB

Discussion:

Revisions to Procedures

The arrival and departure procedures presented in this document are similar to those procedures analyzed previously. One significant difference is the runway 35 departure procedure will climb through airspace currently reserved for John Wayne Airport – Orange County (SNA) and Long Beach Municipal Airport (LGB) arrivals. The original and revised departure procedures are depicted along with SCT arrival radar tracks in figure 6 below:

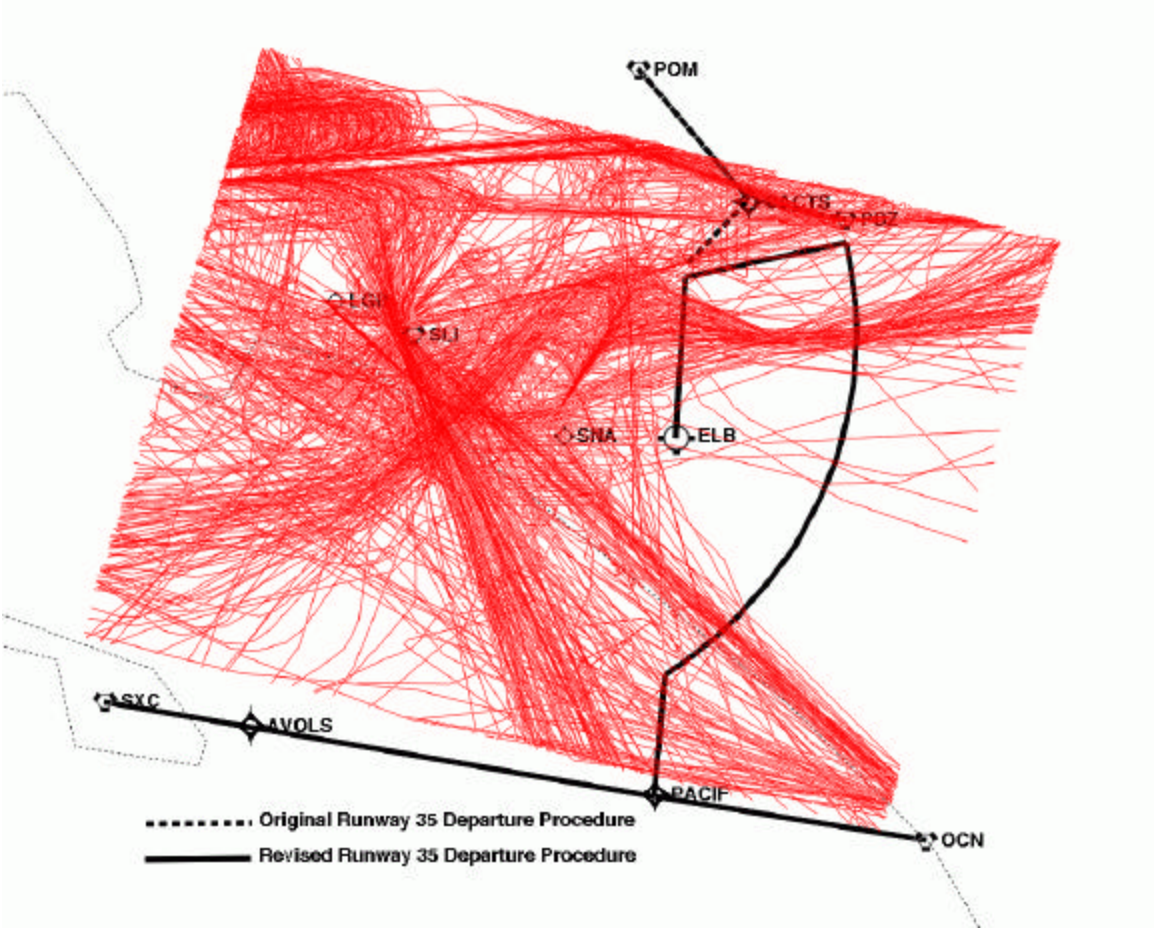

Figure 6. Comparison of Original and Revised Runway 35 Departure Procedures at ELB

In both the original and revised procedures, runway 35 departures climb and maintain runway heading until reaching the vicinity of the SLI 061 radial. The original procedure took departures to CACTS and then to either the POM or PDZ transition. The revised procedure takes departures along the SLI 061 radial until reaching 27 DME from SLI, and departures follow the 27 DME SLI arc South until eventually reaching PACIF and transitioning at SXC or OCN. While these procedures have very different flight paths and transitions, they both require departures to climb through airspace currently set aside for arrival traffic.

Both transitions (SXC and OCN) for the PACIF ONE departure are south of the airport. As a result, northbound departures from runways 35 and 17 under this new procedure will experience an increase in flight distance over the original departure procedures with transitions north of the airport. However, this modification mitigates an airspace conflict between ELB departures to POM and LAX arrivals.

Delay

In order to quantify the delay impacts of runway 35 departures, a computer simulation modeled a single jet departure from ELB to determine the amount of time required to fly the runway 35 departure procedure until three miles clear of the SNA/LGB arrival flow. The modeling effort revealed that the time needed was eight minutes. Furthermore, during peak arrival periods, the combined SNA and LGB arrival flow rate can reach 36 aircraft/hour. The number of arrivals per 15 minute window using the combined SNA and LGB arrival flow are plotted in figure 7.

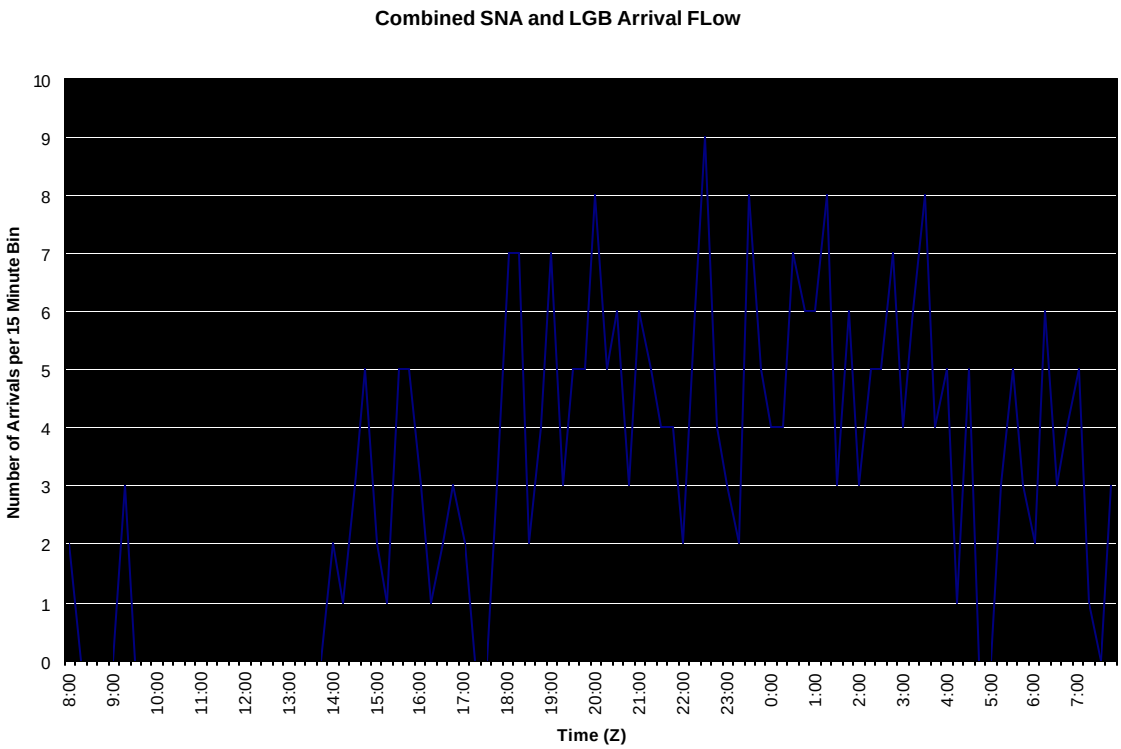

Figure 7. Combined SNA/LGB Arrival Flow Rate

Natural gaps in the combined SNA and LGB arrival flow occur approximately every 60 minutes. If SNA/LGB arrivals are given preference on the use of the airspace, the ELB departure may be held on the ground for up to one hour before being cleared for departure. However, if the ELB departure is given preference, the SNA/LGB arrival flow must provide a gap for up to eight minutes. In this case, the extent of delay impacts are directly related to the time of day that the aircraft is scheduled to depart. For example, if the ELB departure is scheduled for the beginning of the afternoon SNA/LGB arrival push, 24 aircraft could be delayed before the next gap in the arrival flow allows the delays to dissipate. The resultant delay either on the ground or in the air would be greater.

Conclusions:

Since runway usage, the number of flight operations, and procedure definitions do not substantially differ from those analyzed before, the results concerning airspace conflicts remain unchanged. The most significant procedural modification involves runway 35 departures which transition south of the airport at SXC and OCN instead of north at POM and PDZ. However, the initial stage of this procedure is largely unchanged and it is this phase of flight that results in the concerns regarding airspace conflicts. Consequently, the increase in the number of conflicts resulting from the proposed civilian aviation reuse of MCAS El Toro will increase the workload of controllers in the Coast Area.

There is no immediate impediment to runway 35 arrivals at ELB. Likewise, runway 8 departures are feasible in the current system, as far as this level of modeling can ascertain. The secondary departure runway, runway 35, however, seems to require the use of constricted airspace. While 35 is the secondary departure runway, factors such as wind or aircraft climb performance may require its frequent use, especially in light of the type of operations forecasted in the Airport Master Plan. In order to accommodate runway 35 departures, SCT must meter SNA and LGB arrival flows north of ELB which currently use the airspace, or hold the ELB departure on the ground until a gap is created in the SNA/LGB arrival stream. In either case, delay would result from ATC's need to maintain safe separation in the constrained airspace of Southern California.

U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration

Airspace Determination for Proposed Civilian Reuse of the Former Marine Corps Air Station El Toro, California

I. INTRODUCTION:

The Defense Base Closure and Realignment Act of 1990 (10 U.S.C. § 2687 note) (DBCRA), required the U.S. Department of Defense to close, realign and/or dispose of military installations across the United States. The Department of Defense recommended and the President of the United States approved closure of Marine Corps Air Station (MCAS) El Toro, which is located in Orange County, California (Figure 1). In July 1999, military operations ceased at MCAS El Toro and the base was closed. Orange County applied for and was designated the Local Redevelopment Authority (LRA), for MCAS El Toro. In 1996, the LRA submitted a Community Reuse Plan (CRP) that included reuse of a majority of MCAS El Toro as a civilian commercial service airport. The Department of the Navy is responsible for the disposal of the base to a qualified recipient. Under the DBCRA, the Department of the Navy has authority on behalf of the federal government to make cost-free public benefit conveyances of land to state and local governments for, among other things, civilian airports.

Under the Surplus Property Act of 1944, as amended, the FAA is responsible for determining whether to recommend disposal of MCAS El Toro for public benefit transfer for reuse as a civilian airport. The FAA is required to determine whether MCAS El Toro is essential, suitable, desirable, or reasonably necessary to fulfill the immediate and foreseeable future requirements for a public airport. To enable FAA to make such a determination, the FAA requires the LRA to prepare an airport master plan and accompanying Airport Layout Plan (ALP) for FAA approval. An ALP is the graphic depiction of the plan of reuse and proposal to develop a former military base as a civilian airport. Airport proprietors must also develop and maintain an FAA approved ALP to remain eligible for grants of federal financial assistance for airport planning and development under the FAA's Airport Improvement and Military Airport Programs. Title 49 USC 47107(a)(16)(C) states that *"the [airport] owner or operator will not make or allow any alteration in the airport or any of its facilities if the alteration does not comply with the [airport layout] plan the Secretary [of Transportation] approves and the Secretary is of the opinion that the alteration may affect adversely the safety, utility, or efficiency of the airport…"* The LRA would not be eligible to receive Airport Improvement Program funds or participate in the FAA's Military Airport Program until the closed base is transferred by the Department of the Navy in fee or by long-term lease (more than 20-years).

Part of the process to approve the ALP includes a detailed review and analysis of the anticipated effects that the proposed civilian reuse of the base would have on the existing navigable airspace in the vicinity of the airport (FAA Order 7400.2E, Part 3, *Airport Airspace Analysis*). This document is the FAA's Airspace Determination for the proposed civilian reuse of MCAS El Toro, as proposed by the LRA, pursuant to Title 14, Code of Federal Regulations (CFR) Part 157, *Notice of Construction, Alteration, Activation and Deactivation of Airports*.

The LRA prepared an Airport System Master Plan (ASMP)[1] and the resulting ALP depicting a proposed civilian airport at the former MCAS El Toro. Section 1.1.1 of Technical Report 17 of the ASMP states in part "*The Airport System Master Plan study confirms and documents the needs for additional aviation facilities to accommodate Orange County's growing air service demands, and provides implementation-level planning to support the existing policy of Orange County to convert the former MCAS El Toro to meet some of those needs*." Further, Section 1.1.3 of the ASMP states, "*The closure of MCAS El Toro provides Orange County with the unique opportunity to add necessary aviation facilities to adequately meet the air service needs of the County well into the twenty-first century*."

[1] MCAS El Toro Master Development Program, *Airport System Master Plan*, December 1999.

The FAA has a statutory responsibility to ensure that the proposed civilian aviation reuse would be conducted in a safe and efficient manner. FAA reviews the airport design and runway configuration with respect to its safety, efficiency, and utility within the national airspace system. FAA has airport design standards that airport sponsors must meet to qualify for financial assistance. The FAA, however, does not dictate to an airport sponsor how an airport is to be designed and operated within acceptable parameters. Decisions regarding the establishment and development of an airport are the responsibilities of state and local governments (i.e. Orange County) acting as the potential airport owners and operators of the facility.

While the LRA's ASMP is their plan for operating both John Wayne Airport – Orange County and the proposed civilian airport at the former MCAS El Toro, this airspace determination is limited to review and analysis of the ALP, for the proposed civilian reuse of the former MCAS El Toro and how it will operate within the National Airspace System (NAS). The FAA's evaluation considers the proposed reuse plan that would ultimately accommodate 28.8 Million Annual Passengers (MAP) at the former MCAS El Toro by the year 2020. The ASMP includes the continued commercial aviation use at John Wayne Airport – Orange County at a level of approximately 5.4 MAP by the year 2020. This level of passenger enplanements is consistent with the 1985 Settlement Agreement which places a maximum activity level limit of 8.4 MAP at John Wayne Airport – Orange County. The FAA understands that this Settlement Agreement will expire in 2005. The FAA's review of the proposed reuse of the former MCAS El Toro does not include or speculate on the potential airspace or environmental impacts of whether or not the current restrictions at John Wayne Airport – Orange County will or will not remain following the expiration of the 1985 Settlement Agreement[2].

Should an alternative other than the proposed ALP be selected for implementation, additional airspace analysis may be necessary in order for the FAA to make the necessary recommendations for this base disposal and reuse process. Any significant changes in aircraft operations at John Wayne Airport may also require additional airspace analysis.

The Department of the Navy, as the lead federal agency was responsible for the publication of an Environmental Impact Statement (EIS) for the disposal and reuse of the closed base. The Draft EIS was prepared pursuant to the National Environmental Policy Act of 1969 (NEPA) and published on February 18, 2000. The FAA was a cooperating agency in the preparation of the Draft EIS based upon its jurisdiction by law if aviation reuse is approved. The federal environmental review is now being conducted as a joint effort by the Department of the Navy and the FAA, with the FAA as a co-lead agency. The FAA and the Department of the Navy will include relevant information from this airspace determination in subsequent NEPA documents and the determination will be part of the administrative record.

[2] Settlement Stipulation between the County of Orange and other parties *in County of Orange v. AirCal, et al, etc*. U.S. District Court, Central District for California, Civ. No. 85-1542-TJH(Mx) (1985) "1985 Settlement Agreement"

FIGURE 1 - LOCATION MAP

FIGURE 1 - LOCATION MAP
Source: Draft Environmental Impact Report No. 573
prepared by Orange County, California

II. AIRPORT LAYOUT PLAN REVIEW

In November 1999, as part of its Environmental Impact Report (EIR) Number 573, the LRA submitted an ALP, developed as part of the ASMP, for the proposed civilian reuse of the former MCAS El Toro to the FAA. EIR 573, is an environmental document, prepared, by the LRA, pursuant to the California Environmental Quality Act of 1970 (CEQA). EIR 573 evaluates the potential environmental impacts of the LRA's master plan for the proposed airport. This environmental disclosure process under CEQA is similar to the federal environmental review process required by the National Environmental Policy Act of 1969 (NEPA). Figure 2 depicts the proposed ALP submitted by the LRA. This 11-inch by 17-inch figure is a reduced copy of the original 30-inch by 42-inch drawing submitted by the LRA.

FAA's initial review of the proposed ALP began in December 1999. The overall review of the proposed ALP included a review and analysis of impacts of the proposed civilian airport on the existing airspace in Southern California.

The primary features of an ALP review by FAA include a determination that the information described in Chapter 9 of FAA Advisory Circular 150/5070-6A*, Airport Master Plans*, is included on the ALP. This information includes depiction of the basic configuration of the airport, location, direction and length and width dimensions of runways and the parallel and connecting taxiway system, aircraft parking aprons, terminal and other buildings, Runway Safety Areas, and Runway Protection Zones. The ALP describes both existing and planned future facilities and development at an airport.

The ALP must also include wind speed and directional information, the latitude and longitude of the airport reference point and the runway ends. A basic data table is also required on an ALP that includes the airport elevation (the highest point of the usable landing area), the airport reference point coordinates (latitude and longitude to the nearest second), the airport magnetic variations, mean maximum daily temperature for the hottest month, airport and terminal navigational aids, runway identification – magnetic heading, percent effective runway gradient for each existing and proposed runway, percent wind coverage by runway, designated instrument runway, pavement type (concrete, asphalt, turf, etc), pavement strength of each runway, approach surfaces for each runway, type of runway lighting and marking, and a list of electronic and visual approach aids and weather facilities.

The review also includes examining the ALP to determine if there are any specific clearance or airfield layout dimensions such as runway centerline separation to parallel runways, taxiways, aircraft parking aprons, etc. that are not consistent with FAA separation standards in FAA Advisory Circular 150/5300-13, *Airport Design*.

The ALP review also includes examination of the various on-airport land uses depicted to ensure that there are no objects located or planned to be located within a Runway Safety Area that are not fixed by their function. In other words, the FAA reviewed the ALP to determine if there are any movable objects (such as parked aircraft, or automobiles or some type of other movable object) or fixed in-place objects (buildings, navigational aids, fences, etc) that could interfere with the safe operation of aircraft at the proposed civilian reused airport.

The LRA submitted the proposed ALP for FAA's review in November 1999. FAA assigned the ALP a case number, Airspace Case Number 99-AWP-0177-NRA, for purposes of coordinating internal review. The proposed ALP was reviewed by the FAA's Western-Pacific Region. This includes the following operating divisions and offices: Airports, Air Traffic, Flight Standards, Airway Facilities and the Los Angeles Flight Procedures Office.

FIGURE 2 ALP

FIGURE 2 – LOCAL REDEVELOPMENT AUTHORITY'S
PROPOSED AIRPORT LAYOUT PLAN
FOR THE FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA

The FAA notes that the proposed ALP uses the ultimate runway magnetic heading designations for the runways at the former MCAS El Toro. This change in runway identification is due to the annual rate of change of the magnetic declination in the vicinity of the airport. For the purposes of this airspace determination the designation of the existing Runway 7L/25R and Runway 7R/25L is understood to be Runway 8L/26R and Runway 8R/26L, respectively. Runway 16R/34L and Runway 16L/34R is understood to be Runway 17R/35L and Runway 17L/35R respectively. Runway 3/21 does not change designation because the ALP indicates it is to remain closed to all operations.

The basic configuration of the airport is in a cross pattern with one pair of runways intersecting the other pair in the middle of the airfield. The existing airfield at MCAS El Toro does not meet current FAA design standards for separation of runways and for longitudinal runway gradients (slope). The LRA has proposed reuse of the airfield as a civilian airport in its existing configuration initially for a period of at least five years.

The FAA evaluated both the existing layout of the airfield and the ultimate layout of the proposed civilian reuse of MCAS El Toro. The existing airfield is proposed for use by civilian aircraft operators until the various improvements to meet FAA design standards are completed by the LRA. The proposed ALP depicts the current distance between runway centerlines for each pair of runways as 500 feet. The specified minimum parallel runway separation for simultaneous Visual Flight Rule Operations, as defined in paragraph 207 of FAA Advisory Circular 150/5300-13, *Airport Design*, is 700 feet.

The existing effective longitudinal gradient for Runway 8L/26R and 8R/26L is 1.55 and 1.53 percent, respectively. The FAA standard for effective longitudinal gradient for Aircraft Approach Categories C and D is $\pm$ 1.5 percent (reference paragraph 502(a)(2) of FAA Advisory Circular 150/5300-13). The aircraft flight manuals for typical transport category aircraft (i.e. Boeing 727) indicates that the aircraft is certified to be able to perform takeoff and landing operations on runways with a slope of $\pm$ 2 percent. The performance data for a typical McDonnell-Douglas aircraft (now owned by Boeing) such as the MD 90 or Boeing 717 indicates that this aircraft is certified for takeoff operations using a runway with a + 1.7 and –2 percent slope and $\pm$ 2 percent slope for landing operations. Therefore, based on this information, it is reasonable to conclude that transport category aircraft can safely operate using the existing runways.

Airline operators provide a “dispatch release” document to its pilots for each aircraft flight. This document contains information based on the airport elevation, length of runway available, slope of runway, ambient air temperature, and other factors that indicate what departure procedure the pilot is to use. The “dispatch release” will also identify the amount of payload (passengers and/or cargo) that can be loaded onto the aircraft for a particular flight under a particular set of parameters. The effect of runway slope has on aircraft performance, when all other parameters are equal, is the amount of payload (passengers and/or cargo) that can be loaded on board. The determination of how much payload can be carried to support an economically viable airline or aircraft operation is made by each aircraft operator. This type of economic decision is beyond the scope of this airspace determination. Therefore, it is possible that some aircraft operations may occur at less than optimal or maximum gross takeoff weight because of the longitudinal gradients that currently exceed FAA design standards on the existing pair of 8/26 runways.

The proposed ALP also indicates that the existing effective longitudinal gradient (slope) for Runways 17R/35L and 17L/35R is .62 and .61 percent, respectively, which meet FAA design standards. According to the LRA’s master plan, following the base transfer and initiation of civilian operations, the LRA proposes to reconstruct one of each of the two pairs of parallel runways to meet minimum FAA separation standards for runway to runway centerline. In addition, both runways 8L/26R and 8R/26L would be reconstructed so that the longitudinal gradient would meet FAA design standards. The ALP depicts the proposed future gradient for Runways 8R/26L and 8L/26R to be .91 and .87 percent, respectively which would be consistent with FAA standards.

Considering the runway centerline separation distances for both pairs of runways and the longitudinal gradients for the 8/26 pair of runways that currently do not meet FAA design criteria, the FAA considered the need for a Modification to Airport Design Standards consistent with Paragraph 6 of FAA Advisory Circular 150/5300-13, *Airport Design*. Paragraph 6 of the Advisory Circular describes when a

Modification of Airport Design Standards to meet local conditions is necessary. Paragraph 6 also states that Modifications to airport design standards are evaluated on a case-by-case basis. In particular, Paragraph 6 states "*a modification to an airport design standard related to new construction, reconstruction, expansion or upgrade of an airport which received Federal Aid requires FAA approval*." The FAA has considered the need for a Modification of Standards consistent with the Advisory Circular.

MCAS El Toro has not received federal aid from the FAA for airport development. The proposed ALP, submitted by the LRA to the FAA for review indicates that the proposed reuse of the military airport includes proposed changes to the airfield to meet FAA design standards. Therefore, based on this information, the FAA has determined that a Modification of Airport Design Standards for the initial non-standard runway centerline to parallel runway centerline separation and the effective runway gradient is not necessary. Conversely, a Modification to Airport Design Standards would be appropriate if the LRA proposed to permanently retain the non-standard runway centerline to runway centerline separation and effective longitudinal gradients rather than change them as depicted in their ALP.

In summary, FAA's review of the ALP, considers both the existing and ultimate layout of the proposed civilian aviation reuse at MCAS El Toro. As documented above, the operational flight manuals for various commercial service aircraft indicate that these aircraft can safely operate using runways with longitudinal gradients that currently exist at the former MCAS El Toro. The FAA's review of the proposed ALP and development depicted thereon indicates that the ultimate layout for proposed civilian reuse MCAS El Toro can meet the minimum FAA airport design standards.

III. AIRFIELD SAFETY

The FAA's process for evaluating the proposed civilian aviation reuse of the former MCAS El Toro involves first determining if use of the proposed civil airport itself can be accomplished in a safe manner by civilian aircraft operators. This involves, evaluating the various features of existing and proposed facilities, such as length and width of the runways, heading of the runways, number of runways, runway separation, the parallel and connecting taxiway system, proposed navigation aids, etc. and other pertinent features such as off-airport obstructions to air navigation.

After the FAA has concluded that the facility can be used safely**,** the FAA evaluates effects that the existing and proposed facility will have on the efficiency of the local airspace system surrounding the airport and the National Airspace System in general. This analysis is accomplished prior to the FAA issuing formal approval of an Airport Layout Plan (ALP).

During the review of the ALP, the FAA considered the basic configuration of the proposed airport and has concluded that there is no inherent design flaw in the crossing runway pattern at the former MCAS El Toro. The airfield configuration at MCAS El Toro is similar to San Francisco International Airport, which has been operated safely for many years. Intersecting runways are also common at many other airports in Southern California and are not, in and of themselves, the primary contributor to runway incursions or other safety problems. The closest commercial service airport with intersecting runways, to MCAS El Toro, is at Long Beach Airport. The primary runway at Long Beach Airport, Runway 12/30, intersects the other four runways at the airport. Since the proposed civilian airport at MCAS El Toro would have an Airport Traffic Control Tower, the FAA will exercise positive ground and air traffic control to ensure the safety of aircraft operations with this airfield configuration. It is important to understand that pilots of aircraft and FAA air traffic controllers do not treat runway intersections in the same fashion as an uncontrolled roadway intersection that is encountered by motorists. Positive two-way communications between the pilot of an aircraft and Air Traffic Control is maintained to ensure safety of aircraft operations. Several comments were submitted to the Navy on its Draft EIS about why this airfield-unlike other airfields at airports such as Los Angeles International, Ontario International, and John Wayne Airport – Orange County - has intersecting runways. The configuration of each of these airports was designed to maximize the performance of the aircraft operating into the prevailing winds and cross winds. As stated in Appendix 1 of FAA Advisory Circular 150/5300-13, *Airport Design*, "*the most desirable runway orientation based on wind is the one which has the largest wind coverage and minimum crosswind components. Wind coverage is that percent of time crosswind components are below an acceptable velocity.*"

FAA Order 8400.9, *National Safety and Operational Criteria for Runway Use Programs* states "*Under ideal conditions aircraft takeoffs and landings should be conducted into the wind. However, other considerations such as delay and capacity problems, runway length, available approach aids, noise abatement, and other factors may require aircraft operations to be conducted on runways not directly aligned into the wind*". This directive allows for a Voluntary Runway Use Program, in which a pilot-in-command of an aircraft, may accept to operate with tail wind components of less than 8 knots and crosswind components of 15 knots or less.

Another safety factor that the FAA considered during the evaluation of the reuse proposal by the LRA is the separation distance between each pair of runway centerlines. As stated earlier, the existing runway centerline spacing between each pair of runways is 500 feet as constructed by the Department of the Navy. The FAA's minimum standard for runway centerline spacing for large aircraft is 700 feet. The LRA's proposed ALP indicates that each pair of 8/26 runways and 17/35 runways will be reconstructed to meet FAA's runway centerline to parallel runway centerline separation standard. It is important to note specifically how aircraft are operated under Visual Flight Rules and Instrument Flight Rules. FAA can vector aircraft for visual approaches whenever the cloud ceilings are at least 500 feet above the applicable Minimum Vectoring Altitude or Minimum Instrument Flight Rule (IFR) altitude, and the visibility at the airport intended for landing is three miles or greater. Parallel visual approaches can be conducted when the aircraft have each other in sight and agree to maintain visual separation with the other aircraft. This activity occurs at airports with runway centerline spacing of at least 700 feet such as San Francisco International.

Paragraph 207(b) of FAA Advisory Circular 150/5300-13, Airport Design, states *"runways with centerline spacing under 2,500 feet are treated as a single runway by ATC (Air Traffic Control) when wake turbulence is a factor."*

Paragraph 7-4-4(c)(1) of FAA Order 7110.65, *Air Traffic Control*, states the following conditions apply to visual approaches being conducted simultaneously to parallel runways: "*Parallel runways separated by less than 2,500 feet. Unless standard separation is provided by ATC, an aircraft must report sighting a preceding aircraft making an approach (instrument or visual) to the adjacent parallel runway. When an aircraft reports another aircraft in sight on the adjacent final approach course and visual separation is applied, controllers must advise the succeeding aircraft to maintain visual separation. However, do not permit a heavy/B757 aircraft to overtake another aircraft. Do not permit a large aircraft to overtake a small aircraft.*" This means that FAA Air Traffic Control personnel will issue wake turbulence advisories to pilots under visual conditions. This advisory will alert pilots that wake turbulence from other aircraft may exist. The pilot-in-command will then consider the advisory when making his/her decision on when to proceed with the landing.

During IFR conditions, Air Traffic Control will sequence departure and arrival operations on each runway pair to allow for the dissipation of wake turbulence from an aircraft that used the other parallel runway. In effect, arrival aircraft will follow a single stream flow because simultaneous IFR operations may not be conducted to parallel runways which centerlines are separated by less than 4,300 feet. For departures, an aircraft can receive permission to taxi into position and hold for clearance from Air Traffic Control for takeoff on one runway while an aircraft is taking off or landing on the other runway. The aircraft that has taxied into position will wait for the arrival to land or for the wake turbulence from the aircraft that has just taken off to subside before receiving a clearance for takeoff.

During the development of the LRA's Airport System Master Plan (ASMP), Orange County's consultant developed conceptual instrument approach and departure procedures for the facility. While these conceptual procedures are somewhat detailed, the FAA, as part of its mission to ensure the safe and efficient use of navigable airspace, must <u>independently</u> develop and flight check approach and departure procedures for use by the public. Consequently, Orange County, as the LRA, requested the FAA develop instrument approach and departure procedures for Runways 35 (operations to the north), Runways 17 (operations to the south) and departure procedures for Runways 8 (operations to the east). In response to this request from the LRA, the FAA's Western Flight Procedures Office prepared preliminary arrival and

departure procedures for Runways 17 and 35 and departure procedures for Runway 8 that would integrate aircraft operations into and out of MCAS El Toro. For the purposes of this Airspace Determination, the approach and departure procedures developed by the FAA for the LRA's proposed reuse of the former MCAS El Toro are considered to be preliminary proposed procedures. The LRA has clearly indicated to the FAA that it does not intend to make Runway 26 available for takeoffs or an instrument approach to Runway 8 available to aircraft due to the off-airport noise impacts and non-compatible land uses impacts. Existing Runway 3/21 will remain closed. The ASMP operational scenario for a civilian airport at MCAS El Toro includes procedures that are mostly consistent with the former military procedures used by the U.S. Marine Corps while the base was an active military installation. The Runway 35 Departure Procedure is a significant change from what was formerly in use by the military in that it follows a course straight out for approximately eight miles and then makes a right arc turn to the south. The former military procedure made a left arc turn to the south.

Flight procedures requested by the LRA and included in EIR 573 were taken into consideration by the FAA during the preparation of the preliminary procedures that would be proposed for use by the public. Preparation of the procedures was necessary for the FAA to more definitively determine the safety aspect of LRA's proposed operational scenario. The preliminary flight procedures were prepared by the FAA's Western Flight Procedures Development Branch in Oklahoma City, in close coordination by the FAA's Western-Pacific Region offices including the Airports Division, Air Traffic Division and Flight Standards Division. The development of each of these preliminary procedures utilized FAA criteria as specified in FAA Order 8260.3B*, United States Standard for Terminal Instrument Procedures (TERPS).* These procedures (TERPS) ensure safe clearances over natural and artificial obstructions. These procedures include use of common information such as positive course guidance, units of measurement, approach categories and procedure construction.

Paragraph 214 of TERPs, as repeated in the following paragraph, describes the basic features of an approach procedure and how it is constructed:

"An Instrument Approach Procedure (IAP) may have four separate segments. [Figure 3 depicts the segments of an approach procedure]. *They are the initial; the intermediate, the final, and the missed approach segments. In addition, an area for circling the airport under visual conditions shall be considered. An approach segment begins and ends at the plotted position of the fix, however, under some circumstances certain segments may begin at specified points where no fixes are available. The fixes are named to coincide with the associate segment. For example, the intermediate segment begins at the intermediate fix (IF) and ends at the Final Approach Fix (FAF). The order in which this chapter discusses the segments is the same order in which the pilot would fly them in a completed procedure; that is from an initial, through and intermediate, to a final approach. In constructing the procedures, the FAC* [Final Approach Course] *should be identified first because it is the least flexible and most critical of all the segments. When the final approach has been determined, the other segments should be blended with it to produce an orderly maneuvering pattern which is responsive to the local traffic flow. Consideration shall also be given to any accompanying controlled airspace requirements in order to conserve airspace to the extent it is feasible."*

To design procedures to avoid terrain, FAA also uses Chapter 12 of TERPS, which describes departure procedures as it relates to obstacles. Paragraph 1200 states that "*these criteria specify the obstacle clearance requirements to be applied to diverse departures, departure routes, and standard instrument departures (SIDs). Obstacle identification surfaces (OIS) of 40:1 are used. A climb gradient of 200 feet per nautical mile will provide at least 48 feet per nautical mile of clearance above objects which do not penetrate the 40:1 OIS. Objects which penetrate the OIS are obstacles and shall be considered in the departure procedure by specifying a flight path that will safely avoid the obstacle(s) or by specifying a climb gradient greater than 200 feet per nautical mile that will provide 48 feet of required obstacle clearance for each nautical mile of the flight path. Takeoff ceiling and visibility minimums shall be established for those departures specifying a climb gradient."*

FIGURE 3 – SEGMENTS OF AN APPROACH PROCEDURE

Source: FAA Order 8260.3B – United States Standard for Terminal Instrument Procedures (TERPS)

Paragraph 1205 of TERPS, Climb Gradients, further specifies that "*climb gradients shall include 48 feet per nautical mile required obstacle clearance. When precipitous terrain is a factor, consideration shall be given to increasing the obstacle clearance. Gradients shall be specified to an altitude or fix at which a gradient of more than 200 feet per nautical mile is no longer required*."

For the purposes of the development of the various arrival and departure procedures, precipitous terrain means surface features, such as hills, or mountains that would create any concerns for actual flight operations.

During the preparation of the proposed procedures, the FAA considered the proximity of Loma Ridge. Consistent with current FAA procedure development practices for selecting controlling obstacles for instrument procedures the FAA presumes that there is a minimum of a 200-foot tall obstruction on top of the terrain. Consequently, in developing the preliminary departure procedures, the FAA increased the climb gradient for Runway 35 to 450 feet per nautical mile to an altitude of 7,500 feet. This would result in an aircraft altitude of approximately 2,043 feet, which is 386 feet above the presumed 200-foot tall obstruction over a point on Loma Ridge that is north of the airport and approximately 3.73 nautical miles from the departure end of the runway. The ground proximity warning system of an aircraft will activate and initiate an auditory alert to the pilot when the terrain is sensed by the system to be outside the programmed parameters. Pilots of aircraft equipped with this system are trained to respond to a warning to determine if a deviation from the flight operational plan and flight path is necessary. In the event of an auditory alert from the ground proximity warning system, the pilot will cross-reference the aircraft's position with the instrument departure procedures to verify his/her location. The pilot will also look for secondary indications that will verify a valid the alert. If the pilot determines the alert is valid, the pilot will then turn the aircraft away from rising terrain, as necessary.

When preparing for a proposed flight, a pilot must take several factors into consideration. In addition to temperature and other weather conditions, a pilot must consider the loss of engine power and whether an aircraft with a loss of power can achieve the minimum climb rate as prescribed in the published departure procedures. If a pilot, operating pursuant to 14 CFR Part 121, determines the local conditions are such that the aircraft cannot maintain the specified climb rate, then the pilot will adjust the aircraft loading in order to be able to fly the procedure. If the pilot is unable to adjust the aircraft loading to be able to fly the procedure, the pilot will not take off.

Consistent with flight procedure development, the FAA coordinated its preliminary procedures for a civilian reuse at MCAS El Toro with potential aviation industry users including the Air Transport Association (ATA), Airline Pilots Association (ALPA), Allied Pilots Association (APA), Aircraft Owners and Pilots Association (AOPA), National Business Aircraft Association (NBAA), California Department of Transportation – Aeronautics Program, FAA's Los Angeles Air Route Traffic Control Center [(ARTCC), also identified as ZLA], FAA's Southern California Terminal Radar Control (So. Cal TRACON) Facility, and the LRA. ALPA was the only aviation organization, outside the FAA that provided comments on the preliminary procedures. ALPA has stated that they will not accept the Runway 35 North Departure Procedure as designed for safety reasons. ALPA believes the climb rate of 450 feet per nautical mile, established for the Runway 35 Departure Procedure to be excessive, since it is higher than the standard climb rate. It is required to avoid precipitous terrain to the north of the airport. ALPA prefers the former military procedure that was in use, which was a left turn to the south off of Runway 35, avoiding rising terrain. ALPA also opposes utilizing Runway 8 for departure due to the uphill gradient on Runway 8, and the easterly climb into rising terrain. ALPA has recommended that a Departure Procedure be designed for Runway 26, which they consider to be the safest direction to depart because of the absence of rising terrain and ability to apply a standard climb rate, and also because it is the runway most nearly aligned with the wind the majority of the time.

The Runway 26 departure would also be consistent with surrounding airport traffic flows in the Southern California basin. ALPA also recommended that a Precision Instrument Landing System (ILS) Approach Procedure be designed for Runway 8 because of the occasion of so-called "Santa Ana" conditions where high winds from the east favor aircraft landing at the former MCAS El Toro on Runway 8.

An ILS is a precision approach equipment located on an airport. It provides pilots of aircraft with positive course guidance, distance measuring equipment, and a specific glide slope. Typically, this glide slope is three degrees. FAA carefully considered the comments provided and in some cases modified the proposed approach and departure procedures as a result. The LRA has not requested that the FAA develop an approach procedure for Runway 8. Therefore, aircraft would be required to execute an instrument approach to either Runway 35 or 17 and circle to land on Runway 8. However, based on its experience, the FAA believes that the majority of 14 CFR Part 121 operators will not accept a circling approach to Runway 8 because of existing airline policies.

As all approach and departure procedures are prepared for public use, the FAA assumes that each aircraft using the procedures will have all engines properly operating. This means that the procedures do not account for an emergency situation such as single-out or multi engine-out operations. The FAA relies upon the procedures described in the aircraft operations manual for each specific aircraft and the pilot-in-command has the responsibility to operate an aircraft in a safe manner consistent with 14 CFR Part 91 for operating aircraft in an emergency situation. In an emergency requiring immediate action, the pilot-in-command may deviate from any rule in 14 CFR Part 91, Subpart A, General, and Subpart B, Flight Rules, to the extent required to meet that emergency. Examples of an emergency can include but are not limited to the unintentional loss of power from an aircraft engine, an on-board fire, and an on-board medical situation that requires the pilot to determine if urgent action is necessary. The ultimate decision whether to accept an assigned approach or departure procedure is the responsibility of the pilot-in-command.

It is also important to note that the FAA requires extensive and on-going training to achieve an appropriate level of proficiency and a high degree of safety for pilots of commercial aircraft pursuant to 14 CFR Part 121. In the United States, the FAA requires that each airline applicant prepare an operations manual for each type of aircraft it proposes to use that incorporates procedures to account for a variety of emergency situations such as an engine failure (loss of power), pursuant to 14 CFR Part 121. Section 121.135(a) states *"each manual required by section 121.133 must include instructions and information necessary to allow the personnel concerned to perform their duties and responsibilities with a high degree of safety.*"

These procedures are developed to train the flight crew on how to respond to in-flight situations such, as an engine failure occurring at the most critical time of the flight (during takeoff or landing). The airlines procedures and flight crew training and proficiency must meet the cockpit workload that will maintain a high degree of safety. Airlines do not necessarily use identical engine failure recovery procedures, due in part to the differences in aircraft type, engine manufacturers, and aircraft/engine combinations. While these procedures may be different, the FAA continuously ensures that each of these procedures and crew proficiency maintains the required high degree of safety for the flying public. For an engine-out situation, these procedures do not necessarily require a pilot to maintain runway heading. In order to avoid terrain, the emergency procedures at a particular airport may require a turn during climb-out. Prior to the authorization for use, the FAA carefully evaluates these procedures to ensure safety.

The preliminary procedures for the proposed civilian reuse were developed by the FAA such that the surrounding terrain and other obstacles, while considered obstructions, would not be considered as hazards to air navigation. This means that the surrounding terrain would not be hazardous to aircraft provided the aircraft and pilot are using the arrival and departure procedures developed by the FAA, which avoid the terrain. Terrain considerations near an airport are not uncommon. For example, aircraft using Ontario International Airport operate safely with mountainous terrain located to the north of the airport. The FAA recommendations for the development of a sufficient number of procedures for this airport configuration were restricted by the LRA's desire to remain within the former noise footprints of the military. In some cases the recommended procedures were within the former noise footprints of the military but were rejected for other reasons. This limits the efficiency of the airport and may present impacts in the form of delays and decreased capacity to elements of the National Airspace System.

The FAA has developed a proposed Global Positioning System Approach procedure known as an Area Navigation (RNAV) to Runway 17 to accommodate IFR arrivals to the south. The TERPS criteria

determined the descent gradient for this RNAV procedure, this was acceptable for Category A, B and C aircraft. The decision of whether to accept or reject the descent gradient described in this approach is the responsibility of the pilot-in-command of each aircraft considering use of the procedure. This procedure is authorized for straight-in minimums for Approach Category A, B and C aircraft. Circling approaches are authorized for Approach Category A through D aircraft. It is important to note, in FAA's experience, the majority of 14 CFR Part 121 operators do not accept circling approaches. In addition not all aircraft carry the required navigational equipment onboard to utilize the proposed preliminary RNAV Runway 17 Approach. As a result, these aircraft would have to execute an Instrument Landing System approach to Runway 35 in an opposite direction to other aircraft operating to Runway 17 during IFR conditions.

Paragraph 2 of FAA Advisory Circular 150/5300-13, *Airport Design* provides the following definition of Aircraft Approach Categories:

"*Aircraft Approach Category. A grouping of aircraft based on 1.3 times their stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:*

***Category A**: Speed less than 91 knots.*

***Category B**: Speed 91 knots or more but less than 121 knots.*

***Category C**: Speed 121 knots or more but less than 141 knots.*

***Category D**: Speed 141 knots or more but less than 166 knots.*

***Category E**: Speed 166 knots or more."*

As discussed above in Section II, Airport Layout Plan Review, the LRA has proposed reuse of the airfield in its existing configuration, initially for a period of at least five years. Accordingly, the preliminary flight procedures have been developed based on the assumption that for the first five-years of operation as a civilian airfield, the configuration of the airport would not change. This means that the existing distance between parallel runway centerlines would not meet FAA design standards as described in FAA Advisory Circular 150/5300-13. The LRA has stated in its ASMP and depicted on the proposed ALP that in the future, they intend to reconstruct each parallel runway system in the same alignment as currently exists and to reduce the existing runway longitudinal gradients to meet the FAA's design standards.

In January 2001, the FAA performed flight inspections of each of the preliminary procedures to provide real-time data to ensure that the aircraft operations using this facility can be conducted in a safe manner. The results of the flight inspections revealed that the procedures were safe to use during the day and night. The FAA's Flight Standards Division, which is charged with ensuring that the operation of aircraft is conducted in a safe manner, has concluded that if the FAA preliminary procedures are subsequently published for use and are flown by the pilots of aircraft, the operation of that aircraft at this facility can be conducted in a safe manner. These preliminary procedures were developed in accordance with TERPS. It is important to understand that while the flight inspections occurred during the day, use of the preliminary procedures would not be somehow restricted to only daytime. In other words, the procedures are developed for use for both daytime and nighttime aircraft operations. Prior to use of the proposed runways that are to be constructed to meet FAA design criteria, new instrument departure and arrival procedures would need to be developed and approved for use.

The Department of the Navy and the FAA received comments on the Draft Environmental Impact Statement for the disposal and reuse of the former MCAS El Toro that concerned a mishap of a U.S. Air Force C-135A transport aircraft, that departed to the north using Runway 34R, on June 25, 1965, which resulted in fatalities and a loss of the aircraft.

During the airspace analysis for the proposed reuse of MCAS El Toro, the FAA reviewed the "USAF Accident/Incident Report," dated July 19, 1965, concerning this mishap. This report was provided to the FAA by the U.S. Air Force Safety Center, at Kirtland Air Force Base, New Mexico. The Accident/Incident

Report did not describe or identify a cause for the mishap. The Accident/Incident Report included a brief narrative summary that includes the following information:

The aircraft was en route from McGuire Air Force Base, New Jersey to Hickam Air Force Base, Hawaii. The mission of the aircraft at MCAS El Toro was to transport U.S. Marine Corps personnel. The aircraft departed MCAS El Toro at approximately 1:35 a.m. on June 25, 1965. The reported weather at the time was "500 feet scattered, 900 feet broken clouds, and 1,800 feet overcast, visibility was 3 miles, with a light drizzle." The information summary states that following takeoff, Departure Control attempted radio contact; however, the aircraft had disappeared from El Toro radar approximately 4 miles from the field before radio contact was established. Repeated calls were made by both departure control and the control tower without success. Aircraft wreckage was sighted by helicopter at 6 a.m., 3.9 nautical miles from the end of the runway. The aircraft had impacted at 1,300-foot hill approximately 150 feet below the crest of the hill. The aircraft was destroyed and there were no survivors.

IV. AIRSPACE ANALYSIS

The second major part of FAA's analysis of the LRA's ALP for MCAS El Toro consists of determining if the proposed reuse plan will result in the safe and efficient use of navigable airspace. This analysis considers the potential impact on air traffic of the proposed civilian airport at MCAS El Toro as a public use airport. The technical review of the impacts to existing airspace included the examination of the effect of surrounding terrain on aircraft operations and the complexity of existing air traffic control operations and procedures in the area. The review also considered the anticipated aircraft fleet mix combined with the preliminary approach and departure procedures that the FAA developed in response to a request from the LRA.

The LRA proposed a voluntary "Runway Use" program in which departures would depart to the north from Runway 35 or to the east from Runway 8. Arrivals would land from the south on Runway 35 or from the north on Runway 17, or circle from either Runway 35 or 17 to Runway 8. FAA Order 8400.9, *National Safety and Operational Criteria for Runway Use Programs*, authorizes voluntary runway use programs at airports. FAA Order 7110.65, *Air Traffic Control*, Paragraph 3-5-1(a), Note 2, Runway Selection, states "*At airports where a "runway use" program is established, Air Traffic Control will assign runways deemed to have the least noise impact. If in the interest of safety a runway different from that specified is preferred, the pilot is expected to advise Air Traffic Control accordingly. Air Traffic Control will honor such requests and advise pilots when the requested runway is noise sensitive."*

MCAS El Toro is located in Southern California within a very complex and dynamic airspace structure. Consequently, the FAA recognizes that even though the base operated as a military airport for 50 years, the LRA's proposal to operate the facility as a civilian airfield has differences that may affect the existing airspace structure. The analysis of this effect leads directly to the FAA's determinations regarding the efficient use of navigable airspace by the LRA's proposal.

The FAA has evaluated the LRA's proposed operational scenario that will lead to an airport that would be designed to accommodate approximately 28.8 million annual passengers (MAP) forecast for the year 2020. It is important to note that this scenario includes the continued operation of John Wayne Airport – Orange County serving both general aviation and commercial air carrier aircraft at its current activity levels.

The FAA requested that MITRE Corporation's Center for Advanced Aviation System Development (CAASD), in McLean, Virginia, assist the FAA by performing a qualitative analysis of the current traffic around the proposed airport. The analysis included modeling the proposed traffic at MCAS El Toro, as proposed by the LRA, and estimating the impacts of the proposed traffic on the existing local airspace system of Southern California. MITRE prepared a preliminary analysis in May 2000 which identified several areas of concern that would require additional study and evaluation. This additional analysis was determined to be a necessary step before the FAA could complete its evaluation of the LRA's proposal.

The additional analysis included incorporation of the preliminary instrument approach and departure procedures that were developed by the FAA for use at MCAS El Toro and discussed earlier in this determination.

The results of the additional analysis indicate that while the proposed civilian aircraft operations at the former MCAS El Toro can be conducted in a safe manner, however, overall system efficiency in Southern California will be affected. More specific explanation of the FAA's review of the air space issues associated with the proposed reuse of the former MCAS El Toro is described below:

Proposed departures on Runway 8 (to the east), in general would not closely interact with other traffic managed by the FAA's Southern California Terminal Radar Control (SCT) facility, located in San Diego, California. Therefore, any departure delays to aircraft using this runway would occur as a result of weather delays or sector volume delays. This means that aircraft departing on Runway 8 from the former MCAS El Toro would be blended into a stream with aircraft that depart from other airports in the area such as Los Angeles International, John Wayne – Orange County, and Long Beach Airports, etc, to manage sector volume by imposing flow restrictions over exit fix points from the Los Angeles Basin. Any potential delays to this traffic would be similar in nature to current volume restrictions that the Los Angeles Air Route Traffic Control Center (ARTCC) imposes on all traffic leaving the Los Angeles Basin. These restrictions are managed by the SCT and result in directions to the local Airport Traffic Control Towers to increase the number of miles in trail between aircraft departing over the same exit fix, or computer generated expect departure clearance times which is the time assigned to an aircraft to depart beyond its proposed departure time.

Proposed Runway 17 departures at the former MCAS El Toro would be in a similar direction to the Runway 19R departures at John Wayne Airport requiring El Toro departures to be efficiently sequenced over exit fixes with departures from John Wayne Airport. Runway 17 instrument departures are required to proceed straight out to the "PACIF" Intersection before initiating any turn. The FAA's ability to conduct simultaneous parallel departures from the former MCAS El Toro using course divergence consistent with Section 5-8-3 of FAA Order 7110.65 will not be possible. Therefore, standard radar separation must be utilized in accordance with Section 5-5-4, Minima, of FAA Order 7110.65.

Section 5-8-3(a) of FAA Order 7110.65, *Successive or Simultaneous Departures*, states: "*Separate aircraft departing from the same airport or adjacent airports in accordance with the following minima provided radar identification with the aircraft will be established within 1 mile of the takeoff runway end and courses will diverge by 15 degrees or more. Between aircraft departing the same runway or parallel runways takeoff courses separated by less than 2,500 feet – 1 mile if courses will diverge immediately after departure.*"

Section 5-5-4 Minima of FAA Order 7110.65 also, states: "*Separate aircraft by the following Minima: When less than 40 miles from the antenna – 3 miles, when 40 miles or more from the antenna – 5 miles. Note- Wake Turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence."*

Because of the inability to utilize diverging courses between departing aircraft, the difference in the aircraft type and performance becomes a factor that reduces the departure rate for the airport and runway occupancy determinations. In addition, because Runway 35 is the only runway currently proposed to have a precision approach at the former MCAS El Toro, use of Runway 17 for departures will limit the use of the Runway 35 ILS approach in that it creates an opposite direction operation between arrivals and departures. As an example, San Diego International-Lindbergh Field (Lindbergh Field) is an airport that currently runs opposite direction arrivals and departures to a single Runway (9/27) during certain weather conditions. The flow rate under these conditions is approximately 20 arrivals and 20 departures. This flow rate is accomplished by clustering arrivals and departures. The same plan would be in effect for the proposed civilian reuse of MCAS El Toro. However, Lindbergh Field has the ability to utilize course divergence on departure aircraft. At the former MCAS El Toro, the limitations on course divergence will reduce overall airport capacity.

A proposed RNAV [Global Positioning System (GPS)] Runway 17 arrival or a visual approach would be utilized by arriving aircraft to the former MCAS El Toro. The Runway 17 arrivals will be integrated into the John Wayne Airport Runway 19 arrival stream using standard in-trail separation (3-6 miles depending on the type of the succeeding aircraft), unless visual separation may be applied. This aircraft stream would then be "split apart" when turning to final at each airport. The necessity to include the MCAS El Toro 17 arrivals into the John Wayne Airport arrival flow will impact the arrival rates at both airports. If either airport were operated without the operation of the other, then the arrival rates would be significantly higher. An additional limiting factor is the extent to which the IFR aircraft fleet has equipment enabling the use of RNAV/GPS approaches. Weather may also limit the use of both the non-precision Runway 17 RNAV/GPS approach, which has much higher minimums than the ILS to Runway 35 due to terrain, and visual approaches, which may only be conducted when the weather reports ceilings at least 500 feet above the minimum vectoring altitude.

Arrivals on Runway 35 using the proposed Instrument Landing System (ILS) do not closely interact with other Southern California TRACON managed traffic flows with the following exception. The preliminary missed approach procedure for Runway 35 would be a climbing left turn and may conflict with John Wayne Airport Runway 19 arrival traffic. Every aircraft executing the ILS Runway 35 approach to the former MCAS El Toro requires that adequate spacing exist between aircraft on arrival using the John Wayne Airport Runway 19 final approach course, to allow for a missed approach off of the ILS Runway 35 at the former MCAS El Toro. A method to mitigate this problem includes the use of visual approaches at the former MCAS El Toro and flow restrictions on both airports managed by the Southern California TRACON's Traffic Management Unit. Overall capacity would be negatively impacted at both airports by having to flow aircraft into both airports in a single stream, as well as having to protect for a missed approach at MCAS El Toro Runway 35, that turns into the flow of John Wayne Airport Runway 19 arrivals.

The proposed Runway 35 departures at the former MCAS El Toro will also interact with Runway 19 arrivals at John Wayne Airport. The Final MITRE study (Attachment 1) estimated that an eight-minute gap could be required on the John Wayne Airport final in order to release an aircraft that will use a Runway 35 departure at MCAS El Toro. Thus if only one aircraft departed the former MCAS El Toro, an eight minute gap (four minutes before and four minutes after), would be required on the John Wayne Airport final approach to accommodate the opposite direction aircraft departing from the former MCAS El Toro. One method available to reduce delays using this configuration is to cluster arrivals to John Wayne Airport and departures from MCAS El Toro whereby first several John Wayne Airport Runway 19 arrivals are run then several Runway 35 departures from MCAS El Toro are performed. This allows for minimum spacing between like-direction aircraft. While a high degree of safety can be maintained, FAA considers this a highly inefficient method of managing air traffic operations at both airports.

It is the opinion of the FAA, based on our past experience, that 14 CFR Part 121 operators are not likely to accept circling approaches from either Runway 35 or 17 as proposed by the LRA. What the LRA has proposed as a "Runway Use" program would place civilian aircraft operations at the former MCAS El Toro in a configuration where as departures to the north on Runway 35 would operate in an opposite direction to southerly arrivals to John Wayne Airport using Runway 19. In addition, the Runway 35 ILS Missed Approach Procedure would have to be protected by the FAA. This would be done by creating additional spacing between aircraft on the John Wayne Runway 19 final approach course since the arrival is in the opposite direction and the missed approach turns into the face of John Wayne arrivals. The other possible impact would be extensive delays to aircraft on the ground at MCAS El Toro while waiting for a lull in the arrival flow to John Wayne Airport. There are impacts beyond just the John Wayne Airport flow in that the Runway 35 departure procedure also may conflict with arrivals into Los Angeles International Airport, Long Beach Airport, and IFR traffic on Victor 8 (V8) and Victor 21 (V21) Airways. Additionally, potential conflicts with a heavily transited VFR flyway north of the airport has been highly controversial with the Air Line Pilots Association.

In the airspace analysis of the LRA's proposed reuse of MCAS El Toro, the FAA also considers the maximum hourly arrival/departure rate aircraft can theoretically operate to and from a single runway at any given airport. During VFR conditions this theoretical rate is 30 arrivals and 30 departures (60 total aircraft operations on that runway). However, it is important to understand that this theoretical rate, when

applied to a particular runway at a particular airport, is likely to be reduced due to numerous factors that can combine to change this rate. For example, additional separation mileage between aircraft may be required due to the need to be clear of wake turbulence from larger aircraft. The mixing of aircraft with different design approach speeds may require additional separation mileage so a slower aircraft is not overtaken by a faster one. Further, other factors that may affect this hourly acceptance rate are: the variables of the distance at which aircraft departures may initiate the initial course divergence turns, missed approach protection requirements, interactions with other close proximity airports, designs that increase runway occupancy times (such as taxiway layout or runway use programs that mandate tailwind component runways), and the ability to routinely apply visual separation.

In summary, regarding the proposed runway usage at former MCAS El Toro, the FAA has concluded that aircraft operations can be performed safely, however it would not be the most efficient use of navigable airspace within the National Airspace System.

If the weather is IFR, then the missed approach flight path for the ILS Runway 35 must be protected. The missed approach makes a climbing left turn to 4,000 feet into a close parallel flow with John Wayne Airport arrivals. When this occurs, FAA Air Traffic Control must create adequate separation between aircraft using the ILS for Runway 35 and executing the missed approach and aircraft in the arrival stream into John Wayne Airport. This action would be accomplished through traffic management initiatives, reducing the number of arrivals per hour into the John Wayne Airport, delay vectors, or airborne holding. This action would cause delays to arrivals into John Wayne Airport and would, in essence, reduce the arrival rate at both John Wayne Airport and the former MCAS El Toro.

When the wind is from the south or east, during visual conditions FAA Air Traffic Control would utilize the RNAV Runway 17 Approach, or Visual Approaches to Runways 17 or 8 for arrivals. Departures would utilize Runways 8 or 17. When the wind is from the north or east, during visual conditions, FAA Air Traffic Control would utilize the ILS Runway 35 or Visual Approaches to Runways 35 or 8 for arrivals, and Runway 35 or 8 for departures. When IFR conditions are present, instrument approaches into the airport during south and easterly winds will utilize the proposed RNAV Runway 17 Approach. The RNAV Runway 17 Approach may not be possible due to the high approach minima, which may require that the ILS to Runway 35 be utilized which allows for lower minimums and allows for circling to Runways 17 or 8. It has been the FAA's experience that most 14 CFR Part 121 operators would not be likely to accept a circling approach to Runway 8.

Attachment 1, is the final airspace analysis prepared by MITRE Corporation's Center for Advanced Aviation System Development (CAASD), for the FAA. A preliminary analysis was prepared for the FAA, by MITRE in May 2000. The final analysis document refined the initial evaluation of the proposed civilian aviation reuse of the former MCAS El Toro. The text on page 8 of Attachment 1, notes that delays for north departures using Runway 35 at the reused MCAS El Toro were calculated to be between 8 and 60 minutes. This delay range is created by the varying numbers of aircraft in the southerly arrival flow into both John Wayne Airport and Long Beach Airport.

The FAA believes it is important to restate our role in this process. The FAA's principal involvement in the disposal and proposed civilian aviation reuse of the former MCAS El Toro is the approval of an Airport Layout Plan (ALP) submitted by the LRA and making a recommendation to the Department of the Navy on the public benefit transfer of surplus federal property as a civilian airport. The FAA's primary mission, as directed by the Congress of the United States of America, is to ensure the safe and efficient use of navigable airspace in the United States. To that end, the FAA has and will continue to take the appropriate steps to ensure that any approach and departure procedures developed for the proposed reuse of MCAS El Toro are safe for the flying public and do not unnecessarily degrade the efficiency of the National Airspace System.

V. AIRSPACE DETERMINATION:

Based on the information contained in the LRA's proposed Airport Layout Plan, the Airport System Master Plan for the proposed civilian reuse of the former MCAS El Toro, and final airspace analysis by MITRE Corporation (Attachment 1), the FAA has determined that the reuse of the former MCAS El Toro as proposed by the LRA can be conducted in a safe manner. FAA has further determined that the LRA's proposal is not the most efficient use of navigable airspace, as may be possible.

If the LRA revises its proposed civilian reuse of the former MCAS El Toro to include a more efficient use of navigable airspace, FAA believes additional environmental analysis pursuant to NEPA may be necessary prior to the FAA making a recommendation on public benefit transfer of the former base to the LRA as a civilian airport reuse. Any decisions to require additional analysis pursuant to CEQA is beyond the scope of the FAA.

This airspace determination does not mean FAA approval or disapproval of the physical development involved in the proposal. It also does not mean FAA approval or disapproval of the ALP, as submitted by the LRA or approval or disapproval of disposal of the base by the Department of the Navy to the LRA pursuant to the Surplus Property Act of 1944, as amended. This document memorializes FAA's determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground by the proposed civilian reuse of MCAS El Toro.

In making this determination, the FAA has considered matters such as the effect the proposal would have on existing or planned traffic patterns of neighboring airports, the effect it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA) and known natural objects within the affected area would have on the airport proposal. Also, this determination in no way preempts or waives any ordinances, laws, or regulations of any other government body or agency. The FAA cannot prevent the construction of structures near airports. The facility environs can only be protected through such means as local zoning ordinances or acquisition of property rights.

This determination expires on **June 30, 2004**, unless it is otherwise extended, revised, or terminated. An extension may be requested through our office, if necessary up to 15-days prior to this expiration date.

William C. Withycombe

AUG 29 2001

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William C. Withycombe, Regional Administrator, Date
Western-Pacific Region, Federal Aviation Administration

This determination is an opinion of the FAA on the safe and efficient use of navigable airspace and is not an Order of the Administrator. A decision by the FAA regarding a recommendation of public benefit conveyance of the former MCAS El Toro as a civilian public use airport is subject to completion of appropriate environmental disclosure, pursuant to the National Environmental Policy Act of 1969 (NEPA). Following completion of the appropriate NEPA documentation, an FAA decision, if any, including any subsequent actions approving a grant-in-aid of Federal funds to Orange County, California, would be taken pursuant to 49 U.S.C. 40101 et seq. and 49 U.S.C. 47101 et seq., and at that time would constitute an order of the Administrator which is subject to review by the Courts of Appeals of the United States in accordance with the provisions of Section 1006 of the Federal Aviation Act of 1958, as amended, 49 U.S.C. Section 46110.

ATTACHMENT 1

Analysis of Revised Arrival and Departure Procedures for Proposed Civil Aviation Reuse of the Former Marine Corps Air Station El Toro Orange County, California

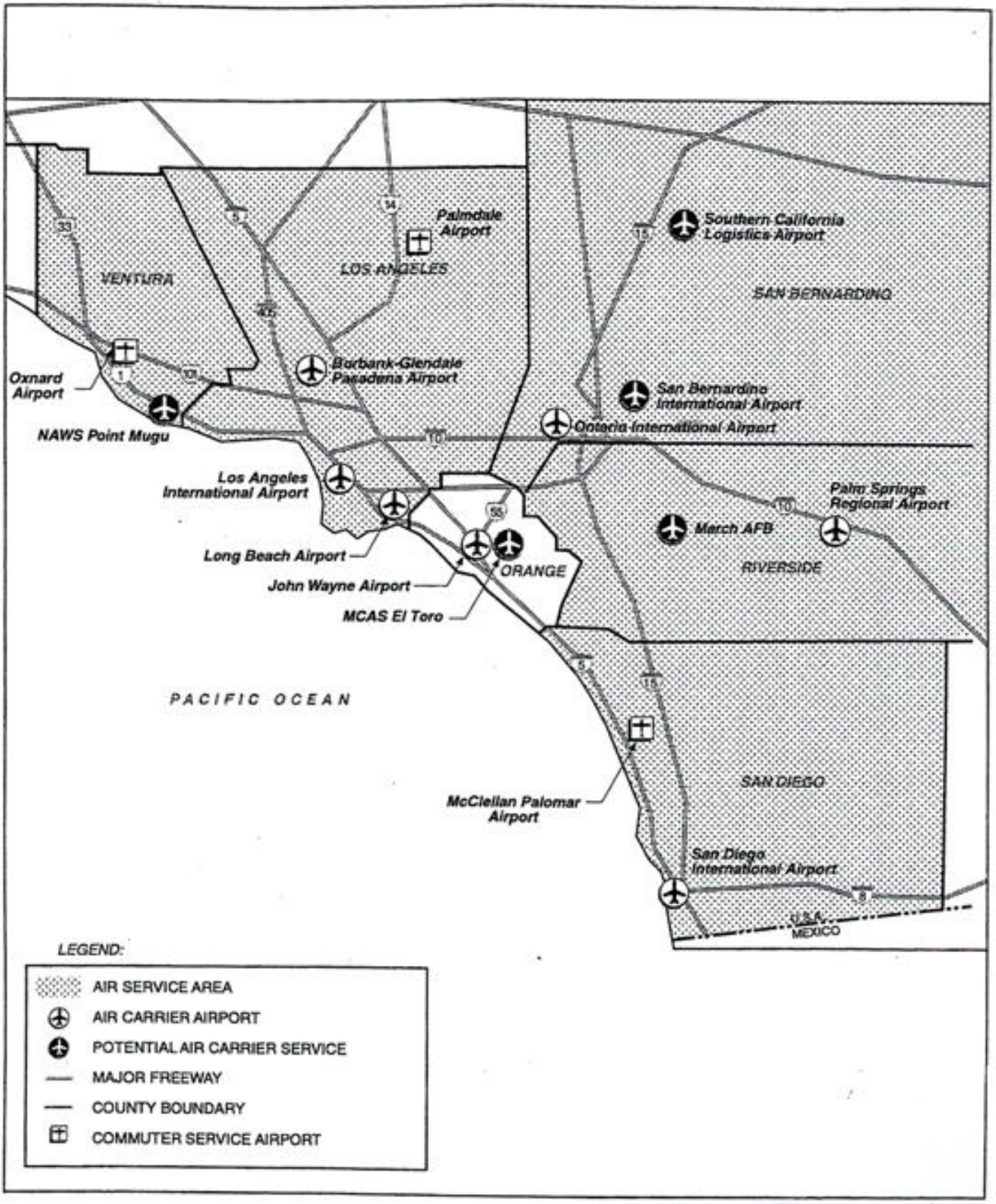

FIGURE 1 - LOCATION MAP
Source: Draft Environmental Impact Report No. 573
prepared by Orange County, California

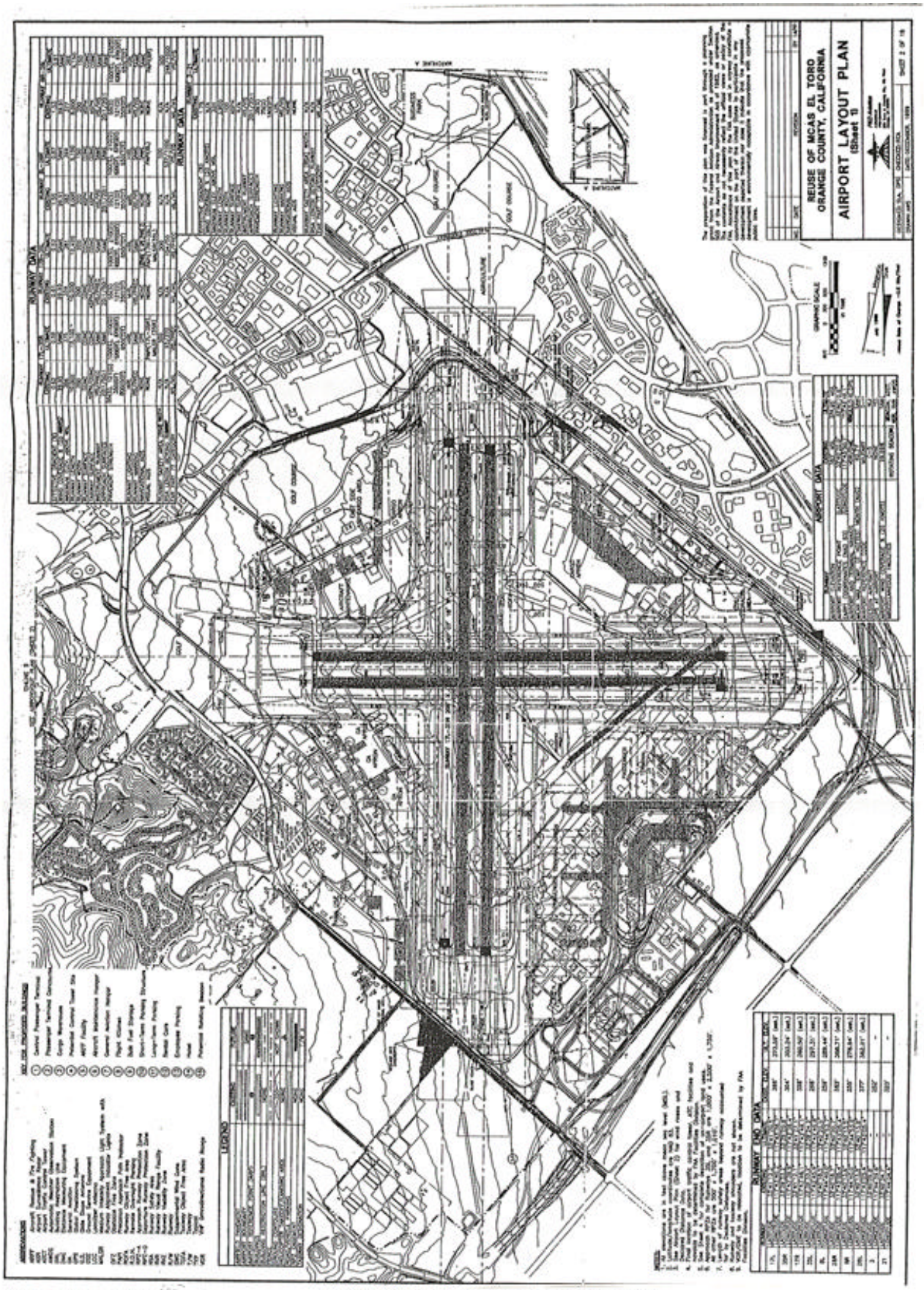

FIGURE 2 – LOCAL REDEVELOPMENT AUTHORITY'S
PROPOSED AIRPORT LAYOUT PLAN
FOR THE FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA

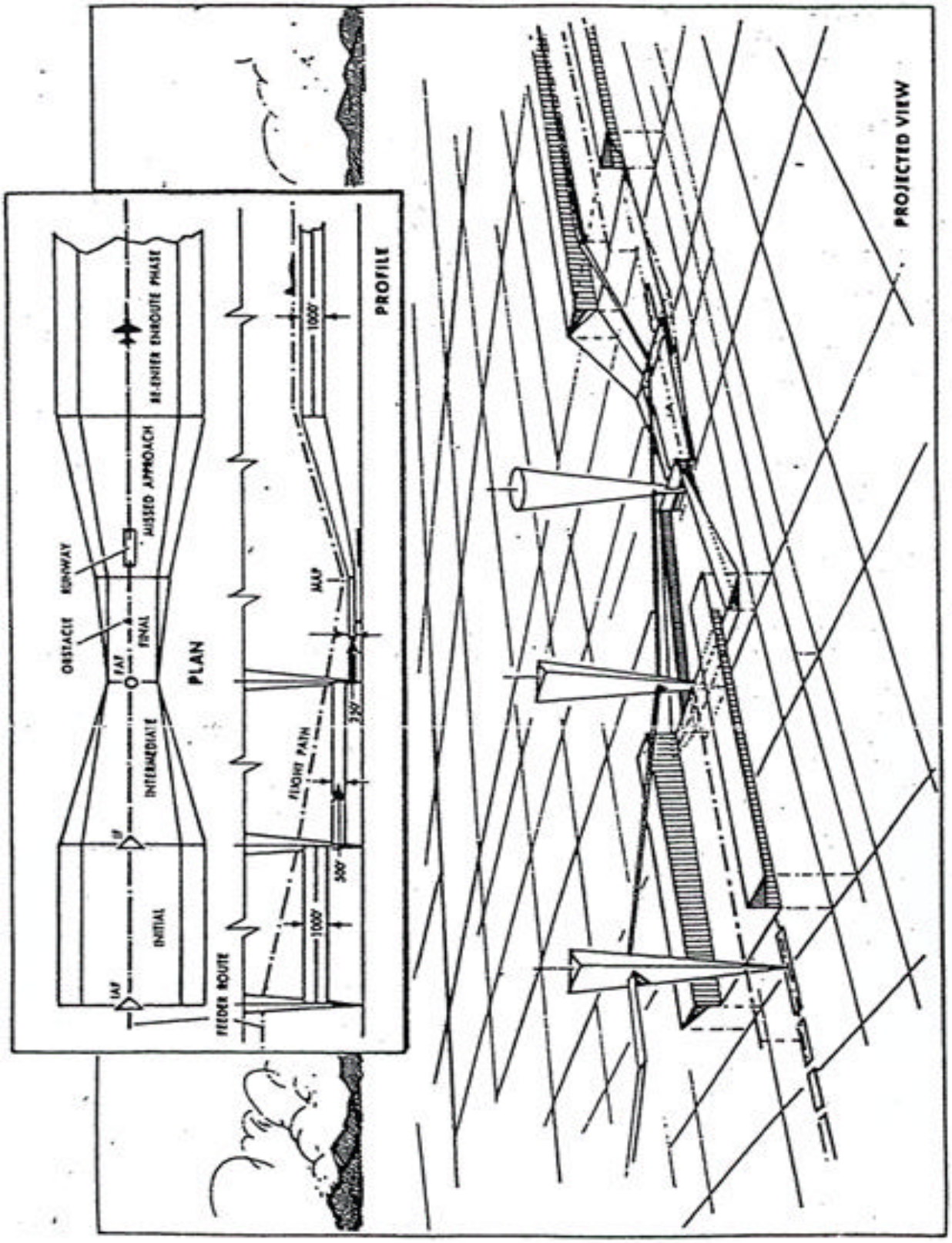

FIGURE 3 – SEGMENTS OF AN APPROACH PROCEDURE
Source: FAA Order 8260.3B – United States Standard for Terminal Instrument Procedures (TERPS)