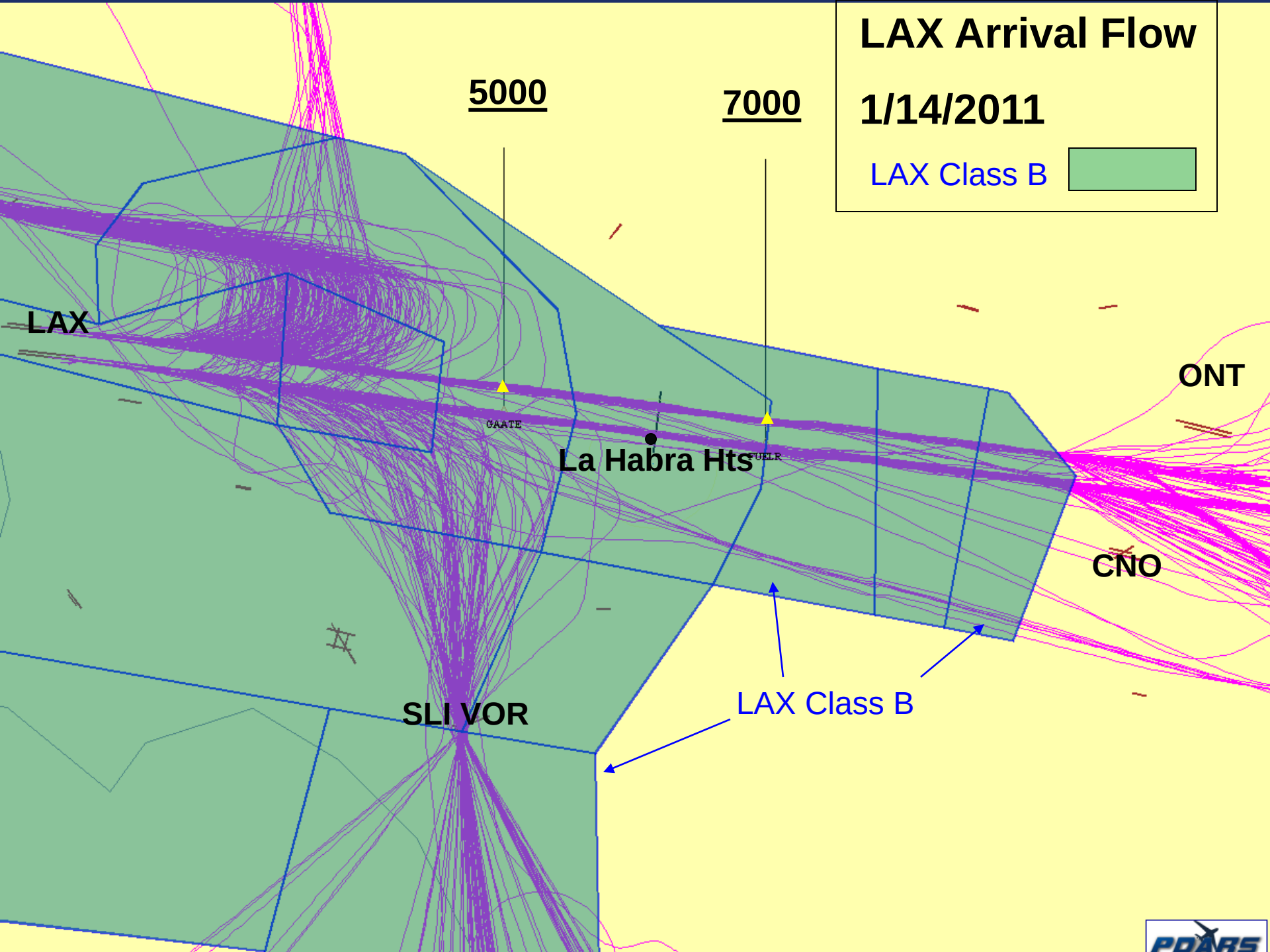
LAX Arrivals near La Habra Heights

Federal Aviation Administration

Presented to: LAX/Community Noise Roundtable

By: WSC Operations Support Group

Date: January 11, 2012

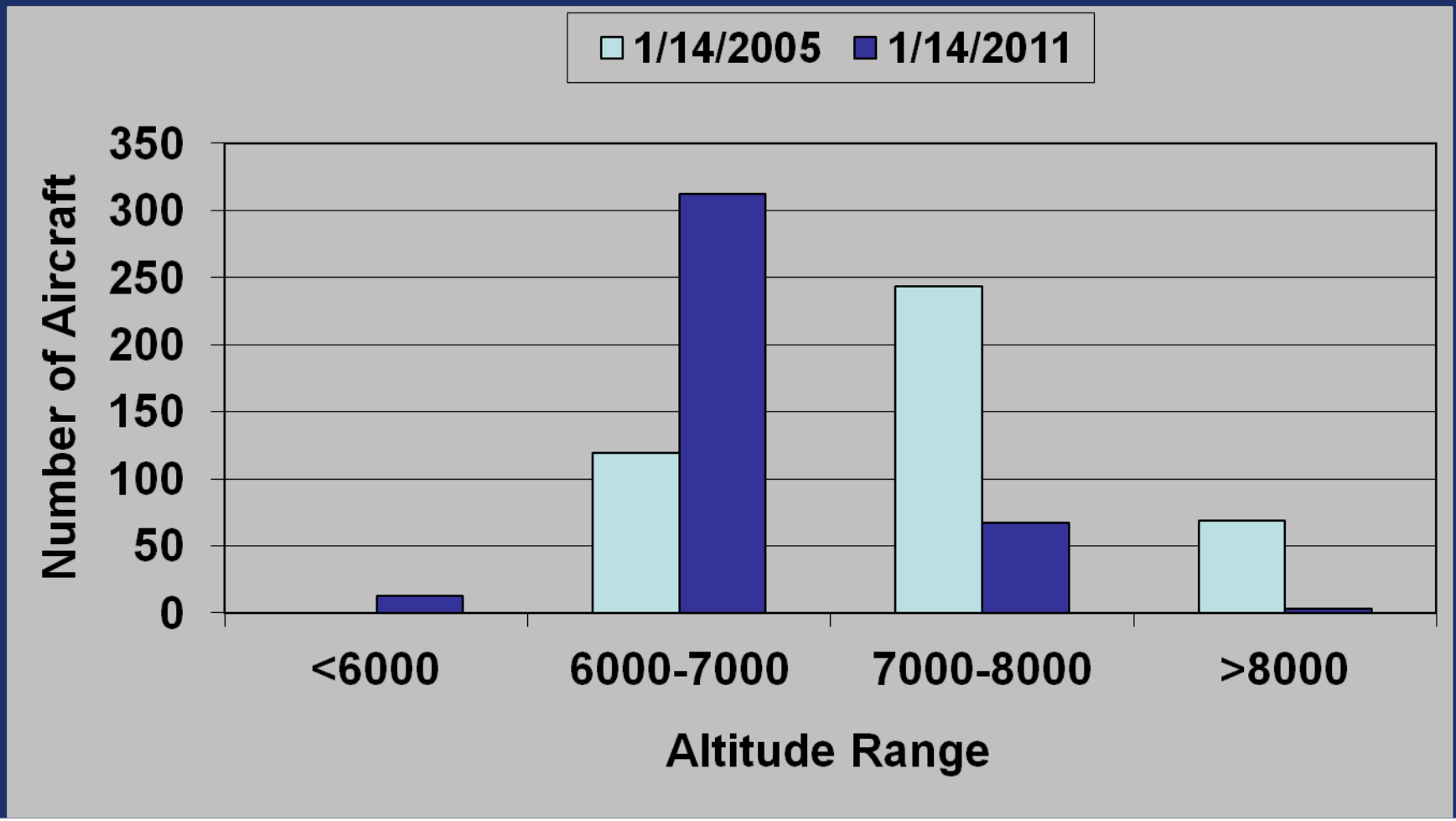

LAX Arrival Flow
1/14/2011
LAX Class B
5000
7000
LAX
ONT
GAATE
La Habra Hts
FUELR
CNO
SLI VOR
LAX Class B

Arrival Altitude Comparison

- One day (January 14) from 2005 and 2011
- Average altitude in 2005 was 7400 ft. MSL
- Average altitude in 2011 was 6600 ft. MSL
- Arrivals originating from nearby airports such as ONT and PSP are not included due to level flight over La Habra Heights
- Altitudes recorded may vary as much as 200 ft. from actual aircraft altitude *(FAA Order JO 7110.65, 5-2-17)*

Arrival Altitude Comparison

Arrivals from nearby airports (ONT, PSP) not included



Altitude Comparison Analysis

- **Flight altitude gradient for east arrivals is lower in 2011 compared with 2005**
- **In 2005, the minimum crossing altitude on arrival procedures was lowered from 8000 to 7000 at FUELR as arrivals were consistently too high when acquiring the glide slope *(SAFETY ISSUE)***
- **There has been NO CHANGE to the glide slope angle of 3°**

Altitude Comparison Conclusions

- **Fleet mix in 2011 has a higher percentage of quieter aircraft vs. 2005**
- **More aircraft today are equipped and capable of automated power off descents**

27th International Congress of the Aeronautical Sciences (2010)

- **The following slides contain excerpts from the report '*Environmental Benefits of New Continuous Descent Operations at Los Angeles International Airport'* by Sandy Liu, Walter White, Richard Nehl, and John-Paul Clarke**

Continuous Descent Arrival (CDA)

- **The first publicly-charted CDA in the US was implemented at LAX on Dec. 20, 2007 called the LAX RIIVR RNAV STAR (Standard Terminal Arrival Route)**
- **A CDA provides an advantage over conventional arrival profiles by reducing ground noise along the flight path, saving flight time and, more importantly, fuel**

CDA (Continued)

- **Environmental benefits were computed by the FAA's Aviation Environmental Design Tool (AEDT)**
- **This CDA implementation has been estimated to save an average 25 gallons of jet fuel per flight, or annually saves approximately 2 million gallons of jet fuel, which is equivalent to mitigation of 41 million pounds of Carbon Dioxide (CO_2)**

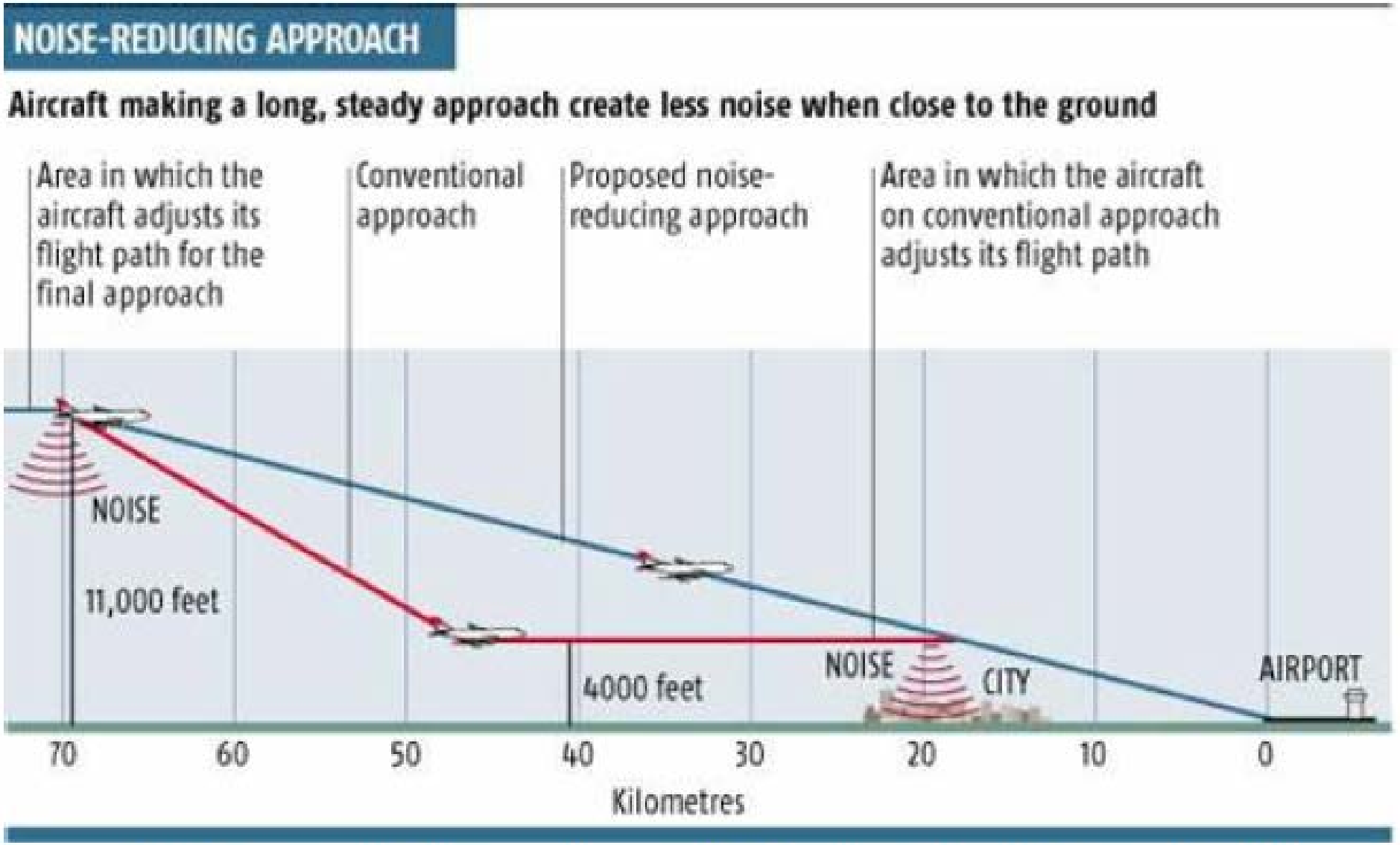


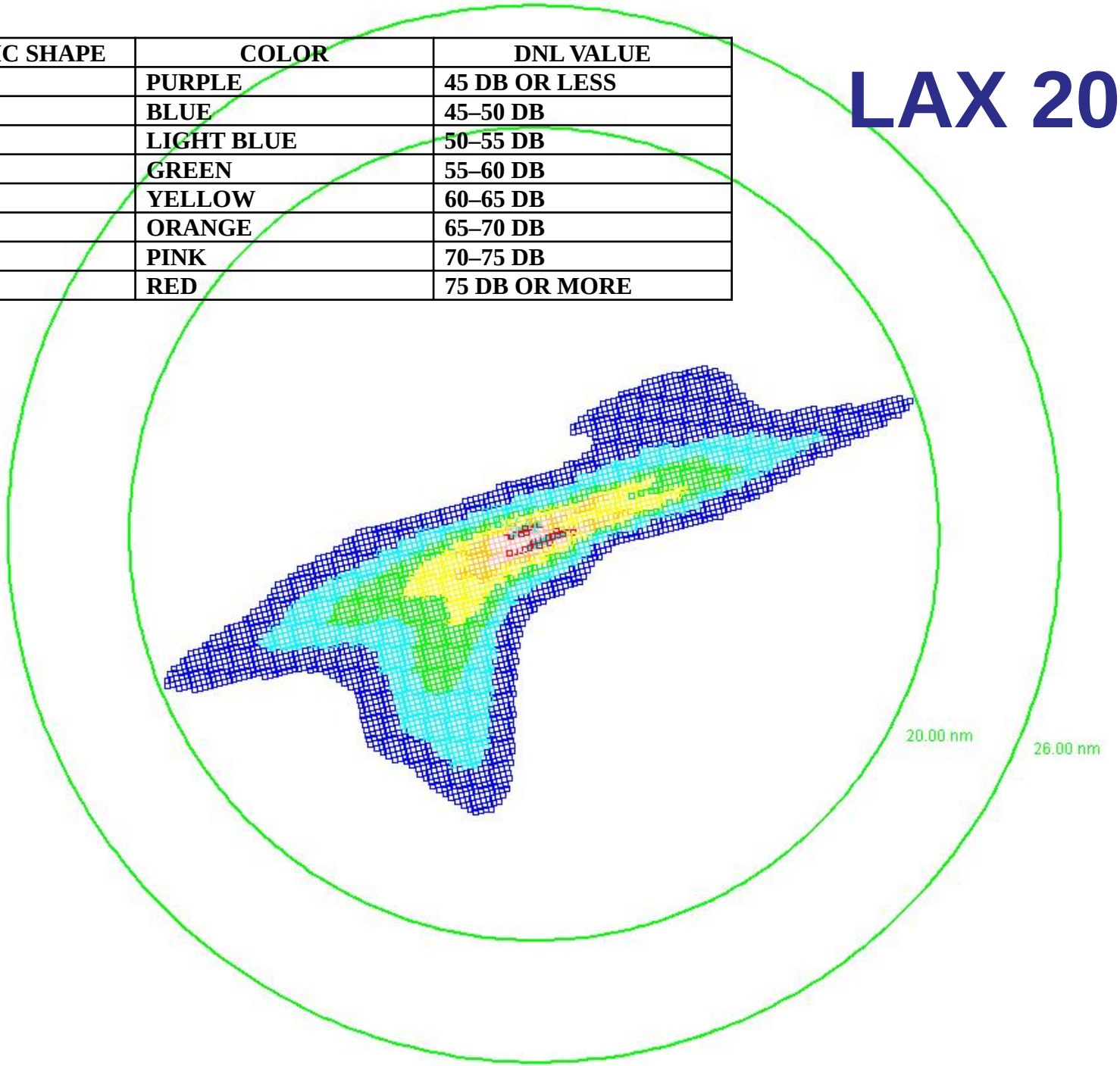
Fig. 1. Conventional Approach versus the Continuous Descent Approach (CDA)

LAX 2010 Noise Footprint

- **Baseline traffic using a week in January, April, July and October**
- **Four weeks of data is approx. 37,000 tracks analyzed**
- **Range rings are based on center of airport so La Habra lies at approx. 21 NM range ring**

LAX 2010

GEOMETRIC SHAPE	COLOR	DNL VALUE
SQUARE	PURPLE	45 DB OR LESS
SQUARE	BLUE	45–50 DB
SQUARE	LIGHT BLUE	50–55 DB
SQUARE	GREEN	55–60 DB
SQUARE	YELLOW	60–65 DB
SQUARE	ORANGE	65–70 DB
SQUARE	PINK	70–75 DB
SQUARE	RED	75 DB OR MORE



CATEX

- **CATEX (December 2007) was a modification to existing RIIVR TWO STAR, not original RIIVR ONE**
- **Removed runway transitions and published each transition on its associated approach**
- **No ground track change**
- **Modification had no impact to National Parks or local scenic resources**
- **CATEX for establishing RIIVR ONE STAR – attempting to locate**

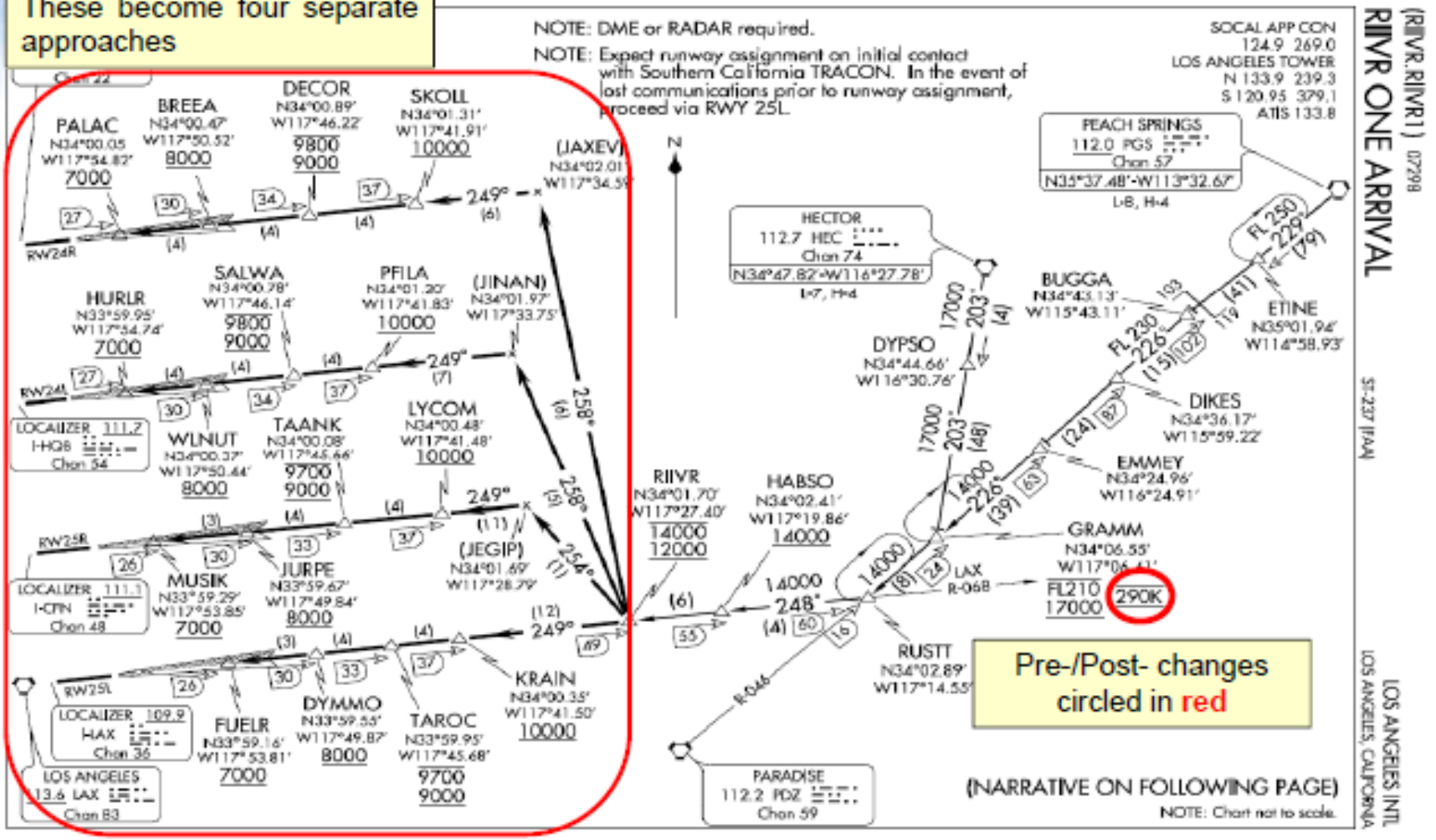
2008 Updates

- **The following slides are from an operational analysis by The MITRE Corporation and are included to show the evolution to the current procedures**
- **Changes implemented on Sept 25, 2008 were made at distances greater than 45 NM from the runway to optimize descent profiles and improve fuel burn and emissions when transitioning from the enroute phase of flight**

LAX Pre-Implementation Procedure

RIIVR ONE Arrival

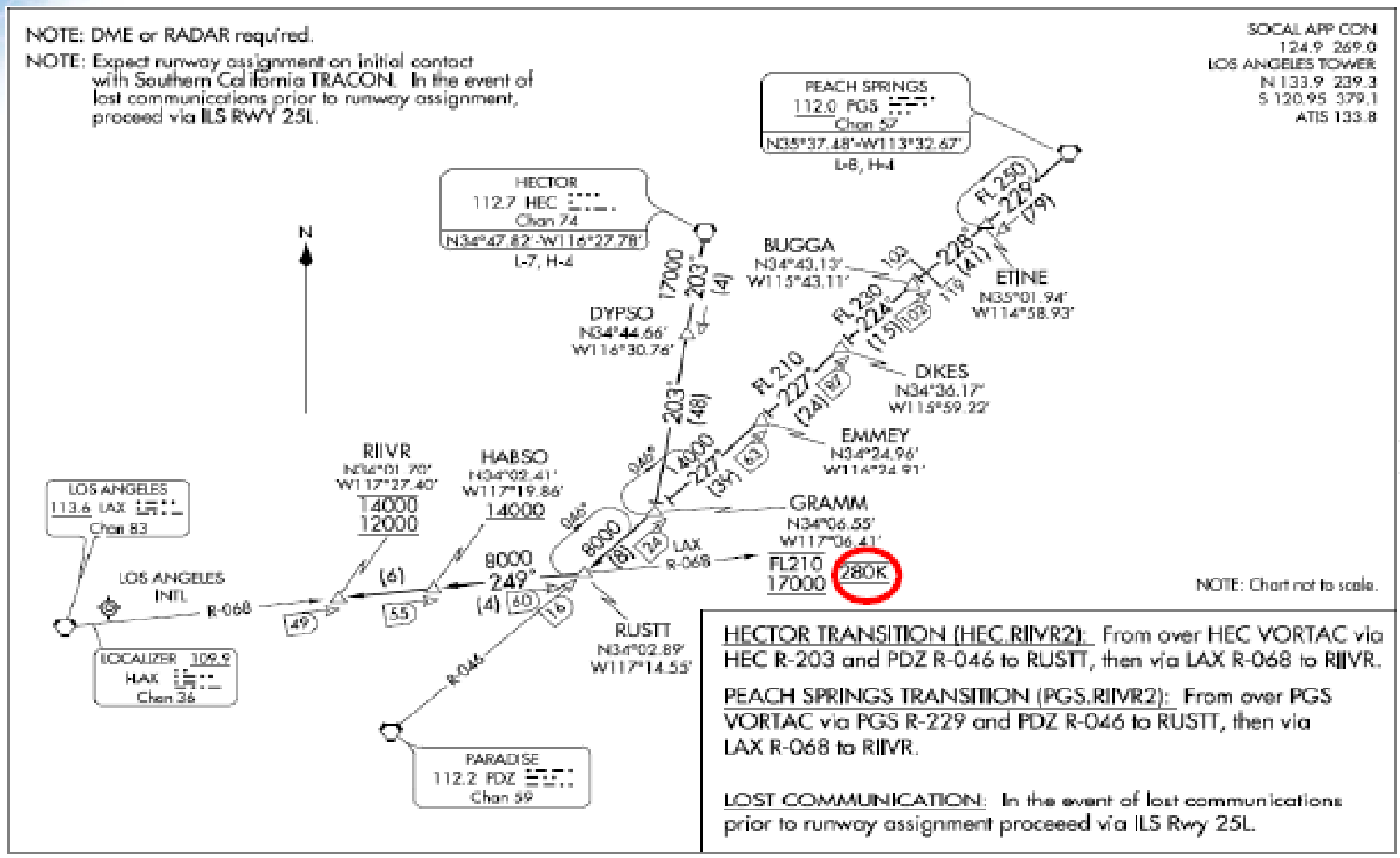
These become four separate approaches



SW-3, 08 MAY 2008 to 05 JUN 2008

LAX Post-Implementation Procedure

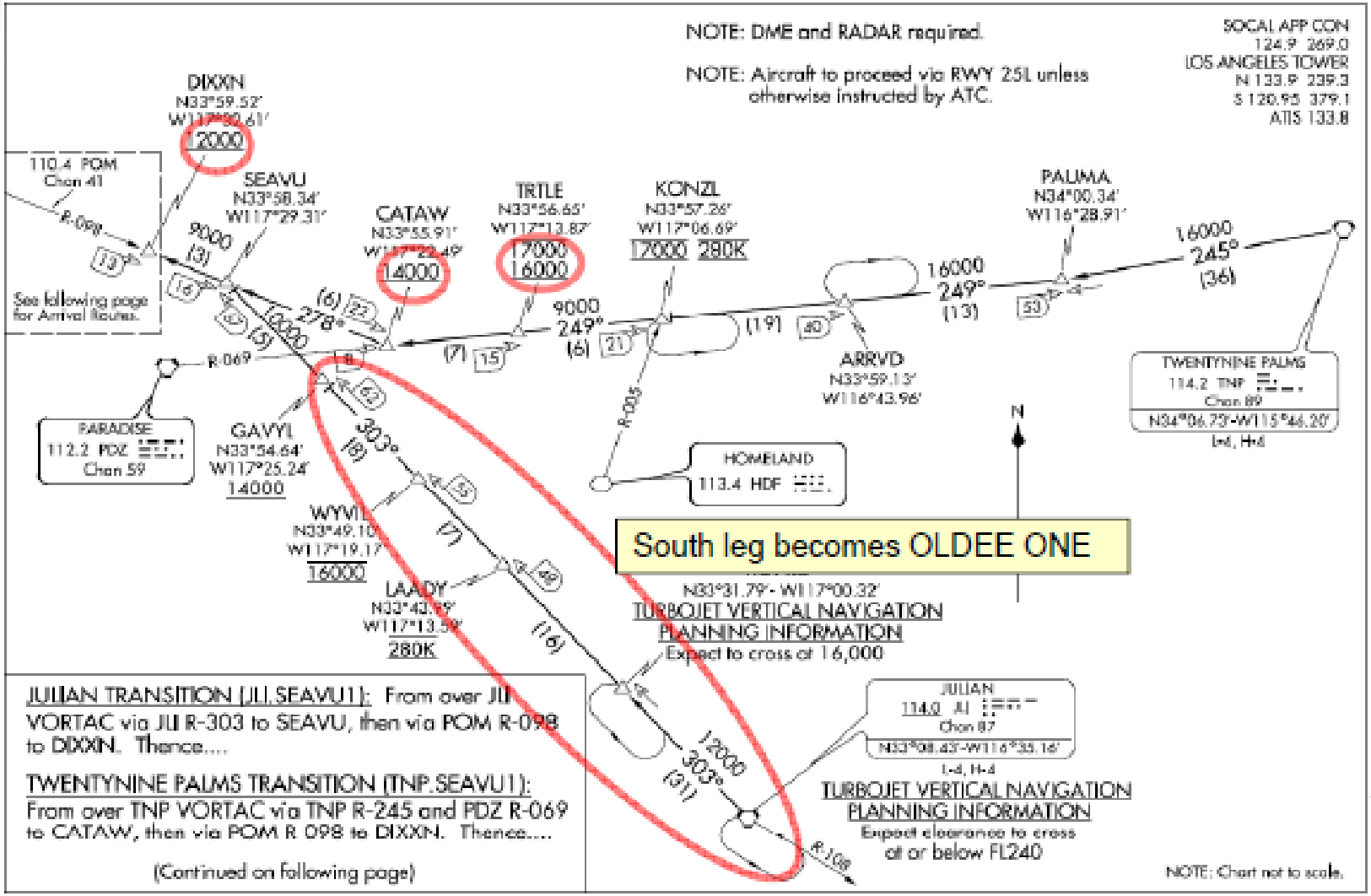
RIIVR TWO Arrival



SW-3, 30 JUL 2009 to 27 AUG 2009

LAX Pre-Implementation Procedure

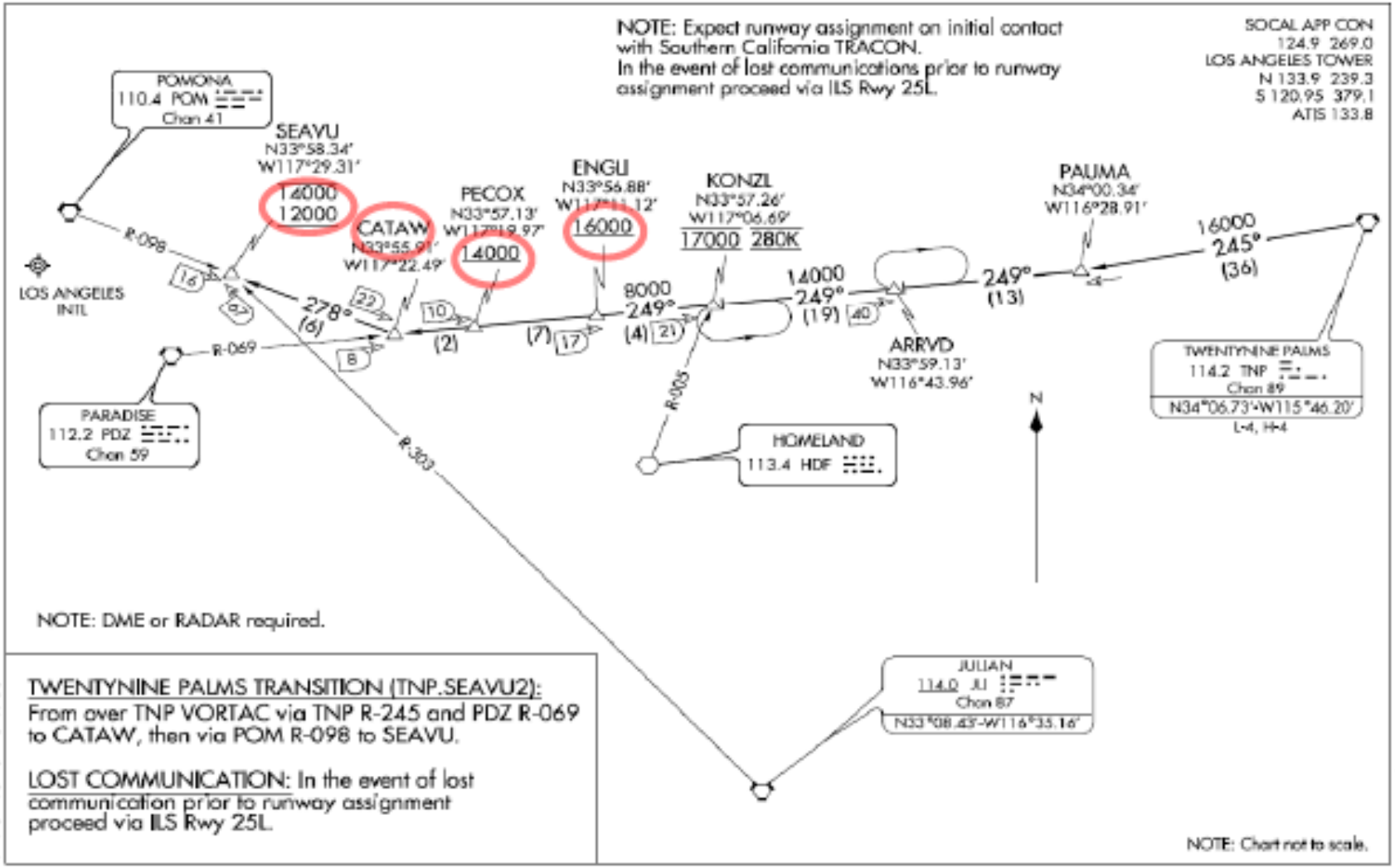
North SEAVU ONE Arrival



SW-3, 08 MAY 2008 to 05 JUN 2008

LAX Post-Implementation Procedure

SEAVU TWO Arrival



SW-3, 30 JUL 2009 to 27 AUG 2009

Current Flight Procedures

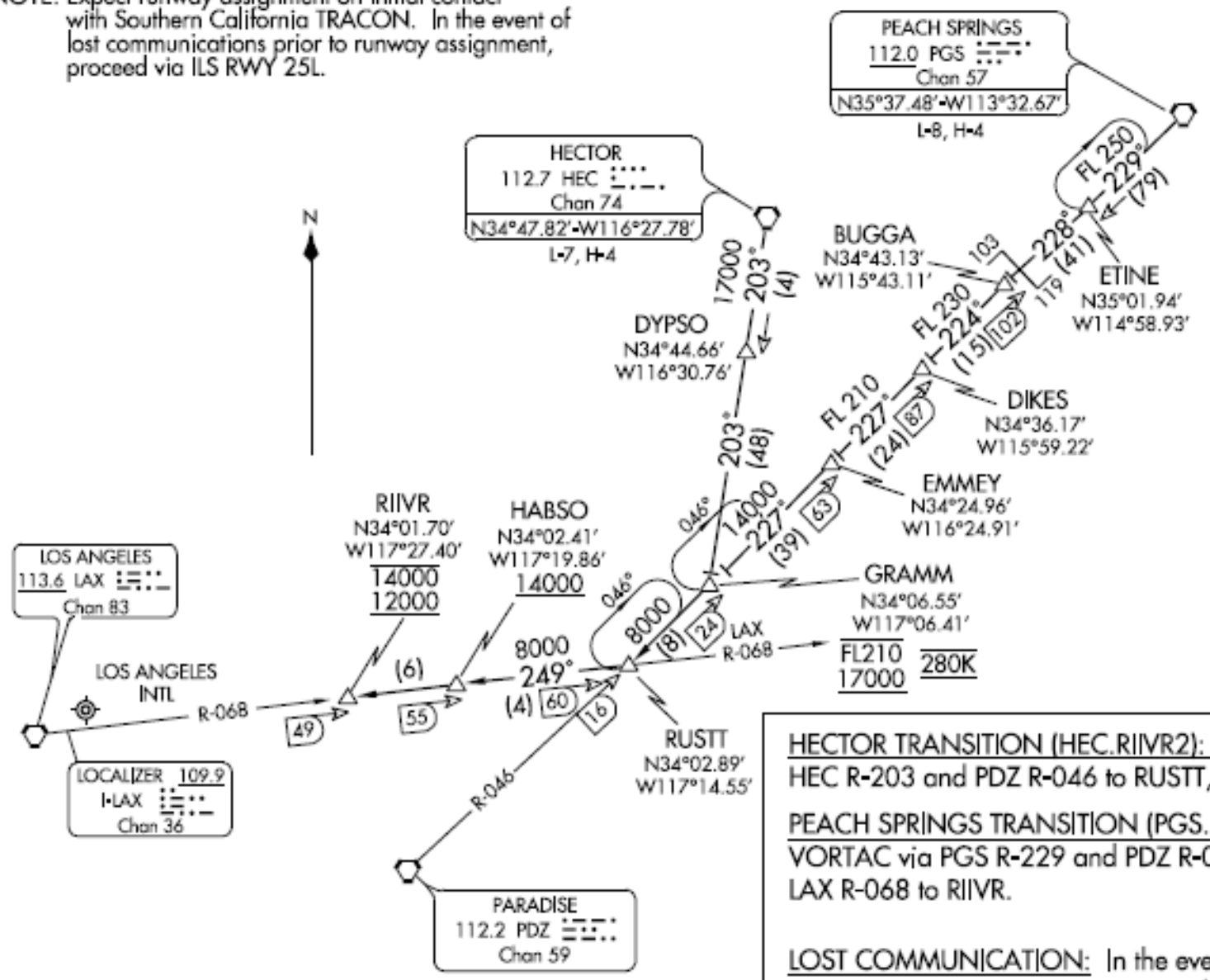
- RIIVR TWO ARRIVAL
- SEAVU TWO ARRIVAL
- ILS or LOC RWY 25L
- ILS or LOC RWY 25R
- ILS or LOC RWY 24L
- ILS or LOC RWY 24R

RIIVR TWO ARRIVAL — LOS ANGELES INTL

NOTE: DME or RADAR required.

NOTE: Expect runway assignment on initial contact with Southern California TRACON. In the event of lost communications prior to runway assignment, proceed via ILS RWY 25L.

SOCAL APP CON
124.05 353.775
LOS ANGELES TOWER
N 133.9 239.3
S 120.95 379.1
ATIS 133.8



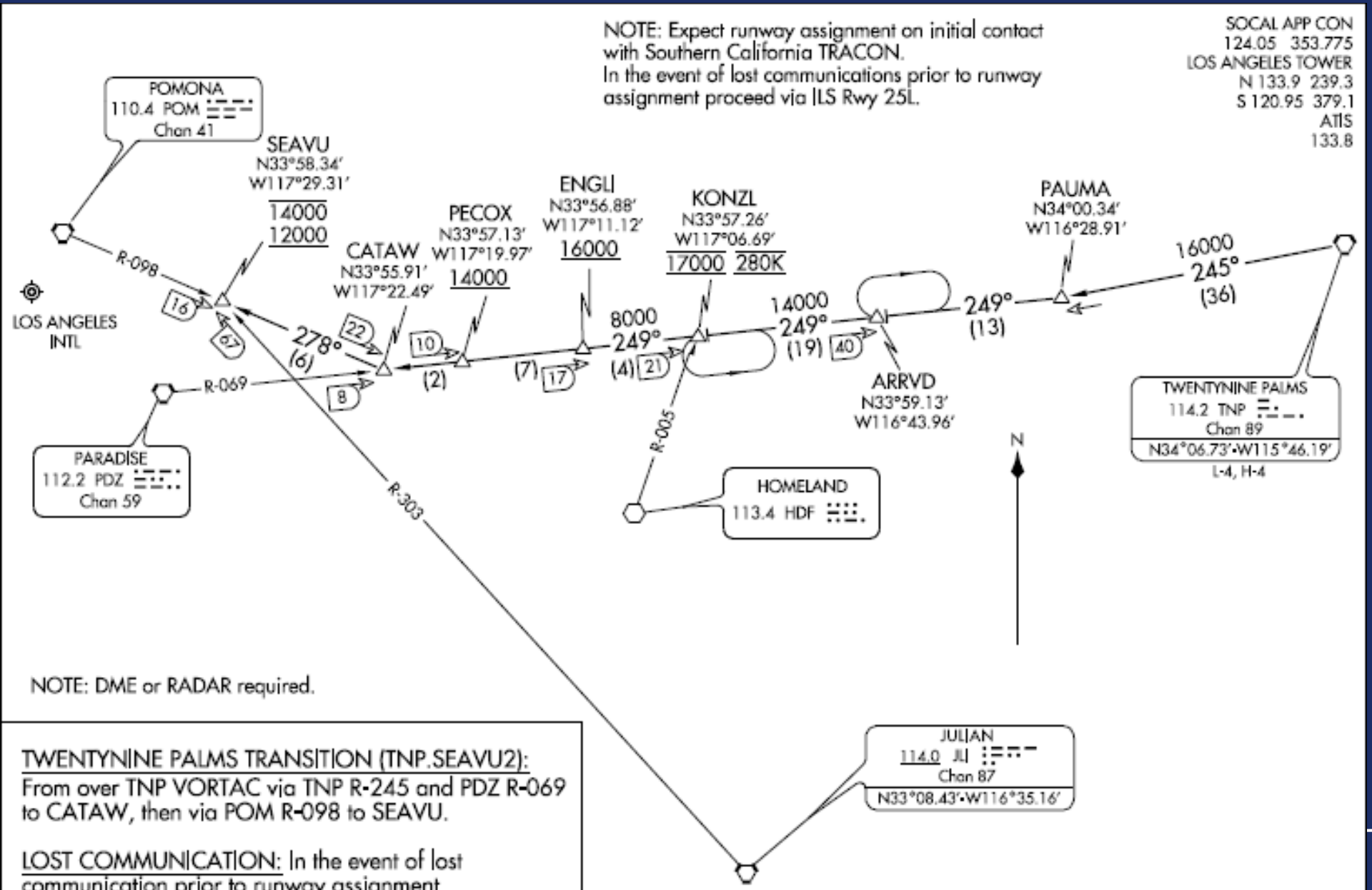
NOTE: Chart not to scale.

HECTOR TRANSITION (HEC.RIIVR2): From over HEC VORTAC via HEC R-203 and PDZ R-046 to RUSTT, then via LAX R-068 to RIIVR.

PEACH SPRINGS TRANSITION (PGS.RIIVR2): From over PGS VORTAC via PGS R-229 and PDZ R-046 to RUSTT, then via LAX R-068 to RIIVR.

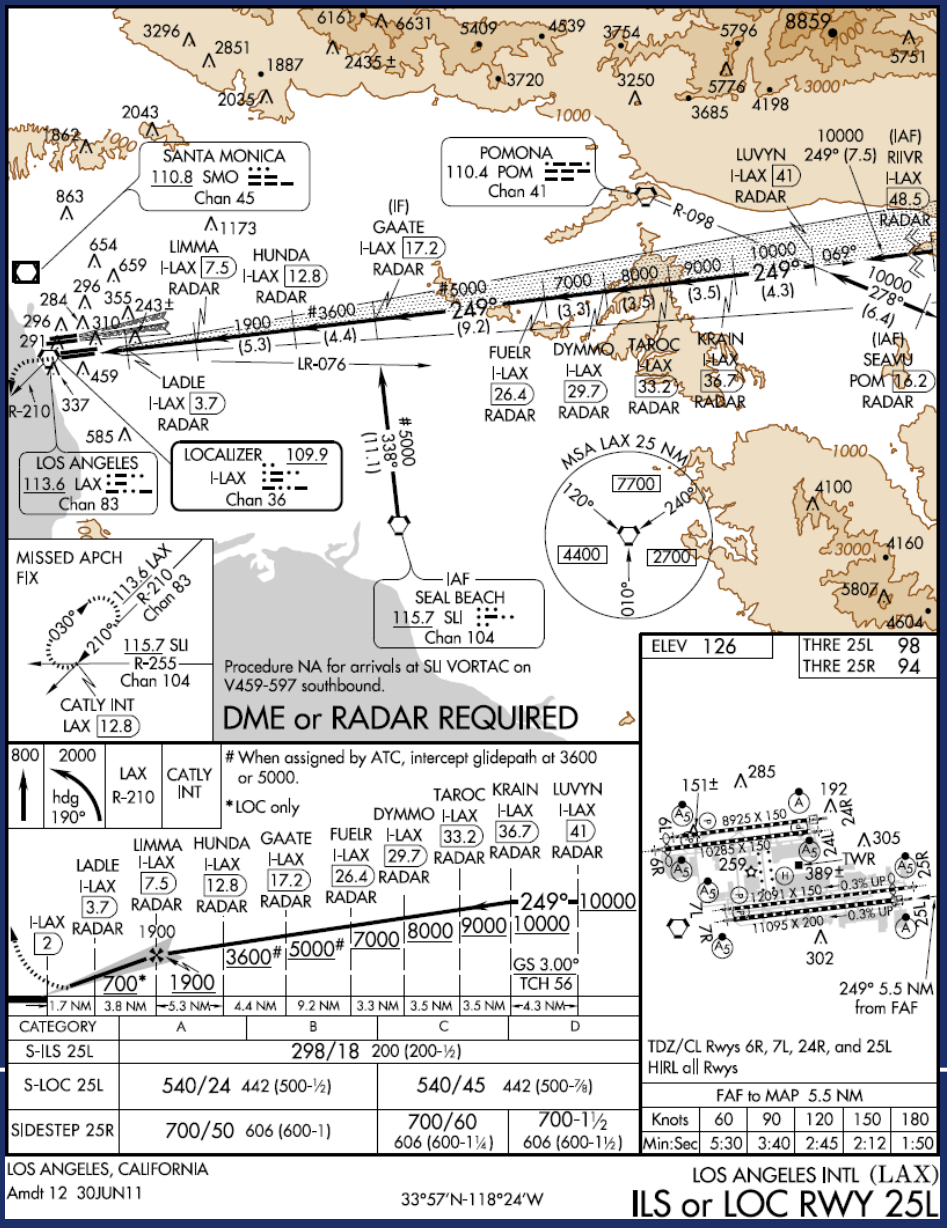
LOST COMMUNICATION: In the event of lost communications prior to runway assignment proceeed via ILS Rwy 25L.

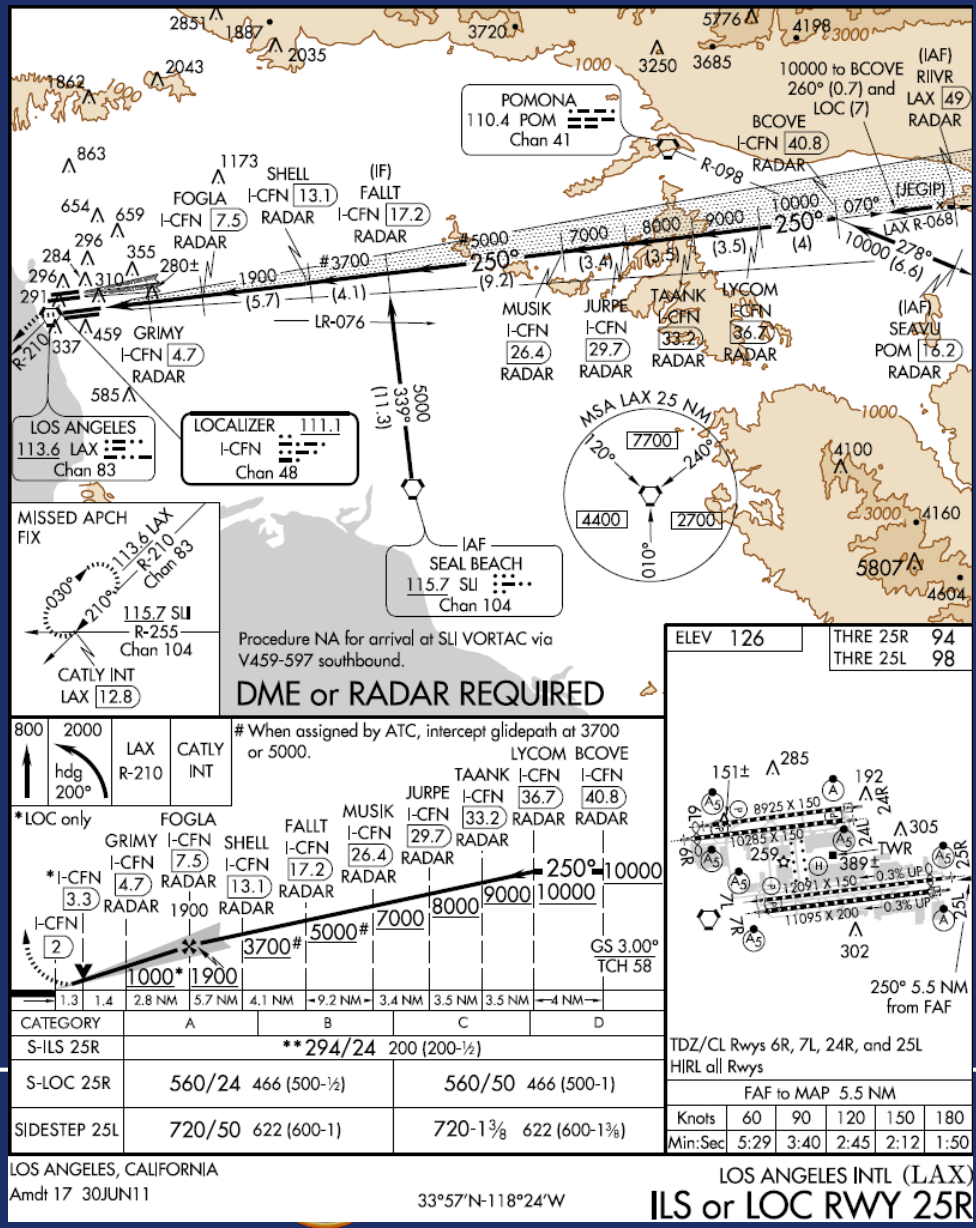
SEAVU TWO ARRIVAL LOS ANGELES INTL



ILS 25L/25R

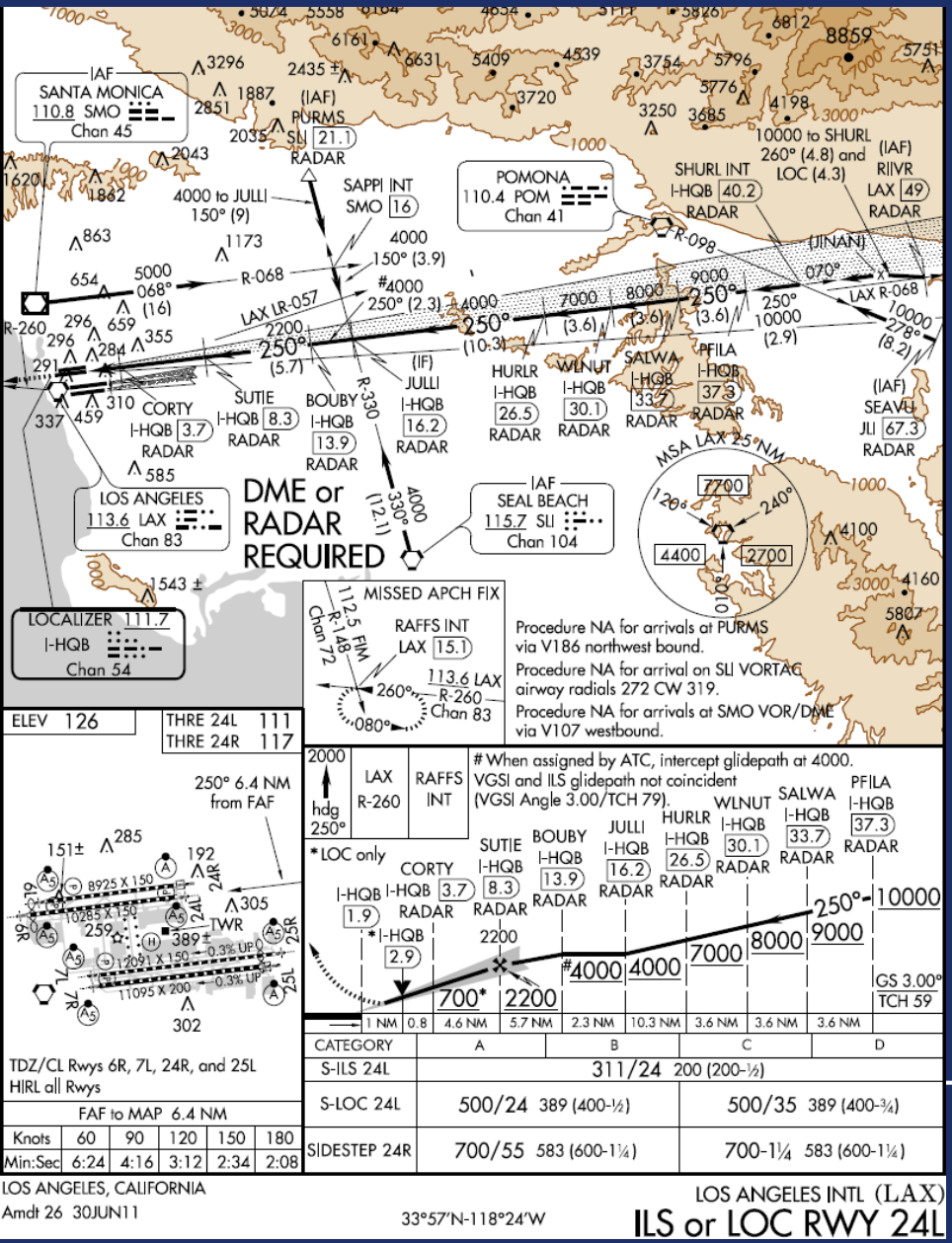
LOS ANGELES INTL





ILS 24L/24R

LOS ANGELES INTL



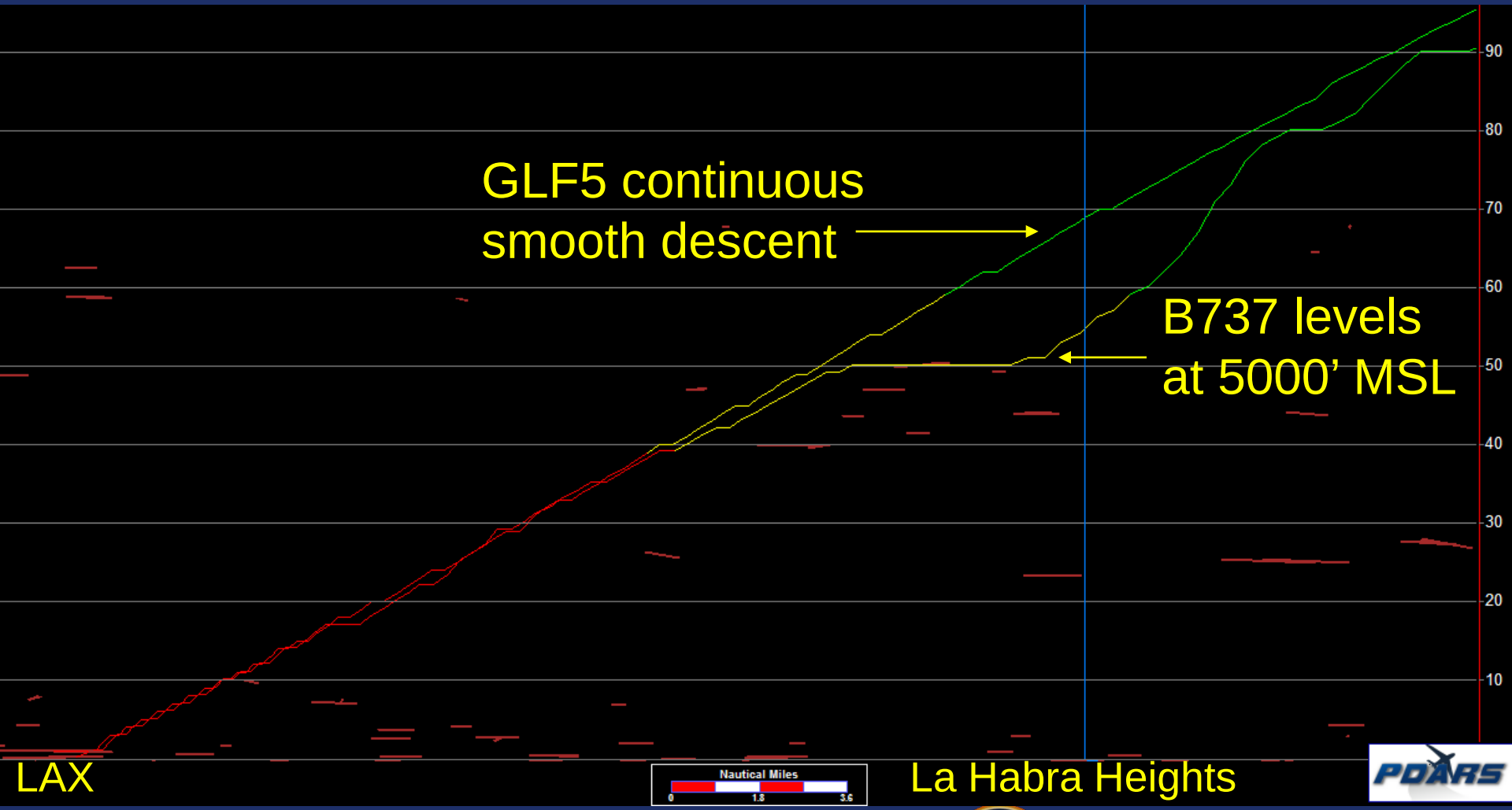
Partner Airlines' Opinion

- For LAX, the RIIVR and SEAVU STARS are a huge benefit for the residents of the LA Basin. These procedures are considered Optimized Profile Descents providing the customers of LAX with fuel savings while reducing the noise footprint for LAX arrivals.
- Below 17,000', both the RIIVR and SEAVU are an idle descent until approximately 4 miles from runway 25L and 24R. At 4 miles from these runways the pilots must configure the aircraft for landing. These procedures are used as an example throughout the U.S. on how to design and use arrivals into airports. If we can design and place into use procedures that allow the pilots to leave the throttles at idle, noise is significantly reduced. The RIIVR and SEAVU arrivals provide pilots with the necessary tools to reduce the noise for the residents of the LA basin.

Flight Profile Comparison 2005/2011

- **Examples from 2005 and 2011:**
  1. aircraft making a smooth continuous descent
  2. aircraft leveling at 5000’ for one or more miles and then continuing descent
- **Side profile of flight tracks for both years**
- **Animation of each sample flight**
  - Click in black area of slide to start animation

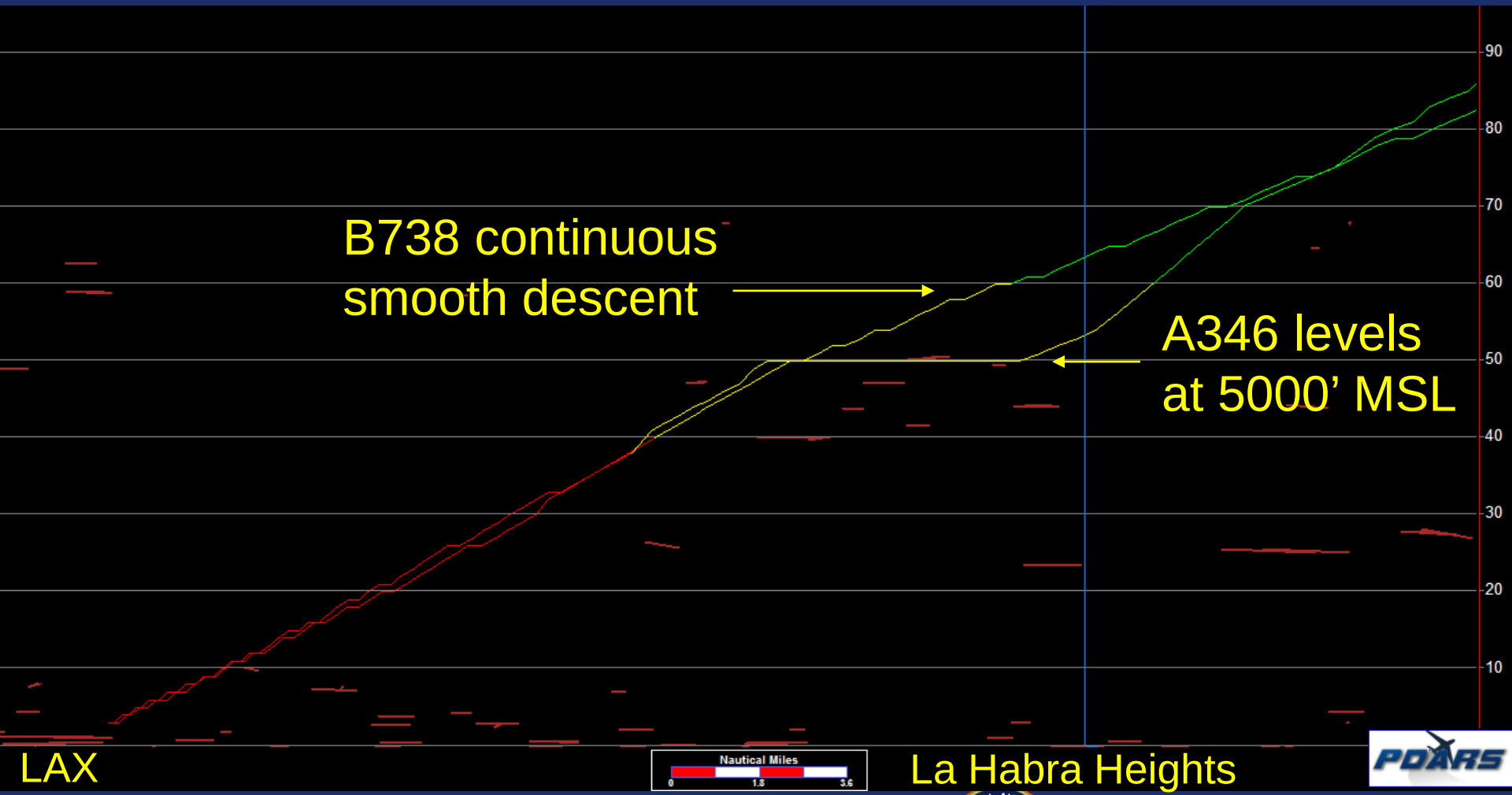
Flight Profile Comparison
1/13-14/2005 ~ B737 & GLF5



B737 – “Dive & Drive” Descent January 13, 2005 (Animation)

GLF5 – Continuous Descent January 14, 2005 (Animation)

Flight Profile Comparison
January 14, 2011 ~ A346 & B738



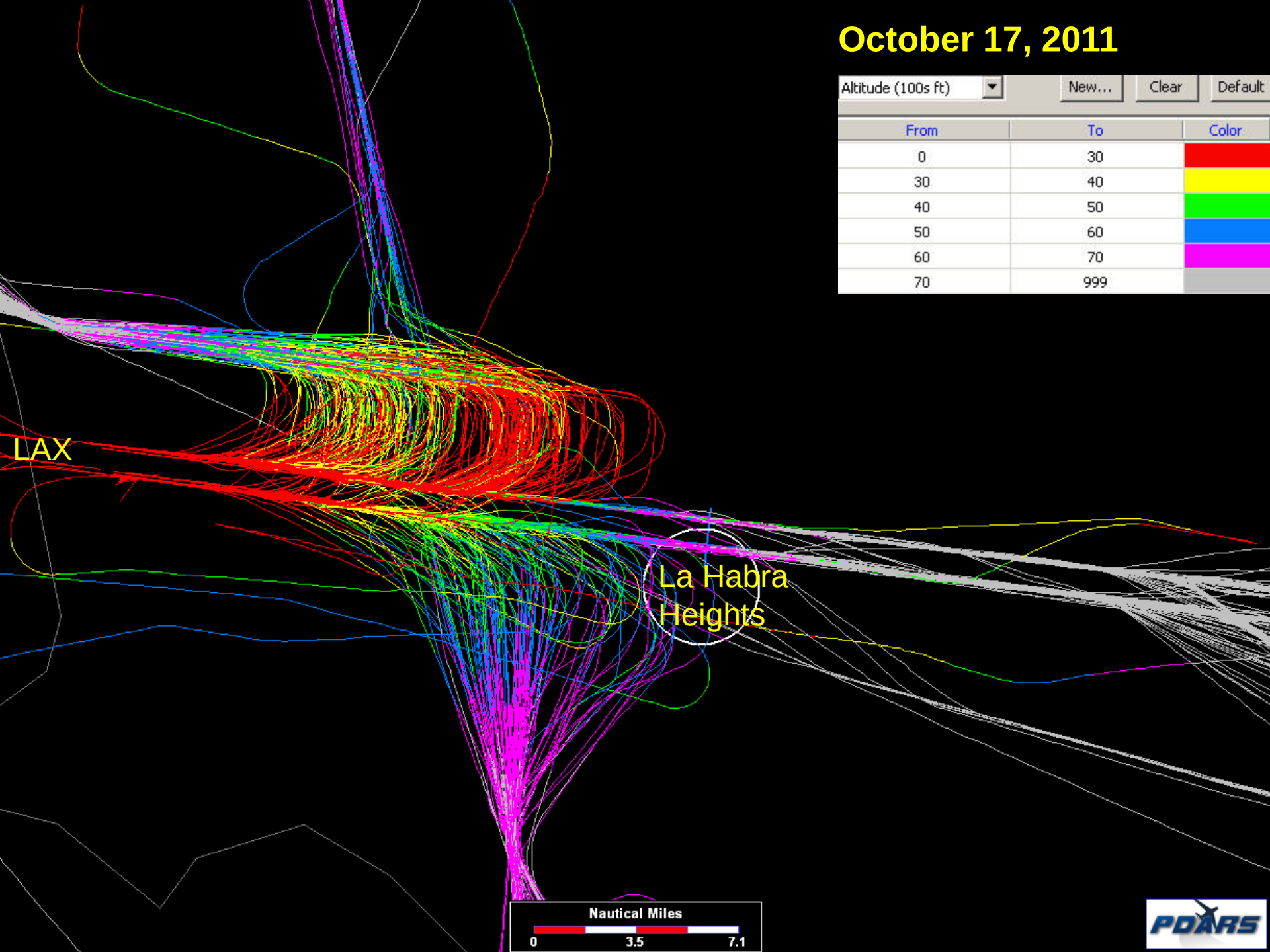
A346 – “Dive & Drive” Descent January 14, 2011 (Animation)

B738 – Continuous Descent January 14, 2011 (Animation)

Arrival flow from west

- Next slide depicts downwind arrival traffic inbound over Fillmore (FIM) and Ventura (VTU) VORTACS
- Downwind traffic is not on CDA's
- Downwind traffic is turned to final approach course inside of La Habra

October 17, 2011



Conclusions

- **Currently most LAX arrivals from the east are on a profile descent (SEAVU2 or RIIVR2 Arrival) that allows for a transition to RWY 24/25 ILS approaches**
- **Standard operating procedure for arrivals is to be cleared for ILS approach no later than 35 nautical miles (NM) out from runway**
  - The aircraft then meet the “at or above” descent altitudes until capturing the glide slope
- **La Habra Heights is approx. 20 NM from runway**
- **The glide slope is normally usable out to 10 NM from runway**
- **Different aircraft may have variable descent rates depending on pilot technique and the onboard navigation capabilities of each aircraft**


Questions?