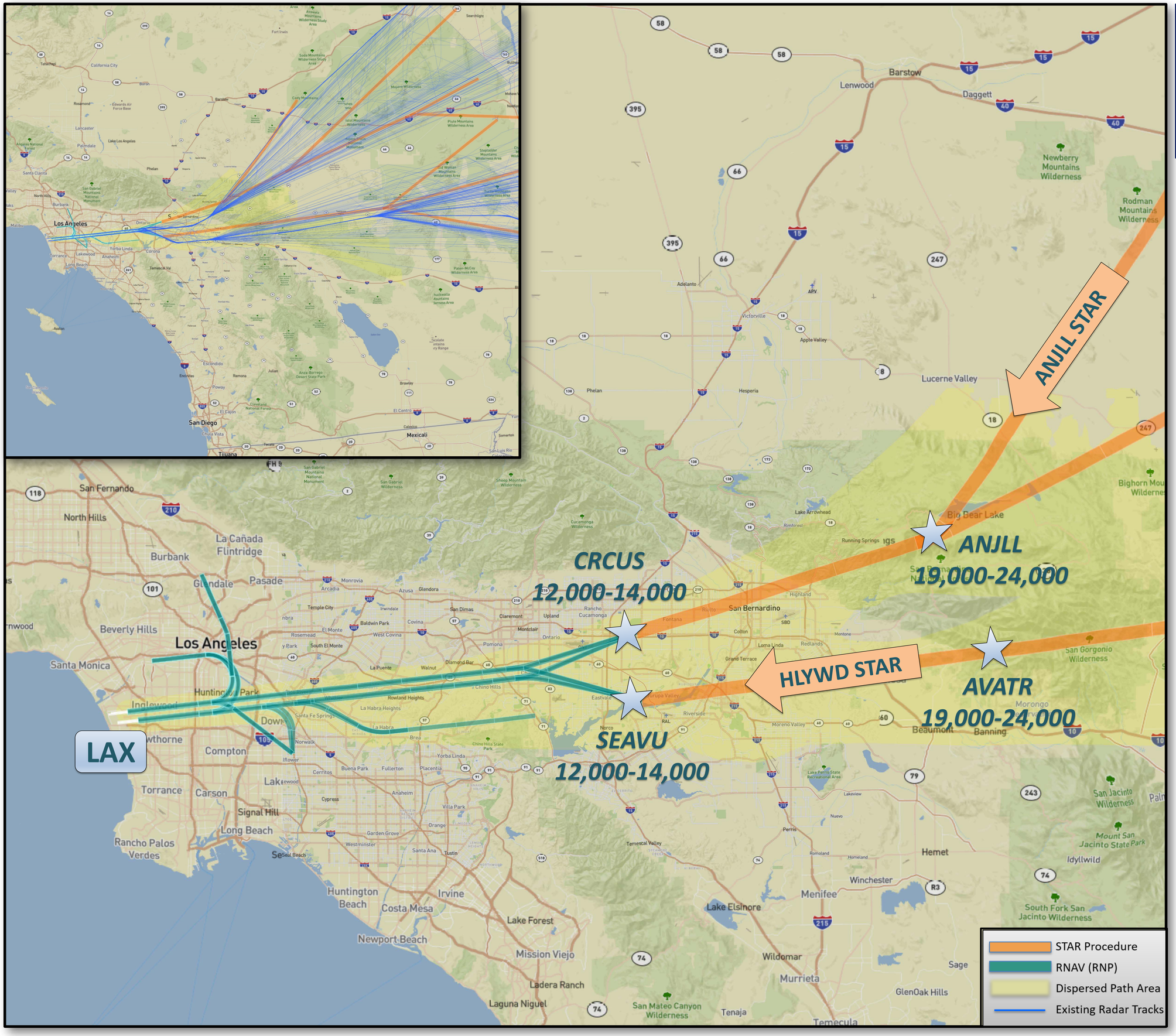


LAX Los Angeles International Airport

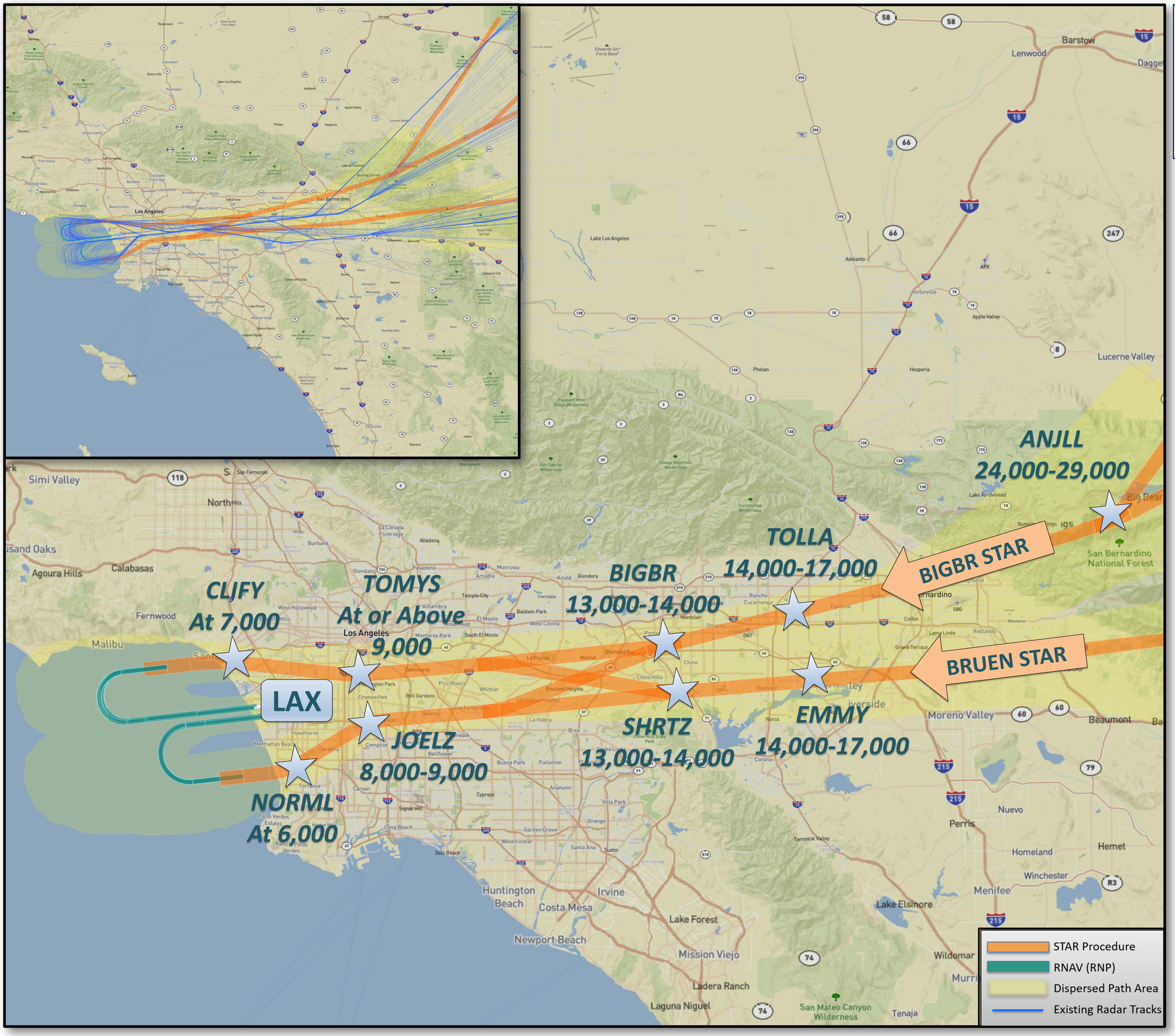
STAR (Arrival)

LAX ANJLL ONE RNAV STAR

LAX HLYWD ONE RNAV STAR

ANJLL ONE / HLYWD ONE

- Current LAX RIIVR and SEAVU STARs create a bottleneck for arrivals and are responsible for heaviest volume into the Metroplex area
- Connects to LAX RNP approaches for Runways 24 L/R and 25 L/R
- ANJLL and HLYWD STARs are OPD procedures
- Offset approach option to the LAX south complex was created



LAX Los Angeles International Airport

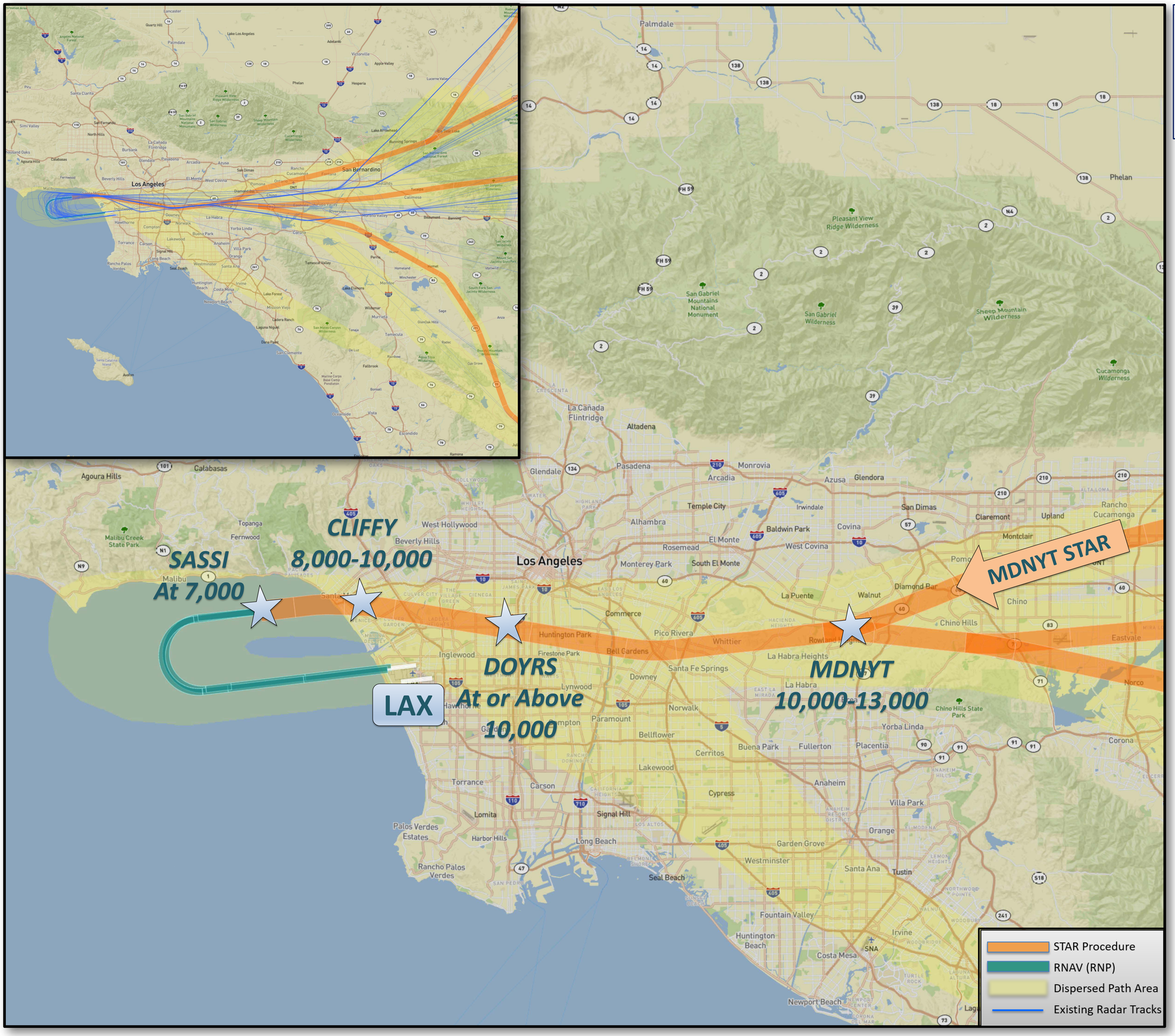
STAR (Arrival)

LAX BIGBR ONE RNAV STAR

LAX BRUEN ONE RNAV STAR

BIGBR ONE / BRUEN ONE

- The BIGBR and BRUEN STARs were designed to replace the BASET STAR
- The BIGBR and BRUEN STARs follow the same lateral path as the ANJLL and HLYWD STARs to the downwind transitions at higher altitudes due to longer flying distances to the west of LAX
- The BIGBR and BRUEN STARs are laterally separated and will provide independent flows for LAX east flow operations

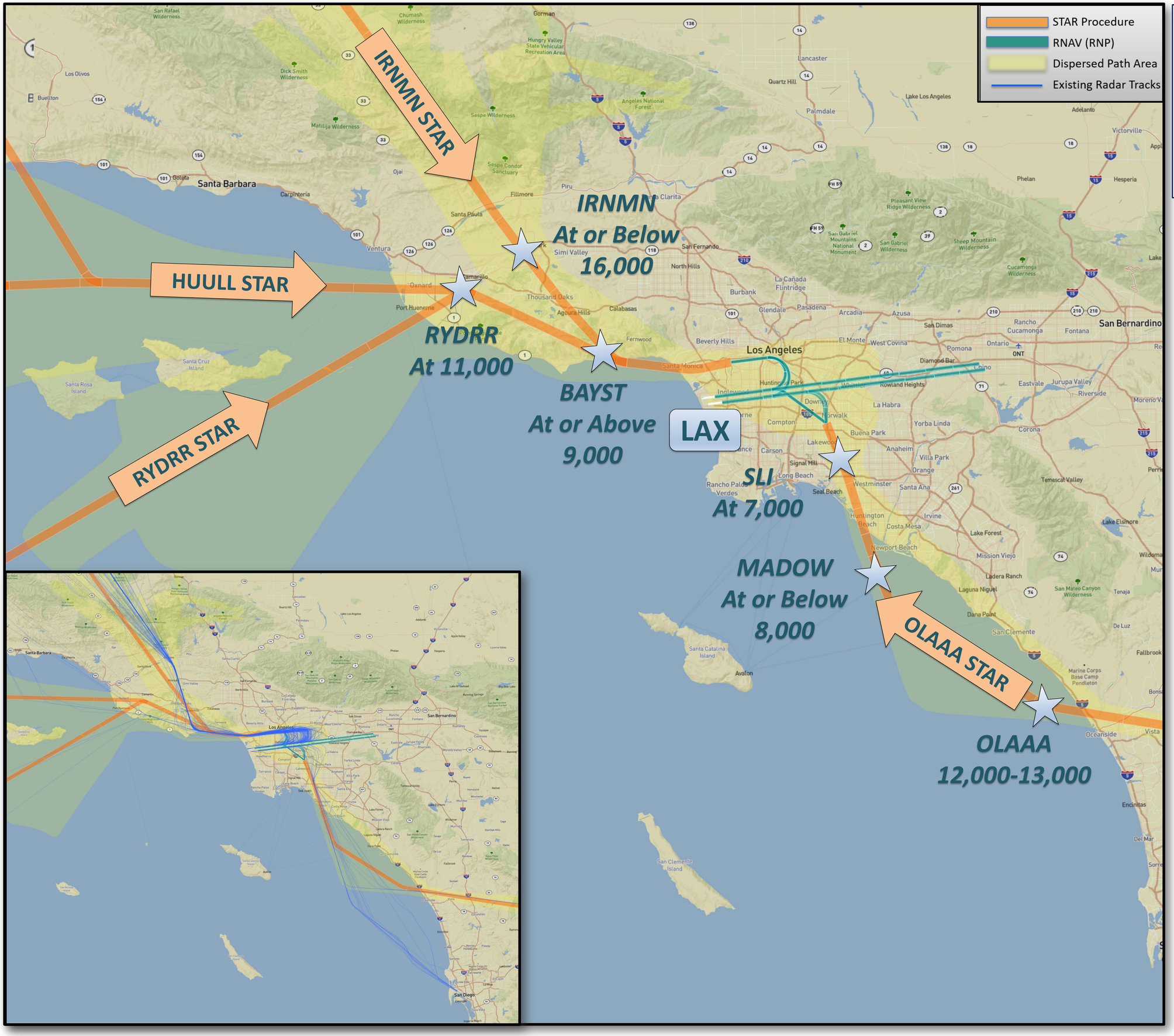


LAX Los Angeles International Airport

STAR (Arrival)
LAX MDNYT ONE RNAV STAR

MDNYT ONE

- The Metroplex Team considered community input and developed the MDNYT STAR to replace the current RDEYE STAR for midnight to 6:30 a.m. local time arrivals to LAX landing on east bound runways
- The current RDEYE STAR requires aircraft to cross SMO at 8,000 feet and routes aircraft towards Malibu
  - There are no other vertical restrictions on the RDEYE STAR west of SMO
- The MDNYT STAR contains a vertical restriction of 8,000 to 10,000 feet over new waypoint CLIFY (co-located with SMO) and a second restriction of 7,000 feet at new waypoint SASSI (over the ocean)
- After crossing the shoreline the lateral track remains over the ocean and away from Malibu



LAX Los Angeles International Airport

STAR (Arrival)

LAX OLAAA ONE RNAV STAR
LAX RYDRR ONE RNAV STAR
LAX HUULL ONE RNAV STAR
LAX IRNMN ONE RNAV STAR

OLAAA ONE

- Serves arrivals from the south

RYDRR ONE

(Name Change from CRSHR ONE)

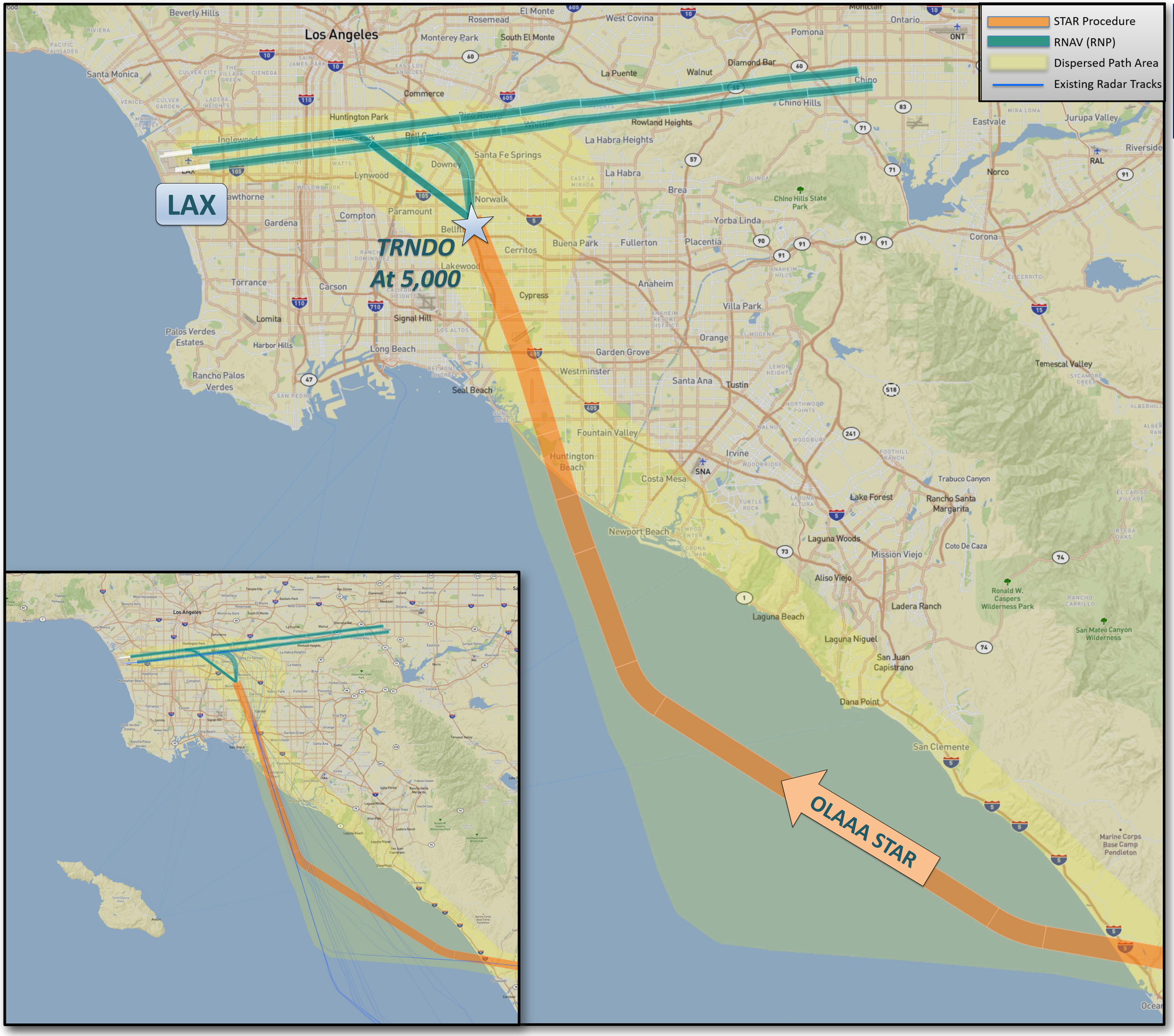
- Serves arrivals from the west and southwest

HUULL ONE

- Serves primarily Asian-departed LAX arrivals from the northwest

IRNMN ONE

- Serves arrivals from the north and northwest

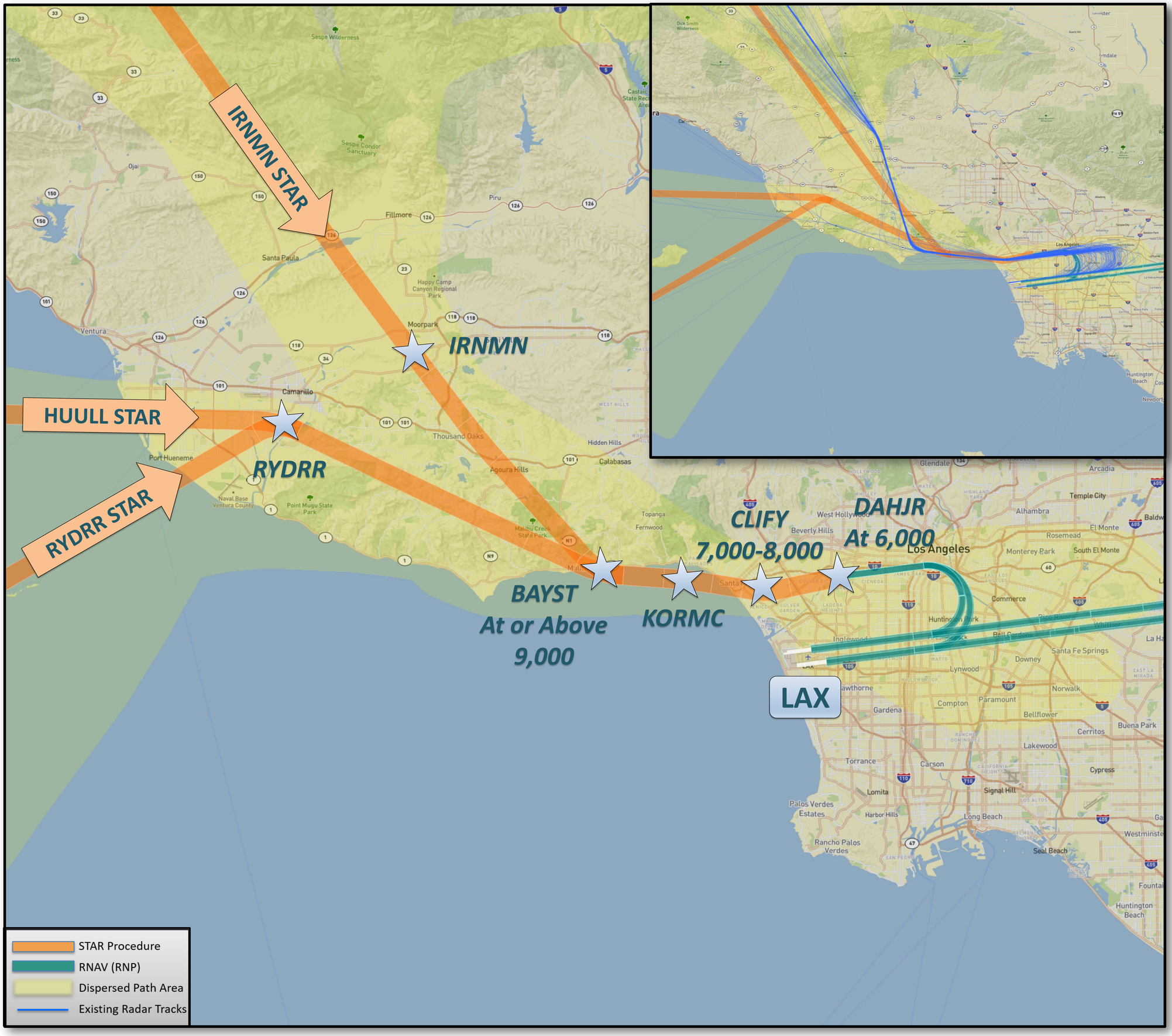


LAX Los Angeles International Airport

STAR (Arrival)
LAX OLAAA ONE RNAV STAR

OLAAA ONE

- Serves arrivals from the south
- Connects to LAX RNP approaches for Runways 24 L/R and 25 L/R
- Designed to more closely follow historical tracks, moving more of the arrival procedure over water and away from populated areas for as long as possible



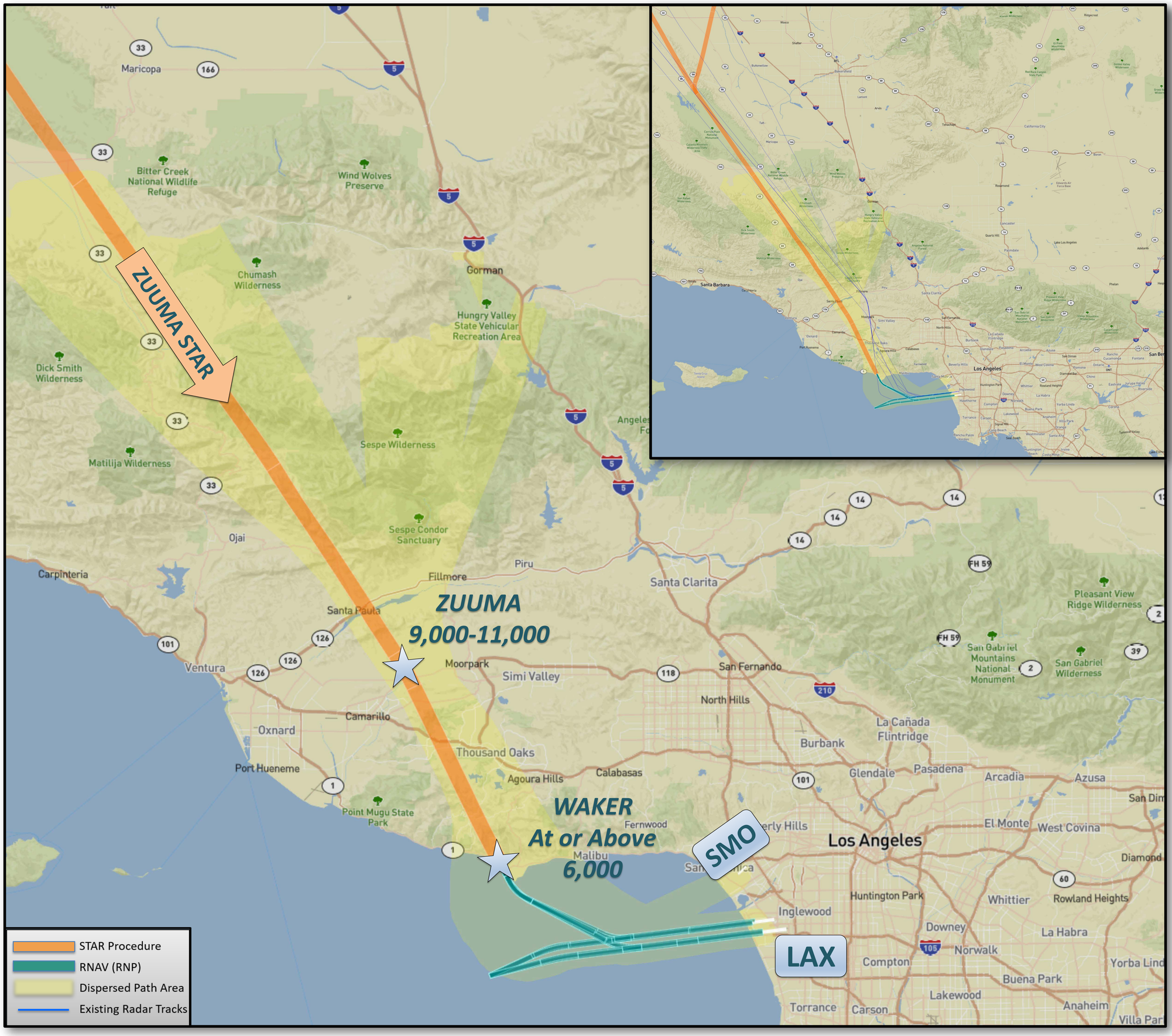
LAX Los Angeles International Airport

STAR (Arrival)

LAX RYDRR ONE RNAV STAR
(Name Change from CRSHR ONE)

LAX HUULL ONE RNAV STAR
LAX IRNMN ONE RNAV STAR

- RYDRR, HUULL, and IRNMN all follow the same lateral path after BAYST and will tie into the new RNAV/RNP approach for LAX
- CLIFY (co-located with SMO) altitude allows aircraft to be up to 1,000 feet higher than the current procedure
- Current ILS approach procedure allows aircraft to descend immediately after passing SMO; for aircraft flying the RNAV/RNP approach, the altitude restriction at DAHJR provides a minimum altitude of 6,000 feet until approximately 5 miles east of SMO
- ILS approach still available for non-RNP equipped aircraft; when requested, visual approaches will continue to be assigned when traffic conditions allow



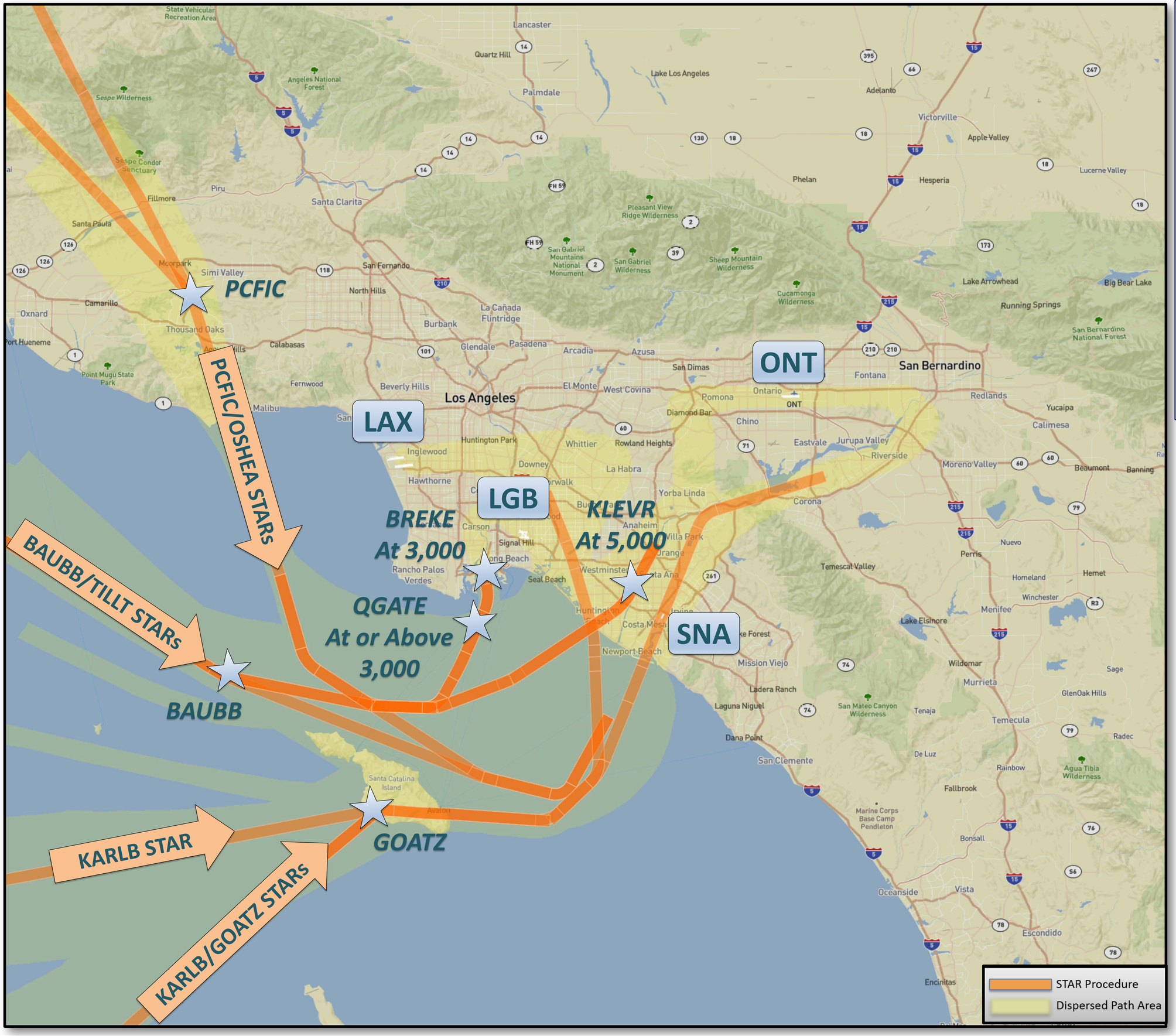
LAX Los Angeles International Airport

SMO Santa Monica Municipal Airport

STAR (Arrival)
LAX/SMO ZUUMA ONE RNAV STAR

ZUUMA ONE

- Serves LAX arrivals from the north when landing to the east
- WAKER intersection located offshore with an altitude restriction of at or above 6,000 feet
- Provides OPD when LAX is landing to the east
- Deconflicted from the LGB PCIFC, SNA OHSEA, and BUR/VNY ROKKR STARs
- Connects to LAX RNP approaches for Runways 06 L/R and 07 L/R
- Ties into SMO RNAV GPS Z Approach which maintains procedural separation from LAX arrivals when LAX is landing east
- Ties into SMO Runway 03 RNAV GPS Z Approach which maintains procedural separation from LAX arrivals when LAX is landing east



LAX Los Angeles International Airport

LGB Long Beach Airport (Daugherty Field)

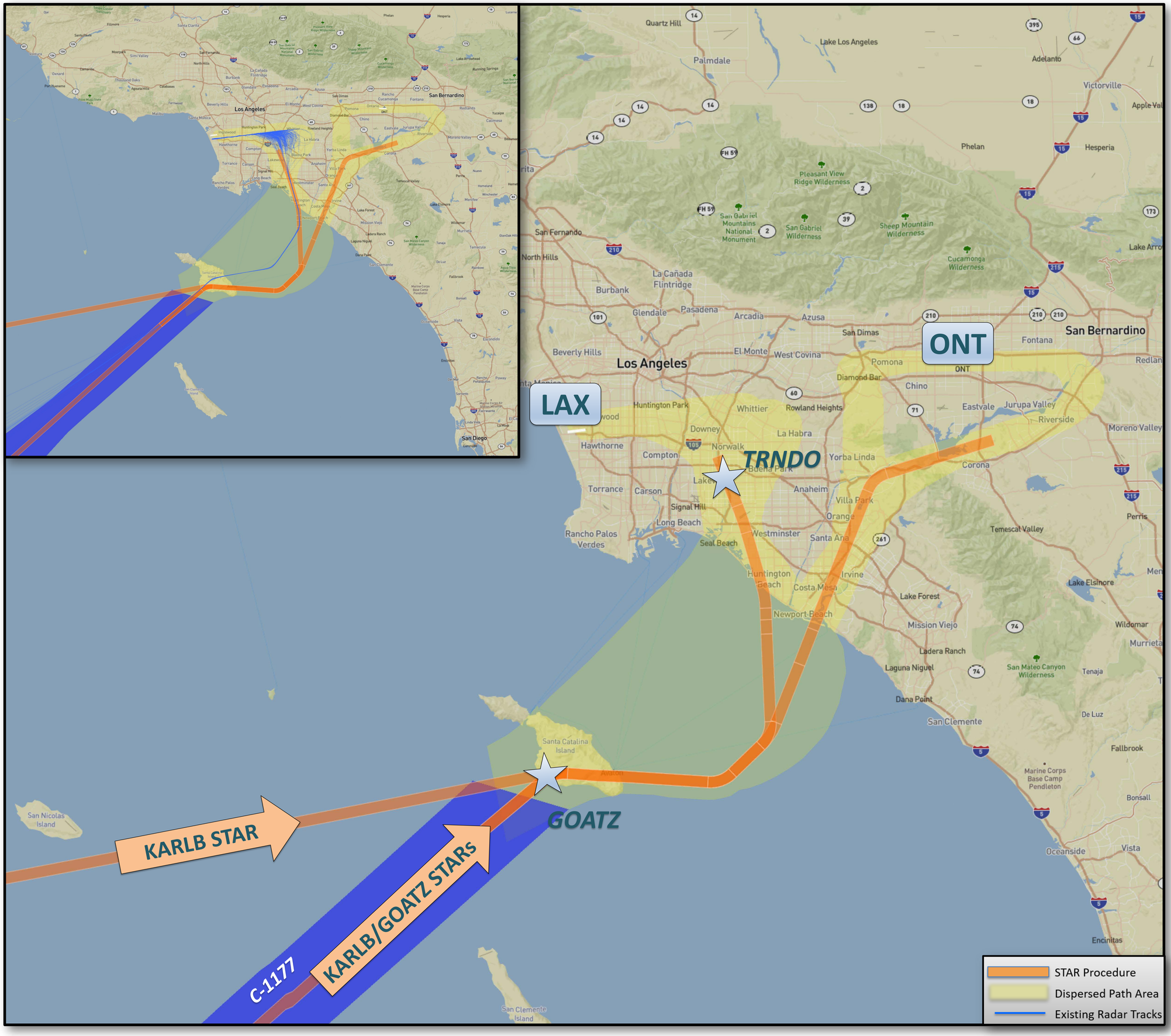
ONT Ontario International Airport

SNA John Wayne-Orange County Airport

STAR (Arrival)

LAX GOATZ ONE RNAV STAR
ONT KARLB ONE RNAV STAR
LGB BAUBB ONE RNAV STAR
LGB PCIFC ONE RNAV STAR
SNA OHSEA ONE RNAV STAR
SNA TILLT ONE RNAV STAR

- New STAR designs for LAX, LGB, ONT, and SNA arrivals from over the ocean
- Designed to limit interactions with other departure and arrival procedures in the Southern California area
- GOATZ and KARLB allow aircraft to be as much as 7,000 feet higher over Catalina Island
- GOATZ, PCIFC, OHSEA, and TILLT STARs tie into new RNP approaches



LAX Los Angeles International Airport

ONT Ontario International Airport

STAR (Arrival)

LAX GOATZ ONE RNAV STAR

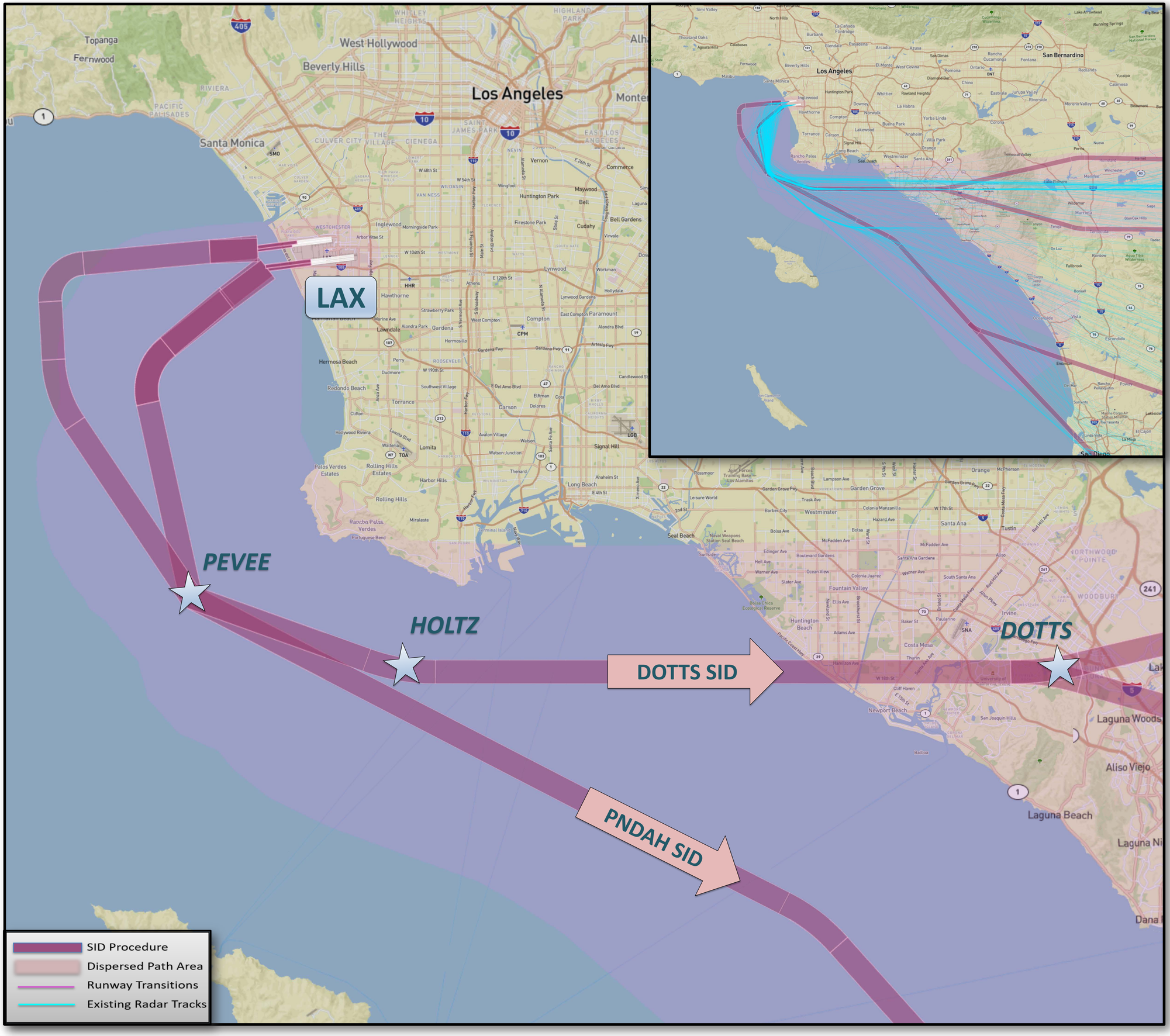
ONT KARLB ONE RNAV STAR

GOATZ ONE

- Serves LAX arrivals from the southwest
- Allows aircraft to be as much as 7,000 feet higher over Santa Catalina Island
- Routing will be unavailable when military airspace Control Extension C1177 (C-1177) is active
- Deconflicted from the SNA HHERO SID
- Ties into new LAX RNP approaches at TRNDO

KARLB ONE

- Currently no published arrival procedure to ONT for aircraft from the west
- Allows aircraft to be as much as 7,000 feet higher over Santa Catalina Island
- OPD design impacted by interactions with LAX and SNA departures as well as SAN and CRQ arrivals



LAX Los Angeles International Airport

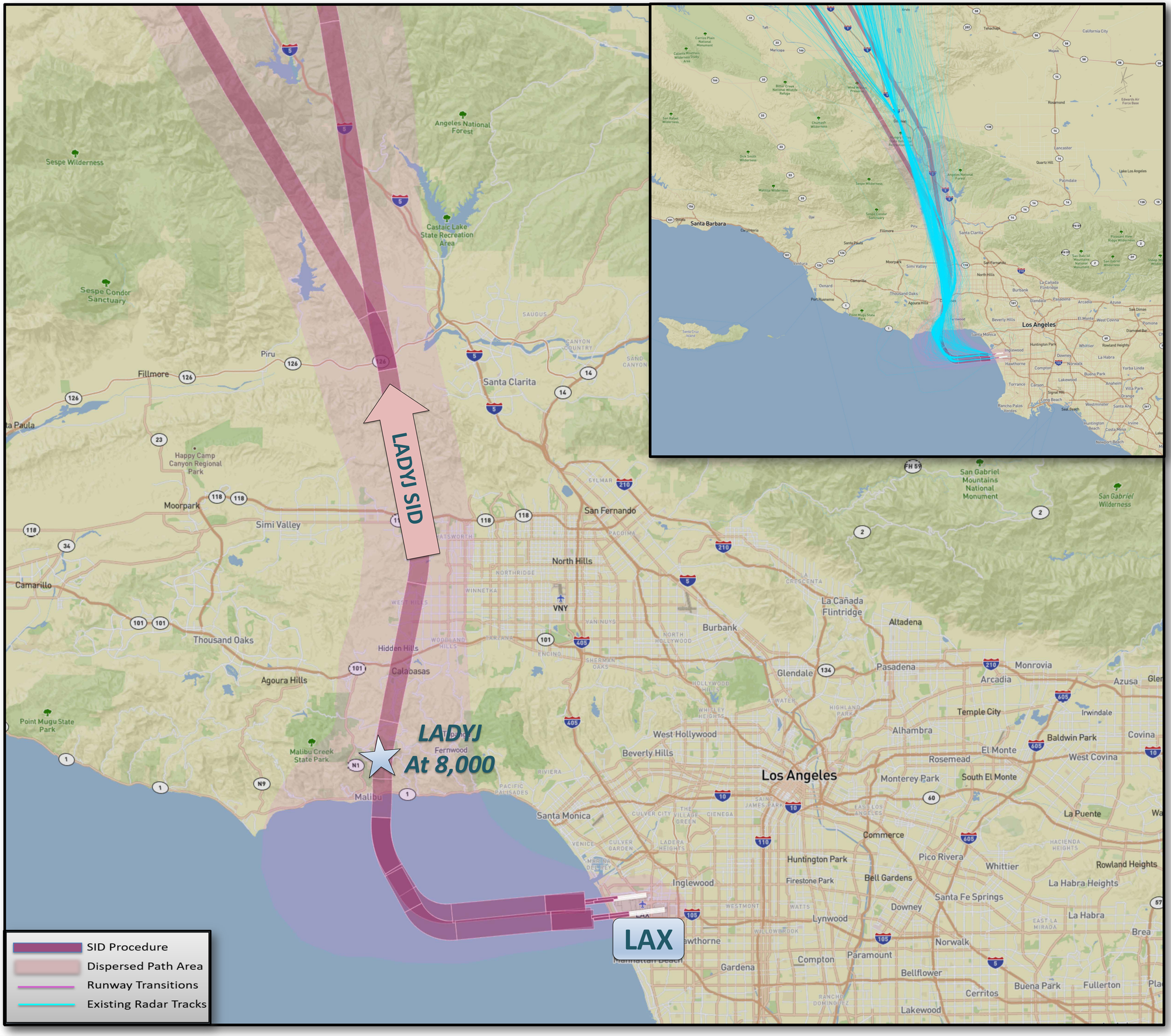
SID (Departure)
LAX DOTSS ONE RNAV SID
LAX PNDAH ONE RNAV SID

DOTSS ONE

- Replaces the HOLTZ SID
- Allows for a more unrestricted climb while allowing an OPD on the SAN COMIX STAR
- Lateral track was designed in conjunction with the ONT RAJEE, SNA PIGGN, LGB FRITR, and SMO PEVEE SIDs

PNDAH ONE

- Replaces the KARVR SID
- Designed to deconflict from CRQ and SAN arrivals
- Two transitions were added to provide greater flexibility

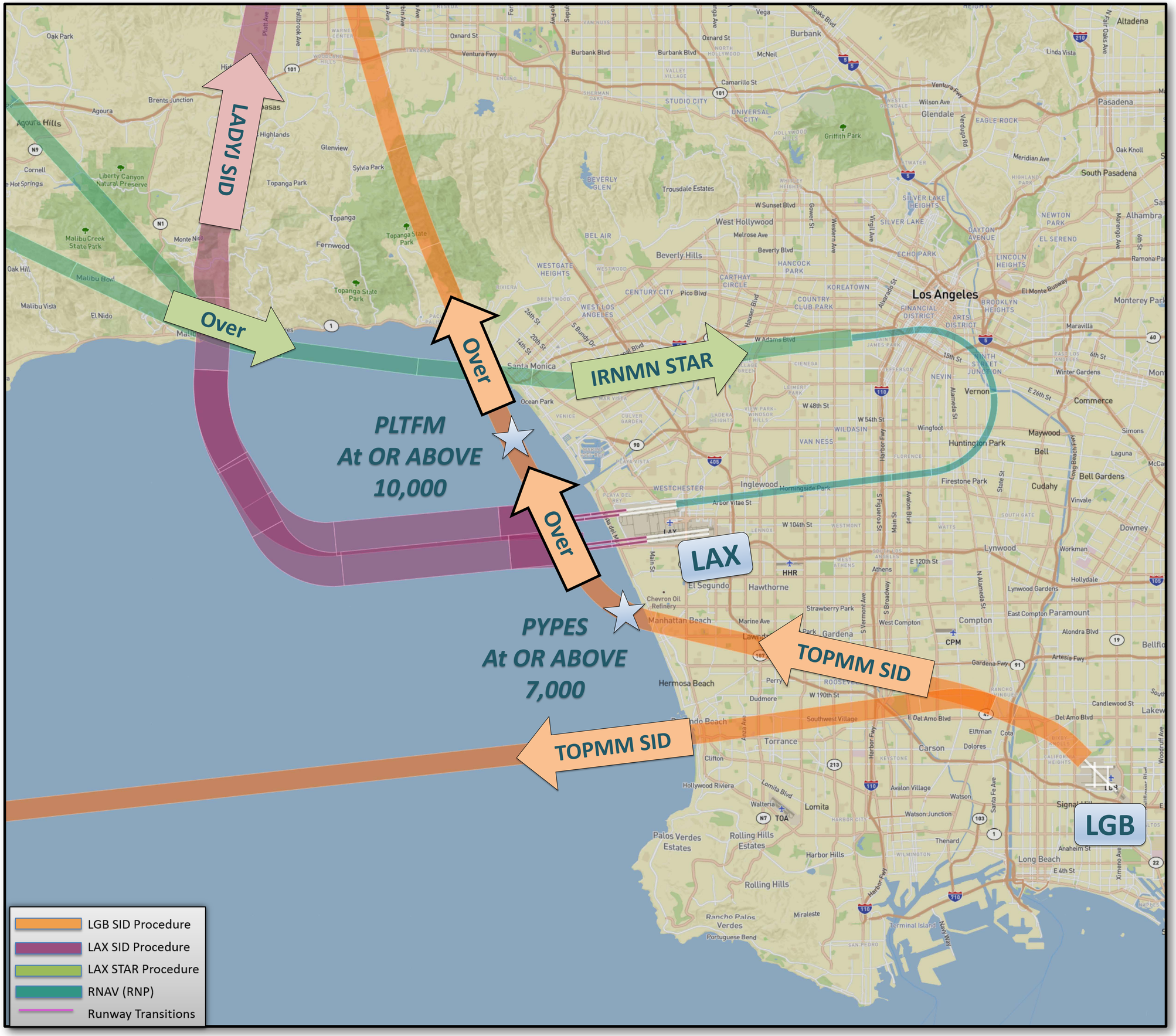


LAX Los Angeles International Airport

SID (Departure)
LAX LADYJ ONE RNAV SID

LADYJ ONE

- An RNAV off the ground SID
- Vertical restrictions de-conflict from the LAX RYDRR, IRNMN, and HUULL STARs
- TCAS alerts between aircraft departing LAX and arriving from the west/northwest are expected to decrease
- The COREZ and CSTRO transitions provide segregation of flows on the procedure



LAX Los Angeles International Airport

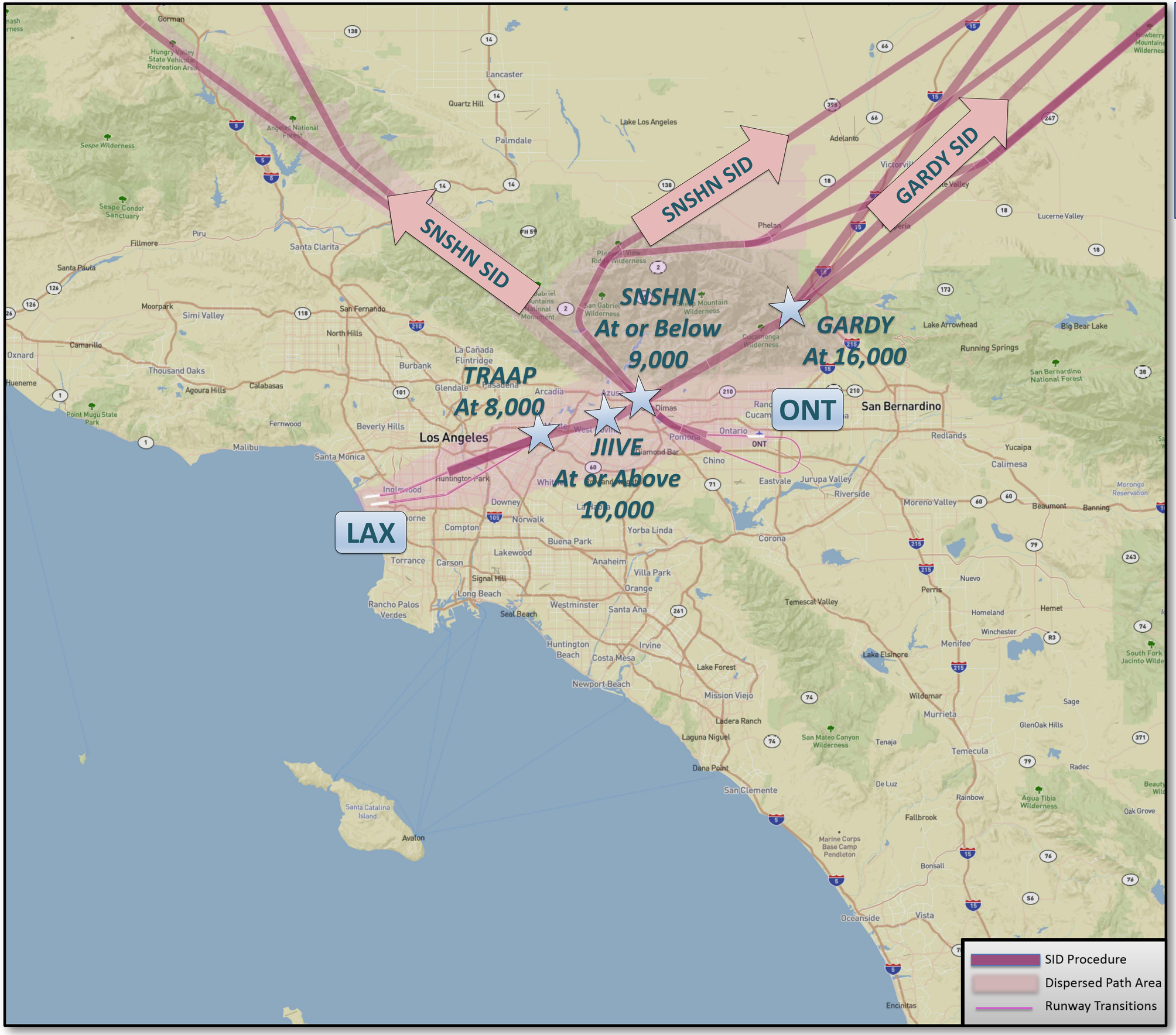
LGB Long Beach Airport (Daugherty Field)

SID (Departure)
LAX LADYJ ONE RNAV SID
LGB TOPMM ONE RNAV SID

STAR (Arrival)
LAX IRNMN ONE RNAV STAR

LADYJ / TOPMM / IRNMN Interactions

- Design of procedures involved controlling interactions between arrivals and departures to and from multiple airports
- Map shows the solutions for two airports
- LAX IRNMN was designed to keep aircraft above the LAX LADYJ departures and below the LGB TOPMM departures
- LAX LADYJ departures will be below the LGB TOPMM departures and LAX IRNMN arrivals
- LGB TOPMM departures will be above LAX LADYJ departures and LAX IRNMN arrivals



LAX Los Angeles International Airport

ONT Ontario International Airport

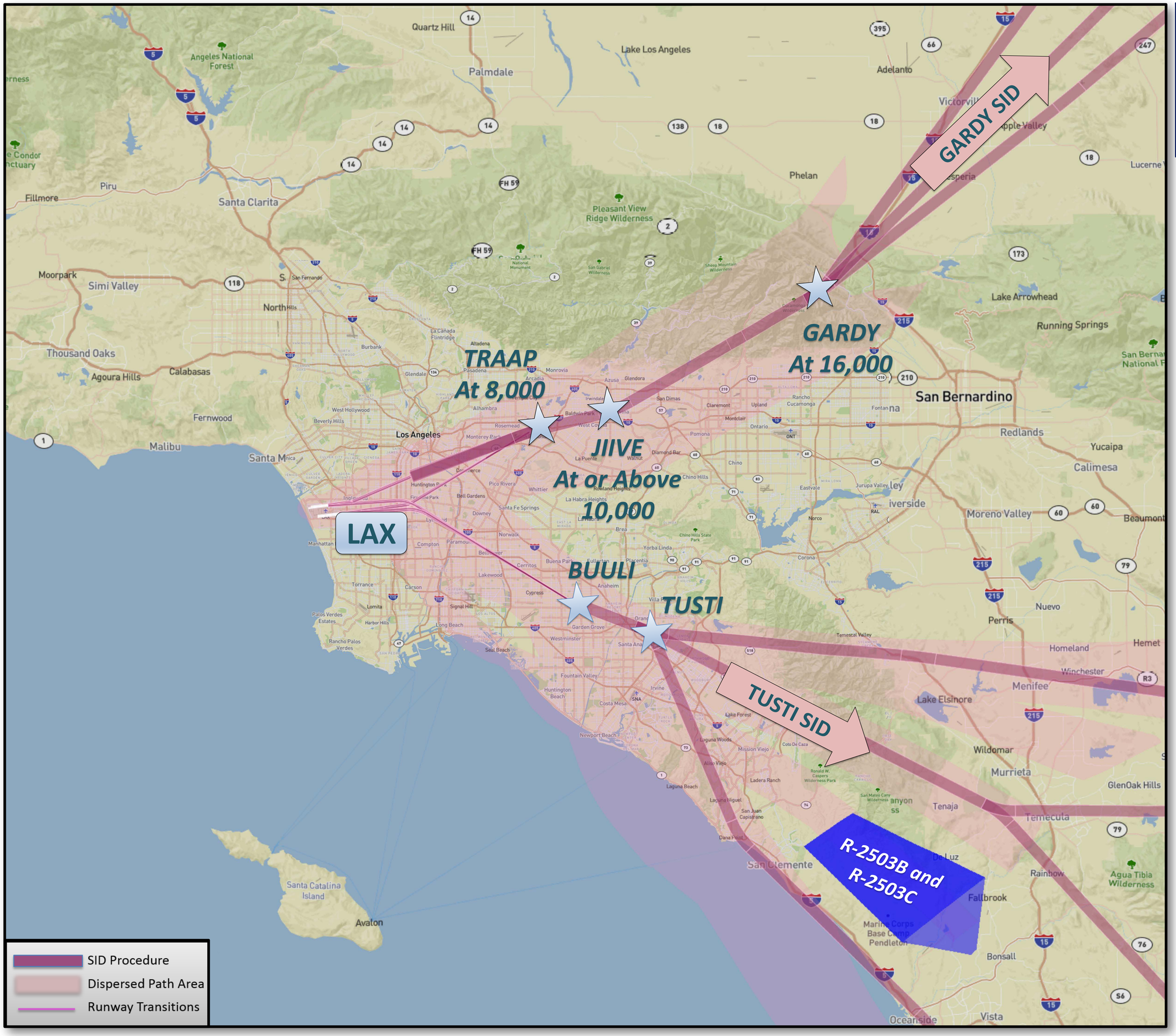
SID (Departure)
LAX GARDY ONE RNAV SID
ONT SNSHN ONE RNAV SID

GARDY ONE

- Serves LAX departures on east bound runways
- Requires aggressive climb gradient due to terrain
- Altitude restrictions added to deconflict from ONT SNSHN SID, ONT GLRNO STAR, and LAX BIGBR/BRUEN STARs

SNSHN ONE

- Serves ONT departures to the northwest, north, and northeast from ONT Runways 08 L/R and 26 L/R
- Current procedure is inefficient conventional SID dependent on ground based navigation
- Deconflicted from LAX arrivals in SCT TRACON airspace
- Provides independent and segregated route structure after departure allowing more unrestricted climbs



LAX Los Angeles International Airport

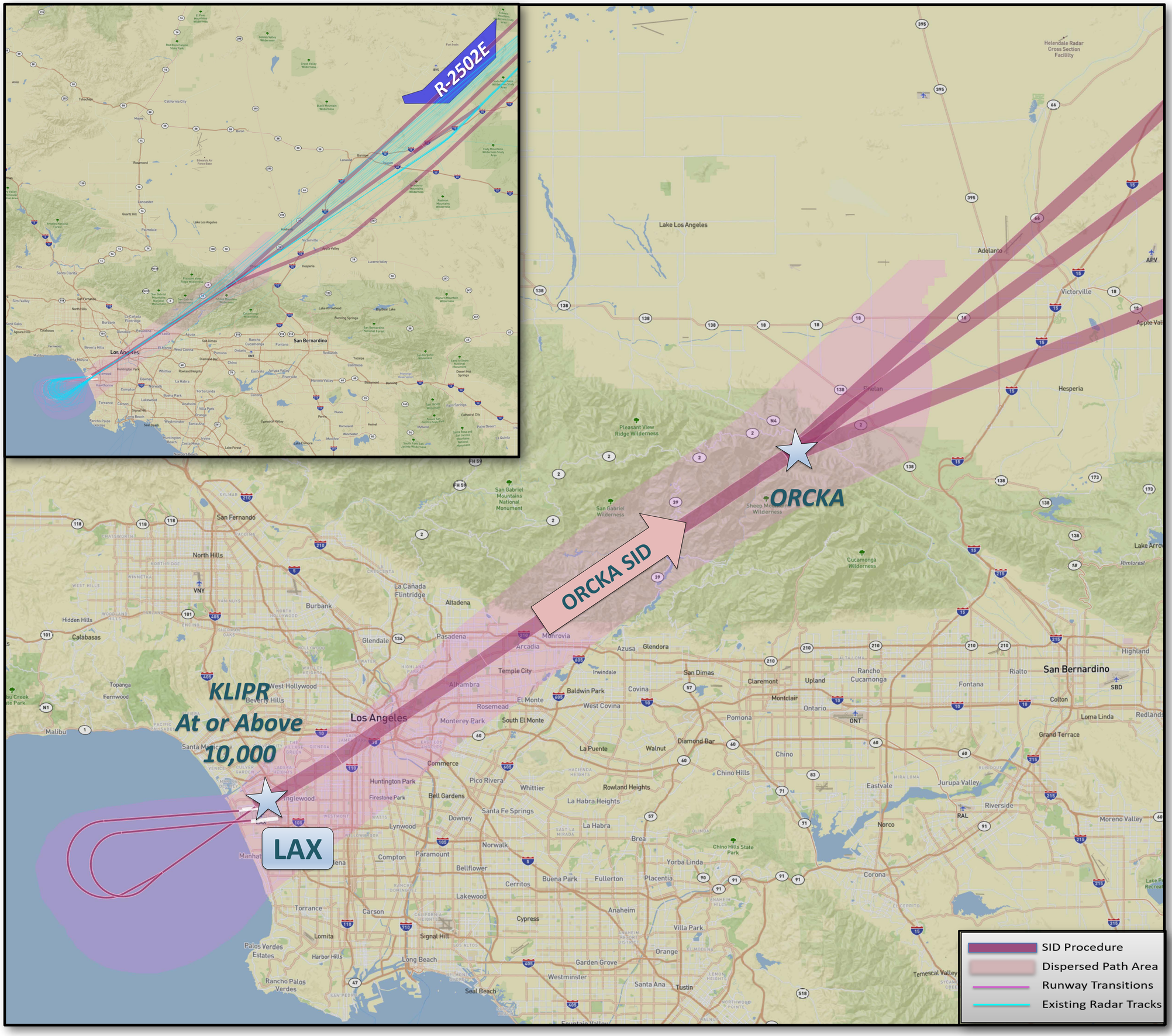
SID (Departure)
LAX GARDY ONE RNAV SID
LAX TUSTI ONE RNAV SID

GARDY ONE

- Serves LAX departures on east bound runways
- Requires aggressive climb gradient due to terrain
  - Aircraft unable to maintain 420 feet per nautical mile will be assigned the LAX TUSTI SID
- Altitude restrictions added to deconflict from ONT SNSHN SID, ONT GLRNO STAR, and LAX BIGBR/BRUEN STARs

TUSTI ONE

- Serves LAX departures on eastbound runways to the east and southeast
- Laterally separated from military airspace Restricted Area 2503 (R-2503B and R-2503C
- Designed to provide an RNAV departure procedure for LAX traffic departing on eastbound runways who are unable to maintain the GARDY climb gradient

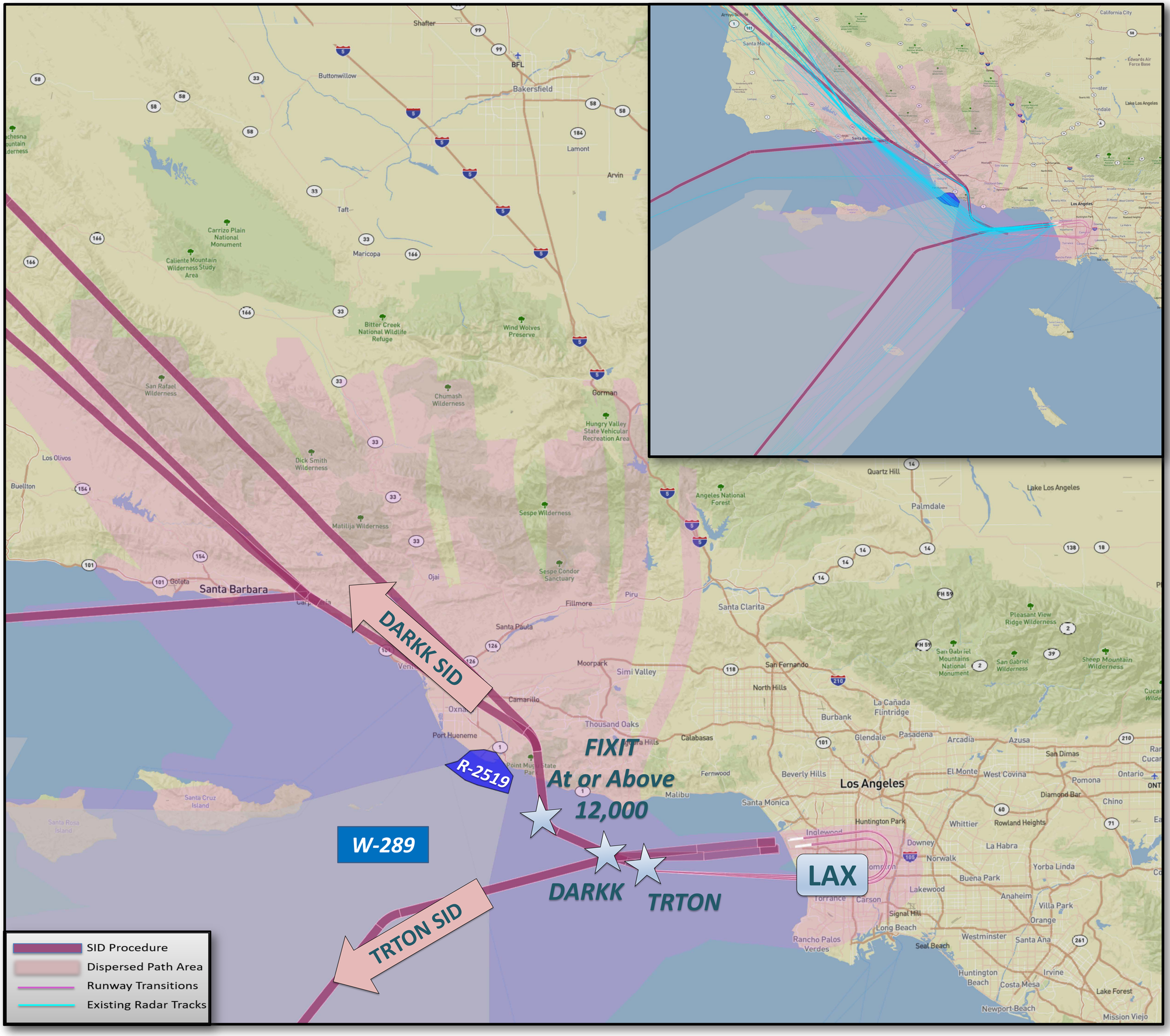


LAX Los Angeles International Airport

SID (Departure)
LAX ORCKA ONE RNAV SID

ORCKA ONE

- An RNAV off the ground SID that replaces the conventional LAX LOOP SID
  - Departures perform a climbing left turn back over the LAX Airport
- Vertical restriction at KLIPR ensures aircraft comply with existing noise abatement procedures and deconflict from arrival traffic
- Multiple enroute transitions allow air traffic controllers greater flexibility depending on the status of military airspace, Restricted Area 2502E (R-2502E)



LAX Los Angeles International Airport

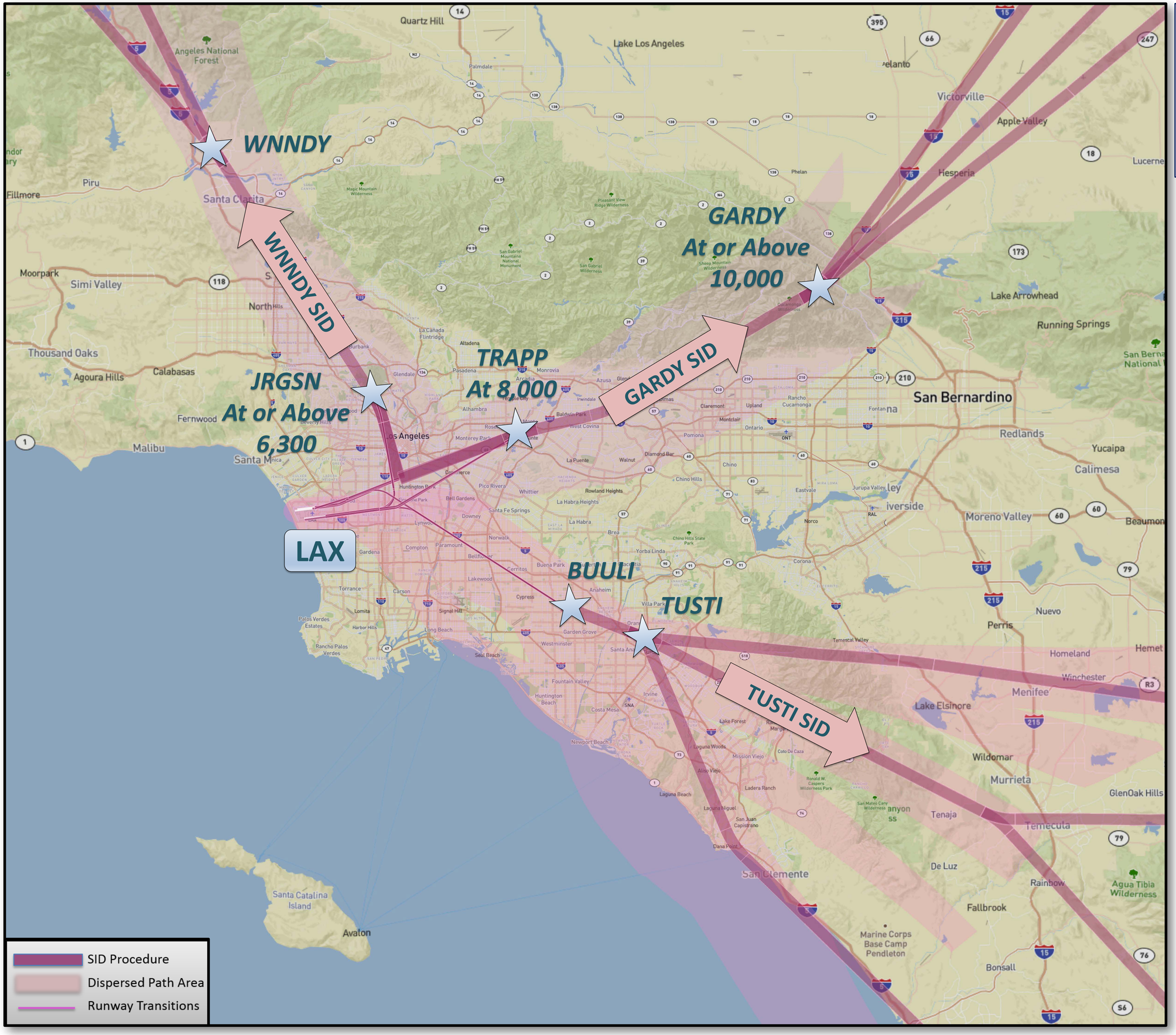
SID (Departure)
LAX DARKK ONE RNAV SID
LAX TRTON ONE RNAV SID

DARKK ONE

- Serves departures to the west and routed to the southwest, west, and northwest
- Deconflicted from LAX, LGB, and SNA arrivals
- Designed to route aircraft away from military airspace, Restricted Area 2519 (R-2519) and Warning Area 289 (W-289)
- Provides more direct routings for oceanic traffic and earlier diversion of traffic flows to SFO Bay Area and Pacific Northwest

TRTON ONE

- Serves departures to the east and routed to the southwest, west, and northwest
- Deconflicted from the LGB PCIFC and SNA OHSEA STARs
- Designed to route aircraft away from military airspace, Restricted Area 2519 (R-2519)
- Provides earlier diversion of traffic flows to SFO Bay Area and Pacific Northwest



LAX Los Angeles International Airport

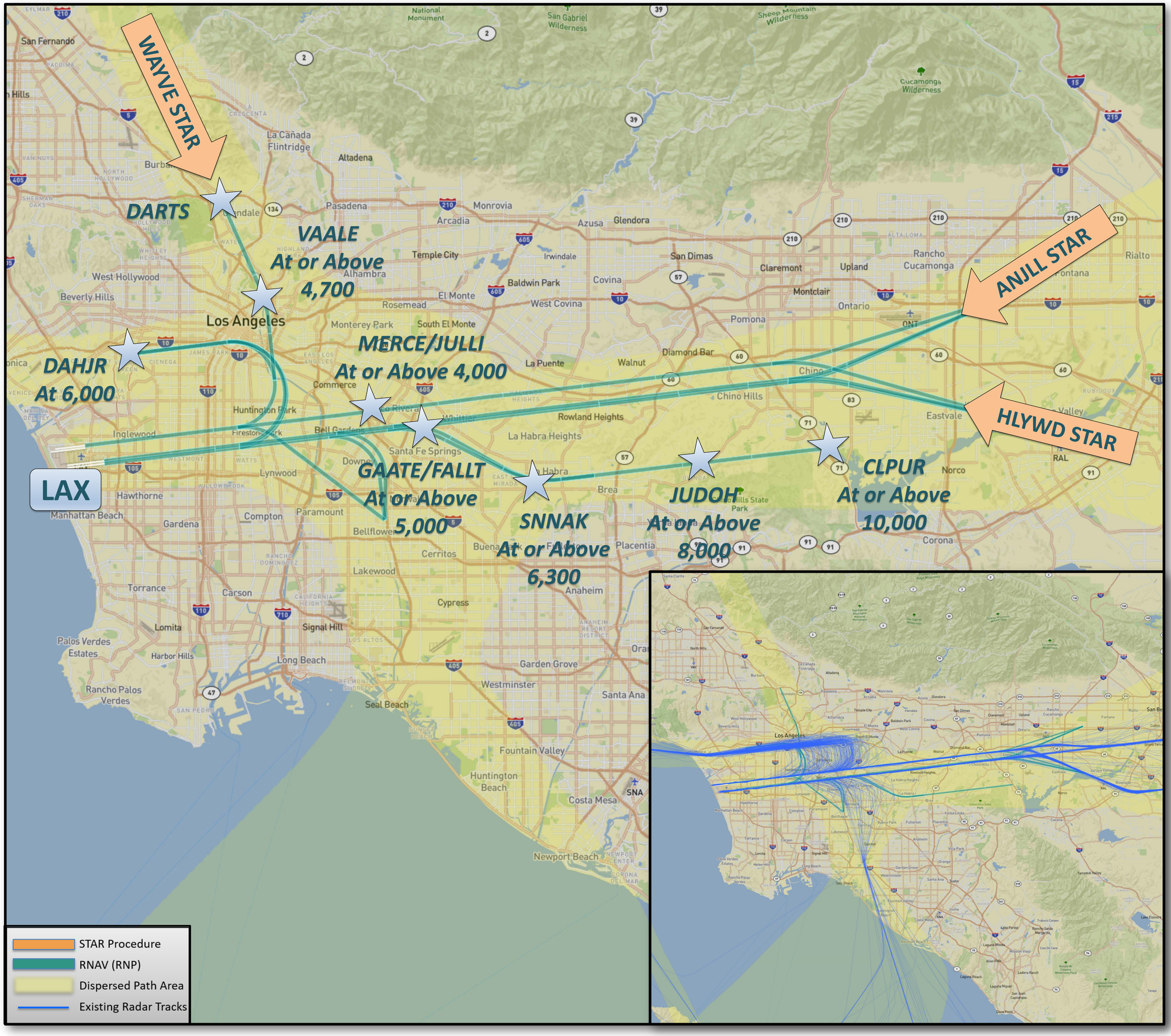
SID (Departure)

LAX WNNDY ONE RNAV SID
LAX GARDY ONE RNAV SID
LAX TUSTI ONE RNAV SID

- Metroplex Team developed several different RNAV SIDs in order to provide the greatest number of options for LAX east departures

WNNDY ONE

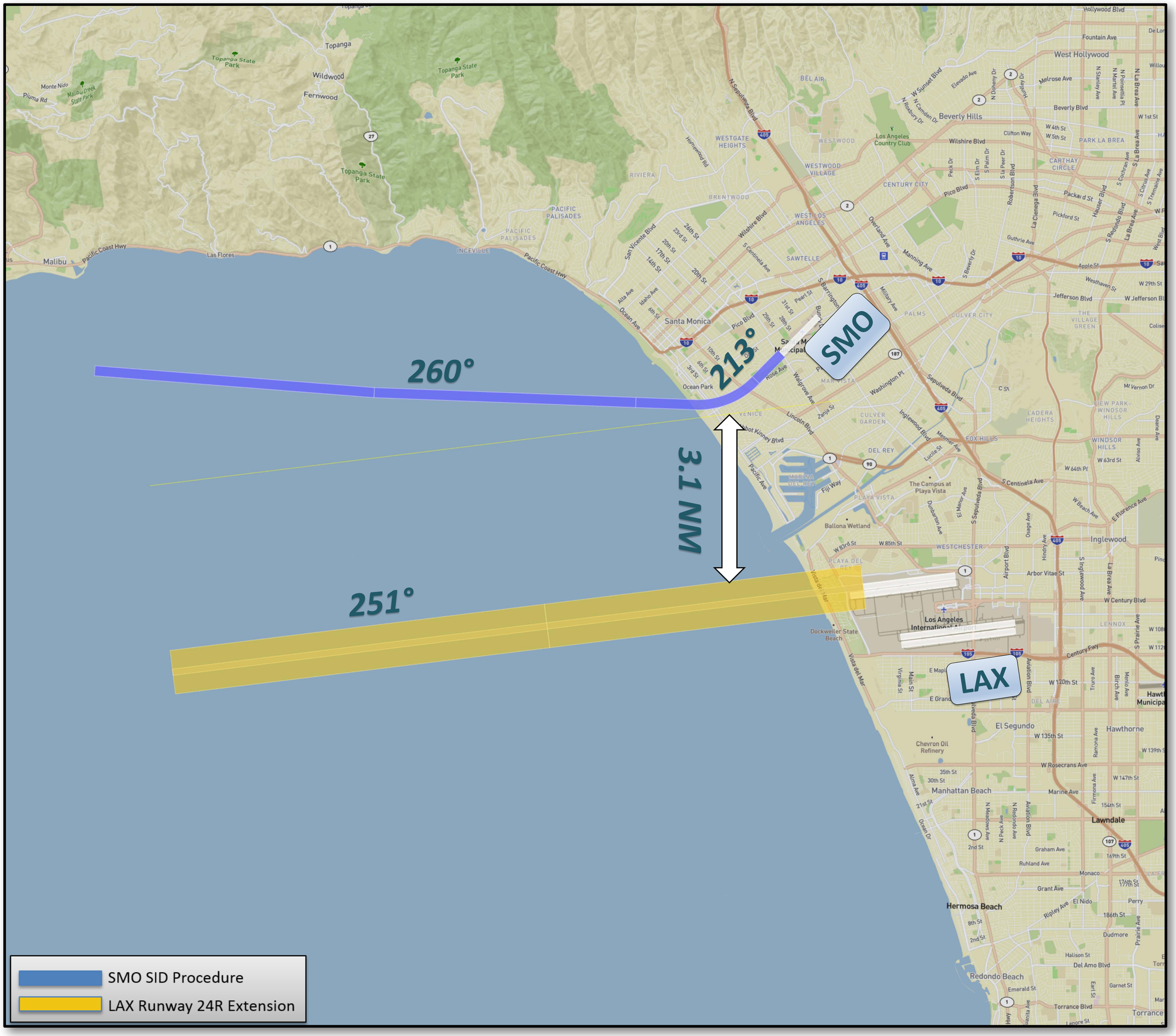
- Serves departures to the east that are routed to the northwest
- Deconflicted from BUR and VNY departures
- Provides earlier diversion of traffic flows to SFO Bay Area and Pacific Northwest



LAX Los Angeles International Airport

Instrument Approach
LAX RNAV (RNP) Z RWY 24L
LAX RNAV (RNP) Z RWY 24R
LAX RNAV (RNP) Z RWY 25L
LAX RNAV (RNP) Z RWY 25R

- STARs connect to the LAX RNAV (RNP) approaches
- The RNP approaches will provide a more repeatable and predictable path, increasing efficiency and safety for LAX arrivals
- The CLPUR offset transition will act as an offload routing to be assigned, by air traffic control only, on a dynamic basis for aircraft arriving LAX from the east
  - Meteorological conditions that exist in Los Angeles can limit the use of visual separation
  - The offset transition to LAX Runways 25 L/R approach can be assigned by ATC to maintain lateral separation between north and south complex arrivals without the need to stagger arrivals to get below a mid level ceiling that limits visual approaches
- Current ILS, Localizer, and GPS approaches were amended to provide continuity with new Metroplex designs



SMO Santa Monica Municipal Airport

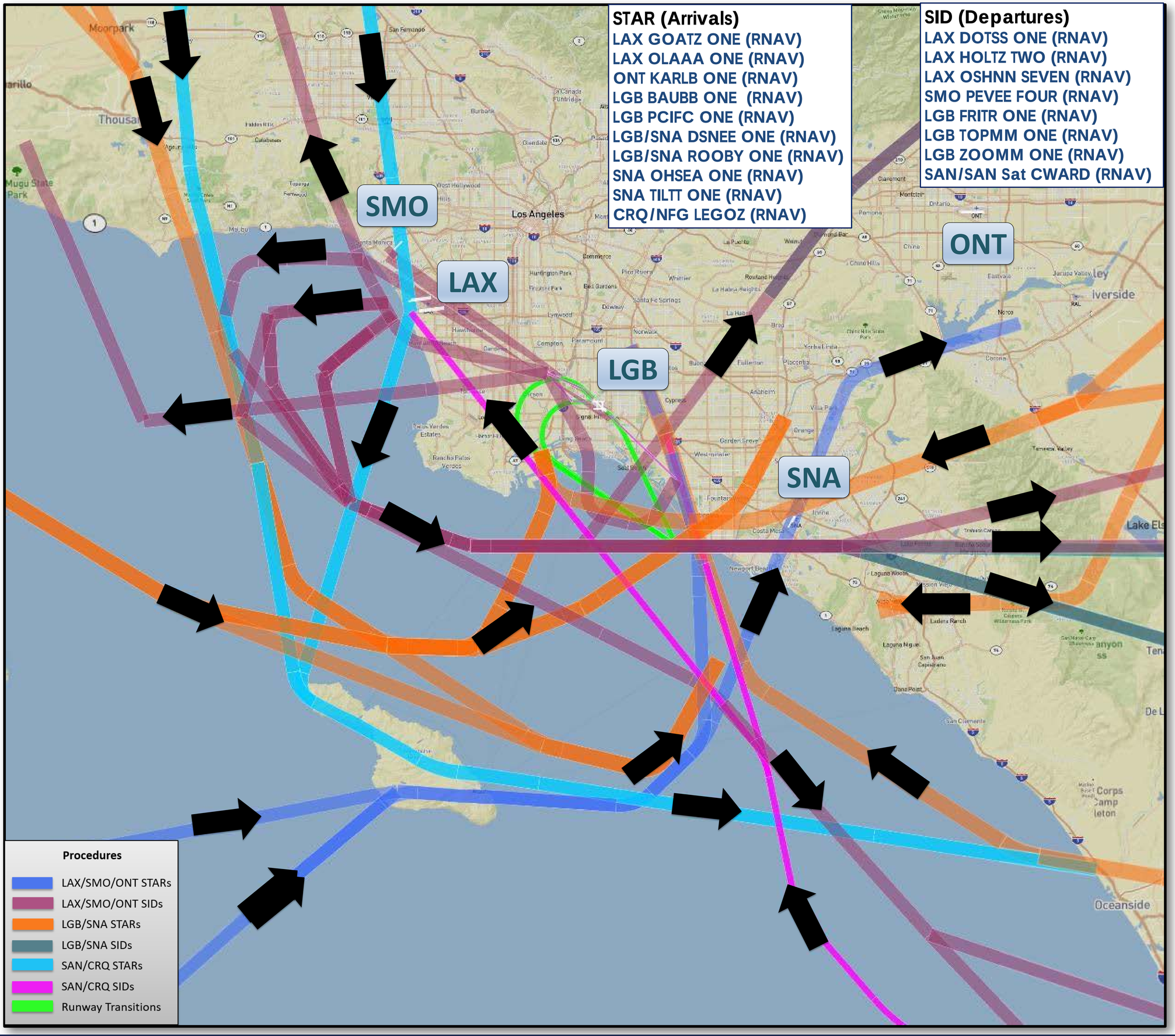
LAX Los Angeles International Airport

SID (Departure)

SMO CTRUS ONE RNAV SID
SMO PEVEE FOUR RNAV SID
SMO ONE (Props) RNAV SID

- SMO SIDs for aircraft departing to the west when LAX is departing west were designed to reduce SMO delays and allow independent operations between the two airports

- SMO SIDs maintain lateral separation between SMO and LAX departures, reducing idle time and delays at SMO



LAX Los Angeles International Airport

ONT Ontario International Airport

SMO Santa Monica Municipal Airport

LGB Long Beach Airport (Daugherty Field)

SNA John Wayne – Orange County Airport

SAN San Diego International

CRQ Mc Clellan-Palomar Airport

The Design of all procedures into and out of Southern California airports was affected by many factors including:

- Traffic flows into and out of other airports
- Military and special use airspace restrictions
- Aircraft performance
- Terrain
- Class B airspace
- Existing noise procedures