San Diego County Regional Airport Authority (SDCRAA)
Flight Procedure Evaluation
Technical Advisory Committee Meeting #2

San Diego International Airport

May 31, 2018

DRAFT Deliberative Document – For Discussion Purposes Only

Agenda

- Introductions
- Project Objectives
- Meeting Goals
- ANAC Recommendation 14 Design Concepts
- ANAC Recommendation 15 Design Concepts
- ANAC Recommendation 16 Design Concepts
- Next Steps

Introductions to Design Team

- Steve Smith – Ricondo, Project Manager
- Robert Varani – Ricondo, RNAV Procedure Concept Lead
- Kevin L. Markwell – Ricondo, Air Traffic Control Operations Lead

Project Objectives

- Evaluate and determine feasibility of potential procedure designs to meet the intent of ANAC recommendations
- Provide preliminary design concepts for RNAV SIDS and STARS based on:
  - Safety
  - FAA Performance Based Navigation (PBN) design criteria
  - FAA ATC Rules, Policies, and Procedures
- Conduct noise screening analysis on feasible alternatives
- Provide recommendations to SDCRAA

Meeting Goals

- Review preliminary design concepts
- Gather technical input from Technical Advisory Committee on:
  - Achieving ANAC recommendation intent
  - Potential operational issues/concerns

Design Parameters

- Do not change aircraft flight paths over areas exposed to CNEL 65 or higher
- Do not impact safety
- Meet FAA design criteria
- Fit within existing airspace and maintain existing airspace hand-off areas
- Do not impact capacity of SDIA
- Do not move noise to new non-compatible areas

Acronyms

- DF = Direct to a Fix
- Kts = Knots
- MDA = Minimum Descent Altitude
- MVA = Minimum Vectoring Altitude
- MSL = Mean Sea Level
- NM = Nautical Miles
- PBN = Performance Based Navigation
- RNAV = Area Navigation
- RNP = Required Navigational Performance
- SIAP = Standard Instrument Approach Procedure
- SID = Standard Instrument Departure Procedure
- STAR = Standard Instrument Arrival Route
- TARGETS = Terminal Area Route Generation Evaluation and Traffic Simulation
- VA = Heading to an Altitude
- WP = Waypoint

ANAC Noise Recommendation 14 – Reduce Noise in Mission Beach, Pacific Beach, and La Jolla

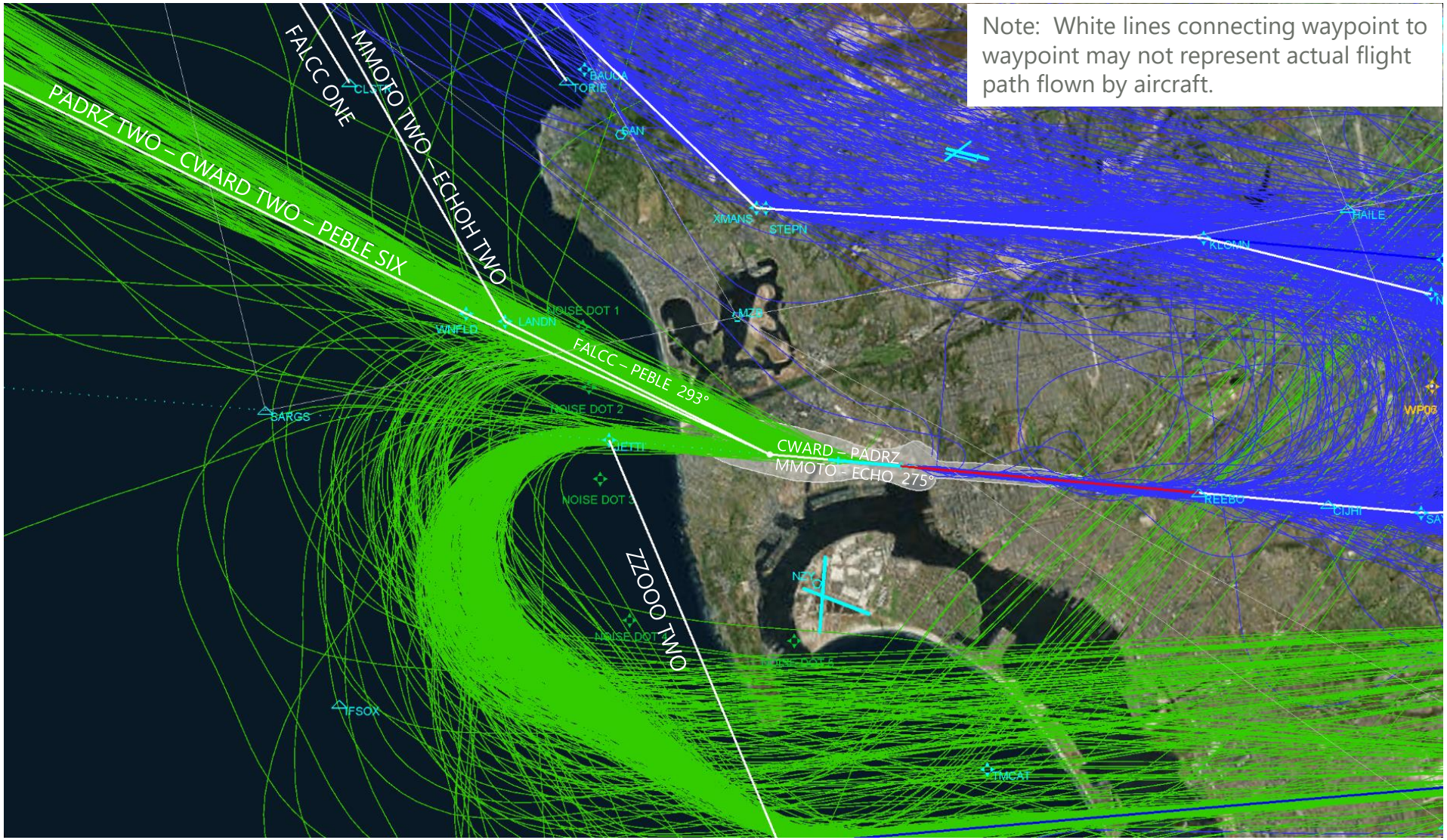
ANAC Noise Recommendation 14

Revise PADRZ SID or create a new procedure to reduce increased noise in La Jolla, Mission Beach and Pacific Beach

☐ To be studied as part of the FAR Part 150 Study

1. Move the WNFLD and LANDN waypoints south so as to align with the relocated Noise Dot #1 at 290° (15° separation from JETTI at 275°) and designate as "Flyover" waypoints in their respective SID's, consistent with JETTI.
2. Establish within the PADRZ SID procedure a horizontal distance from end of runway (1.0 miles) along a fixed heading which must be satisfied along with altitude before a right turn can be initiated to preclude flights that quickly attain the current 520' altitude and turn right of and prior to Noise Dot #1 before correcting to WYNFLD which results in aircraft flying farther north over Mission Beach.
3. PADRZ ONE SID As currently designed the PADRZ ONE departure leaves aircraft very close to and almost paralleling the coast along La Jolla, increasing noise impacts significantly. We recommend moving the WNFLD and KERNL waypoints 1.5NM south of their current positions. This will ensure aircraft proceed more directly off the coast without paralleling the shore and adds less than a mile of track distance to PADRZ.
4. Create a new procedure: BROCK-1 (alternative 1) Request FAA to revise PADRZ SID and establish new waypoint BROCK1. Adds min increased flight time and takes aircraft further offshore before turning to northern destinations. This will help all coastal neighborhoods with noise issues.
5. Create a new procedure: BROCK-2 (alternative 2 - preferred) Relocate Waypoints WNFLD and LANDN 0.75 miles directly south or adopt BROCK recommendation. Maintain 274 Departure until Altitude 520 or greater. Maintain 274 departure heading until 520 foot altitude or greater and the aircraft have reached (new) flyover waypoint 0.25 to 0.5 miles from the end of the runway before turning towards WNFLD, LANDN or new BROCK Waypoint.
6. Do not move the PADRZ SID further south to avoid negative noise impacts on the south side communities of the Point Loma Peninsula.

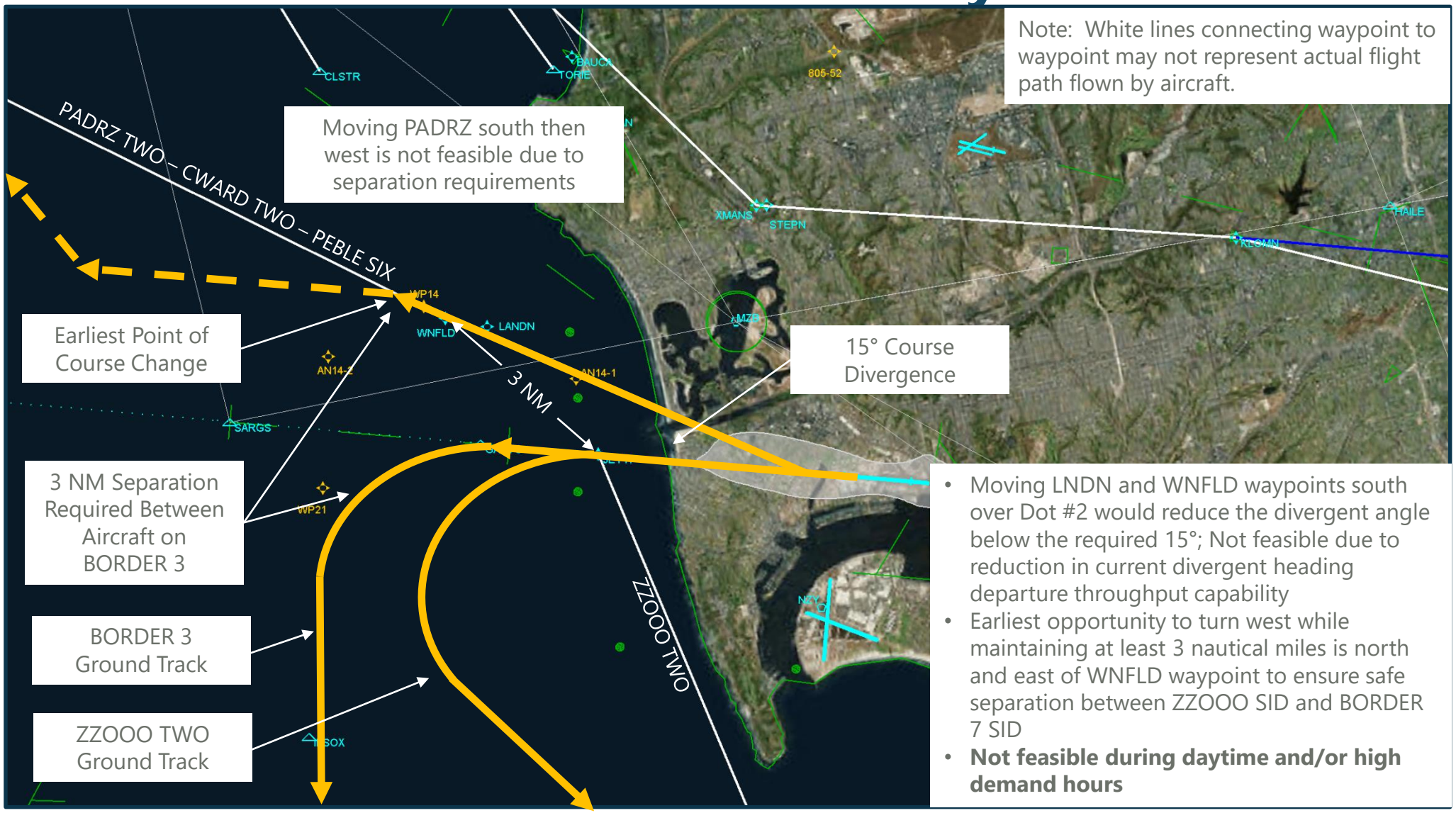
ANAC Noise Recommendation 14 – Existing Flight Tracks



ANAC Noise Recommendation 14 – Initial Review

1. *Move LNDN and WNFLD waypoint south in line with Dot #2*:
   - The magnetic heading from the departure end of Runway 27 is 287°, which is 12° from 275° heading. Moving LNDN and WNFLD waypoints south over Dot #2 would reduce the divergent angle below the required 15°.
   - Not feasible due to reduction in current divergent heading departure throughput capability
2. *Establish within the PADRZ SID procedure a horizontal distance from end of runway (1.0 miles) along a fixed heading which must be satisfied along with altitude before a right turn*: Change to initial heading design will be evaluated in FAR Part 150 Study
3. *Move WNFLD and KERNL waypoints 1.5 miles south of current location*:
   - If aircraft turn more westerly prior to reaching WNFLD, the divergence angle is no longer 15° ; therefore, the procedure must ensure aircraft heading south and north are laterally separated by 3 nautical miles (note: FAA ATC applies an additional buffer between 0.5 to 1 nautical mile to the 3 nautical mile requirement)
   - The earliest opportunity to turn west is north and east of WNFLD waypoint to ensure separation between ZZOOO SID and BORDER 7 SID
4. *Create BROCK-1 procedure*: Is not feasible during daytime hours for same reasons as #3 above, but a procedure similar to the BROCK recommendations for nighttime operations when all traffic is on a 290° heading (existing VA to DF coding) is feasible (see ANAC 14 Alternatives 1, 2 and 3)
5. *Create BROCK-2 procedure*: See #4 above

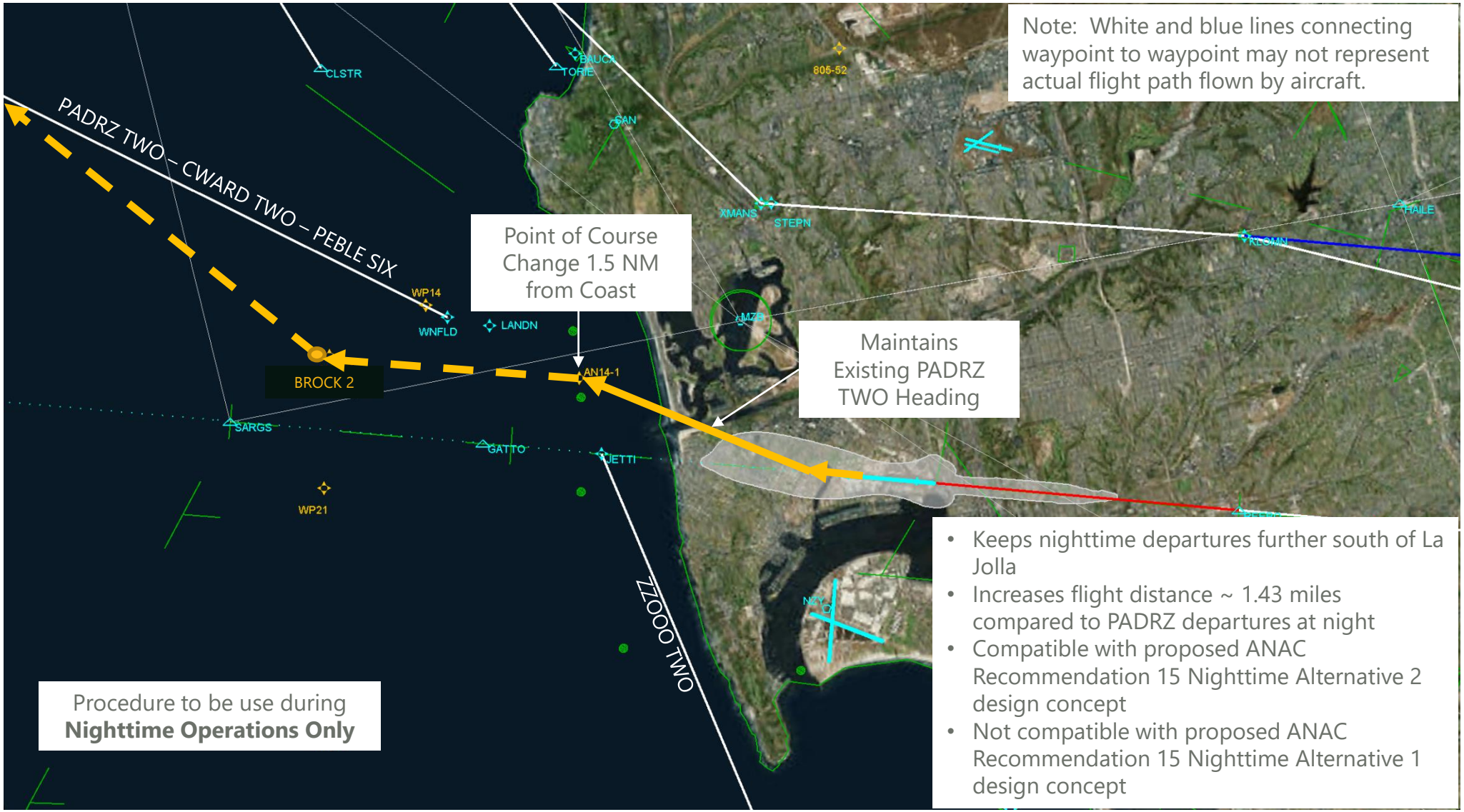
ANAC Noise Recommendation 14 – Day Time Issues



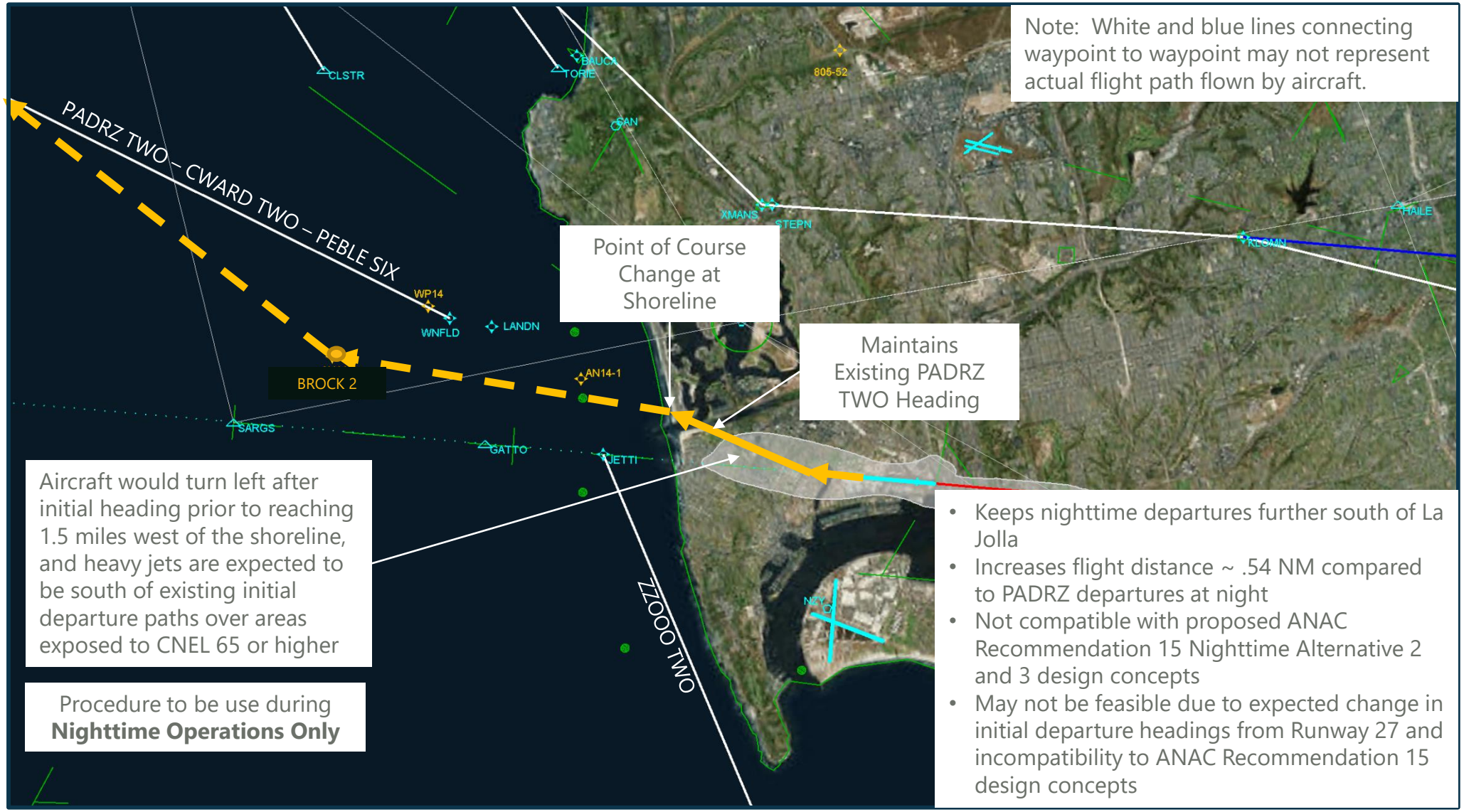
ANAC Noise Recommendation 14 – Nighttime Alternatives

- Alternative 1 - Turn at 1.5 nautical mile (NM) from shoreline
  - Maintains existing initial departure design (VA to DF leg coding)
  - Consistent with FAA Dot agreement
  - Projected flight track on initial heading is consistent with current flight tracks
- Alternative 2 – Turn at shoreline
  - Maintains initial departure design (VA to DF leg coding)
  - Turn location prior to Noise Dot agreement
  - Projected flight track on initial heading is consistent with current flight tracks
- Alternative 3 – Turn at earliest point possible
  - Maintains existing initial departure design
  - Turn occurs where existing design (VA to DF leg coding) heading intersects the DNL 65 contour
  - Turn location prior to FAA Dot agreement
  - Projected flight track on initial heading strays from current flight tracks to the south (potential for change in DNL 65 area)
- All Alternatives not feasible during Contra-Flow operations (arrivals on Runway 9 and departures on Runway 27)

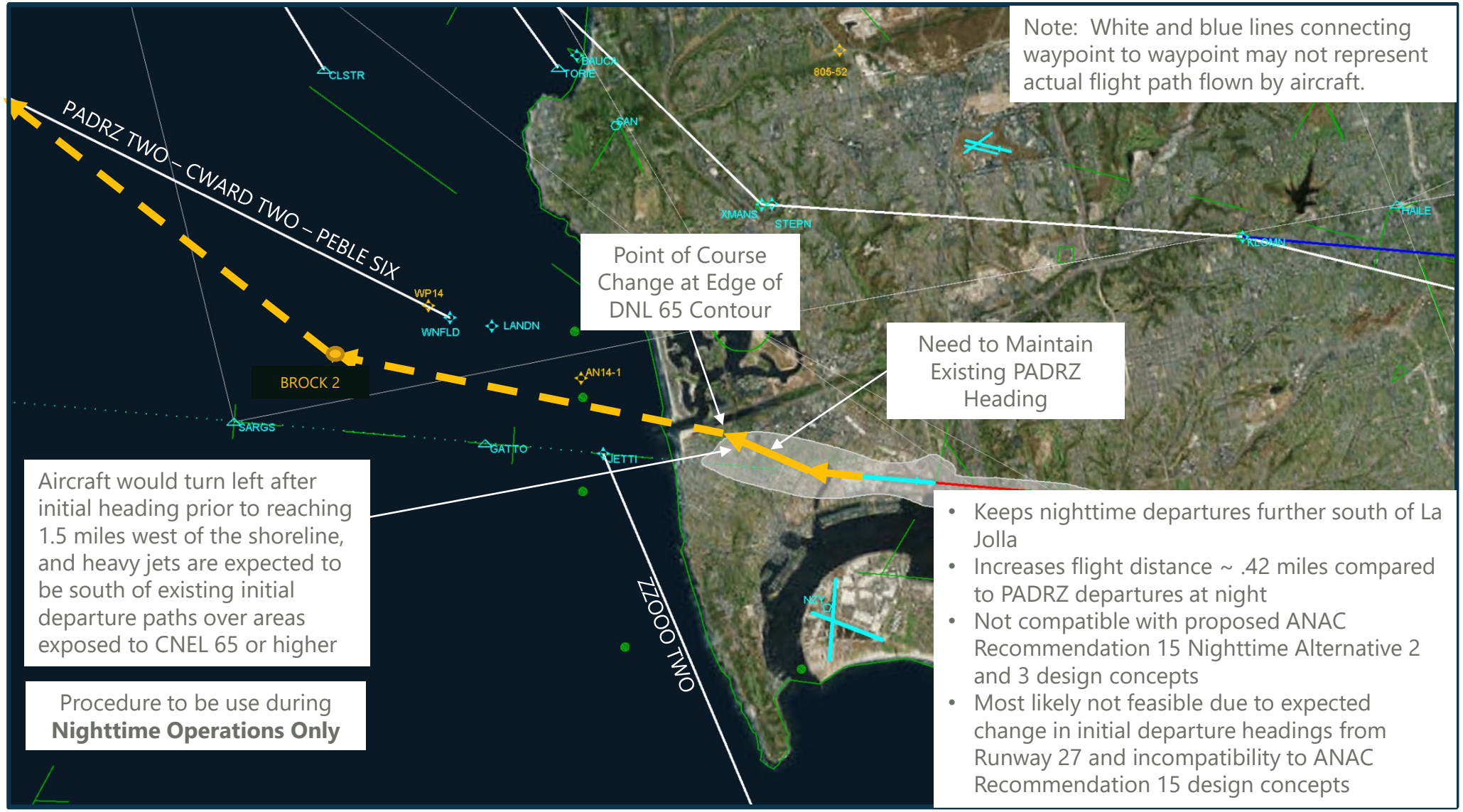
ANAC Noise Recommendation 14 – Alt 1 Turn at 1.5 NM



ANAC Noise Recommendation 14 – Alt 2 Turn at Shoreline



ANAC Noise Recommendation 14 – Alt 3 Turn at DNL 65



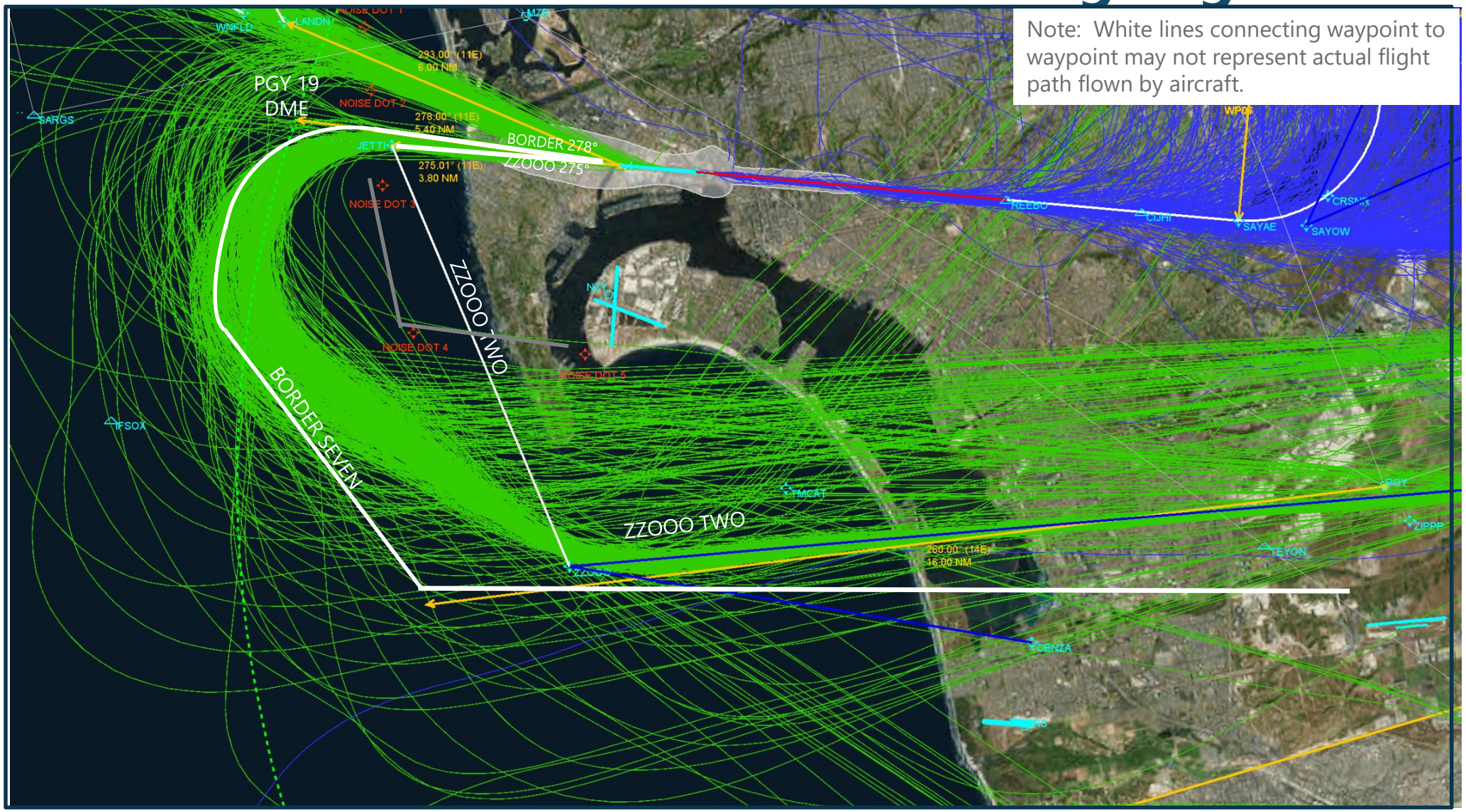
ANAC Noise Recommendation 15 – Reduce Noise Over the Point Loma Peninsula and La Jolla

ANAC Noise Recommendation 15

Revise ZZOOO to significantly reduce or eliminate flights over the Point Loma Peninsula, including Cabrillo National Park and reduce or eliminate eastbound turns over La Jolla. To be studied as part of the FAR Part 150 Study

1. East bound flights should reach a minimum of 8K feet before crossing over ZZOOO to minimize thrusters and reduce duration of noise impacts over Point Loma.
2. FAA\TRACON to discourage the practice of redirecting flights off of their filed ZZOOO flight plan departure, to turn north then east over La Jolla. FAA to increase minimum SID flyover\flyby altitudes to encourage increased climb rates.
3. FAA\TRACON to direct that ALL SAN departure separation be limited to between JETTI (275°) and the historical Red Noise Dot #1 (290° vectors from the end of runway 27) for LNSAY, BORDER, PEBLE and ZZOOO, etc. (plus all new Metroplex SID's); Prohibit 250° to 275° departure vector range, except for specific safety events ("Runway 27 STAR Missed Approach Wave Off").
4. Follow ZZOOO procedure, comply with the JETTI flyover waypoint and consider the establishment of a minimum vectoring altitude for Eastbound turns.
5. The ZZOOO ONE departure as currently designed puts departing aircraft to close to the Point Loma peninsula and the southern end of coastal La Jolla, subjecting residents to increased and at times incessant noise from departing aircraft. Aircraft need to be further offshore before beginning the turn south to the ZZOOO waypoint. We recommend replacing the JETTI waypoint with a waypoint along the same track from the departure end of runway 27 that is 2 NM further west, located at approximately 32.75360N -117.25755W.

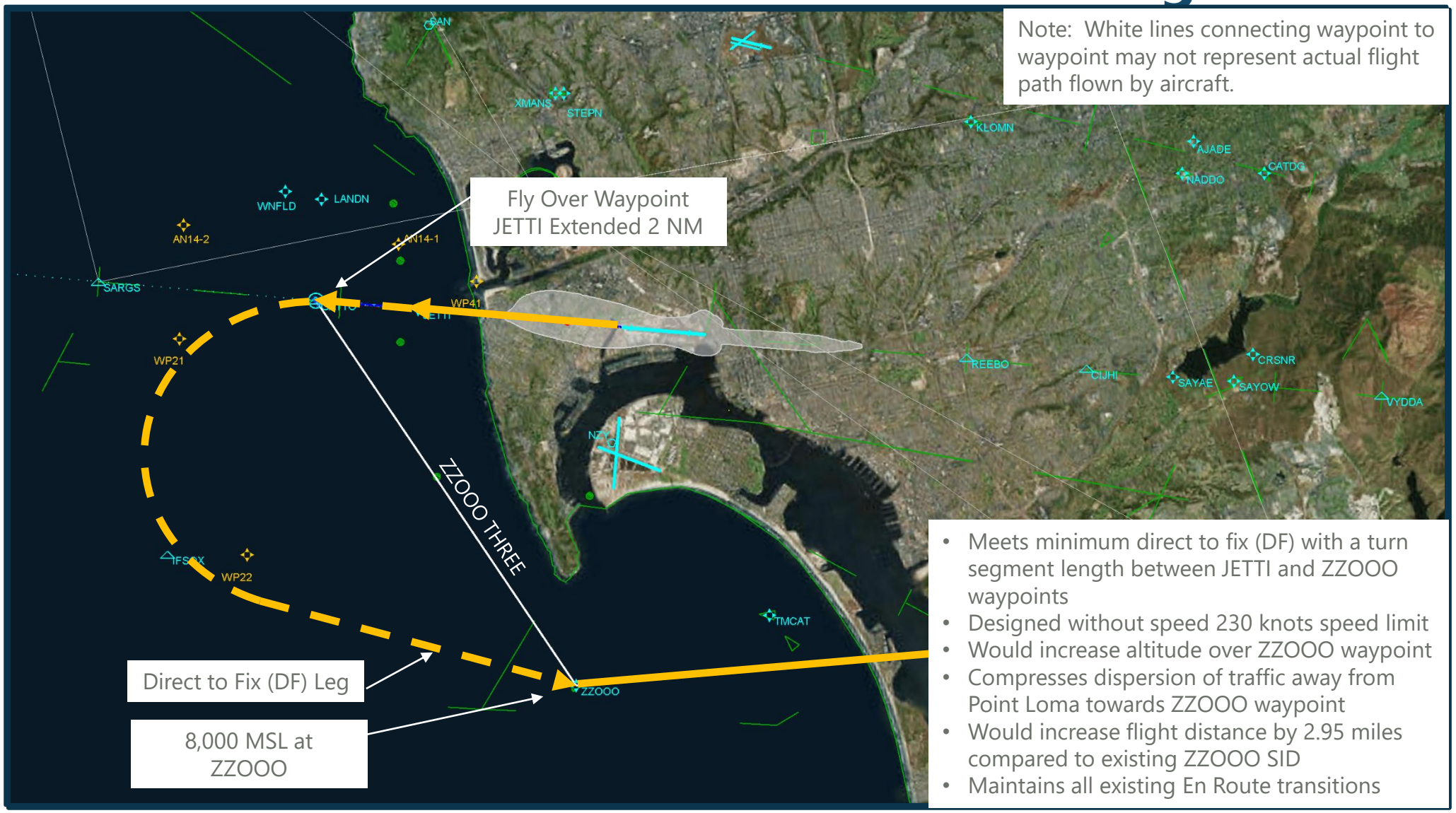
ANAC Noise Recommendation 15 – Existing Flight Tracks



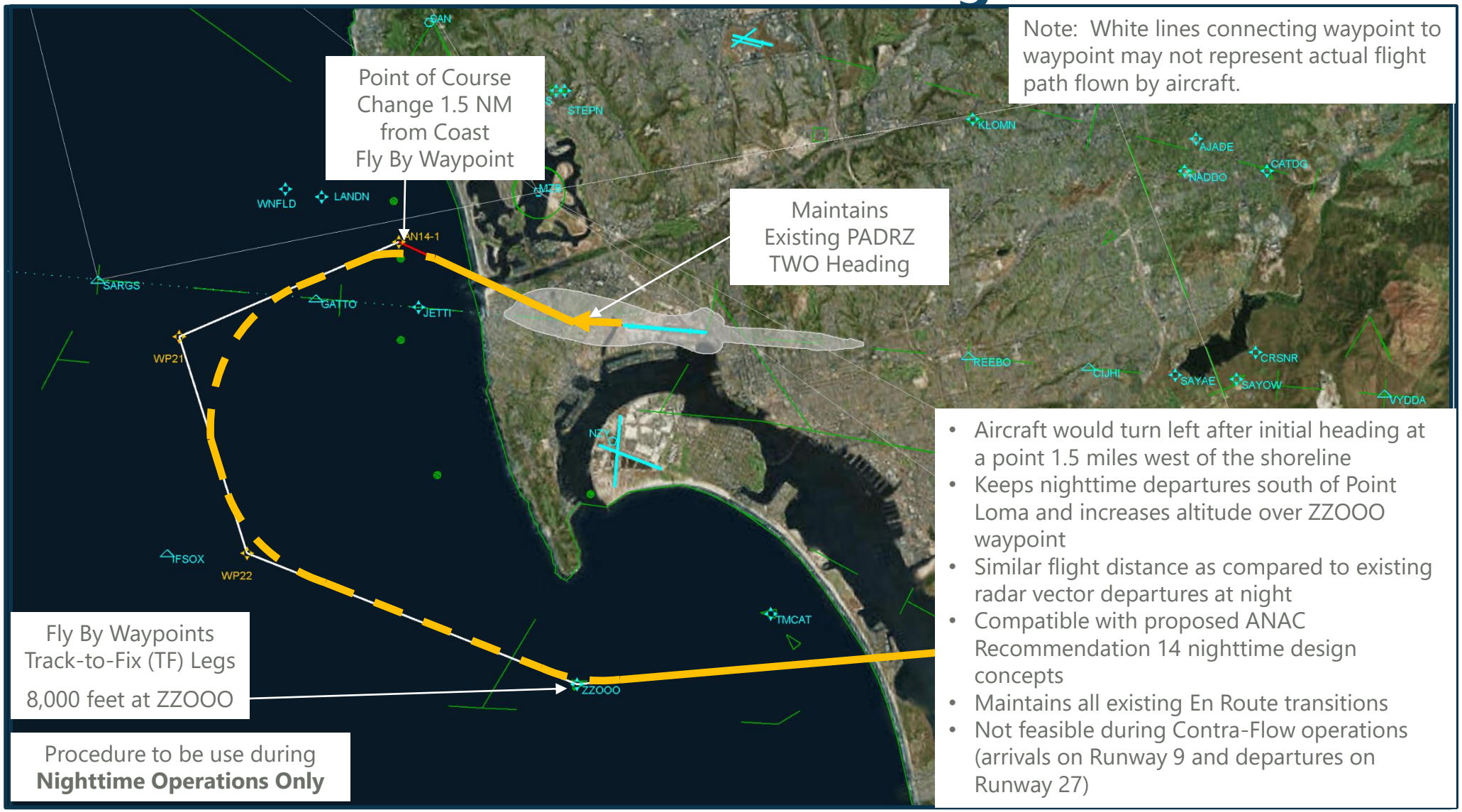
ANAC Noise Recommendation 15 – Initial Review

1. *East bound flights should reach a minimum of 8K feet before crossing over ZZOOO*: A requirement of 8,000 MSL at ZZOOO waypoint is not feasible based on existing design of procedure, but may be possible if existing procedure design is modified (see ANAC 15 Alternative 1).
2. *Redirecting flights off of their filed ZZOOO flight plan departure, to turn north then east over La Jolla*: If an RNAV SID is implemented for eastbound departures on a directed 290° heading and thence directed towards ZZOOO waypoint, it would decrease frequency of traffic vectored north then east over La Jolla (ANAC 15 Alternatives 2 and 3 addresses this issue).
3. *Direct that ALL SAN departure separation be limited to between JETTI (275°) and the historical Red Noise Dot #1 (290° vectors from the end of runway 27)*: Initial or directed heading at departure to be addressed in FAR Part 150 Study.
4. *Comply with the JETTI flyover waypoint and consider the establishment of a minimum vectoring altitude for Eastbound turns*: ZZOOO SID complies with recommendation for flight paths within 275° heading. ZZOOO SID is an RNAV procedure and has no minimum vectoring altitudes (MVA). MVA is driven by obstacle clearance. If the intent is to raise the altitude on specific segments, MVA is not a feasible method.
5. *Aircraft need to be further offshore before beginning the turn south to the ZZOOO waypoint*: Increasing distance from Point Loma shoreline as aircraft turn back to the east would require a modification to ZZOOO SID design (see ANAC 15 Alternative 1). Moving the JETTI waypoint further west is intended to raise altitude over ZZOOO and increase distance from the Point Loma shoreline (see ANAC 15 Alternative 1).

ANAC Noise Recommendation 15 – Alt 1 Design

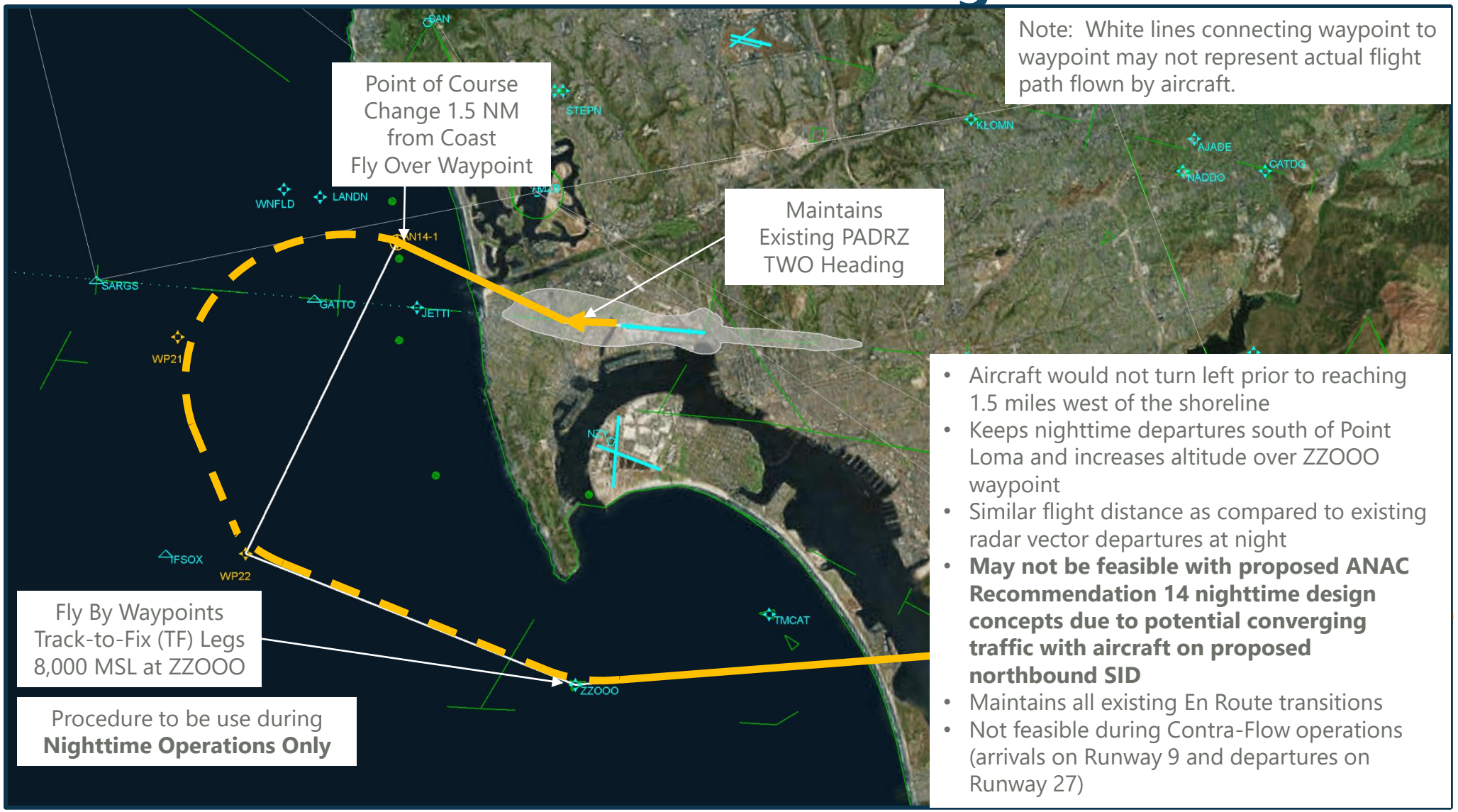


ANAC Noise Recommendation 15 – Night Alt 2



- Aircraft would turn left after initial heading at a point 1.5 miles west of the shoreline
- Keeps nighttime departures south of Point Loma and increases altitude over ZZOOO waypoint
- Similar flight distance as compared to existing radar vector departures at night
- Compatible with proposed ANAC Recommendation 14 nighttime design concepts
- Maintains all existing En Route transitions
- Not feasible during Contra-Flow operations (arrivals on Runway 9 and departures on Runway 27)

ANAC Noise Recommendation 15 – Night Alt 3



- Aircraft would not turn left prior to reaching 1.5 miles west of the shoreline
- Keeps nighttime departures south of Point Loma and increases altitude over ZZOOO waypoint
- Similar flight distance as compared to existing radar vector departures at night
- **May not be feasible with proposed ANAC Recommendation 14 nighttime design concepts due to potential converging traffic with aircraft on proposed northbound SID**
- Maintains all existing En Route transitions
- Not feasible during Contra-Flow operations (arrivals on Runway 9 and departures on Runway 27)

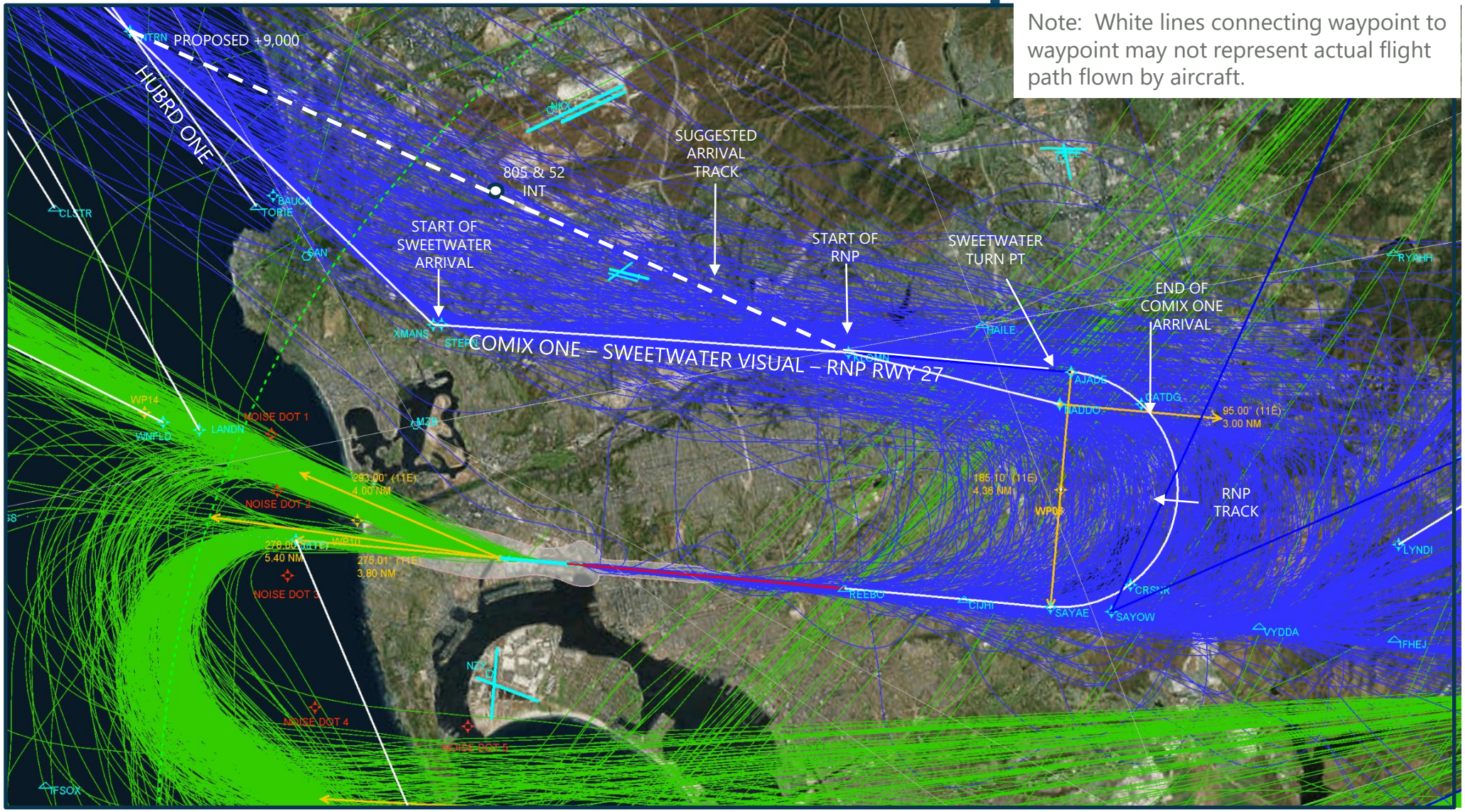
ANAC Noise Recommendation 16 – Reduce Arrival Noise Over La Jolla and East County Communities

ANAC Noise Recommendation 16

Reassess and revise the entire arrival corridor in a manner that more appropriately "shares the noise" instead of concentrating arrivals from the North in a very narrow corridor.

1. Revise COMIX STAR procedure in order to shift flights that Metroplex has moved and concentrated farther South (the downwind leg) over less populated areas and restore prior altitude.
2. Shift the way point XMANS on the COMIX STAR north to a location that is over the interstate freeway 805 and 52 with the constraint to remain clear of MCAS Miramar's airspace. It would come ashore over Torrey Pines State Park before connecting with KLOMN.
3. Increase Min. Altitude at LNTRN (LCOVE) at or above 10,000. This change would result in aircraft flying over less populated areas, including industrial businesses, thus reducing the noise impact and saving time/fuel. This proposed path is closer to the historical flight tracks pre-NextGen.
4. COMIX ONE STAR: The RNAV-only COMIX ONE arrival is very similar to the existing non-RNAV BAYVU arrival in terms of ground track with a key difference being that the COMIX arrival has an "at or above 8,000 feet" altitude restriction on its last offshore waypoint (LANTRN). The BAYVU arrival has an "at or above 9,000 feet" restriction at its nearly identically-located LCOVE waypoint. This has resulted in aircraft being lower and noisier over La Jolla. We recommend changing the LANTRN waypoint's altitude restriction to "at or above 9,000 feet".

ANAC Noise Recommendation 16 - Graphic

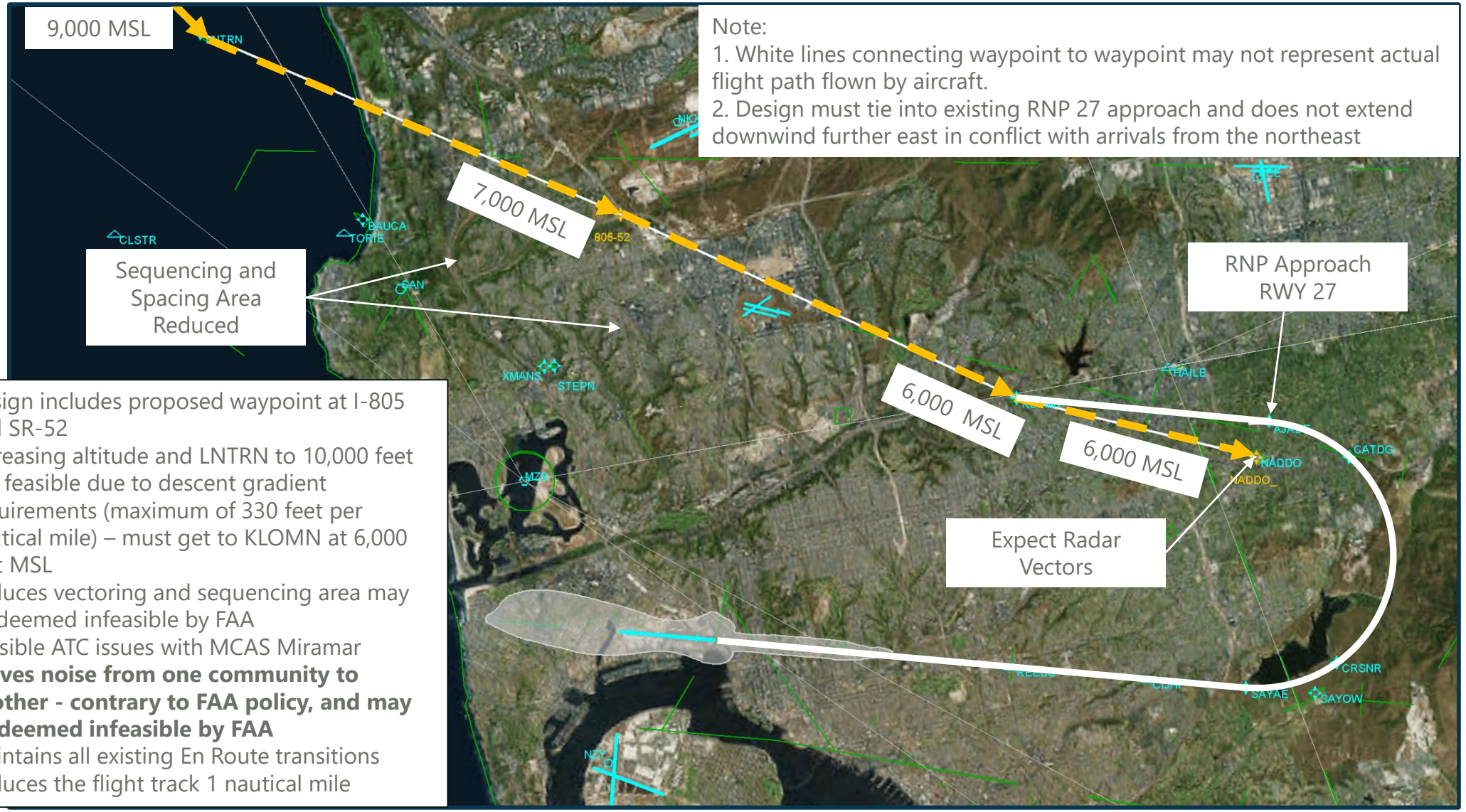


Note: White lines connecting waypoint to waypoint may not represent actual flight path flown by aircraft.

ANAC Noise Recommendation 16 – Initial Review

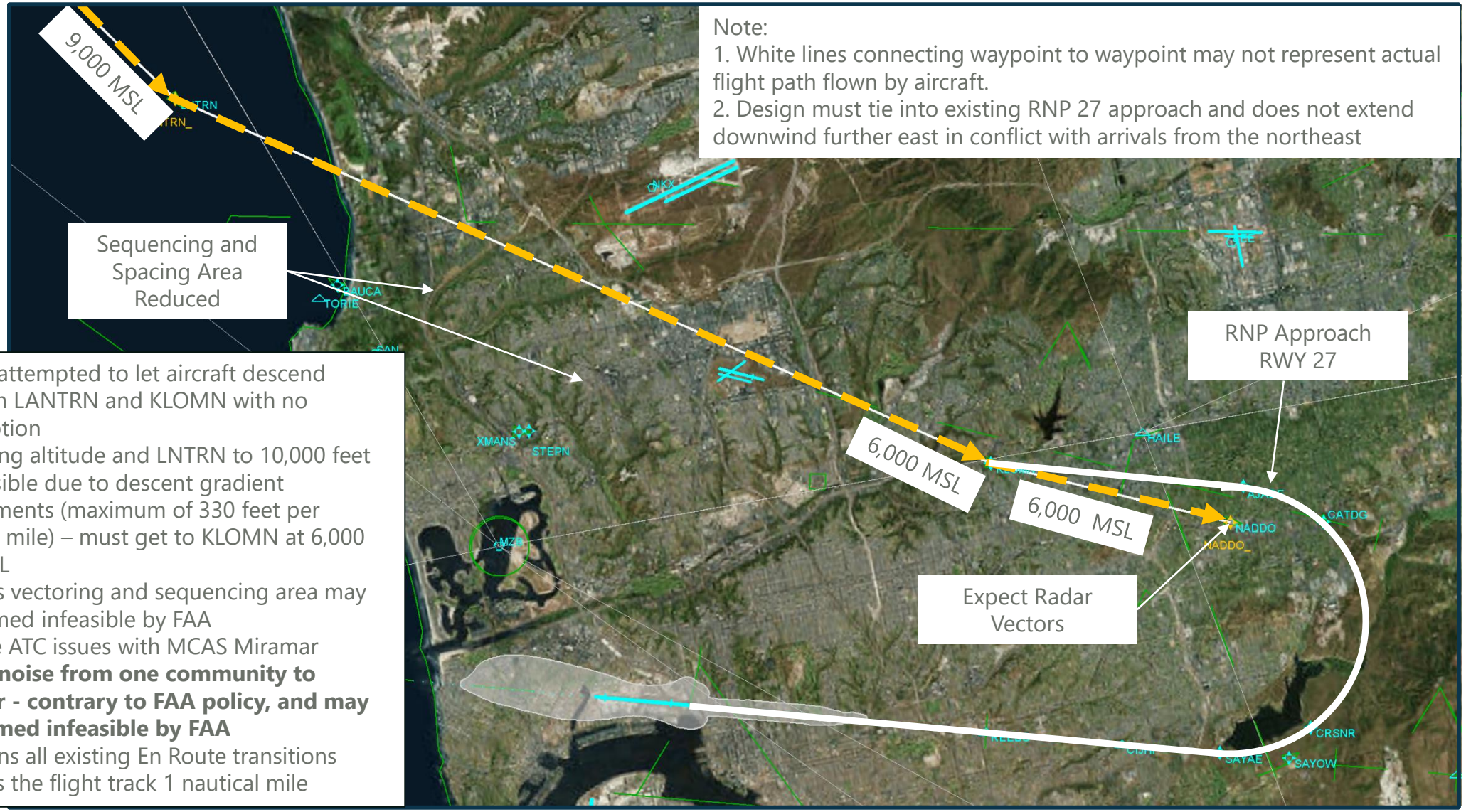
1. *Revise COMIX STAR procedure in order to shift flights over less populated areas and restore prior altitude*: Leg between KLOMN waypoint to NADDO waypoint was designed to prevent Class B airspace excursions. This leg cannot be changed until the Class B redesign is complete. Path may be modified post Class B design.
2. *Shift the way point XMANS on the COMIX STAR north to a location that is over the interstate freeway 805 and 52*: Crossing the shoreline over Torey Pines State Park and heading to XMAN waypoint shifted north over I-805 and SR-52 would reduce the flight track 1 nautical mile (NM) (see ANAC Recommendation 16 Alternative 1 and 2)
   - Reduction in vectoring and sequencing area may be deemed infeasible by FAA
   - Possible ATC issues with Miramar Marine Corps Air Station
   - Moving noise from one community to another is contrary to FAA policy, and may be deemed infeasible by FAA – aircraft overflight location moved over another community and aircraft are lower in altitude
3. *Increase Min. Altitude at LNTRN (LCOVE) at or above 10,000*: Increasing LNTRN to 10,000 feet is not feasible based on current design
   - Increasing to 10,000 feet would exceed the descent gradient criteria (maximum of 330 feet per nautical mile) from LNTRN to KLOMN waypoint at 6,000 feet MSL along the existing COMIX path.
   - Increasing altitude at LNTRN to 10,000 feet along route shifted north would also exceed descent gradient criteria.
4. *Change the LANTRN waypoint's altitude restriction to "at or above 9,000 feet"*: According to FAA information posted on the FAA Instrument Flight Procedure Gateway Production page for SAN, the COMIX TWO STAR is expected raise the altitude from at or above 8,000 to at or above 9,000 feet at the LNTRN waypoint.

ANAC Noise Recommendation 16 – Alt 1



- Design includes proposed waypoint at I-805 and SR-52
- Increasing altitude and LNTRN to 10,000 feet not feasible due to descent gradient requirements (maximum of 330 feet per nautical mile) – must get to KLOMN at 6,000 feet MSL
- Reduces vectoring and sequencing area may be deemed infeasible by FAA
- Possible ATC issues with MCAS Miramar
- **Moves noise from one community to another - contrary to FAA policy, and may be deemed infeasible by FAA**
- Maintains all existing En Route transitions
- Reduces the flight track 1 nautical mile

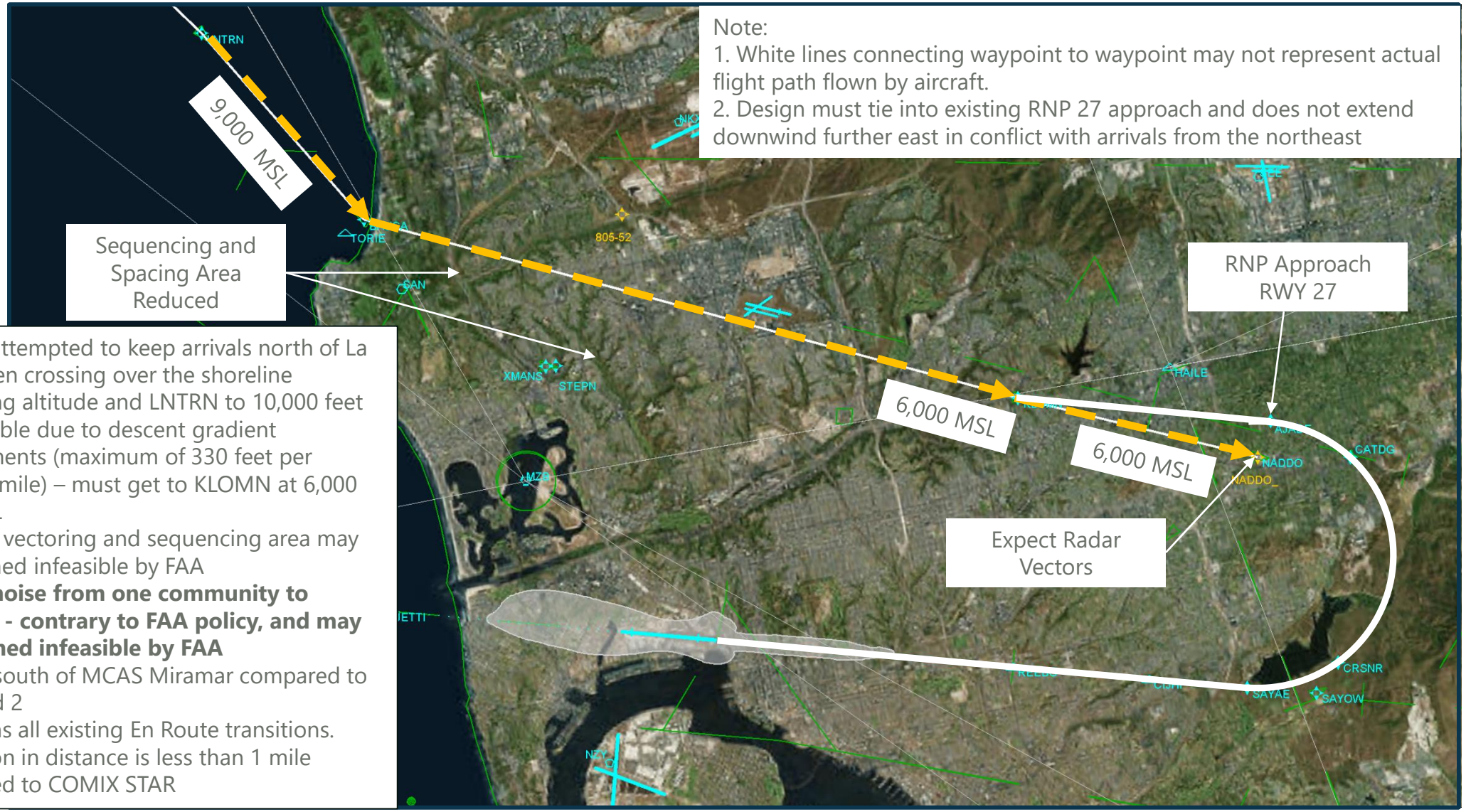
ANAC Noise Recommendation 16 – Alt 2



Note:
1. White lines connecting waypoint to waypoint may not represent actual flight path flown by aircraft.
2. Design must tie into existing RNP 27 approach and does not extend downwind further east in conflict with arrivals from the northeast

- Design attempted to let aircraft descend between LANTRN and KLOMN with no interruption
- Increasing altitude and LNTRN to 10,000 feet not feasible due to descent gradient requirements (maximum of 330 feet per nautical mile) – must get to KLOMN at 6,000 feet MSL
- Reduces vectoring and sequencing area may be deemed infeasible by FAA
- Possible ATC issues with MCAS Miramar
- **Moves noise from one community to another - contrary to FAA policy, and may be deemed infeasible by FAA**
- Maintains all existing En Route transitions
- Reduces the flight track 1 nautical mile

ANAC Noise Recommendation 16 – Alt 3



- Design attempted to keep arrivals north of La Jolla when crossing over the shoreline
- Increasing altitude and LNTRN to 10,000 feet not feasible due to descent gradient requirements (maximum of 330 feet per nautical mile) – must get to KLOMN at 6,000 feet MSL
- Reduces vectoring and sequencing area may be deemed infeasible by FAA
- **Moves noise from one community to another - contrary to FAA policy, and may be deemed infeasible by FAA**
- Further south of MCAS Miramar compared to Alt 1 and 2
- Maintains all existing En Route transitions.
- Reduction in distance is less than 1 mile compared to COMIX STAR

Discussion

Next Steps – Action Items and Next TAC Meeting