

March 2019

San Diego International Airport

Review and Analysis of:

Airport Noise Advisory Committee Recommendations 18, 19, and 20

Prepared for:

San Diego County Regional Airport Authority

Prepared by:

RICONDO

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1. SUMMARY OF FINDINGS

This report documents Ricondo & Associates, Inc. (Ricondo) findings and recommendations related to the San Diego International Airport (SDIA) Airport Noise Advisory Committee (ANAC) Recommendations 18, 19, and 20.

A summary of the findings for the three ANAC recommendations are as follows:

- ANAC Noise Recommendation 18, Independent Definition of an Early Turn – Based on research conducted, Ricondo defines an “early turn” as follows: Runway 27 jet departures or missed approaches that are vectored off an initial departure heading prior to 1.5 nautical miles west of the shoreline or those aircraft routed back (south and east bound) over residential areas of Point Loma north of Fort Rosecrans National Cemetery, with the exception of aircraft vectored off course to ensure safe separation. Ricondo recommends the adoption of this definition as a baseline for the future and is consistent with Federal Aviation Administration’s (FAA) standard operating procedures. The San Diego County Regional Airport Authority (Authority) definition is consistent with Ricondo’s recommended definition, but should add missed approaches to confirm missed approaches stay on FAA air traffic controller assigned initial heading until 1.5 nautical miles west of the shoreline. The FAA is the only entity capable of identifying whether an early turn was initiated for separation purposes or not. The Authority should continue to presume all early turns measured are non-compliant unless Authority staff obtains fact-based evidence of separation requirements (e.g. to avoid adverse weather along the departure path, separate from arrivals to Runway 9, air traffic controller/pilot communication indicating need to divert) and/or FAA can confirm an early turn was necessary to maintain safe separation.
- ANAC Noise Recommendation 19, Modification of Standard Instrument Departure (SID) Flight Procedures to Mitigate Early Turns – The intent of this recommendation is met by the design of the existing SID procedures and is duplicative of Recommendations 14 and 15; therefore, Ricondo recommends not to advance this recommendation forward as a separate concept.
- ANAC Noise Recommendation 20, Incorporation of Noise Dots into Flight Procedures – Incorporating noise dots as waypoints in existing or proposed SIDs is not feasible. The current Area Navigation (RNAV) departures comply with the early-turn restrictions. The focus should be to work with FAA on keeping aircraft on the RNAV departure procedures. An alternative concept to move Noise Dots #3 and #4 south of Point Loma was considered, but most likely will not be feasible based on preliminary feedback from FAA.

2. AIRPORT NOISE ADVISORY COMMITTEE RECOMMENDATION 18

2.1 INDEPENDENT DEFINITION OF AN EARLY TURN

The specific goals of ANAC Noise Recommendation 18 was to review the current definition of an early turn, define what an early turn means, and conduct comparative analyses of actual flight paths if the definition is found to vary from the one applied by the Authority.

Ricondo’s assessment was based on discussions with Authority staff, and source material provided by the Authority and FAA including:

- San Diego County Regional Airport Authority Board (Authority Board) Staff Report, Item #12, “Status Update and Possible Action on Community Noise Issues on Noise Dots,” April 21, 2016 (April 2016 Authority Staff Report) and Attachments
 - Attachment 1: Correspondence from Representative Brian Bilbray on October 28, 1998 (Rep. Bilbray letter)
 - Attachment 2: California State Auditor report titled, San Diego International Airport at Lindbergh Field, Local Government, Including the San Diego Unified Port District, Can Improve Efforts to Reduce the Noise Impact Area and Address Public Dissatisfaction (California State Auditor Report)
- Historical Southern California Terminal Radar Approach Control (SCT) 2007, 2009, 2012, and 2017 radar video maps (radar video maps)
- Noise dot latitudes and longitudes provided via email correspondence from Authority staff, FAA staff, and community members in 2005 and 2016 (refer to **Appendix A** for email correspondence)
- Noise dot coordinate information from the Authority’s Airport Noise and Operations Monitoring System (ANOMS) (refer to Appendix A for email correspondence)
- Mr. Paul Grimes comment letter to the FAA Western Service Center, Operations Support Group, on the *SoCal Metroplex Draft Environmental Assessment, September 25, 2015* (Mr. Grimes letter) (refer to Appendix A for a copy of the letter)
- Review of the FAA Order 7110.65B, *Southern California Terminal Radar Control Standard Operating Procedures*, March 29, 2018 (2018 SCT SOP)¹
- Review of the Southern California Terminal Radar Approach Control and Lindbergh Airport Traffic Control Tower Letter of Agreement, June 27, 2017 (SCT-SAN ATCT LOA)²
- February 2019 ANAC Agenda Package, “Early-Turn Statistics”³ (February 2019 ANAC Agenda Package)

The source materials listed above were the best available at the time this analysis was conducted. A summary of the information considered from each source, along with a citation for each source, is provided in **Appendix B**.

2.1.1 THE AUTHORITY’S DEFINITION OF AN EARLY TURN

The concept of an early turn began following efforts of Representative Brian Bilbray, the FAA, and Point Loma community members to reduce aircraft noise exposure in residential areas of Point Loma in October 1998. As a result of these efforts, FAA added dots to the SCT Air Traffic Control (ATC) radar screens as visual references to assist

¹ FAA Order 7110.65B - Southern California Terminal Radar Control Standard Operating Procedures, March 29, 2018 (Confidential document made available for Ricondo & Associates, Inc. review by the Federal Aviation Administration).

² Southern California Terminal Radar Approach Control and Lindbergh Airport Traffic Control Tower Letter of Agreement, June 27, 2017 (Confidential document made available for Ricondo & Associates, Inc. review by the Federal Aviation Administration).

³ San Diego County Regional Airport Authority, Airport Noise Advisory Committee Agenda, “Item 2.c: Early-Turn Statistics,” December 19, 2018 (Page 5).

https://www.san.org/DesktopModules/Bring2mind/DMX/Download.aspx?EntryId=12501&Command=Core_Download&language=en-US&PortalId=0&TabId=487.

controllers with vectoring aircraft out and south of the residential areas of Point Loma. Although there is no formal agreement in place, this initiative is commonly referred to as the “FAA Noise Dot Agreement.”

Based on discussions with Authority staff, review of several references found in the April 2016 Authority Staff Report, and review of the February 2019 ANAC Agenda Package, early turns for Runway 27 are currently defined by the Authority as follows:

- jet aircraft departures turning to the right 300 feet or more prior to Noise Dot 1 located 1.5 nautical miles (NM) from the shoreline on a 295-degree heading;
- jet aircraft departures turning to the left 300 feet or more prior to Noise Dot 3 located 1.5 NM from the shoreline on a 265-degree heading; and/or
- jet aircraft departures that turn south or east over the residential areas of the Point Loma peninsula 300 feet or more north of Noise Dots 4 and 5.

For illustrative purposes only, **Exhibit 1** depicts the location of the current noise dots and areas considered to define early turns. The lines from Runway 9-27 to Noise Dot 1 and to Noise Dot 3 were designed to define an area wide enough to account for potential course drift as jet aircraft proceed on an assigned initial heading. The lines start prior to the departure end of Runway 27 to account for aircraft that lift-off and climb to an altitude that allows for an initial heading turn prior to reaching the departure end of Runway 27. The Authority relies on ANOMS to tag flight tracks that enter into the early turn areas prior to reaching 1.5 NM west of the shoreline. Next, Authority staff visually review all the potential early turns identified in ANOMS to confirm each track captured was an early turn.

2.1.2 INDEPENDENT DEFINITION OF AN EARLY TURN

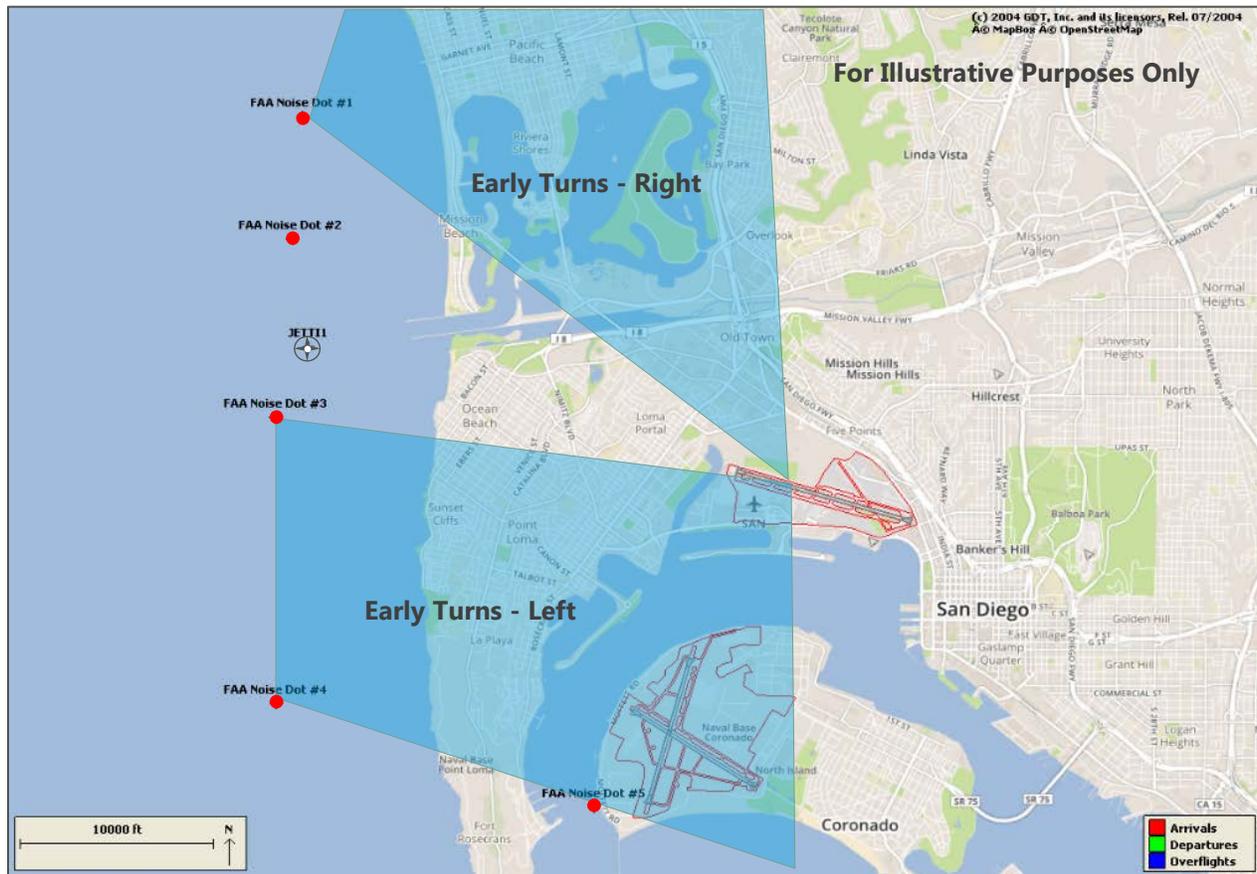
Ricondo reviewed the information provided and found no evidence of a formal agreement in place between the FAA and any other party related to early turns. The radar video maps and the restrictions listed in the 2018 SCT SOP are the only documented actions taken by the FAA pertaining to the use of the noise dots and restricting turns after an initial departure heading from Runway 27 until 1.5 NM west of the shoreline. These actions were taken as a result of the efforts identified in the Rep. Bilbray letter. Through the years, noise dots have been added and their locations have been changed by the FAA for operational feasibility reasons and through collaborative efforts between the Authority and FAA. However, the restrictions in the 2018 SCT SOP have remained the same since at least 2003, which was the earliest SCT SOP made available to Ricondo for review.

The definition of an early turn should be predicated on the procedures that are documented and in use. Based on all the information reviewed, Ricondo definition of an early turn as follows:

Runway 27 jet departures or missed approaches that are vectored off the initial route prior to 1.5 nautical miles west of the shoreline or those aircraft routed back (south and east bound) over residential areas of Point Loma north of Fort Rosecrans National Cemetery, with the exception of aircraft vectored off course to ensure safe separation.

An important note regarding the recommended early turn definition is no mention of noise dots. The primary intent of the routing is to keep jet aircraft on an initial heading from Runway 27 until they are 1.5 NM west of the shoreline. The noise dots on the SCT radar video map serve as visual reference for air traffic controllers when they are guiding aircraft using radar vectors. The routes defined for each current RNAV SID are designed to meet the requirements; therefore, the noise dots are no longer needed as reference if an aircraft is flying an RNAV SID. As the frequency of SID use increases, the role of the noise dots becomes less relevant as more aircraft are assigned the RNAV SIDs.

EXHIBIT 1 AUTHORITY EARLY TURN DEFINITION GRAPHIC



SOURCE: San Diego County Regional Airport Authority, March 12, 2019.

A comparison between the 2017 radar video map and the ANOMS noise dot location data indicate a slight difference in the location of Noise Dot 3 (refer to the ANOMS discussion in Attachment A). Because SCT controllers still rely on radar vectors, Ricondo recommends that the Authority coordinate with SCT to resolve differences in interpreting the location of Noise Dot 3. SCT controllers use the radar video map noise dots as a visual reference when they need to radar vector a departure for safe separation purposes or an RNAV SID is not available (e.g. eastbound departures on nighttime noise abatement heading between 10:00 p.m. and 6:30 a.m.). The Authority's compliance assessment should be based on the same points used by SCT controllers.

2.1.3 COMPARATIVE ANALYSIS

The Authority's definition of an early turn is very similar to Ricondo's. The only difference is the Authority's definition includes a 265-degree magnetic heading to the south and a 295-degree magnetic heading to the north and is silent on reasons for early turns to maintain safe separation. Both magnetic headings are defined from a point prior to the departure end of Runway 27. The 265-degree magnetic heading defines a line to Noise Dot 3, and the 295-degree magnetic heading defines a line to Noise Dot 1. According to Authority staff, the area was designed wide enough to account for potential course drift along the assigned initial headings for jet aircraft. The Authority uses the two lines in ANOMS to define an area to filter for jet aircraft that go through the lines prior to reaching the noise dots. Jet aircraft that do not cross through the lines are considered to be on the assigned initial heading. The area also captures turns required for safe separation. SCT is the only entity capable of identifying whether an early turn

was initiated for safe separation purposes. The Authority presumes all early turns measured are non-compliant unless SCT can confirm otherwise. Ricondo recommends the Authority continue to presume all early turns as non-compliant unless the Authority obtains fact-based evidence of non-compliance to maintain safe separation (e.g., severe weather avoidance, separation from Runway 9 arrivals and air traffic control frequency recordings indicating air traffic controller or pilot request to turn for safe separation) or FAA provided information indicating an early turn was necessary for safe separation. **Table 1** provides a summary of the early turns recorded since 2013.

TABLE 1 EARLY TURNS AS CALCULATED BY THE AUTHORITY

YEAR	OPERATIONS ¹
2013	829
2014	1,105
2015	1,293
2016	776
2017	420
2018	269
2019	37 ²

NOTES:

1 Includes operations at all altitudes.

2 Through January 31, 2019.

SOURCE: San Diego County Regional Airport Authority, Airport Noise Advisory Committee Meeting Agenda Package, "Early-Turn Statistics," February 20, 2019.

SCT does not identify specific initial departure headings as part of the early turn restriction, but it expects jet aircraft to be on standard initial headings issued by SAN ATCT documented in the SCT-SAN ATCT LOA or SID procedures. The area defined by the 265-degree and 295-degree lines includes the standard initial departure headings SAN ATCT can assign to jet aircraft or are defined in existing Runway 27 SID procedures.

In summary, Ricondo confirmed the Authority's area definition captures the primary jet aircraft standard initial headings, identifies flights that changed heading after an initial heading prior to 1.5 NM from the shoreline, allows for some drift due to winds and piloting variation, and accounts for aircraft that initiate the initial heading turn prior to reaching the departure end of Runway 27. Ricondo believes the process the Authority uses to identify early turns as defined by Ricondo is appropriate. Therefore, an independent compliance analysis would likely result in similar results as those reported by the Authority.

The Authority monitors jet aircraft missed approaches and reports the number of missed approaches to the ANAC. However, missed approaches are not included as part of the early turn analysis. Because jet aircraft missed approaches are identified in the SCT SOP as part of the 1.5 NM turn requirement, Ricondo recommends the Authority include those in the analysis, but should not base it on the 265 and 295-degree headings. FAA ATC may direct jet aircraft missed approaches on multiple headings in order to maintain safe separation from other aircraft, which is in accordance to the 2018 SCT TRACON SOP.

Based on this analysis, Ricondo recommends the following:

- The Authority conduct analysis to monitor jet aircraft missed approach along any initial heading assigned by FAA air traffic control. If an aircraft is turned prior to 1.5 NM from the shoreline, it should be identified as non-compliant.
- The Authority continue to identify early turns based on current methodology and only change an early turn from non-compliant to compliant if FAA confirms an early turn was conducted to maintain safe separation.

3. AIRPORT NOISE ADVISORY COMMITTEE RECOMMENDATION 19

3.1 MODIFICATION OF STANDARD INSTRUMENT DEPARTURE (SID) FLIGHT PROCEDURES TO MITIGATE EARLY TURNS

The intent of ANAC Recommendation 19 was to work with FAA and ATC to modify flight procedures to increase compliance and reduce early turns, with consideration of aircraft performance.

All the Runway 27 SIDs published as of the date of this memorandum (ZZOOO, BORDER, PADRZ, PEBLE, CWARD, MMOTO, ECHHO, and FALCC SIDs) conform with the procedures in the SCT SOP restricting early turns. The procedure design for each SID enables jet aircraft to maintain an initial departure heading until 1.5 NM from the shoreline. SIDs that direct jet aircraft to the south then east (ZZOOO and BORDER SIDs) enable aircraft to remain south of the Point Loma residential area, north of the Fort Rosecrans National Cemetery. An RNAV SID does not exist for eastbound departures that are assigned the nighttime noise abatement heading between 10:00 p.m. and 6:30 a.m. Alternatives assessed for ANAC Recommendation 15 include an RNAV SID design to keep aircraft on initial heading until 1.5 nautical miles west of the shoreline and south of the Point Loma residential area.

As documented in the February 20, 2019 ANAC Agenda Package, the number of early turns has decreased since new or amended RNAV SID procedures were implemented in 2016. In 2015, the Authority recorded 1,293 early turns. In 2018, the Authority recorded 269 early turns. This represents a 79 percent reduction in early turns as a result of implementing the RNAV SIDs. The jet departures counted as early-turn operations did not appear to be following a RNAV SID procedure and were radar vectored. For those that are radar vectored, it appears aircraft are directed to another waypoint to re-join the RNAV SID further east.

Preliminary flight procedure design concepts developed as part of ANAC Recommendations 14 and 15 include designs intended to increase compliance for initial jet departure heading until 1.5 NM west of the shoreline and for the routes to remain south of the Point Loma residential area north of the Fort Rosecrans National Cemetery. Therefore, ANAC Recommendation 19 is being met as part of the efforts associated with ANAC Recommendations 14 and 15.

4. AIRPORT NOISE ADVISORY COMMITTEE RECOMMENDATION 20

4.1 INCORPORATION OF NOISE DOTS INTO FLIGHT PROCEDURES

ANAC Recommendation 20 is based on a conceptual design that incorporates noise dots into the SID procedures published for SDIA to enable data collection and compliance monitoring. The specific ANAC suggestions, included the following modifications to the current noise dots:

1. Reposition FAA Noise Dot #1 from its current position at 295 degrees to its "original" pre 2005 position at 290 degrees from end of Runway 27 and 1.5 miles off of the coast.
2. Reposition FAA Noise Dot #3 from its current position at 265 degrees to its "original" pre 2005 position of 275 degrees (JETTI) and 1.5 miles off of the coast.

3. Reposition FAA Noise Dot #4 from its current location (west of Fort Rosecrans) to coincide with the ZZOOO waypoint to deter regular early left turns inside of ZZOOO waypoint.

The purpose of the noise dots was to provide visual reference to assist SCT controllers with vectoring jet aircraft out over the ocean and south of the residential areas of Point Loma. An additional noise dot was added to vector jet aircraft over the ocean to provide abatement to Mission Beach residents. Aircraft can be turned off an initial departure heading after passing 1.5 nautical miles west of the coast, and south and eastbound jet departures can be turned east to stay south of the residential areas north of the Fort Rosecrans National Cemetery. The concept of redefining the noise dots to points in space where aircraft need to fly over, either by pilot navigation or via radar vectors, is not feasible. The following paragraphs provide detail related to the feasibility of the recommendation.

4.1.1 INCORPORATION OF NOISE DOTS IN RNAV SIDS

Two possible methods to incorporate reference points, like the noise dots, on a SID procedure, were considered;

- Depict the noise dots as reference points on a SID chart
- Co locating the noise dots on the radar screen with the waypoints used to define RNAV routes

The following sections describes the reasons why both methods are not feasible.

Depict Noise Dots as Reference Points on SID Charts

FAA Terminal Instrument Flight Rule (IFR) charts are controlled by the FAA Air Traffic Organization, Aeronautical Information Services. Terminal charts follow strict formats developed through collaboration with multiple FAA divisions as well as Air Line Pilots Association (ALPA), Aircraft Owners and Pilots Association (AOPA), Airlines for America (A4A) (formerly the Air Transport Association), Helicopter Association International (HAI), and the National Business Aviation Association, Inc. (NBAA). SID or STAR charts depict features to support the safe navigation to and from an airport and contain no ground features, other than obstacle points. The noise dots are unique to operations at SDIA and procedures used by SCT. They are not a component of instrument flight, are not navigational references, and are not defined in any aeronautical information publication. Because they are not relative to instrument flight operations, it is not feasible to incorporate into a SID chart.

Co-locating Noise Dots on the Radar Screen with Waypoints for RNAV Routes

Changing the location of the noise dots to coincide with waypoints represents a major change to the way the noise dots are used today from shoreline distance references to points in space where aircraft need to cross. This would increase controller's workload and create difficulties in ensuring flight track compliance.

ATC issued radar vectors will continue to occur as needed for separation purposes. For these operations, a controller would be required to vector the aircraft from point to point increasing the workload as compared to operations today. Other variables such as winds, would further increase controller's workload as they monitor the vectored aircraft to determine heading corrections, so the aircraft may cross a designated point on a radar video map. This could detract from a controller's ability to monitor other aircraft, which would be considered an added safety risk.

Ensuring pilots and SCT controller compliance would be difficult due to the nature of dispersion associated with radar vector operations and performance based navigational accuracies as aircraft cross waypoints (of any type) or fixes. Dispersion is expected when aircraft fly over or near waypoints used to define an RNAV route. By definition, the performance requirements of a typical RNAV requires aircraft to be within 1 NM of a designed route. If the route

includes a turn at a waypoint, additional dispersion will occur, especially if the waypoint is a fly-by waypoint.⁴ Therefore, use of a fly-by waypoint or a dot on a radar map as the sole means to monitor aircraft flying over a point in space is not feasible.

With a fly-over waypoint,⁵ aircraft will fly over the designated point, but not always directly over the point. Aircraft can be as much as 1 NM from the waypoint. The predictability is also diminished for the following segment due to dispersion over the waypoint, coding requirements, and the variability of aircraft performance. Furthermore, the use of a fly-over waypoint in RNAV procedure design is not always feasible due to Flight Management System performance issues. For these reasons, they are not preferred by the FAA and should only be used where a special design problem necessitates the use of a fly-over waypoint or is operationally necessary for obstacle clearance.^{6, 7} Use of a fly-over waypoint for all Runway 27 departures contradicts proposed designs for ANAC Recommendation 14, which are supported by CAC community members representing communities that requested consideration of ANAC Recommendation 14. Proposed design concepts for ANAC Recommendation 14 (Alternative 1 for nighttime departures) incorporate a fly-by waypoint to not only ensure aircraft do not turn prior to reaching 1.5 NM west of the shoreline, but that they also remain as far south as possible from La Jolla communities. Due to the FAA's preference towards fly-by waypoints in RNAV design, and the conflict with best meeting the intent of Recommendation 14, incorporating noise dots as fly over waypoints in Runway 27 RNAV SID designs is not feasible.

The current published SIDs and proposed design concepts for ANAC Recommendations 14 and 15 comply with the 1.5 NM turn requirement stated in the 2018 SCT SOP. Therefore, incorporating the noise dot into the route design would not provide added benefit or support compliance monitoring. Compliance monitoring can be conducted based on use of the published SIDs.

Some of the jet traffic that crosses the peninsula is associated with Runway 27 nighttime departure operations that turn south and then east. Currently, no RNAV SID is available for these operations, so aircraft must be radar vectored by SCT. The nighttime procedure design concept, developed as part of ANAC Recommendation 15, proposes an RNAV route with intended flight paths south of the peninsula near the ZZOOO waypoint. Although the current radar vector traffic over areas like Fort Rosecrans National Cemetery comply with the early turn definition, implementation of the proposed concept design would result in fewer aircraft over the southern area of the Point Loma Peninsula as intended under ANAC Recommendation 20.

⁴ Fly-by waypoint is a point where a change in course occurs from one specified route to another, with an aircraft flying near, but not over, the waypoint. The resulting dispersion depends on the degree of the turn between the fly-by waypoint and the next waypoint on the route. Aircraft will begin the turn prior to reaching the waypoint. The fly-by waypoint is preferred as compared to a fly-over waypoint in RNAV procedure design due to the conservation of airspace.

⁵ Fly-over waypoint is a point where aircraft must fly over before changing course or continue on a similar course. The waypoint may or may not identify a change in course from one specified route to another. Fly-over (FO) waypoint fixes may or may not identify a change in course from one specified route segment to another. Aircraft cannot start a turn prior to the waypoint. Fly-over waypoints require the protection of more airspace than that required for a fly-by waypoint and should be used only where special design problems necessitate it, such as being operationally necessary for obstacle clearance.

⁶ US Department of Transportation, Federal Aviation Administration, FAA Order 8260.19F, *Flight Procedures and Airspace*, paragraph 4-7-3 a(2), January 9, 2014.

⁷ US Department of Transportation, Federal Aviation Administration, FAA Order 8260.46F, *Departure Procedure (DP) Program*, paragraph 3-1-5 a(2), December 15, 2015.

4.1.2 NOISE DOTS #3 AND #4 RELOCATION CONCEPT

The modifications specified in Recommendation 20 appear to adjust eastbound jet aircraft departures from Runway 27 such that they would no longer cross the Point Loma Peninsula possibly reducing jet aircraft noise exposure levels over noise-sensitive areas such as Sunset Cliffs Natural Park, Fort Rosecrans National Cemetery, and Cabrillo National Monument.

An alternative to the ANAC recommendation is to adjust the location of the two southern noise dots farther south. This alternative accommodates jet departures directed on controller-issued vector headings while the existing ZZOOO SID keeps aircraft south of Point Loma. **Exhibit 2** depicts the recommended concept called ANAC Recommendation 20 Alternative 1. The concept moves Noise Dots 4 and 5 farther south to a point where the line between both points is just south of the Point Loma Peninsula and maintains parallel geometry to Runway 9-27.

Noise Dot 4 would be moved south to a point located 1.5 NM west of the shoreline and slightly south of the Point Loma Peninsula. Noise Dot 5 would move south to align with a course from Noise Dot 4 parallel to Runway 9-27.

Implementation of this alternative would require an FAA review of the concept for feasibility and to make a determination of potential effects it may pose on the FAA's ability to meet its mission and goals. Ricondo reviewed the concept with FAA to gather preliminary feedback on the concept. Based on preliminary review, FAA indicated the concept would likely impact their ability to meet their mission and goals to maintain safe and efficient management of traffic. Therefore, Ricondo believes if the concept is submitted to FAA, the likelihood of FAA rejecting the concept is high.



LEGEND

- Fly Over Waypoint
- Fly By Waypoint
- Current FAA 2017 Radar Video Map Noise Dots
- Current FAA 2017 Radar Video Map
- ANAC Recommendation 20 Alternative 1 Noise Dots

SOURCES: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, OpenStreetMap Contributors, and the GIS User Community, August 2018 (basemap); San Diego County Regional Airport Authority ANOMS data, 2018 (FAA noise dots); ESRI Data, 2010 (Airports); National Flight Data Center (NFDC), October 2018 (waypoint); Ricondo & Associates, Inc., October 2018 (alternatives).



EXHIBIT 2

**ANAC RECOMMENDATION 20
ALTERNATIVE 1**



APPENDIX A

Primary Source Material Not Available on Internet

A.1 | EMAIL CORRESPONDENCE RELATED TO NOISE DOT LOCATIONS

A.2 | NOISE DOT LOCATION DATA FROM THE AUTHORITY'S ANOMS

A.3 | COPY OF MR. PAUL GRIMES COMMENT LETTER TO THE FAA WESTERN SERVICE CENTER

APPENDIX A PRIMARY SOURCE MATERIAL NOT AVAILABLE ON INTERNET

- Email correspondence related to noise dot locations:
 - Among Authority staff, FAA staff, and community members in 2005 and 2016 related to noise dot latitudes and longitudes
 - Between FAA and Ricondo & Associates, Inc. related to video map noise dots
- Email correspondence from Authority staff providing ANOMS noise dot location latitude and longitudes
- Copy of Mr. Paul Grimes comment letter to the FAA Western Service Center, Operations Support Group, on the *SoCal Metrolplex Draft Environmental Assessment, September 25, 2015*



APPENDIX A.1

Email Correspondence Related to Noise Dot Locations

Hollarn Garret

From: Frazee Dan
Sent: Tuesday, July 05, 2005 10:26
To: Hollarn Garret
Subject: FW: Coordinates of "new noise dots"

-----Original Message-----

From: James.K.Buckles@faa.gov [mailto:James.K.Buckles@faa.gov]
Sent: Tuesday, July 05, 2005 10:05 AM
To: Frazee Dan
Subject: Coordinates of "new noise dots"

DECIMALS OF DEGREES

~~32.46~~13N/~~117.16~~46W

32.770277 N / -117.2794 W

~~32.44~~10N/~~117.16~~58W

32.73617 N / -117.2827 W

~~32.42~~10N/~~117.16~~53W

32.7027 N / -117.28138 W

(204) answer with 

Casey Schnoor

From: Carmona, Hugo <Hugo.Carmona@mail.house.gov>
Sent: Monday, February 22, 2016 12:01 PM
To: 'Casey Schnoor'
Subject: RE: ?

Flag Status: Flagged

Hey Casey - Barry forwarded those numbers to me last week. Take a look:

Here's the coordinates for the 5 points, going from North to South (the actual positions are the second set).

- 1) 32.788010, -117.277901 (32 47 16.8N)/117 16 40.5W)
- 2) 32.770274, -117.279442 (32 46 13N/117 16 46W)
- 3) 32.736111, -117.282776 (32 44 10N/117 16 58W)
- 4) 32.702503, -117.281386 (32 42 09N/117 16 53W)
- 5) 32.688060, -117.227768 (32 41 17N/117 13 40W)

-----Original Message-----

From: Casey Schnoor [mailto:casey.schnoor@cox.net]
Sent: Monday, February 22, 2016 12:00 PM
To: Carmona, Hugo
Subject: Re: ?

??

Sent from my iPhone

- > On Feb 9, 2016, at 7:08 PM, Casey Schnoor <casey.schnoor@cox.net> wrote:
- >
- > Any word from Barry Davis on the waypoint lay/long information? Et al?
- >
- > Thx
- > Casey
- >
- > Sent from my iPhone

From: Ed.Snow@faa.gov
To: [Robert Varani](#)
Subject: RE: Noise Dots on Radar Video Map
Date: Friday, April 20, 2018 10:55:31 AM

“Is it possible the noise dots were shown another way pre 2007?”

I was about to say no, then I found a copy of our SOP from 2003 that indicates the dots were there at that time. After searching around some, I was able to find the original request to add the dots to our video maps, it was in November 1998.

Original coordinates:

N32° 46' 15.00" W117° 16' 35.00"
N32° 04' 23.00" W117° 16' 35.00"
N32° 44' 30.00" W117° 16' 40.00"
N32° 43' 37.00" W117° 16' 45.00"
N32° 42' 44.00" W117° 16' 40.00"
N32° 41' 52.00" W117° 16' 37.00"
N32° 41' 17.00" W117° 15' 45.00"
N32° 41' 17.00" W117° 13' 40.00"

You can copy that list and then right click “Paste From System Clipboard” in TARGETS to place them. They appear to be closer to the shoreline than now, and that may be because the shoreline component of our map wasn’t as accurate back then.

“When was SAN Class C and would that have effected systems at your facility?”

The San Diego area has been Class B (TCA) since a some time after the PSA Crash in the early 70’s, I don’t know the exact date. I think back then there were only TCA’s and TRSA’s and I don’t know what KSAN was before it was a TCA.

“Was there a change from CARTS to STARS in the past?”

I think we changed to STARS in 2014 or 2015, all video maps were the same from one platform to the other.

Regards,

Ed Snow
Southern California TRACON
Operations Support Group
858-537-5982 Work
760-271-0816 Cell

From: Robert Varani [mailto:rvarani@ricondo.com]
Sent: Friday, April 20, 2018 6:35 AM

To: Snow, Ed (FAA) <Ed.Snow@faa.gov>
Subject: RE: Noise Dots on Radar Video Map

Ed,

First of all, let me thank you for your time on Thursday. It was very productive for us. Secondly, thanks for the information. It is interesting that no dots are shown pre 2007. Is it possible the noise dots were shown another way pre 2007 (physical marks on the screen, another video map, an entirely different system?). I believe SoCal TRACON reorganized in the time period from 1999 to today. When was SAN Class C and would that have effected systems at your facility? Was there a change from CARTS to STARS in the past?

I will contact Shjonna and Jim and ask if they want to receive the data directly. I think there may be a process to follow.

Robert Varani, PMP, CM | Director

RICONDO

20 N CLARK STREET | SUITE 1500 | CHICAGO, IL 60602
TEL 312-606-0611 x 131 | **DIRECT** 312-212-8975 | **MOBILE** 612-618-7230

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From: Ed.Snow@faa.gov [<mailto:Ed.Snow@faa.gov>]
Sent: Thursday, April 19, 2018 8:57 AM
To: Robert Varani <rvarani@ricondo.com>; Stephen Smith <ssmith@ricondo.com>
Cc: Brian.Fagan@faa.gov; Tracey.Johnson@faa.gov
Subject: Noise Dots on Radar Video Map

Robb,

I did some research this morning and looked through old files regarding the Noise Dots. They were not there in 2007, but were there in 2009, so I'm reasonably certain they were added sometime in late 2007 or 2008. The extra dot was added on 10-18-2012.

I don't have Mr. Payne's email address, if he was interested in this information can you share it with him?

Regards,

Ed Snow

Southern California TRACON
Operations Support Group
858-537-5982 Work
760-271-0816 Cell



APPENDIX A.2

Noise Dot Location Data from the Authority's ANOMS

From: Knack Sjohnna [mailto:sknack@san.org]
Sent: Wednesday, February 28, 2018 4:24 PM
To: Stephen Smith <ssmith@ricondo.com>
Subject: RE: ANAC Recommendations 18-20

- + FAA Noise Dot #1
 - + FAA Noise Dot #2
 - + FAA Noise Dot #3
 - + FAA Noise Dot #4
 - + FAA Noise Dot #5
- Other Airports/Heliports

Name	FAA Noise Dot #1
Latitude	32.78801
Longitude	-117.277901

- Noise Dots
 - + FAA Noise Dot #1
 - + **FAA Noise Dot #2**
 - + FAA Noise Dot #3
 - + FAA Noise Dot #4
 - + FAA Noise Dot #5
- Other Airports/Heliports

Name	FAA Noise Dot #2
Latitude	32.770277
Longitude	-117.279444

-  Noise Dots
 - + FAA Noise Dot #1
 - + FAA Noise Dot #2
 - + FAA Noise Dot #3
 - + FAA Noise Dot #4
 - + FAA Noise Dot #5
-  Other Airports/Heliports

Name	<input type="text" value="FAA Noise Dot #3"/>
Latitude	<input type="text" value="32.744238"/>
Longitude	<input type="text" value="-117.281982"/>

-  Noise Dots
 - + FAA Noise Dot #1
 - + FAA Noise Dot #2
 - + FAA Noise Dot #3
 - + FAA Noise Dot #4
 - + FAA Noise Dot #5
-  Other Airports/Heliports

Name	<input type="text" value="FAA Noise Dot #4"/>
Latitude	<input type="text" value="32.702777"/>
Longitude	<input type="text" value="-117.281388"/>

- Noise Dots
 - + FAA Noise Dot #1
 - + FAA Noise Dot #2
 - + FAA Noise Dot #3
 - + FAA Noise Dot #4
 - + FAA Noise Dot #5
- Other Airports/Heliports

Name	FAA Noise Dot #5
Latitude	32.68805
Longitude	-117.227777



Sjohnna Knack
Program Manager | Planning & Environmental Affairs (Airport Noise)
 San Diego County Regional Airport Authority
 T 619.400.2639 | M.619.318.6894
sknack@san.org



APPENDIX A.3

Copy of Mr. Paul Grimes Comment Letter
to the FAA Western Service Center

SoCal Metroplex EA
FAA, Western Service Center - Operations Support Group
1601 Lind Avenue SW
Renton, WA 98057

September 28, 2015

Subject: Federal Aviation Administration (FAA) Southern California Optimization of Airspace and Procedures in the Metroplex (SoCal Metroplex) Draft Environmental Assessment (EA) Document

To Whom It May Concern:

I would like to provide input and history on departures from San Diego Lindbergh Field (SAN). I reside near Point Loma Nazarene University and, along with many others, will receive more nuisance noise events from the proposed change in departures heading East at SAN. What criteria is the FAA using to propose these efficiency gains? Under \$5 and 6 seconds per departure isn't worth changes that negatively affect neighborhoods.

Historically, commercial jets have been directed on a 275 degree heading for 3 miles offshore, then a mostly shallow left turn to clear the tip of Point Loma before turning east. In the late 1990's numerous aircraft were turning quicker, traversing over the Point Loma Peninsula. I attribute this to the higher performance of newer aircraft and increased non-stop service from San Diego.

U.S. Congressman Brian Bilbray was contacted and he engaged the FAA's Miramar facility. San Diego City Councilmember Byron Wear was also working toward an eventual agreement to keep the departures south of Point Loma on their eastbound trajectory. The FAA's Walter White came up with a solution to install "noise dots" on the Miramar monitors so that controllers would direct all departures through a gate of 2 dots to the west of SAN and a dot beyond the tip of Point Loma for eastbound aircraft to go around. This agreement, which required and gained air traffic controller union approval, has been in place for about 20 years with a high degree of successfully keeping aircraft over the Pacific Ocean.

The proposed new SAN IIBEE SID departure is in conflict with the nearly 20 year agreement. The proposed abandonment of the LOWMA fix (off the southern tip of Point Loma) in favor of a new fix, ZZOOO (on the Silver Strand) will direct aircraft to continue, and probably tighten their turn and head direct ZZOOO. Depending on aircraft type, takeoff weight, pilot, and other factors, the direct ZZOOO will create numerous tracks, of which most will be over Point Loma.

Looking at the current and proposed tracks of SAN IIBEE SID, it appears about 1 mile is cut from each average departure. From my calculations the fuel cost savings per departure of an average narrow body would be under \$5. Since each aircraft continues to climb regardless of departure path, the saved 1 mile would be cut from the cruise portion of the flight, meaning about 6 seconds of en route time would be saved. While I'm all for efficiency, this proposed impacting change does little to improve efficiency.

Very recently, there appears to be a marked increase in early turns over the Pt. Loma Peninsula. I followed about 8 early turns on FlightAware in a 3 hour period last week. The most egregious violations have been after 10 pm on red eye transcons. For whatever reason, several flights on the POGGI FIVE RNAV departure have turned left at JETTI and avoided 3 waypoints to head direct Julian (JLI). These departures flew directly over residential areas of Pt. Loma, Naval Air Station North Island and Downtown San Diego. Of particular concern is that after either 9 or 10pm, all Runway 27 departures take a noise abatement 290 degree heading. With this more northern heading, aircraft on the proposed SAN IIBEE SID will cross the Pt. Loma Peninsula farther north at a time of day when the federal government and State of California deem noise as more impactful.

I thank the FAA for a second extension of public response on Metroplex SAN. I read the FAA's 2014 changes at PHX caused much pain for citizens and resulted in a lawsuit from the City of Phoenix. While new paths over Phoenix may not have created new 65dB areas, it greatly increased noise and nuisance from scores of jets over new areas that historically did not receive jet traffic. The FAA could be creating a parallel situation in Point Loma with the proposed SAN IIBEE SID departure. Again, what criteria is the FAA using to propose these efficiency gains?

I implore the FAA to modify the proposed SAN IIBEE SID departure to eliminate ZZOOO and retain LOWMA. This move will keep departures away from populated areas; maintain the noise dot agreement while providing a precise path for all departures, which is one of the goals of the Metroplex program. The San Diego Regional Airport Authority, operator of Lindbergh Field, also supports retention of the LOWMA waypoint, undoubtedly knowing that noise nuisance complaints will skyrocket.

Sincerely,

Paul Grimes
936 Moana Dr
San Diego, CA 92106

Public Member, Peninsula Community Planning Board Airport Subcommittee
Former Director of Schedule Planning, Pacific Southwest Airlines (PSA)
Former airport representative for San Diego Councilmember Byron Wear

CC:
Congressman Scott Peters
San Diego Mayor Kevin Faulconer
San Diego City Councilmember Lorie Zapf
San Diego County Regional Airport Authority



APPENDIX B

Historical Information Review and Summary

- B.1 | CORRESPONDENCE FROM REPRESENTATIVE BRIAN BILBRAY ON OCTOBER 28, 1998 (REP. BILBRAY LETTER)
- B.2 | CALIFORNIA STATE AUDITOR REPORT
- B.3 | HISTORICAL SCT TRACON RADAR VIDEO MAPS (RADAR VIDEO MAPS) AND DATA
- B.4 | SAN DIEGO COUNTY REGIONAL AIRPORT AUTHORITY BOARD STAFF REPORT, ITEM #12, "STATUS UPDATE AND POSSIBLE ACTION ON COMMUNITY NOISE ISSUES ON NOISE DOTS,"
- B.5 | EMAIL CORRESPONDENCE
- B.6 | AUTHORITY AIRPORT NOISE AND OPERATIONS MONITORING SYSTEM (ANOMS) – NOISE DOT COORDINATE INFORMATION
- B.7 | FAA ORDER 7110.65B - SOUTHERN CALIFORNIA TERMINAL RADAR CONTROL STANDARD OPERATING PROCEDURES
- B.8 | SOUTHERN CALIFORNIA TERMINAL RADAR APPROACH CONTROL AND LINDBERGH AIRPORT TRAFFIC CONTROL TOWER LETTER OF AGREEMENT
- B.9 | MR. PAUL GRIMES COMMENT LETTER TO FAA WESTERN SERVICE CENTER

APPENDIX B HISTORICAL INFORMATION REVIEW AND SUMMARY

Ricondo & Associates, Inc. (Ricondo) conducted an independent assessment of the definition of an early turn for aircraft departing from Runway 27 at San Diego International Airport (SDIA) based on the source material described in this summary, and discussions with San Diego County Regional Airport Authority (the Authority) and Federal Aviation Administration (FAA) staff. Although multiple documents were made available and reviewed, and multiple discussions occurred there is no known record of an FAA-signed document establishing a formal agreement. The primary source document describing the establishment of noise dots and turns after 1.5 nautical miles (NM) west of the shoreline is a correspondence letter from Representative Brian Bilbray. Other documents verify the actions taken by FAA to incorporate dots on the Southern California Terminal Radar Approach Control (SCT) radar video maps, efforts to modify the dots as requested by FAA, and efforts to establish additional dots as requested by Authority staff to the FAA on behalf of Mission Beach residents. Each of the source documents is described herein.

B.1 CORRESPONDENCE FROM REPRESENTATIVE BRIAN BILBRAY ON OCTOBER 28, 1998 (REP. BILBRAY LETTER)⁸

The correspondence letter from US Congress Representative Brian Bilbray (the Rep. Bilbray letter) recounts an effort to address noise concerns from the Point Loma area based on two meetings that occurred in October of 1998.

The first meeting, convened on October 16, 1998, was attended by staff from Representatives Bilbray's office and representatives from the FAA Regional Administrator, Regional Executive Manager, San Diego Lindbergh Airport Traffic Control Tower (SAN ATCT), SCT and Operation Safety Program, San Diego Unified Port District Strategic Planning and Airport Noise representatives, Councilman Byron Wear's office representative, Point Loma residents, and the San Diego Health Department. At the meeting, FAA indicated no plans to use additional headings other than 275 and 290 degrees. FAA acknowledged that aircraft sometimes depart on a 250-degree heading for safety reasons. FAA proposed establishing marks on the radar screens to enable controllers to easily direct traffic out to sea and then back east over the Point Loma Peninsula, crossing land south of the residential areas on the peninsula.

The second meeting, convened on October 27, 1998, was attended by staff from Representative Bilbray's office, SCT, Councilman Wear's office representative, and Point Loma residents. The purpose of the meeting was to discuss the placement of the marks for incorporation on the FAA radar screens to aid in the directing of aircraft 1.5 miles out to sea before turning south, directing aircraft across the Point Loma Peninsula south of the Fort Rosecrans National Cemetery.

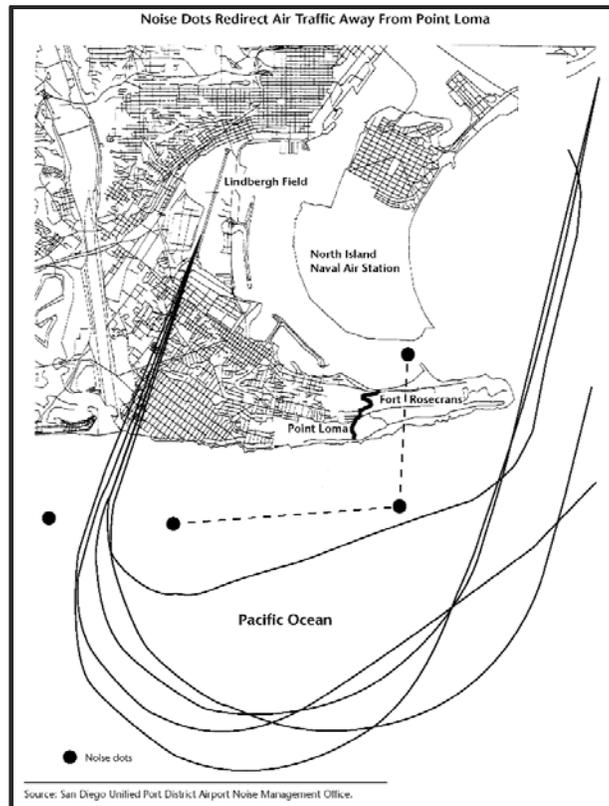
The letter uses the term "aircraft" generically and does not specify whether the efforts are for jet, turbo-propeller, or other propeller type aircraft. The letter also does not specify whether the unit of measure for miles is statutory or nautical.

⁸ U.S. Representative Brian Bilbray, correspondence dated October 28, 1998.
https://san.org/DesktopModules/Bring2mind/DMX/Download.aspx?EntryId=8661&Command=Core_Download&language=en-US&PortalId=0&TabId=341

B.2 CALIFORNIA STATE AUDITOR REPORT⁹

The California State Auditor report was reviewed as part of this analysis. Chapter 2 of the report entitled, *The Port District Cannot Impose Noise Restrictions Without FAA Approval, but It Can Improve Its Community Relations in Other Ways* includes a section titled, "The FAA's 'Noise Dots' Restrict Flights Over Residential Areas." This section provides a discussion of the efforts made in October 1998 described in the Rep. Bilbray letter; highlights the initial headings of 275 and 290 degrees directed by SAN ATCT; and provides a description of the procedures. **Exhibit B-1** presents a copy of the graphic in the report that depicts the noise dot locations and sample tracks of flights directed around the Point Loma Peninsula.

EXHIBIT B-1 NOISE DOTS GRAPHIC FROM 2000 CALIFORNIA STATE AUDITORS REPORT



SOURCE: The California San Diego International Airport at Lindbergh Field: Local Government, Including the San Diego Unified Port District, Can Improve Efforts to Reduce the Noise Impact Area and Address Public Dissatisfaction Report, October 2000.

The report did not define the noise dot locations with coordinates or bearings. Based on the procedure description in the California State Auditor report, three noise dots are located west of SDIA and each is approximately 1.5 miles from the shoreline. The two northern noise dots appear to define an area to which aircraft would proceed while on an initial heading assigned by the SAN ATCT. Aircraft can then turn south after passing these two noise dots. The noise dot south of the Airport and west of Point Loma appears to serve two functions. The first is a visual reference

⁹ California State Auditor, Bureau of State Audits, *San Diego International Airport at Lindbergh Field: Local Government, Including the San Diego Unified Port District, Can Improve Efforts to Reduce the Noise Impact Area and Address Public Dissatisfaction*, Report No. 2000-126, October 2000). https://san.org/DesktopModules/Bring2mind/DMX/Download.aspx?EntryId=8661&Command=Core_Download&language=en-US&PortalId=0&TabId=341

for controllers issuing radar vectored headings to keep departures heading south 1.5 miles west of Point Loma shoreline. The second function is to identify where controllers can begin to issue radar vectored headings to the east. The fourth noise dot located south of the Airport and east of Point Loma serves as a visual reference, in combination with the noise dot west of the Point Loma Peninsula, to keep aircraft south of Point Loma residential areas.

The California State Auditor report indicates that departures are directed 1.5 miles west of the shoreline before turning south and are also directed so they do not cross the Point Loma Peninsula until they are south of the Fort Rosecrans National Cemetery. The example provided in the report indicates that aircraft do not fly to a specific point on a heading, rather fly to the departure gate defined by the noise dots located directly west of the Airport, then turn left to the south.

B.3 HISTORICAL SCT TRACON RADAR VIDEO MAPS (RADAR VIDEO MAPS) AND DATA¹⁰

In fall of 2017 and winter of 2018, Authority staff and Ricondo attended a meeting with the SCT to provide SCT an overview of the Flight Procedure Evaluation effort and request information necessary to establish a baseline understanding of the current air traffic control requirements related to SDIA traffic. Ricondo requested historical radar video maps used by FAA since November of 1998. In April 2018, FAA provided Ricondo radar video maps from 2007, 2009, 2012, and 2017¹¹; a textual reference from the 2003 FAA Order 7110.65 *Southern California Terminal Radar Control Standard Operating Procedures* (2003 SCT SOP) indicating the existence of noise dots¹²; and noise dot coordinates from the original request made in November 1998 by FAA for the creation radar video map.¹³

Exhibit B-2 depicts a comparison of the 2007, 2009, and 2012 radar video maps. The radar video maps are for air traffic control navigation purposes and are may be difficult to understand for the average person as they do not show ground feature details. The intent of the graphic is to simply compare noise dot information that was listed for each year. Noise dots are not incorporated into the 2007 radar video map. FAA could not locate any information to determine why the 2007 version did not depict the noise dots. This does not mean that noise dots were not depicted on the radar video map prior to 2007, it just indicates that the noise dots were not depicted in 2007. The 2009 radar video map depicts four noise dots in locations consistent with those referenced in the California State Auditor report. The radar video map for 2012 depicts five noise dots. The 2017 radar video map, depicted on **Exhibit B-3**, includes the five noise dots at similar locations as indicated on the 2012 radar video map, along with original 1998 noise dot request as described below. The noise dots on the 2017 radar video map are shown in green on Exhibit B-3. These noise dots are located 1.5 NM miles from the shoreline with the exception of the dot located to the southeast in the channel between the Point Loma Peninsula and North Island Naval Air Station. According to FAA, the fifth noise dot was added on October 18, 2012.¹⁴ The additional northern noise dot is related to the Authority's request to SCT on behalf of Mission Beach residents (refer to April 2016 Authority Staff Report below).

¹⁰ Ed Snow, Federal Aviation Administration, "Noise Dots on Radar Video Map" email to Robb Varani, Ricondo & Associates, Inc., April 19, 2018.

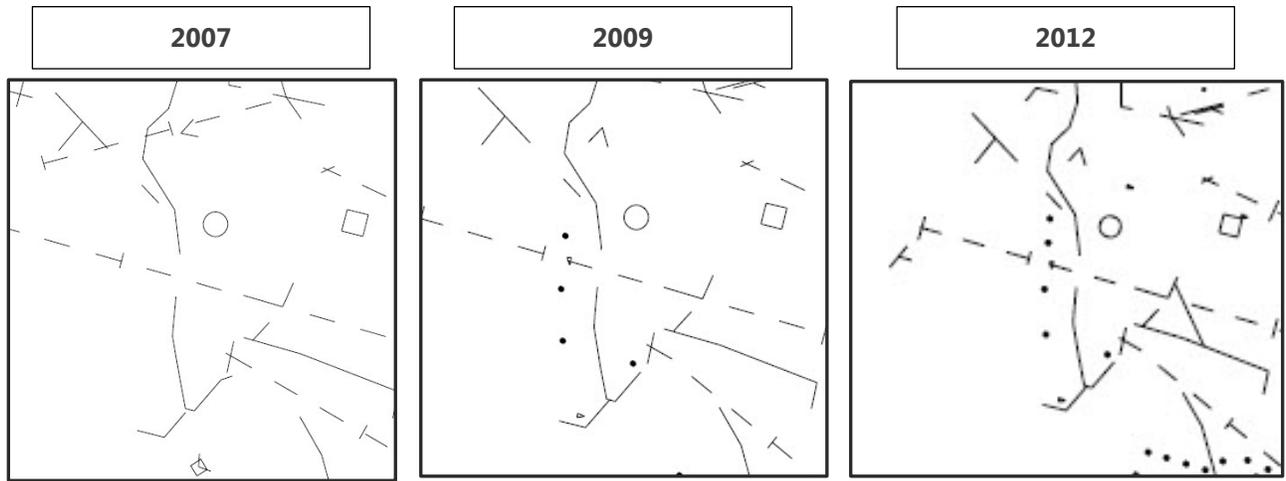
¹¹ Ed Snow, Federal Aviation Administration, "Noise Dots on Radar Video Map" email to Robb Varani, Ricondo & Associates, Inc., April 19, 2018.

¹² Ed Snow, Federal Aviation Administration, "Noise Dots on Radar Video Map" email to Robb Varani, Ricondo & Associates, Inc., April 20, 2018.

¹³ Ed Snow, Federal Aviation Administration, "Noise Dots on Radar Video Map" email to Robb Varani, Ricondo & Associates, Inc., April 20, 2018.

¹⁴ Ed Snow, Federal Aviation Administration, "Noise Dots on Radar Video Map" email to Robb Varani, Ricondo & Associates, Inc., April 19, 2018.

EXHIBIT B-2 RADAR VIDEO MAP COMPARISON – 2007, 2009, 2012



SOURCE: Ed Snow, Federal Aviation Administration, "Noise Dots on Radar Video Map" email to Robb Varani, Ricondo & Associates, Inc., April 19, 2018.



SOURCES: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, OpenStreetMap Contributors, and the GIS User Community, August 2018 (basemap); Federal Aviation Administration, 1998 (noise dots); ESRI Data, 2010 (Airports); National Flight Data Center (NFDC), October 2018 (waypoint); Ricondo & Associates, Inc., October 2018 (alternatives).

EXHIBIT B-3



**NOISE DOT LOCATION COMPARISON
(REQUESTED 1998 REQUESTED AND 2017 RADAR VIDEO MAPS)**

Table B-1 lists the coordinates received from FAA of the noise dot locations from the original radar video map request in 1998. Ricondo was unable to confirm the original source of the information sent to the FAA, or any details related to the intent for each point.

TABLE B-1 NOISE DOT COORDINATES – 1998 (REQUEST)

NOISE DOT #	LATTITUDE (DMS)	LONGITUDE (DMS)
1	N32° 46' 15.00"	W117° 16' 35.00"
2	N32° 04' 23.00"	W117° 16' 35.00"
3	N32° 44' 30.00"	W117° 16' 40.00"
4	N32° 43' 37.00"	W117° 16' 45.00"
5	N32° 42' 44.00"	W117° 16' 40.00"
6	N32° 41' 52.00"	W117° 16' 37.00"
7	N32° 41' 17.00"	W117° 15' 45.00"
8	N32° 41' 17.00"	W117° 13' 40.00"

NOTE:

DMS – Degrees Minutes Seconds

SOURCE: Ed Snow, Federal Aviation Administration, "Noise Dots on Radar Video Map" email to Robb Varani, Ricondo & Associates, Inc., April 20, 2018.

Exhibit B-3 depicts the requested 1998 noise dots as orange triangles (labeled 1998-1 through 1998-8) based on the coordinates listed in Table B-1. Exhibit B-3 also includes the 2017 radar video map with the noise dots depicted in green for comparison purposes.

Seven of the requested 1998 noise dots in Table B-1 are relevant to the efforts described in the Rep. Bilbray letter. Noise Point 2 from the table (not depicted on Exhibit B-3) is located further south along the United States/Mexico border and is thought to have been used for other purposes. A radar video map used between 1998 to 2007 was not available for this analysis; therefore, it is not possible to confirm whether all these dots were shown on the radar screen at the time. It is possible that four of the eight noise dots were selected by the FAA as a result of discussions with Point Loma and Representative Bilbray at the October 27, 1998, meeting. Four of the eight requested noise dots appear to be in locations consistent with the 2000 California State Auditor report but could not be confirmed without the location data used by the California State Auditor.

Ricondo requested SOP information as far back as 1998. FAA only provided Ricondo excerpts from the 2008 SCT SOP. However, FAA SCT staff confirmed that the 2003 SCT SOP included references to the noise dots, which indicates that action was taken by FAA as a result of the efforts described in the Rep. Bilbray letter.

Six of the requested 1998 noise dots appear slightly east of 1.5 NM from the shoreline. This was explained by FAA as a possible function of the radar system in use at the time. The radar system has since been upgraded to the Standard Terminal Automation Radar System. The requested 1998 points may also have been established using statute miles as the unit of measure instead of nautical miles.

B.4 SAN DIEGO COUNTY REGIONAL AIRPORT AUTHORITY BOARD STAFF REPORT, ITEM #12, "STATUS UPDATE AND POSSIBLE ACTION ON COMMUNITY NOISE ISSUES ON NOISE DOTS," APRIL 21, 2016 (APRIL 2016 AUTHORITY STAFF REPORT)¹⁵

The April 2016 Authority Staff Report provides research conducted by Authority staff related to the origin and evolution of the noise dots, starting with the Rep. Bilbray letter and the California State Auditor report. The description also includes sections discussing modifications made to the noise dots, the evolution of definition of early turns, and historical noise dot location drawings submitted by community residents.

According to the April 2016 Authority Staff Report, the FAA made two modifications to the initial noise dots sometime in the mid-2000s. The first modification was made to the noise dot located south of the Airport and west of the Point Loma Peninsula (referred to today as Noise Dot 4) by FAA. Based on information reported by the Authority, the modification was conducted to allow an easier transition for heavy jets turning from the south to the east. Noise Dot 4 was moved 0.3 NM north. The move resulted in modifying the south boundary (which is defined by a straight line drawn between Noise Dots 4 and 5) to be parallel to SDIA Runway 9-27 instead of a straight east-west line. The modification maintained the original intent to keep aircraft overflights south of Point Loma Peninsula residential areas. The second modification was the addition of a new noise dot (now called Noise Dot 1) located 1.5 NM miles from the shore on a 295-degree magnetic heading from a location on Runway 27. This point was added at the request of Mission Beach residents to discourage aircraft from changing the SAN ATCT assigned initial departure heading before reaching 1.5 NM from the shoreline.

The report discusses the definition of early turns in several sections of the document as follows:

- Page 14 – “At the time of these two changes, FAA defined early turns as any aircraft that overflies the 295 degree heading to the right or the 258 degree heading to the left.”
- Page 15 – “For right turning departures, the FAA considers “non-compliant” any aircraft that turns prior to clearing the 295 degree dot...The Authority concurred with FAA in using Dot 1 [Noise Dot 1] as its gauge for “early turns” to the right.”
- Page 15 – “For left turning departures, the FAA considers “non-compliant” any aircraft that either 1) turns prior to clearing the 258 degree dot (Dot 3 above) [Noise Dot 3], or 2) turns eastbound without first clearing Dots 4 and 5 [Noise Dots 4 and 5]. However, to address community concern in the mid-2000’s, the Airport Authority began using a different dot than the FAA’s DOT 3 to represent early left turns. Rather than using the FAA’s 258 degree dot [magnetic heading between a location prior to the end of Runway 27 to FAA’s Dot 3], the Airport Authority began recording “early turns” using a narrower 265 degree dot [magnetic heading between a location prior to the end of Runway 27 to the Authority’s proposed Noise Dot 3] to measure “non-compliance.”
- Page 16 – “On March 22, 2016 Airport Staff requested the FAA TRACON staff to consider abandoning their 258 degree heading Dot 3, and begin using a more restrictive 265 degree heading.”
- Page 17 – “Once again, the Authority has defined early turns to the right as those jet aircraft that turn prior to FAA Noise Dot 1 at the 295 degree heading to the right [magnetic heading between a location prior the end of

¹⁵ San Diego County Regional Airport Authority Board, Staff Report, Item #12, “Status Update and Possible Action on Community Noise Issues on Noise Dots,” April 21, 2016.
https://san.org/DesktopModules/Bring2mind/DMX/Download.aspx?EntryId=8661&Command=Core_Download&language=en-US&PortalId=0&TabId=341

Runway 27 and Noise Dot 1]. Left early turns are defined as those jet aircraft that turn prior to the 265 degree heading to the left [magnetic heading between a location prior to the end of Runway 27 and Noise Dot 3].”

The report also includes a map provided by a Point Loma resident. The map depicted a history of noise dot locations since 1998 based on the resident’s research and information. The map also identified a noise dot concept showing a preferred corridor from a 275-degree heading to a 295-degree heading. The report indicated further that the origin of some of the points was unknown.

B.5 EMAIL CORRESPONDENCE

Email correspondence was provided by the Authority and reviewed as part of this analysis. The first was a message from James K. Buckles (FAA) to Dan Frazee (previous SDIA Director of Airport Noise Mitigation for the Authority) in July of 2005.¹⁶ The email subject was related to and contained “new noise dot” coordinates. This email was forwarded from Dan Frazee to Garret Holland (Authority staff) in July of 2005.

The second email was from Casey Schnoor (Point Loma resident) to Carmona Hugo (U.S. Congress Representative Peters staff) on February 9, 2016 requesting a status update on receiving noise dot latitude/longitude data from Barry Davis (previous FAA SCT Manager).¹⁷ Carmona Hugo responded on February 22, 2016, with the latitude/longitude data for five points provided by Barry Davis.¹⁸

Ricondo compared the location data of the points provided in the July 2005 and February 2016 emails. The three points listed in the July 2005 email are included as part of the five points in the February 2016 email. A summary of the coordinate information in the email is provided in **Table B-2**.

TABLE B-2 NOISE DOT COORDINATES – FAA EMAIL CORRESPONDENCE

NOISE DOT	LATITUDE (DD)	LONGITUDE (DD)	LATITUDE (DMS)	LONGITUDE (DMS)
1	32.788010	-117.277901	N32° 47' 16.8	W117° 16' 40.0
2	32.770274	-117.279442	N32° 46' 13.0	W117° 16' 46.0
3	32.736111	-117.282776	N32° 44' 10.0	W117° 16' 58.0
4	32.702503	-117.281386	N32° 42' 09.0	W117° 16' 53.0
5	32.688060	-117.227768	N32° 41' 17.0	W117° 13' 40.0

NOTES:

DD – Decimal Degrees

DMS – Degrees Minutes Seconds

SOURCE: James K. Buckles, Federal Aviation Administration, “Coordinates of new noise dots” email to Dan Frazee, Federal Aviation Administration, July 5, 2005.

B.6 AUTHORITY AIRPORT NOISE AND OPERATIONS MONITORING SYSTEM (ANOMS) – NOISE DOT COORDINATE INFORMATION

For comparative purposes, a request was made to the Authority to provide the exact coordinates of noise dots used in ANOMS. Ricondo received the coordinate information, which is provided in **Table B-3**.

¹⁶ James K. Buckles, Federal Aviation Administration, “Coordinates of new noise dots” email to Dan Frazee, Federal Aviation Administration, July 5, 2005.

¹⁷ Casey Schnoor, “Re: ?” email to Carmon Hugo, February 22, 2016.

¹⁸ Carmon Hugo, “Re: ?” email to Casey Schnoor, February 22, 2016.

TABLE B-3 NOISE DOT COORDINATES – ANOMS

NOISE DOT	LATTITUDE (DD)	LONGTITUDE (DD)
1	32.78801	-117.277901
2	32.770274	-117.279444
3	32.744238	-117.281982
4	32.702777	-117.281388
5	32.688050	-117.227777

NOTE

DD – Decimal Degrees

SOURCE: San Diego County Regional Airport Authority ANOMS data, 2018

A comparison was made of the coordinates in Tables B-1, B-2, and B-3, and the 2017 radar video map to determine if the noise dots have moved over time. **Exhibit B-4** depicts the comparison of noise dots over the years (i.e., requested 1998, FAA email correspondence, ANOMS, and the 2017 radar video map). Although there is no way to know if any of the requested 1998 was ever depicted on a radar map, it is clear to see the change in noise dot locations over time. The coordinates of ANOMS noise dots are reflective of the change made by the Authority to Noise Dot 3 in 2016. Exhibit B-4 confirms that the ANOMS noise dots are the same as the 2017 radar video map, except for Noise Dot 3. The FAA Noise Dot 3 appears to be slightly north and west of the ANOMS Noise Dot 3. Noise Dot 3 on the FAA 2017 radar video map is on a 266-degree magnetic heading from the end of Runway 27 and is slightly farther west from the shoreline. Ricondo recommends that the Authority coordinate with SCT to resolve differences in interpreting the location of Noise Dot 3.

B.7 FAA ORDER 7110.65B - SOUTHERN CALIFORNIA TERMINAL RADAR CONTROL STANDARD OPERATING PROCEDURES (2018 SCT SOP)¹⁹

A review of the 2018 SCT Standard Operating Procedures (2018 SCT SOP) was conducted as part of this analysis. The 2018 SCT SOP references the noise dots and specifies no vectored turns prior to 1.5 NM west of the shoreline for the air traffic control sectors²⁰ that manage SDIA departures from Runway 27 (the WIZKY, SOUTH BAY, and WEST sectors). The 2018 SCT SOP states the following:

Unless required for separation purposes, SAN turbojet [jet] departures and missed approaches must not be vectored off the initial route until one and one half (1 ½) nautical miles west of the shoreline. Additionally, aircraft routed south and east bound must be vectored to pass over or south of Fort Rosecrans. These restrictions are represented on the radar video map as a series of dots.²¹

¹⁹ FAA Order 7110.65B - Southern California Terminal Radar Control Standard Operating Procedures, March 29, 2018 (Confidential document made available for Ricondo & Associates, Inc. review by the Federal Aviation Administration).

²⁰ Air Traffic Control Sector: A geographic area of airspace designated for air traffic control

²¹ FAA Order 7110.65B - Southern California Terminal Radar Control Standard Operating Procedures (Confidential document made available for Ricondo & Associates, Inc. review by the Federal Aviation Administration).



SOURCES: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, OpenStreetMap Contributors, and the GIS User Community, August 2018 (basemap); Federal Aviation Administration, 1998 (noise dots); ESRI Data, 2010 (Airports); National Flight Data Center (NFDC), October 2018 (waypoint); Ricondo & Associates, Inc., October 2018 (alternatives); James K. Buckles, Federal Aviation Administration, "Coordinates of new noise dots" email to Dan Frazee, Federal Aviation Administration, July 5, 2005.

EXHIBIT B-4



NOISE DOT COMPARISON
(ANOMS, 2017 RADAR VIDEO MAP, 2016, AND 1998 [REQUESTED])

The referenced language defines the restrictions in place for SCT controllers to follow when managing Runway 27 departures and missed approaches. This language represents the most formal documentation about the daily operation of the noise dots. The statement provides an air traffic controller the ability to issue a turn prior to 1.5 NM from the shoreline if required for separation purposes. A second key element of the statement is the identification of jet departures; therefore, this restriction does not apply to propeller or turbine-driven propeller aircraft. A third key element is related to the initial route. The statement does not specify magnetic headings for initial routes. The requirement applies to any initial route issued by SAN ATCT or required in a standard procedure.

B.8 SOUTHERN CALIFORNIA TERMINAL RADAR APPROACH CONTROL AND LINDBERGH AIRPORT TRAFFIC CONTROL TOWER LETTER OF AGREEMENT (SCT-SAN ATCT LOA)²²

The current Letter of Agreement (LOA) between the SCT and SAN ATCT was reviewed as part of this analysis. The LOA does not reference the noise dots or restrictions on departures or missed approaches. The agreement references the use of the multiple Instrument Flight Rule (IFR) and Visual Flight Rule (VFR) initial departure headings for multiple runway operating plans (e.g., West Plan, East Plan, and 9/27 Plan). The information indicates that jet aircraft follow initial magnetic headings of 275 degrees, 290 degrees, and those specified or designed in the published SIDs (e.g., ZZOOO, PADRZ, BORDER and PEBLE). The LOA also indicates that the 290-degree magnetic heading must be issued between the hours of 10:00 p.m. and 06:30 a.m.

B.9 MR. PAUL GRIMES COMMENT LETTER TO FAA WESTERN SERVICE CENTER, OPERATIONS SUPPORT GROUP, ON THE *SOCAL METROPLEX DRAFT ENVIRONMENTAL ASSESSMENT* (MR. GRIMES LETTER)²³

Mr. Paul Grimes was one of the attendees on the October 16, 1998 teleconference call led by Rep. Bilbray. The Mr. Grimes letter, submitted as part of the FAA's Southern California Metroplex (SoCal Metroplex) Draft Environmental Assessment (EA) public comment period, provides historical information on SDIA departures to the FAA. The letter highlighted the efforts made by SCT and Representative Bilbray's office, points out issues with the aircraft on the POGGI FIVE SID (replaced by the ZZOOO SID), and identifies the concern that the proposed SAN IIBEE SID (the FAA's draft proposed action to replace the POGGI FIVE RNAV SID) would result in more noise over the Point Loma Peninsula. The letter further recommends the use of the LOWMA waypoint to keep departures farther south of Point Loma Peninsula. The proposed IIBEE SID did not have a waypoint south of the Point Loma Peninsula. For the Final SoCal Metroplex EA, the FAA proposed the ZZOOO SID, which included the ZZOOO waypoint south of the Point Loma Peninsula.

²² Southern California Terminal Radar Approach Control and Lindbergh Airport Traffic Control Tower Letter of Agreement, June 27, 2017 (Confidential document made available for Ricondo & Associates, Inc. review by the Federal Aviation Administration).

²³ Paul Grimes, "Federal Aviation Administration (FAA) Southern California Optimization of Airspace and Procedures in the Metroplex (SoCal Metroplex) Draft Environmental Assessment (EA) Document," letter to SoCal Metroplex EA, FAA Western Service Center, Operations Support Group, September 28, 2015.