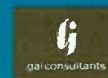




# *14 CFR Part 150 Noise Exposure Map Update*

Martin County Airport / Witham Field

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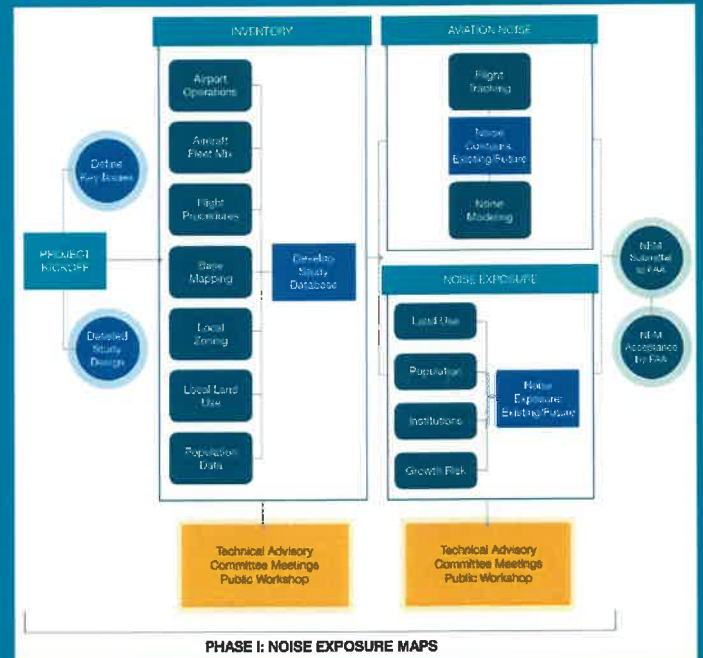
# Presentation Outline

- NEM Overview
- Modeling Assumptions
- Previous Part 150 Contours and Noise Mitigation Program
- 2020/2025 Noise Contours
- Changes since Previous Contours
- Previous Contours vs New Contours
- Next Steps
- Questions

# NOISE EXPOSURE MAP UPDATE: OVERVIEW

## *Noise Exposure Map Report (NEM)*

- Develop a comprehensive database of current conditions
- Noise contour development and impact analysis
- Prepare and submit Noise Exposure Map (NEM) Report



# NOISE OVERVIEW

## *Day-Night Average Sound Level (DNL)*

- 24-hour time weighted energy average noise level based on A-weighted decibels (dBA)
- Noise occurring between 10 p.m. to 7 a.m. is penalized by 10 dB to account for the higher sensitivity to noise during nighttime hours and for the expected further decrease in background levels that typically occur in the nighttime
- FAA requires the use of DNL for airport noise assessments
- Average Annual Day aircraft noise exposure is calculated over a broad area and then depicted using contour lines of equal noise levels

# NOISE CONTOUR GENERATION

## *Noise Modeling*

- Aircraft noise modeling allows:
  - Calculation of noise exposure at any point
  - Depicting annual average aircraft noise exposure
  - Predicting future aircraft noise exposure
  - Assessing changes in noise impacts resulting from runway configuration changes or new runways
  - Assessing changes in fleet mix and/or number of operations
  - Evaluating operational procedures
- Aviation Environmental Design Tool (AEDT) replaced the Integrated Noise Model (INM) when it was released in 2015. AEDT 2d was used to generate the contours seen in this analysis

# NOISE CONTOUR GENERATION

## *Model Inputs*

- The Amount of Noise Exposure is determined by:
  - Aircraft types
  - Stage length
  - Number of average annual day operations
  - Nighttime weighting (1 nighttime operation = 10 daytime operations)
- The Noise Exposure Distribution is determined by:
  - Runway configuration and use
  - Flight track locations
  - Flight track use
- Other Factors
  - Meteorological Conditions
  - Terrain



Aviation Environmental  
Design Tool (AEDT)

# MODELING ASSUMPTIONS

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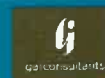
# FLEET MIX

- Operational Data collected from SUA over 12 months to assemble Fleet Mix for NEM Analysis
  - July 1, 2017- June 30, 2018
- Vector Airport Systems is contracted by SUA to track airport activity and collects data including:
  - Aircraft Type
  - FAA registry number
  - Operation type
  - Date and time of operation
- Records were compiled into a list of 126 unique aircraft/engine combinations with operational information for each aircraft group, which incorporated over 91% of the original data from Vector Airport Systems
  - Cessna 560 Citation XLS and Cessna 172 Skyhawk are the most common jet and non-jet aircraft respectively



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# RUNWAY USE

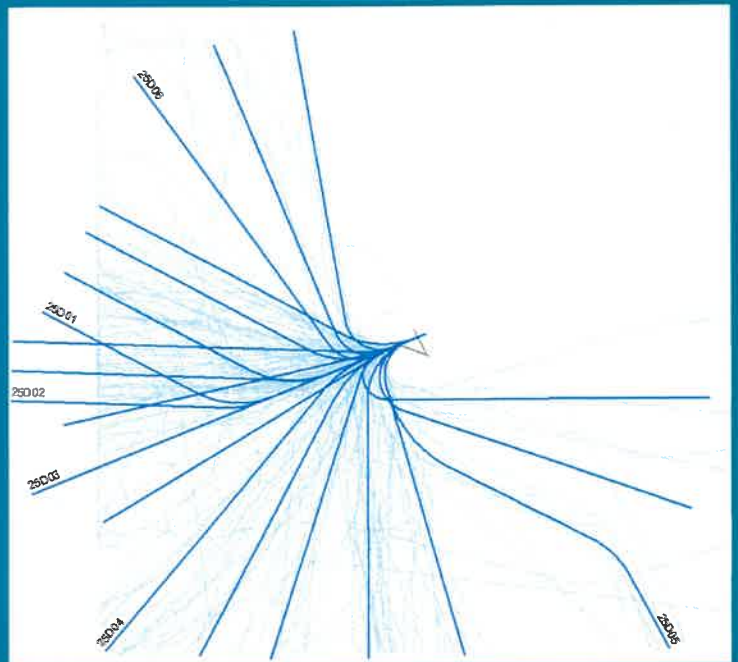
- Vector Airport Systems data was used to generate Runway Usage Percentages for each Runway End
- Runway 12/30 is the most commonly used runway including 84.6% of arrivals and 77.7% of departures
- This information, as well as the detailed fleet information, will be loaded into the Aviation Environmental Design Tool (AEDT) in order to accurately assess the noise soundscape at Martin County Airport/Witham Field

SUA ARRIVALS RUNWAY PERCENTAGES							
	12	30	16	34	7	25	All Runways
<i>Single/Multi Eng. Piston</i>	35.75%	31.88%	1.02%	0.75%	8.75%	1.66%	79.80%
<i>Jet</i>	9.33%	3.51%	0.25%	0.15%	1.74%	0.41%	15.39%
<i>Turbo-Prop</i>	2.01%	1.78%	0.06%	0.04%	0.48%	0.09%	4.46%
<i>Helicopter</i>	0.17%	0.14%	0.00%	0.00%	0.03%	0.01%	0.35%
<b>Total</b>	<b>47.26%</b>	<b>37.30%</b>	<b>1.33%</b>	<b>0.95%</b>	<b>11.00%</b>	<b>2.17%</b>	<b>100.00%</b>

SUA DEPARTURES RUNWAY PERCENTAGES							
	12	30	16	34	7	25	All Runways
<i>Single/Multi Eng. Piston</i>	44.80%	18.79%	4.11%	2.92%	9.75%	1.90%	82.26%
<i>Jet</i>	6.69%	3.96%	0.31%	0.51%	1.26%	0.49%	13.21%
<i>Turbo-Prop</i>	2.29%	0.96%	0.21%	0.15%	0.50%	0.10%	4.21%
<i>Helicopter</i>	0.17%	0.08%	0.02%	0.01%	0.03%	0.01%	0.32%
<b>Total</b>	<b>53.94%</b>	<b>23.80%</b>	<b>4.64%</b>	<b>3.59%</b>	<b>11.54%</b>	<b>2.49%</b>	<b>100.00%</b>

## RUNWAY USE

- An alternate report from Vector Airport Systems tracks the radar tracks as aircraft land and depart SUA
- These radar tracks were downloaded for the complete year (July 1, 2017- June 30, 2018), and then separated by aircraft type, and runway type in a GIS software
- AEDT Flight Tracks were then built using the radar tracks as a guide for each aircraft type and runway end combination; AEDT Flight Tracks will simulate the lateral distribution of aircraft actions and will be assigned the number of flight tracks proportional to the number of radar tracks used to built the flight tracks



## FORECAST OVERVIEW

- Coordination with the FAA on the aviation forecast to be used in the Part 150 began in January 2019
- The Part 150 scope of work identified use of the FAA's most recent Terminal Area Forecast (2018 TAF, issued January of 2019).
- Review of the TAF indicated that the growth projections were extremely conservative (.5%) and did not reflect recent trends at the airport.
  - Project Team considered multiple sources in recommending a proposed approach:
    - FAA's Air Traffic Activity Data System (ATADS)
    - FAA's Terminal Area Forecast (TAF)
    - FDOT's Aviation and Spaceports Aviation Forecast
    - SUA's Vector Airport System Operations

## FORECAST OVERVIEW

- Alternate forecast approaches were proposed to the FAA that better reflected recent trends:
  - FDOT's Aviation and Spaceports Aviation Forecast (1.6% growth projection)
    - FAA rejected application of the FDOT growth rates to recent activity levels – indicating that the forecast was developed in 2016 and outdated and potentially overstated activity
  - 10 year historic growth trend line projection (4.7% projection)
    - FAA rejected projection of the historic growth trends forward indicating that they did not believe that the airport activity would continue to grow at the same rate of growth moving forward
  - Adjusted activity projection based on actual capacity of recent improvements (2.75% growth)
    - FAA ultimately accepted this approach

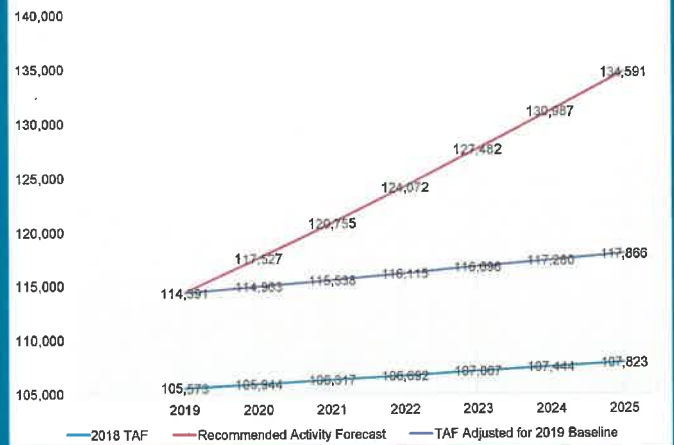
## FORECAST OVERVIEW

- Forecast approval was received from the FAA on August 26, 2019.
- Because of the delays related to the approval of the forecast, approval was requested for 2 sets of study years – 2019/2024 and 2020/2025
  - Based on the anticipated submission date, the project team has selected 2020/2025 as the study years for use in the NEM Update

# FORECAST OVERVIEW

<i>Fiscal Year</i>	<i>2018 TAF</i>	<i>Recommended Activity Forecast</i>	<i>Difference</i>	<i>TAF Adjusted for 2019 Baseline</i>	<i>Adjusted Difference</i>
2019	105,573	114,391	8.4%	114,391	0.0%
2020	105,944	117,527	10.9%	114,963	2.2%
2021	106,317	120,755	13.6%	115,538	4.5%
2022	106,692	124,072	16.3%	116,115	6.9%
2023	107,067	127,482	19.1%	116,696	9.2%
2024	107,444	130,987	21.9%	117,280	11.7%
2025	107,823	134,591	24.8%	117,866	14.2%

Comparison of 2018 TAF, Adjusted TAF, and Recommended Activity Forecast



# PREVIOUS PART 150 CONTOURS AND NOISE MITIGATION PROGRAM

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# NOISE HISTORY

- First Part 150 Study completed in 2004 (2002 and 2007 contours)
- Martin County Airport started the process to adopt the 60 DNL contour in 2002
  - City of Stuart has not adopted the 60 DNL contour for significance
- Airport Noise Advisory Committee formed in 2003
- Updated NEMs submitted in September 2010 (2010 and 2015 contours)
  - Between 60,000 and 70,000 operations
  - 3% nighttime
  - 17% jets (10-12,000 annually)
- Updated Noise Compatibility Program submitted August 16, 2013 (2010 and 2015 contours certified to represent 2012 and 2017 conditions)
  - Record of Approval issued by the FAA on June 16, 2014



# NOISE CONTOURS AND NOISE MITIGATION: RUNWAY 30



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# NOISE CONTOURS AND NOISE MITIGATION: RUNWAY 12



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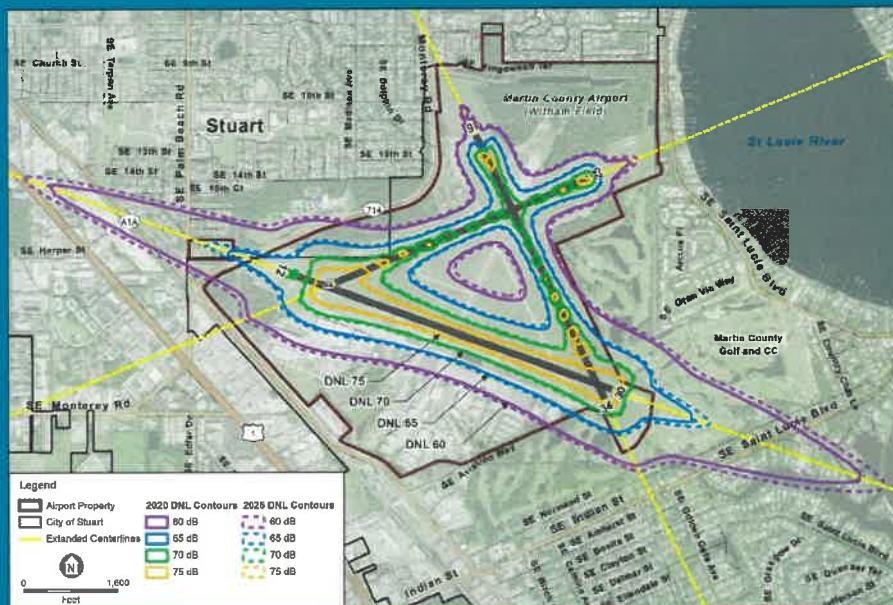
# 2020/2025 NOISE CONTOURS

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# 2020/2025 CONTOURS



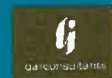
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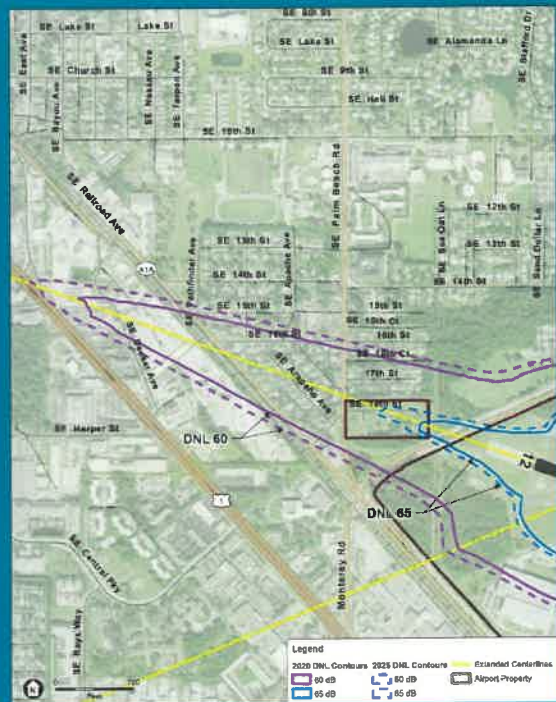
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# 2020/2025 CONTOURS RUNWAY 12 END



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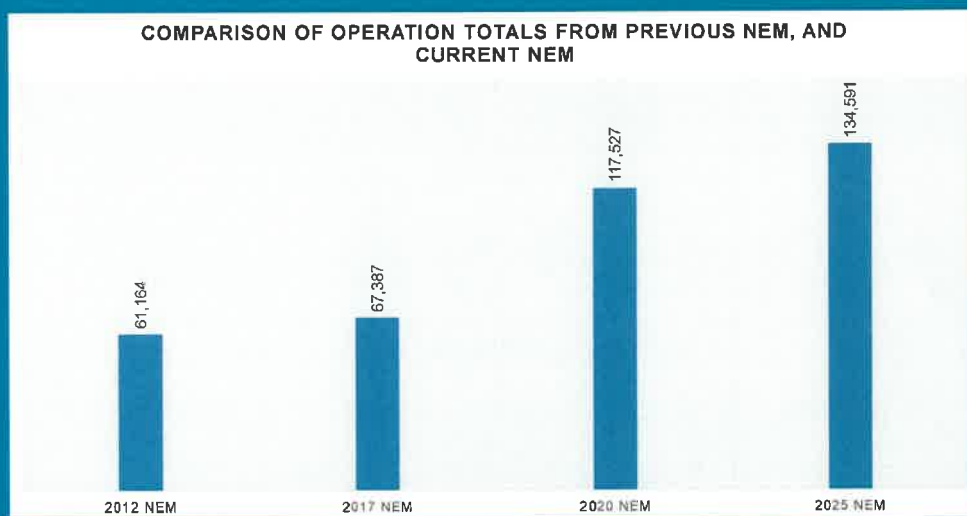
# Changes Since Previous NEM Contours

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## CHANGES SINCE PREVIOUS NEMs



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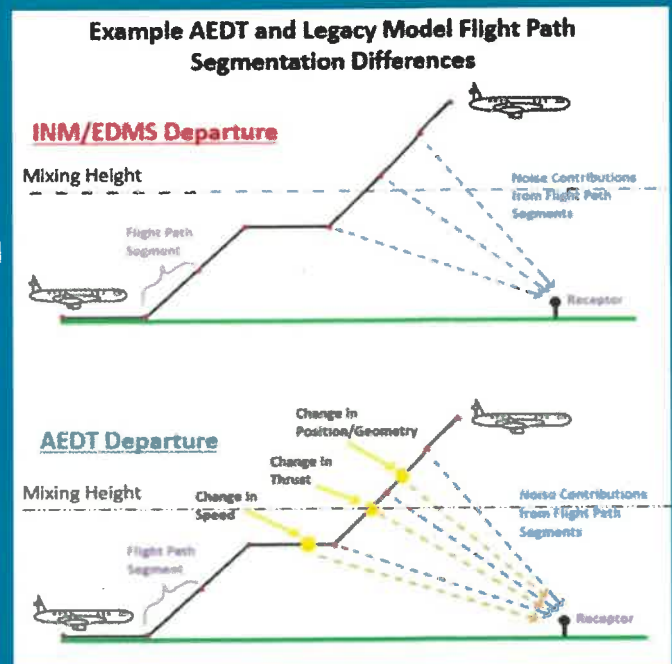
## CHANGES SINCE PREVIOUS NEMs

- Operation Totals for the Current Noise Exposure Map illustrate the growth at Martin County Airport since the last NEM
- The growth is predicated in Single/Multi Engine Piston and Jet Aircraft while Turboprop operations remain relatively flat and helicopter operations decrease.

	2012 NEM			2017 NEM			Existing Conditions 2020			Forecasted Future Conditions 2025		
	Total	%	Avg. Day	Total	%	Avg. Day	Total	%	Avg. Day	Total	%	Avg. Day
<i>Single/Multi Eng. Piston</i>	44,650	73%	122	49,382	73%	135	89,206	76%	244	102,033	76%	280
<i>Jet</i>	10,398	17%	29	11,700	17%	32	23,178	20%	64	26,675	20%	73
<i>Turbo-Prop</i>	4,893	8%	13	5,274	8%	14	4,772	4%	13	5,458	4%	15
<i>Helicopter</i>	1,223	2%	3	1,031	2%	3	371	0%	1	425	0%	1
<b>Total</b>	<b>61,164</b>	<b>100%</b>	<b>167</b>	<b>67,387</b>	<b>100%</b>	<b>184</b>	<b>117,527</b>	<b>100%</b>	<b>322</b>	<b>134,591</b>	<b>100%</b>	<b>369</b>

# CONTOUR UPDATES

- Previous NEMs generated using the Integrated Noise Model, which was the FAA's standard model from 1978-2015
- The Aviation Environmental Design Tool (AEDT) replaced INM and included multiple improvements including:
  - Flight Path Segments Increased
  - Improved Aircraft Performance Modeling
  - Improved Computation of Weather Impacts
  - Inclusion of Updated Aircraft Information and improved sound modeling of individual aircraft engines



## CONTOUR UPDATES

- The Previous NEM aircraft fleet and operations were compiled from analog counts of operations and observations at the airport.
- The airport now uses Vector Airport Systems, a service that digitally tracks airport activity and provides aircraft data about each operation at the airport
- This more detailed Vector data allows for more precise fleet modeling and includes the following data:
  - Aircraft Type
  - FAA registry number
  - Operation Type
  - Date of Operation
  - Time of Operation

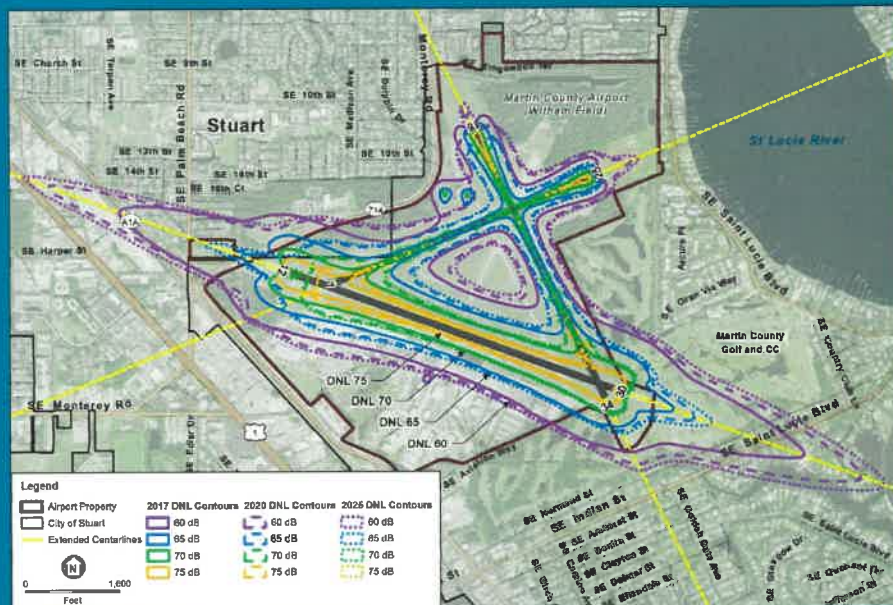
# PREVIOUS CONTOURS VS. NEW CONTOURS

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# 2017/2020/2025 CONTOURS

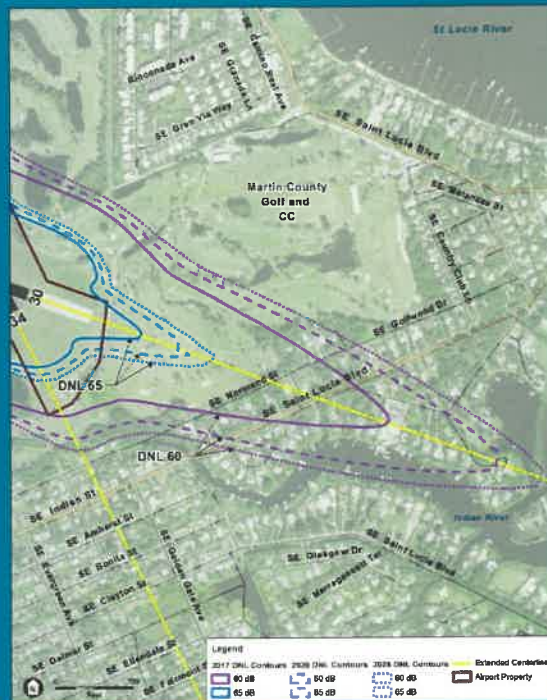


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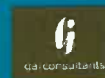


# 2017/2020/2025 CONTOURS RUNWAY 30 END



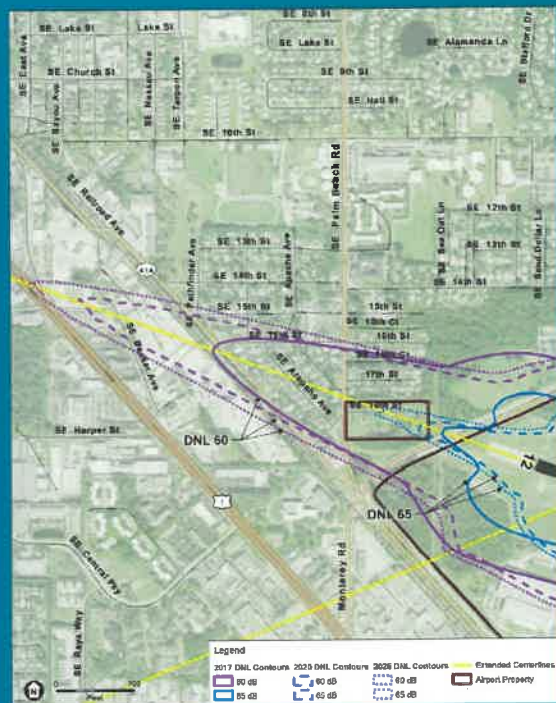
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# 2017/2020/2025 CONTOURS RUNWAY 12 END



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## UPCOMING SCHEDULE

- Draft Report for Public Review: February 2020
- NEM Public Workshop: March 2020
- Address Comment and Submit to FAA: May 2020
- FAA Compliance Determination: September 2020
- Noise Compatibility Program Amendment : December 2020
- NCP Design: Catalogue of Properties: March 2021



# QUESTIONS



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