Mitigation of Aircraft Noise in College Park

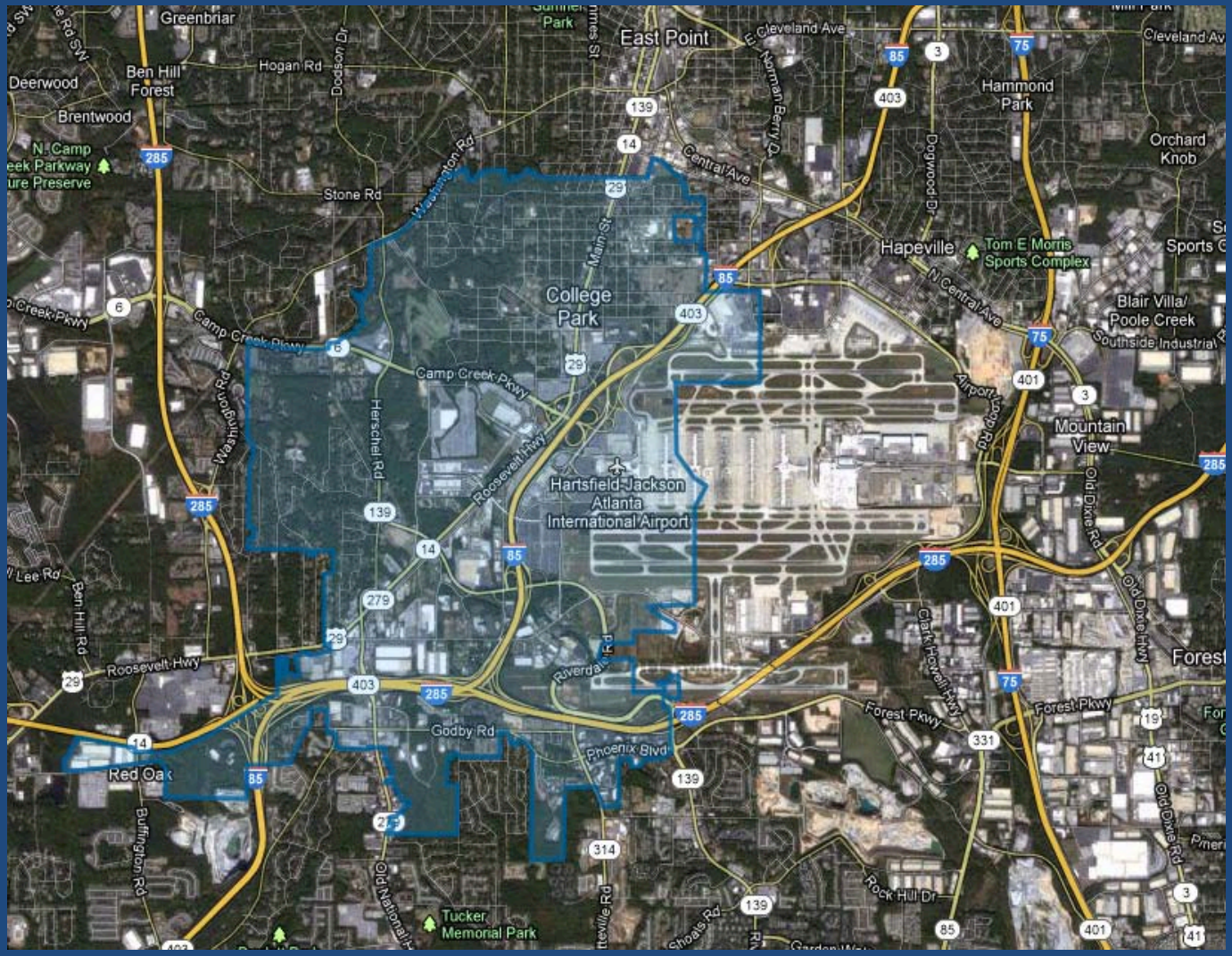
GA Tech Course AE4803 – 2/9/2018

Ambrose W Clay, Councilman, College Park, GA

Agenda

- Where is College Park, GA?
- College Park's Noise Cases
- NextGen Flight Characteristics
- KATL West Departure Paths
- NextGen Noise Measurements
- FAA's Noise Annoyance Metric - DNL
- NextGen Noise Impacts on Quality of Life
- Noise "Facts"
- 10 dB Noise Corridors at KATL
- Conclusions

Where is College Park?



College Park's Noise Cases

- Over-flight Noise from Westward Take Offs
- Over-flight Noise from Eastward Landings
- Ground Noise from Eastward Landings
- Ground Noise from Aircraft Taxiing
- Ground Noise from Eastward Take Offs

- Focus Today is On Noise from Westward Over-flights

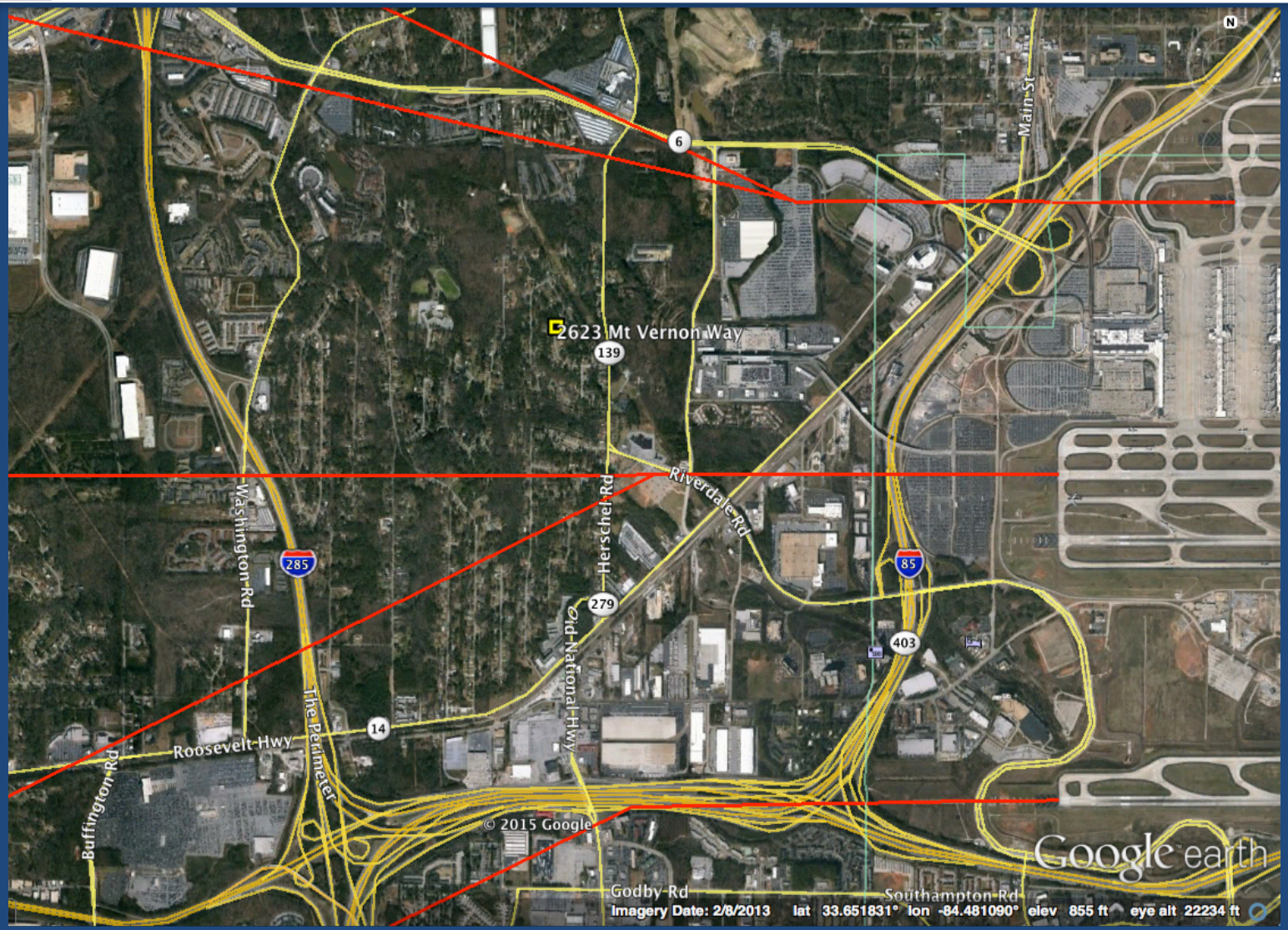
NextGen Flight Characteristics

- NextGen with RNAV/RNP is creating well-defined departure tracks with dispersion about their ground level projection of 0.1 mile (1 city block), or less – i.e., ***Expressways in the Sky***.

- Precision flying and tracking enables controllers to reduce separation between aircraft. At ATL, for runway 26L, rush hour ("Push") departures have been observed as frequently as every 35 seconds, with 45 seconds being more typical.

- Even if existing RNAV tracks are not relocated, Citizens located directly "beneath" departure tracks ***newly*** experience more frequent over-flights, at regular intervals, concentrated in very narrow corridors.

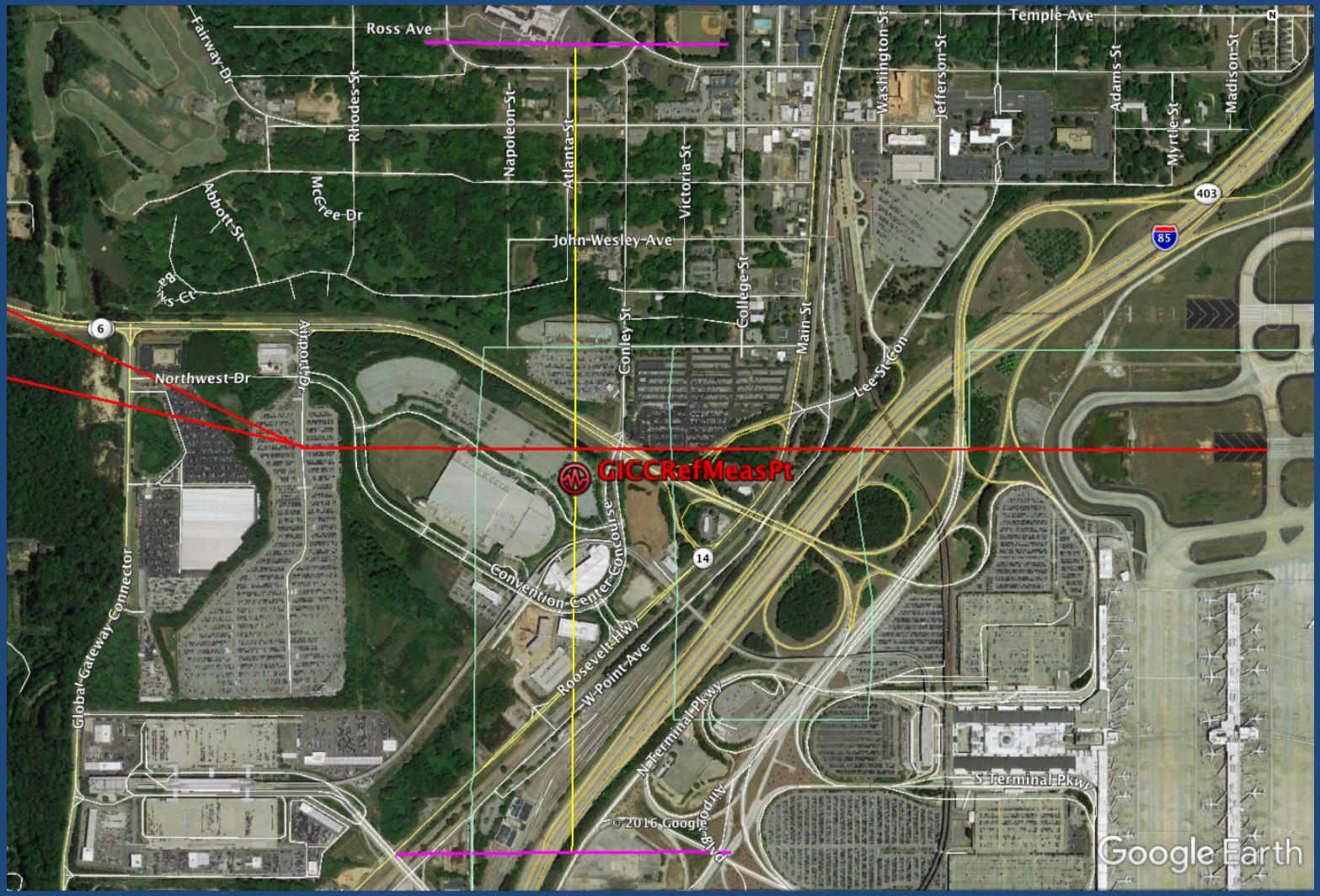
KATL West Departure Paths



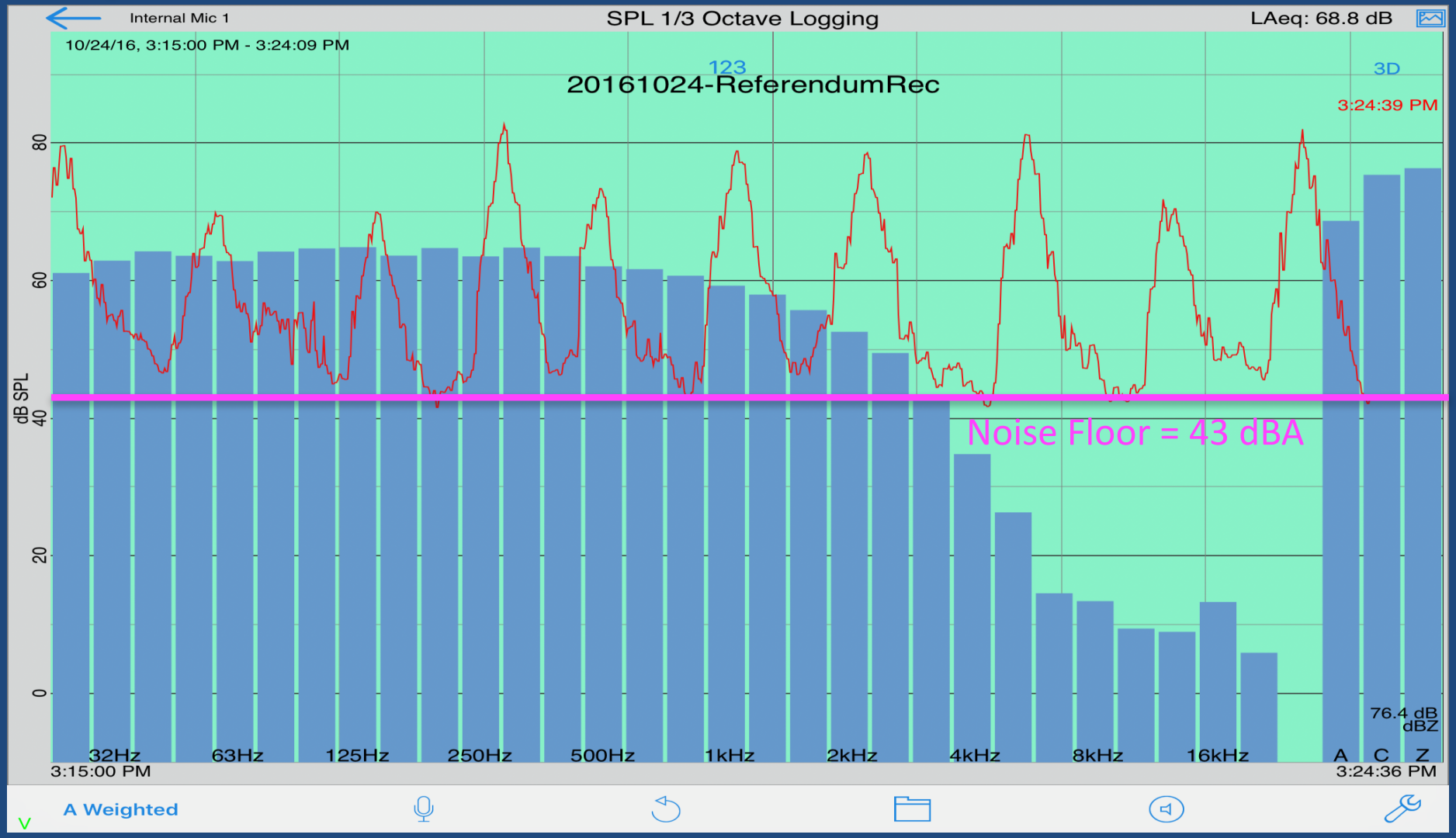
NextGen Noise Measurements (An Example)

- A measurement location was established about 1 mile from the DER (Departure End of Runway) of runway 26L, and 0.05 miles from the departure path flight projection on the ground.
- "A-weighted" measurements were made for 9 minutes with a Type 2 calibrated microphone. The typical minimum sound level between overflights was about 43 dB – the ***Noise Floor***.
- 10 aircraft were recorded in 9 minutes.
- During this moderate departure period, some over-flights produced 40 dB sound level shifts above the ***Noise Floor***.
- At one busy hour peak, 4 planes departed, 35 seconds apart. Typical peaks have planes departing every 45 seconds for extended periods lasting 20 - 30 minutes, or more.

NextGen Noise Measurements (cont.)



NextGen Noise Measurements (cont.)



FAA's Noise Annoyance Metric - DNL

- FAA's current metric for aircraft noise annoyance "averages" dB levels for a simulated mix of flights throughout a 24 hour day, with a 10 dB penalty added for noise from flights after 10 PM and before 7 AM.

- Peak levels of noise are accounted for only by their effect on the average. The amount of change in noise level during noise events (i.e., during over-flights) is not considered.

- The "A Weighting" aspect of the DNL metric discounts low frequency noise that nonetheless is palpable and that also can induce audible noise through structural vibration (rattling the teacup on the shelf), "C" weighted readings being typically 10 – 12 dB higher.

NextGen Noise Impacts On Quality of Life

- During waking hours, significant changes in sound level, repeated frequently at a regular interval during a rush-hour, are perceived like a ***Noise Blitz*** by those beneath it.

- At night, infrequent, significant changes in sound level interfere with sleep, yet they have very little impact on the average dB level described by the FAA DNL noise metric.

NextGen Noise Impacts On Quality of Life (cont.)

- A Phoenix resident, returning from vacation after the 9/18/2014 major departure track change, was astonished by the noise and thought the military was holding maneuvers – a ***Noise Blitz***

- Another Phoenix resident noted the impact of noise at night awakening her mentally handicapped child, who then couldn't sleep.

- Recent research appears to show a relationship between sleep disturbance and a number of illnesses.

NextGen Noise Impacts On Quality of Life (cont.)

Note from a College Park home owner:

Date: February 8, 2015 at 7:23:33 PM EST
To: clayoncouncil@mac.com
Subject: BACK TO BACK ROARING AND THUNDERING

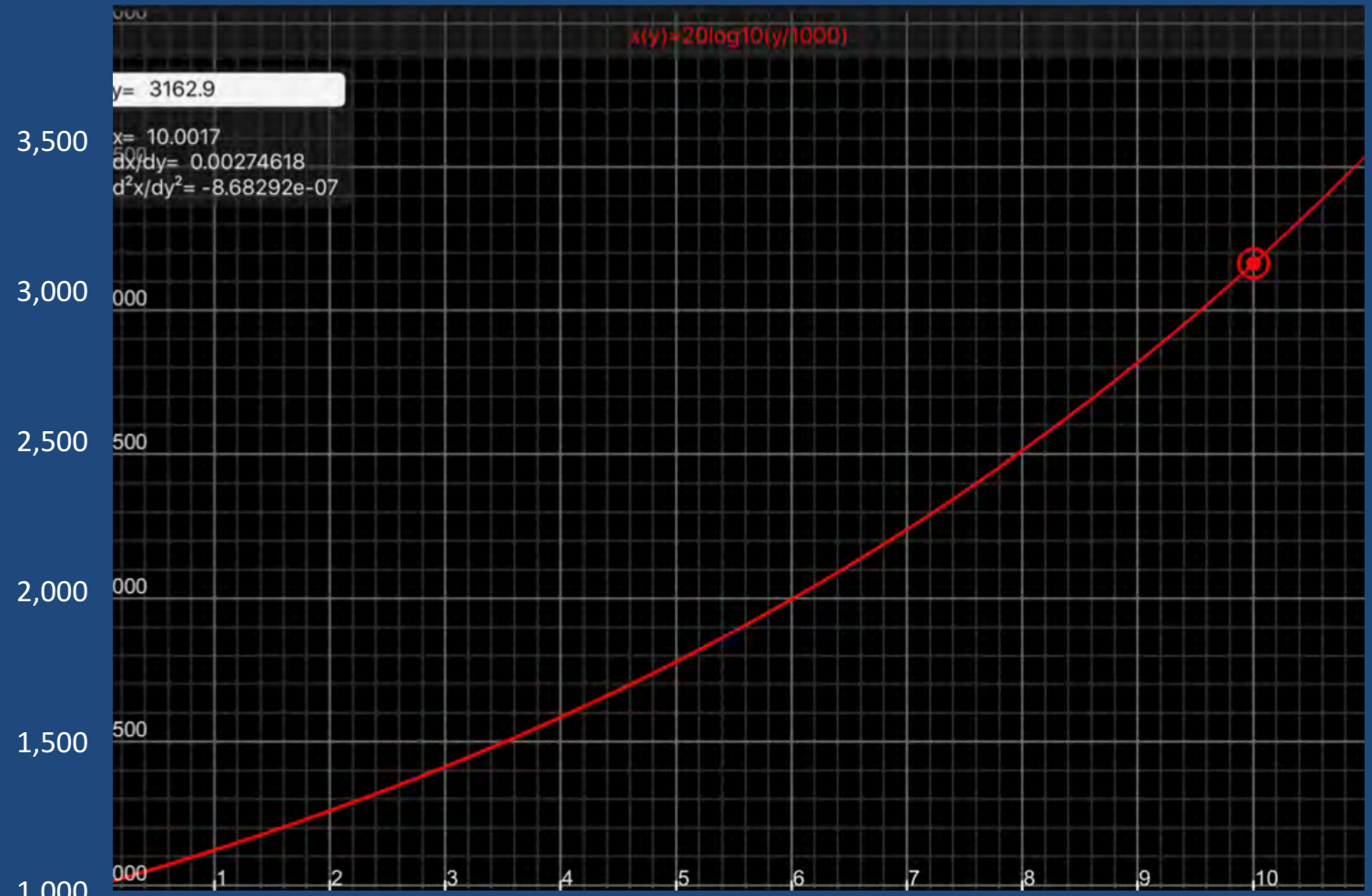
Hi Ambrose,
Too much air traffic noise. Ear pain is back and I'm very sad. Just fyi.

Sincerely,
XXXXXXX

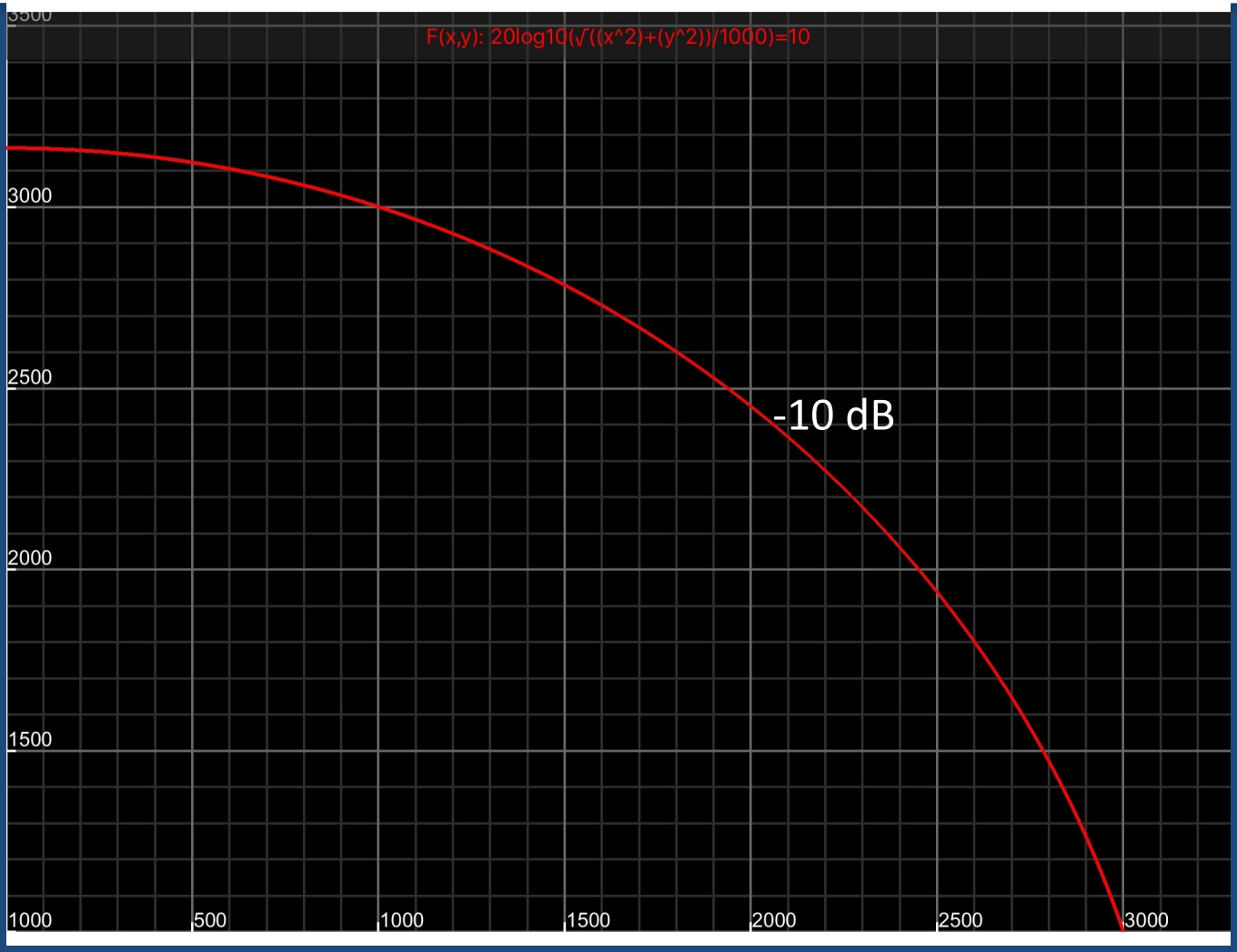
Noise “Facts”

- Quiet Neighborhood = 45 dB
- Conversation = 60 - 65 dB
- Noise from MD80 flying 1,000 feet above = 80 dB+
- A 10 dB decrease in sound seems ½ as loud
- Sound Transmission Loss of untreated house = 20 dB
- Sound Transmission Loss of ”sealed” house = 30 dB
- Sound decreases inversely with square of distance
- Distance is function of altitude & ground distance
- Sound from 3,163 ft overflight is 10 dB less than at 1,000 ft
- Sound 3,000 ft off-track is 10 dB less than directly below

Noise “Facts” (cont.)
Noise Decrease With Increase in Altitude



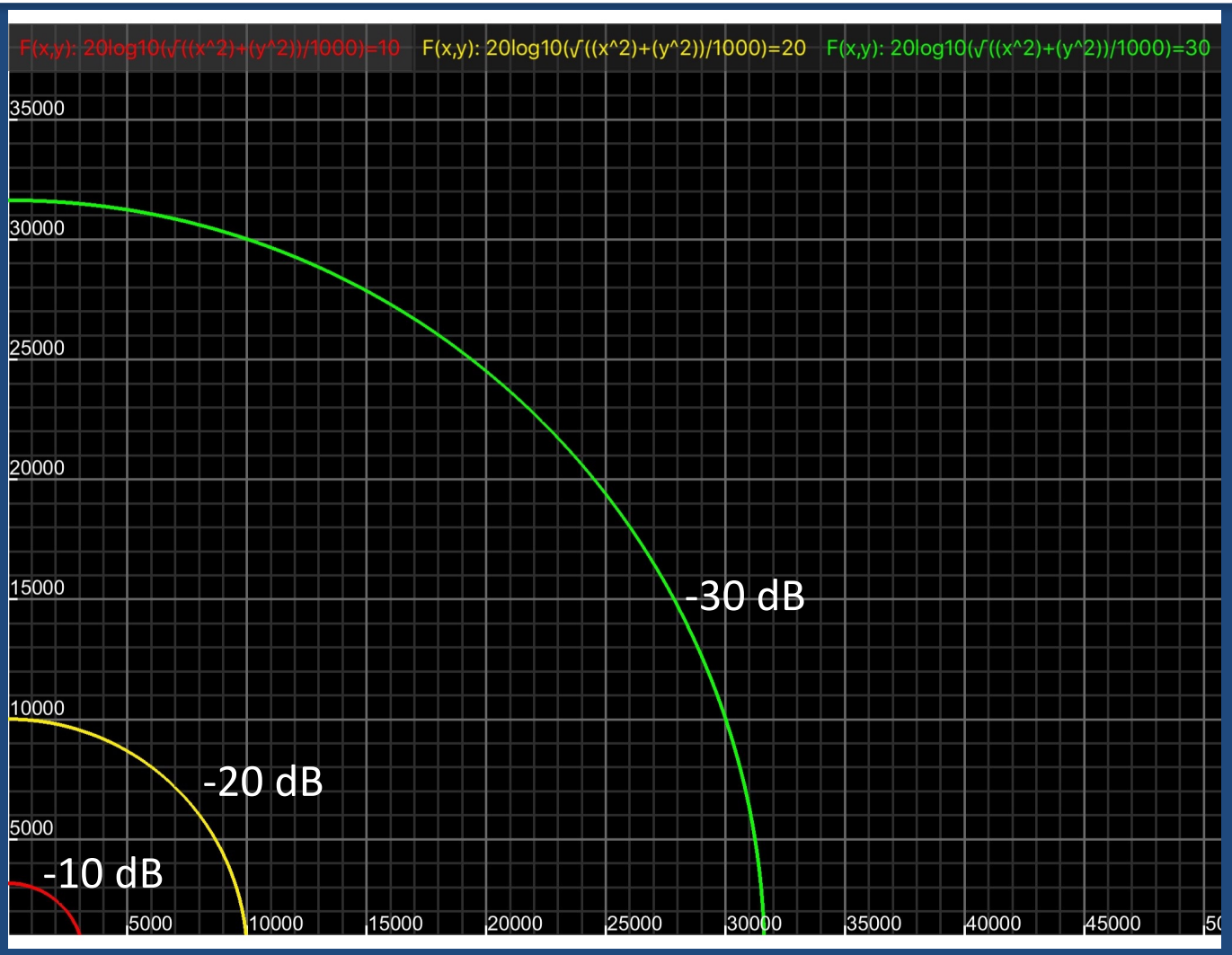
Noise “Facts” (cont.)
Altitude Vs Off-Track Location



Altitude AGL

Distance Off-Track

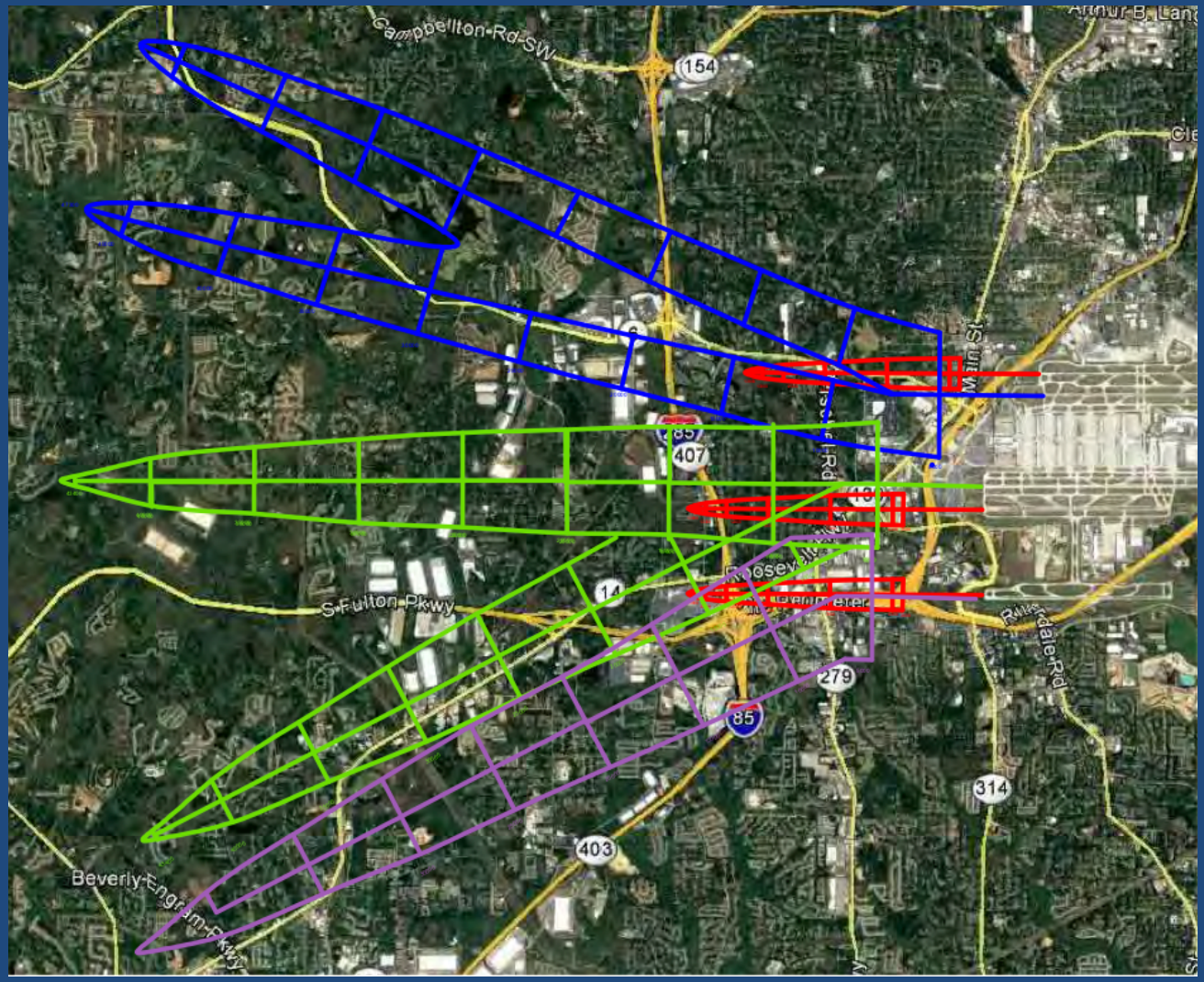
Noise “Facts” (cont.)
Altitude Vs Off-Track Location



Altitude AGL

Distance Off-Track

KATL B737 Typical Departure
10 dB Noise Corridor Width



Conclusions

- Insulate for excursions, not averages
- Insulate narrowing noise corridors, further out
- Fly planes higher, sooner, to reduce insulation needed
- Flying high enough, soon enough, could reduce insulation needs to zero
- Narrower noise corridors fit easier over compatible land (like expressways)

Contact Information

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Backup Slides

Considerations For a New Noise Metric

- With the current significant changes to the NAS, now is the time to recommend changes to the current FAA noise [dose-response] metric that is used to predict annoyance, so as to account for:
  - The psychological impact of frequent, significant noise spikes, often occurring at regular intervals for an extended period, multiple times per day
  - The physiological impact of infrequent, significant noise spikes occurring when people are trying to sleep.

Considerations For a New Noise Metric (Cont.)

- Noise Type
  - "Overhead Noise" (Takeoff & Landing - C Vs A Weighting)
  - "Ground Noise" (C Weighting)
- Intrusiveness
  - Noise Floor (level of floor - dB)
  - Peaks of Excursions (dB)
  - Interval Between Excursions Above Threshold (secs between excursions)
  - Duration of "Push" (minutes)
  - Number of "Pushes" per Day
- Inside Vs Outside, Day Vs Night (Vs Evening?)
- Mitigation Cost: Insulation Vs Altitude Vs Ground Distance