



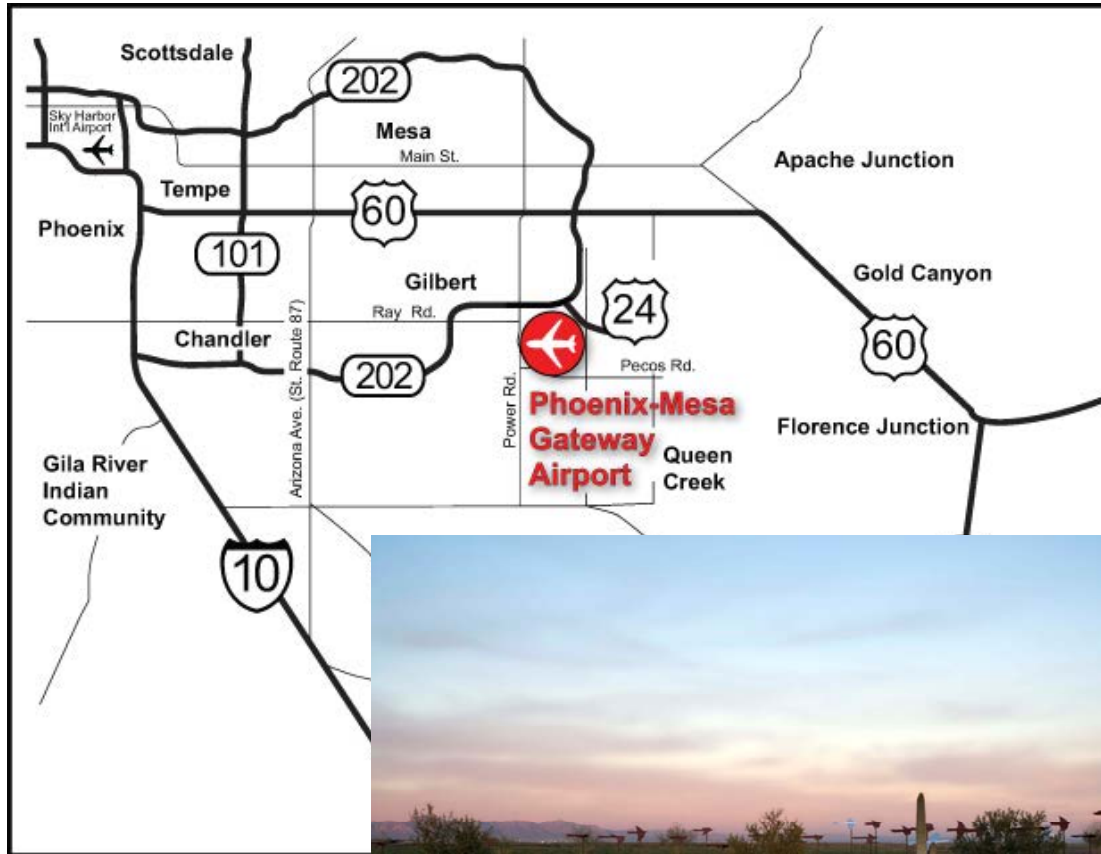
# Utilizing GIS in Airport Land Use Compatibility Planning & Development

2016 ESRI User's Conference

June 30, 2016



# Gateway @ a Glance



# Gateway @ a Glance



- ➔ Previous Williams AFB- Closed in 1993
- ➔ Commercial Service (FAA Small Hub)
  - 1.3 million total passengers in Calendar Year 2015
  - Allegiant Air focus city serving 38 non-stop destinations
- ➔ 219,014 operations (44<sup>th</sup> Busiest Airport)
  - Busiest Contract Tower in U.S.
- ➔ Over 50 Tenants and 2,000 employees on site

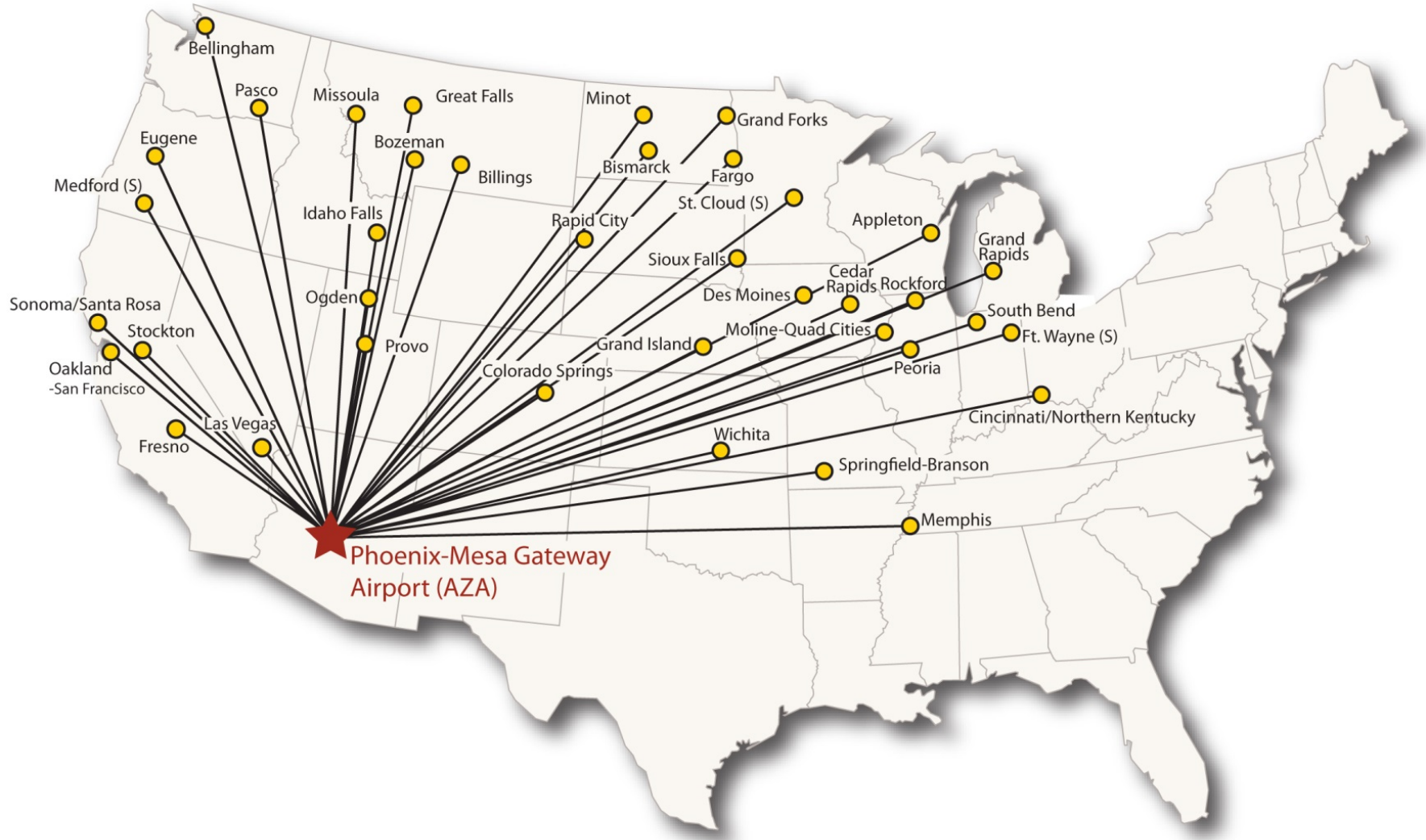


# Route Map

38 NONSTOP DESTINATIONS



PhxMesa  
**Gateway**  
Airport





# Gateway & Vicinity

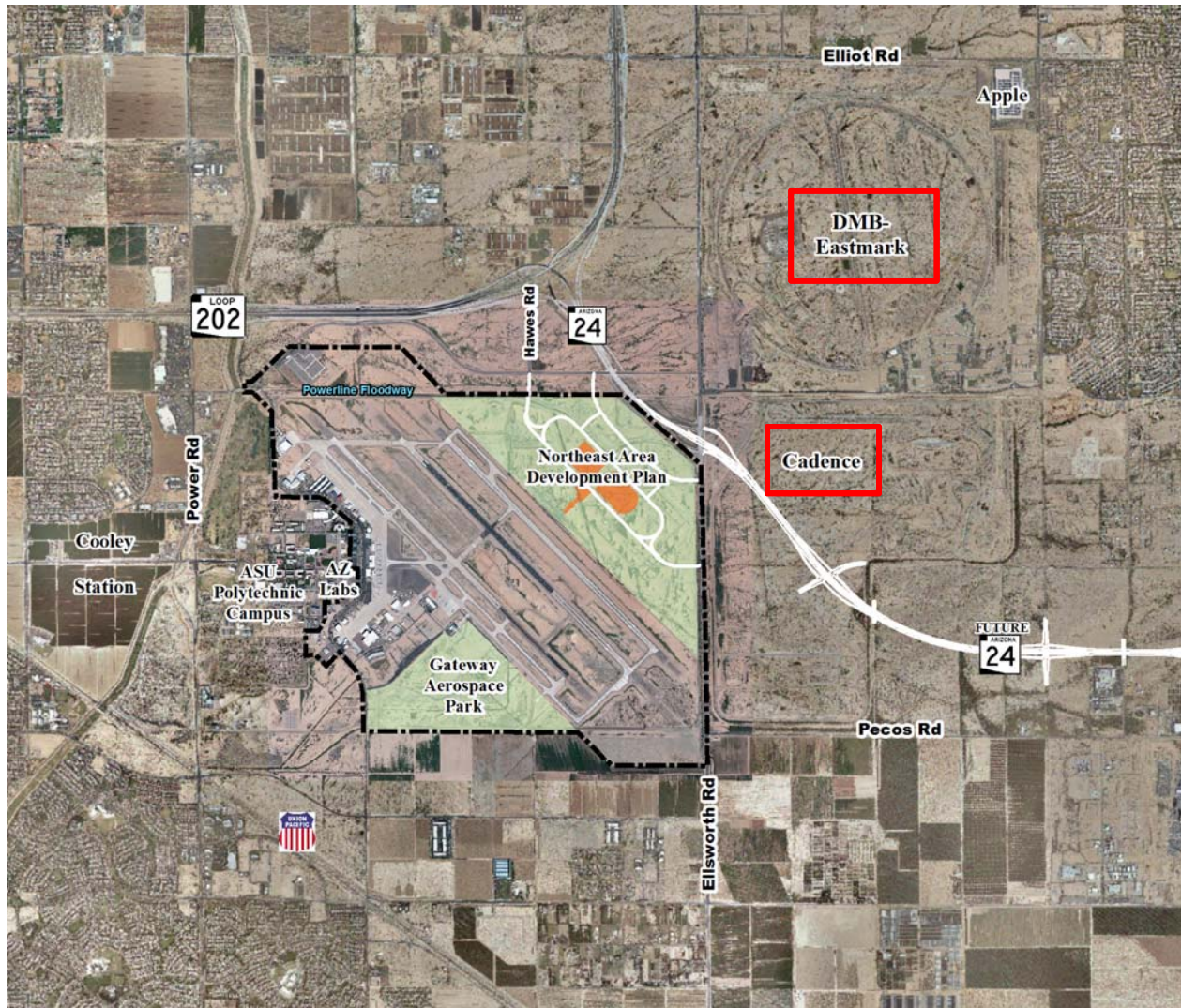


## Why is Gateway Unique?

- Infrastructure
  - Runways
  - Highway
  - Rail
- College Campuses
- Fleet Mix
- Climate
- Available Land
- Growing Population



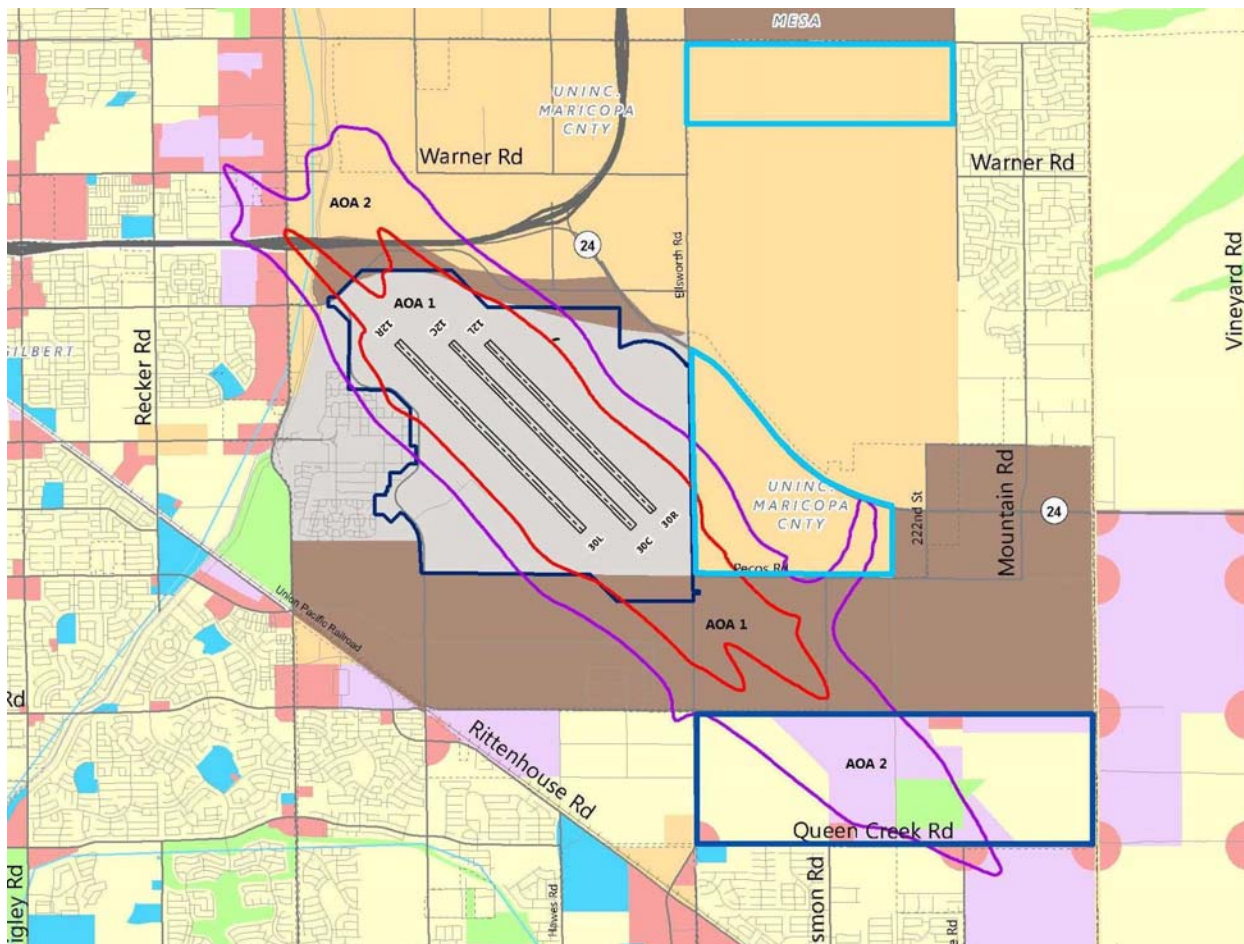
# Gateway & Vicinity



## How does Gateway...?

- Address Continued Residential Growth
- Accommodate Development Encroachment
- Protect FAA Flight Surfaces
- Comply w/ State Law Requirements
- Work w/ 3 cities & 2 counties

## GLUE = Gateway Land Use Effectiveness



- Land Use
- Height
- Disclosure

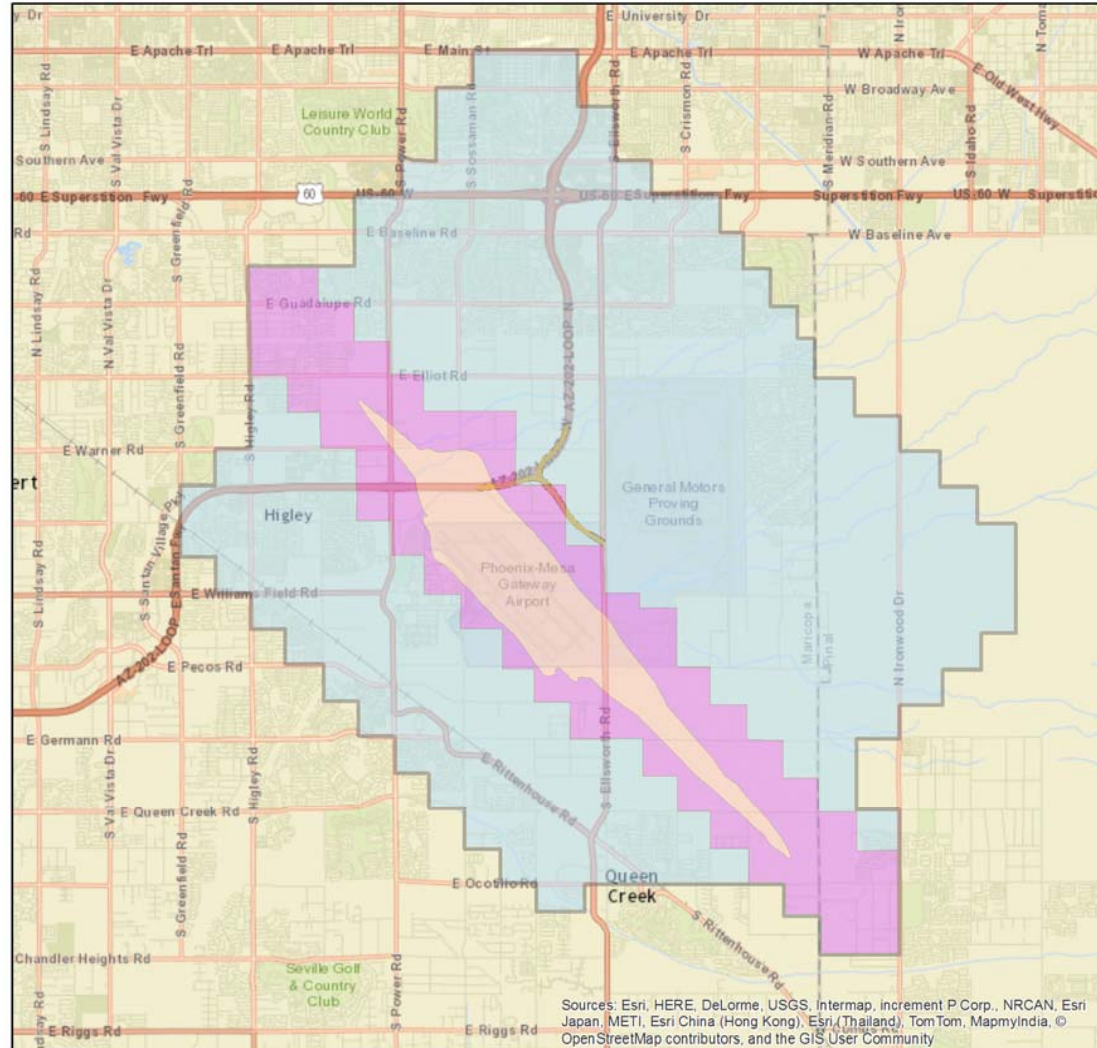


# Current Airport Planning & Overflight Area



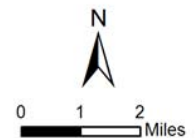
## Airport Focused Plans

- **Airport Master Plan & Updates (1993, 1999, 2008)**
- **Williams Regional Planning Study (1996)**
- **FAA Part 150 Study (2000)**
- **Gateway Airport Land Use & Height Compatibility Plan (2016)**



## Airport Planning Area

- LEGEND**  
Airport Planning Area/  
Airport Overflight Zone (AOZ)
- AOZ 1 (65 DNL)
  - AOZ 2
  - AOZ 3- Airport Planning Area Boundary



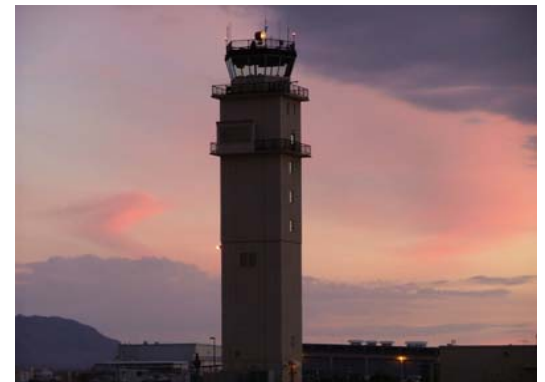


## What the Airport Land Use Compatibility Plan (ALUCP) is:

- Updated land use compatibility plan for the Airport & adjacent jurisdictions
- Capacity & data based approach
- Protection of airspace and capacity while complying with FAA grant assurances
- Allows for compatible development around the airport
- Communication & outreach tool for planned operations growth

## What the Airport Land Use Compatibility Plan (ALUCP) is NOT:

- Change to air traffic patterns and flight procedures
- Time-based study
- An impact or restriction to existing uses
- A restriction on proposed/new compatible development





## Partnered w/ Ricondo & Associates

### Software Utilized

- Symphony EnvironmentalVue- (Flight tracks & patterns)
- Integrated Noise Model (INM 7D)- (Noise contours)
- AutoCAD- (FAA surfaces)
- **ArcGIS 10.3** – (Spatial analysis, data incorporation & exhibit creation)
  - 1st Airport ArcMap licenses

# Calculating Airport Capacity



- Annual Service Volume (ASV): The annual number of operations that can be accommodated without unacceptable delay (4 to 6 minutes/operation).
  - Capacity for 498,000 annual operations (takeoffs & landings)

| USER CATEGORY           | OPERATIONS (TAKEOFFS AND LANDINGS) |                |                |
|-------------------------|------------------------------------|----------------|----------------|
|                         | Itinerant                          | Local          | Total          |
| <b>Air Carrier</b>      | 32,123                             | 0              | 32,123         |
| <b>Air Taxi</b>         | 50,819                             | 0              | 50,819         |
| <b>General Aviation</b> | 159,904                            | 247,383        | 407,287        |
| <b>Military</b>         | 3,755                              | 4,017          | 7,772          |
| <b>Total</b>            | <b>246,600</b>                     | <b>251,400</b> | <b>498,000</b> |

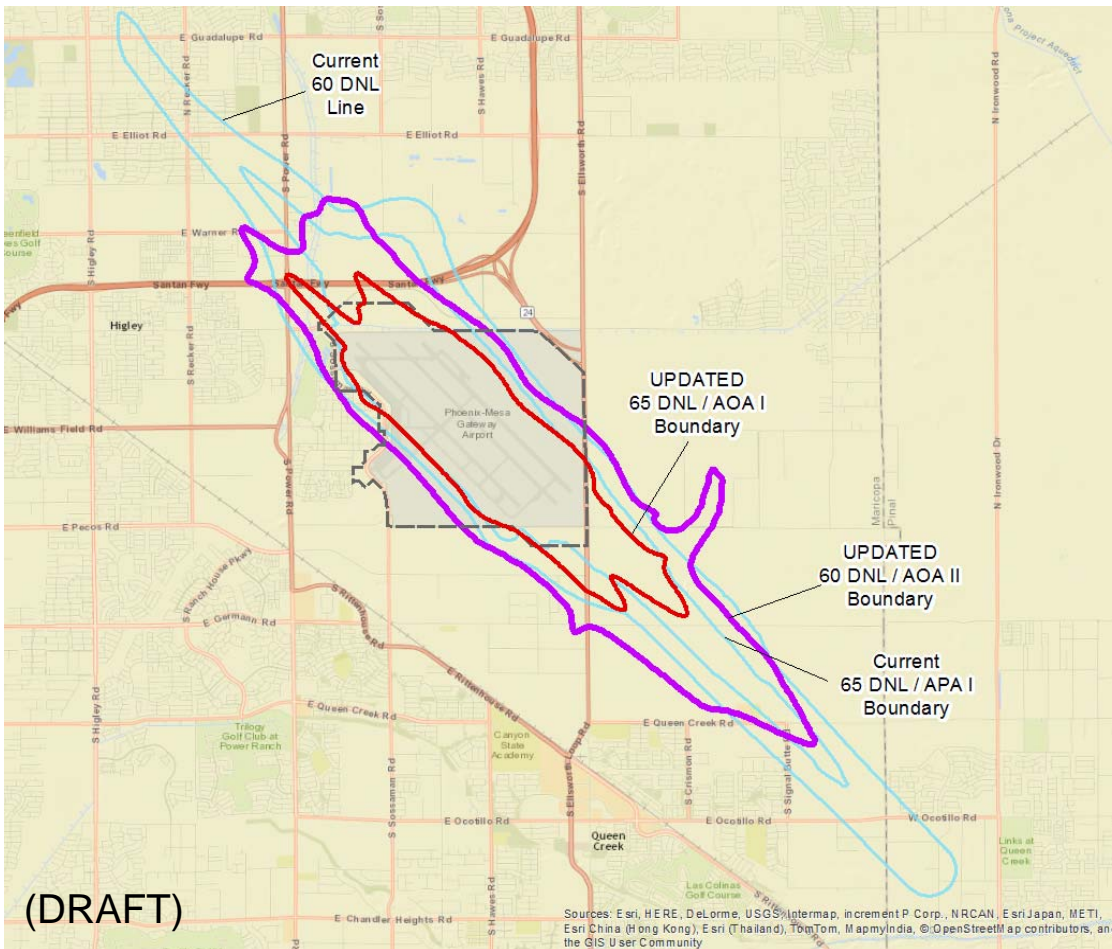
NOTE: In 2014, the Airport had 225,181 operations.



# Updated Planning Noise Exposure Contours



## Proposed Overflight Areas (AOA) I (65 DNL) & II (60 DNL)



Updated 65 DNL (AOA I)  
Boundary  
(4± Square Miles)



Updated 60 DNL (AOA II)  
Boundary  
(9± Square Miles)

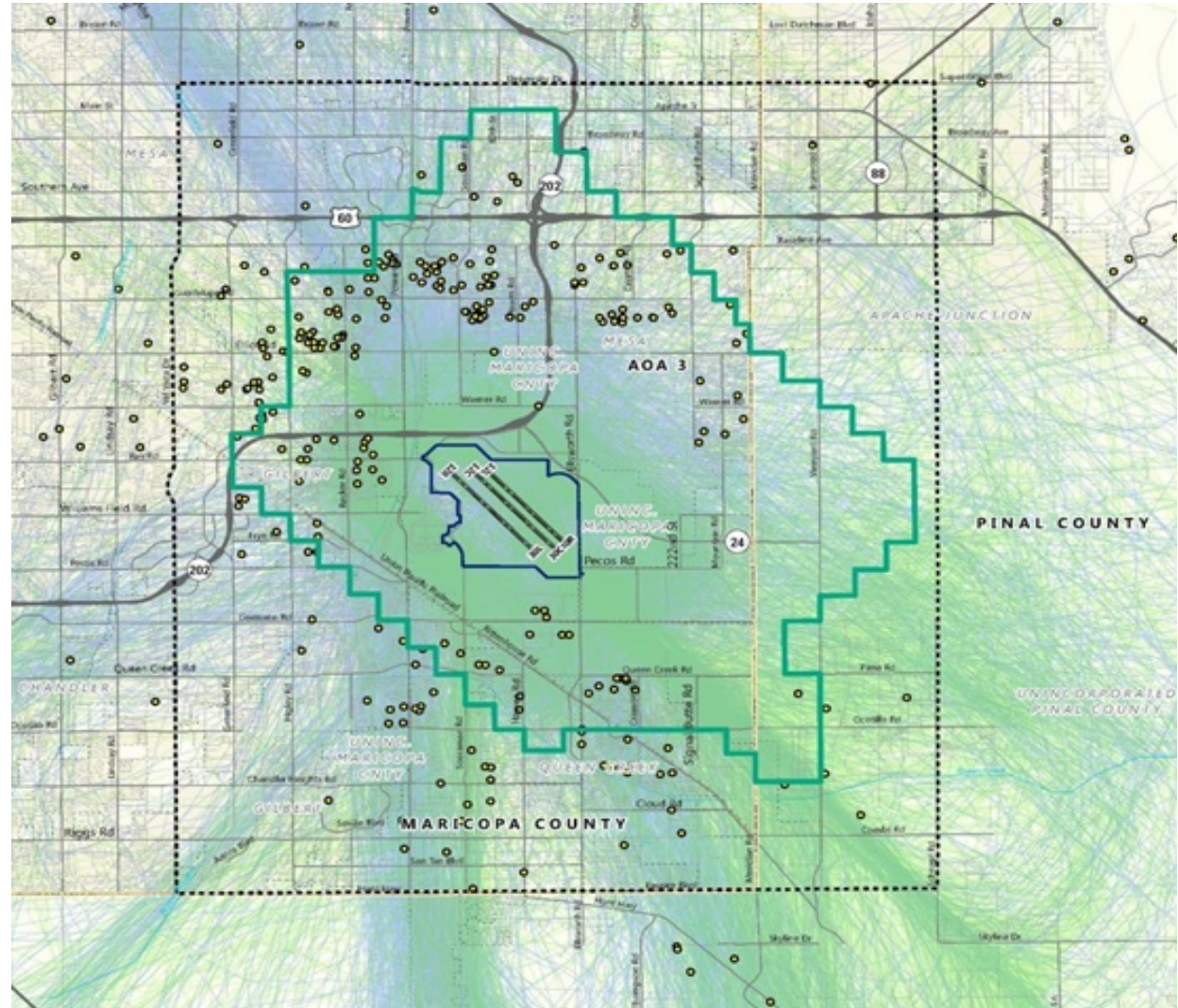


Current 65 DNL Boundary  
(6± Square Miles)  
Current 60 DNL Boundary  
(12± Square Miles)

# Arrival & Departure Tracks & Noise Complaints



- 4 weeks of flight tracks
- 1 week per season
- 10-years of noise calls (2005-2015)
- 85%± call addresses plotted (2,400± calls)





# Generalized Arrival Flight Tracks



PhxMesa  
**Gateway**  
Airport

-  ALUCP Update Study Area
-  Airport Planning Area and AOA 3
-  Commercial Operations
-  Business Jet Operations
-  Military Operations
-  Propeller Operations
-  Helicopter Operations



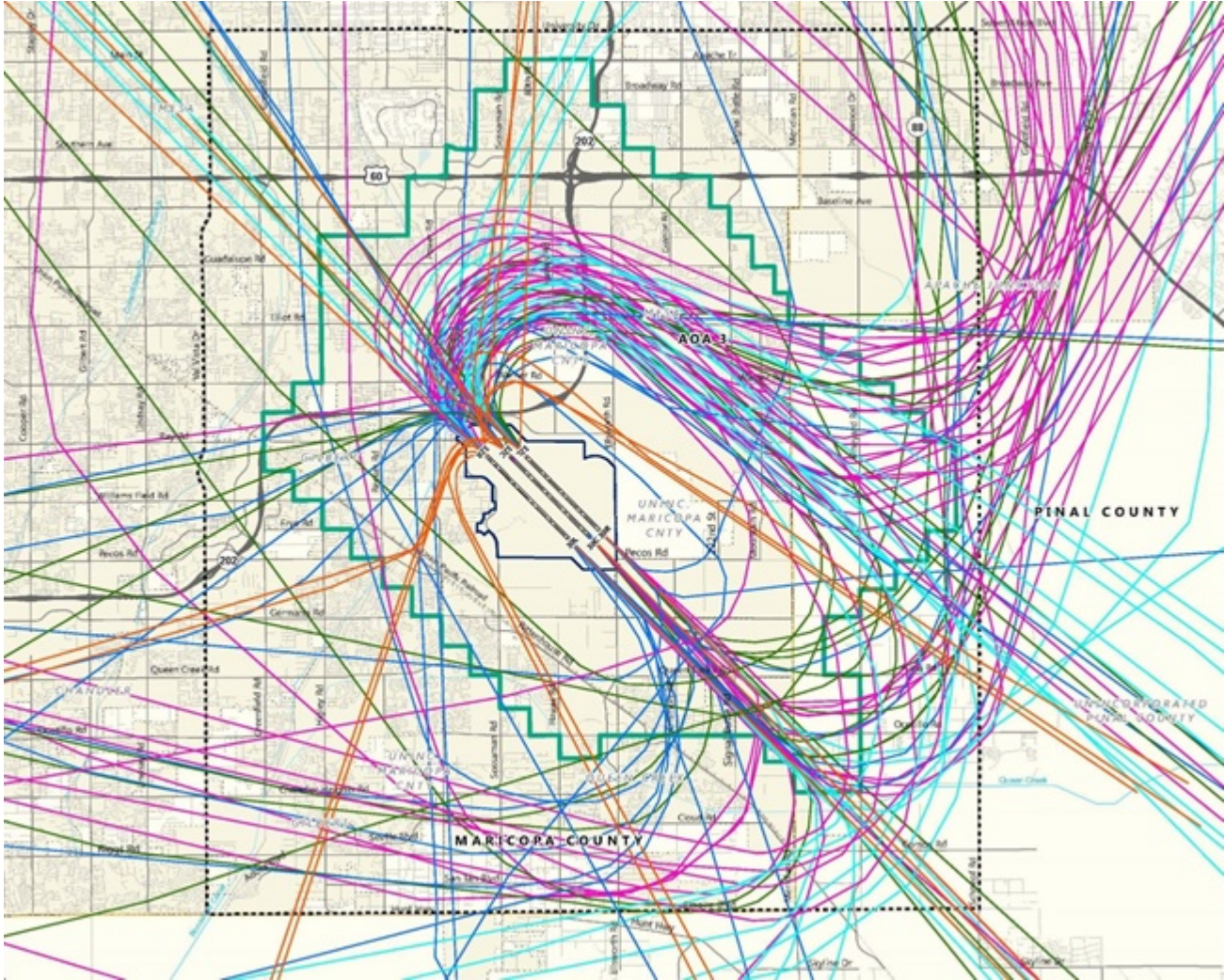


# Generalized Departure Flight Tracks



PhxMesa  
**Gateway**  
Airport

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-  Airport Planning Area and AOA 3
-  Commercial Operations
-  Business Jet Operations
-  Military Operations
-  Propeller Operations
-  Helicopter Operations






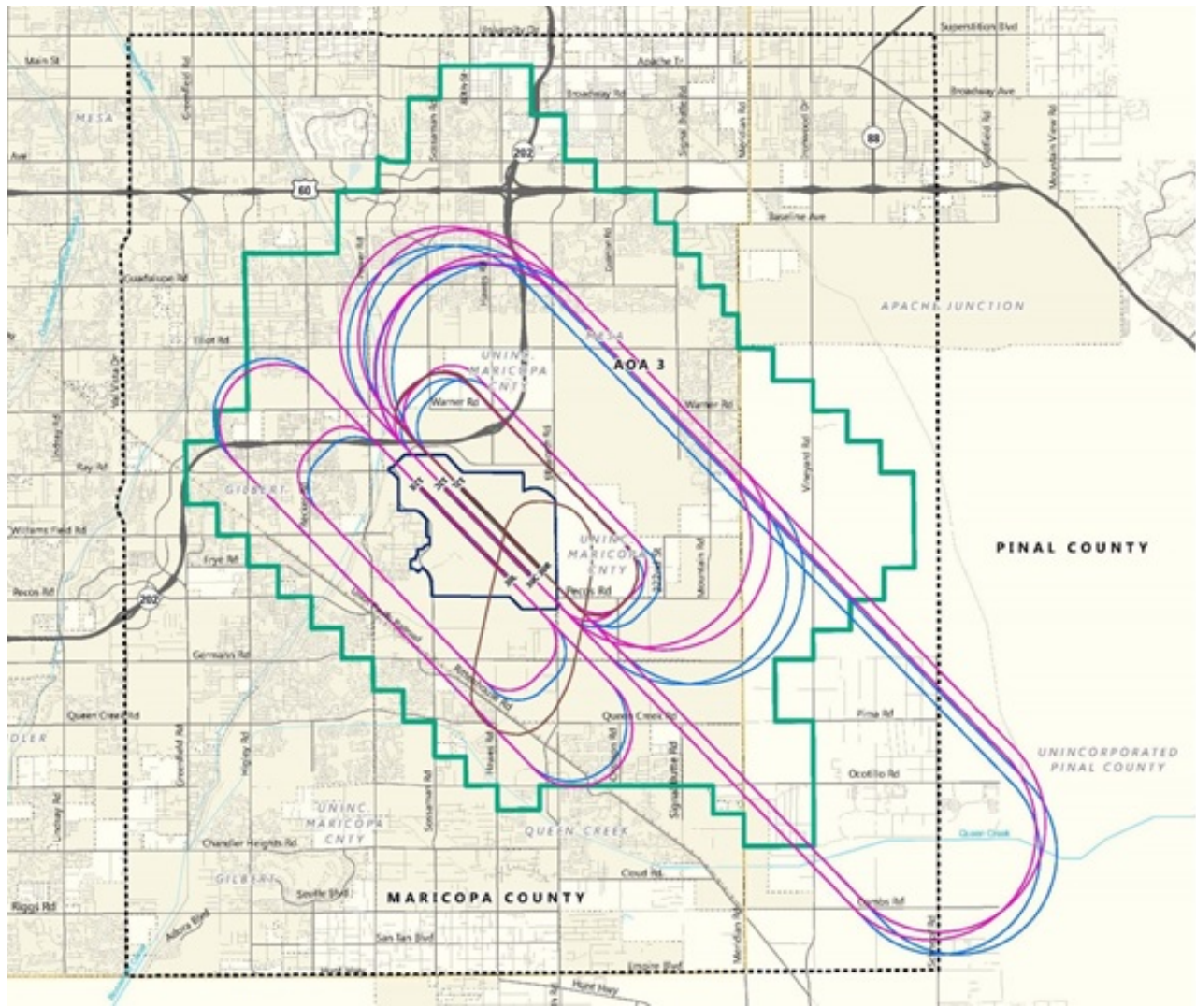


# Generalized Touch-and-Go Patterns



PhxMesa  
**Gateway**  
Airport

-  ALUCP Update Study Area
-  Airport Planning Area and AOA 3
-  Touch & Go Operations - Runway 30 (30L, 30C and 30R)
-  Touch & Go Operations - Runway 12 (12L, 12C and 12R)
-  Touch & Go Operations - Helicopter

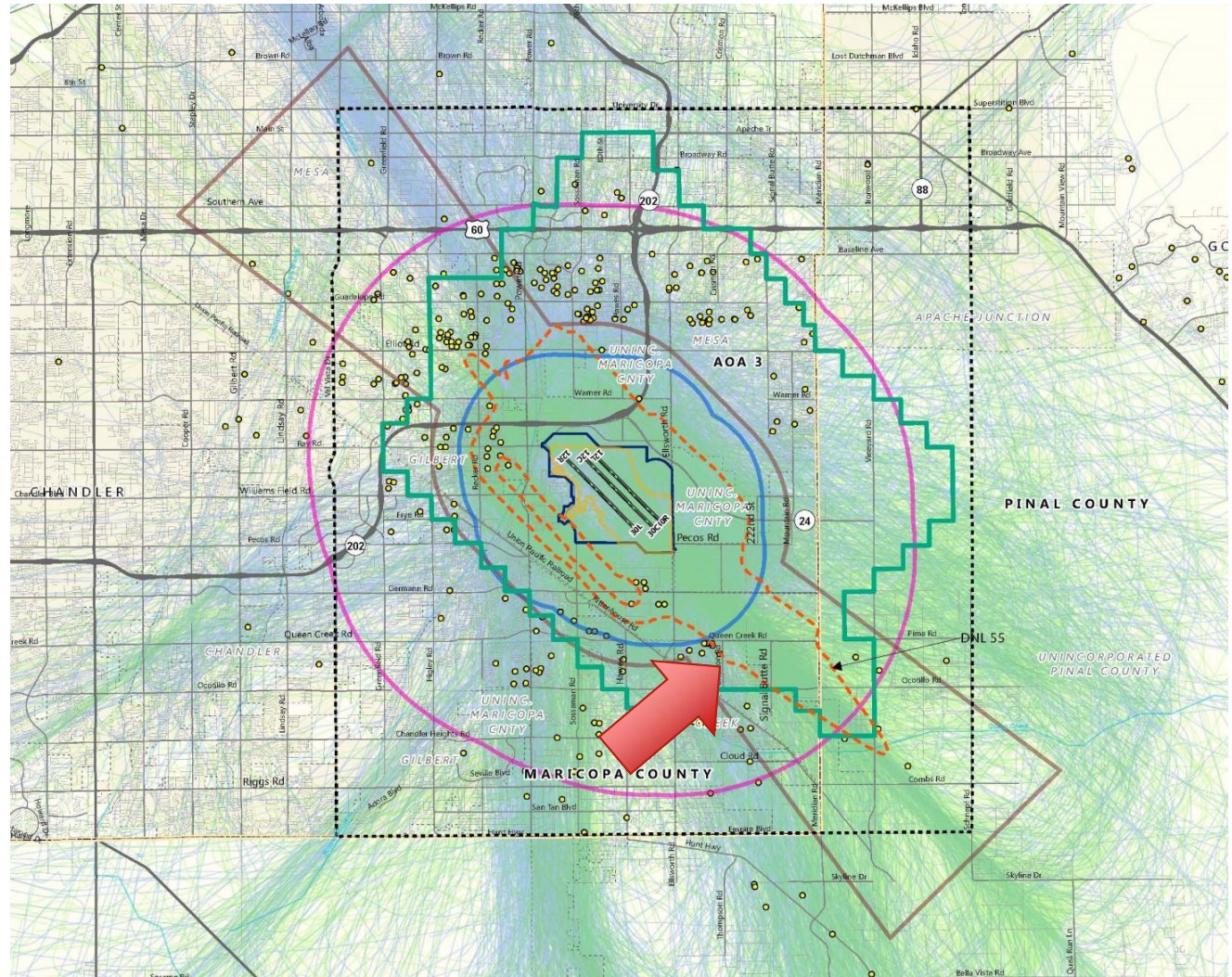




# Airport Influence Area Factors



- Current boundary
- Flight tracks
- Noise complaints
- Touch & go patterns
- **55 DNL contour**
- **FAA wildlife separation**
- **FAA Part 77 area**
- **Gateway tower controlled airspace**

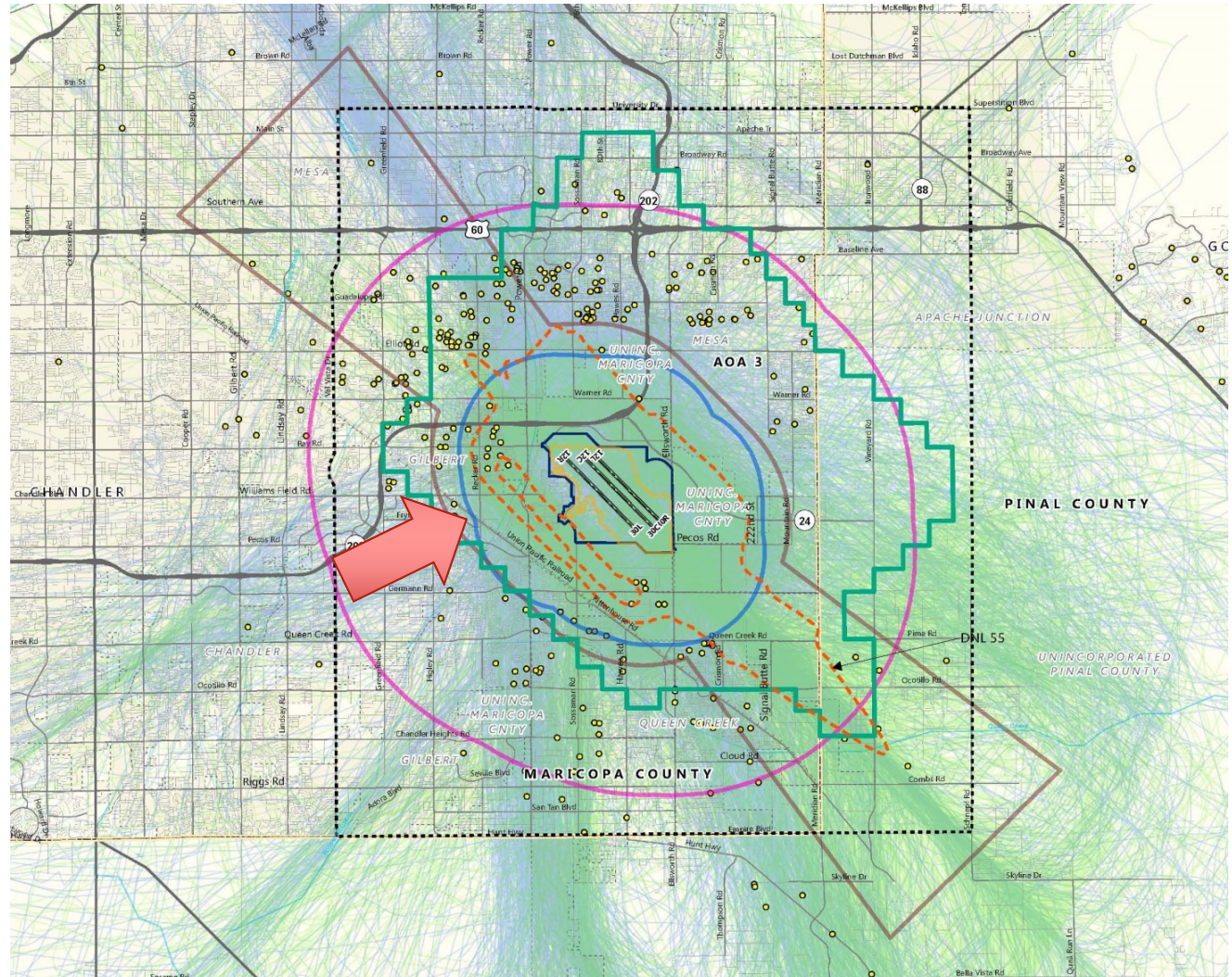




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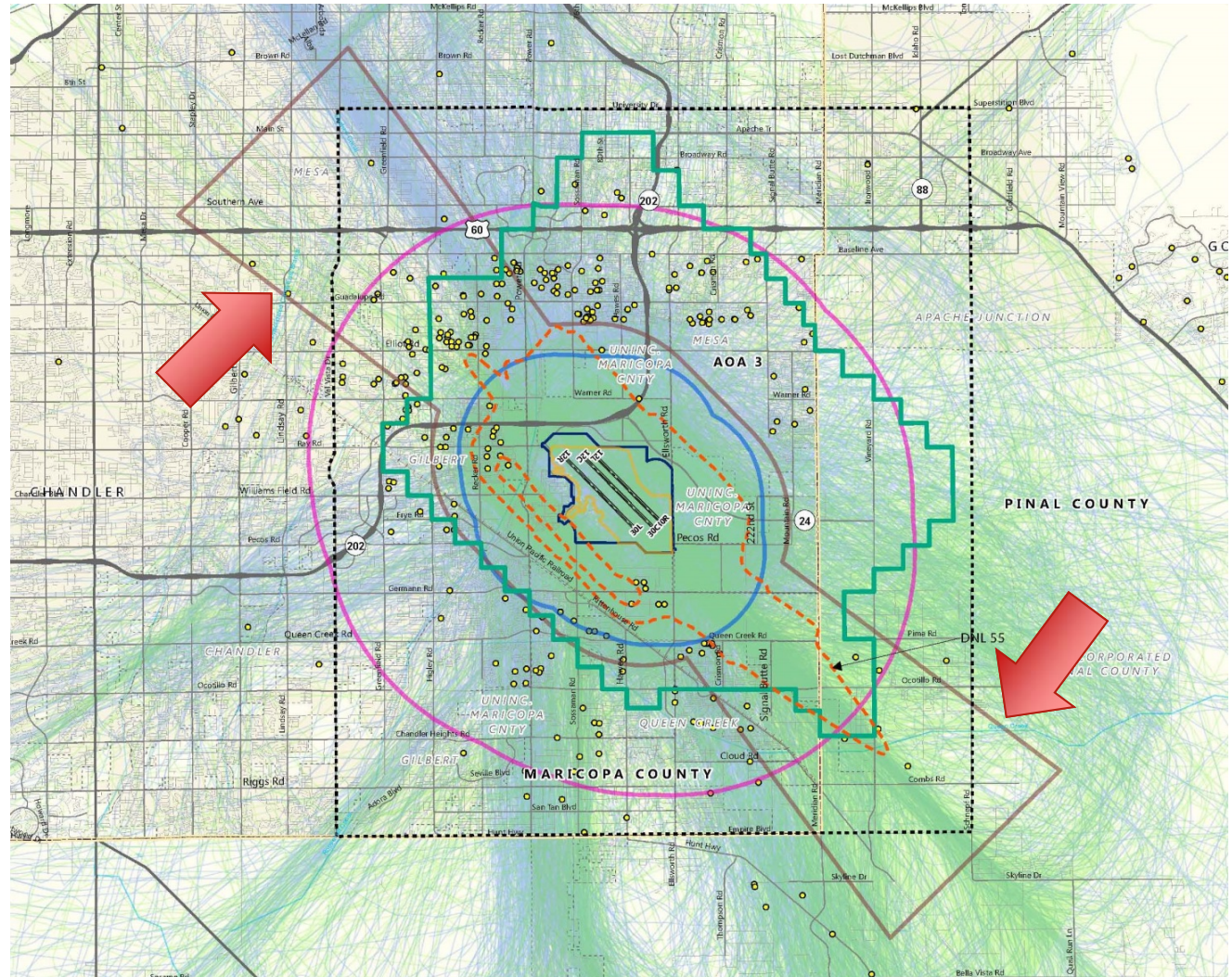




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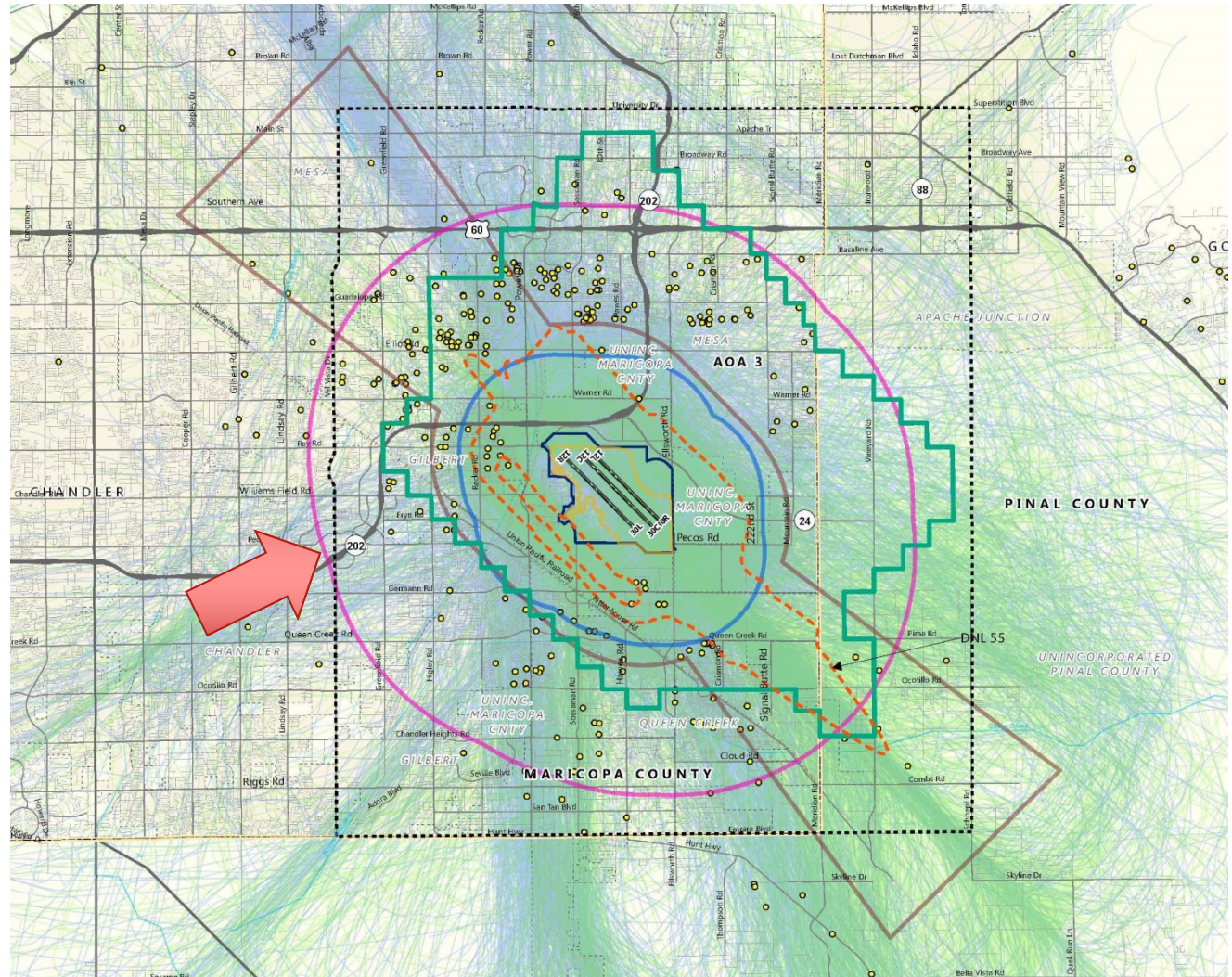




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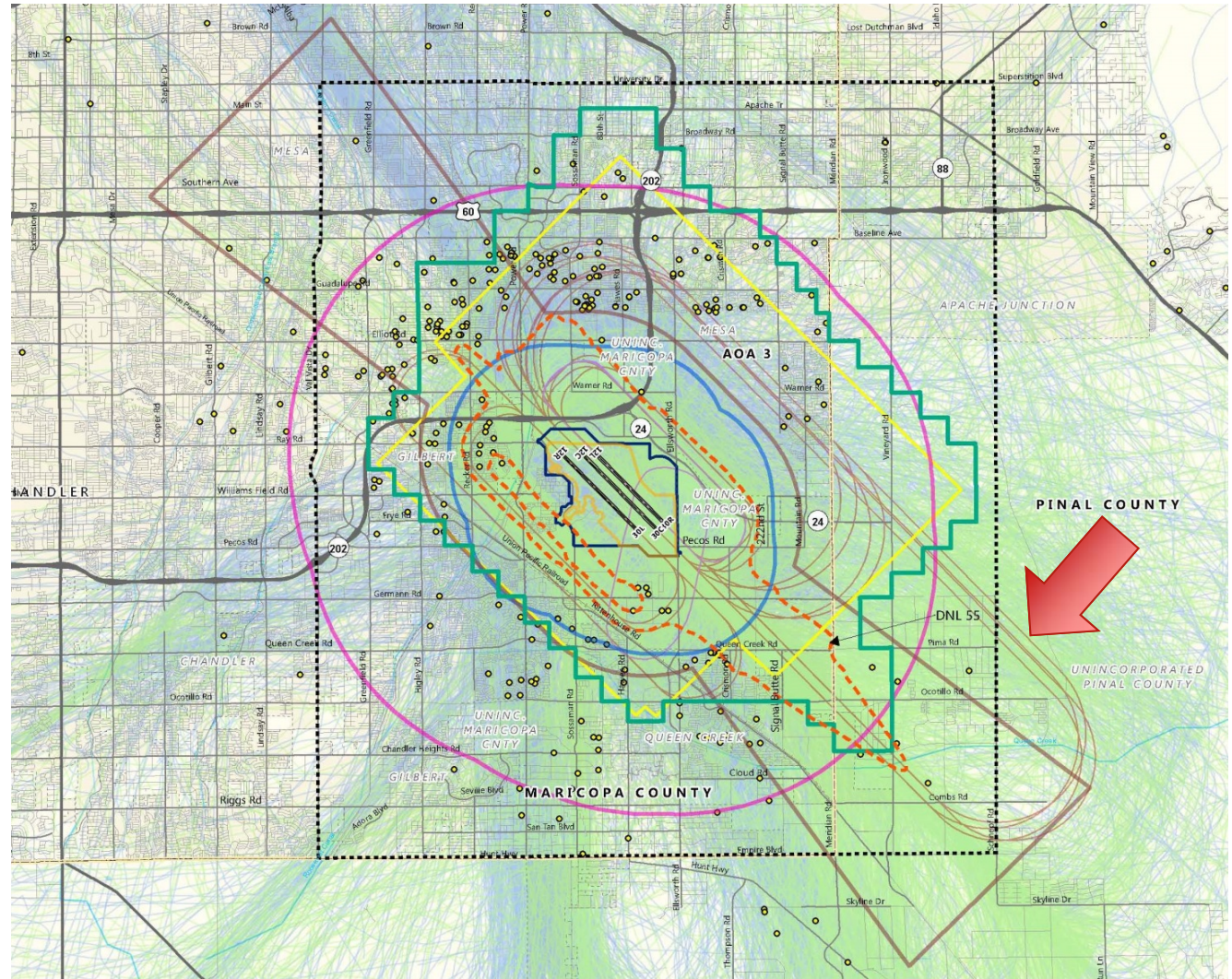




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- **Generalized touch & go patterns**
- **Current traffic pattern airspace on file**

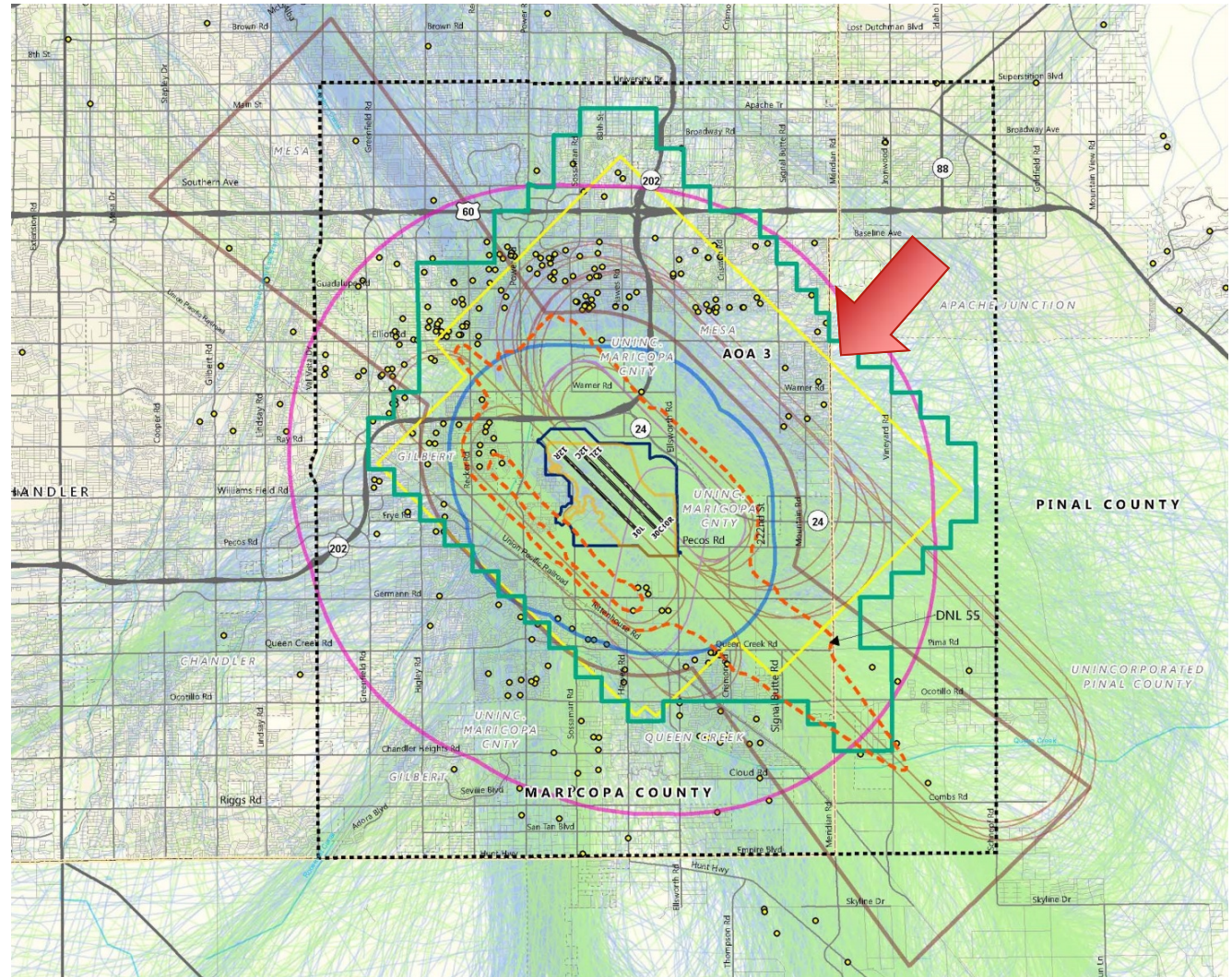




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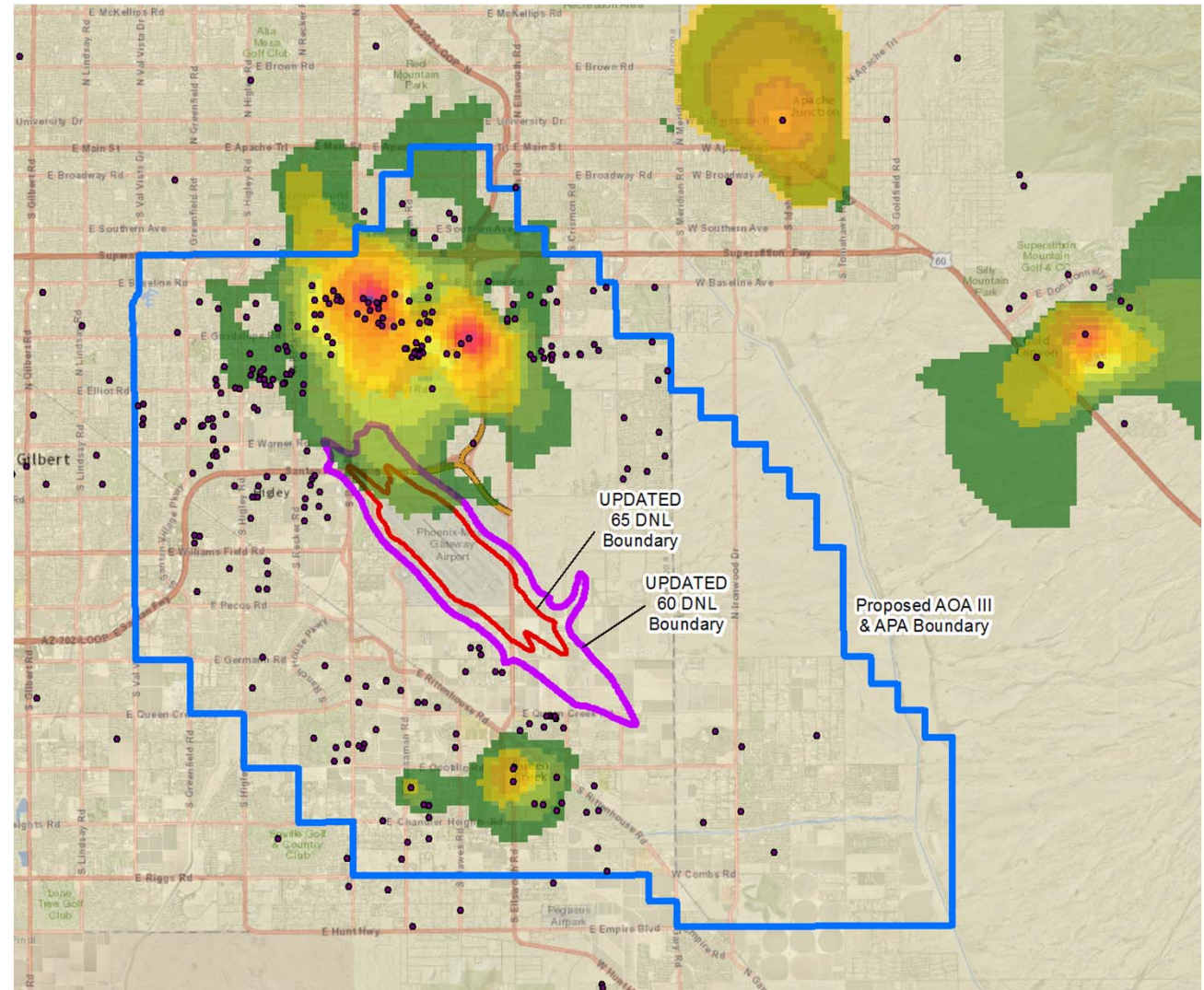




# Noise Complaint Density Analysis



- Accounts for multiple calls from single locations
- Identifies outlier locations
- Verify Airport Overflight Area (AOA) boundaries
- Over 80% of calls within proposed Airport Planning Area












# Proposed Updated Airport Overflight Areas

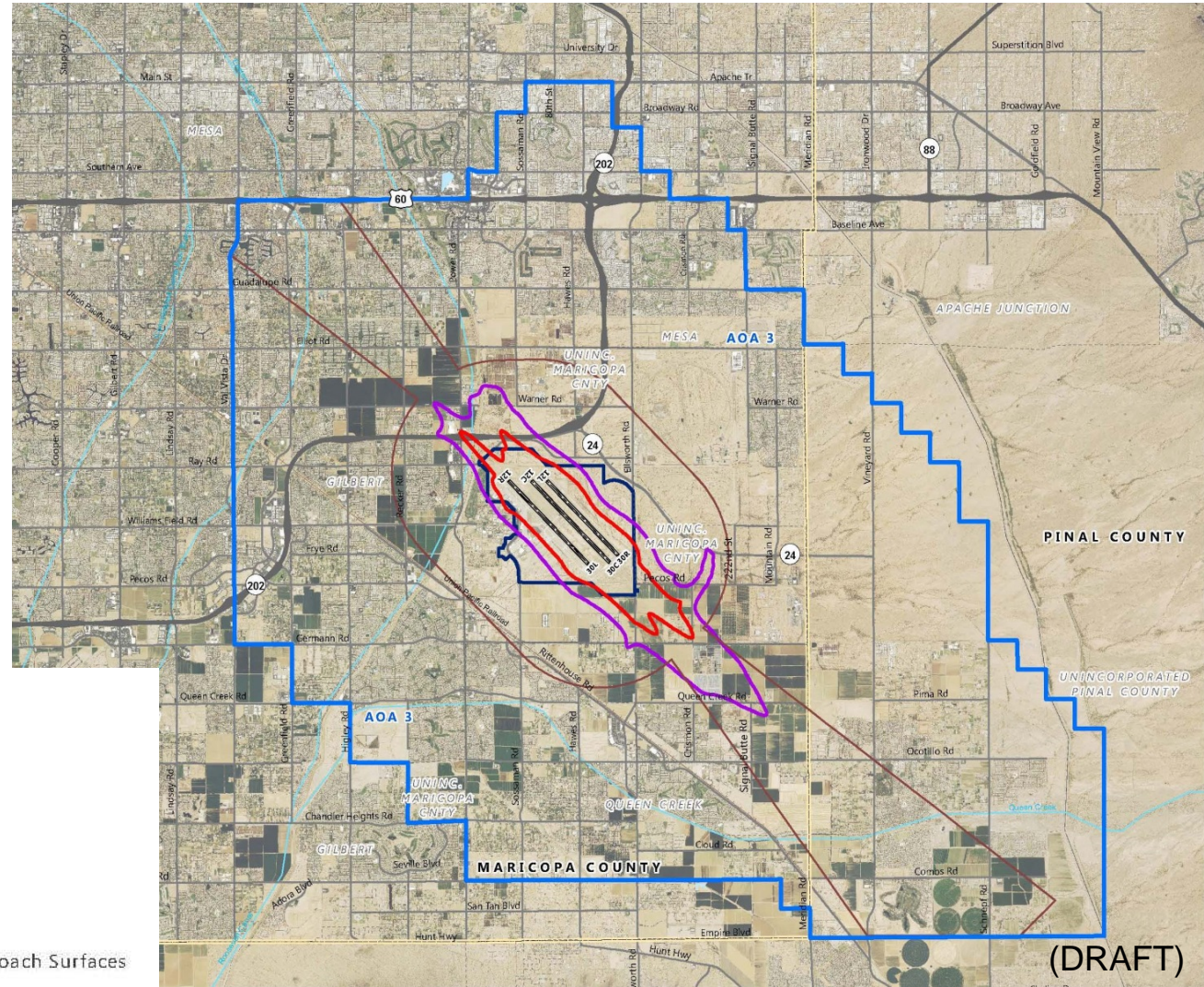


## Airport Overflight Areas (AOA):

- I & II decrease
- III increase

## Capacity & data derived plan recommendation

-  Existing Airport Boundary
-  Municipal Boundary
-  County Boundary
-  Updated AOA 1
-  Updated AOA 2
-  Updated AOA 3
-  14 CFR Part 77 Horizontal and Outer Approach Surfaces





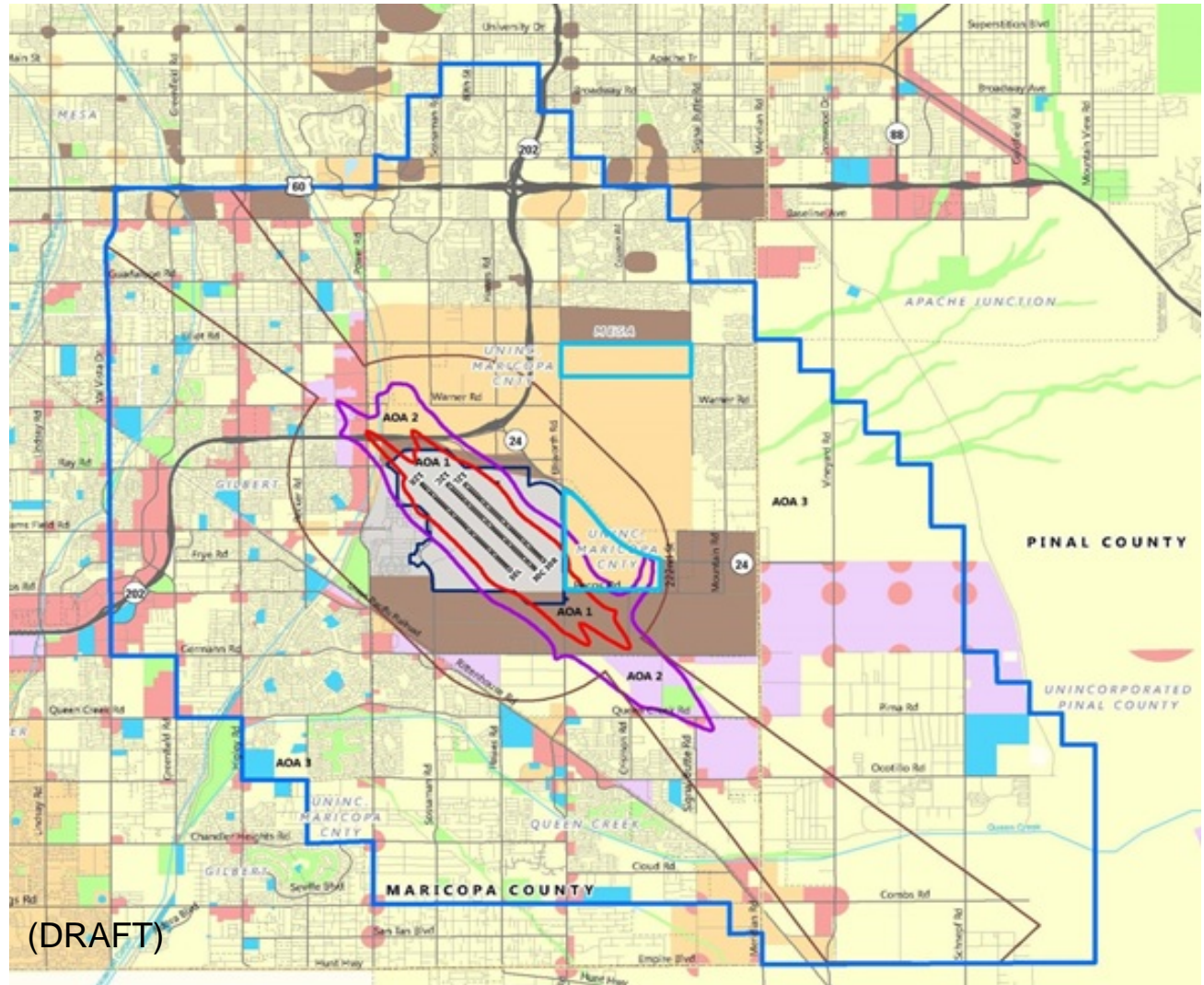
# Generalized Planned Land Use



Planned land use overlay identifies:

- Areas of compatibility & incompatibility
- Areas for land use change consideration

## Generalized Future Land Use



# Proposed Land Use Matrix



| PROPOSED LAND USE  | Aircraft Overflight Zone (AOA)/Noise Exposure Range (DNL)                                  |  |  |
|--|--|--|--|
|  | AOA 1<br>65+   | AOA 2<br>60-65   | AOA 3<br>60-Planning Boundary              |
| Residential  | Incompatible   | Incompatible   | Conditionally Compatible (Disclosure only) |
| Commercial, Office, Service, Lodging                           |  |  |  |
| Hotels, motels   | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Conditionally Compatible (Disclosure only) |
| Retail; professional, offices                                  | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Compatible   | Compatible                                 |
| Indoor recreation, amusements, spectator events                | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Compatible   | Compatible                                 |
| Theaters, performing arts centers                              | Incompatible   | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Conditionally Compatible (Disclosure only) |
| Outdoor sports, entertainment, public assembly, amphitheaters  | Incompatible   | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Conditionally Compatible (Disclosure only) |
| Educational, Institutional, Public Services                    |  |  |  |
| Hospitals, other health care facilities                        | Incompatible   | Incompatible   | Conditionally Compatible (Disclosure only) |
| Elementary and secondary schools, preschools, day care centers | Incompatible   | Incompatible   | Conditionally Compatible (Disclosure only) |
| Day care centers accessory to a business or industrial use     | Incompatible   | Incompatible   | Compatible                                 |
| Colleges, universities   | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Conditionally Compatible (Disclosure only) |
| Religious facilities; libraries; museums                       | Incompatible   | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Conditionally Compatible (Disclosure only) |
| Industrial   |  |  |  |
| Manufacturing, processing, and assembly – light to general     | Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure) | Compatible   | Compatible                                 |
| Refining, manufacturing, and storage of hazardous materials    | Incompatible   | Compatible   | Compatible                                 |

- Incompatible: Use is not encouraged
- Conditionally Compatible (Construction Requirements, Avigation Easement and/or Disclosure)
- Conditionally Compatible (Disclosure only)
- Compatible: Use is acceptable

(DRAFT)



# Development Height Guidance



Partnered w/ Planning  
Technology, Inc. (PTI)

## Software/API Utilized

- AutoCAD- (FAA surfaces)
- SQL Server- (Spatial)
- Javascript API- (web-based app)
- ArcGIS 10.3 – (Spatial & 3D analysis, raster processing & composite map creation)



# Development Height Guidance



## iALP Application

- Web-based app
- Models development proposal height against FAA surfaces
- Allows airport & applicants to identify issues prior to FAA 7460 filing
- HTML report indicating heights below or above surface penetrations

The screenshot displays the iALP application interface. The main window shows a map with various colored overlays representing different surfaces and boundaries. On the left, a 'Layers' panel lists various data layers such as 'FAA Facility', 'IWA RWs ALP FUTR', and 'IWA P100 1'. On the right, a 'Single Point Analysis' panel is active, showing coordinates (X: 778259.89556303, Y: 832071.72040763), latitude (33° 17' 13.4608" N), and longitude (-111° 39' 38.0059" W). It also displays elevation data: 'Struct Ht (AGL) 80', 'Site Elev (AMSL) 1,368.46', and 'Overall Ht (AMSL) 1,448.46'. The bottom status bar shows the current location as 'X: 786233.596905, Y: 841330.073632 (FOOT)' and the scale as '1: 51031.79'.

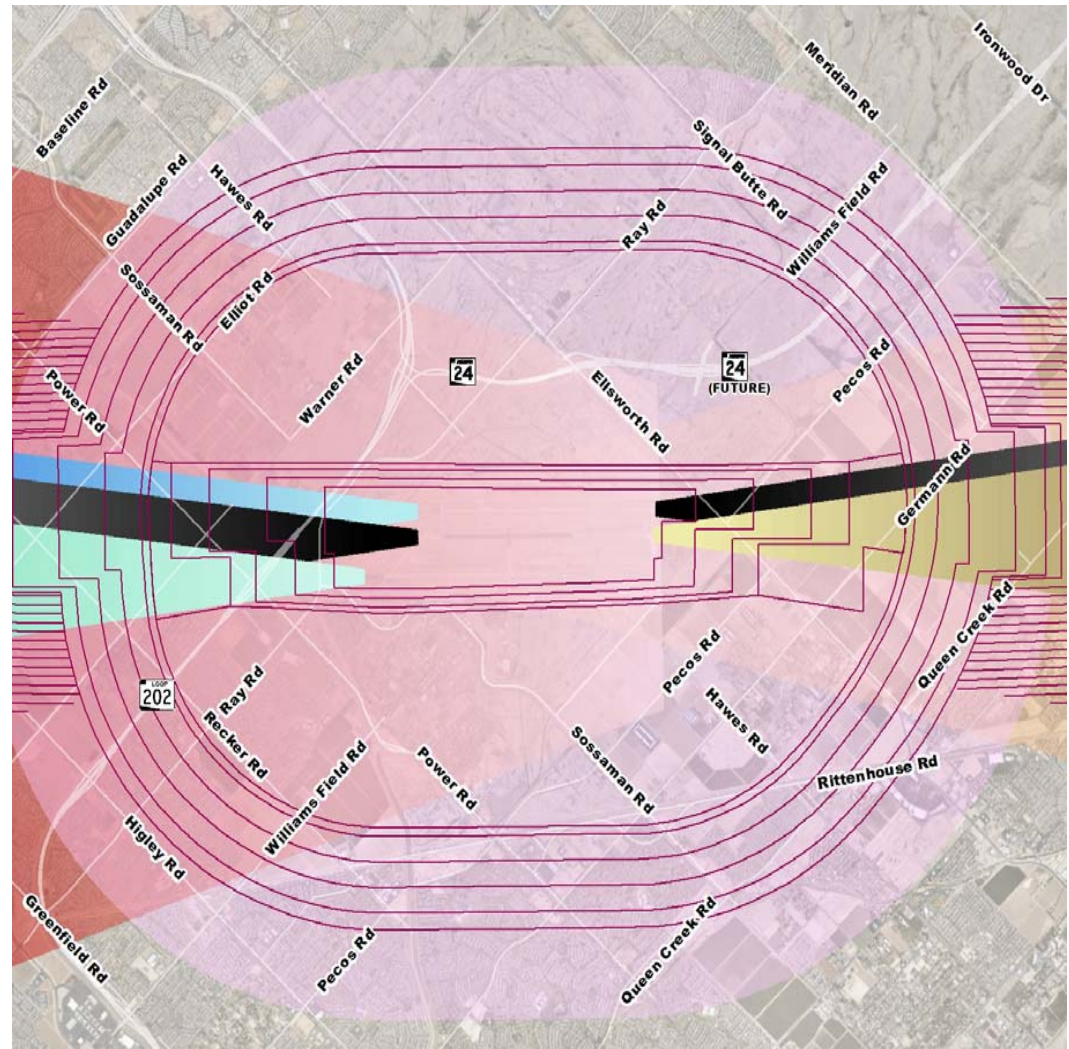


# Development Height Guidance



## Height Composite Map

- Determine maximum allowed structure height based on controlling surface (AMSL)
- Controlling surfaces include:
  - Part 77
  - TERPS (Precision approach)
  - One Engine Inoperative (OEI)
- Raster conversion to polyline for controlling height extents

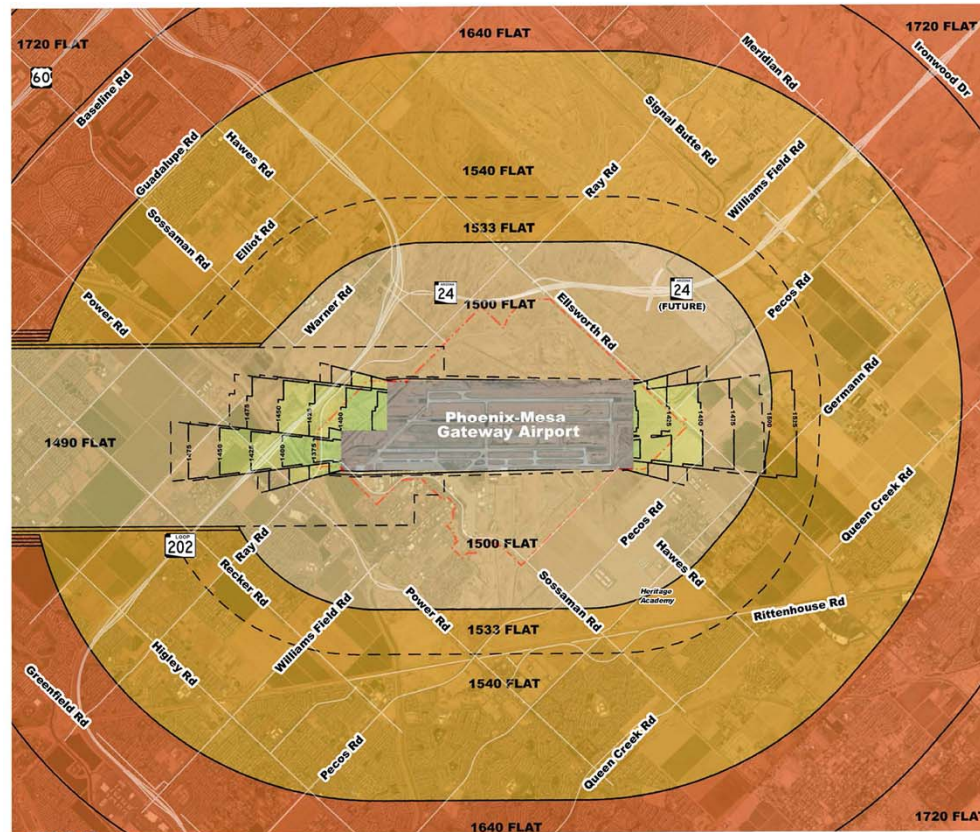


# Development Height Guidance



## Height Composite Map

- Coordination tool with member cities/towns
  - GIS incorporation
- Height overlay zoning
  - Assist with height variance requests
  - Height waiver process



**PhxMesa Gateway Airport**  
**Phoenix-Mesa Gateway Airport**  
**Composite of Critical Airport Surfaces**

**LEGEND**

- More than 1550'
- 1500' to 1550'
- 1450' to 1500'
- 1400' to 1450'
- Up to 1400'
- Airport Property
- Airspace Contour Interval = 25'
- AMSL = Above Mean Sea Level (NAVD 88)

**COMPOSITE MAP PARAMETERS**

| SURFACE TYPES            | RUNWAYS            |
|--------------------------|--------------------|
| CIRCLE-TO-LAND           | ALL RUNWAYS        |
| ICAO/C ONE ENGINE IN/OP  | ALL RUNWAYS        |
| IFR STD DEPARTURE        | ALL RUNWAYS        |
| ILS APPROACH*            | 30C                |
| LOCALIZER APPROACH**     | 30C                |
| LNAV APPROACH**          | 12C, 12R, 30C, 30L |
| PART 77                  | ALL RUNWAYS        |
| VISIBILITY (CIRCLING)    | 12L, 30R           |
| VISIBILITY (STRAIGHT-IN) | 12C, 12R, 30C, 30L |
| VOR APPROACH**           | 30C                |

\* FINAL, MISSED AND OGE  
 \*\* FINAL, MISSED AND 1:1 DRIFTDOWN

Notes:  
 FAA Surfaces are subject to change.  
 Map does not replace the FAA's 7460 process.  
 FAA 7460 determination letter, if required,  
 per Federal Aviation Regulations (FAR) Part 77.  
 Maximum structure height includes all rooftop  
 appurtenances, obstruction lights,  
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 Variance for additional height could be  
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**DRAFT**

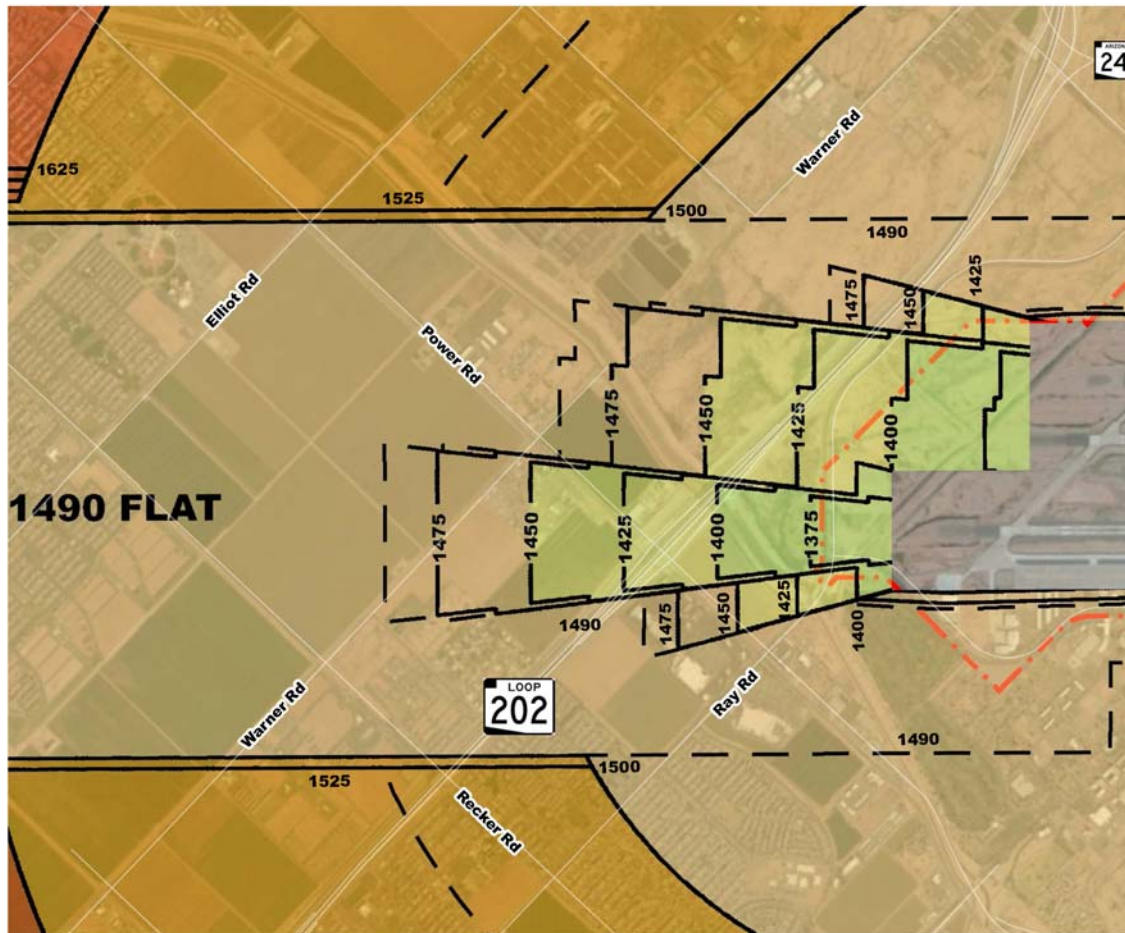
0 1 2 Miles

This map is intended for information and Planning purposes. Phoenix-Mesa Gateway Airport Authority (PMGAA) makes no claims concerning the accuracy of this map nor assumes any liability resulting from the use of the information herein.

MAP CREATION DATE: 2/2/16  
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- Refine & simplify boundaries as requested by cities

# Conclusion



## Next Steps

1. PMGAA Board consideration
2. Height guidance map & overlay completion
3. Record updated Airport Influence Area map (APA boundary)
4. Zoning, height overlay & disclosure implementation

## Questions?

Contact: Tony Bianchi, GISP  
Airport Planner  
Phoenix-Mesa Gateway Airport Authority  
[tbianchi@phxmesagateway.org](mailto:tbianchi@phxmesagateway.org)  
480-988-7649

Thank You

