

An aerial view of a large stadium with blue seats and a tennis court in the center. The stadium is mostly empty, with a few people scattered throughout. The tennis court is a standard blue hard court with white lines. The text is overlaid on a semi-transparent blue rectangle in the center of the image.

# COST-EFFECTIVENESS OF THE YEAR-ROUND USE OF THE 'TENNIS CLIMB' IN QUEENS, NY, USA.

PRESENTED BY BRIAN WILL & DR. ZAFAR ZAFARI



# Part 1





# Historical Airspace Flows





# DNL Contours



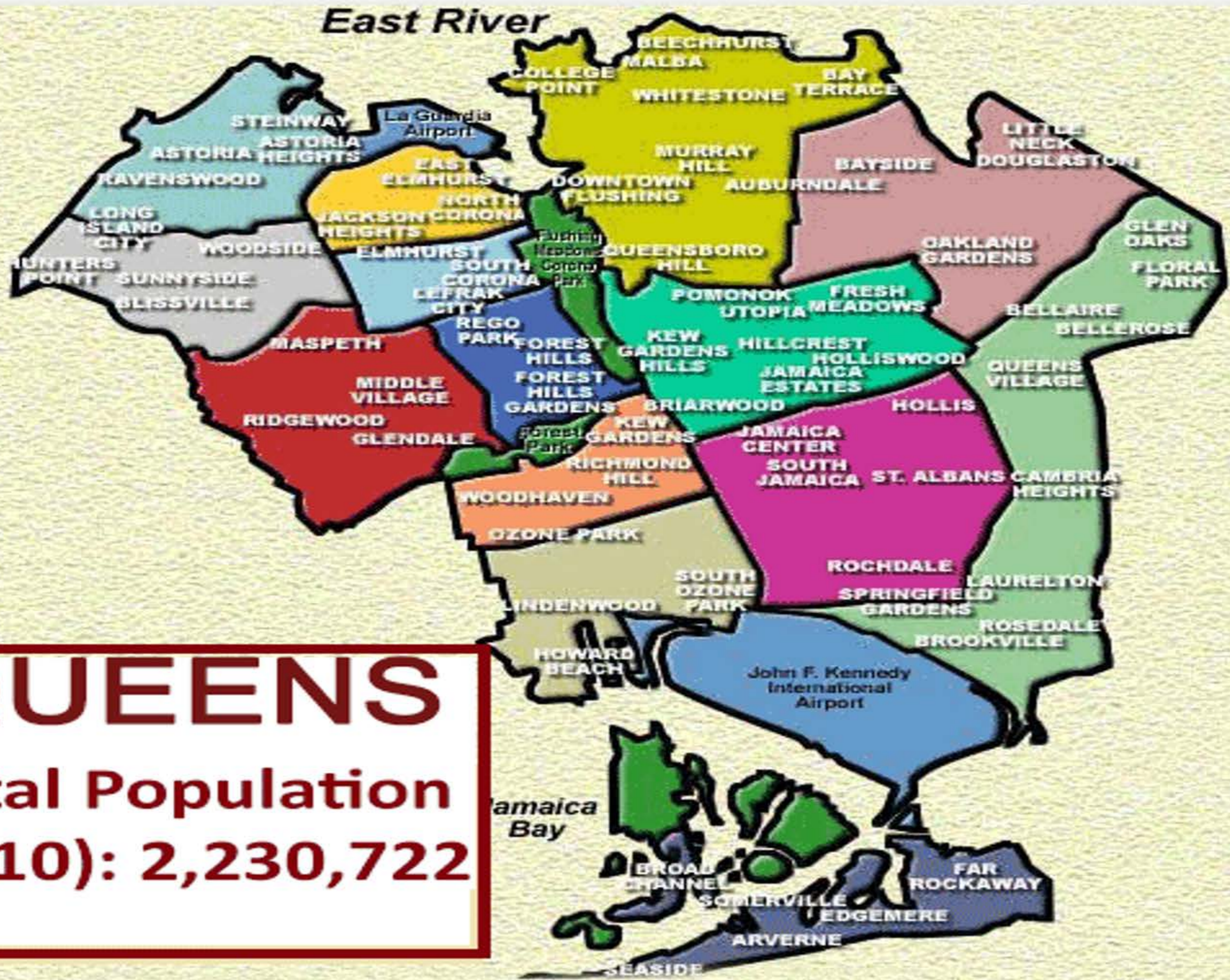


# Census Tracts





**QUEENS**  
Total Population  
(2010): 2,230,722





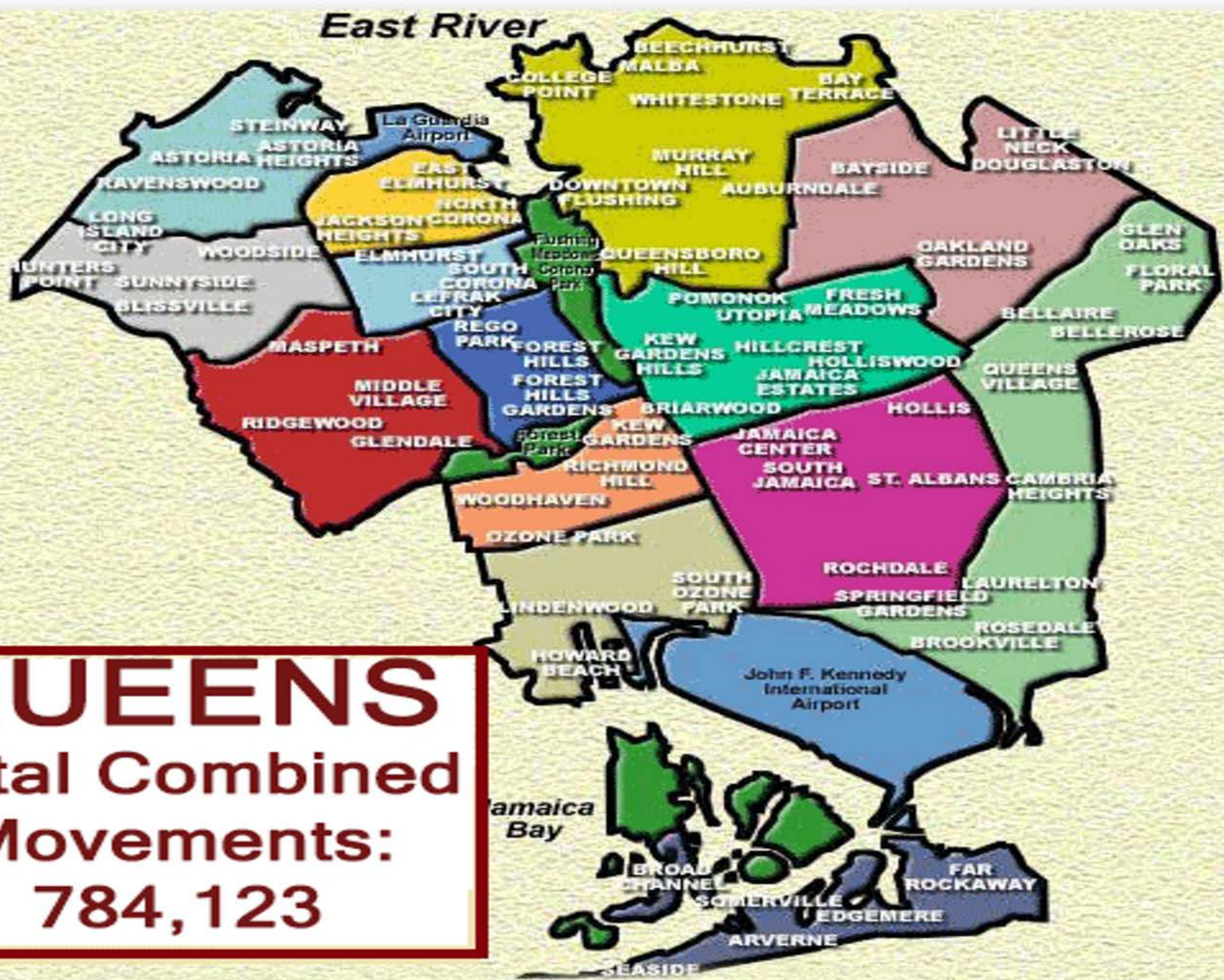


# QUEENS

Two Airports:  
LGA & JFK



**QUEENS**  
Total Combined  
Movements:  
**784,123**





**QUEENS**  
NextGen/TNNIS  
Implemented  
2012





# AIRPORT DIAGRAM

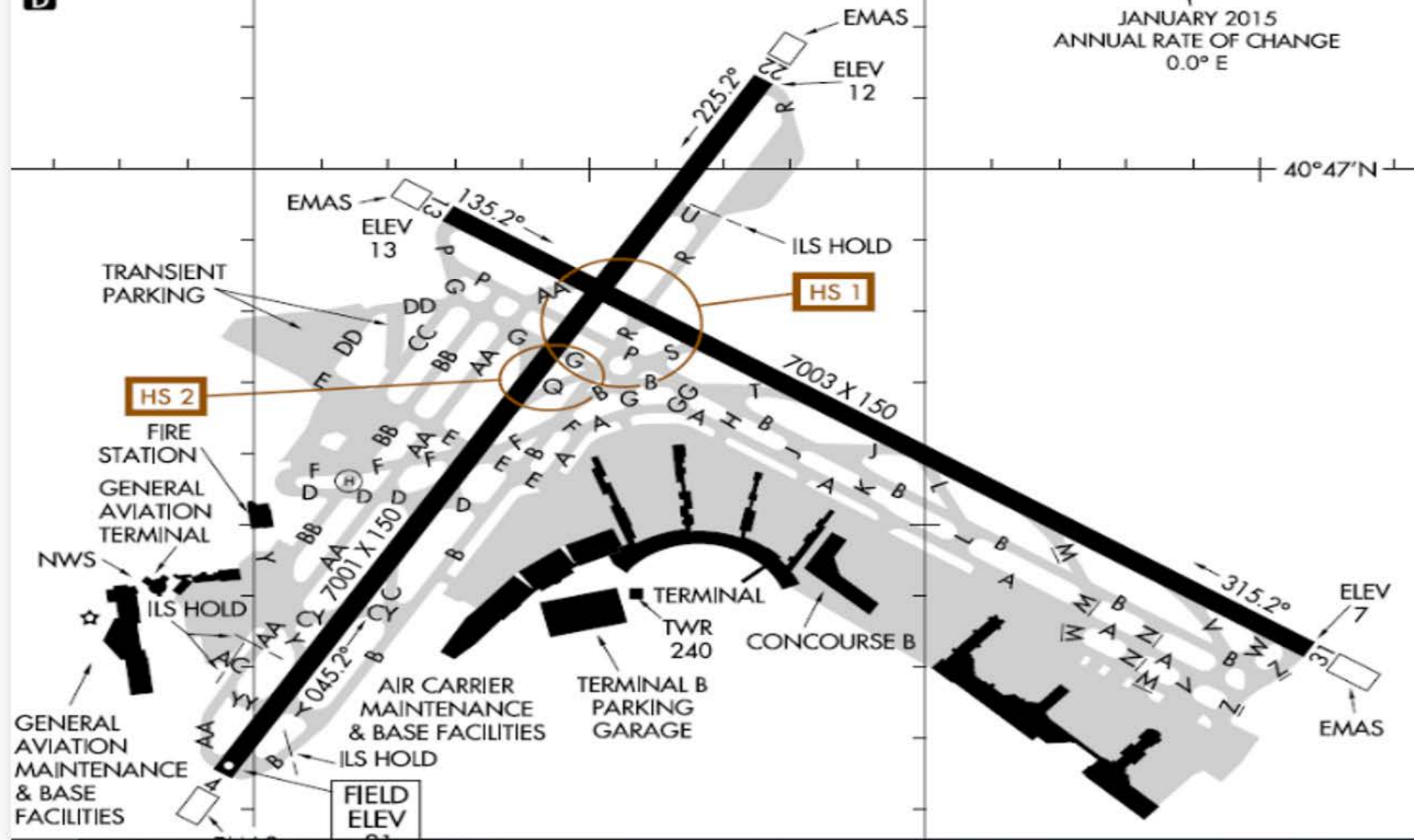
AL-289 (FAA)

LAGUARDIA (LGA)  
NEW YORK, NEW YORK

D-ATIS  
ARR 125.95  
DEP 127.05  
LAGUARDIA TOWER  
118.7 263.0  
GND CON  
121.7 263.0  
CLNC DEL  
135.2  
121.875 (HELICOPTER)  
CPDLC

**D**

VAR 13.1° W  
JANUARY 2015  
ANNUAL RATE OF CHANGE  
0.0° E



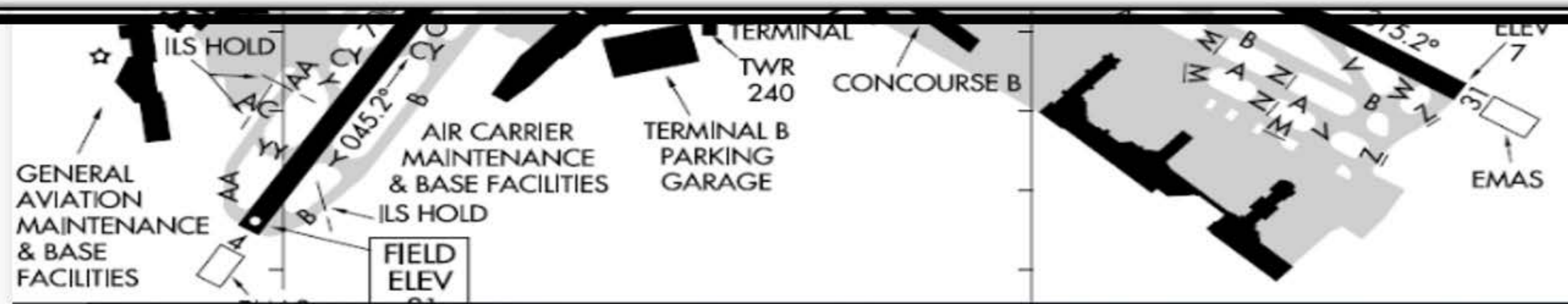


19003  
**AIRPORT DIAGRAM**

AL-289 (FAA)

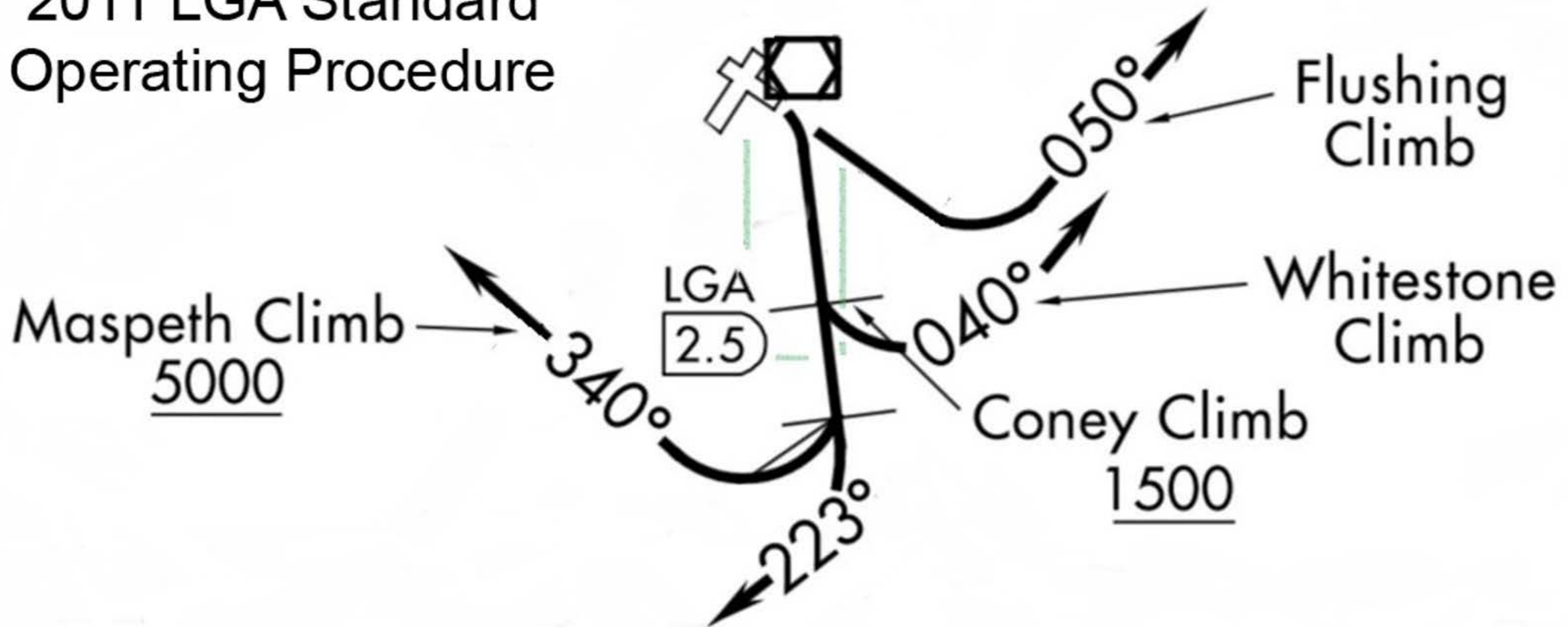
**LAGUARDIA (LGA)**  
NEW YORK, NEW YORKD-ATIS  
ARR 125.95  
DEP 127.05  
LAGUARDIA TOWER  
118.7 263.0

Air Controllers Union President, Jonathan S. Carr in testimony to Congress in December, 2000: *"With intersecting runways, the distance a departing aircraft must travel from the point of takeoff to the crossing intersection is a major factor in establishing an airport's capacity. At LaGuardia, when departures are run southeast, aircraft only have to travel 1,500 feet to the point of crossing thus allowing more arriving and departing aircraft to be sequenced by air traffic control."*



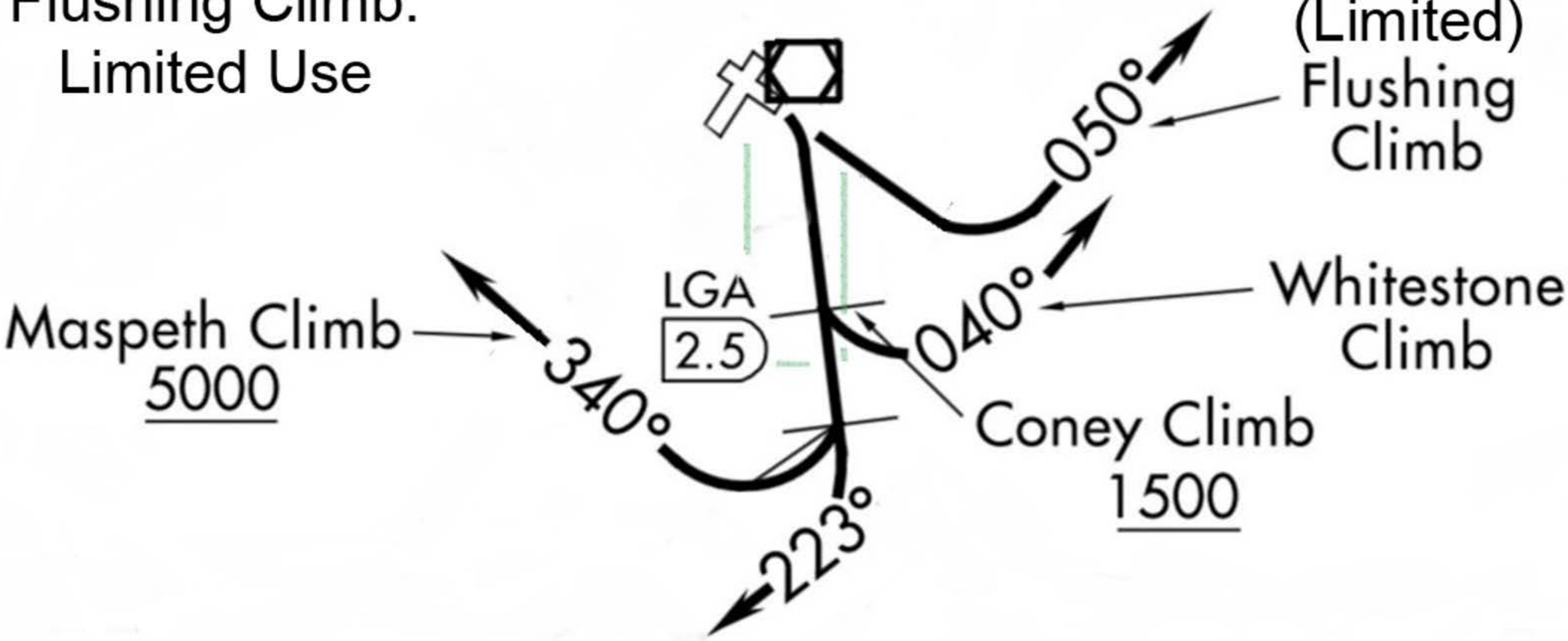


# 2011 LGA Standard Operating Procedure





Flushing Climb:  
Limited Use



Maspeth Climb  
5000

LGA  
2.5

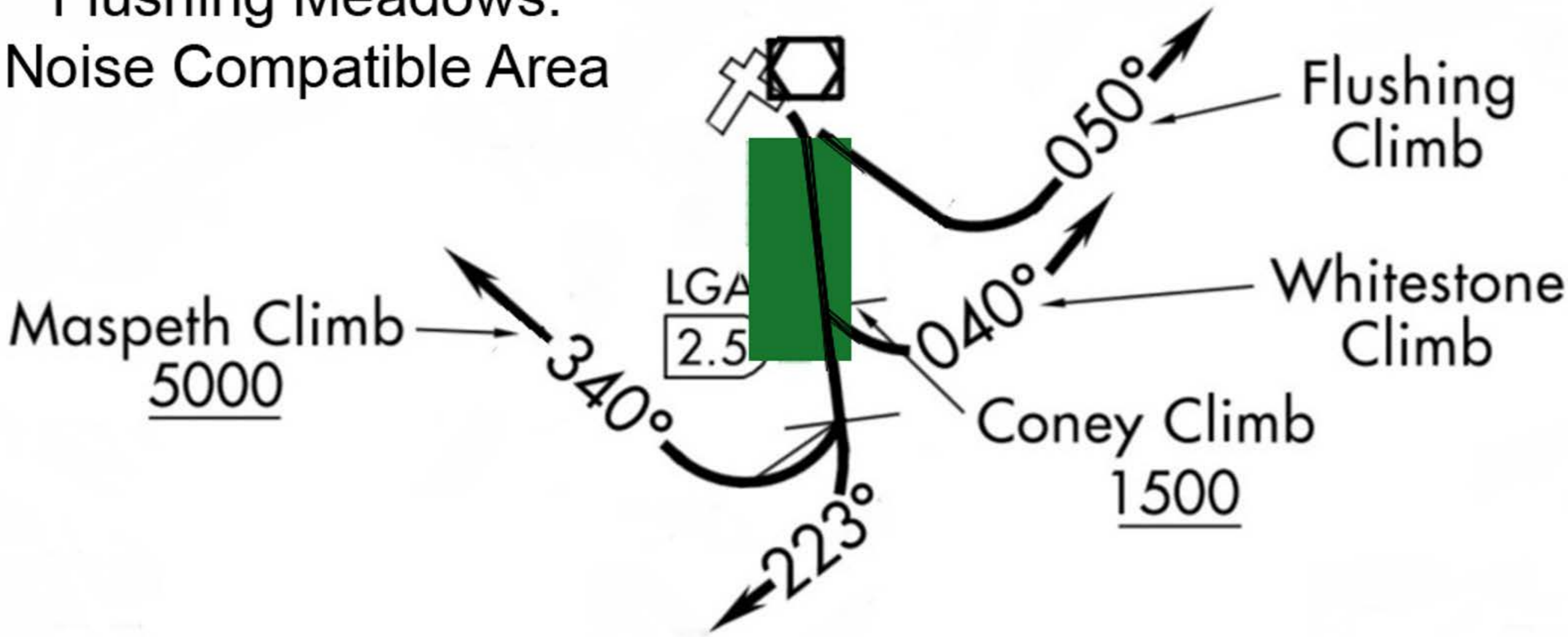
Coney Climb  
1500

(Limited)  
Flushing  
Climb

Whitestone  
Climb



# Flushing Meadows: Noise Compatible Area






### Noise Abatement Procedures

- 1) Avoid clearing aircraft arriving LGA from the northeast for visual approaches unless the aircraft is within 10nm of LGA airport.
- 2) Clear LGA arrivals from the southwest using right traffic patterns to runway 22 to visually follow the Hudson River.
- 3) Allow at least a 1000' final approach when vectoring LGA arrivals for uncharted visual approaches.
- 4) Use the LDA-A/VOR/DME-G approach to LGA runway 22 in preference to visual approaches.
- 5) Approach procedures when landing LGA runway 31 shall be Expressway Visual, VOR-F, ILS/NDB 4 circle, VOR 4 circle.
- 6) Approach sequence for LGA runway 22 shall be LDA-A, VOR/DME-G, ILS 22.
- 7) Clear visual approaches making left turns to LGA runway 31 to follow the Long Island Expressway to Flushing Meadow Park.
- 8) Allow runway 13 departures to overfly Flushing Meadow Park and achieve at least 1,500' before issuing turns.
- 9) Allow runway 31 departures to follow the initially assigned heading for 5 miles, with the exception of eastbound departures and props. Runway 31 noise abatement dispersal headings are 340 degrees, 350 degrees, 360 degrees. Assigned heading of 010 degrees may be used by coordination with LGA tower when weather conditions or runway used make it preferable.
- 10) HPN runway 34 – Large and all turbine powered aircraft conducting uncharted visual approaches, shall maintain 3,000' (or 2,000' in the case of LGA landing runway 22) until turning base leg south of the shoreline.
- 11) HPN runway 16 – Large and all turbine powered aircraft conducting uncharted visual approaches shall intercept the final approach course outside the outer marker.



The Port Authority of NY & NJ, Benefit Cost Analysis of Runway 4L/22R RSA Compliance. (July, 2011):

**“...when LGA uses Coney climbs, JFK will not have Runway 31L for departures.”**





**“...the Flushing Climb is used only in a few specified Circumstances:**

- By agreement with the City of New York during the US Tennis Open.**
- When JFK uses ILS 13L/R approach [rare]**
- When strong winds make use of Whitestone Climb inadvisable.”**

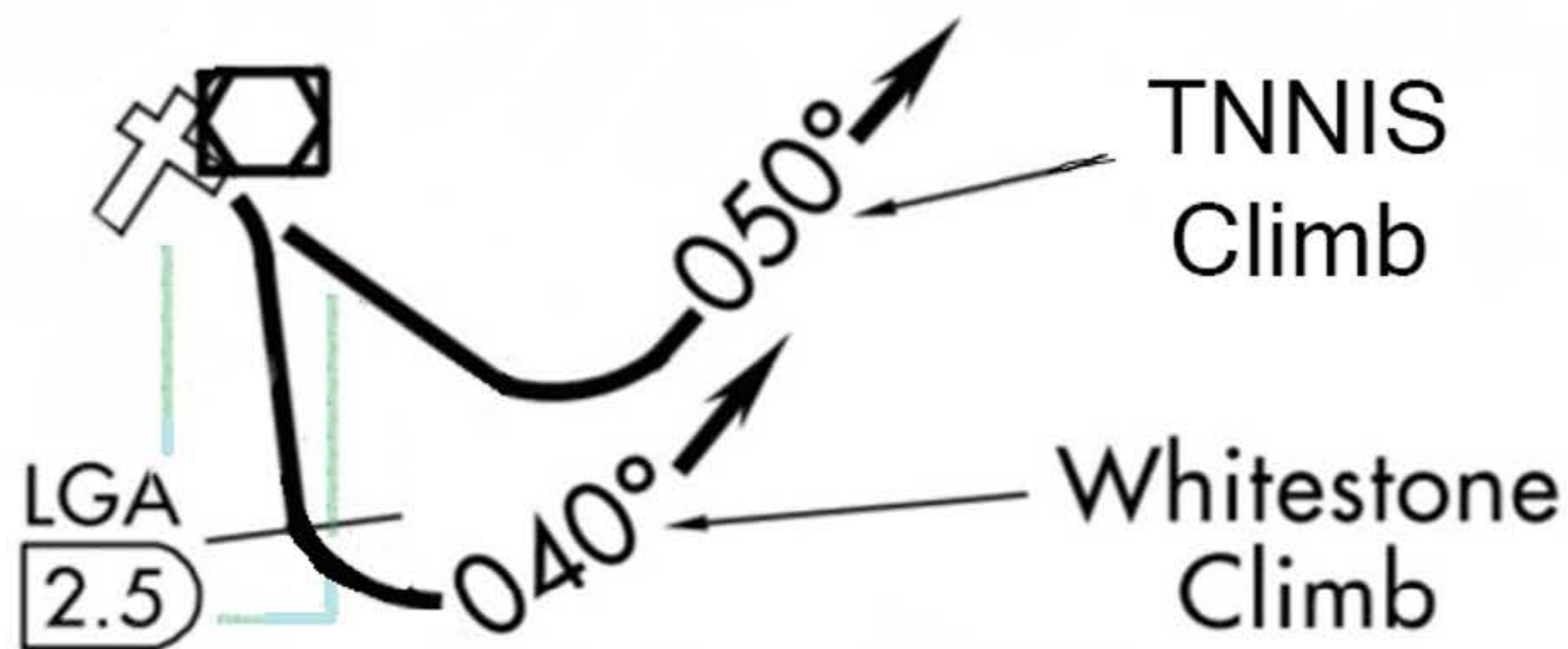


The National Academies Press. *NextGen for Airports, Volume 2: Engaging Airport Stakeholders; 2017:*

**“When FAA designed the initial versions of the tennis overlay, the Flushing Climb and TNNIS departure procedures were only used when winds were from the southeast and only during the 2-week period when the U.S. Open tennis matches were being played.”**

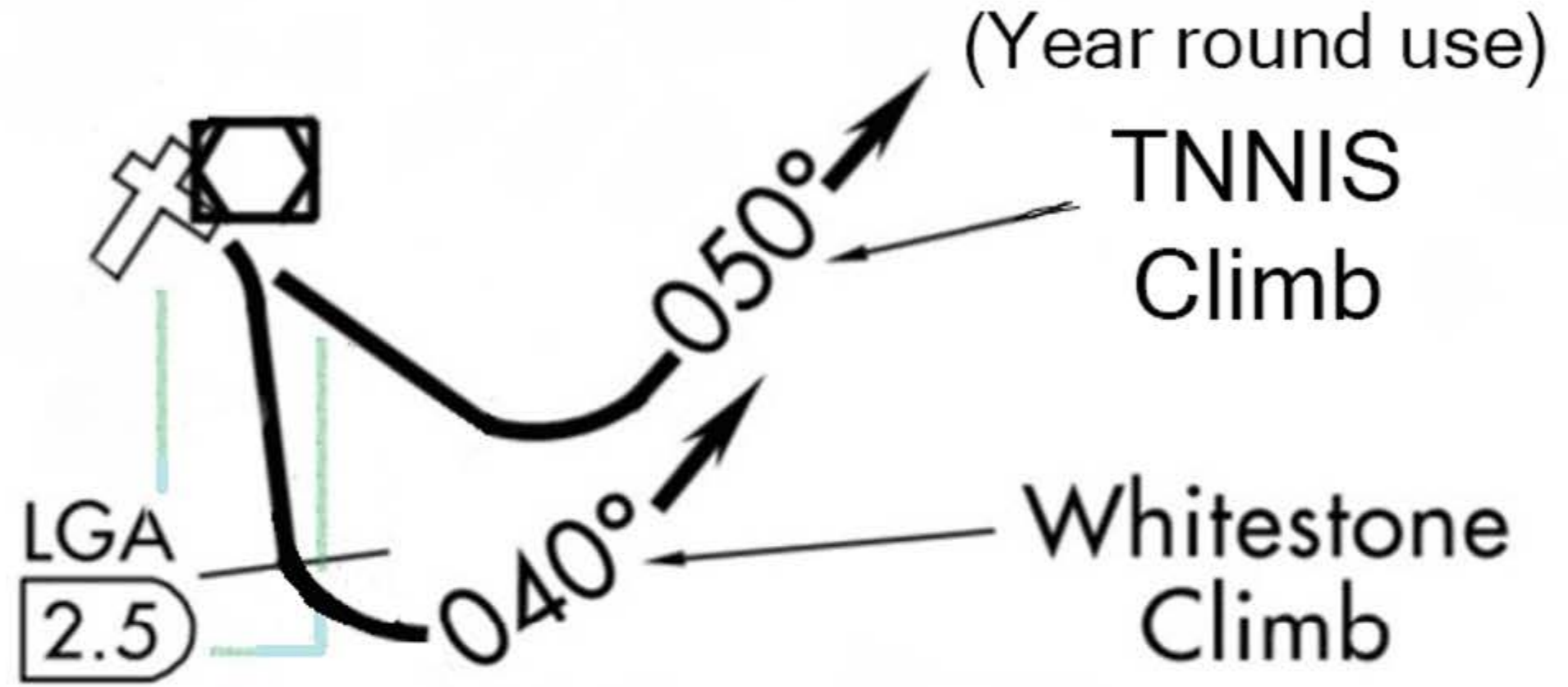


NextGen  
Implemented at  
LGA in 2012





Flushing Climb  
(limited Use)  
becomes  
TNNIS Climb  
(year round use)







U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Mission Support Services  
800 Independence Avenue SW  
Washington, DC 20591

MAR 01 2016

Mr. Brian Will  
Queens Quiet Skies  
47-23A 169<sup>th</sup> Street  
Flushing, New York 11358

RE: Freedom of Information Act (FOIA) Control No. 2016-001861(ES)

<b>FY-2014</b>			
<b>Month</b>	<b>Total Departures</b>	<b>TN4 Departures</b>	<b>% OF TN4 USE</b>
Oct 2013	14,527	2,311	16%
Nov 2013	13,977	1,256	9%
Dec 2013	13,802	1,004	7%
Jan 2014	12,657	1,707	13%
Feb 2014	11,443	952	8%
Mar 2014	14,390	925	6%
Apr 2014	14,323	1,505	11%
May 2014	14,570	1,959	13%
June 2014	14,615	3,198	22%
Jul 2014	14,681	2,571	18%
Aug 2014	15,367	2,776	18%
Sep 2014	14,144	2,789	20%
<b>FY-2014 TOTAL</b>	<b>168,496</b>	<b>22,953</b>	<b>14%</b>



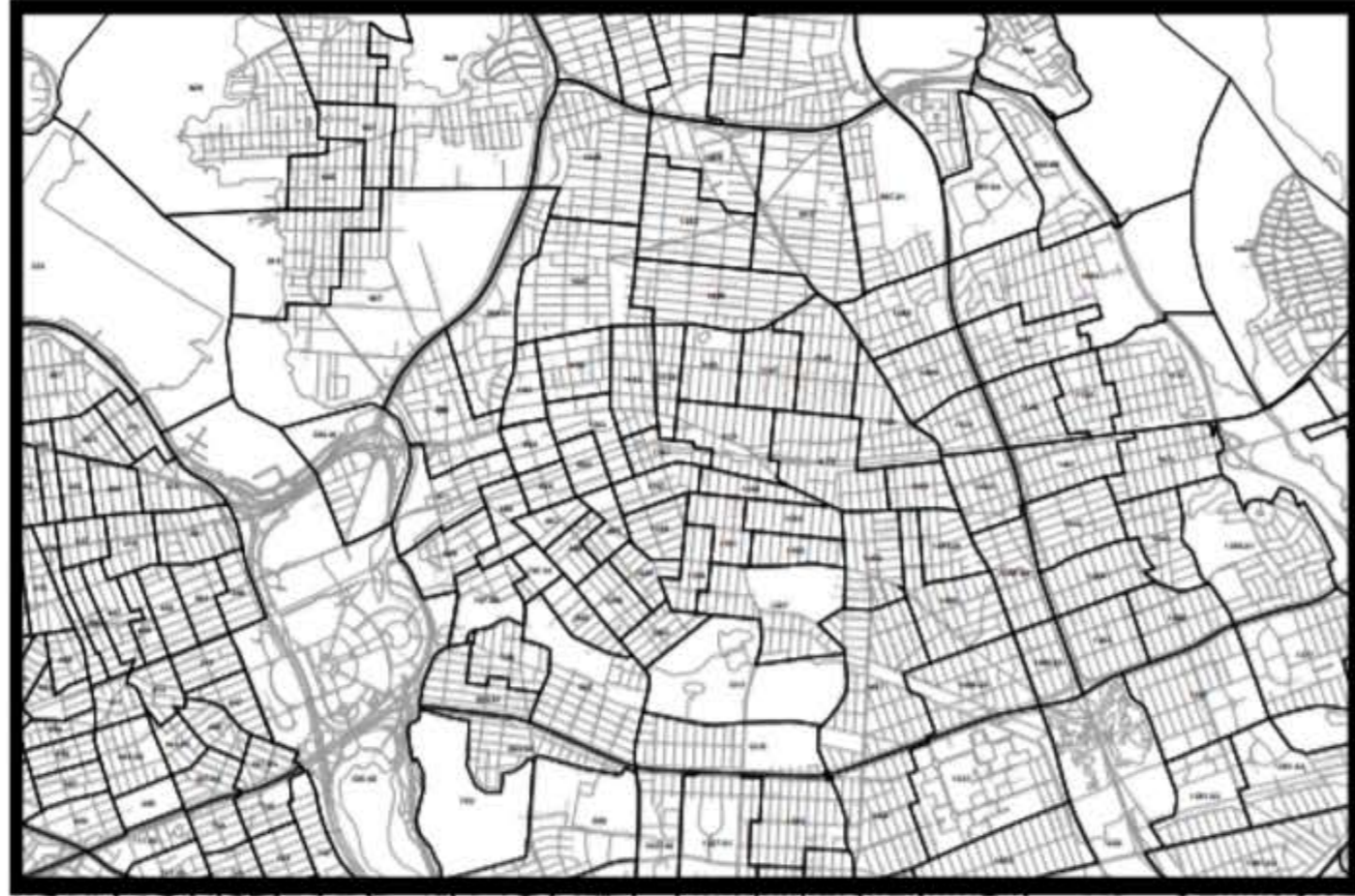
So...how did we derive  
population affected by TNNIS?





Hesse County





# Northeast Queens Census Tracts

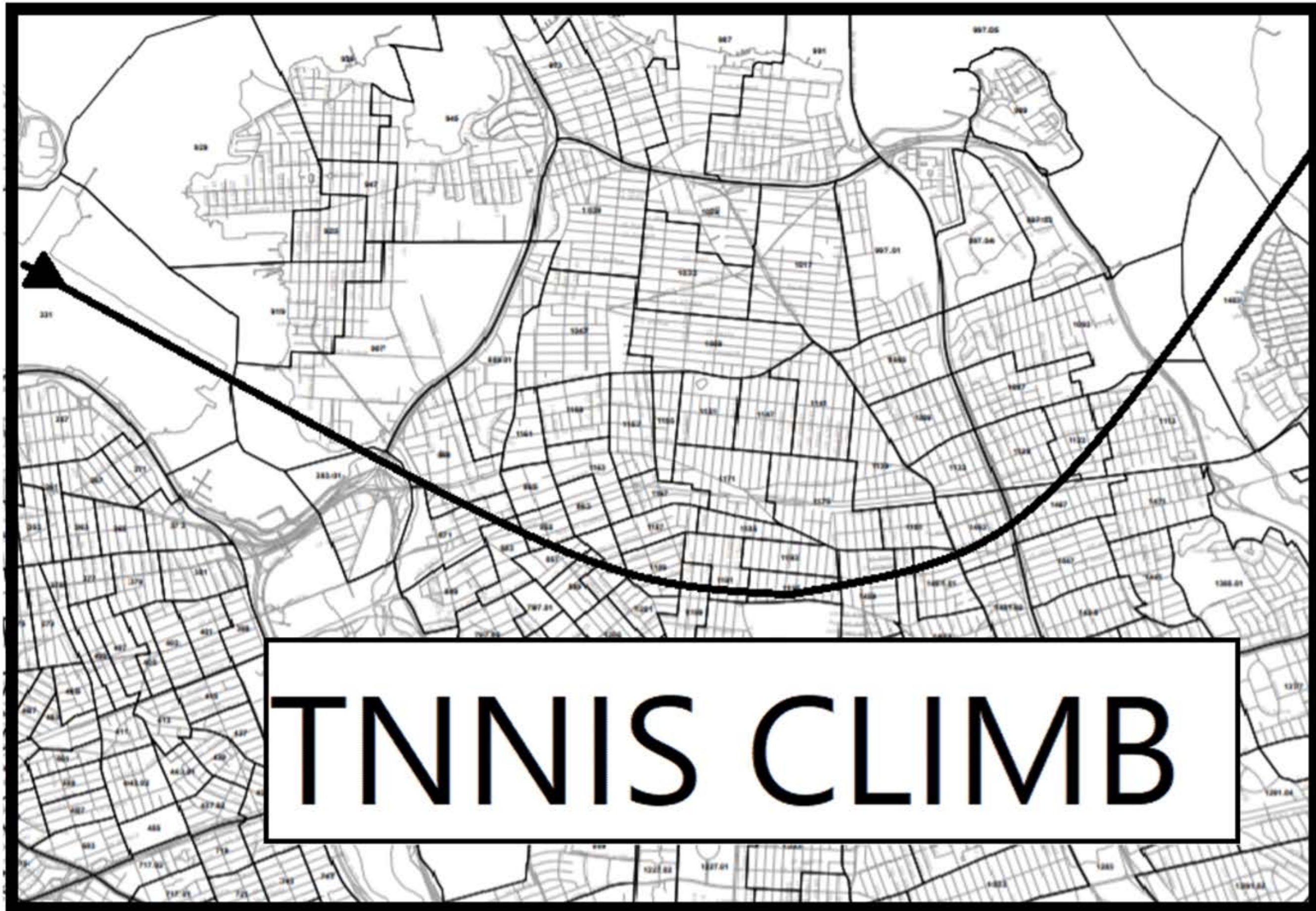












**TNNIS CLIMB**







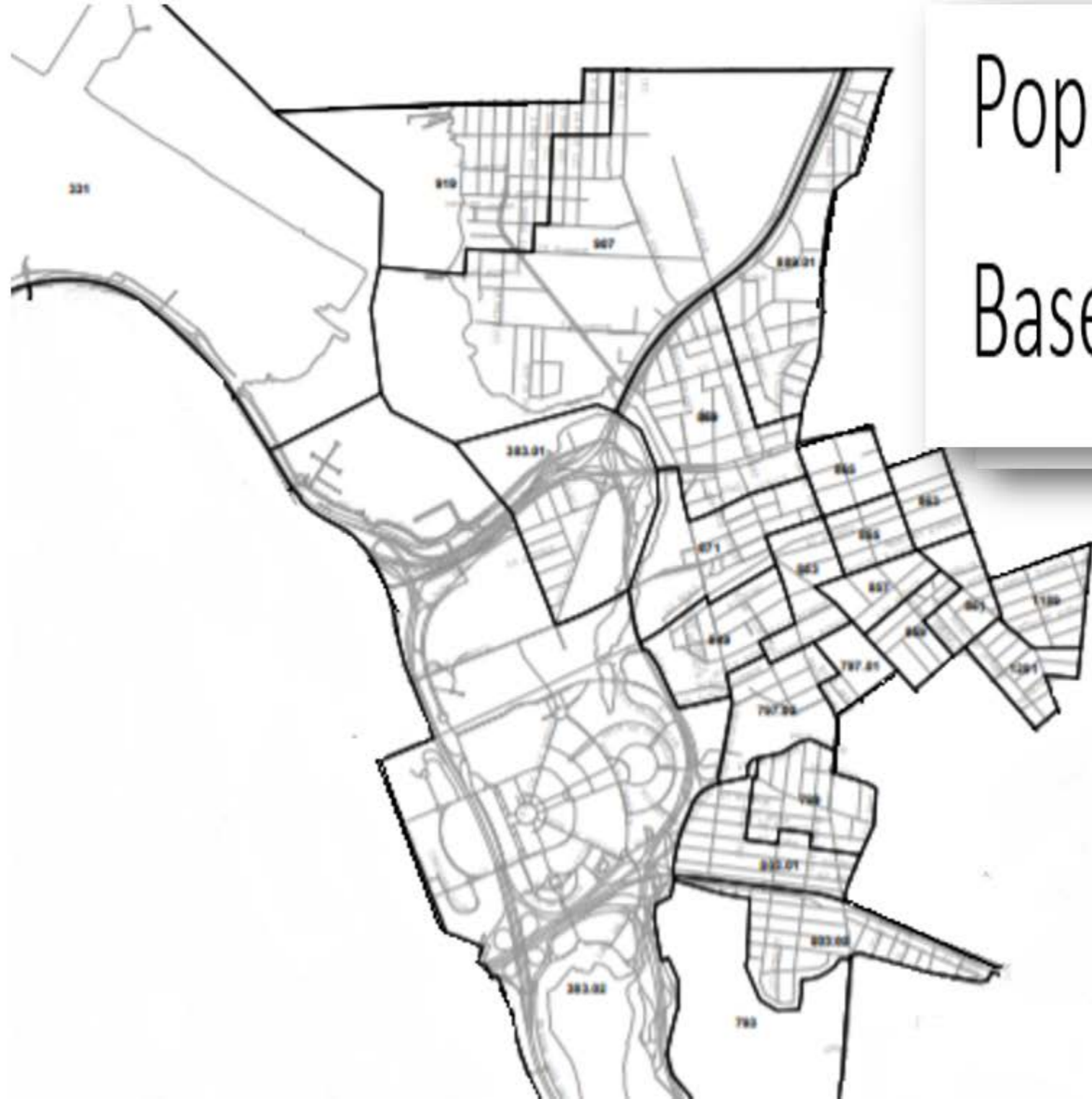








# Population (Census Tracts) Based On the 2010 Census





# Noise Contours Based on 2014 Part 150 Study







83,807 Persons  
Within 60 DNL