Indianapolis International Airport

2013 Noise Exposure Map Update

Executive Summary

BACKGROUND

This Executive Summary Report presents the process and findings of the 2013 Noise Exposure Map (NEM) Update for the Indianapolis International Airport (the Airport). The Indianapolis Airport Authority (IAA) has undertaken a long history of noise compatibility planning at the Airport. This NEM Update reflects the sixth iteration in noise compatibility planning for the Airport. The first five iterations are listed below:

- Part 150 NCP, 1987
- Part 150 NCP Study Update, 1992
- Part 150 NCP Study Update, 1997
- NEM Study Update, 2003
- NEM Study Update, 2008

One of the recommendations of the previously approved Noise Compatibility Program (NCP) for the Airport is the periodic update of the NEMs to stay current with local conditions.

NOISE EXPOSURE MAPS (NEMs)

These 2013 NEMs are the official noise contours for the Airport and have been prepared for Existing (2013) conditions and for Future (2018) conditions. The NEMs were prepared according to Federal Aviation Administration (FAA) guidelines, which include using the Integrated Noise Model (INM) to prepare the NEMs.

METHODOLOGY

The noise exposure patterns at the Airport are presented in terms of the Day Night Average Sound Level (DNL) for Existing (2013) and Future (2018) conditions. The DNL metric is used for calculating noise levels from transportation sources, such as aircraft. It includes an adjustment to reflect the increased sensitivity of noise events that occur at night (10:00 p.m. to 6:59 a.m.).

The noise contours calculated by the INM are a function of the number of aircraft operations during the evaluation period, the types of aircraft flown, the time of day when they are flown, the way they are flown, how frequently each runway is used for landing and takeoff, and the routes of flight to and from the runways.

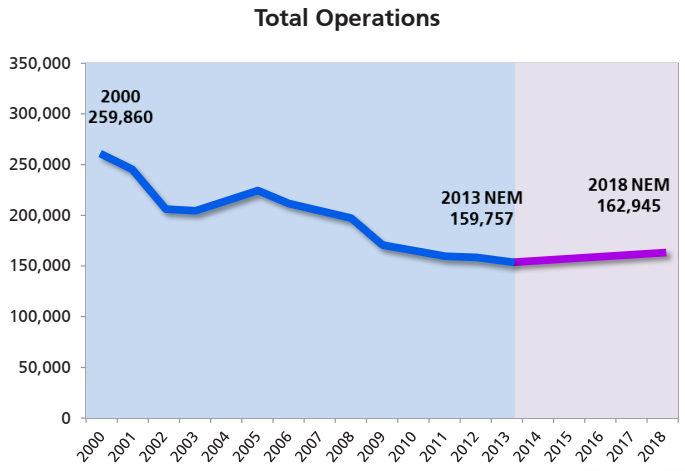
NOISE EXPOSURE CONTOUR INPUT DATA

Aircraft Operations and Fleet

The number of annual operations used as input for the 2013 NEM for the Airport was 159,757, or 438 average-annual day operations, of which approximately 27 percent occurred during nighttime hours.

The number of operations used to model the Future (2018) NEM was based on the Forecast of Aviation Demand prepared for the Airport Master Plan, and the FAA's Terminal Area Forecast. Total operations forecast for 2018 at the Airport was 162,945, or 468 average-annual day operations, which is an increase of approximately seven percent compared to Existing (2013) NEM conditions. The distribution of aircraft operating during nighttime hours is expected to remain at approximately 27 percent. **Figure 1** below shows the historic and forecast operations at the Airport from 2000 through 2018.

Figure 1 | Historic and Forecast Aircraft Operations at Indianapolis International Airport



Runway End Utilization

Runway end utilization refers to the percent of time each runway end is used for arrivals and departures at the Airport. During the daytime, the Airport primarily operates in southwest flow, in which aircraft arrive from the northeast and depart to the southwest on Runways 23L and 23R.

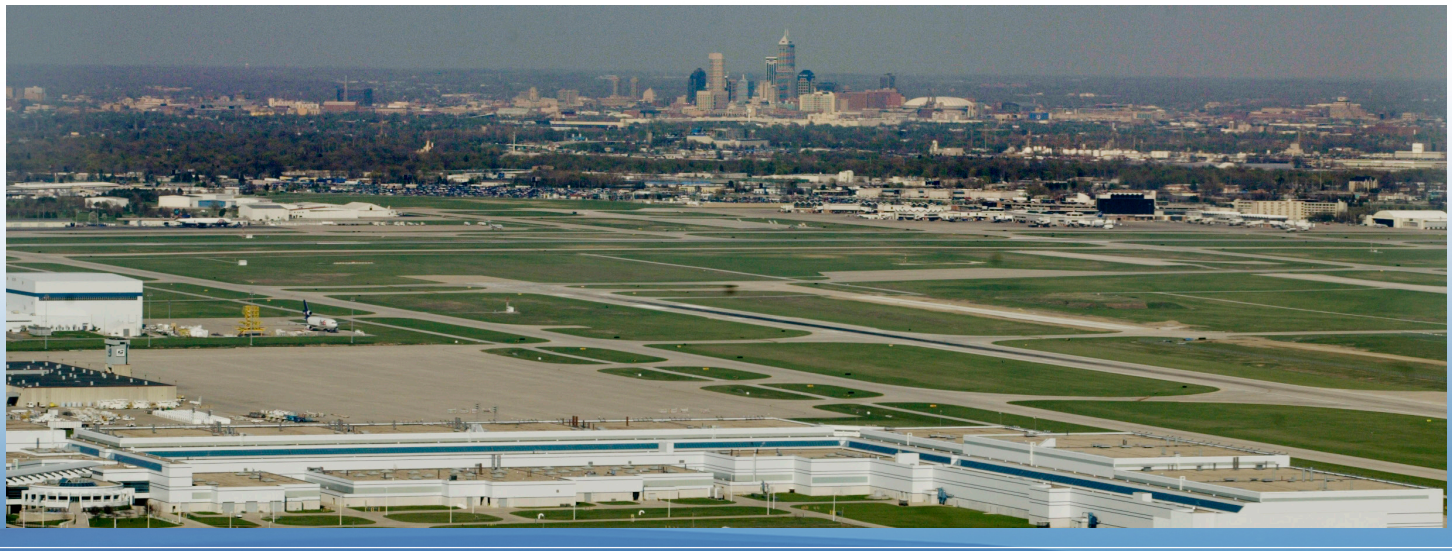
During the nighttime (10:00 p.m. to 6:59 a.m.), the Airport operates in a preferential reverse flow configuration when weather and operating conditions permit. Under this operating configuration aircraft arrive from the southwest to Runways 05L and 05R and depart to the southwest on Runways 23L and 23R. The use of preferential reverse flow was implemented as a noise abatement measure to reduce nighttime overflights of the more densely populated areas to the northeast of the Airport.

Runway use patterns are not expected to change by 2018. **Figure 2** graphically depicts the runway use patterns at the Airport for average daytime and nighttime conditions.

Figure 2 | Runway Utilization

Daytime

Nighttime



NOISE EXPOSURE CONTOURS

Noise exposure contours were generated for this study showing equal lines of noise exposure at 65, 70, and 75 DNL. Per FAA guidelines, 65 DNL is the threshold at which noise-sensitive uses (defined as residences, schools, libraries, churches, hospitals, and nursing homes) are considered incompatible without sound insulation or other mitigation.

Existing (2013) Noise Exposure Contour

The 65 DNL of the Existing (2013) Noise Exposure Contour encompasses approximately 6.55 square miles of land area. The majority of this area is either over airport property or within the Airport's voluntary acquisition area. To the northeast of the Airport the noise contours are shorter and thinner, which reflects heavier usage by aircraft arriving to Runways 23L and 23R, while the contour is longer and wider to the southwest due to the greater percentage of departures from Runways 23L and 23R. There are four housing units and an estimated 11 persons living within the 65 DNL of the Existing (2013) Noise Exposure Contour.

Future (2018) Noise Exposure Contour

The 65 DNL of the Future (2018) Noise Exposure Contour encompasses approximately 6.40 square miles of land area. The majority of this area is either over airport property or within the voluntary acquisition area. The 65 DNL of the Future (2018) Noise Exposure Contour is smaller than the 65 DNL of the Existing (2013) Noise Exposure Contour due to the continued phase-out of older, louder aircraft that is forecast for the Airport. There are six housing units and an estimated 16 persons living within the 65 DNL of the Future (2018) Noise Exposure Contour.

Figure 3 shows the Future (2018) Noise Exposure Contour compared to the Existing (2013) Noise Exposure Contour. The Future (2018) Noise Exposure Contour retains a similar shape as the Existing (2013) Noise Exposure Contour; however, some differences occur due to the forecasted increase in aircraft operations and change in fleet mix as a result of the anticipated phase-out of older aircraft from commercial fleets. This phase-out primarily reduces noise from aircraft on departure. Therefore, the 65 DNL of the Future (2018) Noise Exposure Contour is smaller to the southwest of Runways 05R/23L and 05L/23R because the majority of aircraft depart to the southwest and the reduction in noise from this phase-out is greater than the increase in noise due to the forecasted increase in overall operations at the Airport. However, the 65 DNL of the Future (2018) Noise Exposure Contour is larger than the 65 DNL of the Existing (2013) Noise Exposure Contour to the northeast of the Airport because the majority of aircraft arrive from the northeast and the phase-out of older aircraft has less of an effect on reducing arrival noise.

Area Exposed To Various Noise Levels (In Square Miles) Future (2018) Compared To Existing (2013) Noise Exposure Contours

CONTOUR RANGE	2013 BASELINE (SQUARE MILES)	2018 BASELINE (SQUARE MILES)	DIFFERENCE
65-70 DNL	4.03	3.94	-0.09
70-75 DNL	1.45	1.42	-0.04
75 + DNL	1.06	1.04	-0.02
65 + DNL	6.55	6.40	-0.15

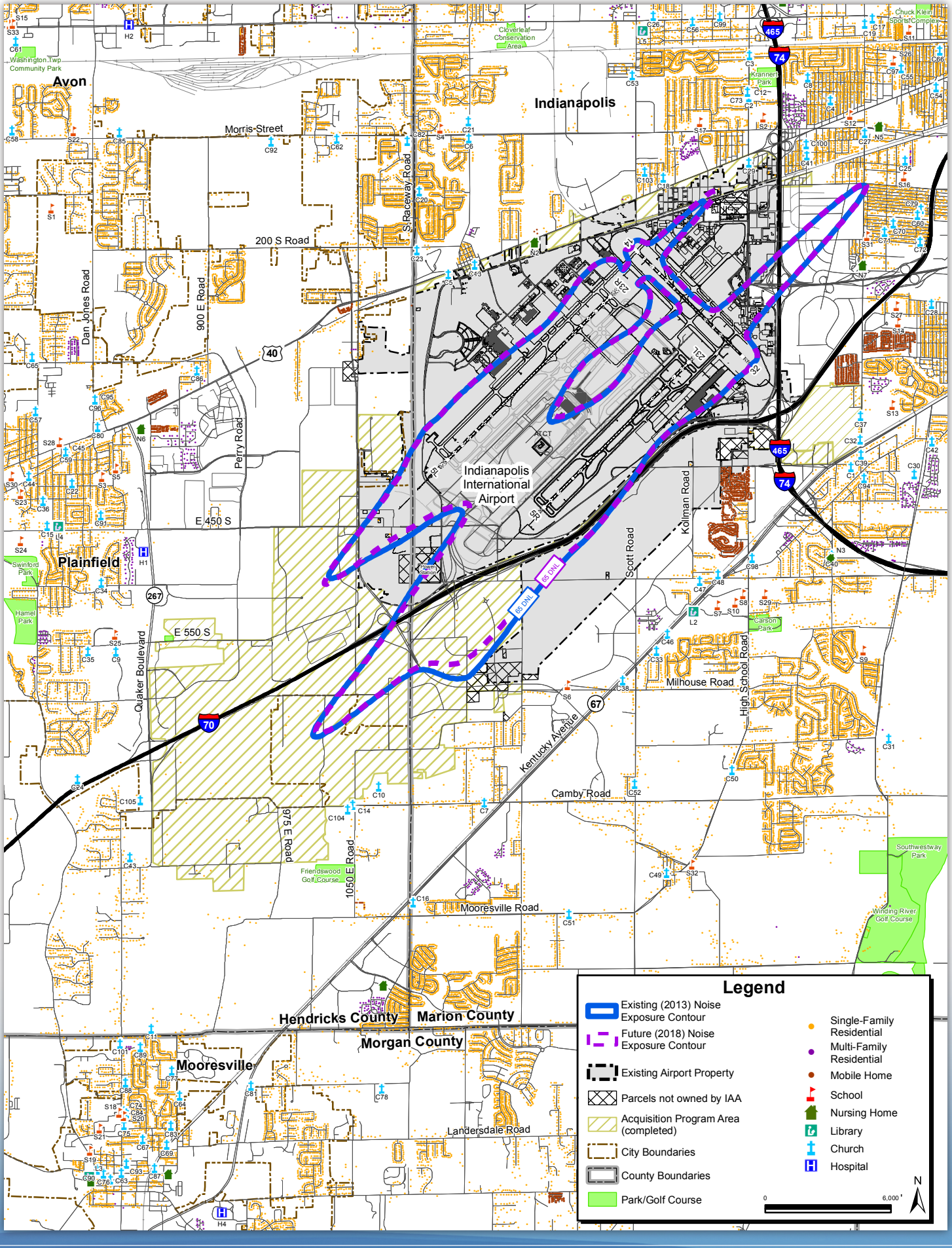
Total may not equal sum of individual contour bands due to rounding.
Source: Landrum & Brown, 2013.

Population, Housing, And Noise-Sensitive Facilities Exposed To Various Noise Levels

Jurisdiction / Mitigation Area	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
EXISTING (2013) NOISE EXPOSURE CONTOUR				
Housing Units				
Indianapolis / Marion County	2	0	0	2
Plainfield	2	0	0	2
Total Housing Units	**4**	**0**	**0**	**4**
Population				
Total Population	**11**	**0**	**0**	**11**
Noise-Sensitive Facilities				
Total Noise-Sensitive Facilities	**0**	**0**	**0**	**0**
FUTURE (2018) NOISE EXPOSURE CONTOUR				
Housing Units				
Indianapolis / Marion County	4	0	0	4
Plainfield	2	0	0	2
Total Housing Units	**6**	**0**	**0**	**6**
Population				
Total Population	**16**	**0**	**0**	**16**
Noise-Sensitive Facilities				
Total Noise-Sensitive Facilities	**0**	**0**	**0**	**0**

*Total population estimated based upon the housing counts multiplied by the average household size for each Census Track
Source: Landrum & Brown, 2013.

Figure 3 | Future (2018) Noise Exposure Contour Compared to Existing (2013) Noise Exposure Contour

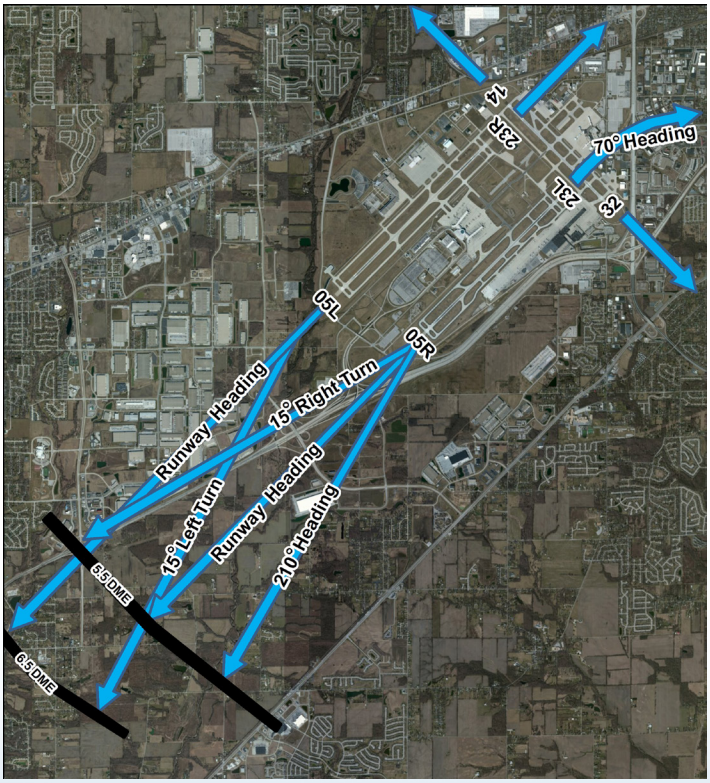


CURRENT NOISE ABATEMENT MEASURES

The current Noise Abatement Measures define flight corridors for arriving and departing aircraft at the Airport. During the daytime (7:00 a.m. to 7:00 p.m.) departing aircraft maintain runway heading until reaching 2,500 feet above mean sea level (MSL) (1,800 feet above airport elevation). During the evening and nighttime (7:00 p.m. to 6:59 a.m.) departing aircraft follow the headings as shown in **Figure 4**. At night, aircraft arriving to Runways 05R and 05L intercept the final approach course beyond the outermarkers (approximately 7.5 miles out).

Based on field observations and analysis of radar data, the goals of the measures are being accomplished. The changes in operating levels and fleet mix do not have a negative impact on the effectiveness of the noise abatement measures. Therefore, no recommendations were made to modify, remove, or supplement the existing, currently-approved Noise Abatement measures at the Airport.

Figure 4 | Nighttime Departure Procedures



COMPLETED LAND USE MITIGATION MEASURES

The current Land Use Mitigation Measures were based on the recommendations from the 1987 Part 150 Study and subsequent updates, which included the implementation of the Noise Abatement Measures listed in the previous section. The Noise Abatement Measures created new flight corridors that provided the FAA air traffic controllers much needed capacity during the nighttime hours. The location of the flight corridors and the turn points were defined in order to minimize additional or new noise impacts. However, not all noise impacts resulting from the new flight corridors could be avoided. As a result, the Land Use Mitigation Measures were developed beginning in 1987 to prevent the introduction of non-compatible land uses and to provide mitigation for existing non-compatible land uses that were located within and adjacent to the new flight corridors.

There were approximately 1,450 housing units eligible for land use mitigation developed in the 1987 Part 150 Study and subsequent Part 150 Study Updates. Some of the housing units represent multiple parcels. Depending upon their location, these housing units were offered inclusion in either the ***Guaranteed Purchase Program*** *(measures LU-10 through LU-19); the* ***Sound Insulation/Purchase Assurance Program*** *(LU-20 and LU-21); or the* ***Sales Assistance Program*** *(LU-22, LU-23, LU-24, and LU-25).*

The Guaranteed Purchase Program included 1,149 eligible parcels, of which 1,104 have been acquired as of the end of 2013. The Sound Insulation/Purchase Assurance Program included 365 parcels, of which 317 have been completed and the program is now closed. The Sales Assistance Program included 482 eligible properties, of which 377 noise disclosures/releases have been accomplished. **Figure 5** shows the program boundaries for the land use mitigation programs.

Based on the analysis prepared for this NEM update, a majority of the housing units that were previously eligible for the Land Use Mitigation Program fall outside of the 65 DNL noise contour of the Existing (2013) and Future (2018) NEMs, but remain under the approved nighttime flight corridors. Therefore, no modifications to the land use measures were recommended. The FAA determined that the updated NEMs were in compliance with applicable requirements in April 2014.

Nighttime Departure Procedures shown in Figure 4

- All turbojet aircraft departing runways 5R/5L and 14/32 climb to 2,500' above mean sea level (MSL) before turning on course. (10pm-6am)
- All turbojet aircraft departing runway 23R climb to 6.5 miles from the Distance Measuring Equipment (6.5 DME) before turning on course. (7pm-7am)
- All turbojet aircraft departing runway 23L climb to 5.5 miles from the Distance Measuring Equipment (5.5 DME) before turning on course. (7pm-7am)

Figure 5 | Current Land Use Mitigation Program Boundaries