

APPENDIX B

2010 and 2020 Population Analysis

Methodology Applied to 30 and 45 Minute Drive Time Contours

The population analysis calculated the affected population for the following three drive time intervals:

- 45 minutes from a commercial service airport
- 30 minutes from a general aviation airport
- 45 minutes from a commercial service airport OR 30 minutes from a general aviation airport

Phase 1 – Data Acquisition

Drive Time Contours – Street network files for Virginia were obtained from Environmental Systems Research Institute (ESRI) U.S. StreetMap data (2012). Each road centerline segment was assigned a speed and a road type. These speeds, in miles per hour, were assigned to the following road types:

- Interstate = 65 mph
- US and State Route = 60 mph
- County Roads = 35 mph
- Local Roads = 30 mph
- Ramps = 25 mph
- Driveways = 5 mph
- Farm Roads = 5 mph

The time to travel each road segment was then determined using the following formula:

- $(\text{Distance} \times 60) / \text{speed}$

Population Data – 2010 Virginia population data used was at the census block group level. This data was downloaded from the U.S. Census Bureau - Topologically Integrated Geographic Encoding and Referencing (TIGER) system. The 2020 projected population data was downloaded at the county/city level from the State of Virginia Workforce Connection.

Geographic Data – Using this data, a percent change from 2010 to 2020 was calculated for county/city areas. Since the 2020 projected population data was only available at the county/city level, the data had to be extrapolated to the census block level in order to compare the two datasets. The block parcels are separated by a unique ID according to the county/city that the block falls inside. Therefore, the percent change for each county/city area was joined with the census blocks according to the previously described unique ID. The 2010 population for each block was then multiplied by the percent change to give an approximate 2020 population per block.

Phase 2 – Analysis

A population density was first calculated for each census block for the entire state of Virginia. This was created by dividing the population of the block by the area (acreage) of the block:

- $\text{Block Population/Block Acreage} = \text{Population Density}$

Census blocks in more urban areas generally have a higher population density, while blocks in more rural areas tend to have lower population density.

The ESRI road network was used to perform the network analysis to determine the drive time areas for each airport. The network analyst tool uses a road network with a speed value assigned to each road segment to determine drive times from a certain location such as an airport. Generalized polygons are then created by connecting the end points for the furthest point that can be traveled in every direction along the network from an airport. The census blocks that are inside of a resulting drive time polygon are considered the affected population for that airport.

The 2020 population data was only available at the county/city level, instead of the census block level. The process described previously was used to extrapolate the population change (+ or -) to the census block level for accurate comparison with the 2010 data.