# Appendix 1

Trip Generation Data

I1 TRIP GENERATION DATA MODELING

An original spatial dataset was created to model distance to ridership for the three finalist sites. All GIS processing and analysis was performed using ArcGIS Desktop v. 10.3 (Esri: Redlands, Calif.). The primary data source was the U.S. Census Bureau's 2010 TIGER/Line shapefile representing population by block (tabblock2010_51_pophu). Additional inputs included official university staff and student enrollment figures, campus maps, and high-resolution aerial photography. Together, these formed a series of layers covering residents, faculty, and students.

High-level Methodology
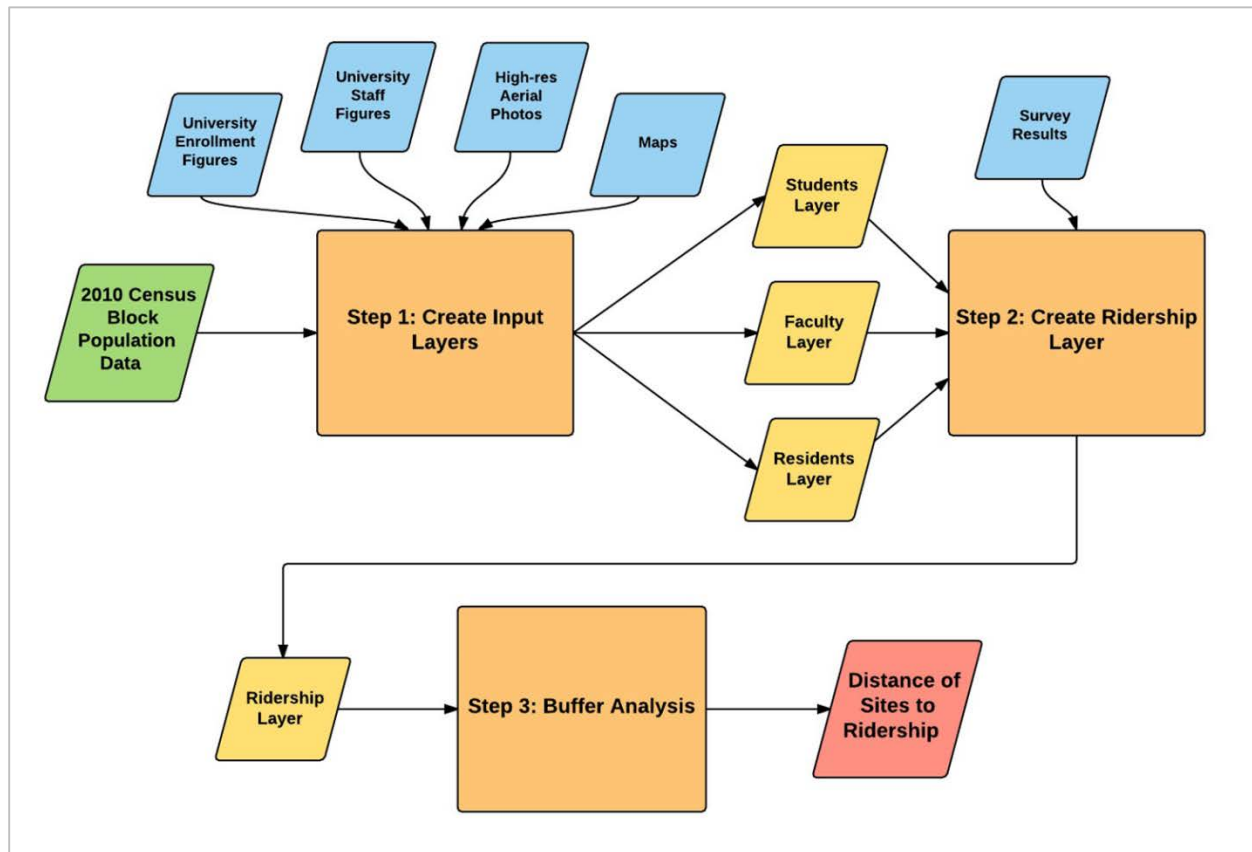
First, using the input data, blocks exclusively containing on-campus university students were determined and their population was classified as students. The remainder of each university's enrollment was distributed throughout Blacksburg and Radford proportional to a block's population and subtracted from the blocks overall population. Second, blocks containing university facilities were selected and university staff were distributed among these blocks dependent on the blocks density and the types of buildings located within it. Last, the remaining population attached to any block was classified as residents.

Next, these layers were combined so that each census block would have an attribute representing its total number of students, faculty, and residents. According to Virginia Department of Transportation traffic data, NRV average daily traffic totals 17,520 cars, for a total of 6,394,800 annual trips. The NRV generates approximately 2,628 northbound vehicles per day, originating in Pulaski and Montgomery Counties, for an annual estimate of 959,220 trips annually. The total was rounded up to 1,000,000 for modeling purposes.

The percentage of trips assigned to students, faculty, and residents was based on nearly 6,200 responses captured in the public survey (22.5%, 22.5%, and 55% respectively). The image (below) illustrates the calculated northbound trips, as a result of assigning the 1,000,000 estimated trips, for each Census Block.

Ridership Layer
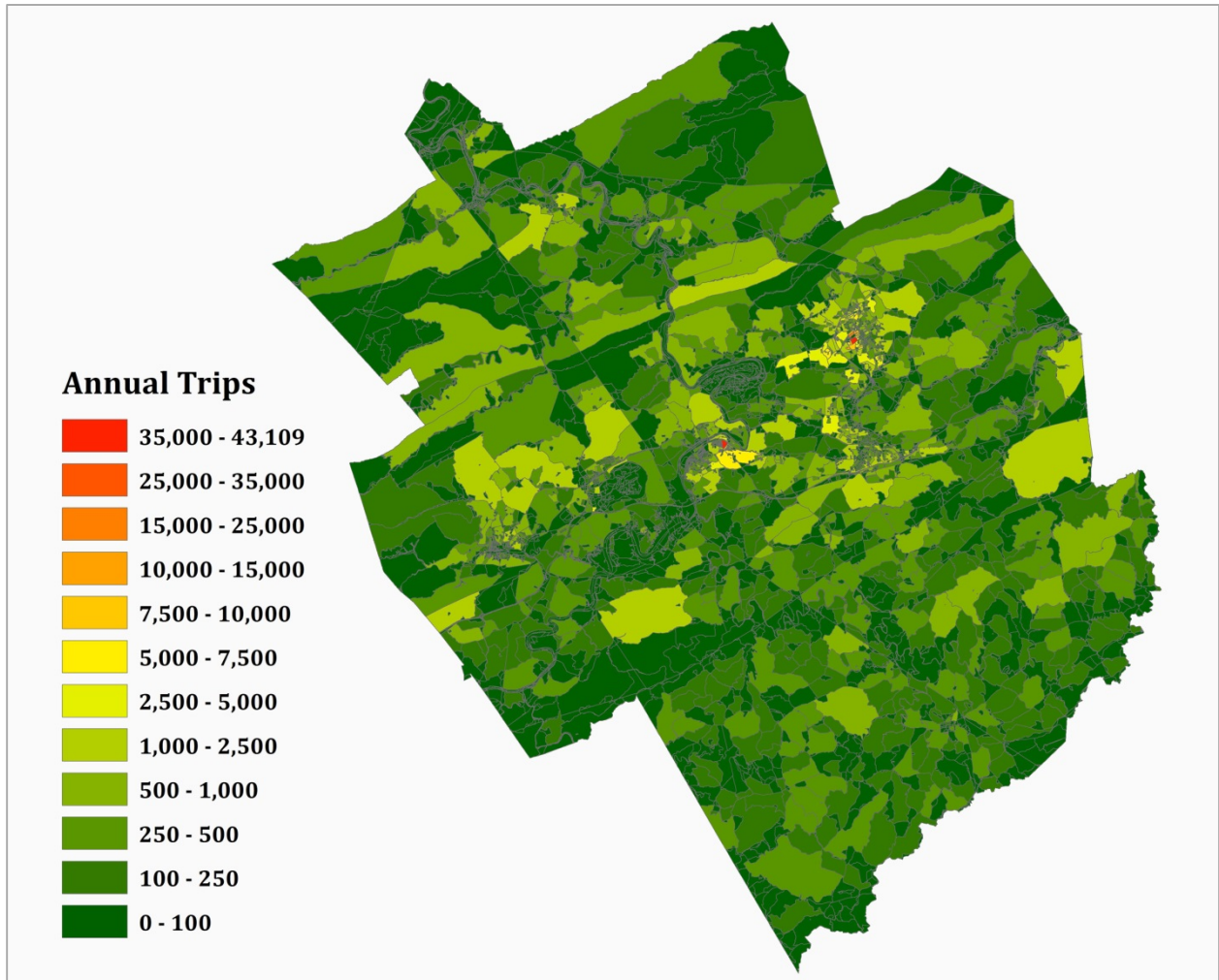
North Franklin West Buffering (1-Mile Intervals)
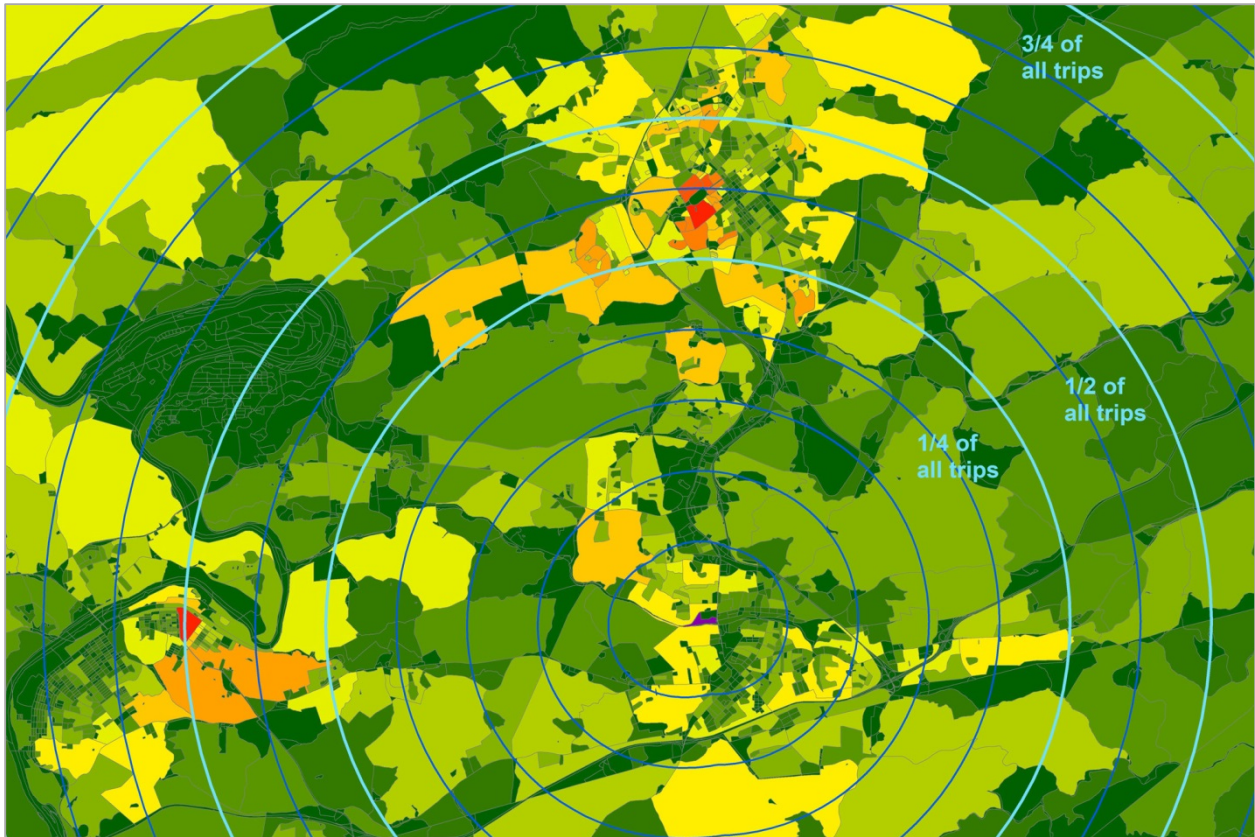
Buffer analyses were conducted to determine the distances between a potential passenger site and north-bound trip origins. When a buffer intersected a block it would 'capture' all of the block's potential trips. Buffer selections at one-mile intervals were performed to demonstrate the overall distribution of a site's proximity to ridership. Knowing the general distribution, the distances at which a site captured 25%, 50%, and 75% of all trips was calculated to the tenth of a mile. The chart below illustrates the final three site location's proximity to potential ridership.