Trinity Lively
GIS 5653
Term Project Report

Title:
Walk and Drive times to Storm Shelters in Wilburton, Oklahoma

Abstract:

This project's research of public storm shelter locations within the City of Wilburton and the walk and drive times to the locations shows that if someone is located within the City of Wilburton boundary, they should be able to drive to a public tornado shelter within 5 minutes. If the person has no other choice but to walk, reaching a public tornado shelter within 5 minutes is difficult unless they are in close proximity to a shelter to begin with.

Introduction:
I moved to Wilburton, Oklahoma in October of 2018 after losing my house to a hurricane in Panama City, Florida. Wilburton, with a population of just over 2900, sits within just 3.13 square miles. (Wilburton Facts) Wilburton is also home to Eastern Oklahoma State College where students from around the world live and study. As a new resident in the region, I had expected the local topography to tend to prevent the formation of tornados. It was not long after living in town that I heard my first tornado siren. My lack of preparedness led to panic during that initial storm. From that point I made it my mission to find the location of the nearest storm shelter. I was on a mission to find the closest tornado shelter. I contacted City Hall and was directed to a flier taped to the window of their City Hall office. On this flier was a list of 9 public use storm shelters. I spent the next several days walking to the three closest shelters and took note of the travel times. I am exploring the walk and drive times it takes to get to any of the 9 public storm shelters within the City of Wilburton, Oklahoma.

Materials and Methods:
Data for this project was collected from the internet and was self-collected. Files that were downloaded include county boundaries, highway, and local roads. Self-collected data was obtained by visiting the City of Wilburton office and asking for the locations of the public accessible tornado shelters.

	A	B	C	D	E	F
1	Name	Address	Latitude	Longitude	Handicap	Pets
2	Gary Rosebure City Park	103 Leland Street, Wilburton, OK	34.9245186	-95.3274426	N	N
3	Gunning Hall - EOSC	1501 W Main Street, Wilburton, OK	34.914722	-95.328056	N	Y
4	Mitchell Hall - EOSC	1501 W Main Street, Wilburton, OK	34.913889	-95.327778	N	Y
5	Pratt Hall - EOSC	1501 W Main Street, Wilburton, OK	34.913333	-95.32765	N	Y
6	Wilburton Fire Department	310 W Ada Street, Wilburton, OK	34.91984641	-95.31484434	N	Y
7	First Baptist Church	101 W Blair Street, Wilburton, OK	34.9212276	-95.3104917	Y	N
8	First Methodist Church	209 E Ada Street, Wilburton, OK	34.9202459	-95.306779	Y	Y
9	VFW Post 3649	108 W Ada Street, Wilburton, OK	34.9194225	-95.3113736	N	Y
10	Wilburton Housing Authority	600 E Ash Street, Wilburton, OK	34.9167175	-95.3024706	Y	N

I had to create a polygon of the City of Wilburton boundary due to this information not being available. I used IDLE Python Shell, ArcGIS Pro, and Jupyter Notebook to write, save, and view this project.

To set the location in which I wanted to focus the research on I needed to create a polygon of the City of Wilburton. For this, I use ArcGIS Pro to create the polygon in which I saved as a shapefile for later use.
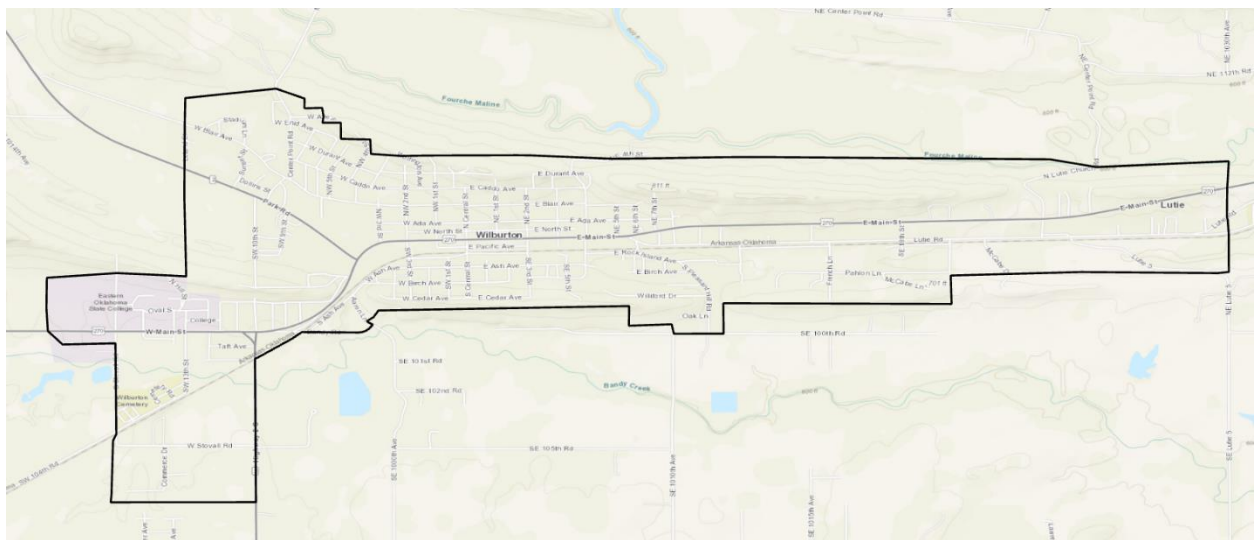

I began coding in IDLE and verified it in Jupyter Notebook. I set the environments by calling arcpy and os. This will allow me to use arcpy functions in the geoprocessing steps. I then imported PIL so that I could call an image as an output. This image was created after the entire script was written to give a clean visual. I used the input feature to ask the user if they are walking or driving to the shelters.

Wilburton Tornado Shelter Walk/Drive times. Please select if you are walking or driving: [   ]

Once the user enters either walking or driving, the script begins. The first step in either response is to set the workspace. This is where all the files are stored. The variables are set to be called throughout. A feature class was created, and the geographic coordinate system is set. The newly created feature class was appended with the tornado shelter information that was self-gathered and created into a .csv file. The next step is to create a buffer around each of the tornado shelters in increments of 264 feet, 794 feet, and 1320 feet. These numbers are based upon a person walking at a normal pace for 1 minute, 3 minutes, and 5 minutes. For the drive

times, the increments are 1758 feet, 5274 feet, and 8790 feet, based upon driving a 20 miles per hour.
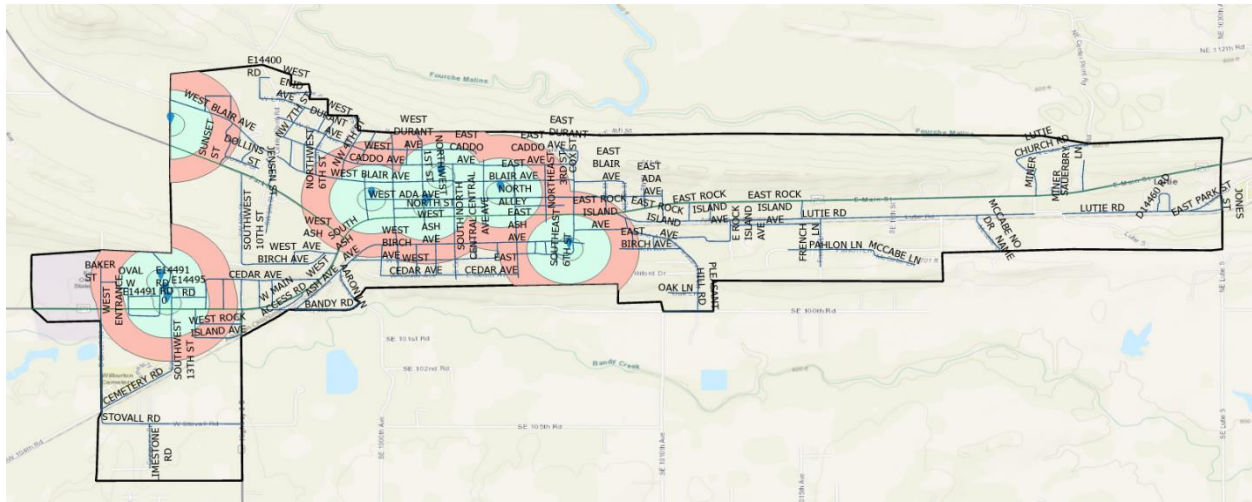
Setting additional variables to be called was the next step within the statement. The script then began to clip the highway and local road data with the City of Wilburton boundary. This was done to display only the data within the boundaries. The script then clipped the walk time buffers to the City of Wilburton boundary. Again, this is to only display the walk times for the area within the boundaries. Once all the information is completed, the user is then asked if they would like to see the map.


The map was created from the script in ArcGIS Pro. If the user selects yes or hits the enter key, the map will display. If the user selects anything they will get a response of "Be safe". The code repeats with variables changing for drive times.

Results:
After looking at both maps, I've determined that for most people who are within the city limits of Wilburton, they can drive to any one of the nine tornado shelters within five minutes. Those in the east part of town will have a greater than five minutes' drive.

Of the nine shelters, three are located on the Easter Oklahoma State College campus in the

west side of town. One is located to the north of town at a city park. The remaining five shelters are located in city center. Walking to these shelters will be difficult for those not living in city center. My family and I live in a five-minute walk zone to two different shelters. Additional research should be done to identify population densities within the boundaries to identify if there is a need for additional public tornado shelters.

Public Tornado Shelters (Drive Distance) Wilburton, OK

Public Tornado Shelters (Walking Time) Wilburton, OK
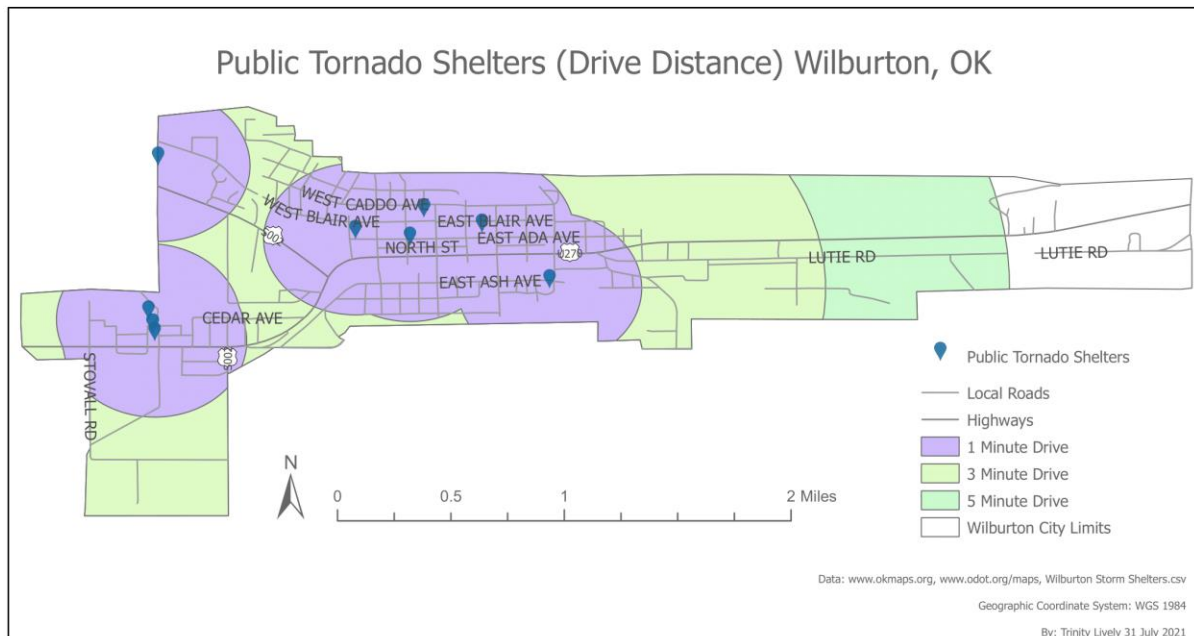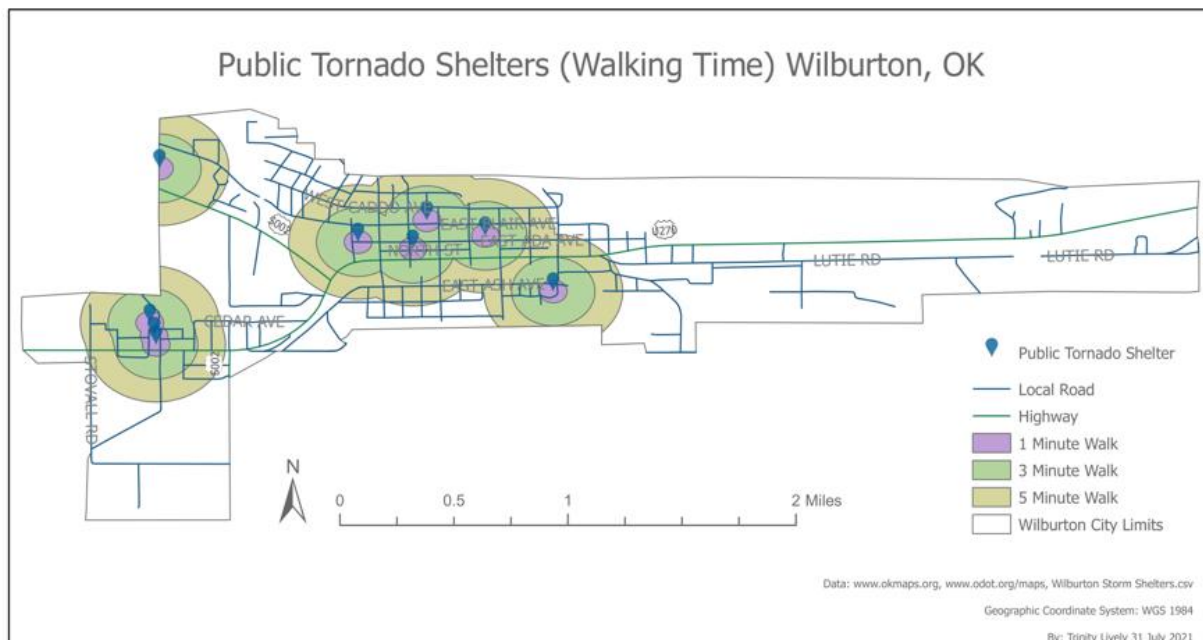
Conclusion:

I found that writing the code for the actual processing of the data to be straight forward and was done without difficulty. I did, however, find that buffering is not the proper way to identify accurate walkshed and drive times. I played with the data without using Python and found that the walkshed was substantially different than just placing a buffer on a point. Using the arcpy codes for making service areas are too complicated for myself. I want to explore this in the future as my coding skills increase because this method will provide a more accurate analysis of the walking and driving times. I also want to explore more details as to population density and incorporate them into a script with this same theme to identify the needs for additional tornado shelters. I also had difficulty with main and modules. This was not covered in class and therefore was not able to be implemented into the project.

Reference:

Oklahoma Department of Transportation. (n.d.). https://www.odot.org/maps/incorp-city/map_city_wilburton.pdf.

Oklahoma Maps. (n.d.). https://okmaps.org

Wilburton, OK Profile: Facts & Data. (n.d.). https://oklahoma.hometownlocator.com/ok/latimer/wilburton.cfm.