TERM PROJECT

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Project Theme: GIS and site selection: Choosing the location for one more grocery store in San Antonio

GIS 200

Spring 2010

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**Executive summary.** Having lived on the East Side of San Antonio, TX, for around a year, I found that area to be undersupplied with many important amenities, including some as basic as grocery stores. During the course of this project, I determined that the area is home to roughly 97,000 people, yet has only 3 grocery stores within a 3-mile radius of its centroid. There are convenience stores and the like, but few full-service supermarkets, meaning that residents of the area have to either travel long distances or subsist on fast food and junk food. The grocery stores that do exist, meanwhile, seemed to be patronized quite heavily, suggesting that there is enough demand in the area for at least one more grocery store. The purpose of my project, then, was to analyze existing land parcels on San Antonio’s East Side to determine the best location for building a new supermarket. Potential sites were identified on E. Houston Street, Rigsby Avenue, and Southcross Boulevard. After further analysis, I determined that Rigsby Avenue should be recommended as the new store site.

**Goals.** The goal of this project was to use GIS to analyze land parcels on San Antonio’s East Side to determine the optimal site for a supermarket. For the purposes of this study, the East Side was defined as the part of the City of San Antonio that is bounded by I-35 to the north, I-37 to the west and south, and Foster Road to the east. (Interstates 35 and 37, with few crossing points, form a “natural border” separating the East Side from the rest of the city.)

**Objectives.**

1. Establish criteria for site selection. The criteria included:

-Location on or very near a major thoroughfare;

-An area of at least three acres (the size of the smallest parcel occupied by an actual, existing grocery store and its parking lot in my study area);

-Location at least a certain distance from any existing supermarket. In my case, I used a buffer of 2000 feet around existing stores (approximately 2000 feet is the smallest distance between two actual stores in or near my area);

-A vacant parcel;

-A parcel zoned for commercial development.

1. Obtain the data necessary to carry out analysis using these criteria.
2. Using the criteria listed above, narrow the list of potential sites down to a few, then determine the preferred site based on the population within a 1-mile radius.

**Data.** The project required me to obtain cadastral data for San Antonio. Finding this data turned out to be the most frustrating, time-consuming, and costly part of the project.

The City of San Antonio Planning & Development Services Department could provide a shapefile of parcel data, but it was not to exceed 4 megabytes. An excellent interactive parcel map of the city, searchable and containing zoning and other information for each parcel, can be viewed on the site, and I referred to it in step 8 of my analysis as described below, but the data behind it are not available for downloading. As the GIS Manager at Bexar County Appraisal District later wrote to me, “Getting the data from SA is difficult or impossible even for me at the moment.  They’ve changed servers, web apps, personnel, and pretty much everything else.” After finding out that Bexar County, which includes San Antonio, has one of the best cadastral GIS nationwide, I contacted the Bexar County Appraisal District. There, I easily obtained a CD-ROM with a shapefile of parcel data for the entire Bexar County.

Street center lines and census block data were easily available as TIGER files, and I imported them from the ESRI web site. These files were unprojected; the Bexar County parcel layer used the NAD 1983 State Plane Texas South Central FIPS 4204 Feet projected coordinate system. I therefore had to project the TIGER files into this coordinate system, which is used for all the maps I made for this assignment.

Finally, a point layer of existing stores was not easily available, and I had to digitize it myself. I needed to obtain addresses of existing grocery stores, and this I did rather crudely at [yellowpages.com](http://www.yellowpages.com). Once I had the addresses, I created a point layer by heads-up digitizing.

**Analysis.**

1. Create a personal geodatabase and import all my source data into it, as well as any layers I would create in the steps below.
2. Draw a polygon layer of my study area -> clip the census block, parcel, and street layers by it.
3. From the resulting street layer, select major streets. (Not easily selected by attributes; required consulting the San Antonio zoning map to decide which streets are “major” and manually selecting these). Export these as a new shapefile.
4. Buffer major streets by 500 feet -> select parcels within buffer -> export these as a new shapefile.
5. From the new shapefile, select parcels 3 acres or larger -> export data as new feature class.
6. From the resulting shapefile, select parcels within a 2,000-foot buffer around existing stores -> switch selection so as to select parcels outside buffer-> export selected features as new feature class.
7. From the new feature class, select only vacant parcels (STATE\_CD = C1).
8. From these, select those where ZONING = C3 or C3R (required looking up each parcel’s zoning type by parcel key, creating a .dbf table of parcel keys and zoning types, and joining the .dbf table to the shapefile by the parcel key attribute.)

With the above steps, I narrowed down my choice of potential sites to just 3.

1. Add census block layer->compute census block centroids->add centroid event layer to map->buffer remaining sites by 1 mile->spatially join centroid layer and buffer layer->sum each buffer by population->label each buffer by the sum of the population of census blocks whose centroids fall within the buffer. The Rigsby Avenue site is the recommended future store location.

**Conclusions and General Comments.** The lack of a zoning attribute in the parcel feature class was the most glaring drawback of the data I used. It would also have helped to have a San Antonio zoning shapefile, but apparently obtaining it is impossible at this moment. It would have been a good idea to locate a shapefile of existing grocery stores. Perhaps my suggestion to anyone doing similar research in the future is to start collecting data earlier. On another note, the metadata for the Bexar County parcel layer was complete and easy to use, that for the ESRI files, less so.

**Suggestions for Further/Future Research.** Traffic patterns on the surrounding streets merit further study, as does projected population growth and upcoming development in the area—both of these could affect the site’s suitability. In addition, there are other factors, such as the cost of remodeling or demolishing existing structures on the site, that are outside the scope of this project but that need to be taken into consideration.

**References.**

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