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GIS 415

Final Project

Land Capacity Analysis

The focus of this research project was to find land in Tacoma that could be established as centers for residential, commercial and industrial growth for the growing populations. All of the unused land which is made up of vacant and unused parcels from the classifications of residential, commercial, and industrial. All of the data that was dissected came from the existinglanduse shapefile for Peirce County which was downloaded from WAGDA. All the features from the existinglanduse shapefile were compared against the zoning shapefile from the City of Tacoma website.

This research projects target audience is anyone person or municipality that is interest in maximizing the usage of unused parcels within Tacoma City Limits. The main reason I decided to do this analysis is because I am interested in the conservation of land by building in first than up instead of out. To live in a community that I can walk to the grocery store, work, and my kid could walk to

school would be ideal and the City of Tacoma has created two major growth centers that has all amenities available to live sustainably.

During my winter quarter at UWT I took the Urban Studies Capstone, my thesis was what the city of Tacoma was doing about supplying the growing population with housing. In my research I found that the city had designated (Tacoma, Mixed Use Centers Analysis, 2007) as growth center and mixed use centers in the Comprehensive Plan for 2040. All the rezoning plans for each mixed center involved rezoning and building up creating buildings that are three to four stories tall and if they get taller they have to use step back layers to let in sunlight, this is the same thing that was done in Manhattan to stop excessive height of high-rises and the shadows they created.

When the city produced the Comprehensive Plans of 2040 for new growth centers and made them accessible to the community; the public sent in letter and voiced complaints at public meeting about the new plans. One of the already established mixed used centers was Procter District; Procter District is located in the North End of Tacoma which is a middle class, upper middle class, upper class neighborhood with historical buildings. Preserving historical building is outlined in the green ribbon task force guidelines to help reduce waste, conserve energy, and reduce carbon emissions. The people that own home and businesses in the area do not like the new plans because they like things the way that they already are.

Changing the zoning of already established buildings could lead to problems later with local small business and take away from Proctor District charming character. In the Hilltop Neighborhood the plan is to change the zoning of the parcels for along the street MLK. The Hilltop Community was very excited to hear the plans that the City of Tacoma has for them, but, some members of the community sent letters in asking not to add new stories to historical buildings. One of the concerns several of the community members had was for the unoccupied residential buildings, they asked, “Why build more when we are ready have empty buildings that should be occupied” When I read this I thought of new buildings like the Esplanade Condos located on along the Thea Foss Waterway and other vacant new buildings I have seen downtown. The first chance I had I asked one of the Planners for the City of Tacoma the same question, the planner answered the question by saying, “They will fill up one day!” According current growth rate of the population the Plans for 2040 should be able to support the needs of the city.

I began by maximizing the unused land parcels and classifying them into one or more of the three major zones. By adding the current population, schools, hospitals, commercial shopping, and occupied industrial sites with the unused parcels from residential, commercial, and industrial zones my first analysis shows that Tacoma has 5 major growth centers that are already in existence, two of the three growth centers were already designated by the City of Tacoma as Regional

Growth Centers, Downtown Tacoma and the Tacoma Mall. The next step in my analysis was to classify areas of the city specific the needs of its population and what the surrounding land is already being used for. This was done three times; the population was added together with unused residential, commercial, and industrial. Each analysis showed which locations would be the best for each category.

The analysis was very tedious and involved lots of repetition so it was hard to know where to start. I began by getting shape files from WAGDA, I download PeirceSchools, and ExistingLandUse and imported in to the featuredatabase located in Arc Catalog and projected (). For the zoning layout for the City of Tacoma website and downloaded the zoning shapedfile and imported into the featuredatabase. Once all the shapefiles were properly projected and opened in Arc Map. I began by clipping the Shape of Tacoma out of PeirceCountyShapefile, and then did the same for both PeirceSchools and existinglanduse. After clipping each feature class down to Tacoma I opened the attribute table for existinglanduse and selected the Select by Location category and selected the field that had the category of land use. First I selected all categories of residential, and then exported to make a new shapefile. After that was done I completed the same process for all parcels categorized as industrial and then again to all commercial parcels. Once all three classes were exported to the map, I went back into the attribute table for each

of the categories and exported vacant and unknown parcels and exported them as unused parcels. So at this point I have dissected the attribute table and have the feature classes of unused residential, unused commercial and unused industrial. After finishing with the existinglanduse I opened up the attribute table for the zoning layout for Tacoma and exported three new feature classes, zoned residential, zoned commercial, and zoned industrial.

Once all the layers were on my map I converted all the parcel layers from polygon to point. Along with the new points and completion a of density analysis for both commercial locations and all schools, and the data I was given which was interpolated population raster, hospital density analysis raster from another classmate. Once I had all of my data in raster format I began my analysis. I began with the most complicated part, I added the population, schools, commercial, medical clinics, unused residential, unused commercial, and unused industrial into the raster calculator and used this to determine the best places to look at for future planning. After the analysis found the cities possible growth centers was complete I did a small analysis for each zoning category. Adding the population raster with each zoning designation the analysis determined what would be the best thing to do with the unused parcels.

The two paragraphs above are the steps I used to complete my analysis, but way more work was done than what is mentioned above. Originally I did not

know what techniques I needed to complete the project. During the process I tried intersect parcels with designated zone, I tried clipping the parcels out of the zones, finally I did select by location to find out which parcels were not in their proper zones. Once I was introduced to the proper way to start my projected I used a combination of select by location, select by attributes, exporting, and merges to the categories I would end up needing for my final calculations. When the analysis was complete I realized that the work flow that I had completed during winter quarter just scratched the surface of what I actually did.

After I finished my analysis I began visualizing. For the Mixed Use Center map I used NAIP through the GIS Server and then turned on all of the used parcels and made all the colors from the calculation 60% transparent to see the underlying parcels. For the calculation colors I use the qualitative colors recommendation from Color Brewer and for the parcels are used dark colors color's that would complement the transparent layers created by the density analysis calculation. Each of my calculations was represented as its own map because they each show different data.

Originally I wanted to do my final layout in 3D, and then I decided that I wanted to use the NAIP photo of Tacoma for all of the categories. Just putting to NAIP photo's I decided to change all my outputs except one which was the map with the calculation results for possible mixed used center in Tacoma. For the

other outputs I used elevation data with a light tan to forest green chloropleth, and then my data features were colored to compliment the information shown. The back ground color of my final layout was chosen to keep the clean look that I was going for, I wanted black but I ended up with a gradient of white to grey. I of the coloring I chose was directing influenced by Color Brewer.

The final analysis of this project was ended up being a mixture of qualitative and quantitative data. The qualitative data was used to create the best locations for growth in the city. The transparent colors on my layout determined the best location for growth with a numerical rating system. None of my data was primary; it was all downloaded from WAGDA and the City of Tacoma website. Both websites are managed by government municipalities. Being that all the data is secondary, the analysis I conducted reflect any biased in the local government. The census data for any place is never going to be completely accurate to what is actually happening. For instance a parcel that is considered vacant might not be, in the eyes of a squatter, the vacant parcel is their home.

Challenging the contours: critical cartography, local knowledge, and the public that was included in module 6. This article discussed noise pollution that affected surrounding areas of the Saint Paul Airport in Minneapolis, Minnesota. After the analysis complete a map was produced that showed the airport and the surrounding neighborhood that was affected by the noise pollution. When the

neighborhood residents saw the map output of the noise map many neighbors claimed they had a problem with noise pollution and the results did not show. According to the article many of the community members were educated and had an interest in what was happening around the airport. The analysis that was completed was critiqued and not considered accurate, this is the opinion of one analyst “I think you've tried to do a good job. I think you've sent out scientists and measured sound and tried to come up with some decent [noise] contours. And I think you've tried hard. But I do not think that it's realistic to think that you're going to be accurate.” Comparing the article to my analysis, my analysis is not any more accurate than the output for the noise pollution at the Saint Paul Airport.

In conclusion, the completion of the capacity analysis showed that the City of Tacoma has plenty of room for the growing population. This project identified the cities two regional growth centers and three proposed candidates that already fit the description of growth center. The city plans on have many mixed use centers planned for 2040; my calculations have found areas that are already in existence and the needed amenities to support the people living within proximity. The one thing that I wish I could have added to this research project was the actual acreage that is being use and compared it to what is being unused to determine the percentage of available to all categories.

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