Cartographic Modeling of Sidewalk Location Selection for the City of San Marcos, Texas

Cypress Cartographic Solutions

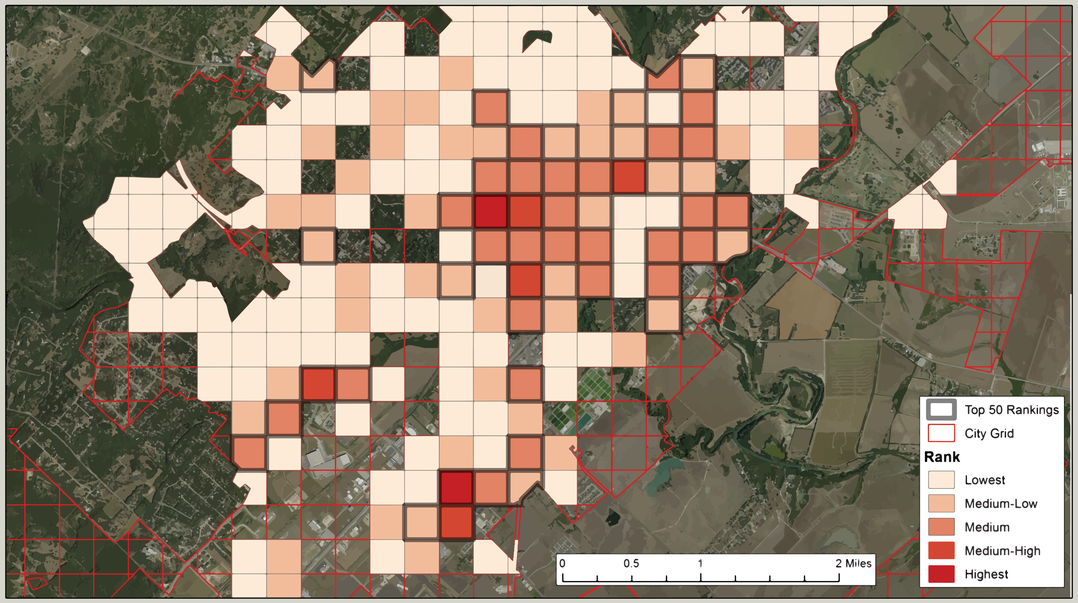
Presented for the City of San Marcos and Geography 4427 by Rachel Cavin, James Dodds, Taylor Dorn, Kyler McNew under direction of Dr. Giordano

Purpose & Scope

The citizens of San Marcos expressed a desire for improved sidewalk infrastructure in crowd-sourcing performed by the city. Currently, no formal system exists for siting future sidewalk locations. The city wanted us to develop a model that hierarchically ranks potential sidewalk locations based on specific traffic generators such as hospitals and schools. The study is focused on areas specifically within the San Marcos city limits. Our main goal was to develop a sidewalk location model that can be used for future use.

San Marcos City Limits with Areas in High Need of Sidewalks

Fig. 1



Authored By: Cypress Cartographic Solutions
Date: 4/22/13

Data Source: City of San Marcos GIS, Google Earth, TNRIS, Texas State University, San Marcos C.A.R.T.S., San Marcos Housing Authority,

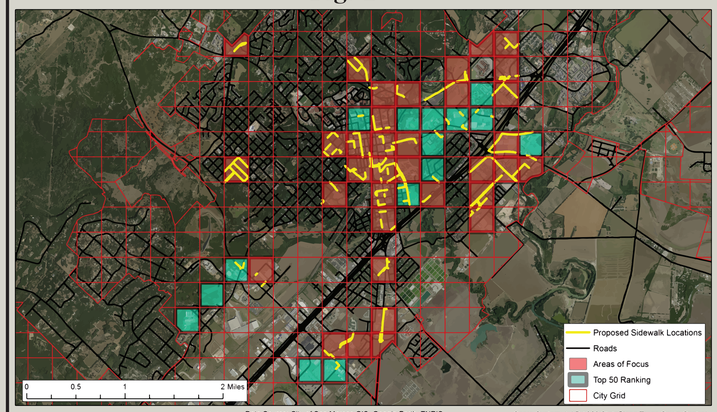
Coord System: NAD 1983 StatePlane Texas South Central
Projection: Lambert Conformal Conic

Results & Conclusion

Within the top 50 ranked cells we found 35 that were in high need of increased sidewalk infrastructure. The top 35 rank cells all had a sidewalk to road ratio of less than one. We found the areas of higher need were located near the downtown area of San Marcos where the road density was higher containing a higher number of surrounding traffic generators. We also found that two other areas received high scores. These were located in south San Marcos on either side of I-35. Both are on Wonderworld Drive which is experiencing rapid development.

City-wide Proposed Sidewalks

Fig. 2



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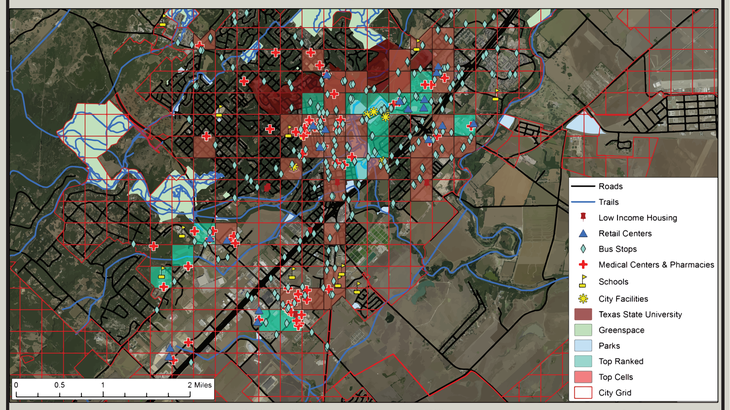
Ranked Cells With Traffic Generators

Fig. 3



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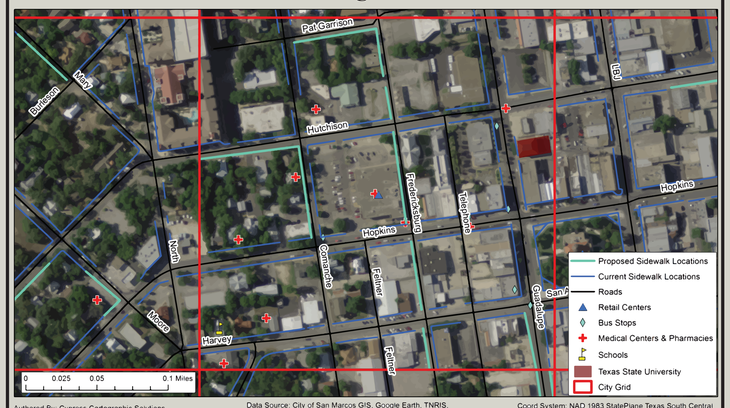
Methodology & Data

Our data was collected from the City of San Marcos, TNRIS, Texas State University , San Marcos Housing Authority, San Marcos CARTS and was compiled and edited in ESRI ArcGIS10. Because of the size of the city limits, we had to devise a system that would allow us to survey potential sidewalk sites more efficiently. To do this, we divided the city limits into 1/4 mile^2 grid cells. Within each of these grid cells lie the traffic generators (schools, hospitals, etc.). Each of the traffic generators was given different weights depending on their overall importance to the community. We then merged the weighted traffic generators with the grid cell that they are present in (Fig.6). Overall, this gave each 1/4 mile grid cell a cumulative score that was ranked accordingly (Fig. 1). Lastly, we analyzed top 50 scoring grid cells to see where sidewalks should be implemented using an aerial image as a reference (Fig 4.) (Fig. 5). We also included a zoomed out view of the city limits with our proposed sidewalks (Fig. 2), and also all of the ranked cells with the traffic generators within them (Fig. 3).

Proposed Sidewalks Grid ID #460

Fig. 4



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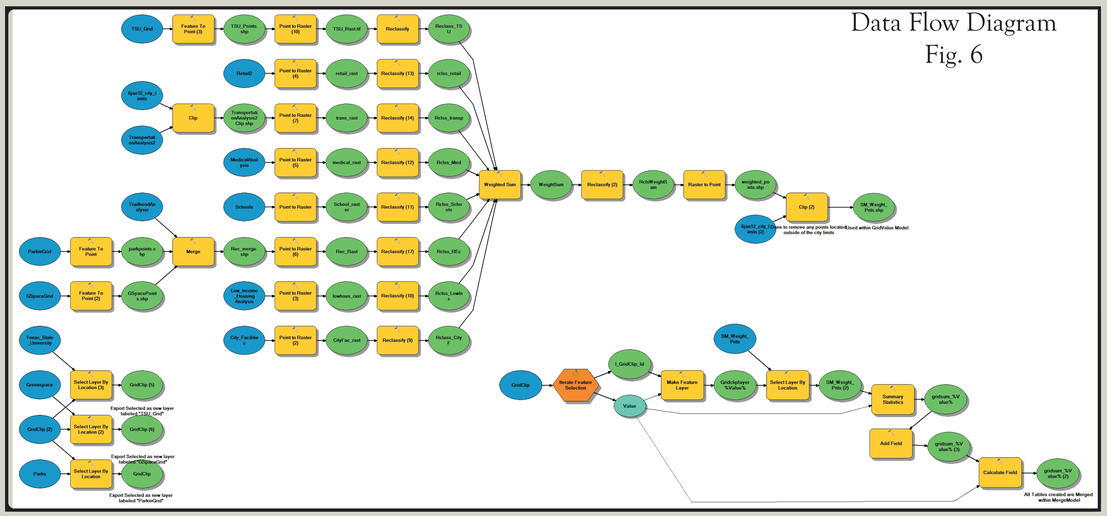
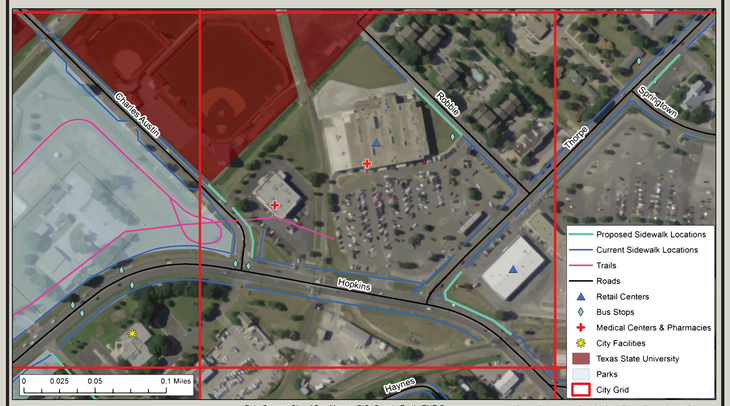
Data Flow Diagram

Fig. 6



Proposed Sidewalks Grid ID #494

Fig. 5



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