DYNAMIC GEO SOLUTIONS

Elizabeth Wesley, Project Manager, GIS Analyst
Jennifer Lopez, Assistant Manager, GIS Analyst
Enrique Delgado, GIS Analyst
Cameron King, GIS Analyst

Location Analysis for
Outdoor Recycling Bin Placement:

Final Report

Prepared for:

TEXAS STATE UNIVERSITY

The rising STAR *of Texas*

Prepared by: Dynamic Geo Solutions
1 May 2014

Table of Contents

Introduction

Purpose

The Texas State University Recycling and Waste Management Department approached Dynamic GeoSolutions in January 2014 to determine the optimal placement for recycling bins in an area of central campus. The purpose of this final report is to present a summary of the problem presented, a problem statement, the data and methods we used to solve the problem, the results of the analysis, a discussion of the results, and our conclusions about the project.

Summary

According to the EPA, in 2011 the United States recovered 26 percent of the municipal solid waste (MSW) generated through recycling. The amount of MSW generated that is disposed of in landfills has decreased from 89 percent in 1980 to less than 54 percent in 2011. However, there is still a long way to go. The EPA estimates that only 45 percent of what is recyclable is actually recycled (EPA 2011). Recycling not only reduces greenhouse gas emissions and other pollutants, but also preserves natural resources, reduces the need for landfills, and produces economic benefit.

Texas State University in San Marcos enrolled over 35,000 students in 2013 and is still growing (Blaschke 2013). As an Emerging Research University it seeks to be cutting edge, not only in academics and research, but in infrastructure sustainability as well. A key part of this goal is an efficient, university-wide recycling program. Texas State currently has 44 outdoor recycling bins placed across campus, and 8 more bought with revenue from the university recycling program that have yet to be placed. The university utilizes single stream recycling, where students can dispose of all empty metal, glass, and plastic containers in a single receptacle. An efficient recycling system will not only support the University's environmental ethics, but will produce economic benefit for the Recycling and Waste Management Department of Texas State University. The department can then reinvest this money into the recycling program, providing for new bins and improved facilities.

Problem Statement

In order to have the most efficient campus-recycling program, the department must locate recycling bins in areas of high student traffic where they have the maximum potential to capture recyclable material. Without adequate coverage, students will place recyclable material in trash bins. Dynamic GeoSolutions determined that a GIS analysis was the best option for determining optimal locations for recycling bins on campus. Before beginning work on the problem, we determined that the likely outcome of the analysis would be heavy foot traffic on the major east to west thoroughfare of campus and that new bins should be placed along this thoroughfare and near bus stops and food courts.

Project Overview

In order to solve this problem, Dynamic GeoSolutions analyzed the flow of foot traffic on campus to determine the most used paths, and with that information determined the optimal locations for outdoor recycling bins. The recommendations for bin placement took into consideration bus stops and food courts where students dispose of large amounts of waste, as well as currently unserved and underserved areas. Both university enrollment data and data collected in the field were used to make recommendations for the placement of bins.

Scope

This study covered the central campus area of Texas State University. According to the specifications of Recycling and Waste Management Supervisor Mario Garza this comprised the area east of Academy and west of University, and north of University and Lindsey and south of Sessom (Fig. 1). All processes and deliverables were executed during the spring 2014 semester, February 2014 – May 2014, with the final recommendations submitted on 2 May 2014.


W SESSOM DR
TOMAS RIVERA DR
STUDENT CENTER DR
N COMANCHE ST
BOBCAT TRAIL
E WOODS ST
W WOODS ST
EDWARD GARY ST
MOON ST
UNIVERSITY DR
AQUARENA SPRINGS DR
E SESSOM DR
N LBJ DR
N GUADALUPE ST
PAT GARRISON ST
W HUTCHISON ST
E HUTCHISON ST
E HOPKINS ST
OSCAR SMITH AVE
ACADEMY ST
ALAMO ST
LINDSEY ST
NORTH ST
MOORE ST
N

Fig. 1. Scope.

Data

In order to conduct our GIS analysis for recycling bin placement, we needed to analyze the student foot traffic along routes from building to building during the school day. The data necessary for this analysis was: Texas State University data, including sidewalks and buildings; and the student enrollment per building.

We obtained the student enrollment data from Dr. Marc Turner, a Research Analyst for the Texas State University Office of Institutional Research. The data represents the course enrollment for every academic building on campus and came in the form of an excel spreadsheet. This data was necessary to assign weights the routes to determine student foot traffic. We consider the data high quality because it is the official Texas State University enrollment data. We deleted the buildings from the spreadsheet that were not within our study area, leaving us with 23 buildings.

We obtained the Texas State University data from Bob Stafford, the GIS analyst for the Texas State University Facilities Planning, Design and Construction Department. The data came in the form of ArcMap shapefiles. This data was necessary to create the walking routes between buildings. We consider the data of high quality because it is the official Texas State University campus data set. We deleted the buildings from the building file for which we did not have student enrollment data, leaving us with 23 buildings. We used the sidewalk data as a base to create our student path network so that the simplified routes would reflect real-world paths. Using the sidewalks and each building as both an origin and a destination, we created a simplified line network of routes between the buildings that was appropriate for use in Network Analyst. The Texas State University campus data came in the projected coordinate system NAD 1983 State Plane Texas South Central, using the Lambert Conformal Conic projection.

We created the points for the food courts using the Texas State University Dining Services Map and the buildings and sidewalks as points of reference (Dine on Campus). We created the points for the bus stops using the Texas State University Bobcat Shuttle Campus Routes and Stops Map in the same fashion (Texas State University). This method of manual point creation was accurate within the context of our scope. We created the points for the existing recycling bins located within our study area using a handheld Garmin GPS unit. The handheld units provide a positional accuracy appropriate for the scope of our project. We projected all data that we created in the projected coordinate system NAD 1983 State Plane Texas South Central, using the Lambert Conformal Conic projection.

Methodology

Methodology for Network Creation

We used the sidewalk data as a base to create our student path network so that the simplified routes would reflect real-world paths. Using the sidewalks and each building as both an origin and a destination, we created a simplified line network of routes between the buildings that was appropriate for use in Network Analyst (Fig.2). The network of lines represented routes from building to building within
our study area. The lines (routes) were then dissolved to create a single line. Once the dissolve was finished we used the feature to line data management tool. This tool enabled us to separate the single line into unique line segments that met at junctions. We then used this network of unique segments and junctions to create a route network dataset using Network Analyst. We created points to represent the 23 buildings where they intersect with the line segments (routes). The building points are our origins and destinations for the network. Using the route network dataset, we used Network Analyst to find the optimal route between an origin and a destination. We used a Python script provided to us by Lab Assistant Ryan Schuermann to run iterations of this task. Routes from a building to itself were also removed during this process. Each route is unique and nondirectional, so that A to B is the same as B to A. This resulted in a network of 253 routes each of which consisted of several segments.

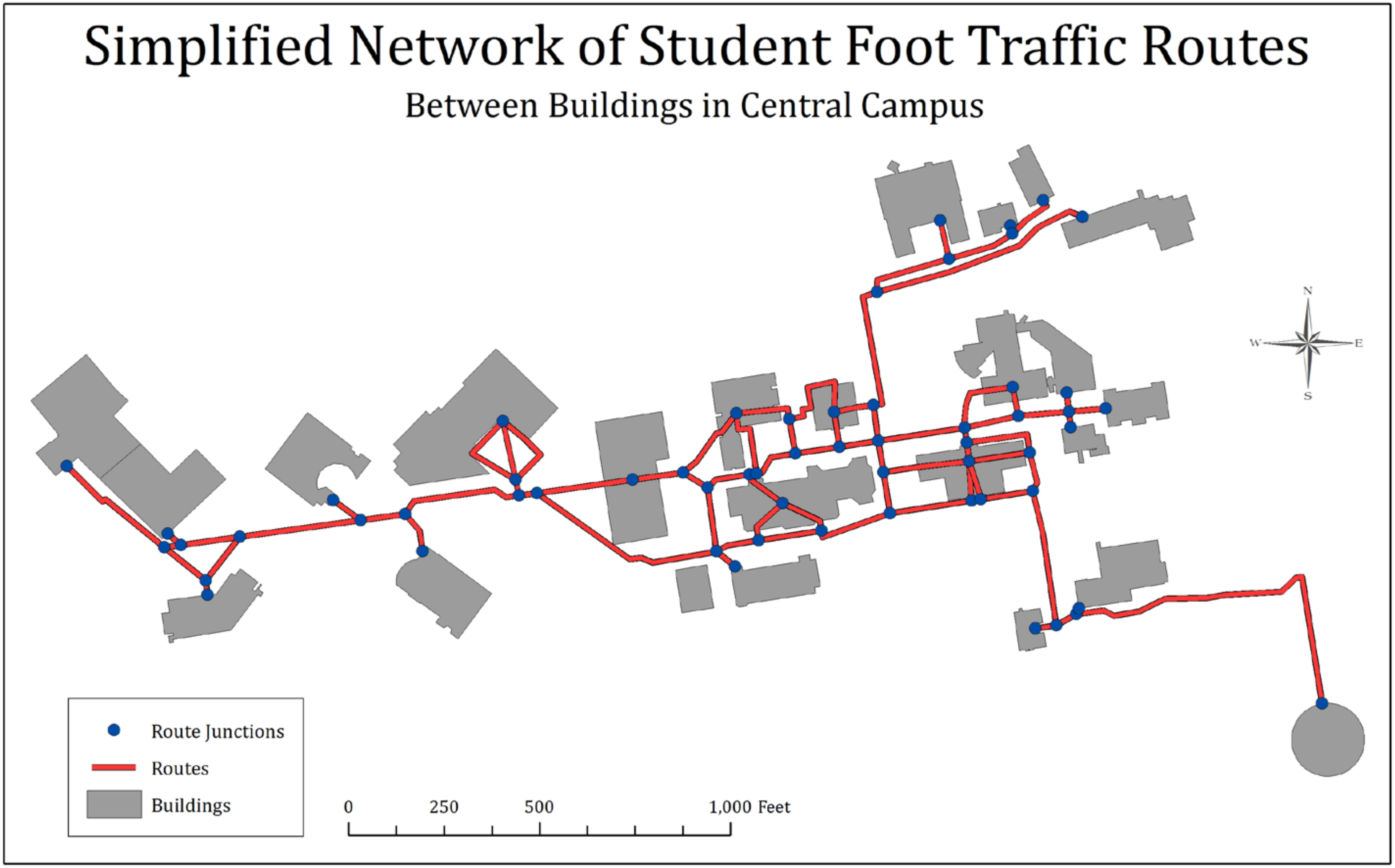


Fig. 2. Simplified route network

Methodology for Student Population Change Spreadsheet Creation

The data that we used to create the student population change spreadsheet contained the student enrollment for all of the buildings in the Texas State system for five time periods: 7:00 am-10:00 am, 10:00 am-1:00 pm, 1:00 pm-3:00 pm, 3:00 pm-6:00 pm, and 6:00 pm-9:00 pm. We first removed all the buildings outside of our study area; this left us with 23 buildings. Then, for each of the five time segments, we calculated what percent of the total enrolled student population was enrolled in each individual building. For each of the four times of population change between buildings (10:00 am, 1:00 pm, 3:00 pm, and 6:00 pm) we made three columns: class-class, to represent the number of students from each building who remained on campus and were redistributed among the buildings; class-home, to represent the number of students who left campus from each building at times of negative population change; and home-class, to represent the number of students who arrived on campus during times of positive population change. For each time where there is a positive population change, the class-class value is the same as the population of the building during the earlier time period, the class-home value is zero, and the home-class value is the class-class value subtracted from the population of the building during the later time period. For each time where there is a negative population change, the class-home value is the building population during the earlier time period multiplied by the percent decrease between the two time periods, the class-class value is the class-home value subtracted from the building population during the earlier time period, and the home-class value is zero (Fig. 3).

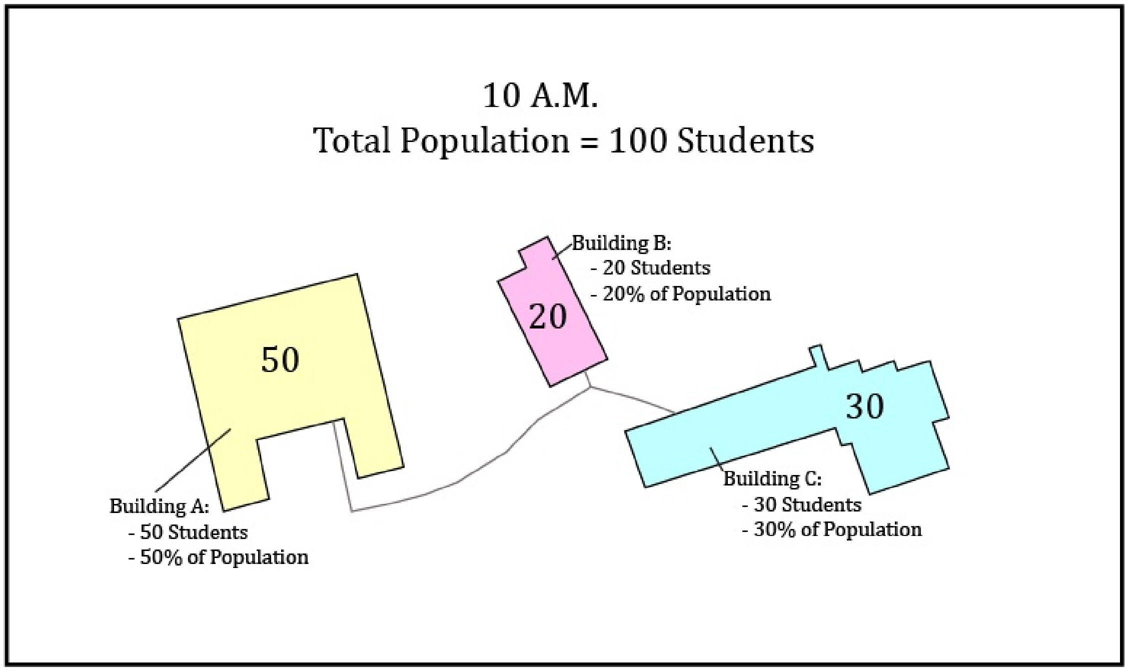
	A	B	C	D	E	F	G	H
1	**Campus/Building**	**7am-10am**	**Percentage**	**Class-Class**	**Class-Home**	**Home-Class**	**10am-1pm**	**Percentage**
2	Agriculture	419	1.48	419	0	442	861	1.28
3	Alkek Library	2361	8.34	2361	0	42	2403	3.56
4	Brazos	0	0.00	0	0	0	0	0.00
5	Centennial Hall	3632	12.83	3632	0	2224	5856	8.68
6	Chemistry	445	1.57	445	0	1003	1448	2.15
7	College of Education	914	3.23	914	0	2122	3036	4.50
8	Derrick Hall	3578	12.63	3578	0	3952	7530	11.17
9	Emmett & Miriam McCoy Hall	3802	13.43	3802	0	4721	8523	12.64
10	Evans Liberal Arts	1765	6.23	1765	0	3896	5661	8.40
11	Flowers Hall	1373	4.85	1373	0	3282	4655	6.90
12	Health Professions	1278	4.51	1278	0	1383	2661	3.95
13	Jerome & Catherine Supple Scie	1828	6.46	1828	0	2904	4732	7.02
14	Joann Cole Mitte	82	0.29	82	0	1869	1951	2.89
15	Lampasas	75	0.26	75	0	139	214	0.32
16	LBJ Student Center	1689	5.96	1689	0	1056	2745	4.07
17	Music	1436	5.07	1436	0	1246	2682	3.98
18	Old Main	306	1.08	306	0	648	954	1.41
19	Pedernales	50	0.18	50	0	84	134	0.20
20	Roy F. Mitte	644	2.27	644	0	1815	2459	3.65
21	Taylor-Murphy History	340	1.20	340	0	1271	1611	2.39
22	Theatre Center	245	0.87	245	0	1487	1732	2.57
23	Trinity	24	0.08	24	0	114	138	0.20
24	Undergraduate Academic Center	2033	7.18	2033	0	3410	5443	8.07
25	**Total**	**28319**					**67429**	

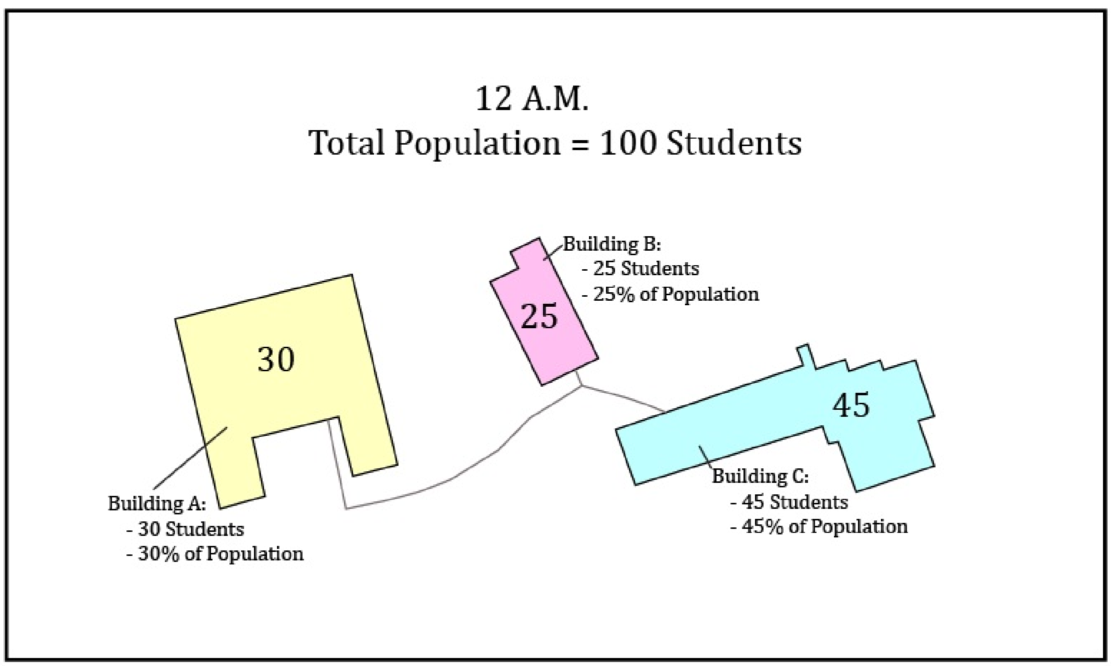
Fig. 3. Section of student population change spreadsheet.

Methodology for Student Population Change Spreadsheet Creation cont.

The next step was to calculate the number of students who moved from each building to every other building at each time of population change. Considering the scope of the project and the availability of data, we made the assumption that each building population is redistributed evenly to all other buildings, including itself, at each time of population change. Therefore our analysis does not take into consideration the likely occurrence of student movement clustering between related academic buildings. We created a 23 by 23 matrix of buildings for each of the times of population change, with the columns representing origins and the rows representing destinations. Then, for each building to every other building, we multiplied the class-class population of students from the earlier time segment by the percent of total population in a building from the following time segment. For example: the amount of students moving from Agriculture to Alkek at 10:00 am is the number of students in Agriculture between 7:00 and 10:00 that remained on campus and moved to another building (Class-Class=419) multiplied by the percentage of the total student population enrolled in Alkek between 10:00 am and 1:00 pm (Percentage=0.0356). Therefore the total student movement from Agriculture to Alkek at 10:00 is 14.932 students (Fig. 4). We repeated this process between every origin (23 buildings) and every destination (the same 23 buildings) for each time of student population change to produce four population change matrices (10:00 am, 1:00 pm, 3:00 pm, and 6:00 pm) of 529 values each (23 origins by 23 destinations).

Fig. 4. Example of mathematical operations.





Methodology for Student Population Change Spreadsheet Creation cont.

Because we are looking at the cumulative foot traffic over a single day, we then summed the values for all four matrices, to produce a final spreadsheet of the total number of students moving from every building to every other building throughout the day. Since it is only necessary to consider the total student foot traffic and not the directionality of their movement, student movement from Agriculture to Alkek is traffic along the same route as student movement from Alkek to Agriculture. Consequently we made one master list of routes (23! =276) where each of the 276 routes only exists once, and its value is equal to the total number of enrolled students moving along that route through the course of the day. We then edited the master list to remove the routes from each building to itself, i.e. Alkek to Alkek, because students staying within the same building at times of population change will not affect the student foot traffic. The final master list of students moving from building to building consists of 253 routes (23! - 23=253).

Methodology for Analysis

We first updated the final route list spreadsheet so that each route had exactly the same name as the routes produced in Network Analyst. Then, in ArcMap, we joined the final route list spreadsheet to the network of routes between buildings. This added the total number of students using a route through the course of the day as an attribute of the route. Each route consisted of multiple segments; many of these segments existed in multiple routes. In order to calculate the total number of students using each segment we dissolved the routes based on the unique identifier of each segment while summing the total population of each route. This produced 69 unique segments. Each segment contained an attribute representing the total number of students that use that segment as part of a route each day. This number is the weight of each segment. We then normalized these weights to put them on a scale of 0 to 1 and classified them into 5 classes to create a map of student foot traffic.

To calculate the influence of the food courts, we created points to represent food court locations based on the Texas State University Dining Services Map (Dine on Campus). For each of the food court locations we constructed a buffer of 188 ft, which is the average distance between each food courts and its nearest building (Fig. 5). Each segment that intersected a food court buffer was assigned a food court factor of 1.175. Each segment that did not intersect a food court buffer was assigned a food court factor of 1. We calculated the food court factor of 1.175 based on a study that determined that 69 percent of college students purchased food and beverages from on-campus food courts once a week or more (Food Product Design 2013). Because Texas State University offers few classes on Fridays, Saturdays, or Sundays, we divided 70 percent by 4, resulting in approximately 17.5 percent of students purchasing items from food courts daily. 17.5 percent on a scale of 0 to 1 is 0.175. This generous math accounts for some of the students who purchase items from food courts more than once a week.

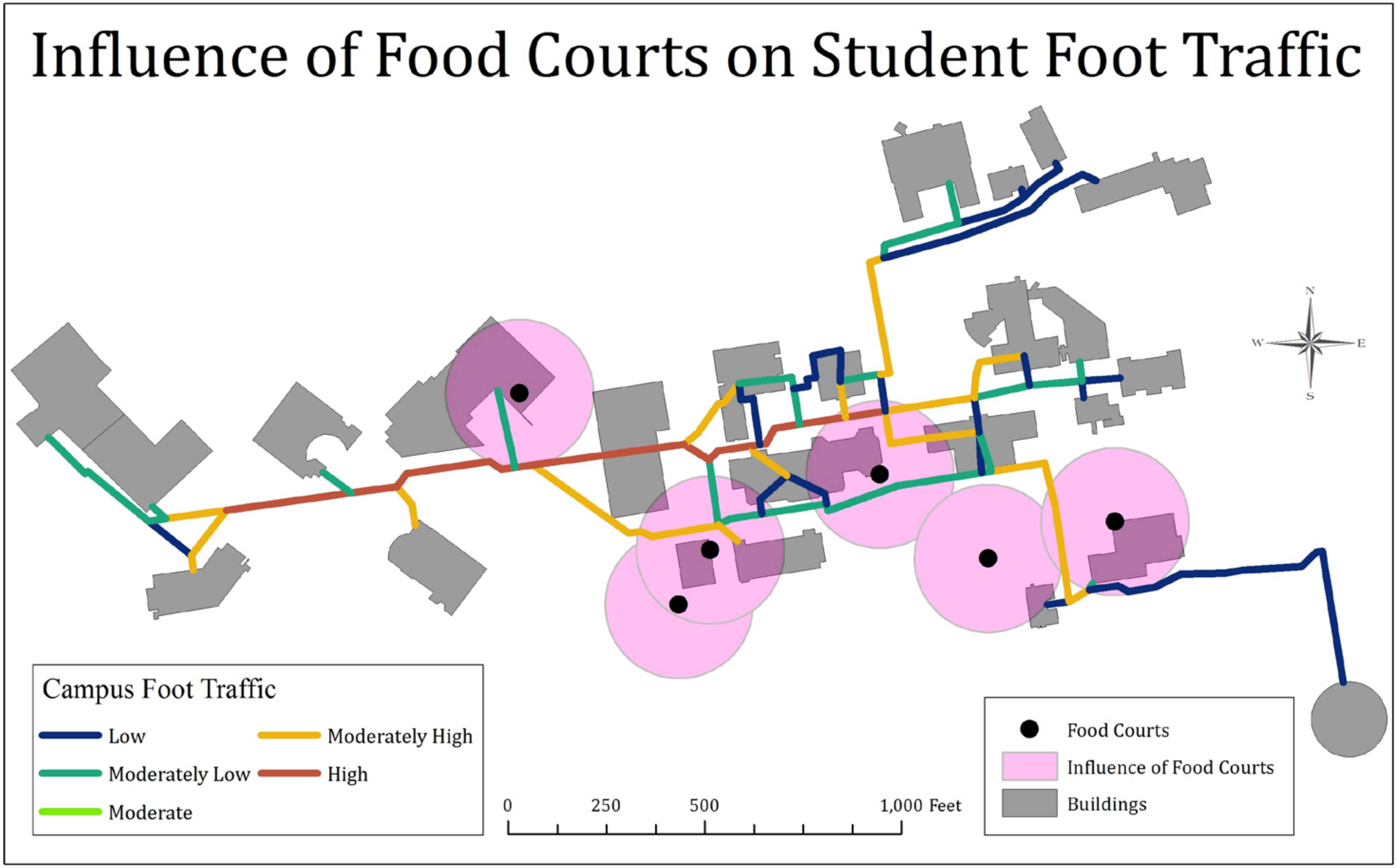


Fig. 5. Food court buffers.

Methodology for Analysis cont.

To calculate the influence of bus stops we created points to represent bus stop locations based on the Texas State University Campus Routes & Stops map for the Bobcat Shuttle (Texas State University). For each of the bus stop locations we constructed a buffer of 356 ft, which is the average distance between each bus stop and the closest route segment (Fig. 6). Each segment that intersected a bus stop buffer was assigned a bus stop factor of 0.03. Each segment that did not intersect a bus stop buffer was assigned a bus stop factor of 0. We calculated the bus stop factor of 0.03 based on the fact that there are 3,483,000 annual Bobcat Shuttle riders. The number of annual riders divided by days of the year, adjusted for the number of stops within our study area, and normalized to the same scale as our route segments, results in a 0.03 increase of student foot traffic for each segment intersecting a bus stop buffer. Again, the math is generous, which accounts for the fact that the bulk of riders do so Monday through Thursday and not on weekends, during the summer, or during breaks.

To create a map of student foot traffic with the influence of food courts and bus stops, we calculated a field for each segment that was equal to the scaled segment weight (foot traffic based on enrolled students) multiplied by the food court factor and added to the bus stop factor. The result of this analysis is a weight per segment that represents the total number of students travelling along that segment each day, including the additional influence of food courts and bus stops (Fig. 7).

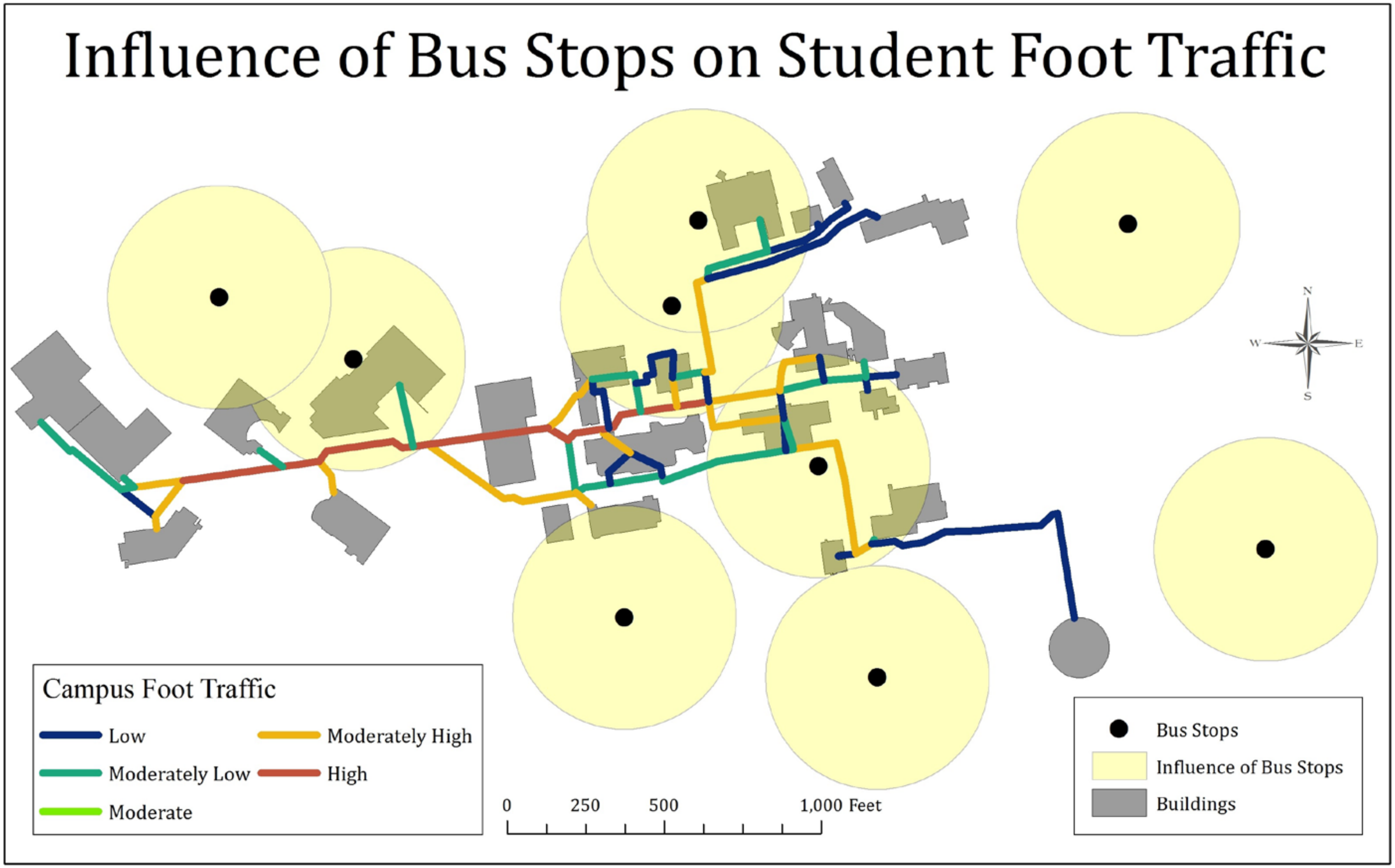


Fig. 6. Bus stop buffers.

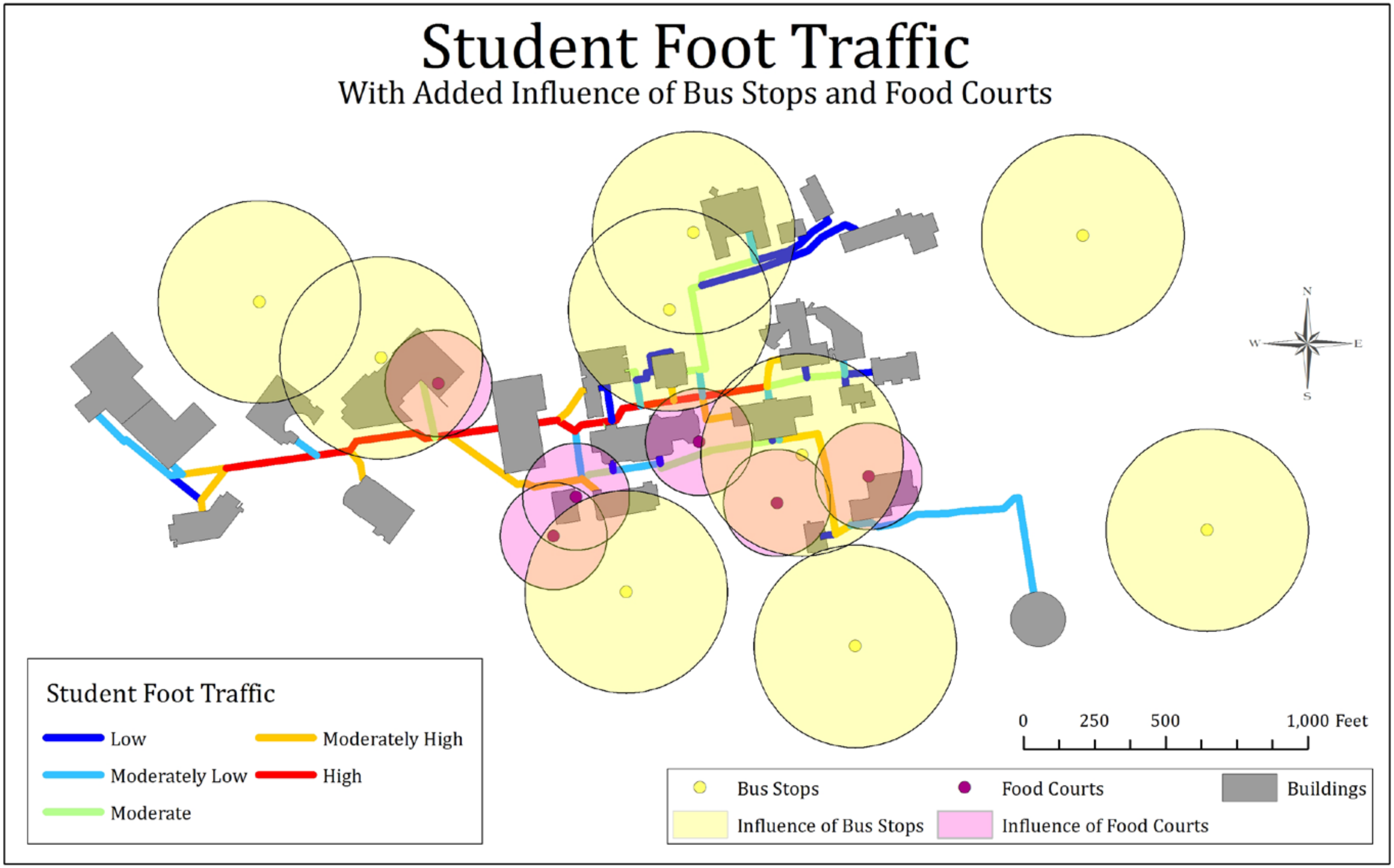


Fig. 7. Student foot traffic with influence of food courts and bus stops.

Methodology for Recommendations

In order to make our recommendations for bin placement, we first added the existing recycling bins to the final map of student foot traffic that included the influence of food courts and recycling bins. For each of the existing recycling bin locations we constructed a buffer of 12 m (39.37 ft.), which is the average distance an individual is willing to walk to dispose of refuse in a public place. (Department of Environment and Conservation 2005) (Fig. 8). These buffers represent the area that each recycling bin serves. To make our recommendations, we considered areas where food court buffers and bus stop buffers overlap, areas where there is high foot traffic, areas where there is a confluence of segments, and areas that are underserved by existing recycling bins. These objectives are subjective and based on a combination of our visual analysis of the results and our experience. Our recommendations for new bins represent the highest priority areas that meet all or most of the above criteria. These 8 recommendations are for the 8 bins purchased by the Recycling and Waste Management Department that are unplaced. Our recommendations for future bins represent areas of slightly lower priority that we feel could benefit from the addition of a recycling bin. For these bins we also considered the above criteria.

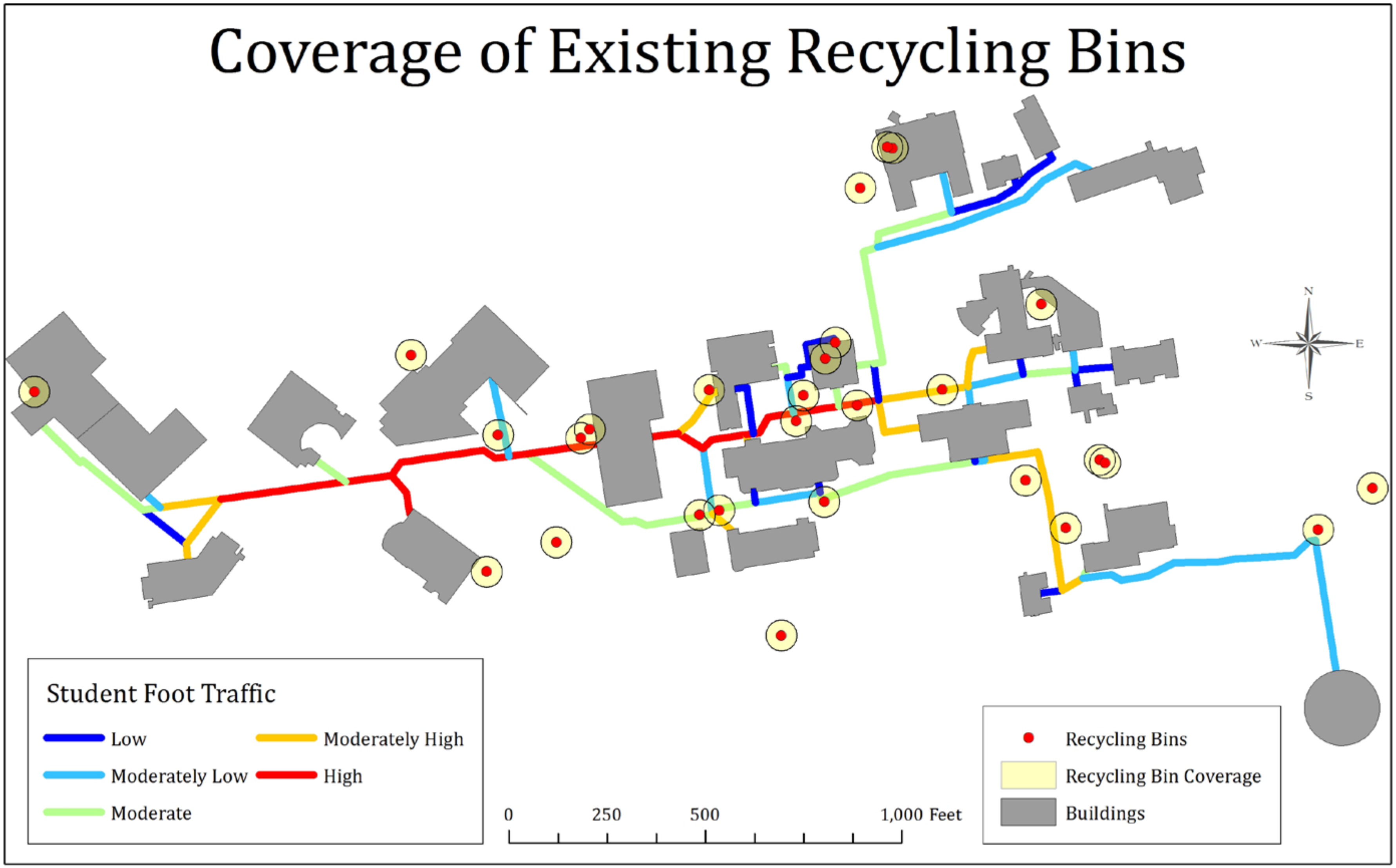


Fig. 8. Buffers of existing recycling bins.

Results

After completing our analysis our results were similar to our initial expectations. After the initial foot traffic analysis only one route had high student foot traffic. However, our ranking system is based not only on student foot traffic but also proximity to bus stops and food courts. After factoring in the influence of bus stops and food courts, some of the routes were classified as having higher foot traffic than before. Most of the routes that gained more weight were near the Quad, such as the route on Edward Gary St. and the route that passes in front of Jones Dining Hall. Routes near the bus loop also gained more weight as well as the route leading up to Old Main.

As we expected, our results show most of the student foot traffic on the route that stretches from the Quad to the Supple Science building. This route has high student foot traffic and most of the routes that directly connect to it have at least moderate student foot traffic. On the eastern side of campus the Quad is surrounded by many buildings and is the social core of campus, and it is no surprise that the area has high student foot traffic. Most of the routes that connect to the Quad have moderate student foot traffic since the Quad is such a concentrated area of traffic. Coming from the western side of campus (Supple Science) there is only one main route available to students: over the Comanche St. bridge, past the LBJ Student Center, through the Alkek breezeway, through the Quad, and ending at Old Main. Since this route is the quickest and easiest way to travel across campus it acts as a highway for students. This explains why it has high student foot traffic without the influence of bus stops and food courts. It is logical to place more bins along this highway to increase the chances of recyclable materials being collected. Routes that directly connect to this student highway have a greater chance of experiencing foot traffic as well. This is why the majority of routes with moderately high student foot traffic connect to this highway. Most of the routes that surround the Quad have moderate or higher foot traffic. This is mainly caused by the presence of food courts and bus stops. For instance, Edward Gary St. has a food court on either side of the street, which is why it has moderately high student foot traffic although there are not many classes in that area of campus. It would be beneficial to place a bin on Edward Gary St. since it has three buffers intersecting it: two food courts and one bus stop. The farther routes are from the Quad or student highway, the lower their student foot traffic. This is true for routes that lead to the Music building and the route that leads to the Theater building. Since they are isolated from the core of campus, they have moderately low or low student foot traffic. It would not be efficient to place an additional bin along those routes since they will most likely not collect much material.

According to our results, most of the student foot traffic is along the student highway (Supple-Old Main) as well as clustered around the Quad. Our results show that most of the routes with moderately high to high student foot traffic are already covered by the existing recycling bins. However, there are a few areas that are underserved such as routes located south of the Quad and routes on the western portion of campus. Areas with low student foot traffic need less recycling bins since they will not collect as much material.

We made our recommendations through a visual analysis of our student foot traffic analysis results. They are subjective and represent our professional opinion about bin placement. The existing bins all cover areas of high need and there is no reason to move them. Our recommendations for new bins are for the 8 bins purchased by the Recycling and Waste Management Department that have not yet been placed. Our recommendations for future bins are for bins that the Recycling and Waste Management Department may buy in the future (Fig. 9).

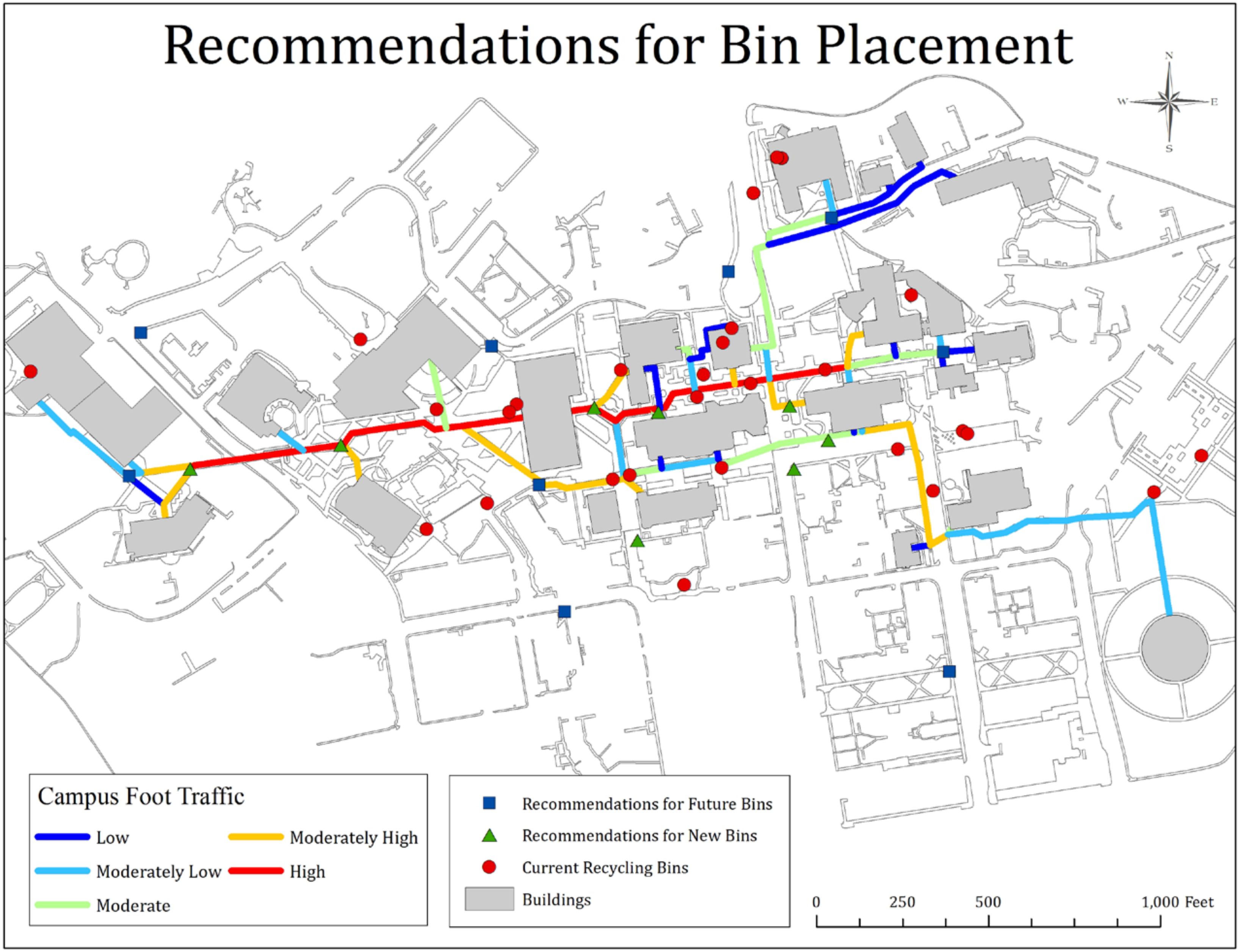


Fig. 9. Final recommendations.

Discussion

Our methods for foot traffic analysis were effective, producing results that match our experience on campus. Areas with high traffic such as the Quad were labeled high student foot traffic and areas such as the outer portions of central campus, were labeled low student foot traffic.

The methodology we used to approach the problem was restricted by data availability and the temporal scope of our project. The student population data was limited to only the enrolled student population of buildings and did not include professors or faculty, or students using buildings without being enrolled in classes in them (like Alkek library). Because our time frame was limited to the duration of the semester, we chose to assume in our analysis that the enrolled student population of each building was evenly redistributed to all the other buildings at each time of population change. This assumption does not take into consideration the likely clustering of student movement along paths between buildings with related academics. A recommendation for further study is to develop methods for modeling this clustered movement in order to improve the accuracy of the student foot traffic map. One method is to cluster the data according to the majors and degree plans that are taught in each building. For instance, science majors are more likely to travel to between the Supple and Mitte buildings since they are both science buildings. Developing methods to find clusters will better match the reality of student movement on campus. Furthermore, data on the number of students who use the busses daily as well as data on the attendance of dining halls would give more detail on how the population is being distributed.

Our analysis does show the feasibility of using student enrollment data to perform a foot traffic analysis of the Texas State University campus. Although our analysis cannot be easily updated due to the complexity of the mathematics involved, we have created a methodology that is replicable with new data. The final foot traffic analysis created by Dynamic GeoSolutions was an appropriate tool for making recommendations for the placement of recycling bins, and would additionally be appropriate for use in locating other campus amenities like litter bins, booths for social clubs, and vending machines as well as for determining areas where campus police should patrol frequently.

Conclusions

During the course of the project it became clear to use that familiarity with GIS software is only a small part of the successful completion of a GIS project. Many tasks were involved including technical writing, document design, cartographic visualization, and mathematical analysis. Conceptualization of the problem was also a key component of the analysis.

Likewise, organization was crucial, and through trial and error we learned that a common language for the project must be established and adhered to from the very start. File names, folders, and documents must all reference each other with clarity, and comprehensiveness of work done saves time in the end. Most importantly it was our ability to work as a team and to trust each other's work ethic that contributed to our successful completion of the project.

References

Adenso-Días, B. and P.L. González-Torre. 2005. "Influence of distance on the motivation and frequency of household recycling." *Waste Management* 25 (1) 15-23. doi: 10.1016/j.wasman.2004.008.007

Batty, M. 2009. "Urban Modeling." In *International Encyclopedia of Human Geography*, edited by R. Kitchin and N. Thrift, 51-58. Oxford: Elsevier.

Blaschke, Jayme. 2013. "Texas State sets enrollment record for 16th consecutive year." *University News Service*, September 16. http://www.txstate.edu/news/news_releases/news_archive/2013/September-2013/Enrollment091613.html

Department of Environment and Conservation. 2005. "Better Practice Guide for Public Place Recycling." http://www.epa.nsw.gov.au/resources/warr/2005156_gov_pprguidelines. pdf

Dine on Campus. "Texas State University Dining Services Map." http://www.dineoncampus.com/tools/contentImages/image/Campus-Dining-Map-2012.jpg. Accessed 21 April 2014.

EPA. 2011. "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2011." http://www.epa.gov/epawaste/nonhaz/municipal/pubs/MSWcharacterization_508_053113_fs.pdf

Food Product Design. 2013. "More College Students Eating from On-Campus Foodservice." http://www.foodproductdesign.com/news/2013/06/more-college-students-eating-from-on-campus-foods.aspx. Accessed 22 April 2014.

Texas State University. "Campus Routes & Stops." http://www.shuttle.txstate.edu/schedule/Campus.html. Accessed 22 April 2014.

Appendix I: Metadata

Food_Courts_Project

Tags

location, Food Courts, Cafeterias

Summary

This data was created by Dynamic GeoSolutions to analyze the effectiveness of food court populations on the student foot traffic segements at Texas State University.

Description

This layer displays the approximate location of all food courts within the area of scope at Texas State University. Each location is representative of an influx of students whereby the increase of population gives weight to the point location and a referenced buffer area which is not included in the final map document.The buffers created were 188 ft.; the average distance between each food courts and its nearest building. Each segment that intersected a food court buffer was assigned a food court factor of 1. We calculated the food court factor of 1.175 based on a study that determined that 69 percent of college students purchased food and beverages from on-campus food courts once a week or more (Food Product Design 2013). Because Texas State University offers few classes on Fridays, Saturdays, and Sundays we divided 70 percent by 4, resulting in approximately 17.5 percent of students purchasing items from food courts daily. 17.5 percent on a scale of 0 to 1 is 0.175.

Credits

Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Use limitations

This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Extent

There is no extent for this item.

Scale Range

There is no scale range for this item.

ArcGIS Metadata ►

Citation ►

TITLE Food_Courts_Project

Hide Citation ▲

Resource Details ►

Credits

Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Hide Resource Details ▲

Resource Constraints ►

Constraints

Limitations of use

This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Hide Resource Constraints ▲

Fields ►

Details for object Food_Courts_Project ►

Definition

Location of food courts on the Texas State University campus; within the scope of study

Definition source

Dynamic GeoSolutions

Field FID ►

Field description

Internal feature number.

Description source

Esri

Description of values Sequential unique whole numbers that are automatically generated.

Hide Field FID ▲

Field Shape ►

Field description

Feature geometry.

Description source

Esri

Description of values Coordinates defining the features.

Hide Field Shape ▲

FIELD Id ►

FIELD DESCRIPTION

Null

DESCRIPTION SOURCE

Null

RANGE OF VALUES

MINIMUM VALUE 1

MAXIMUM VALUE 9

Hide Field Id ▲

Hide Details for object Food_Courts_Project ▲

Hide Fields ▲

FGDC Metadata (read-only) ▼

CITATION

CITATION INFORMATION

ORIGINATOR Dr. A. Giordano, Texas State University, Department of Geography - Professor and Chair

PUBLICATION DATE 2014-04-22

TITLE

Food_Courts_Project

GEOSPATIAL DATA PRESENTATION FORM vector digital data

DESCRIPTION

ABSTRACT

This layer displays the approximate location of all food courts within the area of scope at Texas State University. Each location is representative of an influx of students whereby the increase of population gives weight to the point location and a referenced buffer area which is not included in the final map document.The buffers created were 188 ft.; the average distance between each food courts and its nearest building. Each segment that intersected a food court buffer was assigned a food court factor of 1. We calculated the food court factor of 1.175 based on a study that determined that 69 percent of college students purchased food and beverages from on-campus food courts once a week or more (Food Product Design 2013). Because Texas State University offers few classes on Fridays, Saturdays, and Sundays we divided 70 percent by 4, resulting in approximately 17.5 percent of students purchasing items from food courts daily. 17.5 percent on a scale of 0 to 1 is 0.175.

PURPOSE

This data was created by Dynamic GeoSolutions to analyze the effectiveness of food court populations on the student foot traffic segements at Texas State University.

Time Period of Content
Time Period Information
Range of Dates/Times
Beginning Date 2014-04-22
Ending Date 2014-04-22
Currentness Reference
East of Academy and west of University, and north of University and Lindsey and south of Sessom.

Status
Progress In work
Maintenance and Update Frequency None planned

Spatial Domain
Bounding Coordinates
West Bounding Coordinate -97.944018
East Bounding Coordinate -97.939228
North Bounding Coordinate 29.889289
South Bounding Coordinate 29.887773

Keywords
Theme
Theme Keyword Thesaurus ISO 19115 Topic Categories
Theme Keyword location

Theme
Theme Keyword Thesaurus None
Theme Keyword Food Courts
Theme Keyword Cafeterias

Access Constraints
None

Use Constraints
This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Point of Contact
Contact Information
Contact Organization Primary
Contact Organization Texas State University
Contact Person Dr. A. Giordano
Contact Position Department of Geography - Professor and Chair
Contact Address
Address Type unknown
Address 601 University Drive
City San Marcos
State or Province Texas
Postal Code 78666
Country UNITED STATES

Contact Voice Telephone (512) 245-6581
Contact Electronic Mail Address ag22@txstate.edu
Contact Instructions

Contact via e-mail or by phone to schedule an appointment.

DATA SET CREDIT
Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

NATIVE DATA SET ENVIRONMENT
Microsoft Windows 7 Version 6.1 (Build 7601) Service Pack 1; Esri ArcGIS 10.1.1.3143

Hide Identification ▲

DIRECT SPATIAL REFERENCE METHOD Vector

POINT AND VECTOR OBJECT INFORMATION
SDTS TERMS DESCRIPTION
SDTS POINT AND VECTOR OBJECT TYPE Entity point
POINT AND VECTOR OBJECT COUNT 6

Hide Spatial Data Organization ▲

HORIZONTAL COORDINATE SYSTEM DEFINITION
PLANAR
MAP PROJECTION
MAP PROJECTION NAME NAD 1983 StatePlane Texas South Central FIPS 4204 Feet
LAMBERT CONFORMAL CONIC
STANDARD PARALLEL 28.38333333333333
STANDARD PARALLEL 30.28333333333334
LONGITUDE OF CENTRAL MERIDIAN -99.0
LATITUDE OF PROJECTION ORIGIN 27.83333333333333
FALSE EASTING 1968500.0
FALSE NORTHING 13123333.33333333

PLANAR COORDINATE INFORMATION
PLANAR COORDINATE ENCODING METHOD coordinate pair
COORDINATE REPRESENTATION
ABSCISSA RESOLUTION 0.00000002857585279514297
ORDINATE RESOLUTION 0.00000002857585279514297
PLANAR DISTANCE UNITS foot_us

GEODETIC MODEL
HORIZONTAL DATUM NAME D North American 1983
ELLIPSOID NAME GRS 1980
SEMI-MAJOR AXIS 6378137.0
DENOMINATOR OF FLATTENING RATIO 298.257222101

Hide Spatial Reference ▲

DETAILED DESCRIPTION
ENTITY TYPE
ENTITY TYPE LABEL Food_Courts_Project
ENTITY TYPE DEFINITION
Location of food courts on the Texas State University campus; within the scope of study
ENTITY TYPE DEFINITION SOURCE Dynamic GeoSolutions

ATTRIBUTE
ATTRIBUTE LABEL FID

Attribute Definition
Internal feature number.
Attribute Definition Source Esri
Attribute Domain Values
Unrepresentable Domain
Sequential unique whole numbers that are automatically generated.

Attribute
Attribute Label Shape
Attribute Definition
Feature geometry.
Attribute Definition Source Esri
Attribute Domain Values
Unrepresentable Domain
Coordinates defining the features.

Attribute
Attribute Label Id
Attribute Definition
Null
Attribute Definition Source Null
Attribute Domain Values
Range Domain
Range Domain Minimum 1
Range Domain Maximum 9

Hide Entities and Attributes ▲
Metadata Date 2014-05-02
Metadata Contact
Contact Information
Contact Organization Primary
Contact Organization Texas State University
Contact Person Dr. A. Giordano
Contact Position Department of Geography - Professor and Chair
Contact Address
Address Type physical
Address 601 University Drive
City San Marcos
State or Province Texas
Postal Code 78666
Country UNITED STATES

Contact Voice Telephone (512) 245-6581
Contact Electronic Mail Address ag22@txstate.edu
Contact Instructions
Contact via e-mail or by phone to schedule an appointment.

Metadata Standard Name FGDC Content Standard for Digital Geospatial Metadata
Metadata Standard Version FGDC-STD-001-1998
Metadata Time Convention local time

Metadata Use Constraints
This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the

use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Bus_Stops_Project

Tags

location, transportation, bus stops, bus drop-off, bus pick-up

Summary

This data was created by Dynamic GeoSolutions to analyze the effectiveness of food court populations on the student foot traffic segements at Texas State University.

Description

This layer displays the approximate location of all bus stops within the area of scope at Texas State University. Each location is representative of an influx of students whereby the increase of population gives weight to the point location and a referenced buffer area which is not included in the final map document. The buffers created were a radius of 356 ft; the average distance between each bus stop and the closest route segment. Each segment that intersected a bus stop buffer was assigned a bus stop factor of 0.03. Each segment that did not intersect a bus stop buffer was assigned a bus stop factor of 0. We calculated the bus stop factor of 0.03 based on the fact that there are 3,483,000 annual Bobcat Shuttle riders. The number of annual riders, divided by days of the year, adjusted for the number of stops within our study area, and normalized to the same scale as our route segments, results in a 0.03 increase of student foot traffic for each segment intersecting a bus stop buffer.

Credits

GEO 4427 Spring 2014 Dynamic GeoSolutions: Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor: Dr. A. Giordano; Lab Instructor: Ryan Schuermann

Use limitations

This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Extent

There is no extent for this item.

Scale Range

There is no scale range for this item.

ArcGIS Metadata ►

Citation ►

TITLE Bus_Stops_Project

Hide Citation ▲

Resource Details ►

CREDITS

GEO 4427

Spring 2014

Dynamic GeoSolutions: Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King;

Instructor: Dr. A. Giordano;

Lab Instructor: Ryan Schuermann

Hide Resource Details ▲

Resource Constraints ►

CONSTRAINTS

LIMITATIONS OF USE

This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Hide Resource Constraints ▲

Fields ►

DETAILS FOR OBJECT Bus_Stops_Project ►

DEFINITION

Location of bus stops on the Texas State University campus; within the scope of study

DEFINITION SOURCE

Dynamic GeoSolutions

FIELD FID ►

FIELD DESCRIPTION

Internal feature number.

DESCRIPTION SOURCE

Esri

DESCRIPTION OF VALUES Sequential unique whole numbers that are automatically generated.

Hide Field FID ▲

FIELD Shape ►

FIELD DESCRIPTION

Feature geometry.

Description source
Esri

Description of values Coordinates defining the features.

Hide Field Shape ▲

Field Id ►
Field description
Null

Description source
Null

Range of values
Minimum value 1
Maximum value 9

Beginning date of values 2014-04-22
Ending date of values 2014-05-22

Hide Field Id ▲

Hide Details for object Bus_Stops_Project ▲

Hide Fields ▲

FGDC Metadata (read-only) ▼

Citation
Citation Information
Originator Dr. A. Giordano, Texas State University, Department of Geography - Professor and Chair
Publication Date 2014-05-22
Title
Bus_Stops_Project
Geospatial Data Presentation Form vector digital data

Description
Abstract
This layer displays the approximate location of all bus stops within the area of scope at Texas State University. Each location is representative of an influx of students whereby the increase of population gives weight to the point location and a referenced buffer area which is not included in the final map document. The buffers created were a radius of 356 ft; the average distance between each bus stop and the closest route segment. Each segment that intersected a bus stop buffer was assigned a bus stop factor of 0.03. Each segment that did not intersect a bus stop buffer was assigned a bus stop factor of 0. We calculated the bus stop factor of 0.03 based on the fact that there are 3,483,000 annual Bobcat Shuttle riders. The number of annual riders, divided by days of the year, adjusted for the number of stops within our study area, and normalized to the same scale as our route segments, results in a 0.03 increase of student foot traffic for each segment intersecting a bus stop buffer.

Purpose
This data was created by Dynamic GeoSolutions to analyze the effectiveness of food court populations on the student foot traffic segements at Texas State University.

Time Period of Content
Time Period Information
Range of Dates/Times
Beginning Date 2014-04-22
Ending Date 2014-04-22
Currentness Reference
East of Academy and west of University, and north of University and Lindsey and south of Sessom; San Marcos, Texas

Status
Progress In work
Maintenance and Update Frequency None planned

Spatial Domain
Bounding Coordinates
West Bounding Coordinate -97.946015
East Bounding Coordinate -97.935457
North Bounding Coordinate 29.890762
South Bounding Coordinate 29.886680

Keywords
Theme
Theme Keyword Thesaurus ISO 19115 Topic Categories
Theme Keyword location
Theme Keyword transportation

Theme
Theme Keyword Thesaurus None
Theme Keyword bus stops
Theme Keyword bus drop-off
Theme Keyword bus pick-up

Access Constraints
None

Use Constraints
This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Point of Contact
Contact Information
Contact Organization Primary
Contact Organization Texas State University
Contact Person Dr. A. Giordano
Contact Position Department of Geography - Professor and Chair

Data Set Credit
GEO 4427

Spring 2014

Dynamic GeoSolutions: Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King;

Instructor: Dr. A. Giordano;

Lab Instructor: Ryan Schuermann

NATIVE DATA SET ENVIRONMENT
Microsoft Windows 7 Version 6.1 (Build 7601) Service Pack 1; Esri ArcGIS 10.1.1.3143

Hide Identification ▲

LOGICAL CONSISTENCY REPORT
Topology has not be validated for these points. All bus stop points and other inconsistencies may exist and have not been corrected.

COMPLETENESS REPORT
This map only includes information collected in the study area and base map for the same area. Other portions of the Texas State University campus are not included and have not be analyzed.

LINEAGE
PROCESS STEP
PROCESS DESCRIPTION
Null

PROCESS DATE 2014-04-22

Hide Data Quality ▲

DIRECT SPATIAL REFERENCE METHOD Vector

POINT AND VECTOR OBJECT INFORMATION
SDTS TERMS DESCRIPTION
SDTS POINT AND VECTOR OBJECT TYPE Entity point
POINT AND VECTOR OBJECT COUNT 9

RASTER OBJECT INFORMATION
RASTER OBJECT TYPE Grid Cell

Hide Spatial Data Organization ▲

HORIZONTAL COORDINATE SYSTEM DEFINITION
PLANAR
MAP PROJECTION
MAP PROJECTION NAME NAD 1983 StatePlane Texas South Central FIPS 4204 Feet
LAMBERT CONFORMAL CONIC
STANDARD PARALLEL 28.38333333333333
STANDARD PARALLEL 30.28333333333334
LONGITUDE OF CENTRAL MERIDIAN -99.0
LATITUDE OF PROJECTION ORIGIN 27.83333333333333
FALSE EASTING 1968500.0
FALSE NORTHING 13123333.33333333

PLANAR COORDINATE INFORMATION
PLANAR COORDINATE ENCODING METHOD coordinate pair
COORDINATE REPRESENTATION

Abscissa Resolution 0.00000002857585279514297
Ordinate Resolution 0.00000002857585279514297
Planar Distance Units foot_us

Geodetic Model
Horizontal Datum Name D North American 1983
Ellipsoid Name GRS 1980
Semi-major Axis 6378137.0
Denominator of Flattening Ratio 298.257222101

Hide Spatial Reference ▲

Detailed Description
Entity Type
Entity Type Label Bus_Stops_Project
Entity Type Definition
Location of bus stops on the Texas State University campus; within the scope of study
Entity Type Definition Source Dynamic GeoSolutions

Attribute
Attribute Label FID
Attribute Definition
Internal feature number.
Attribute Definition Source Esri
Attribute Domain Values
Unrepresentable Domain
Sequential unique whole numbers that are automatically generated.

Attribute
Attribute Label Shape
Attribute Definition
Feature geometry.
Attribute Definition Source Esri
Attribute Domain Values
Unrepresentable Domain
Coordinates defining the features.

Attribute
Attribute Label Id
Attribute Definition
Null
Attribute Definition Source Null
Attribute Domain Values
Range Domain
Range Domain Minimum 1
Range Domain Maximum 9
Beginning Date of Attribute Values 2014-04-22
Ending Date of Attribute Values 2014-05-22

Hide Entities and Attributes ▲

Metadata Date 2014-05-02
Metadata Contact
Contact Information
Contact Organization Primary
Contact Organization Texas State University
Contact Person Dr. A. Giordano
Contact Position Department of Geography - Professor and Chair
Contact Address

ADDRESS TYPE physical
ADDRESS 601 University Drive
CITY San Marcos
STATE OR PROVINCE Texas
POSTAL CODE 78666
COUNTRY UNITED STATES

CONTACT VOICE TELEPHONE (512) 245-6581
CONTACT ELECTRONIC MAIL ADDRESS ag22@txstate.edu
CONTACT INSTRUCTIONS
Contact via e-mail of by phone to schedule an appointment.

METADATA STANDARD NAME FGDC Content Standard for Digital Geospatial Metadata
METADATA STANDARD VERSION FGDC-STD-001-1998
METADATA TIME CONVENTION local time

METADATA USE CONSTRAINTS
This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Foot_Traffic

Tags

location, structure, foot traffic, student paths, sidewalks, walking routes, student routes

Summary

This data was created by Dynamic GeoSolutions and is based upon a sidewalk shapefile acquired from Bob Stafford of the Texas State University Facilities Planning, Design, and Construction Department.

Description

This layer displays the location of foot traffic through socially selective routes within the area of scope at Texas State University. These routes have been based upon a temporal population dataset to analyze the number of students who use the chosen sidewalk segments between 24 buildings at 4 different time periods of class change in a day. Furthermore, the 69 selected foot traffic segments have been correlated with buffered areas surrounding food courts, bus stops, and current recycling bin points to find locations of highest recyclable waste collection efficiency.

Credits

Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Use limitations

This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Extent
There is no extent for this item.

Scale Range
There is no scale range for this item.

ArcGIS Metadata ►

Citation ►
TITLE Foot_Traffic

Hide Citation ▲

Resource Details ►
CREDITS
Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Hide Resource Details ▲

Resource Constraints ►
CONSTRAINTS
LIMITATIONS OF USE
This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Hide Resource Constraints ▲

Fields ►

DETAILS FOR OBJECT Foot_Traffic ►
DEFINITION
A polyline shapefile which represents the number of students who use the chosen sidewalk segments between 24 buildings at 4 time periods of class change in a day.

DEFINITION SOURCE
Dynamic GeoSolutions

FIELD FID ►
FIELD DESCRIPTION
Internal feature number.

DESCRIPTION SOURCE
Esri

Range of values
Minimum value 1
Maximum value 69

Description of values Sequential unique whole numbers that are automatically generated.

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field FID ▲

Field Shape ►
Field description
Feature geometry.

Description source
Esri

Description of values Coordinates defining the features.

Hide Field Shape ▲

Field Id ►
Field description
Numeric assignment used to identify each route segment.

Description source
Dynamic GeoSolutions

Range of values
Minimum value 1
Maximum value 69

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field Id ▲

Field SUM_Total_ ►
Field description
The total number of students using a route through the course of the day as an attribute of the route

Description source
Dynamic GeoSolutions

Range of values
Minimum value 1
Maximum value 69

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field SUM_Total_ ▲

Field Scaled_Pop ►

Field description

Student population count per segment per day normalized to a range of 0 to 1 by dividing each population count by the highest population number.

Description source

Dynamic GeoSolutions

Range of values

Minimum value 1

Maximum value 69

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field Scaled_Pop ▲

Field Bus_Factor ►

Field description

Based on intersection of bus stop buffers, each segment that intersected a bus stop buffer was assigned a bus stop factor of 0.03. Each segment that did not intersect a bus stop buffer was assigned a bus stop factor of 0

Description source

Dynamic GeoSolutions

Range of values

Minimum value 1

Maximum value 69

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field Bus_Factor ▲

Field FC_Factor ►

Field description

Based on intersection of food court buffers, each segment is assigned a food court factor of 1.175. Each segment that dioes not intersect a food court buffer is assigned a food court factor of 1.

Description source

Dynamic GeoSolutions

Range of values
Minimum value 1
Maximum value 69

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field FC_Factor ▲

Field Foot_Traff ►
Field description
Assigned weight per segment whcih represents the total number of students travelling along that segment each day, including the additional influence of food courts and bus stops.

Description source
Dynamic GeoSolutions

Range of values
Minimum value 1
Maximum value 69

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field Foot_Traff ▲

Hide Details for object Foot_Traffic ▲

Future_Recommendations

Tags
environment, location, future bins, recommended bins

Summary
This data was created by Dynamic GeoSolutions to recommended locations for bins that will be purchased in the years to come at Texas State University.

Description
This layer displays the approximate location of 9 recommended recycling bins within the scope of study at Texas State University. Each location is representative of a point at which is not currentyly underserved, but may become underserved in the near future.

Credits
Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Use limitations
This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic

GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Extent
There is no extent for this item.

Scale Range
There is no scale range for this item.

ArcGIS Metadata ▶

Citation ▶

TITLE Future_Recommendations

Hide Citation ▲

Resource Details ▶

CREDITS

Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Hide Resource Details ▲

Resource Constraints ▶

CONSTRAINTS

LIMITATIONS OF USE

This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Hide Resource Constraints ▲

Fields ▶

DETAILS FOR OBJECT Future_Recommendations ▶

DEFINITION

Recommended locations for 9 unpurchased recycling bins on the Texas State University campus; within the scope of study

DEFINITION SOURCE

Dynamic GeoSolutions

FIELD FID ▶

FIELD DESCRIPTION

Internal feature number.

DESCRIPTION SOURCE

Esri

Range of values
Minimum value 1
Maximum value 9

Description of values Sequential unique whole numbers that are automatically generated.

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field FID ▲

Field Shape ▶
Field description
Feature geometry.

Description source
Esri

Range of values
Minimum value 1
Maximum value 9

Description of values Coordinates defining the features.

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field Shape ▲

Field Id ▶
Field description
Null

Description source
Null

Range of values
Minimum value 1
Maximum value 9

Beginning date of values 2014-04-22
Ending date of values 2014-04-22

Hide Field Id ▲

Field Reason ▶
Field description

Description of location which justifies proposed bin placement. This is based upon convergence of food court buffers, bus stop buffers, and foot traffic density.

DESCRIPTION SOURCE
Dynamic GeoSolutions

RANGE OF VALUES
MINIMUM VALUE 1
MAXIMUM VALUE 9

BEGINNING DATE OF VALUES 2014-04-22
ENDING DATE OF VALUES 2014-05-22

Hide Field Reason ▲

Hide Details for object Future_Recommendations ▲

Recommendations

Tags

environment, location, new bins, recommended placement

Summary

This layer was created by Dynamic GeoSolutions to represent the recommended placement for recently purchased recyling bins within the area of scope at Texas State University.

Description

This layer displays the suggested placement of 8 newly purchased recycling bins within the area of scope at Texas State University. Each recommended location is based upon a combined weight of foot traffic density, food court proximity, and bus stop proximity that when overlapping maintain a level of foot traffic, but are not served by current recycling bins.

Credits

Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Use limitations

This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Extent

There is no extent for this item.

Scale Range

There is no scale range for this item.

ArcGIS Metadata ▶

Citation ▶

TITLE Recommendations

Hide Citation ▲

Resource Details ▶

CREDITS

Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Hide Resource Details ▲

Resource Constraints ▶

CONSTRAINTS

LIMITATIONS OF USE

This data is for illustrative purposes only. Dynamic GeoSolutions makes no warranties regarding the accuracy, completeness, reliability, or suitability of these data. Dynamic GeoSolutions disclaims any liability associated with the use or misuse of these data. In accessing and/or relying on these data, the user fully assumes any and all risk associated with this information.

Hide Resource Constraints ▲

Fields ▶

DETAILS FOR OBJECT Recommendations ▶

DEFINITION

Recommended locations for 8 newly purchased recycling bins on the Texas State University campus; within the scope of study

DEFINITION SOURCE

Dynamic GeoSolutions

FIELD FID ▶

FIELD DESCRIPTION

Internal feature number.

DESCRIPTION SOURCE

Esri

RANGE OF VALUES

MINIMUM VALUE 1

MAXIMUM VALUE 8

DESCRIPTION OF VALUES Sequential unique whole numbers that are automatically generated.

BEGINNING DATE OF VALUES 2014-04-22

ENDING DATE OF VALUES 2014-04-22

Hide Field FID ▲

Field Shape ▶

Field description

Feature geometry.

Description source

Esri

Range of values

Minimum value 1

Maximum value 8

Description of values Coordinates defining the features.

Beginning date of values 2014-04-22

Ending date of values 2014-04-22

Hide Field Shape ▲

Field Id ▶

Field description

Null

Description source

Null

Range of values

Minimum value 1

Maximum value 8

Beginning date of values 2014-04-22

Ending date of values 2014-04-22

Hide Field Id ▲

Field Reasons ▶

Field description

Description of location which justifies proposed bin placement. This is based upon convergence of food court buffers, bus stop buffers, and foot traffic density.

Description source

Dynamic GeoSolutions

Range of values

Minimum value 1

Maximum value 8

Beginning date of values 2014-04-22

ENDING DATE OF VALUES 2014-04-22

Hide Field Reasons ▲

Hide Details for object Recommendations ▲

Recycling_Bins

Tags

environment, location, recycling bins, receptacles, bins

Summary

This data was created by Dynamic GeoSolutions to analyze the effectiveness of 28 current recycling bin locations based on the student foot traffic count at Texas State University.

Description

This layer displays the exact location of all 28 recycling bin locations on the Texas State University campus within the scope of study. These points are used to assist in determining whether the current location of bin placement is efficient in gathering the appropriate amount of recyclable waste based on the foot traffic

Credits

Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Use limitations

None

Extent

There is no extent for this item.

Scale Range

There is no scale range for this item.

ArcGIS Metadata ►

Citation ►

TITLE Recycling_Bins

Hide Citation ▲

Resource Details ►

CREDITS

Dynamic GeoSolutions – Elizabeth Wesley, Jennifer Lopez, Enrique Delgado, and Cameron King; Instructor - Dr. A. Giordano and Lab Instructor - Ryan Schuermann

Hide Resource Details ▲

Resource Constraints ►

CONSTRAINTS

LIMITATIONS OF USE

None

Hide Resource Constraints ▲

Fields ►

DETAILS FOR OBJECT Recycling_Bins ►

DEFINITION

Points representative of current recycling bin locations on the Texas State University campus; within the scope of study

DEFINITION SOURCE

Dynamic GeoSolutions

FIELD FID ►

FIELD DESCRIPTION

Internal feature number.

DESCRIPTION SOURCE

Esri

RANGE OF VALUES

MINIMUM VALUE 1

MAXIMUM VALUE 28

DESCRIPTION OF VALUES Sequential unique whole numbers that are automatically generated.

BEGINNING DATE OF VALUES 2014-04-22

ENDING DATE OF VALUES 2014-04-22

Hide Field FID ▲

FIELD Shape ►

FIELD DESCRIPTION

Feature geometry.

DESCRIPTION SOURCE

Esri

RANGE OF VALUES

MINIMUM VALUE 1

MAXIMUM VALUE 28

DESCRIPTION OF VALUES Coordinates defining the features.

BEGINNING DATE OF VALUES 2014-04-22

ENDING DATE OF VALUES 2014-04-22

Hide Field Shape ▲

Field Label ▶

Field description

Numeric assignment of location in the order of which coordinates were acquired.

Description source

Dynamic GeoSolutions

Range of values

Minimum value 1

Maximum value 28

Beginning date of values 2014-04-22

Ending date of values 2014-04-22

Hide Field Label ▲

Field Type ▶

Field description

Geometric interpretation of coordinate points provided by ExpertGPS; GPS coordinate downloading software

Description source

Dynamic GeoSolution

Range of values

Minimum value 1

Maximum value 28

Beginning date of values 2014-04-22

Ending date of values 2014-04-22

Hide Field Type ▲

Field Elevation ▶

Field description

The vertical distance of a point or object above or below a reference surface or datum (generally mean sea level). Elevation generally refers to the vertical height of land.

Description source

http://support.esri.com/en/knowledgebase/GISDictionary/search

Range of values

Minimum value 1

Maximum value 28

Beginning date of values 2014-04-22

Ending date of values 2014-04-22

Hide Field Elevation ▲

Field TemperatureN ►

Field description

Null

Description source

Null

Range of values

Minimum value 1

Maximum value 28

Hide Field TemperatureN ▲

Field Waypoint ►

Field description

Numeric assignment of location in the order of which coordinates were acquired.

Description source

Dynamic GeoSolutions

Range of values

Minimum value 1

Maximum value 28

Beginning date of values 2014-04-22

Ending date of values 2014-04-22

Hide Field Waypoint ▲

Field Easting ►

Field description

The distance east of the origin that a point in a Cartesian coordinate system lies, measured in that system's units.

Description source

http://support.esri.com/en/knowledgebase/GISDictionary/search

Range of values

Minimum value 1

Maximum value 28

Beginning date of values 2014-04-22

Ending date of values 2014-04-22

Hide Field Easting ▲

FIELD Northing ►

FIELD DESCRIPTION

The distance north of the origin that a point in a Cartesian coordinate system lies, measured in that system's units.

DESCRIPTION SOURCE

http://support.esri.com/en/knowledgebase/GISDictionary/search

RANGE OF VALUES

MINIMUM VALUE 1

MAXIMUM VALUE 28

BEGINNING DATE OF VALUES 2014-04-22

ENDING DATE OF VALUES 2014-04-22

Hide Field Northing ▲

FIELD Descrip_ ►

FIELD DESCRIPTION

Name of building which recycling bin is closest to.

DESCRIPTION SOURCE

Dynamic GeoSolutions

RANGE OF VALUES

MINIMUM VALUE 1

MAXIMUM VALUE 28

BEGINNING DATE OF VALUES 2014-04-22

ENDING DATE OF VALUES 2014-04-22

Hide Field Descrip_ ▲

Appendix II: Group Members Contributions

Elizabeth Wesley, Project Manager

- designed the Dynamic GeoSolutions logo
- created the Scope Map
- wrote the introductory section of the proposal
- edited the proposal and designed the document
- designed the presentation template
- helped write the progress report
- worked with Cameron King to construct the Student Population Change spreadsheet
- created the final route list and updated the names of the routes to match those in ArcMap
- worked with Cameron King to conduct the analysis
    - joined spreadsheet to routes
    - dissolved segments
    - created student foot traffic map
    - created points layer for food courts
    - created points layer for bus stops
    - created buffers for food courts and bus stops
- researched to determine weights for buffers
- applied weights to buffers and assigned them to segments intersecting buffers
- created final foot traffic map with influence of food courts and bus stops
- worked with Cameron King to make bin placement recommendations
- wrote methodology for the student population change spreadsheet
- wrote methodology for the analysis
- wrote methodology for recommendations
- poster design
- created maps for poster
- placed maps in poster template designed by Jennifer Lopez and Enrique Delgado
- wrote text of poster
- wrote the introductory section of the final report
- wrote the conclusion of the final report
- compiled and edited the final report
- put together the final presentation

Jennifer Lopez, Assistant Project Manager

- Organized timeline and budget
- Completed research for literature review
- Edited literature review
- Wrote proposal conclusion
- Acquired temporal data based on building population
- Assisted with the creation of student pathways based on sidewalks layer
- Assisted with the creation/troubleshooting of student paths network
- Assisted with methodology development

- Assisted with collection of campus recycling bin GPS coordinates
- Created bin location and buffer shapefiles
- Metadata creation
- Poster editing

Enrique Delgado, GIS Analyst

- Created a simple line network using the obtained sidewalk layer alongside Jennifer Lopez.
    - Enrique focused on staying within the sidewalk boundaries and constructed the simple line network for the central, north, east, and south portions of campus.
- Created a dissolved shapefile of the simple line network.
    - Enrique had to troubleshoot the errors we were encountering for the network dataset based on the simple line network by using the Dissolve Management tool.
- Separated the dissolved shapefile to make a new line network with intersections and endpoints.
    - Enrique used the dissolved feature with the Feature to Line tool so we could create a line network that could be transformed into a useable network dataset.
- Constructed a network dataset using the separated line network.
- Created a point feature class shapefile representing our scope buildings with the assistance of Cameron King.
    - Cameron thought of the concept and I created the points along the student path network.
- Developed a file geodatabase containing the student network dataset, origins/destinations (buildings), and the separated path line network.
- Collected GPS coordinates for currently placed outdoor recycle bins alongside Jennifer Lopez
- Wrote the data section and my contributions for the final report deliverable
- Wrote the mission statement, project links, and my portion of the about us section in the website deliverables.
- Wrote the literature review portion from my research and two other documents discovered by Elizabeth Wesley and Jennifer Lopez.
- Wrote the implications section.
- Worked alongside Jennifer Lopez to create a PowerPoint Template for our final poster.
- Wrote the network portion of the methodology for the final report.
- Created a text file document for the DVD given to the client.

- Gathered files and documents into created folder that would be put on the DVD and listed in the text file on the DVD.
- Collected maps to be included on the website.

Cameron King, GIS Analyst

- Wrote methodology for proposal
- Calculated student population movement using building population data in Excel
- Assisted with the building of the GIS network
- Linked excel data to the GIS network
- Worked with Elizabeth Wesley to conduct the analysis
    - joined spreadsheet to routes
    - dissolved segments
    - created student foot traffic map
    - created points layer for food courts
    - created points layer for bus stops
    - created buffers for food courts and bus stops
- Assisted with the final recommendations based on analysis results
- Wrote results and discussion for the final report