Walking and Bicycling Demand

Where do people want to walk or bicycle?

If we build it, will they come?

In order to address these questions in this master planning process, both ***potential*** walking and bicycling demand were measured within the City of Clearwater.

The specific results of this analysis are used to prioritize the list of projects in this Master Plan. This chapter also presents a methodology that can be used in the future to identify areas of need and to evaluate specific projects.

Perspective

Since the 1950's, transportation professionals have been predicting changes in travel behavior and characteristics for motorized travel using various aggregate (area wide) and disaggregate (individual) models.

Travel demand models generally project the mode choice and total trip making based on a finite number of factors, such as characteristics of households and time and cost of competing modes or routes.

The most common model used is the four-step Urban Transportation Planning Process. This model integrates various factors of travel behavior with spatial information on land use patterns and the transportation network.

However, the factors that are used in predicting automobile travel demand are different than the factors that influence the decision to walk or bicycle.

Non-motorized Factors

The factors that influence the decision to walk or bicycle, according to the Federal Highway Administration, at both the aggregate and disaggregate level, include[1]:

Segment Characteristics. Physical characteristics of a roadway segment (e.g., traffic volume, lane width, or pavement quality).

Segment Friendliness. The overall acceptability of a segment as a bicycle or pedestrian route.

Network Characteristics. Physical characteristics and connectivity of a

[1] U.S. Department of Transportation, **Federal Highway Administration, "**Guidebook on Methods to Estimate Non-Motorized Travel: Overview of Methods".

network that determines its overall acceptability to the user.

Network Friendliness. A general measure of how acceptable the local road and trail network is for bicycling or walking.

Supporting Policies. Other programs, policies and facilities which affect the acceptability of bicycling or walking (e.g., bicycle parking, showers and lockers and educational programs).

Population Characteristics. Demographics of the local population which relate to likelihood of bicycling or walking (e.g., socioeconomic characteristics or attitudes).

Climate. General propensity to walk or bicycle, as a function of climate.

Characteristics of Other Modes. Relative travel times and costs of bicycling or walking vs. other modes, as well as safety, comfort or other factors that influence choice of mode. Policy variables might include price of parking, transit service improvements, etc.

Land Use Density. Destinations such as employment, shopping and other activities affect where people travel, how many trips are generated, trip length, etc.

Total Non-Motorized Trip Making. Overall level of non-motorized trip making in an area as a result of the above factors.

Methodology

Due to the limitations of the automobile travel demand models available, this planning process utilizes a disaggregate latent demand analysis.

Latent demand quantifies the ***potential*** demand in a specific geographic area relative to other geographic areas in the City. **It is a gravity model based on the location of trip attractors (destinations) and the distance that people are willing to walk or bicycle.** The latent demand that is measured for each geographic area does not account for existing roadway conditions. This results in an unencumbered demand perspective if people were to journey to their destinations in a comfortable environment without impedances.

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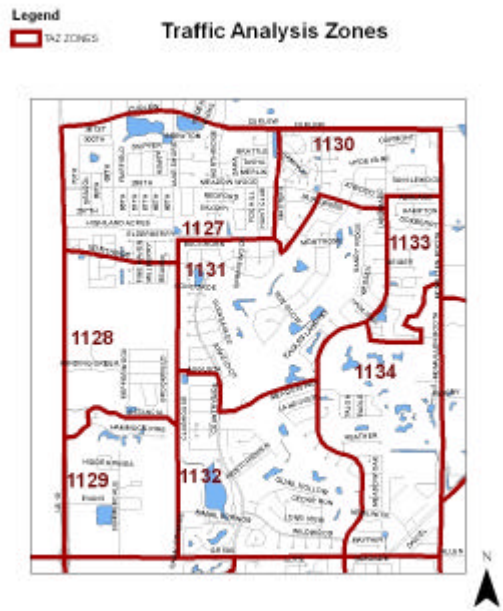
Geographic Areas

When determining hot spot locations for walking and bicycling demand, geographic areas must be divided into very small units named Traffic Analysis Zones (TAZ). A Traffic Analysis Zone is the unit of geography most commonly used in transportation planning and its boundaries are defined by the United States Census Bureau. There are 114 defined TAZs within the City of Clearwater. The map presented here displays the TAZs located in the City's Countryside area.



Trip Attractors

For this analysis, the two primary factors are trip attractors and trip distance. The three key attractors for bicyclists and pedestrians in the City of Clearwater are:

- public and private educational institutions
- parks
- commercial destinations as identified in the future land use map.

Trip Distance

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The second factor of this analysis is the distance that people are willing to travel. The 2001 National Household Transportation Survey (NHTS) represents an inventory of daily and long distance travel in the United States. The survey data was collected from a sample of approximately 66,000 households in the United States. The data was expanded to provide national estimates of trips and trip distance per travel mode, trip purpose, and other household characteristics. As part of the NHTS, the average distance for walking and bicycling was determined by trip purpose: commercial destinations, school or social/recreation. The average distance that a person traveled to a type of destination by walking or bicycling is demonstrated below.

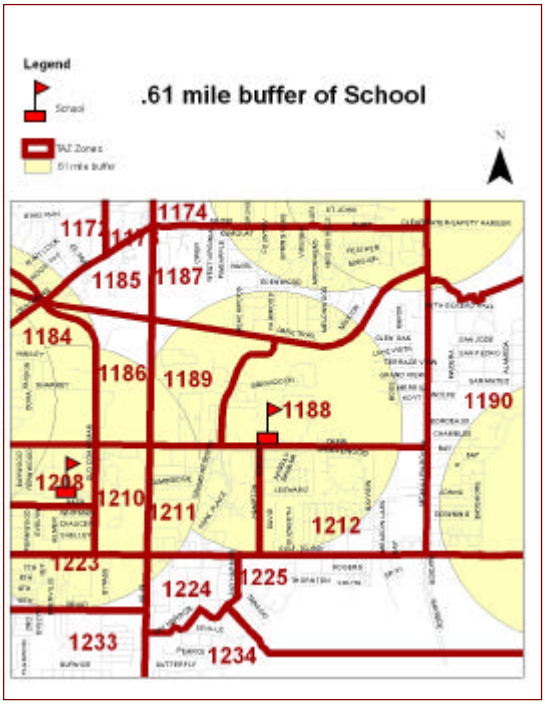
Average Trip Distance by Purpose

	Walk	*Bicycle*
	in miles	*in miles*
School	0.61	1.17
Social/Recreation	0.97	2.31
Commerical	0.51	1.39

2001 National Household Transportation Survey

Spatial Queries

After the three types of trip attractors were identified and located, spatial queries were performed, respective to the distance identified by the NHTS for all three trip purposes (schools, social/recreation and commercial) for both walking and bicycling. An example of the spatial queries (buffers) created around the City of Clearwater's schools for walking is displayed to the right.



Need Determination

Each TAZ was then assigned a numeric value based on the value of the buffers that intersect with the specific TAZ.

The value of the buffers were determined differently for each trip purpose as follows.

School Demand

The total enrollment at the public and private elementary, middle, high schools and colleges was calculated for the City of Clearwater. Due to the location of the schools and the distance students are willing to walk and bicycle, most TAZs contain numerous buffer areas. Each TAZ was assigned a numeric value based on the sum of the proportion of students that were enrolled in the school year 04-05. For example, TAZ 1189 has a total value of 111.9104 because of the proximity of Eisenhower Elementary and St. Petersburg College. This example is depicted below.

Calculations were performed for both bicycling and walking modes. Maps on the next two pages demonstrate Clearwater's bicycling and walking demand for school trips.

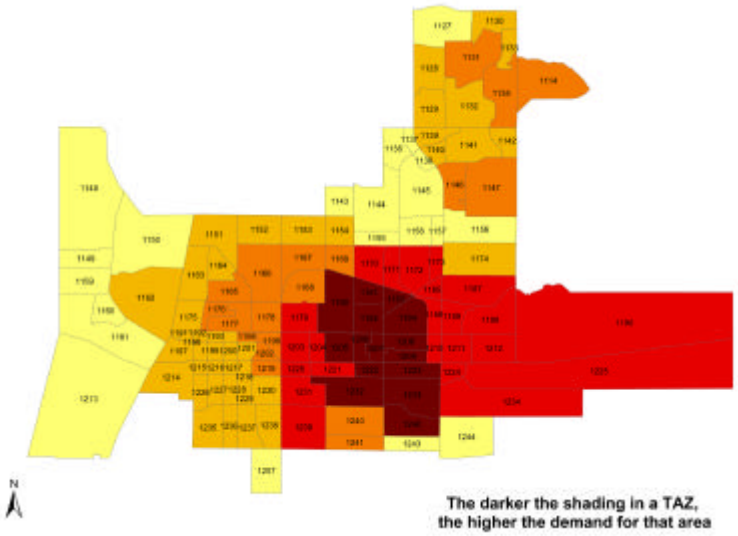
TAZ Value Calculation Example

Walking Value for School Trips TAZ 1189

School Enrollment (04/05)	*100% Scale*	*Name of School*	*TAZ 1189*
798	11.9104	Eisenhower Elementary	11.9104
6700	100.0000	St. Petersburg College	100.0000
		Total Value	111.9104

Bicycling Demand

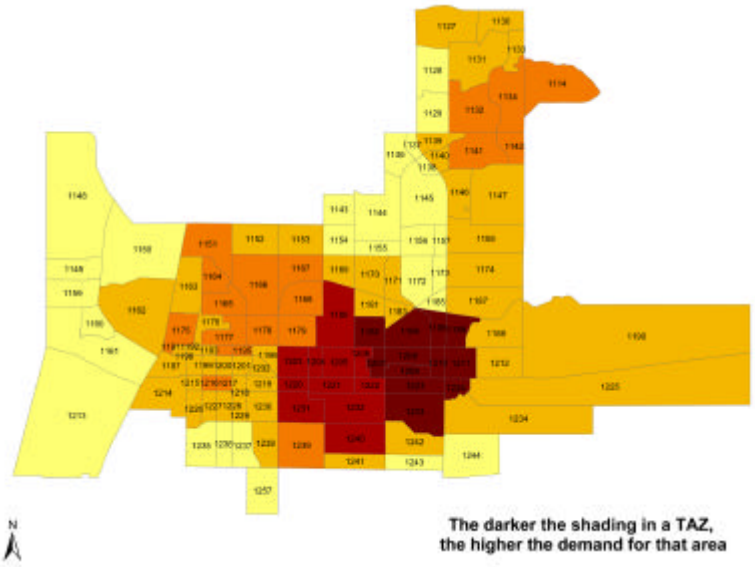
For School Trips by TAZ



The darker the shading in a TAZ, the higher the demand for that area

Walking Demand

For School Trips by TAZ



The darker the shading in a TAZ, the higher the demand for that area