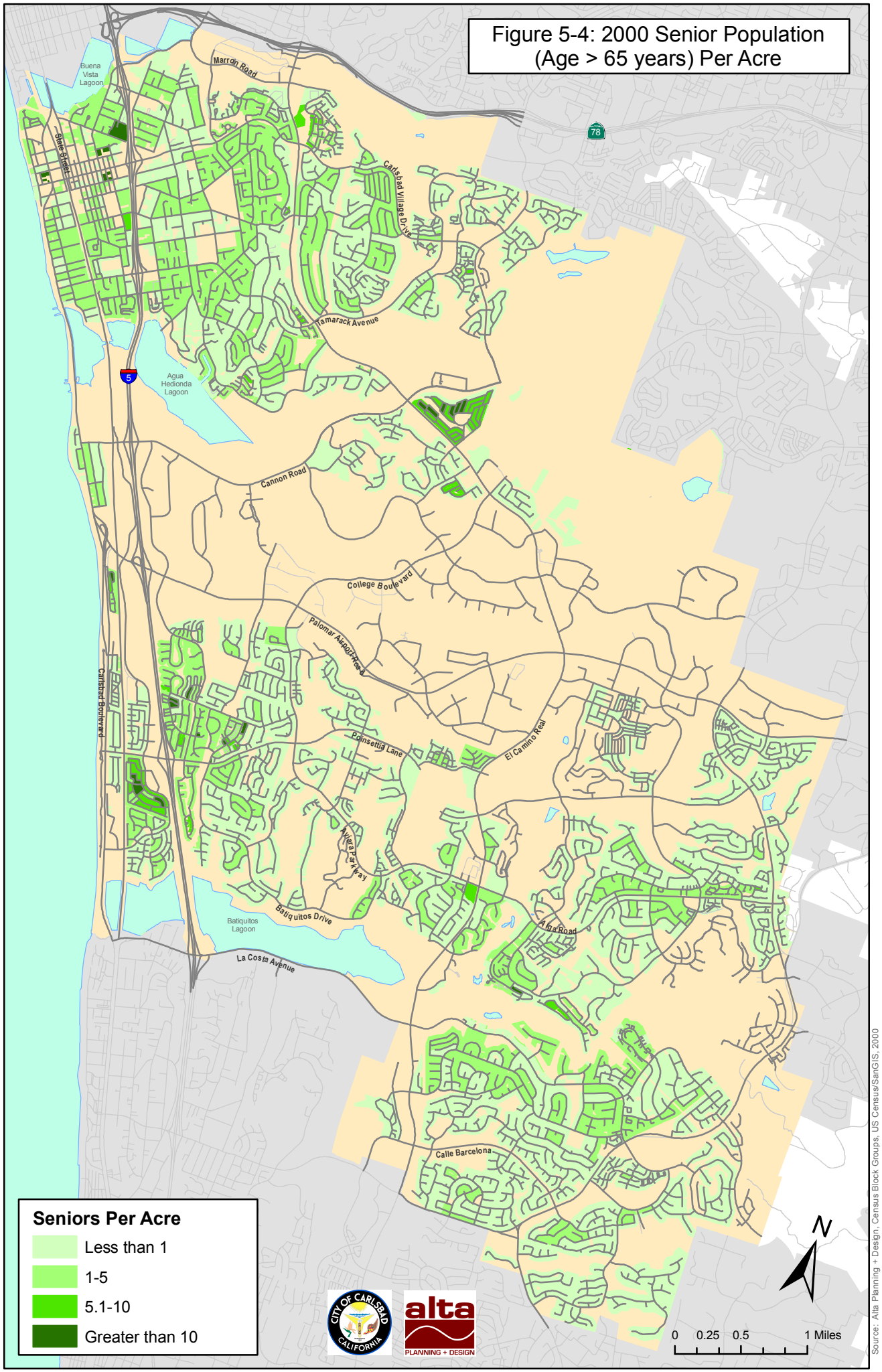


Figure 5-4: 2000 Senior Population
(Age > 65 years) Per Acre
Buena Vista Lagoon
Marron Road
State Street
Carlsbad Village Drive
78
Tamarack Avenue
5
Agua Hedionda Lagoon
Cannon Road
College Boulevard
Palomar Airport Road
Carlsbad Boulevard
Poinsettia Lane
El Camino Real
Aviara Parkway
Batiquitos Drive
Batiquitos Lagoon
Alga Road
La Costa Avenue
Calle Barcelona
Seniors Per Acre
Less than 1
1-5
5.1-10
Greater than 10
CITY OF CARLSBAD CALIFORNIA
alta
PLANNING + DESIGN
N
0 0.25 0.5 1 Miles
Source: Alta Planning + Design, Census Block Groups, US Census/SanGIS, 2000

west of Interstate 5; at the southeast corner of El Camino Real and Cannon Road, and at the southwest corner of Avenida Encinas and Poinsettia Lane.

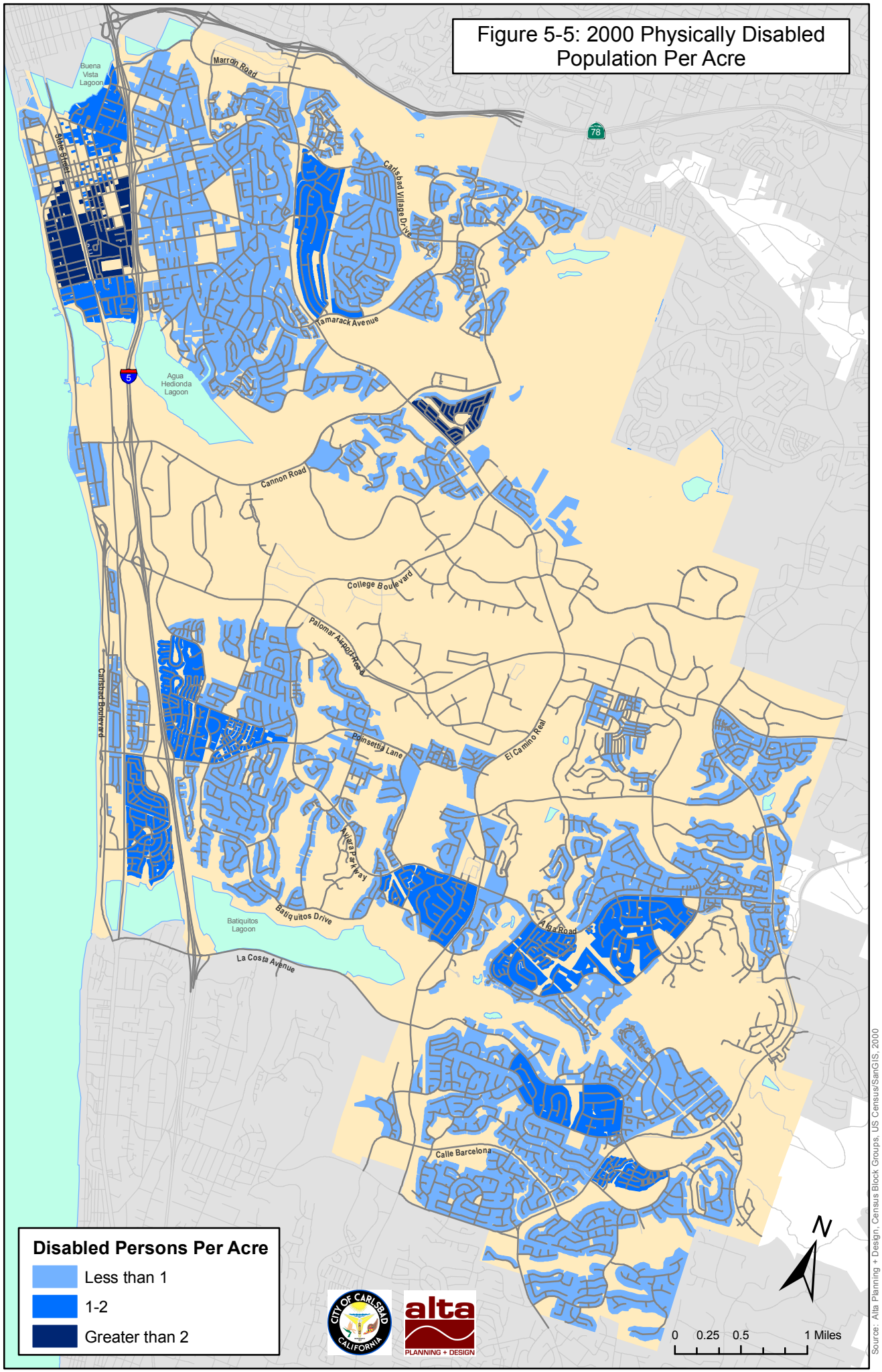
Figure 5-5 displays the distribution of physically disabled population across Carlsbad. As shown, disabled populations are clearly concentrated in the Village, in the area bound by Carlsbad Village Drive on the north, Interstate 5 on the east, Carlsbad Boulevard to west, and Tamarack Avenue to the south.

Figure 5-6 displays the household income patterns across the City of Carlsbad. As shown, there is a distinct concentration of low income households in the area west of I-5, between Chestnut Avenue and Laguna Drive.

5.1.3 Final Pedestrian Generator Map

Figure 5-7 displays the final pedestrian generator map of all pedestrian generators for the City of Carlsbad, including population and employment densities, presence of population subgroups and mixed land uses. This map was developed using a GIS tool called Spatial Analyst which combines all of the individual generators, as discussed in the previous sections, into a single, composite file. The pedestrian generators are weighted individually, with higher values assigned to locations with higher levels of pedestrian generating features. Differing multipliers are also applied to the various pedestrian generators to account for the relatively greater importance of some generators over others. **Table 5.1** displays the pedestrian generators, along with the associated weights and multipliers.

Figure 5-5: 2000 Physically Disabled Population Per Acre



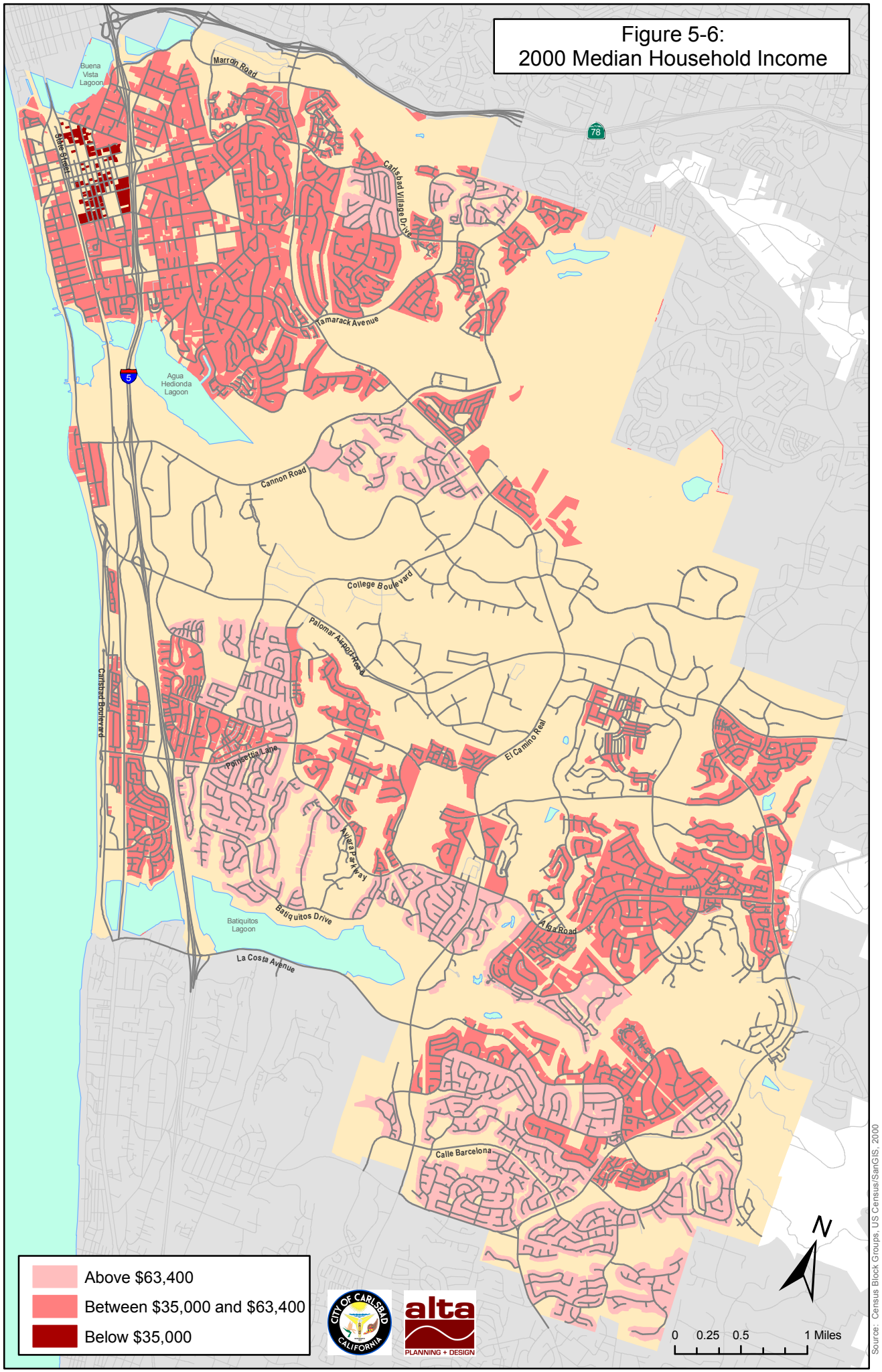


Figure 5-6:
2000 Median Household Income
Above $63,400
Between $35,000 and $63,400
Below $35,000
Buena Vista Lagoon
Agua Hedionda Lagoon
Batiquitos Lagoon
Marron Road
Carlsbad Village Drive
Tamarack Avenue
Cannon Road
College Boulevard
Palomar Airport Road
El Camino Real
Poinsettia Lane
Aviara Parkway
Batiquitos Drive
La Costa Avenue
Alga Road
Calle Barcelona
Carlsbad Boulevard
State Street
5
78
N
0 0.25 0.5 1 Miles
Source: Census Block Groups, US Census/SanGIS, 2000
CITY OF CARLSBAD CALIFORNIA
alta PLANNING + DESIGN

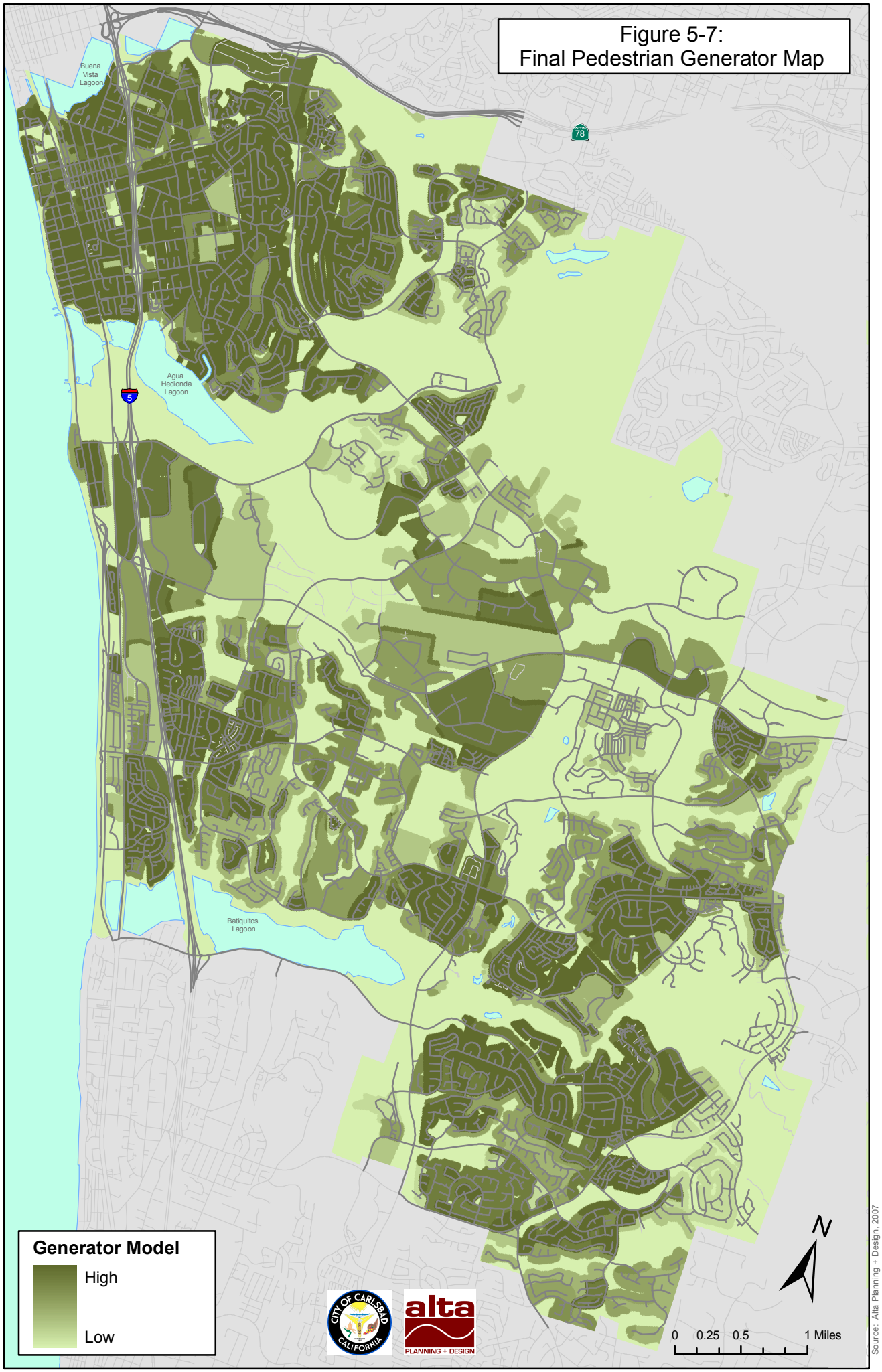


Figure 5-7:
Final Pedestrian Generator Map
Buena Vista Lagoon
Agua Hedionda Lagoon
Batiquitos Lagoon
5
78
Generator Model
High
Low
CITY OF CARLSBAD CALIFORNIA
alta
PLANNING + DESIGN
N
0 0.25 0.5 1 Miles
Source: Alta Planning + Design, 2007

Table 5.1
Pedestrian Generator Weights and Multipliers
Used to Create the Final Pedestrian Generator Map

Pedestrian Generator	Weights	Multipliers	Final Score
Pedestrian Commuters (percent pedestrian commuters by census block)			
> 2	3	2	6
1 - 2	2		4
0.25 - 1	1		2
< 0.25	0		0
Population Density (persons per residential acre by census block)			
> 25	3	2	6
5 – 25	2		4
1 – 5	1		2
Employment Density (employees per nonresidential acre by traffic analysis zone)			
> 15	3	2	6
5 – 15	2		4
1 – 5	1		2
Elderly (population older than 65 years per residential acre by census block)			
> 10	3	1	3
5 – 10	2		2
1 – 5	1		1
<1	0		0
Youth (population younger than 16 years per acre by census block)			
> 10	3	2	6
5 – 10	2		3
1 – 5	1		2
<1	0		0
Disabled (disabled population per residential acre by census block)			
> 5	3	1	3
2 – 5	2		2
1 – 2	1		1
<1	0		0
Land Use Adjacencies (mixed land uses)			
Presence of housing near commercial	2	2	4
Presence of housing near employment	1		2

Sources: Alta Planning + Design; City of Carlsbad Shapefiles, 2000 U.S. Census Bureau, *City of San Diego Pedestrian Master Plan*

Interpreting the weight and multiplier values assigned to one of the generators is useful for understanding this process. In the case of population density, three classes of density were defined (>25 persons per acre, 5 - 25 persons per acre, and <5 persons per acre). Point values were then assigned to the different classes, with higher population densities receiving higher point values. A multiplier value of 1 or 2 was applied to all of the generators. Those generators receiving a multiplier of 2 should have a greater effect on pedestrian activity than those generators receiving a multiplier of 1. The population density generator was assigned a multiplier of 2, meaning that it is more highly correlated with walking than some of the other pedestrian generators. The weight and

multiplier values were similarly applied by the City of San Diego in their *2006 Draft Pedestrian Master Plan*.

As shown in Figure 5-7, the final pedestrian generator map identifies several high-generator areas within Carlsbad, especially within the northwest quadrant of the City, and several smaller high generation areas within the southwest and southeast quadrants.

5.2 Pedestrian Attractors

This section summarizes the distribution of various land use types across the City of Carlsbad that are typically associated with high levels of walking, especially land use types that attract a pedestrian trip. Such land uses include schools, transit stops, parks, beaches, retail, and civic facilities (libraries, post offices, and government buildings).

5.2.1 Schools, Parks, and Other Pedestrian Generating Land Uses

Figure 5-8 displays schools, parks, and other pedestrian attracting land uses. As shown, these land uses are fairly evenly distributed across the City of Carlsbad.

5.2.2 Transit Stops and Ridership

An important focus for pedestrian travel is the public transit system, since a large percentage of transit riders typically do not own cars, and must access the transit system on foot. Carlsbad is served by the North County Transit District (NCTD) which operates a total of 15 bus routes within the City boundary. **Figure 5-9** displays 2005 transit stops within the City of Carlsbad. There are a total of 219 transit stops in the City of Carlsbad, with ridership ranging from 1 to 3,273 daily boardings and alightings. Of the 219 transit stops, only thirteen stops average more than 50 boardings and alightings per day. The NCTD operates the Coaster Commuter Rail which provides service between the City of Oceanside and downtown San Diego. Carlsbad has two Coaster stations, one at Poinsettia Lane and the other at Carlsbad Village Drive. The two Coaster stations and the Plaza Camino Real Transit Center have the highest demand of all transit facilities within the City, averaging over 1,000 boardings and alightings per day.

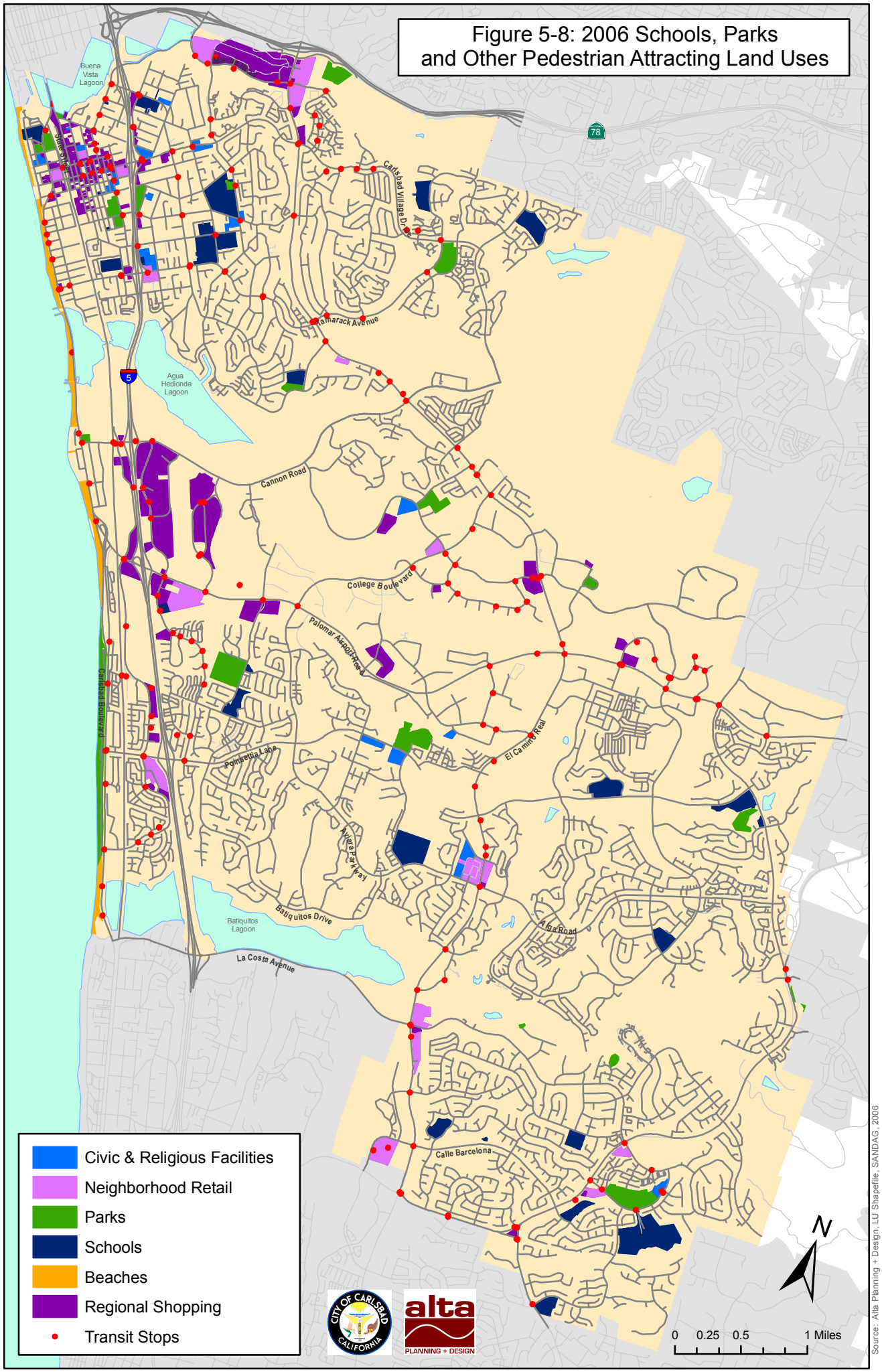


Figure 5-8: 2006 Schools, Parks and Other Pedestrian Attracting Land Uses
Buena Vista Lagoon
Agua Hedionda Lagoon
Batiquitos Lagoon
Carlsbad Village Drive
Tamarack Avenue
Cannon Road
College Boulevard
Palomar Airport Road
El Camino Real
Poinsettia Lane
Aviara Parkway
Batiquitos Drive
La Costa Avenue
Alga Road
Calle Barcelona
Carlsbad Boulevard
State Street
5
78
Civic & Religious Facilities
Neighborhood Retail
Parks
Schools
Beaches
Regional Shopping
Transit Stops
N
0 0.25 0.5 1 Miles
CITY OF CARLSBAD CALIFORNIA
alta PLANNING + DESIGN
Source: Alta Planning + Design, LU Shapefile, SANDAG, 2006


Figure 5-9:
2005 Transit Facilities and Ridership
Plaza Camino Real Transit Center
Marron Road
Buena Vista Lagoon
State Street
Carlsbad Village Coaster Station
Carlsbad Village Drive
78
Tamarack Avenue
5
Agua Hedionda Lagoon
Cannon Road
College Boulevard
Palomar Airport Road
Poinsettia Coaster Station
Carlsbad Boulevard
Poinsettia Lane
El Camino Real
Aviara Parkway
Batiquitos Drive
Batiquitos Lagoon
La Costa Avenue
Alga Road
Calle Barcelona
Transit Stops (Daily On/Offs)
Less than 50
51 - 100
101 - 1000
More than 1,000
Commuter Rail
Bus Route
CITY OF CARLSBAD CALIFORNIA
alta PLANNING + DESIGN
N
0 0.25 0.5 1 Miles
Source: Alta Planning + Design, trcov_05, stops_05, SANDAG, 2005

5.2.3 Final Pedestrian Attractor Map

Figure 5-10 displays the final pedestrian attractor map, as described in the previous sections, for the City of Carlsbad. This map was developed using a GIS tool called Spatial Analyst which combines all of the individual attractors into a single, composite file, with higher values assigned to locations closer to the pedestrian attracting land use and lower values assigned to locations further away from the pedestrian attracting land uses. Whereas the assessment of pedestrian generators was based mainly upon concentration of various population characteristics, pedestrian attractions are assessed in terms of distances to/from the attractor.

Varying weights were assigned to all locations within the City of Carlsbad based upon their proximity to pedestrian attracting land uses. Concentric rings or buffers were created emanating out from the pedestrian attracting land uses. The buffer distances assessed include: within one-eighth mile of an attraction, between one-eighth and one-quarter mile of an attraction, between one-quarter and one-third mile of an attraction, and between one-third and one-half mile of an attraction. Weight values are highest within one-eighth mile of an attracting pedestrian land use, and lowest in locations between one-third and one-half mile of a pedestrian attracting land use.

Table 5.2 displays the distance-based weight values assigned to the respective buffers around the pedestrian attracting land uses.

Table 5.2
City of Carlsbad
Distance-Based Pedestrian Attractor Multipliers

Buffer Distance	Distance-Based Multiplier
Within 1/8 Mile	1.5
1/8 to ¼ Mile	1
¼ to 1/3 Mile	0.75
1/3 to ½ Miles	0.5
Beyond ½ Mile	0.05

Source: Alta Planning + Design, *City of San Diego Pedestrian Master Plan*

Figure 5-10:
Final Pedestrian Attractor Map

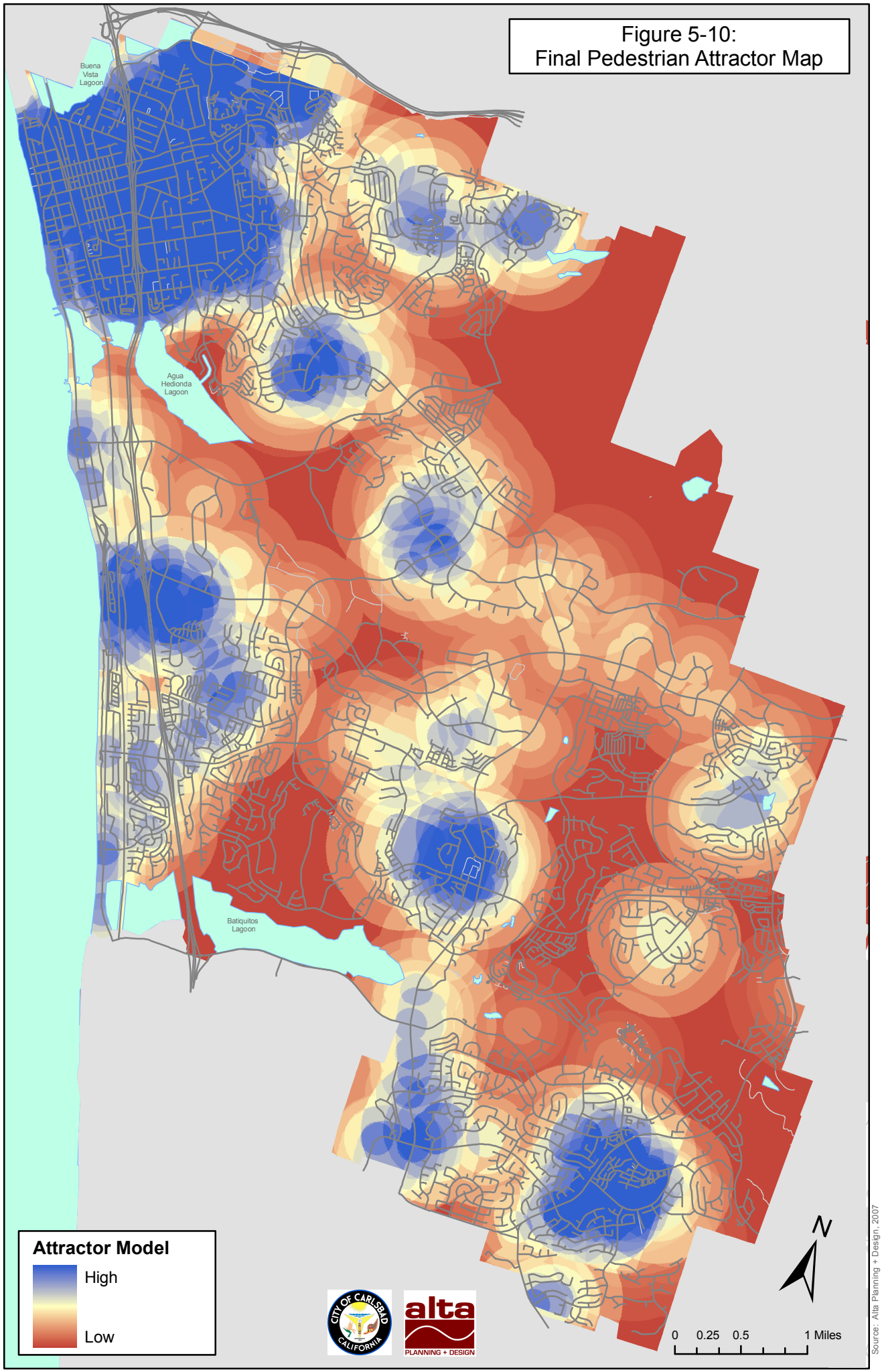


Table 5.3 displays the weights applied to the various pedestrian attracting land uses, along with the associated distance-based multipliers.

Table 5.3
City of Carlsbad
Pedestrian Attractor Weights & Distance-Based Multipliers

Pedestrian Attracting Land Uses	Weights	Distanced-Based Multiplier			
		Within 1/8 mile	Between 1/8 and ¼ mile	Between ¼ and 1/3 mile	Between 1/3 and ½ mile
Major Transit Centers	4	6	4	3	2
Transit Stops	3	4.5	3	2.25	1.5
Elementary Schools	3	4.5	3	2.25	1.5
Middle Schools	2	3	2	1.5	1
Neighborhood Civic Facilities	2	3	2	1.5	1
Retail Facilities	2	3	2	1.5	1
Beaches	2	3	2	1.5	1
Parks & Recreation	1	1.5	1	0.75	0.5
High Schools	1	1.5	1	0.75	0.5

Source: Alta Planning + Design, *City of San Diego Pedestrian Master Plan*

As shown in Figure 5-10, the final pedestrian attractor map identifies several high-attraction areas within Carlsbad, especially in the northwest portion of the City, north of the Agua Hedionda Lagoon. There are also several smaller concentrations of high pedestrian attraction areas between Palomar Airport Road and Poinsettia Lane, along the Interstate 5 corridor, along El Camino Real, and along Rancho Santa Fe Road, between La Costa Avenue and Calle Barcelona.

5.3 Pedestrian Barriers

This section summarizes the distribution of various factors across the City of Carlsbad which tend to discourage people from walking. Indicators of pedestrian barriers include pedestrian/vehicle collisions, high traffic volumes, absence of street lights, high posted speed limits, steep slopes, and un-traversable infrastructure, specifically freeway and rail corridors.

These types of barriers generally undermine broadly accepted walkability goals of safety, connectivity, and walkability. For example, presence of infrastructure and natural barriers inhibit pedestrian network connectivity. High accident rates, high speeds and traffic volumes, and low street lighting coverage are generally indicators of low levels of pedestrian safety. The following sections describe the pedestrian detractors individually and then the methodology for creating a composite detractor map for the City of Carlsbad.

5.3.1 Freeways, Rail and Slopes

Figure 5-11 displays topographical slopes and infrastructure-related barriers, specifically freeway and railroad corridors. Slopes over 25% were considered high pedestrian detractors. As shown, Carlsbad is traversed by several areas with slopes greater than 25%. Two transportation corridors, Interstate 5 and the rail corridor, also run the entire length of the City from north to south, and are significant barriers to east/west pedestrian travel.

5.3.2 Vehicular Travel Characteristics

Figure 5-12 displays existing traffic volumes and posted speed limits. Roadways with high traffic volumes, over 45,000 Average Daily Trips (ADT), were considered high pedestrian detractors, as were roadways with posted speed limits over 45 mph.

5.3.3 Pedestrian Accidents

This section summarizes recent pedestrian-related accidents within the City of Carlsbad. A total of 123 pedestrian-involved crashes in Carlsbad were reported to police between the years 2001 and 2006. **Figure 5-13** displays the distribution of pedestrian accidents across the City. Key findings from this assessment include the following:

- The intersection of Carlsbad Village Drive and Harding Street had 6 pedestrian-involved crashes – the most of any intersection within the City.
- A total of 8 intersections experienced 3 or more pedestrian-related accidents between 2001 and 2006, three of which are along Carlsbad Village Drive at Harding Street, Roosevelt Street, and Jefferson Street. The five other intersections are as follows: El Camino Real/Marron Road, I-5 NB and SB Ramps at Tamarack Avenue, Paseo del Norte/Palomar Airport Road, Monroe Street/Chestnut Avenue, and Pine Avenue/Carlsbad Boulevard.
- A total of 34 accidents (almost 28% of all accidents) occurred in the Village, west of Interstate 5 and within two blocks of Carlsbad Village Drive. An additional 15 took place in the Village to the south of Carlsbad Village Drive and north of Tamarack Avenue.

A total of 17 pedestrian accidents (or almost 14% of all accidents) occurred within a $1/16^{th}$ mile of a Carlsbad freeway on/off ramp. An analysis of the time of day pedestrian-involved crashes was also conducted and resulted in several key findings. Almost half (49%) of the reported accidents took place between the hours of 1PM and 7PM. The highest one-hour rate of accidents occurred between 2PM and 3PM. Twelve percent of the accidents were reported during the morning peak

List of Figures