

Appendix C

Pedestrian Demand Analysis

San Mateo County Comprehensive Bicycle and
Pedestrian Plan

Final

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C Pedestrian Demand Analysis

This appendix describes the walking demand forecasting process for the San Mateo County Comprehensive Bicycle and Pedestrian Plan. The purpose of this task is to model the demand for walking at the countywide level in order to better evaluate the location and type of future pedestrian improvements of countywide significance.

C.1 Pedestrian Demand Estimation Methodology

The goal of this analysis is to produce generalized estimates of pedestrian activity along all streets in San Mateo County. The methodology is based on research Fehr & Peers has conducted for the US Environmental Protection Agency (EPA) on the relationship between the built environment and travel patterns. Through this and subsequent studies, several factors have been shown to have significant effects on the number of people walking in a given area¹.

The analysis uses a combination of existing GIS data and newly collected information to develop variables highly correlated with walking activity. The weighting of each individual variable is based on the results of the EPA research described above.

Variables are organized into four categories:

- Built Environment
- Proximity to Walking Destinations
- Demographics
- Street Network and Pedestrian Permeability

In total, seventeen (17) indicators were selected to estimate pedestrian demand within the County, including specific variables identifying the density and diversity of land uses, proximity to walking destinations, transit accessibility and pedestrian supportiveness of the street network.

The methodology for developing the PedINDEX walking model is comprised of the following steps:

- Step 1: Compile GIS data that will be used to create pedestrian demand model
- Step 2: Perform GIS analysis and processing
- Step 3: Summarize walking results scores for all street segments in the County

Step 1: Compile GIS Data

Several variables were compiled and analyzed in order to forecast future pedestrian demand. The seventeen indicators, identified in Table C-1, illustrate the diversity of variables that have an effect on pedestrian activity.

¹ The literature on travel behavior substantiates that several “D-factors” independently affect travel behavior, including: land use Density, Diversity (land use mix); pedestrian Design, and access to regional Destinations. Because these “Ds” work at a very local level, most travel demand models are too aggregate in scale to capture the effects of the Ds. Additional “D” factors such as Distance to Transit and population Demographics are also included based on their demonstrated relationship to walking/biking.

Table C-1: List of Variables Used in GIS Model

Factor	Type	Date	Source	Variable Used
Built Environment (Density and Diversity of land uses)				
1. Population Density	Polygon: Census Tract	2000	Census 2000	Score based on average density within a 2 mile buffer
2. Employment Density	Polygon: TAZ	2007	MTC	Score based on average density within a 2 mile buffer
3. Land Use Mix	Polygon: Census Tracts, Blocks	2007	Census 2000, MTC, County of San Mateo	Index score based on population/ employment mix and parcel density
Proximity Factors (Destinations)				
4. Schools	Point File	-	County of San Mateo	Value based on distance to nearest school (all school levels within county)
5. Parks/ Beaches	Point File	-	County of San Mateo	Value based on distance to nearest park
6. Transit Proximity – Bus lines	Polyline	-	MTC	Value based on distance to nearest bus line
7. Transit Proximity – Rail stops	Point File	2010	MTC	Value based on distance to nearest rail (Caltrain or BART) stop
8. Neighborhood Shopping Districts	Point File	2010	Fehr & Peers	Buffer of 400 ft around designated districts
9. Social and Recreational Destinations	Point File	-	Peninsula Library System/ County of San Mateo	Value based on distance to nearest senior center or major county recreational destination
10. Employment Centers	Point File	2010	Fehr & Peers	Value based on distance to nearest employment center
Demographics				
11. Age	Polygon: Census Tract	2000	Census 2000	Percent of population below 18 and above 65
12. Income	Polygon: Census Tract	2000	Census 2000	Percent of population below poverty level
13. Vehicle Ownership	Polygon: Census Tract	2000	Census 2000	Percent of population with 1 or fewer vehicles
14. Priority Development Areas	Polygon	2008	MTC	Value based on location within or outside of PDA
Street Permeability / Accessibility (Design)				
15. Street Segment Length	Polyline	2006	San Mateo County Street Centerline	Score based on length of street segment
16. Intersection Density	Polyline	2006	San Mateo County Street Centerline	Score based on number of intersections per square mile
17. Street Connectivity	Polyline	2006	San Mateo County Street Centerline	Score based on street connected at both ends or a cul de sac
<i>Source: Fehr & Peers, 2010</i>				

Step 2: GIS Data Processing

Each of the 17 variables was processed in GIS, utilizing several tools and extensions. Each variable was weighted and assigned to the street centerline file.

Step 3: Develop Final Database and Join Attributes to Street Centerline File

The processed GIS data was then assigned to the countywide street centerline file in order to derive the pedestrian model. Each street segment has a walking potential rating, or pedestrian demand score, ranging from 0-100; this number is applied to the street segment based on the corresponding GIS factors used in the PedINDEX model. This final process utilizes all the input variables to calculate the street segments within San Mateo County (approximately 24,260 street segments).

Figure C-1 through Figure C-4 illustrate pedestrian demand in San Mateo County. These streets hold the highest ranking when all 17 variables are calculated and given their respective weighting. In general, the areas

with the highest pedestrian demand are concentrated along the El Camino Real Corridor. This includes El Camino Real itself and many streets on either side of it, which combined rank as some of the streets with the highest walking demand in the County.

Based on the PedINDEX model results, the highest street segment walking demand are located in the downtown areas of Daly City, South San Francisco, San Bruno, San Mateo and Redwood City. Other downtown districts, including Burlingame, Belmont, San Carlos, Menlo Park and East Palo Alto, also have many streets with a high walking demand. Several areas in the western part of the County, including Half Moon Bay and Pacifica, also have neighborhoods with moderate to high pedestrian demand.



Figure C-3: San Mateo County Pedestrian INDEX Walking Demand Score –Coastal

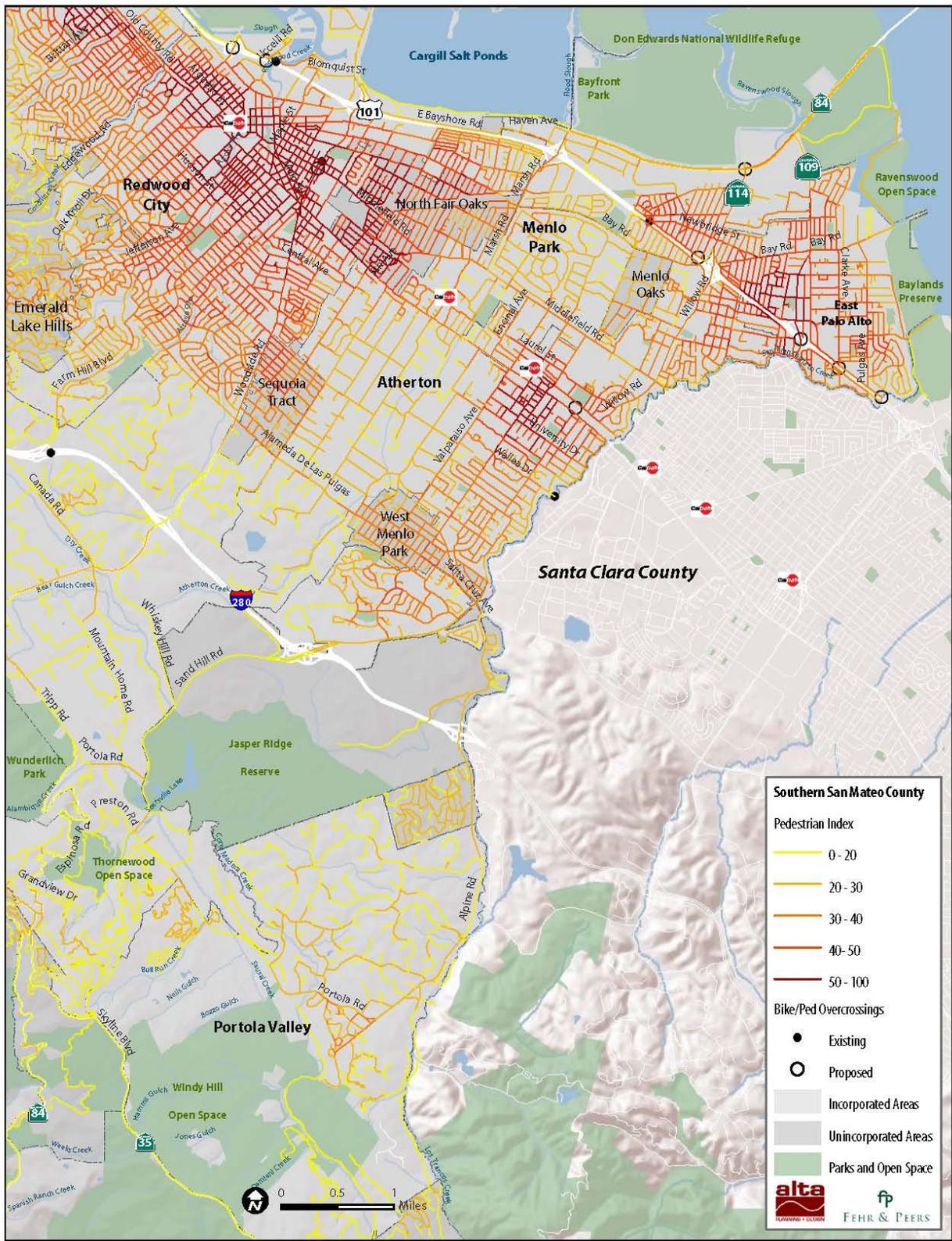


Figure C-4: San Mateo County Pedestrian INDEX Walking Demand Score -South

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