that encourages lively pedestrian circulation among parcels, uses, transit stops and public spaces.

STRATEGY 1.8: Install signage to support pedestrian safety and inform pedestrians of nearby destinations.

STRATEGY 1.9: Encourage and require, where feasible, the incorporation of publicly accessible urban open spaces, including parks, courtyards, water features, gardens, passageways, and plazas, as part of public improvements and projects.

STRATEGY 1.10: Promote development that creates and enhances positive spatial attributes of major streets, open spaces, cityscape and mountain sight lines, and important "gateways" into the City.

STRATEGY 1.11: Provide pedestrian-friendly transit-oriented development near light rail stations and along major transportation corridors, thereby creating nodes that encourage pedestrian activity and transit use.

STRATEGY 1.12: Encourage pedestrian amenities through measures such as requiring a human scale for new development, regular visual (ground-floor windows) and physical access for pedestrians, requirements that ground-floor residential and commercial entries face and engage the street, and encouraging pedestrian amenities.

STRATEGY 1.13: Encourage development of businesses that serve residents within walking distances of homes.

POLICY 2: A street should be safe.

STRATEGY 2.1: Sidewalks should provide safe environments that support and encourage pedestrian activity.

STRATEGY 2.2: Streetscape elements should be installed so that they are not obstacles to pedestrians. Sidewalk treatment should take into account the needs of persons with disabilities.

STRATEGY 2.3: Provide and maintain barrier-free mobility that meets ADA requirements for all pedestrians.

STRATEGY 2.4: Reduce conflicts between pedestrians and automobiles by minimizing the number of drive approaches along a block; when possible, consolidate and place drive approaches near the mid-block. Discourage fences and tall shrubs near the intersections of driveway and sidewalk so that drivers can easily see pedestrian.

STRATEGY 2.5: A street and its intersections should accommodate the safety needs of various users including children, seniors, and persons with disabilities.

STRATEGY 2.6: Provide and locate signage to improve pedestrian safety.

STRATEGY 2.7: Provide adequate glare-free lighting to ensure safety for pedestrians, particularly at transit stops.

STRATEGY 2.8: Discourage excessive traffic on residential streets by incorporating traffic calming treatments; wherever feasible, direct through traffic away from residential neighborhoods and onto major and secondary arterials.

STRATEGY 2.9: Manage traffic volumes and speeds on local and collector streets so that they are compatible with the character of the adjacent land uses, the function of the street, and pedestrian and bicycle traffic.

STRATEGY 2.10: Minimize the use of street widening which narrows sidewalks in order to promote walking and use of bicycles.

STRATEGY 2.11: Design signal plans to accommodate the needs of pedestrians with particular attention given to the **WALK** interval at active pedestrian places and sensitive land uses.

STRATEGY 2.12: Promote pedestrian safety and pedestrian-friendly design in the development of transportation projects and services and evaluate such programs regularly to determine their effectiveness.

STRATEGY 2.13: Enforce traffic and parking regulations to ensure pedestrian safety.

POLICY 3: A street should include amenities for pedestrians.

STRATEGY 3.1: Install pedestrian-serving street furniture where appropriate.

STRATEGY 3.2: Emphasize the planting of street trees to define the street and sidewalk, and provide overhead cover. Species choices should consider access to both shade and sun along sidewalks.

STRATEGY 3.3: Allow sufficient room where feasible for street canopies to grow without conflict with other building elements. Maintain tree canopies so that branches do not obstruct pedestrian travel.

STRATEGY 3.4: Use tree grates in areas with considerable commercial and pedestrian activity to increase sidewalk width and reduce safety hazards. Tree wells without grates should have the ground surface surrounding the trees at the level of adjacent sidewalk.

STRATEGY 3.5: Develop and implement a program for management and replacement of street trees so that on each street there is a mixture of trees of various ages.

STRATEGY 3.6: Detail street and streetscape amenities to high standards that demonstrate evidence of quality that is appealing to pedestrians. Provide visual interest and human scale through the use of varied forms, materials, details, colors, and planes.

STRATEGY 3.7: Design public sidewalks and connecting paths to meet at grade; sidewalks extending across private property should also continue at grade, wherever feasible.

STRATEGY 3.8: Eliminate gaps in sidewalks to support an accessible pedestrian environment.

STRATEGY 3.9: Require, where appropriate, overhead cover along the sidewalk for pedestrian comfort, especially where there are few mature trees, or along a southern exposure; encourage canopies and awnings.

STRATEGY 3.10: Design lighting to provide ambience, safety, and security without unnecessary spillover or glare onto adjacent properties.

STRATEGY 3.11: Pedestrian light poles along pathways and alleys should be of appropriate scale.

STRATEGY 3.12: Provide enhanced bus stops with seats and shelter to increase safety and comfort; consider additional features such as bicycle facilities, waste receptacles, and directional maps.

POLICY 4: A street is a public space.

STRATEGY 4.1: Locate and orient buildings to positively define public streets and civic spaces such as plazas.

STRATEGY 4.2: Use public landscape and streetscape improvements to reinforce the public character and quality of major streets.

STRATEGY 4.3: Maintain a hierarchical distinction in the design of streets; nonetheless all streets should accommodate a diversity of users, multiple purpose and modes of transportation including walking.

STRATEGY 4.4: Reinforce the spatial definition of streets and important public spaces.

STRATEGY 4.5: Provide sufficient building height and mass.

STRATEGY 4.6: Maintain a minimum clear pedestrian passage along public sidewalks (as determined by the Director of Public Works) without conflicts from utility equipment, trunks and branches of street trees, street amenities, or other potential interferences.

POLICY 5: A community should have a strong identity, including the presence of recognizable districts, landmarks, and places of interest.

STRATEGY 5.1: Create human-scale environments that are safe, attractive, and encourage walking.

STRATEGY 5.2: Provide wayfinding signs to identify pedestrian routes and popular pedestrian destinations to inform pedestrians of major places of interest.

STRATEGY 5.3: Preserve pedestrian amenities and features such as streetlights and historic sidewalk treatments, granite and river rock curbs, appropriate tree preservation and replacements, and respect for the spatial design of pathways.

STRATEGY 5.4: Encourage and accommodate pedestrian, transit, and bicycle access to major destinations.

STRATEGY 5.5: Amenities in a district, i.e., lighting, benches, trash and receptacles, should reinforce district design theme.

POLICY 6: There should be an easy transition between exterior and interior space.

STRATEGY 6.1: Promote active, pedestrian-oriented uses that are readily discernable to the passer-by and design of sites that makes walking convenient and enjoyable.

STRATEGY 6.2: Establish clear pedestrian connections on-site that are well-marked

STRATEGY 6.3: Parcels that include parking and buildings should be designed to achieve a cohesive and safe interaction between automobile and pedestrian circulation within the site and between adjacent properties and activities and to immediately adjacent to transit stops.

POLICY 7: A building should contribute to a more pleasant and humane living environment and add interest and variety to its surroundings.

STRATEGY 7.1: Provide articulated and engaging storefronts rather than blank walls that face onto pedestrian spaces, sidewalks and corridors.

STRATEGY 7.2: Architectural detail should be used to enhance the building and the adjacent pedestrian spaces by adding color, shadows, and appropriate variation in form.

STRATEGY 7.3: Encourage a balance in the configuration of shops in the downtown between pedestrian and auto comfort, visibility, and accessibility.

STRATEGY 7.4: Orient shops to the street and transit stops and orient smaller shops primarily to pedestrian "main" streets and urban open spaces.

STRATEGY 7.5: Identify pedestrian priority areas and develop project review guidelines to develop, protect, and foster the pedestrian-oriented character of these places. Consider traffic impacts on these places and apply traffic mitigation measures which do not restrict pedestrian circulation.

POLICY 8: Public transportation facilities should be designed to promote pedestrian safety and access.

STRATEGY 8.1: Pedestrian safety provisions along the Gold Line corridor are especially important and should be monitored routinely to determine whether modifications are needed.

STRATEGY 8.2: The Pedestrian Network should include routes that radiate out from each Gold Line Station to adjoining neighborhoods and commercial districts.

STRATEGY 8.3: Users of the public parking facilities should be encouraged to park once and walk or use transit to other local destinations.

STRATEGY 8.4: Signage at public transportation facilities, including major transit stations and public parking facilities, should provide directional information for destination in the immediate areas and indicate walking distance to those locations.

STRATEGY 8.5: Pedestrian safety provisions and amenities should be provided at bus stops throughout the City to promote the use of transit.

POLICY 9: Public education initiatives should promote public safety messages and the benefits of walking in creating a healthy community.

STRATEGY 9.1: Raise public safety awareness of all groups responsible for planning and maintaining the pedestrian environment.

STRATEGY 9.2: Inform and involve neighborhood residents in the development of transportation services including public safety initiatives such as the Safe Routes to Schools program.

STRATEGY 9.3: Review safety provisions along the perimeter of schools for drop off and pick up.

STRATEGY 9.4: Use signage at public facilities and on local public transit vehicles to promote public safety educational messages directed to both drivers and pedestrians.

STRATEGY 9.5: Encourage Pasadena residents to walk for short trips for health reasons.

STRATEGY 9.6: Raise the awareness of residents, workers and visitors about the benefits of walking and the resources of Pasadena's pedestrian environment.

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[1] http://www.ci.pasadena.ca.us/planning/deptorg/commplng/GenPlan/centdis.asp

[2] http://www.ci.pasadena.ca.us/planning/ECSP/ECSP.asp

[3] http://www.ci.pasadena.ca.us/planning/deptorg/commplng/GenPlan/epsp.asp

[4] http://www.ci.pasadena.ca.us/planning/deptorg/commplng/GenPlan/foog.asp

[5] http://www.ci.pasadena.ca.us/planning/deptorg/commplng/GenPlan/sfobiotech.asp

[6] http://www.ci.pasadena.ca.us/planning/deptorg/commplng/GenPlan/westgateway.asp

[7] http://www.ci.pasadena.ca.us/planning/deptorg/commplng/GenPlan/nlake.asp

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4. PEDESTRIAN NEEDS AND INFRASTRUCTURE IMPROVEMENTS

This section provides information about pedestrian travel, the needs of pedestrians, and major places of pedestrian activity throughout Pasadena. Also included are summaries of sidewalks and curb ramps reviews conducted by the City, and information regarding upcoming signal timing provisions and bus stop enhancements. These reviews along with provisions of adopted plans are the basis for pedestrian improvements implemented through the Capital Improvement Program and summarized in Volume 1 Section 5 of the Pedestrian Plan.

Major components of the City's transportation infrastructure were mapped in a Geographic Information System (GIS) format for the Pedestrian Plan for use in refining pedestrian improvements and to facilitate updates of plans, policy documents, and project review activities. Application of this analytical capability is discussed in this section.

4.1 PEDESTRIAN CHARACTERISTICS AND NEEDS

While the overall proportion of pedestrian trips compared to all modes of travel is relatively small, in urban areas pedestrian trips account for as much as 39 percent of all trips less than one mile, and 73 percent of all pedestrian trips are less than one-half mile.[1] Therefore, in addition to addressing the quality of the pedestrian space throughout all contiguous major travel corridors, the needs of residential areas must also be considered.

The pedestrian journey often starts at home and may also occur throughout the day while a person is at another destination. In each case, the choice to walk is determined by the person's immediate surroundings. Walking needs to be safe and easy and preferably the trip should be comfortable and enjoyable. Some important needs of pedestrians include:[2]

- ❑ Safe streets and walking areas
- ❑ Convenience
- ❑ Nearby places to walk
- ❑ Visibility: day and night
- ❑ Comfort and shelter

- ❑ Tree cover and landscaping
- ❑ Attractive and clean environment
- ❑ Access to transit
- ❑ Interesting things to look at while walking
- ❑ Social interaction

Table 4-1: Common Pedestrian Characteristics[3]

Age Group	Characteristics
0-4	• Learning to walk, less predictable • Requiring constant supervision • Too small to be seen by fast moving or inattentive drivers • Developing peripheral vision (have one-third narrower peripheral vision), depth perception • Have trouble judging speeds and distances of moving cars; not aware of dangerous conditions
5-12	• Increasing independence, but still requiring supervision • Poor depth perception • Susceptible to dart out and/or dash into intersection
13-18	• Sense of invulnerability • Intersection dash
19-40	Active, fully aware of traffic environment
41-65	Slowing of reflexes
65+	• Street crossing difficulty • Poor vision • Difficulty hearing vehicles approaching from behind • High fatality rate

There is no typical pedestrian trip and like most travelers, pedestrians often combine one trip purpose with another, such as walking to work and stopping to shop on the way home. Some linked trips, such as waiting for transit, have particular needs including shelter and night lighting. The following list provides examples of pedestrian trips:

- ❑ To and from work or school
- ❑ Multimodal trips (walking to a bus stop or from a bike or auto parking place)
- ❑ Errands and shopping
- ❑ Appointments
- ❑ Health, exercise, and recreation
- ❑ Extracurricular activities
- ❑ Combined trips

We also know that certain pedestrians have particular needs that must be taken into account in designing and operating an effective system. Following are common pedestrian characteristics as well as aids that assist older and disabled pedestrians.[4]

Table 4-2: Aids to Older and Disabled Pedestrians[5]

Group	Suitable Strategies/Aids
Older Pedestrians	• Reduced roadway crossing distances • Signal timing at lower than average walking speed • Easy to read signs, good viewing distance for signals • Traffic measures particularly at sensitive uses such as community centers • Transit shelters • Low floor buses • Smooth unobstructed surfaces
Pedestrians with Disabilities	• Curb cuts and ramps • Tactile warnings • Easy to reach traffic signal activation buttons • Audible warnings and message systems • Braille letters on traffic signals • Signal timing at lower than average walking speed • Reduced roadway crossing distances • Traffic control devices • Handrails • Smooth and unobstructed surfaces • Low floor buses

4.2 PEDESTRIAN INFRASTRUCTURE IMPROVEMENTS

Pedestrian facilities are the sidewalks and paths traveled and the aids and assists that make them safe and accessible. These facilities include: sidewalks, walkways and trails, curb ramps, crosswalks, traffic control devices, signals timed to specified walking speeds; furnishings that create a pedestrian-friendly atmosphere (such as benches and landscaping), and other technology, design features, and strategies designed to encourage pedestrian travel and alert motorists to safe driving.

An effective pedestrian program includes consideration of all these measures to assure good performance, safe operations, connectivity, and continuity.

4.2.1 Sidewalks

Sidewalks are a fundamental component of the pedestrian system. Basic elements of a sidewalk include: width, surface, and separation from adjacent motorized vehicular traffic. Pasadena is fortunate that its early design was based on streets built for walking, bicycling, horse-pulled carts, and trolleys. Today such conditions are referred to as traditional neighborhoods served by a multimodal and balanced transportation system - places where the importance of walkability is growing.

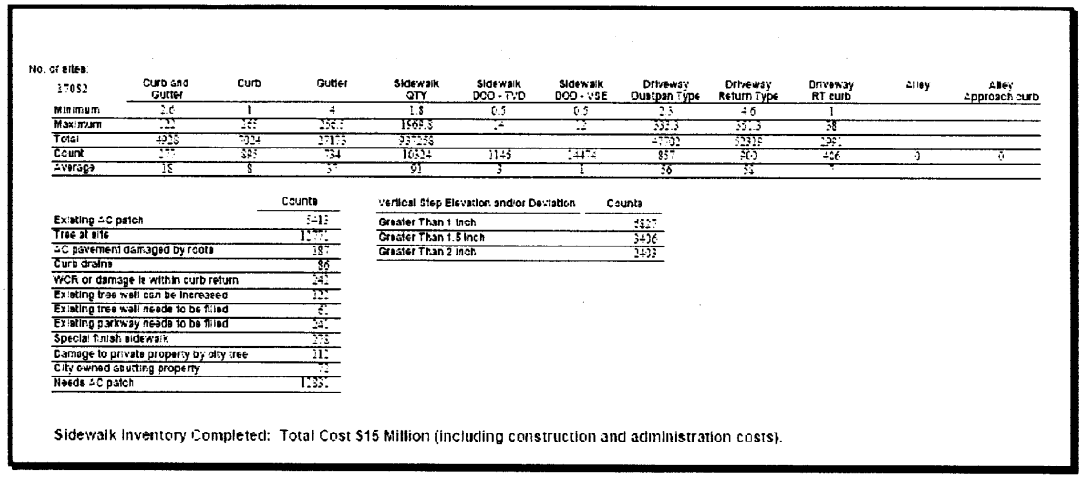
Most of the City's sidewalk surfaces in commercial areas are concrete, a smooth and durable material. In many commercial areas concrete pavers are used; some sidewalks have borders made from pavers.

Sidewalks are important in the pedestrian realm because they provide a separation from vehicular traffic. Pasadena makes a special effort, especially on busy streets, to provide a separation space - usually one that is landscaped with trees for shade and visual aesthetics. Sidewalk improvements are incorporated into a wide range of implementation projects outlined in this report. Improvements addressed include pedestrian lighting, design and installation of street trees, tree grates, and trash receptacles. Other elements include benches, signage, bicycle racks, and public art. Requirements for a minimum of 10-foot to 15-foot sidewalk width in the Central District provide for ease of pedestrian movements. Figure 4-1 provides summary statistics on a sidewalk inventory that was

Sidewalk repair is the responsibility of abutting property owner even if the damage was caused by a City owned tree.

recently conducted by the Department of Public Works.

Figure 4-1: Sidewalk Concrete Inventory Statistics



No. of sites.
17052

	Curb and Gutter	Curb	Gutter	Sidewalk QTY	Sidewalk DOD - TVD	Sidewalk DOD - VSE	Driveway Dustpan Type	Driveway Return Type	Driveway RT curb	Alley	Alley Approach curb
Minimum	2.6	1	4	1.8	0.5	0.5	2.5	4.6	1		
Maximum	[illegible]	[illegible]	[illegible]	1569.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
Total	4925	7024	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]		
Count	[illegible]	[illegible]	[illegible]	10634	1145	[illegible]	[illegible]	[illegible]	[illegible]	0	0
Average	18	8	[illegible]	91	3	1	56	53	[illegible]		

	Counts
Existing AC patch	[illegible]
Tree at site	[illegible]
SC pavement damaged by roots	[illegible]
Curb drains	[illegible]
WCR or damage is within curb return	[illegible]
Existing tree well can be increased	[illegible]
Existing tree well needs to be filled	[illegible]
Existing parkway needs to be filled	[illegible]
Special finish sidewalk	[illegible]
Damage to private property by city tree	[illegible]
City owned abutting property	[illegible]
Needs AC patch	[illegible]

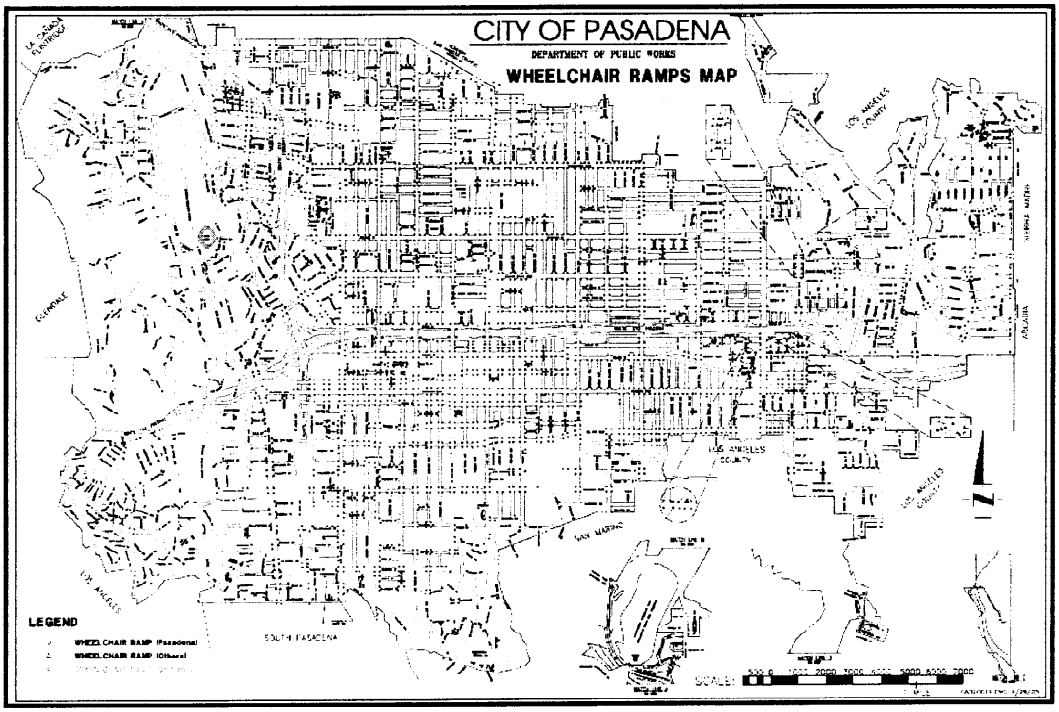
Vertical Step Elevation and/or Deviation	Counts
Greater Than 1 Inch	[illegible]
Greater Than 1.5 Inch	3406
Greater Than 2 Inch	2403

Sidewalk Inventory Completed: Total Cost $15 Million (including construction and administration costs).

4.2.2 Curb Ramps

The Department of Public Works conducts an ongoing review of curb ramps citywide to complete a program that complies with the Americans Disabilities Act requirements. This on-going review is incorporated into a fifteen-year project, initiated in 1994, to install wheelchair ramps along arterial and collector streets throughout the City. The arterial and collector street network was targeted because of higher pedestrian volume and proximity to commercial and business districts. The Accessibility and Disability Commission works annually with staff to identify specific corridors for wheelchair ramps installation. Also, the program installs ramps in residential districts in response to specific requests from citizens. Figure 4-2 illustrates ADA-compliant curb ramps that have been implemented through this review. Volume 1 Section 5 of the Pedestrian Plan outlines provisions for the next phases of this annual improvement program.

Figure 4-2: Citywide Wheelchair Ramps Map



4.3 INTERSECTIONS AND PEDESTRIAN SAFETY

Most people cross streets throughout their daily routine. And most take for granted that this activity will occur without incident. In general this is true, but sometimes accidents occur. In planning for pedestrians, particular attention is given to the condition of sidewalks and other transportation infrastructure at locations where streets intersect, where heavy volumes of vehicular traffic exist, and where there are transit stops, loading zones, and traffic controls.

The focus on intersection safety is for good reason. The National Highway Traffic Safety Administration reported that in 2002, 4,808 pedestrians were killed and 71,000 were injured; 22% of fatalities and 44% of injuries occurred at intersections; and 36% of pedestrian deaths among those aged 65 or older occurred at intersections. This is due in part to the common disregard of traffic control devices by both motorists and pedestrians. Nationally, about one-third of fatal crashes involving pedestrians are the result of pedestrians disobeying intersection traffic control or making misjudgments while attempting to cross a street.[6]

Research informs us that most collisions involving pedestrian are due to the following causes:

- Driver inattention
- Struck by vehicle while crossing at an intersection (50 percent of all collisions)
- Struck by vehicle while crossing mid-block (33 percent of all collisions)
- Struck from behind while walking along the roadway in the same direction as traffic
- Motorists exceeding safe speed (contributes to most pedestrian deaths)
- Darting out into the street at mid-block (most common type of pedestrian collision for children)
- Vehicles backing up (difficult to see children and others walking behind)
- Collisions in commercial areas (80% of all collisions)

A review of traffic accidents in Pasadena over the past five years shows that there have been 486 traffic accidents involving pedestrians and vehicles (Table 4-3). These accidents have resulted in injuries to 466 individuals and nine fatalities. The number of collisions has ranged from a low of 68 in 2002 to a high of 105 in 2004. As of September 30, 2005, there have been 60 collisions involving pedestrians in the City with one fatal accident and 55 persons injured.

Pasadena's Police Department Traffic Section has identified the top five primary causes for collision for each traffic accident involving pedestrian (Table 4-4). The leading cause for traffic accidents was pedestrian right-of-way violations. Of the 486 traffic accidents reported between 2000 and 2005, 37.8 percent or 184 collisions between pedestrians and vehicles were caused by pedestrian right-of-way violations.

The next major cause for collisions was pedestrian violations. Nearly 22.6 percent or 110 collisions resulted from pedestrian violations. This could be in the form of a pedestrian violation outside a crosswalk, pedestrian violation at a crosswalk, pedestrian violation of signals, jaywalking, and a pedestrian on roadway.

Unsafe starting or backing of vehicle resulted in 33 or 6.8 percent of all collisions. And 32 collisions were caused by unsafe speeds.

Table 4-3: Traffic Accidents Involving Pedestrians[7]

Year	No. of Collisions	Injuries	Killed
2000	95	99	3
2001	83	77	2
2002	68	66	1
2003	75	71	0
2004	105	98	2
2005*	60	55	1
TOTAL	486*	466	9

* Date Range Reported: 1/1/00 to 9/30/05

Table 4-4: Top Five Primary Causes for Collisions Involving Pedestrians

Primary Cause	'00	'01	'02	'03	'04	'05*	Total
Ped R/W Violation	32	33	25	28	43	23	184
Pedestrian Violation	27	18	12	19	22	12	110
Unsafe Vehicle Starting or Backing	6	7	4	7	5	4	33
Unsafe Vehicle Speed	6	8	4	5	8	1	32
Unknown	5	3	4	3	4	3	22

* Date Range Reported: 1/1/00 to 9/30/05

Figure 4-3 illustrates all pedestrian actions that occurred during this five year period.

Figure 4-3: Cumulative 5-Year Pedestrian Collisions

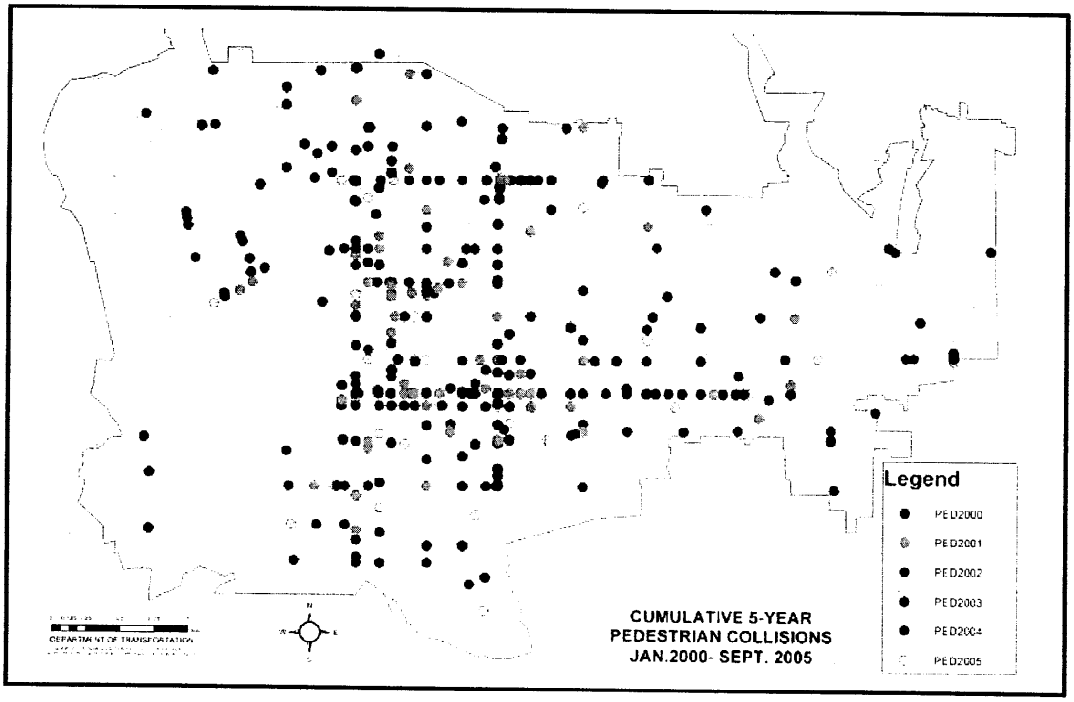


Table 4-5 summarizes the frequency and distribution of traffic accidents by location. It illustrates intersections with three or more accidents involving vehicles and pedestrians. As shown in Table 4-5, there were twenty intersections with three collisions involving pedestrian, six intersections with four collisions, four intersections with five collisions, and two intersections with six collisions. Mitigation of any traffic and pedestrian safety problems is a City priority.

The City assesses each accident to determine whether engineering improvements are needed to improve public safety. Additionally, the Pasadena Police Department posts the **Top Ten Most Dangerous Intersections**[8] on the City's web page showing accident location, the number of accidents and the primary collision factor. This site is updated regularly to provide timely safety information to the public and to promote safe driving behavior.

Table 4-5: Locations Where Four or More Pedestrian Accidents Occurred in Pasadena between Jan. 00 and Sept. 05

Locations Where 4 Ped Collisions Had Occurred	Locations Where 5 Ped Collisions Had Occurred	Locations Where 6 Ped Collisions Had Occurred
Colorado Boulevard & Allen Avenue	Lake Avenue & Colorado Boulevard	Fair Oaks Avenue & Painter Street
Colorado Boulevard & Garfield Avenue	Lake Avenue & Washington Boulevard	Fair Oaks Avenue & Washington Boulevard
Fair Oaks Avenue & Colorado Boulevard	Orange Grove Boulevard & Summit Avenue	
Green Street & Mentor Avenue	Washington Boulevard & Lake Avenue	
Lake Avenue & Del Mar Boulevard		
Orange Grove Boulevard & Lincoln Avenue		

Since many accidents involve collisions while making left turns, the City has instituted a **Photo Red Light Program**. The intersections chosen for application of this technology were the site of broadside or 90-degree collisions and frequent red light violations. A red light violation carries a $341 minimum fine plus a point against the driver's record. The following intersections are equipped with Photo Red Light cameras (see Table 4-4). This program is a good example of a joint enforcement and engineering effort to promote public safety.

Table 4-6: Photo Red Light Camera Locations (As of July 2005)

Intersection	Directions of Enforcement
Lake Avenue at Union Street	Northbound and Southbound
Marengo Avenue at Union Street	Northbound, Southbound, and Westbound
Foothill Boulevard at San Gabriel Boulevard	Northbound and Southbound

The first Photo Red Light Enforcement system in Pasadena was installed at the intersection of Lake Avenue and Union Street.

4.4 TRAFFIC SIGNAL SYSTEM

4.4.1 Placement of Traffic Signals

Traffic signals attract attention of all road users and provide direction. The selection and use of traffic signals are based on an engineering study of roadway, pedestrian, bicycle, and other conditions including analysis of existing traffic volumes, pedestrian usage, collision history, and site conditions. Modifications to existing signals may include pedestrian actuation, pedestrian clearance intervals, ADA pushbuttons, pedestrian heads, countdown pedestrian signals, scramble phasing, leading pedestrian phasing, etc.

The Department of Transportation is responsible for determining the needs for new signal locations. Established Traffic Signal Warrants that are consistent with the State and Federal guidelines provide the basis for this review.[9] Figure 4-4 illustrates signalized intersections in the City.