Chapter 3

Issues and Possible Solutions

This chapter discusses the issues currently affecting the pedestrian environment on a citywide basis. It also discusses some of the existing issues and potential solutions associated with the project objectives of improving safety, accessibility, connectivity, walkability, neighborhood quality and cost effectiveness.

3.1 SAFETY RELATED GOALS, ISSUES AND SOLUTIONS

Create a safe pedestrian network free of barriers and tripping hazards, that has sufficient street crossings, buffer pedestrians from vehicles and has facilities wide enough to accommodate peak pedestrian use.

Certain concerns over safety can affect behavior and decrease walking. Being a pedestrian comes with some safety risks, including a chance of being hit by a vehicle, being a victim of a crime and incurring injuries from a fall. This section describes existing conditions for each of these aspects of pedestrian safety.

3.1.1 Pedestrian Collisions and Injuries in San Diego

The following pedestrian collision and injury data were derived from the Statewide Integrated Traffic Records System (SWITRS). The analysis of the SWITRS data was based primarily on "prevalence" data, that is, how much or how often did a particular event or situation occur. Note all tables, unless otherwise noted, are from this source. For the most part, data on the volume of pedestrians does not exist so we are unable to measure relative risk. For example, an area with a high number of pedestrians would most likely have a higher number of pedestrian collisions compared to an area with many fewer pedestrians. But, this does not necessarily mean that the first area is more of a risky location to pedestrians because the relative risk of a pedestrian in either location is unknown. Where possible, other pedestrian safety literature and national data has been used to help describe what is commonly known about pedestrian collisions and injuries.

From 1999 to 2004, an average of 598 pedestrians were hit by a vehicle each year in San Diego.

On average, from 1999 to 2004, two people were hit by a vehicle each day in San Diego. This added up to an average of 598 pedestrians each year (see Table 3). There is a steady trend of fatalities per year which roughly stays at 4 percent over five years. The lowest trend was in 2001 when the fatality total dipped to 3 %.

Table 3: Pedestrians hit by a vehicle, City of San Diego (1999-2004) Source: SWITRS

	1999	2000	2001	2002	2003	2004	Totals
Number of pedestrian collisions each year	651	597	611	612	554	562	**3,587**
# of Non-injury pedestrians	41	30	33	35	33	28	**200**
Average # of ped collisions each day	2	2	2	2	2	2	**2**
# of ped injuries each year	674	614	578	627	516	587	**599**
# of ped fatalities each year	31	23	16	26	21	21	**138**
# of collisions with drunk/drug impaired pedestrians	0	0	0	0	0	0	**0**
# of collisions involving drunk/drug impaired drivers	5	6	6	7	7	2	**33**
# of collisions where driver suspended or unlicensed	1	0	1	2	1	1	**6**
# of collisions involving speeding	7	6	9	12	17	13	**64**
# of fatal injuries involving speeding	0	1	0	2	2	0	**5**
# of pedestrians at fault	200	114	126	131	109	133	**813**
# of drivers at fault	267	253	294	331	297	270	**1,712**
# of fault unknown	183	229	191	150	148	159	**1,060**
# of hit & run	122	106	142	133	113	105	**721**
# of collisions within 1/4 mile of school	318	289	281	290	248	256	**1,682**
# of collisions within 1/4 mile of parks	229	185	179	203	194	178	**1,168**

Table 4: Pedestrian collisions with vehicles for City of San Diego compared to the County of San Diego (1999-2004) Source: SWITRS

	1999	2000	2001	2002	2003	2004	Total	Yearly Average
City of San Diego	652	597	611	612	554	562	3,588	598
County of San Diego	480	430	419	441	447	509	2,726	454
Total Region	1,132	1,027	1,030	1,053	1,001	1,071	6,314	1,052
Percent of Collisions occurring in the City of San Diego	58%	58%	59%	58%	55%	52%	57%	57%

Table 5: Pedestrian collisions with vehicles for City of San Diego compared to the County, Adjusted for Population (1999-2004) Source: SWITRS

Year 2000	Population	the Year 2000	per 1,000 People
City of San Diego	1,223,400	597	0.49
County of San Diego	1,590,433	430	0.27
Total Region	2,813,833	1,027	0.36

More than half (57%) of the region's pedestrian collisions occur in the City of San Diego (see Table 4). Between 1999 and 2004, there were 3,588 and 6,314 for the City and County, respectively. A disproportionate amount also is shown when the data has been normalized per 1,000 people for the year 2000. Table 5 indicates the rate of pedestrian collisions is much higher than that of the County. The higher rate for the City is most likely explained by San Diego's higher density of pedestrians and traffic compared with the County.

Pedestrians are at a physical disadvantage when hit by a vehicle. Since 1999, over 133 San Diegans have died due to pedestrian collisions while 3,500 survived, but suffered severe to minor injuries. Compared to the county, the City has a higher rate of pedestrian injury (.48 vs .39 per 1,000) but a slightly lower rate of pedestrian fatalities (.018 vs. .023 per 1,000).

More than half (57%) of the region's pedestrian collisions occur in the City of San Diego. Per 1,000 population, .49 pedestrians are involved in collisions in the City of San Diego compared to .27 for the rest of the County.

The City of San Diego accounted for only about 34 percent of all pedestrian fatalities in the county. This likely relates to higher speeds and corresponding lower survival rates on County roads versus those of the City where more urban areas have slightly lower speed rates. Pedestrian deaths in the City account for over 25 percent of all traffic-related fatalities, yet only about 6 percent of all trips are made on foot (2000 SWITRS Annual Report). This figure is more than two times the national average (11 percent), and one and a half times that of the state's average (17 percent) (NHTSA Traffic Safety Facts, 2003).

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To highlight more positive trends, pedestrian collisions are heading downward, in San Diego and elsewhere. Nationally, pedestrian deaths have decreased by 37 percent since 1975. In San Diego, between 1999 and 2004, pedestrian collisions declined by 14 percent, greatly outpacing the 5 percent decline seen at the county level. Even more encouraging was the decrease in the number of deaths due to pedestrian collisions. During this same six-year timeframe, there were 32 percent fewer pedestrian fatalities in San Diego, compared to a 23 percent decline for the county. In addition to improvements in road safety and law enforcement, there were a number of factors that could have contributed to this downward trend, including fewer people walking and improvements in medical response times and services, leading to fewer deaths as a result of a collision.

3.1.2 Profile of Pedestrians at Risk for Collisions and Injuries

The young and the old are the most at-risk and vulnerable to pedestrian collisions and injuries. Children, ages 15 years and younger, are the most likely to be struck by a vehicle and pedestrian injuries are the one of the leading causes of injury death among school age children (see Table 6). In the year 2000 in San Diego, children under 15 years represented 20 percent of the total population, yet they accounted for 30 percent of all pedestrian collisions (see Table 7). Several factors put young children at greater risk for pedestrian collisions. Their smaller size means it is harder for drivers to see them and for them to see drivers, particularly when there are parked cars. Developmentally and physiologically, they are more impulsive and not yet able to accurately determine distances and vehicle speeds, so they may misjudge whether it is safe to cross a street.

Older adults are also more vulnerable as pedestrians. Seniors are not hit by cars as often, but they are three times more likely than younger people to die as a result of a pedestrian collision. In 2000 in San Diego, seniors ages 65 and older represented 9 percent of the total population, but they accounted for one third of all pedestrian deaths. This is largely due to the greater frailty of seniors and their decreased ability to fully recover from trauma and illness. Table 8 shows the rate in which the senior fatalities are greater than those of other age groups.

Table 6: Pedestrian collisions for City of San Diego Based on Age (1998-2004) Source: SWITRS

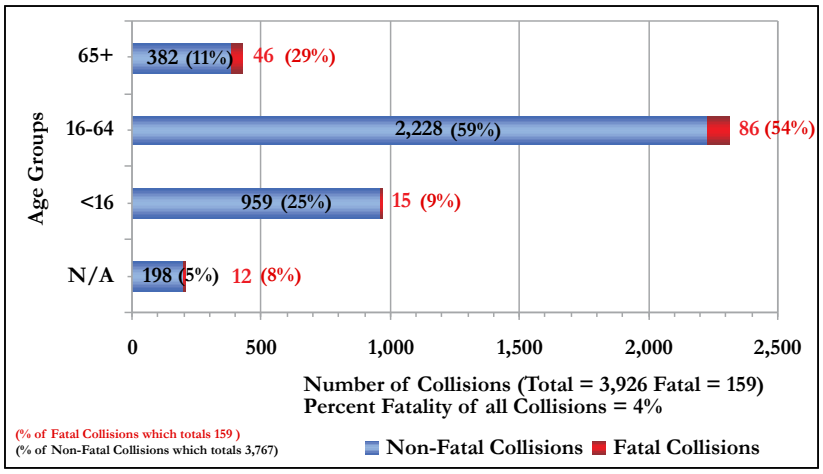


Table 7: Pedestrian collisions for City of San Diego Based on Age (2000) Source: SWITRS

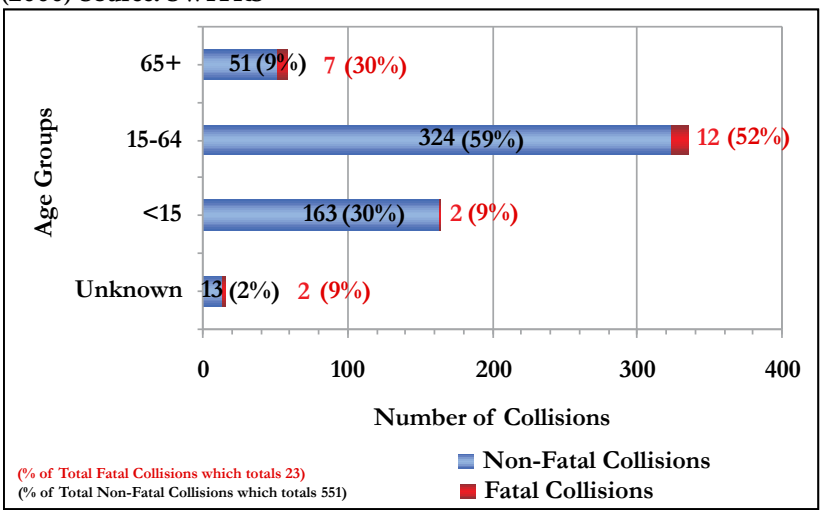
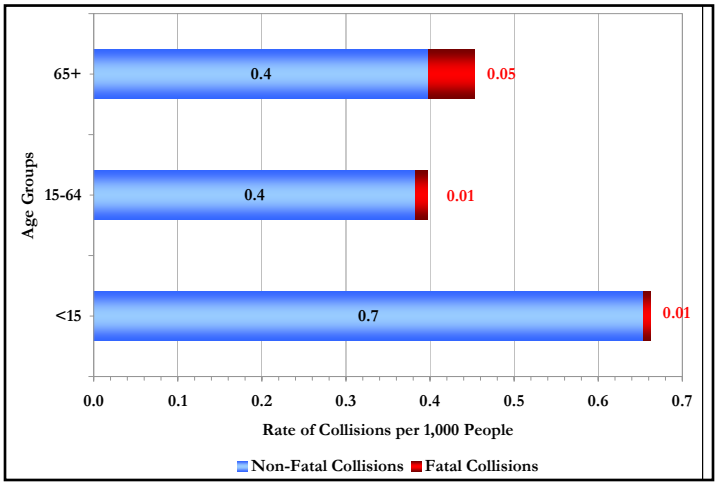


Table 8: Pedestrian collisions for City of San Diego Based on Age (2000) per 1,000 population. Source: SWITRS



People of color and those from low-income communities have some of the highest rates of pedestrian injuries and death.

People of color and those from low-income communities have some of the highest rates of pedestrian injuries and death. At the national level, Latinos and African Americans have pedestrian fatality rates approximately two times higher than the rate for Whites. In 2000 in San Diego County, African Americans had the highest pedestrian injury rate (22 per 100,000) followed by Latinos (12 per 100,000) and Whites (8 per 100,000). This pattern is also seen among children: in California, Latino children comprise 39 percent of the state's child population but 48 percent of all pedestrian incidents.

African-American children account for eight percent of the state's child population but are victims in 14 percent of all pedestrian crashes. Researchers believe differences in rates in these communities are due, in part, to differences in walking patterns and frequency of walking. For example, the Nationwide Personal Transportation Survey, conducted in 1995 by the Department of Transportation, found that African Americans walk 82 percent more than whites. Environmental and socioeconomic factors are also likely to contribute to these rate differences.

Between 1999 and 2004 about 2% of all pedestrian collisions involved a disabled pedestrian but almost 8 % of all fatal pedestrian collisions involved a person with a physical or mental disability.

The disabled are at increased risk of being hit and injured as pedestrians. Between 1999 and 2004 in San Diego, about 2 percent (82) of all pedestrian collisions involved a disabled pedestrian but almost 8 percent of all fatal pedestrian collisions involved a person with a physical or mental disability. The incidence of collisions are not disproportional to those with disabilities, since an estimated 15 percent to 20 percent of the San Diego region's population has some form of physical, developmental or mental challenge, according to the San Diego-based Center for an Accessible Society.

3.1.3 Pedestrian Collision Circumstances and Contributing Factors

At first glance, the answer to the question - "Why and under what circumstances do pedestrian collisions occur?" – may appear to be relatively simple. Typically, the focus is on the behavior and actions of the individuals involved in the crash: Did the pedestrian jaywalk? Was the driver speeding? Did the driver yield to the pedestrian? However, in most cases, there are a number of factors working in combination that cause and provide the circumstances for a crash and injuries. Circumstances and contributing factors can range from personal aspects of the driver and pedestrian to the broader socio-cultural environment. Understanding these factors is key to lowering the rate of collisions and improving pedestrian safety.

Personal Factors

Personal factors include the driver's and pedestrian's mental and physiological state at the time of the incident in addition to their specific maneuvers or actions that preceded the collision.

Alcohol Impairment

San Diego does not appear to have as significant of a problem of alcohol impaired pedestrians as some cities do.

The role of alcohol in pedestrian deaths, like motor vehicle occupant deaths, is major. Nationally, alcohol is involved in nearly 50 percent of all fatal pedestrian collisions. The driver is not always the impaired individual. In 2003 in the U.S., 36 percent of fatally injured pedestrians were legally drunk.

Pedestrian and Driver Actions

Clearly, the actions taken by pedestrians and drivers may help create the conditions for a crash or directly cause the crash. Between 1998 and 2004, the two most common actions of pedestrians just prior to being hit included crossing mid-block (16% of all pedestrian collisions) and crossing along with the signal at a signalized intersection (20%). Among fatal collisions, crossing mid-block was also the most common pedestrian action (26%). Crossing mid-block is clearly a risky maneuver for pedestrians (and is discussed in more detail below). However, the data suggest that pedestrians may be at significant risk even when they follow traffic laws.

With pedestrians determined to be at fault only 33% (24% fault unknown) of the time, the data suggest that pedestrians may be at significant risk even when they follow traffic laws.

In San Diego, drivers were at fault for pedestrian collisions 43 percent of the time, while pedestrians were at fault about 33 percent of the time (24% fault unknown). This differs from studies of other cities where drivers were culpable in 39 percent of collisions compared to 50 percent for pedestrians (see Table 9). Pedestrians were typically assigned fault in mid-block and intersection "dash" crashes, particularly among young children where mid-block "dart out" is one of the most common forms of being hit by a vehicle. Public health and safety experts contend that the tendency to blame children that are hit darting out near their home or on school routes places too much responsibility on the child. Until the age of 10, children often lack the experience and neurological development to perceive and avoid traffic dangers. Yet, parents want their neighborhoods to be safe places for their children to play outside and walk to school. To effectively improve pedestrian safety for children, experts recommend shifting our emphasis from victim blaming to efforts and ways in which we can improve and adapt street and neighborhood design to take child development and behavior into consideration.

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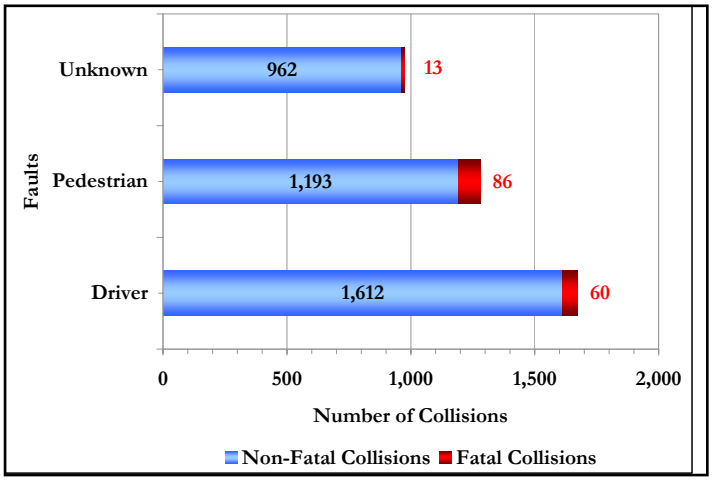
Table 9: Pedestrian collisions for City of San Diego Based on Fault (1998-2004): Source: SWITRS



Unfortunately, 20 percent of pedestrian collisions in San Diego are "hit-and-run" incidents, compared to 12 percent for the state and 19 percent for the nation. This extrapolates to over 100 pedestrian collisions each year in which the driver flees the scene of the crash. Studies show that drivers in "hit and run" collisions are more likely to have had a previous arrest for driving while intoxicated and were more likely to be driving with an invalid or suspended license. Additionally, drivers with suspended or no license or other type of driving violations, were more likely to hit a pedestrian. These findings suggest a need for law enforcement and educational strategies that target offenders and risk-taking drivers.

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Table 10: Survival Rate Based on Differing Speed Categories
Source: US Department of Transportation

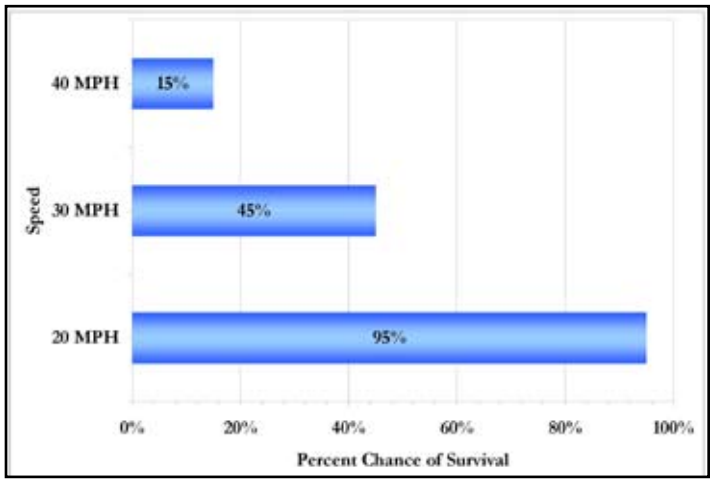


Table 11: Braking Distance with Reaction Time
Source: Transportation Tools to Improve Children's Health

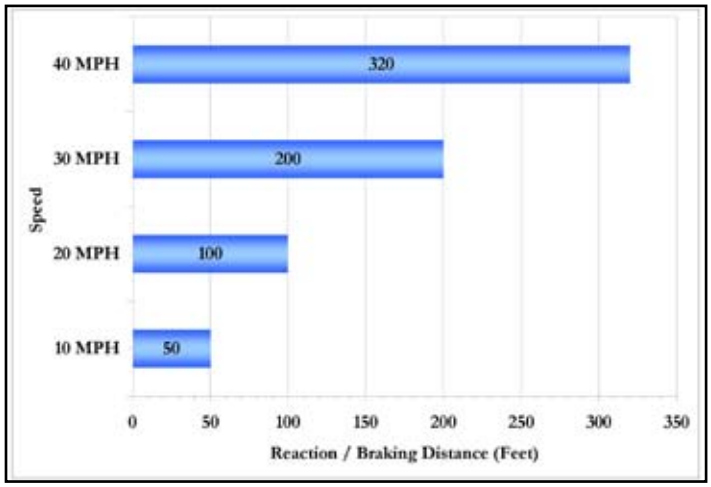
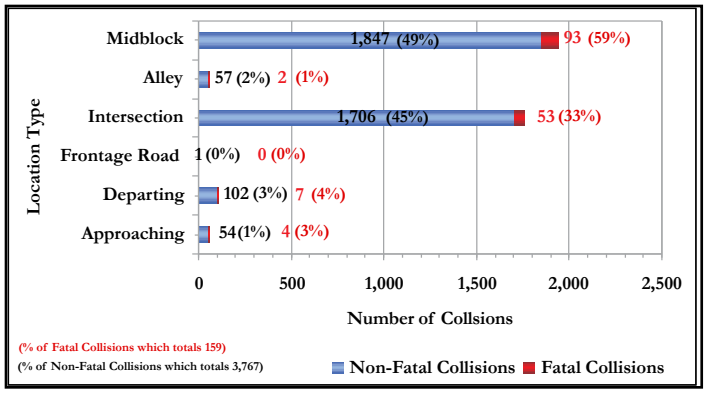


Table 12: Comparison of Collisions on Locations
Source: SWITRS



Driver Speed

Driver speed is one of the most critical factors influencing whether a pedestrian will be injured and die from a collision or whether they will escape injury-free. Studies show that pedestrians hit by a vehicle traveling 40 mph have only a 15 percent chance of survival (see Table 10). At 30 mph, their odds increase to 55 percent. In stark contrast, a pedestrian has a 95 percent chance of survival if hit by a vehicle moving at 20 mph (UK Department of Transportation: "Killing Speed and Saving Lives").

Drivers underestimate the distance it takes to react and come to a stop to avoid hitting a pedestrian. At 20 mph, drivers require 40 feet to stop. At 30 mph, the distance required to stop jumps to 75 feet. At 40 mph, drivers need at least 120 feet to come to a complete stop (see Table 11).

Location of Pedestrian Collisions

Figure 5 shows the general location of all pedestrian related vehicular collisions in the City of San Diego. According to the SWITRS data, Pedestrian collisions occur mid-block about as often as they do in intersections, but most fatal collisions take place mid-block. In San Diego, almost half (1,847) of all pedestrian collisions occurred mid-block and slightly less (1,706) occurred in intersections. In comparison, nearly 60 percent of all fatal collisions occurred mid-block and 33 percent took place in intersections (see Table 12). Mid-block collisions are more common and result in more deaths, in part because speeds are usually higher and drivers often do not expect to have to stop. Relative to younger people, seniors are more likely to be hit and killed in an intersection. This is partly because older adults are more likely than younger people to cross at intersections, and in general their slower walking speed and diminished vision, hearing, and reaction time put them at greater risk.

Figure 5: Location of Pedestrian Collisions (1998-2004)

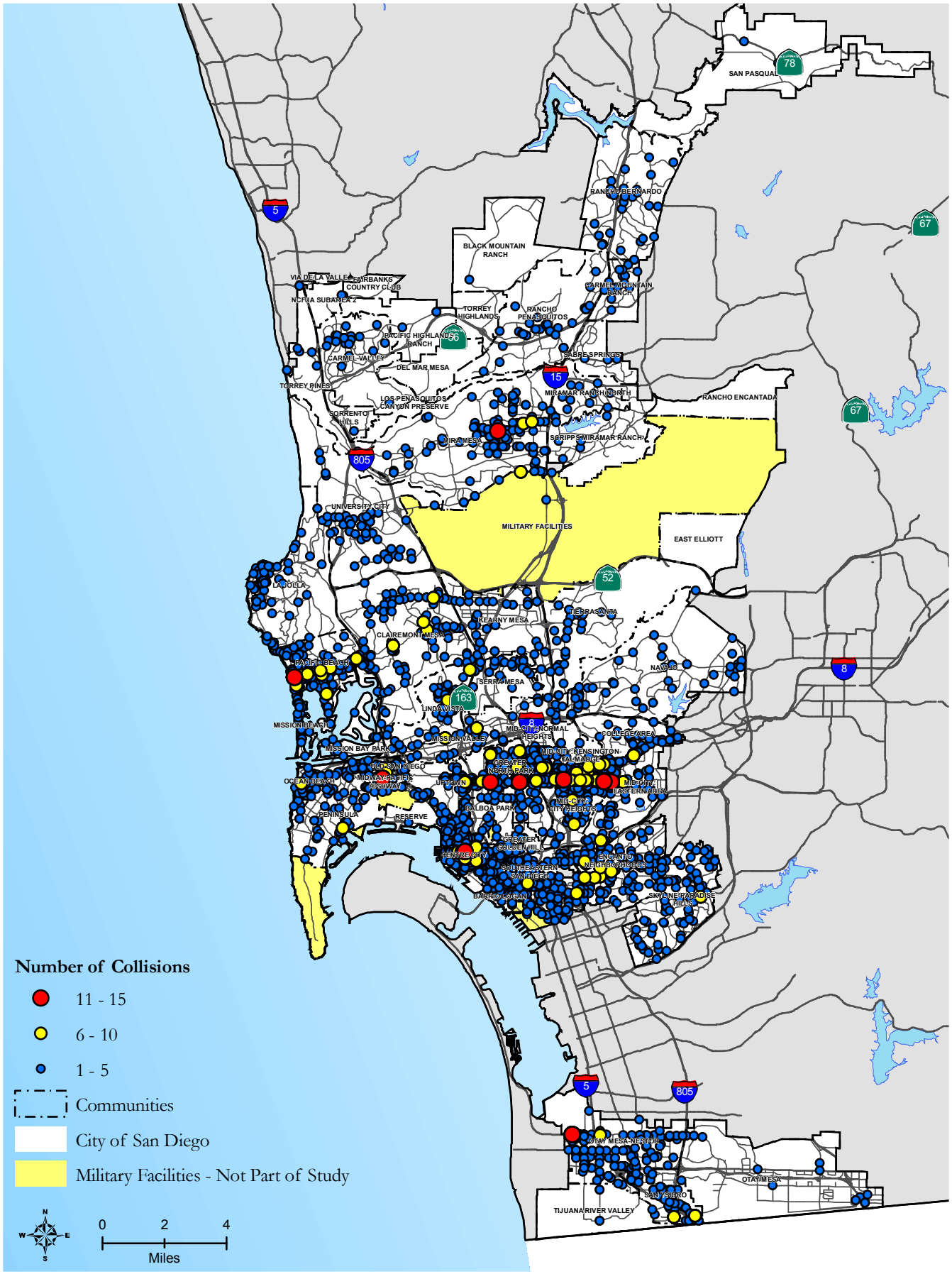


Table 13: Comparison of Collisions Relative to Street Classification
Source: SWITRS

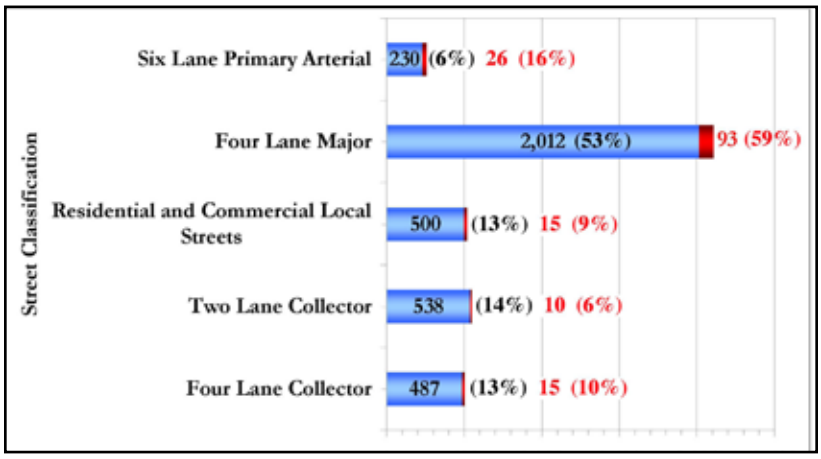


Table 14: Comparison of Collisions Relative to Roadway ADT
Source: SWITRS

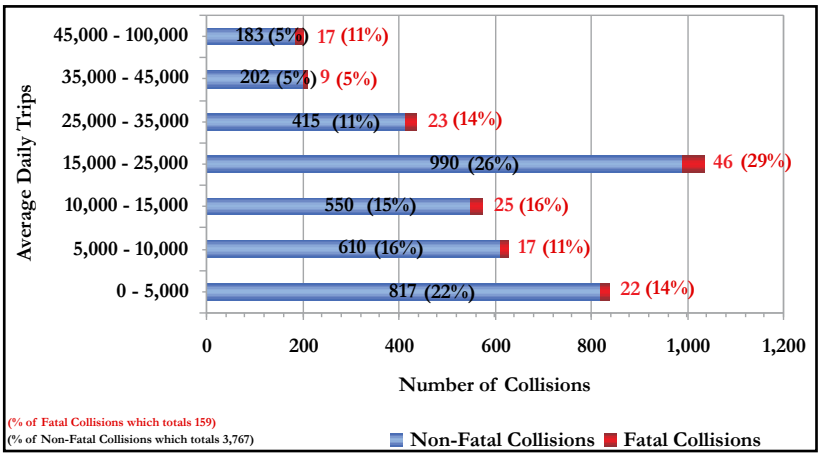
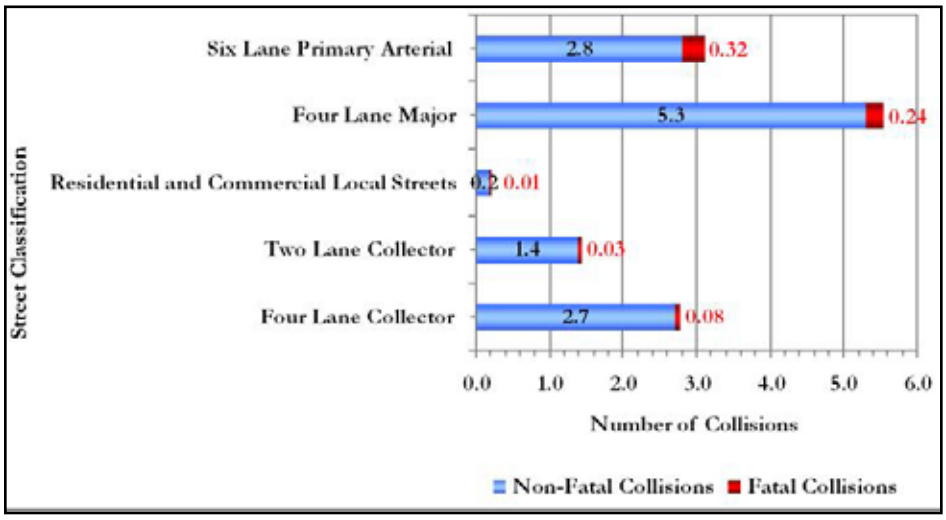


Table 15: Comparison of Collisions Relative to Street Classification, Normalized per Mile - Source: SWITRS



Streets that are fast and busy pose the greatest risk for pedestrians of all ages. The majority of San Diego's pedestrian collisions (52%) and fatal collisions (60%) take place on the Cities' Four Lane Major streets. By comparison, less than 39 percent of collisions and 26 percent of fatal collisions occur on local streets, local collector streets and collector streets (see Table 13). Supporting this pattern, the greatest number of collisions (26%) and fatal collisions (29%) occur on streets with an Average Daily Traffic (ADT) count of 15,000 – 25,000 vehicles, the volume of most major arterials (see Table 14). In many areas of the City, arterials divide communities, meaning residents have to cross them to get to shops, schools and other community locations.

A high portion of pedestrian collisions (22%) and fatalities (14%) occur on roads with the lowest traffic volumes (0-5,000 ADT). Typically, these are residential streets where speeds would be low and pedestrian access high. It is unclear why there are so many collisions and fatalities occurring on such slower lower volume streets. While traffic volumes are low, these streets nevertheless can have the occasional high speed driver, making collisions and fatalities more explainable. These lower volume streets tend to be residential neighborhoods where there are more children playing on or near a street. When looking at the rate of collisions per mile, the numbers tell a more logical story. Local streets become a less likely street for a collision to occur on since the majority of San Diego street miles fall into this category. A pedestrian is more likely to be involved in a collision or even killed on prime or major streets as their rates for fatal incidents are the highest (see Table 15).

The same can be said for streets with high average daily trips. Table 16 shows fatalities to occur more often on streets with over 15,000 ADT's. While major streets (four lane urban and major) have the highest incidence of collisions per mile (total collisions divided by total miles of this type of street in San Diego) of all of the street categories. Children are being hit on residential streets at 24%, on collectors at 21% and on primary arterials at 32% of total collisions. When normalizing the data for collisions per mile, the outcome is clearer. Children are more likely to be injured or killed along a major street or prime arterial (see Table 17). Without further data or analysis, one can only speculate on the reasons for different collision rates on these different categories of roads. However, national data generally points to serious injuries and fatalities are more likely on multi-lane wide streets with higher volumes of traffic and higher speeds. These streets are even more dangerous for school age children with less experience in crossing these busy streets and slower motor and cognitive skills that are needed to make appropriate judgements for crossing.

In recent years, there has been a significant effort at the national, state and local levels to improve children's safety along routes to and from school, particularly elementary schools. This was born out of the coinciding movements to reduce childhood pedestrian injuries and get kids walking to school to increase physical activity and prevent obesity. School age children are most likely to get hit near home or on the school route. In San Diego, 48 percent (1,903) of all pedestrian collisions between 1998 and 2004 occurred within a quarter mile of a school. This suggests our neighborhood schools are not isolated from higher risk streets. Table 18 lists elementary schools with the highest number of collisions between vehicles and children, within a quarter mile of the school. Most of these schools are in older urban neighborhoods with higher walk to school rates.

Table 16: Comparison of Collision Locations Relative to ADTs, Normalized per Mile -Source: SWITRS

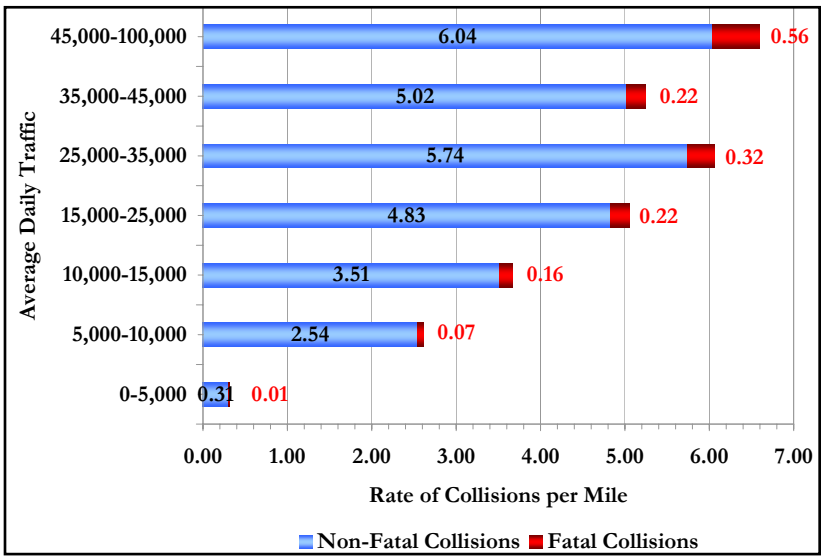


Table 17: Comparison of Collision Locations (for 16 Years and Younger) Relative to Street Classification, Normalized per Mile- Source: SWITRS

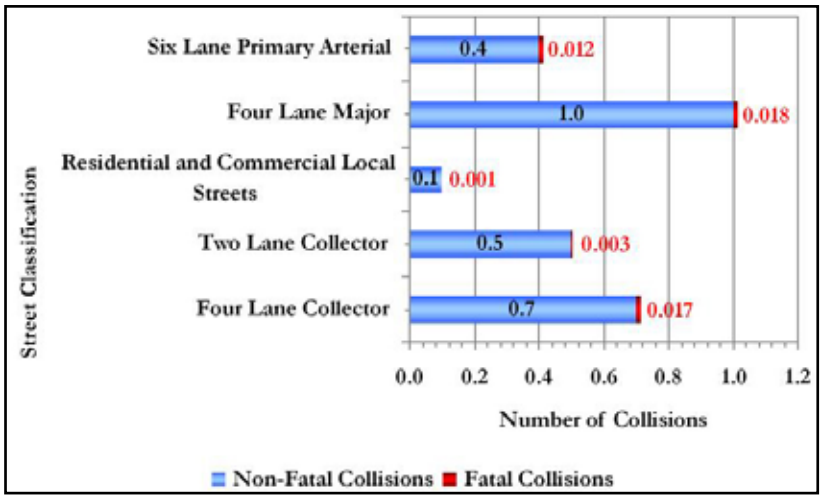


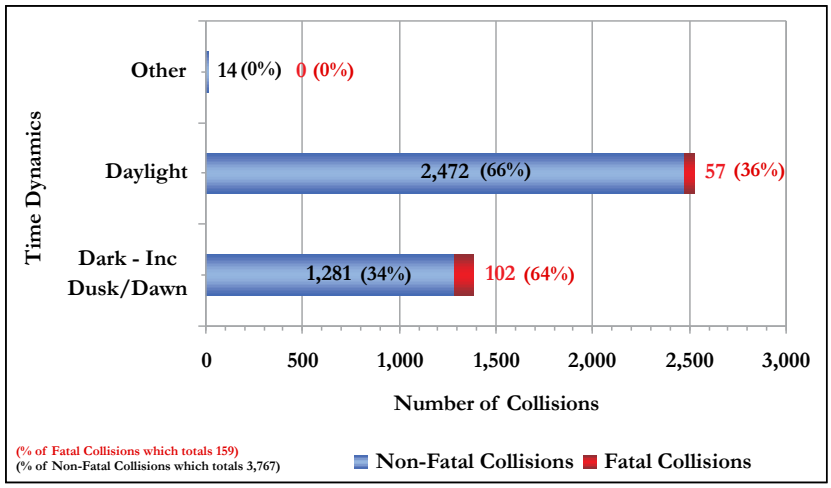
Table 18: Top 5 San Diego Elementary Schools with the Highest Collision Rates for Children- Source: SWITRS

Elementary School	Number of Collisions within a quarter mile for children under 12 years old (1998 - 2004)
Euclid Elementary	30
Our Lady of the Sacred Heart	20
Central Elementary	20
Rosa Parks Elementary	16
Adams Elementary	13

Time Dynamics of Collisions

In San Diego, the majority (62%) of all pedestrian collisions occur during daylight hours but the majority (66%) of all fatal collisions occur during the night, which includes dusk and dawn (see Table 19). At the county level, there are also more fatal pedestrian collisions in the late afternoon and evening hours, with the peak number occurring between 9:00 pm and 10:00 pm (San Diego County Health and Human Services, Trauma System Report: FY 00/01). Night time collisions may be more fatal due to several factors including greater speeds, poor lighting conditions and higher levels of alcohol impaired drivers. The time dynamics for child pedestrian collisions show a different pattern. Statewide, the most common time for child pedestrian injuries to occur is from 3:00 pm to 6:00 pm (on both weekdays and weekends), suggesting children at play. However, 21 percent of school-age children (ages 5-14 years) are injured during the weekday morning commute hours (6:00 to 9:00 am), compared to less than 1 percent at this time on weekends (California Department of Health Services, EPIC Branch. Pedestrian Injuries to Young Children. EPICgram Report No. 5. May 2002).

Table 19: Collisions Based on Time of Day: Source SWITRS



...foot notes...

CVC 21949-21971 (Crosswalk regulations)

21954. (a) Every pedestrian upon a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right-of-way to all vehicles upon the roadway so near as to constitute an immediate hazard.

21955. Between adjacent intersections controlled by traffic control signal devices or by police officers, pedestrians shall not cross the roadway at any place except in a crosswalk.

Vehicle Design

Over the past two decades, Americans have increasingly purchased light trucks and Sport Utility Vehicles (SUVs) and this has been strongly linked to an increase in pedestrian injury severity and changes in the types of injuries pedestrians incur. One study involving six cities found that pedestrians struck by light trucks/SUVs were three times more at-risk for severe injury and 3.4 times more at-risk for dying, compared to those hit by passenger vehicles (after controlling for pedestrian age and impact speed). The biomechanics of pedestrian injury in these types of crashes is different. The front-end design and higher bumpers of light trucks/SUVs mean that pedestrians are often hit in the upper extremities, thereby more likely to suffer head, neck and thorax injuries. With passenger vehicles, pedestrians are usually hit in their lower extremities. In addition, the greater mass of these larger vehicles contribute to more severe injuries. Experts point to the need to establish federal safety standards for the front-end design of light trucks/SUVs.

Physical Environment

Street and neighborhood design and the condition of roads are aspects of the physical environment that can cause or create the conditions for a pedestrian crash to occur. Studies show that automobile speeds and street design are the most significant physical environment risk factors for pedestrians. Design practices over the past fifty years have favored arterials that are wide and straight. These types of roads are now understood to contribute to speeding and diminish the safety of pedestrians. To address these risk factors, traffic safety experts recommend traffic calming and changes in road design.

3.1.4 Violence and Personal Safety

Personal safety is an important aspect of the pedestrian environment and greatly affects the level of pedestrian activity. People are less likely to walk – for transportation or recreation - when they fear being a victim of crime. In particular, seniors and low-income residents cite their fear of crime and violence as the most significant factor deterring them from walking. This, despite the fact that economic status and physical impairments make these groups the most dependent on walking and transit for transportation.

Recent data indicate that San Diegans, including pedestrians, may be safer from crime and violence. Between 2000 and 2004, crime rates in the City of San Diego fluctuated, but they showed a general downward trend. In 2004, there were 40.35 crimes per 1,000 residents, down by four percent from 2003, but up 1.1 percent from the 2002 rate of 39.91 per 1,000 residents. Perhaps most relevant to pedestrians, the rate of violent crimes dropped almost 10 percent from 5.78 per 1,000 residents in 2003 to 5.23 per 1,000 residents in 2004. This translated to almost 600 fewer acts of violent crime in the City of San Diego. Hopefully several years of these statistics will verify if this is an improved trend or a one-year anomaly.

Perception is sometimes more powerful than reality and such is the case when it comes to a parent's fears over letting their child walk to school. A generation ago, nearly two-thirds of children walked or rode their bikes to school. Today, less than 15 percent of children do so. Public health experts have warned that the related epidemics of childhood obesity, physical inactivity and Type II diabetes are some of the negative consequences of a society afraid to let children walk and play outside. Along with long distances and traffic concerns, parents cite fear of crime as a major barrier to letting their child walk to school. Parents are particularly afraid of "stranger danger" and child abductions. Yet children are at much greater risk of being killed or injured in a motor vehicle crash than they are of being abducted. In 2002, over 2,000 children were abducted in California, but only 54 of those were by strangers. Family members abducted all others. In that same year, more than 4,000 children were hospitalized due to injuries incurred as a passenger in a motor vehicle crash and 413 died. Parents' perception of risk is a significant barrier to getting more children to walk and play in our neighborhoods.

3.1.5 Pedestrian Trip and Falls

Trip and fall information in the City of San Diego, were collected for the fiscal year 2005 and included data for the entire 2003 and 2004 years. Only January to June was collected for 2005. In 2004, there were 88 incidents of trip and falls reported. For the six months of recorded data in 2005, there were 41 trip and falls. Many reasons for the incidents range from the more common tripping on a pothole or uneven sidewalk surface to bolts protruding from the sidewalk. Injuries described in the database include stubbed toes, twisted ankles, broken feet, injured collarbones and shoulders.

...foot notes...

CVC 21949-21971
(Crosswalk regulations)
21950. (a) The driver of a vehicle shall yield the right-of-way to a pedestrian crossing the roadway within any marked crosswalk or within any unmarked crosswalk at an intersection, except as otherwise provided in this chapter. (b) This section does not relieve a pedestrian from the duty of using due care for his or her safety. No pedestrian may suddenly leave a curb or other place of safety and walk or run into the path of a vehicle that is so close as to constitute an immediate hazard.

3.1.6 Pedestrian Safety Education Awareness

This Plan, along with the City's Traffic Calming Program, describes the engineering improvements and pedestrian facilities needed to create a safe physical environment for pedestrians. However, creating the right environment is not, by itself, sufficient to fully address the problem of pedestrian safety in San Diego. Rather, this requires a comprehensive approach involving the three E's of traffic safety: Education, Engineering, and Enforcement. Education may include programs that target pedestrians and improve their pedestrian skills and knowledge. They may also include programs that target drivers and educate them on safe driving and yielding to pedestrians. Enforcement of laws may include special "sting" operations that increase enforcement and awareness of existing pedestrian safety laws or the adoption of new ordinances that give drivers greater responsibility for pedestrian safety (e.g., increasing fines for speeding or hitting a pedestrian in school zones).

Based on study findings and on what is known about effective practices, potential areas for pedestrian safety education in San Diego include:

- School Age Children and Parents (schools, after school programs, parenting classes)
- Seniors (senior centers)
- Low-income, recently immigrated and communities of color (community centers and religious centers)
- Drivers (DMV publications and testing requirements)

3.1.7 Solutions that Address Safety Issues

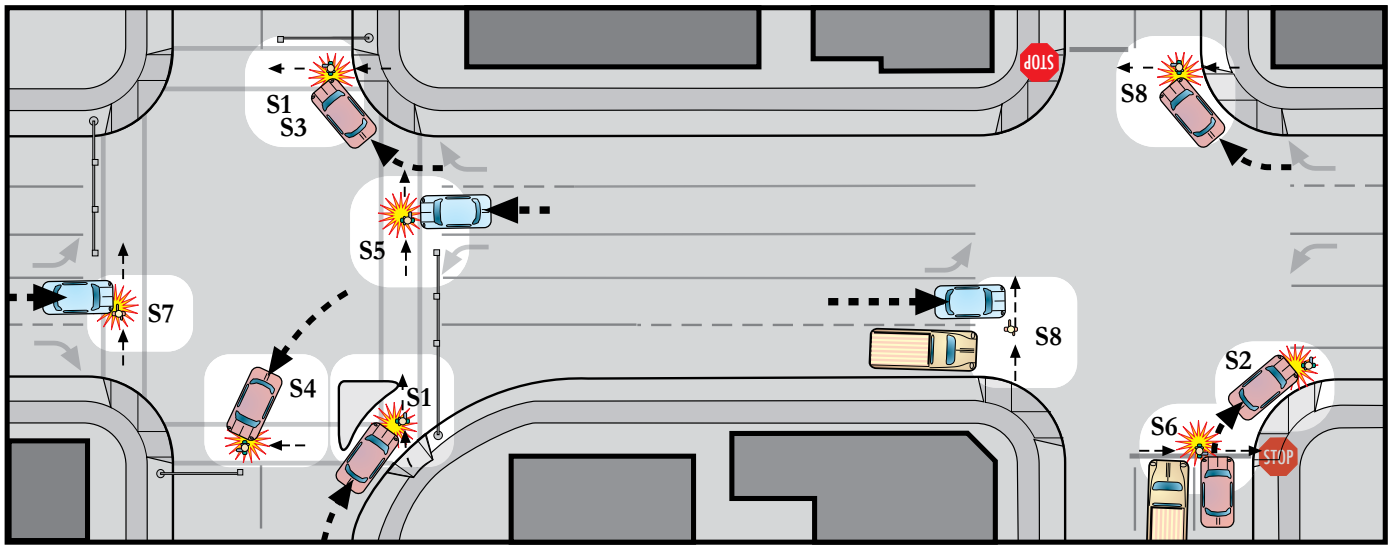
Tables 20 and 21 have been developed to describe the typical safety issues associated with pedestrians crossing at intersections and walking or crossing along roadway segments. These tables also make recommendations for possible solutions that can fully or partially address the safety issues.

...side step

Pedestrian safety can be improved when both drivers and pedestrians understand each other's right of way, when both pay greater attention to their actions and when the most appropriate improvements are matched with the existing setting. The combination of Education, Engineering and Encouragement actions are much more effective when all three are used instead of relying only on one approach.

Table 20: Safety Issues (at Intersections)

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



Issues	Potential Solutions *(See legend*)*
S1 - Right turning collisions. Collisions can occur between right turning vehicles and pedestrians even though both may have a green light or pedestrian walk phase. Dual right turn lanes may obstruct views and wide-radius corners with channeled right turn lanes can make collisions severe.	**2S, 3S, 4S, 7S, 8S, 11S, 17S, 18S, 19S**
S2 – Turns from minor road stop-controlled intersection. Turning vehicles may violate the pedestrian right-of-way.	**2S, 3S, 4S, 7S, 17S, 19S**
S3 – Right turns at red lights. Drivers of right turning vehicles at red lights may violate the pedestrian right-of-way during the pedestrian signal or when the pedestrian illegally walks against the red light because they may be watching for vehicles approaching from the left.	**2S, 3S, 4S, 9S, 17S, 19S**
S4 - Left turning collisions. Left turning vehicles at permissive left turns (green light yield) may violate pedestrian right-of-way, or at protected left turn (green arrow) if pedestrians walk illegally against the light.	**1S, 3S, 4S, 8S, 17S, 19S**
S5 – Wide streets. Age, ability and street crossing distance may make it difficult for some pedestrians to cross wide streets in one cycle. Pedestrian may enter the crossing signal phase illegally without time to cross.	**1S, 2S, 3S, 4S, 8S, 11S, 17S, 18S, 19S**
S6 - Multiple lane crosswalk collisions. Pedestrian collisions with vehicles can occur in crosswalks at stop signs with multiple lanes in each direction. Larger vehicles can shield views of pedestrians and drivers from each other. Drivers may also encroach on the crosswalk in an attempt to see oncoming traffic.	**2S, 3S, 4S, 5S, 17S, 18S, 19S**
S7 - Controlled intersection collisions. Pedestrian collisions with vehicles may occur at intersections with signals or stop signs. Collisions may occur due to high speeds, signal running, or either a driver or pedestrian violating the other's right-of-way.	**1S, 2S, 3S, 4S, 6S, 9S, 17S, 18S, 19S**
S8 - Uncontrolled intersection collisions. Collisions may occur at intersections without traffic controls (no stop signs or traffic signals). Multiple lanes in each direction can dramatically intensify this problem, as well as poor visibility and lack of median refuges. Drivers may not understand that pedestrians have right-of-way at intersections, regardless of crosswalk markings.	**1S, 2S, 3S, 4S, 5S, 7S, 17S, 18S, 19S,** *also see* **5W** *on page 4-23*

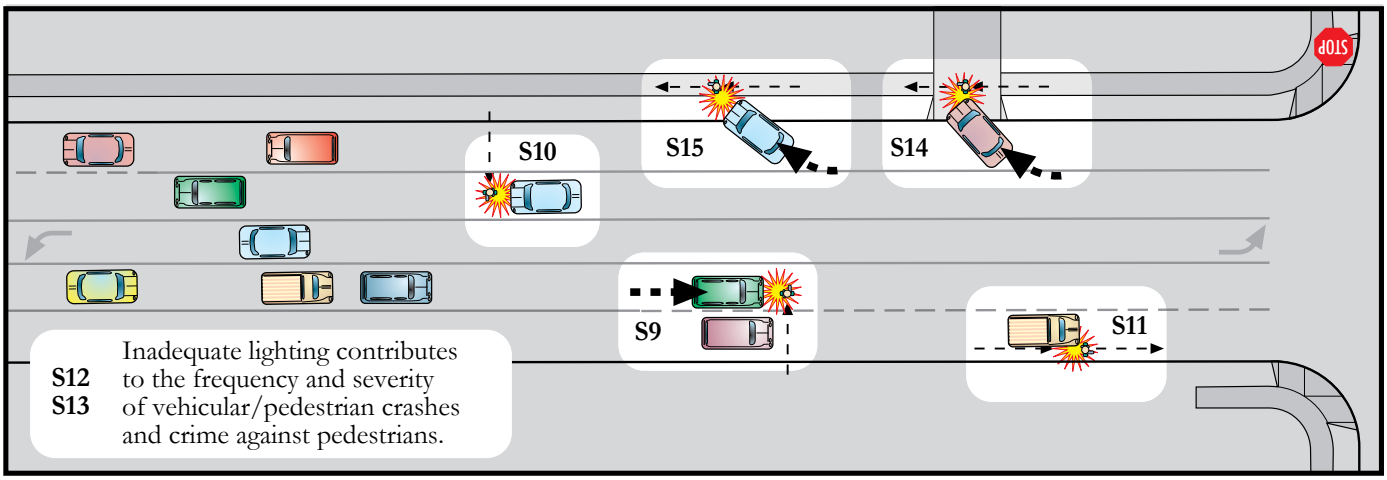
Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

1S) Median refuges (a safe place to stand in the street) *(See page 4-15)*
2S) Pedestrian pop-outs (curb/sidewalk extensions into street) *(See page 4-15)*
3S) High-visibility crosswalk striping *(See page 4-16)*
4S) Elevated and/or specially paved crosswalks *(See page 4-16)*
5S) Advance stop bars 5-10 feet from crosswalks *(See page 4-16)*
6S) Radar speed monitoring and display *(See page 4-16)*
7S) Reduced curb radii *(See page 4-17)*
8S) Early pedestrian start at crossing signal *(See page 4-17)*
9S) No right turn on red at intersection *(See page 4-17)*
10S) Mid-block crosswalks with pedestrian flashers, but no traffic control *(See page 4-17)*
11S) Automatic pedestrian detection and signal control *(See page 4-18)*
12S) Mid-block crosswalks with signs, median or curb extensions and flashing lights in roadway *(See page 4-18)*
13S) Mid-block crosswalks with pedestrian-actuated traffic control devices *(See page 4-19)*
14S) One-lane mid-block crossing with high contrast markings, signs, and center lane marker *(See page 4-19)*
15S) Parkway planting buffer between cars and pedestrians *(See page 4-20)*
16S) On-street parking buffer between cars and pedestrians *(See page 4-20)*
17S) Adequate pedestrian lighting levels *(See page 4-21)*
18S) Traffic calming measures *(See page 4-21)*
19S) Enforcement and education solutions *(See page 4-21)*
20S) Missing sidewalk added or provide adequate walkway width clear of obstructions *(See page 4-21)*

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

Table 21: Safety Issues (along Streets)

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



Issues	Potential Solutions *(See legend*)*
S9 – Lack of legal or safe crossings. Uncontrolled, restricted or excessively spaced crossings without stop signs or signal control can encourage mid-block crossings (whether legal or illegal).	**1S, 5S, 10S, 11S, 12S, 13S, 14S, 17S, 18S, 19S**
S10 – Mid-block "jay walking." Some adjacent uses and high levels of pedestrian use may encourage illegal crossings, putting the pedestrian at risk, especially if crossing from between parked vehicles.	**1S, 2S, 3S, 4S, 5S, 10S, 11S, 12S, 13S, 14S, 17S, 18S, 19S**
S11 - Street collisions where no sidewalk exists. Where sidewalks are missing or damaged, pedestrians may be required to walk in the street, exposing them to collisions. Walking in the street is especially unsafe if vehicular speeds are above 25 mph, the travel lane is next to the curb or edge of the roadway, and the roadway is relatively narrow.	**19S, 20S**
S12 - Unsafe conditions in the dark. Where lighting and/or building forms do not allow for defensible space, the walker may be subjected to robbery or personal harm.	**17S, 19S**
S13 - Disincentive to walk in the dark. Inadequate light levels can influence a pedestrian's decision to not walk at night and can also result in collisions due to low visibility.	**17S, 19S**
S14 - Turning into or out of driveways and alleys. Vehicles turning into or out of curb-cuts, driveways or alleys can collide with pedestrians on sidewalks. The driver is violating pedestrian right-of-way, but this collision is difficult to control through physical changes.	**15S, 17S, 19S**
S15 - Out-of-control collisions on sidewalks. Pedestrians may be exposed to high speed vehicles where no buffers exist (such as trees, bike lane or parked cars). The problem is worse where there is no buffer between travel lanes and sidewalks.	**6S, 15S, 16S, 18S, 19S**

Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

1S) Median refuges (a safe place to stand in the street) *(See page 4-15)*
2S) Pedestrian pop-outs (curb/sidewalk extensions into street) *(See page 4-15)*
3S) High-visibility crosswalk striping *(See page 4-16)*
4S) Elevated and/or specially paved crosswalks *(See page 4-16)*
5S) Advance stop bars >10 feet from crosswalks *(See page 4-16)*
6S) Radar speed monitoring and display *(See page 4-16)*
7S) Reduced curb radii *(See page 4-16)*
8S) Early pedestrian start at crossing signal *(See page 4-16)*
9S) No right turn on red at intersection *(See page 4-16)*
10S) Mid-block crosswalks with pedestrian flashers, but no traffic control *(See page 4-16)*
11S) Automatic pedestrian detection and signal control *(See page 4-18)*
12S) Mid-block crosswalks with signs, median or curb extensions and flashing lights in roadway *(See page 4-18)*
13S) Mid-block crosswalks with pedestrian-actuated traffic control devices *(See page 4-19)*
14S) One-lane mid-block crossing with high contrast markings, signs, and center lane marker *(See page 4-19)*
15S) Parkway planting buffer between cars and pedestrians *(See page 4-20)*
16S) On-street parking buffer between cars and pedestrians *(See page 4-20)*
17S) Adequate pedestrian lighting levels *(See page 4-21)*
18S) Various traffic calming measures *(See page 4-21)*
19S) Enforcement and education solutions *(See page 4-21)*
20S) Missing sidewalk added or provide adequate walkway width clear of obstructions *(See page 4-21)*

3.2 ACCESSIBILITY RELATED GOALS, ISSUES & SOLUTIONS

Make facilities accessible to pedestrians of all abilities and meet all local, state and federal requirements.

Following the specific requirements of federal and state legislation for accessibility is a focal point of this section. However, all improvements to the walking environment that these regulations require, have many benefits for making the walking environment better for all users, with or without physical challenges for access.

3.2.1 Regulatory Context - Americans with Disabilities Act of 1990

The Americans with Disabilities Act (ADA) of 1990 set standards and a compliance schedule for providing public accommodations for persons with disabilities. Typically, right-of-way accommodations included:

- Continuous, maintained sidewalks with uplifts not exceeding one-half inch
- Slopes not exceeding 1:12 (or 8.33 percent) for pathways with handrails and not exceeding 1:20 (or 5 percent) without handrails
- Curb ramps at street corners
- Accessible signals at signalized intersections
- Tactile strips at hazardous locations along rail line edges such as trolley platforms

3.2.2 State of California Title 24 Summary

In addition to the ADA, California has additional accessibility regulations through California Code of Regulation, Title 24. The federal ADA Accessibility Guidelines and California Title 24 differ in several technical respects, but the most important distinction between the two is that the ADA is civil rights legislation and Title 24 is a building code. Another important difference is that ADA applies to existing facilities, while Title 24 only applies when alterations, additions or new construction takes place. Therefore, if remedial work is performed to eliminate a physical barrier, the more stringent of ADA Accessibility Guidelines or Title 24 applies.

The ADA and Title 24 are also enforced differently. The ADA can be enforced only in a court of law when no other resolution is possible, and Title 24 is enforced by state and local building departments, either when a building permit is obtained or when a citizen complaint is filed in regard to an existing facility. Title 24 is the regulation that most directly affects the built environment in San Diego and provides the state leverage for implementing the federal ADA through the building review, approval and inspection process.

Universal access goals provide a better environment for all users, including those severely disabled to those with only minor physical challenges.

3.2.3 City of San Diego ADA Transition Plan

The City's 1997 ADA Transition Plan supplied a compliance "baseline" for providing navigable walkways and corner curb ramps. The 1997 Plan indicated:

- Since the 1970's, the City has administered an aggressive curb ramp retrofit program.
- A survey from the early 1990's found that approximately 39 percent, or 20,931 corner curb ramps were in place.
- There were 20 public stairways, none of which provided adjacent ramps. The Plan called for providing signs indicating an alternative route via public sidewalks.
- Of the approximately 4,000 transit stops within the City, half were estimated to be accessible.
- Since the adoption of the Transition Plan in 1997, the City has continued to install curb ramps, repair uplifted or broken sidewalks and to make transit stops accessible. Accessible (audible) pedestrian crossing signals have been installed at many intersections throughout the City.

The property owner and the City both have responsibility in making certain that the public right-of-way for pedestrians is fully accessible under the reasoning that accessibility is not limited to the installation of curb ramps. Universal access as well as Title 24 and ADA require accessible paths of travel that are free from obstructions, meet specific slope and cross slope requirements and are maintained to be safe and accessible. This requirement transfers to the street pavement used for crossing streets, whether in a marked or unmarked crosswalk.

3.2.4 Solutions that Address Accessibility Issues

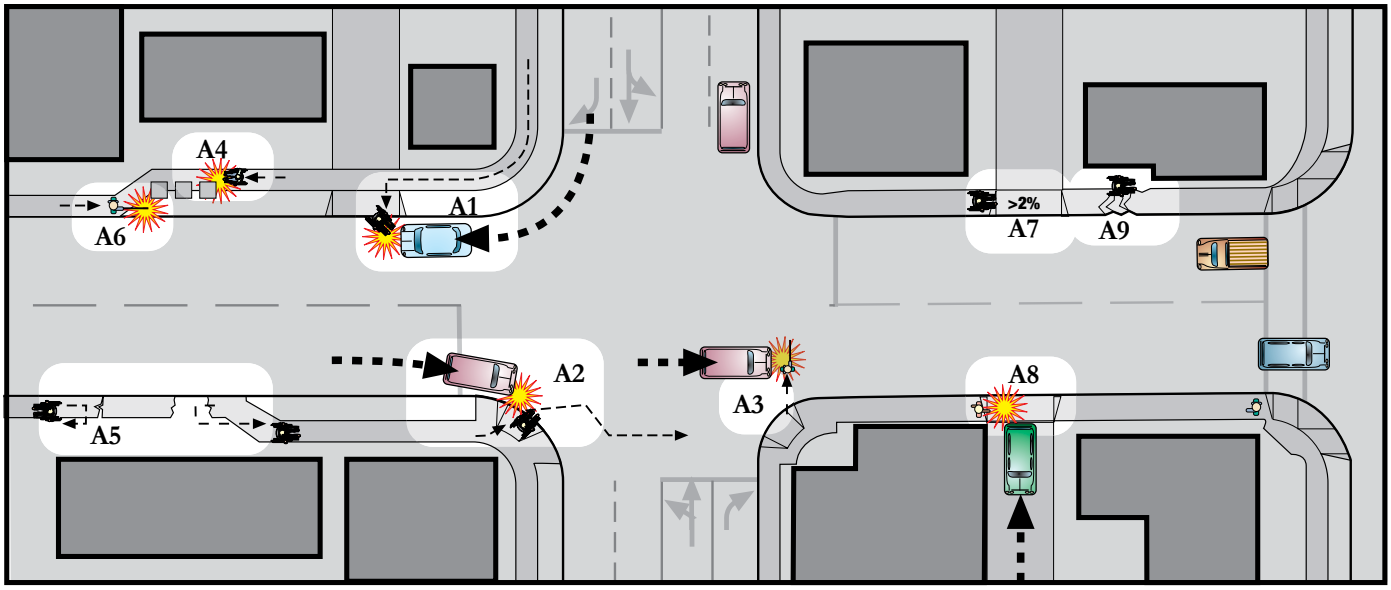
Table 22 has been developed to describe the typical accessibility issues associated with public rights-of-way that require walking or non-vehicular access. Several solutions are suggested, but it remains the responsibility of the property owner or agency to make sure that all reasonable efforts have been made to make as much of the environment universally accessible as possible and that the intent and the letter of ADA and Title 24 regulations have been met.

Findings within this PMP should be considered in future updates of the Transition Plan. The PMP suggests that accessibility is only second to safety in terms of priority for projects and solutions to public issues faced by pedestrians. The Transition Plan helps to set the priorities for improvements of the public right of way, considering limited financial ability to address all shortcomings. The highest priority should be given to improving areas that have accessibility issues as well as safety issues and other connectivity and walkability issues.

If any part of a route is inaccessible, the entire route is inaccessible. Not only is this a difficulty for the physically challenged but all users are forced to walk in the street. Photo Credit: Mike Singleton

Table 22: Accessibility Issues

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



Issues	Potential Solutions *(See legend*)*
A1 – Missing curb ramps. Pedestrians requiring the use of ramps for maneuverability may not be able to cross the street, or may be forced to travel in the street, increasing the risk of vehicular/pedestrian collision.	**1A**
A2 – Curb ramps do not meet standards. Ramps that lack tactile indicators, or ramps that are constructed with steep running slopes, large gutter transitions or excessive cross slopes, decrease accessibility. Some intersections require two ramps per corner for safety and access.	**1A, 3A, 6A**
A3 – Missing pedestrian signals. Missing or non-accessible (height or location) pedestrian signals or signal actuators diminish maneuverability.	**2A**
A4- Sidewalk obstacles. Site furnishings, above-grade utilities, parked vehicles on sidewalks, vehicles overhanging walk, & construction fencing create vertical clearance & protruding barriers.	**4A, 7A,** *also see* **19S** *on page 4-21*
A5 – Sidewalk gaps. Missing sidewalk segments can make an entire route inaccessible for some pedestrians.	**4A,** *also see* **20S** *on page 4-21*
A6 – Inconsistent sidewalk design. Meandering walkways or abrupt changes in the travel path can be difficult for the visually impaired to navigate.	**4A**
A7 – Cross slopes. Excessive cross slopes, often at driveways, can decrease accessibility.	**5A, 6A**
A8 – Blind corners. Visual obstructions (especially at alleys) are made worse when combined with the lower height of wheelchairs or the visually challenged that may not know they are crossing an alley.	**1A, 5A**
A9 – Substandard walking surfaces. Slick or uneven walking surfaces, or trip hazards, can make maneuverability difficult.	**3A, 6A,7A**

Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

1A) Add/upgrade curb ramps equipped with tactile indicators/truncated domes *(See page 4-13)*
2A) Accessible crosswalk signals *(See page 4-13)*
3A) Walkways and ramps free of damage or slip hazards *(See page 4-16)*
4A) Pedestrian paths free of gaps, abrupt directional changes and with obstructions confined to utility/furnishing zone *(See page 4-14)*
5A) Sidewalks with limited driveways and minimal cross-slope *(See page 4-14)*
6A) Re-grade slope of walkway to meet ADA/Title 24 standards *(See page 4-14)*
7A) Repair, slice or patch lifts on walking surfaces and re-set utilities boxes to flush to eliminate trip hazards *(See page 4-14)*

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

3.3 CONNECTIVITY GOALS, ISSUES AND SOLUTIONS

Develop a complete pedestrian network that provides direct and convenient connections for neighborhoods, employment centers, transit stations, public places and community destinations.

Connectivity refers to the existence of a defined direct pedestrian path (generally along streets) between where a walker starts and where she or he wants to go. Community connectiveness is the basis for a pedestrian-friendly environment. The human scale of walking is typically not much more than 1/4 mile distance which is equivalent to a five- to ten-minute walk at an easy pace. Within this ten-minute radius, residents should be able to walk to the center from anywhere in a neighborhood to take care of daily needs or to use public transit. The pedestrian system is an integral component of the overall transit system and serves as a connector between where we live and where we work and how we connect to the city.

3.3.1 Typical Connectivity Issues

In San Diego, sidewalk obstacles that make walking difficult include gaps in the sidewalks, multi-block areas without pedestrian facilities, steep slope/canyon barriers, "difficult to cross" road barriers and land use barriers that prevent the easy pedestrian flows through a site.

Sidewalk Gaps

Throughout the City, there are gaps where sidewalks have not been completed because of development phasing. A typical situation occurs where development takes place on a parcel that is only a portion of an undeveloped block and the sidewalk is constructed to serve only the developed parcel. Until the remainder of the block is developed, there is no connection to other sidewalks in the area. Lack of sidewalk facilities exist at the local site level as well. Often movement around a development, community or commercial center is difficult because there is no separation between the vehicular driving and parking environment and the pedestrian.

Roadway edges that were thought would never be used by pedestrians, are often used even without proper walkway facilities.

Multi-block Areas without Pedestrian Facilities

During the 1960's and 1970's, some large development projects in some areas of the City were constructed without sidewalks and pedestrian facilities in the belief that all areas would be served almost exclusively by private automobile. However, this has not always been the case and pedestrians have had a difficult time in such neighborhoods, such as in parts of La Jolla (Birdrock and Soledad neighborhoods) and in parts of Linda Vista and Clairemont Mesa.

Steep Slope/Canyon Barriers

San Diego's canyons and hillsides are its defining natural features, but these landforms can make pedestrian movement difficult. In some of the City's older neighborhoods, these gaps were addressed by pedestrian bridges (such as Vermont and Upas Street bridges in Uptown) and stairways along hillsides (Uptown, La Jolla, Mission Valley).

Road Barriers

Designing for the movement of vehicles has often relegated the pedestrian to a secondary status. This includes practices of wide curb radii that allowed cars to make turns without significantly reducing speed, and freeway-like ramping, turn lanes and merge lanes that required a pedestrian to cross high speed traffic. Also, high speed, high volume and wide streets represent barriers because of the length of time needed to wait between cycles to cross, the overall crossing distance and the fear of safety issues. These roadway related barriers do affect connectivity.

Because of the volume of traffic and the lack of regularly spaced crossings, some of our urban roads become barriers for pedestrians.

Sidewalk Capacity & Obstruction Barriers

The location and size of sidewalks can also be a connectivity problem if the route is avoided because of other walkability issues. A sidewalk, even one that meets the City's minimum required width, can be a deterrent to pedestrian travel. Though against City Policy, poles for streetlights, traffic signal poles, utility boxes, newspaper racks, backflow preventors, vending machines, etc., are often located in the path of travel making it difficult to maneuver even if there is only a small number of pedestrians using the walk.

Street Patterns that Limit or Extend Pedestrian Connections

The typical suburban street layout, with its hierarchal designation of streets, long blocks without cross-streets and streets ending in cul-de-sacs, makes it difficult for pedestrians to walk from home to school, to shopping, or to recreation, because the street pattern does not allow easy access to destinations, even if they are relatively close by. In turn, this forces potential walkers to rely on the automobile. In some of the region's newer developments, a "connected" street system has been put in place. While not as formalized and geometrically arranged as the street systems in older communities, these systems do allow many options for people to walk to their destinations and they allow people to walk around the block. In neighborhoods where the street connectivity is not possible due to topography or traffic, pedestrian-only walkways have been put in place and some cul-de-sacs have pedestrian connections to adjacent areas.

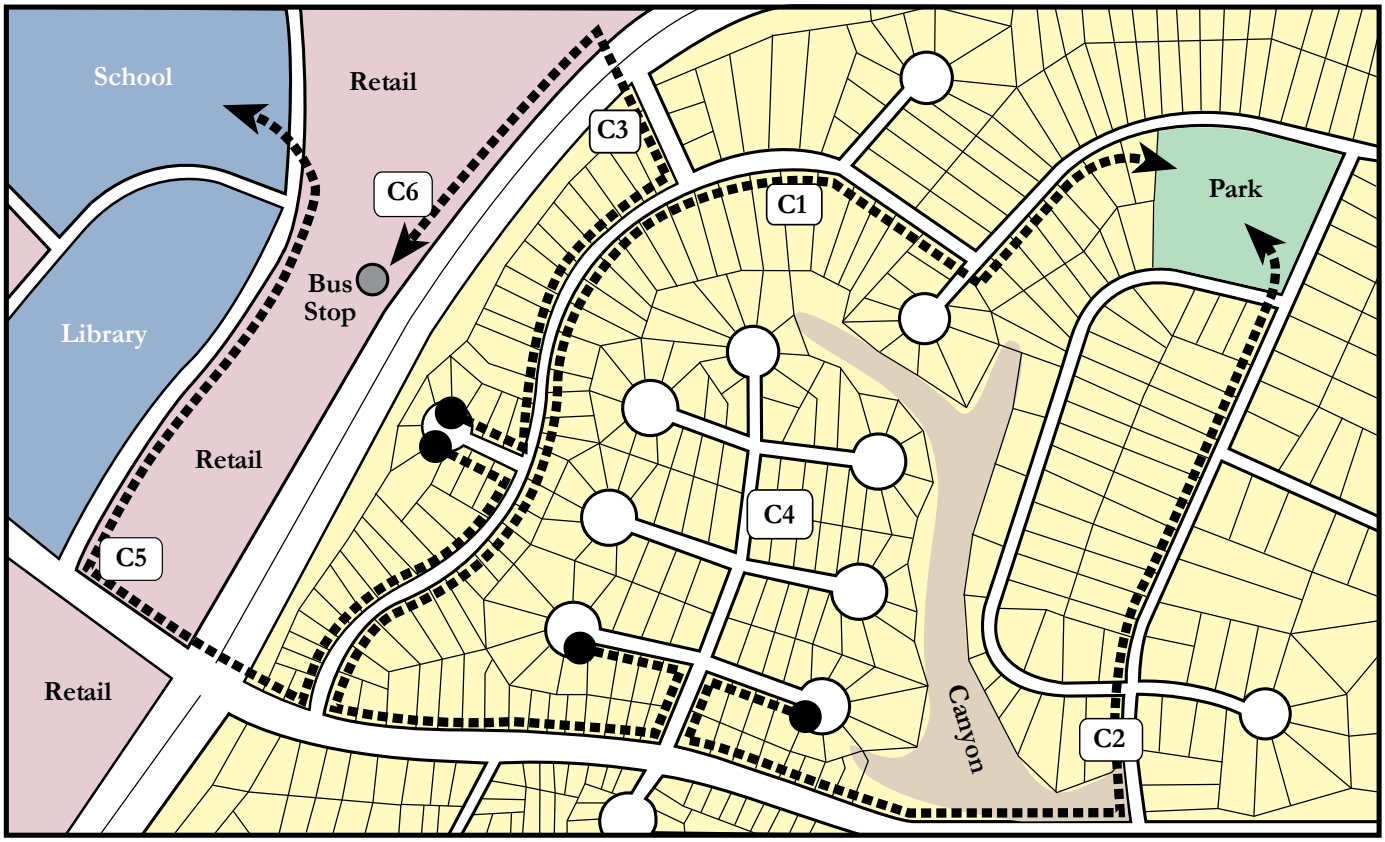
Poorly placed utility boxes can counter the efforts that provide wide and obstruction free sidewalks.

3.3.2 Solutions that Address Connectivity Issues

Table 23 has been developed to describe the typical connectivity issues associated with public rights-of-way and development patterns. Many of these solutions need to be brought up at the site planning and project approval stage. When a project is being portrayed as supporting smart growth strategies, it is incumbent upon the developer or property owner to prove that the new project will be connected with local land uses through direct walking facilities. This often requires connections that lead beyond the immediate limits of the project parcel. If the new or retrofitted environment is not fully connected at a pedestrian scale, then it will not support the objectives of smart growth.

Table 23: Connectivity Issues

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



Issues	Potential Solutions *(See legend*)*
C1 - Street patterns are not connected. Pedestrians are required to take a long route to reach neighborhood attractors, schools and transit. Curvilinear and dead-end streets (cul-de-sacs) tend to discourage walking.	**1C, 2C, 3C, 5C, 8C**
C2 - Walking barriers. Natural barriers (canyons or slopes) or man-made barriers (freeways or rail lines) tend to discourage walking.	**6C**
C3 - High speed roadway barriers. High volume, multi-lane and high speed roads create a perceptual and/or safety barrier that discourages crossing and may require pedestrians to walk blocks out of direction to safely cross.	**4C, 5C, 6C, 7C,** *also see* **1S, 2S, 3S, 4S, 10S, 12S, 13S** *on page 4-19*
C4 - Complete lack of walkways. Entire neighborhoods may lack pedestrian facilities. Except in some rural locations or other special circumstances, all streets should have sidewalks.	**2C**
C5 - Isolated land uses. If the distance between where people live and where they work, shop, learn or play is more than a mile, most people will never walk. Curvilinear streets and non-connected street patterns contribute to this effect.	**3C, 5C, 8C**
C6 - Isolated transit facilities. Transit systems are often not close enough to origins (generators) or destinations (attractors) to make walking between them feasible. Transit systems generate pedestrian activity, which, in turn, supports transit if the stops are within a reasonable walking distance.	**1C, 2C, 3C, 4C, 5C, 6C, 7C, 8C**

Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

1C) Missing sidewalk segments added in areas where sidewalks mostly exist (See page 4-24)
2C) Missing sidewalks added in areas where no sidewalks exist at all (See page 4-24)
3C) Connecting pathways added between streets (See page 4-24)
4C) Street widths reduced or features added to narrow crossing distance (See page 4-25)
5C) Destinations added or made more connected within walking distance of origins (See page 4-25)
6C) Pedestrian bridges that avoid excessively long approach ramps (See page 4-26)
7C) Pedestrian crossing opportunities added for all sides (legs) of intersections (See page 4-26)
8C) When reviewing projects, verification that pedestrian routes and distances between land uses are reasonable and direct (See page 4-26)

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

3.4 WALKABILITY GOALS, ISSUES AND SOLUTIONS

Create pedestrian facilities that offer amenities to encourage usage and to enhance the pedestrian experience.

Walkability is defined as a mixture of physical and perceptual elements that make up the built environment that are conducive to walking. They general fall within one of four zones (road edge zone, furnishing zone, throughway and the building frontage zone). The physical elements include the walkway itself (throughway zone), amenities along the walkway (usually in the furnishing zone), items that provide protection from harsh environmental conditions of sun, wind or rain provided adjacent to or above the walkway (also in the furnishing zone) and the uses along the walkway edge (usually the vehicular edge on one side and some form of building frontage zone on the other side). The perceptual elements are factors that contribute to the feeling of safety, protection from collisions, avoidance of crime, buffering from activity and noise and the comfort and interest that the visual environment provides. The ultimate measure of walkability is whether pedestrians seek out the walking environment, ignore the environment as they pass through it, or actually avoid it completely because of it being perceived as not being walkable.

3.4.1 Basic Requirements for Walkability

In addition to providing a safe, accessible and connected pedestrian environment, a walkable environment includes some additional elements and requirements including:

- The introduction of elements such as shade trees, pedestrian-level lighting, street furniture and appealing plazas not only enhance the pedestrian walking experience, but create streetscapes of superior design that improve the City's image and make the driving experience more pleasant.
- Protection from the elements. This is mostly handled through the use of street trees that add shade and reduce ground reflection of heat and light during warm weather. They provide protection from wind and rain during cold weather. They add visual interest to the streetscape. Trees also serve an important role in increasing safety from passing traffic and the improved perception of safety by buffering adjacent busy uses.
- The arrangement of physical elements must be handled in a way that promotes defensible space.
- Visual access into adjacent land uses such as windows of stores or residences, or an unfenced yard, park, or garden add interest and provide a sense that other people are providing "eyes on the street."
- Public art, water fountains, benches, trash receptacles, drinking fountains and quality lighting communicate welcome and invite lingering. These amenities can improve the success of business establishments.

3.4.2 Solutions that Address Walkability Issues

Table 24 has been developed to describe the typical environmental elements that prevent an area from being considered as walkable and proposes changes to this environment that will make it more walkable. In order for a facility to be truly walkable, however, it must also be mostly void of the issues shown on the Safety, Accessibility and Connectivity matrices.

...foot notes...

"The principal ornament to any city lies in the siting, layout, composition, and arrangement of its roads, squares, and individual works. Each must be properly planned and distributed according to use, importance, and convenience. For without order, there can be nothing commodious, graceful or noble."

Leon Battista Alberti, de Refedifica Foria.

3.5 NEIGHBORHOOD QUALITY GOALS

When walkable communities are provided, they enhance neighborhood quality by providing opportunities for social interaction, enhanced economic development and healthy lifestyles.

Though not a primary issue and solution topic, neighborhood quality is often the result of a variety of environmental and social elements that have been brought together to create a quality living and working environment. If a pedestrian and public environment has been provided that is safe, accessible, connected and walkable, a quality neighborhood is almost assured. When these four goals have been met, they produce positive side affects, such as neighborhood quality. There is a link between the physical environment and the degree of social interaction in a community. Streets and neighborhoods that promote pedestrian activity provide opportunities for the development of social networks. The physical environment of neighborhoods is also known to correlate with the incidence and fear of crime and violence. Certain building designs, the presence of trees and green space, good street lighting and community gathering places are all commonly known to provide residents with a greater sense of security and to serve as an actual deterrent to crime and violence. People like places that are more than just walkable, they like places where they can interact with others in their community.

3.5.1 Required Elements to Assure Neighborhood Quality

The most memorable public places in our cities and towns have generally been those places where people congregate on foot; the streets, parks and squares. These have been democratic places that make our towns and cities livable and vital. Community structure is the basis for a pedestrian-friendly environment. An inviting pedestrian environment helps create a sense of place within a neighborhood and not only makes the streets more walkable, they actually encourage walking, which is the overall goal of this plan.

Places that feel inviting to pedestrians usually share some common characteristics or amenities:

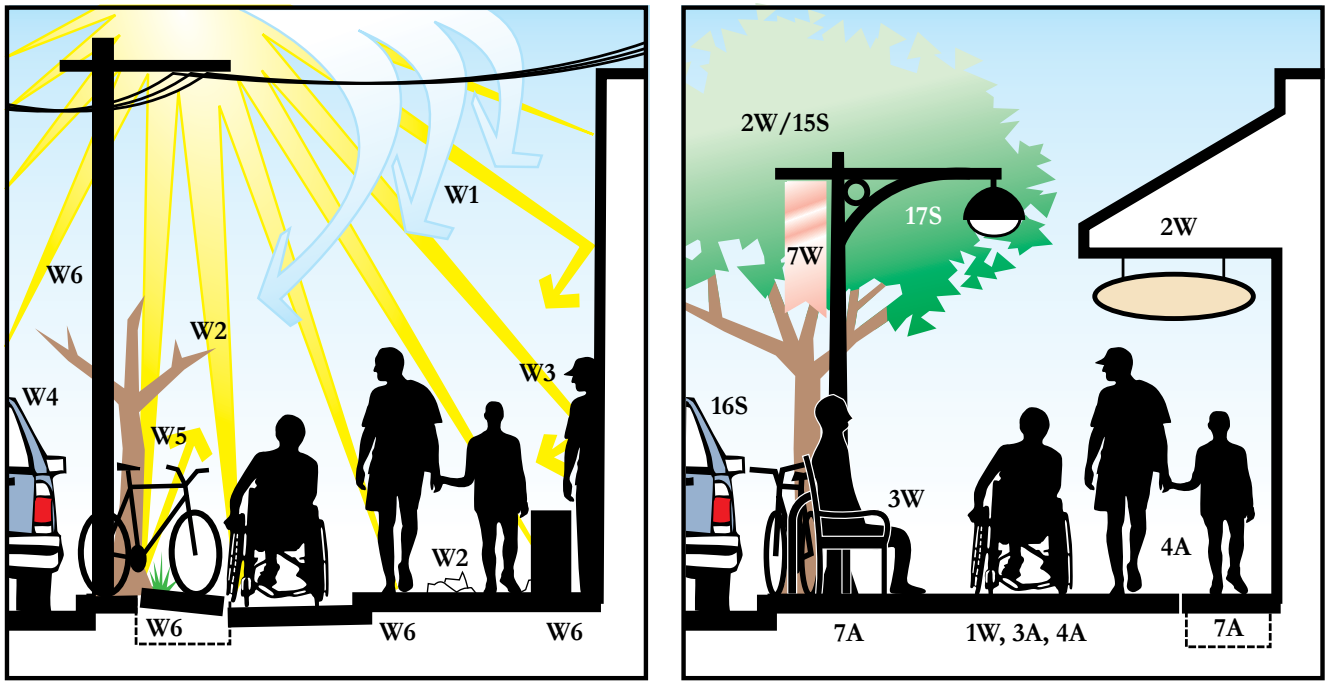
- A sense of enclosure, provided by buildings or other structures, awnings, or trees close to the walkway. Particularly in suburban areas, the proliferation of low-density neighborhoods with wide streets has not allowed a sense of enclosure to develop. There are notable exceptions in denser areas and traditional main streets such as La Jolla, Newport Avenue in Ocean Beach and Adams Avenue in Normal Heights.
- In traditional neighborhoods, buildings were not set back from the street and "window shopping" drew pedestrians along the street. In suburban areas, buildings were set far back from the street, separated from the sidewalk by parking lots, or feature blank walls rather than windows. In some cases, this suburban building form has also been allowed in traditional neighborhoods and in Downtown San Diego, disrupting the pedestrian environment.
- Clearly defined spaces are provided by the City via controls on the intrusion of private commercial uses in the pedestrian way such as zoning ordinances and code compliance. However, in neighborhoods lacking a planting buffer or a defined place for fixtures, the pedestrian path was frequently interrupted by a proliferation of utility poles, newspaper racks, mailboxes and other obstacles.

...side step

When all of the elements of safety, accessibility, connectivity and walkability come together, a quality neighborhood or community will be created.

Table 24: Walkability Issues

These tables and graphics are for illustrative purposes only and are not to be used for engineering analysis or design.



An unwalkable environment...made walkable

Issues	Potential Solutions *(See legend*)*
W1 - Harsh environmental conditions. Direct sun, noise, vehicle fumes and wind can all contribute to an unpleasant walking environment.	**1W, 2W,** *also see* **15S, 16S** *on page 4-20*
W2 - Poor maintenance. Trash, weeds, derelict structures and graffiti can discourage people from walking.	**1W,** *also see* **19S** *on page 4-21*
W3 - Perceived unsafe walkways due to fear of crime. The actual or perceived threat of theft, assault or panhandling can discourage walking.	**1W, 7W,** *also see* **17S** *on page 4-21*
W4 - Lack of buffer from high speed or high volume traffic. Proximity to high speed, high volume traffic creates an unpleasant walking environment.	**1W, 2W, 3W,** *also see* **2S, 15S, 16S, 18S** *on page 4-21*
W5 - Absence of site amenities. Streets lack amenities such as places to sit, shade, drinking fountains, trash receptacles, bicycle racks and pedestrian signage.	**3W, 7W,** *also see* **15S** *on page 4-20*
W6 - Walkway obstructions. This issue goes beyond minimum ADA standards and includes obstructions that force a sidewalk user to go around an obstruction, crowded sidewalks, or the presence of multiple surfaces, slopes and trip hazards.	**1W,** *also see* **3A, 4A, 7A** *on page 4-14*
W7- Limited or difficult street crossisngs. This issue relates to accessibility, safety, connectivity as well as walkability. It is included here to emphasis the need for visual clues and physical design features needed to create visible signs of a safe pedestrian crossing in a vehicle dominanted area.	**4W, 5W, 6W** *also see* **2S, 3S, 4S,** *on page 4-15 and 4-16*

Potential Solutions Legend *(See Table 27 and sample photos in Chapter 4)*

1W) Provide greater than minimum walkway widths and maintain minimum level of repair and maintenance (see page 4-22)
2W) Provide trees, awnings or building overhangs to shade walkways (see page 4-22)
3W) Provide street furnishings for comfort and enjoyment and place amenities (along with utilities) in the right location (see page 4-22)
4W) Provide countdown display crosswalk signals (see page 4-23)
5W) Provide traffic control for crossings such as traffic signals or "all way stops" (see page 4-23)
6W) Provide "pedestrian scrambles" simultaneous crossing allowed in any direction, including diagonally (see page 4-23)
7W) Provide public art such as decorative paving, tree grates, banners, art pieces, signage, etc. (see page 4-23)

** The potential solutions are a possible list of methods to address the problem. Implemented solutions will be determined by actual site conditions, interpretation of policies and engineering evaluation.*

3.6 ALTERNATIVE TRANSPORTATION GOAL

When walkable communities are provided, they support walking as a primary means of transportation, support other transit and bike transportation options and can also improve the beginning and end of vehicular trips when the driver becomes a pedestrian.

Another desired outcome of this PMP is to encourage the use of alternative means of transportation through facilitating pedestrian activity. If the four primary goals of this plan are met, then the chance of having walking as a primary transportation choice (or the use of transit in conjunction with walking as the transportation choice) is greatly increased.

Transit success is reliant upon a walkable and pedestrian friendly environment. Walking to work (or to shop or school) as a primary transportation mode, rivals the mode split of public transportation systems with a fraction of the cost of investment. Walking can also support or extend the travel distance of bicycling and even vehicular transportation since all vehicular trips start and end with a pedestrian mode.

It is beyond this plan to describe alternative transportation issues and solutions, except in recognizing the important role that walking plays in many alternative transportation strategies. To support these strategies, a pedestrian-friendly environment is needed that is safe, accessible, connected and walkable. When neighborhood quality goals are achieved as well, the environment will tend to support walking as a viable and preferred choice.

3.7 COST EFFECTIVENESS GOAL

When funded equitably and appropriately, pedestrian improvements can combine public and private investments for the good of the public and can lower expenses related to vehicular and transit investments.

The final desired outcome of this PMP is to assure cost-effective investment of private and public money for infrastructure needed to support a walkable community. Since funding for pedestrian facilities is limited and often competes with many other community funding priorities, it is highly critical that these funds be used as effectively as possible. Successful examples of improved pedestrian facilities that increase safety, access, connectivity and walkability are needed to assure the continued availability of funding for this alternative transportation mode. Funds spent that do not result in increased walking or that do not address the deficiencies in the pedestrian environment, can often be used as examples as to why funding should be limited for this transportation choice. Other sections of the plan (Chapter 5, 6, 7 and 8) describe the goals of cost-effective investments and prioritization processes for funding.

3.8 RELATIONSHIP OF GOALS & EXISTING POLICIES

Table 25 summarizes existing policies that have been adopted or are in the process of being adopted that affect the pedestrian environment. This plan does not directly create new policies, though it provides guidelines for how to implement policies. In most cases, the existing policies cover all of the topic areas necessary to encourage the inclusion of a walkable environment. Policies that were determined to need further review and refinement are:

- **Policies controlling pedestrian crosswalk striping** (Council Policy 200-07)

  Are the current policies and practices regarding the use of stop bars with double line standard crosswalk markings, the most appropriate for pedestrian safety, or should crosswalk markings with higher visibility to the driver be used (such as continental, zebra or ladder styles)? Should the city consider the use of these different marking styles under certain circumstances and not others? A hierarchy of pedestrian crosswalks is advisable to help indicate to the driver areas of higher pedestrian activity or special conditions such as nearby schools. Using the pedestrian route types in this plan as a basis, policies for crosswalk markings should be made specific to these different route types and treatment areas. Concern over stripng application and maintenance costs should be reviewed as well. The use of staggered continental style markings are used by many municipalities since they are highly visible and do not have the wear and maintenance restriping problems of other crosswalk markings.

- **Policies allowing the use of mid-block crosswalks (with flashing lights) across multiple traffic lanes without active traffic controls** (Council Policy 200-07)

  Should the city use mid-block crossings without active controlled signals? If so, in what situations are these crossings considered safe (such as one-lane each direction with a median refuge) and under what circumstances are other treatments that utilize traffic control warranted? (such as high pedestrian areas with multi-lane multi- threat situations resulting from the shadow affect of one vehicle blocking visibility for other vehicles).

- **Policies that allow for the use of third and fourth leg pedestrian restrictions in situations where left turn conflicts are minimal**

  Should the city refine policies that allow the elimination of pedestrian crossings? Clearly, certain situations such as dual left turns, make pedestrian crossings unsafe. However, in some situations, increased throughput of vehicular turning motions may come at the expense of pedestrian safety, connectivity, accessibility and walkability.

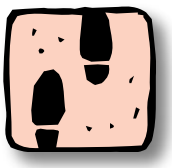
- **Current warrants for stop signs and traffic signals** (Council Policy 200-06, 07 & 08)

  Many times, the most effective method for increasing walkability, connectivity, accessibility and safety is to install a positive traffic control device such as stop signs or traffic signals. Should the city refine its policies on relying on collision and use warrants to justify these treatments or should a more proactive method of improving walkability and safety be integrated with the warrant process?

- **Increased lighting levels along pedestrian routes** (Council Policy 200-18)

  Are there locations with higher pedestrian use that warrant increased lighting levels? Lighting plays a factor in pedestrian safety through avoidance of collisions and crime, which indirectly affect walkability.

Steps that can be taken ...



• The policies listed on this page should be reviewed for adjustments and potential policy amendments or additions.

• Safety and collision data should be reviewed in greater detail to help discover repeating patterns, trends or geographic areas that may warrant appropriate countermeasures.

Table 25: Existing or Draft Proposed City of San Diego Policies Relevant to Pedestrian Issues and Goals

Policy #	Description	Safety	Accessibility	Connectivity	Walkability
DRAFT GP (OCTOBER 2006)-URBAN DESIGN ELEMENT					
GP-UD-A.2	Open space linkages			X	
GP-UD-A.3	Development adjacent to natural features			X	
GP-UD-A.5	Architecture				X
GP-UD-A.8	Landscape				X
GP-UD-A.9	Transit integration	X	X	X	X
GP-UD-A.10	Streets			X	X
GP-UD-A.12	Surface parking			X	
GP-UD-A.13	Lighting	X			
GP-UD-A.14	Signs				X
GP-UD-B.1	Residential design				X
GP-UD-B.4	Residential street frontages		X		X
GP-UD-B.5	Neighborhood streets			X	X
GP-UD-B.6	Alleys			X	
GP-UD-C.1	Mixed-use villages			X	X
GP-UD-C.2	Mixed-use villages			X	X
GP-UD-C.4	Pedestrian-oriented design				X
GP-UD-C.5	Village center public space				X
GP-UD-C.6	Village street layout and design	X	X	X	X
GP-UD-C.7	Streetscape	X	X	X	X
GP-UD-C.8	Superblocks			X	X
GP-UD-D.1	Pedestrian-oriented design	X	X	X	X
GP-UD-F.3	Public spaces				X
GP-UD-F.5	Village center public space				X
DRAFT GP (OCTOBER 2006) - ECONOMIC PROSPERITY ELEMENT					
GP-EP-A.21	Pedestrian design elements on industrial land			X	X
GP-EP-B.9	Retain commercial within walking distance of residential		X		
GP-EP-B.14	Redesignation of commercial land			X	X
DRAFT GP (OCTOBER 2006) - RECREATION ELEMENT					
GP-RE-C.1	Barrier free recreation facilities		X		
GP-RE-C.2	Barrier free outdoor experiences		X		
GP-RE-C.6	Linkages between recreation facilities			X	
GP-RE-C.7	Public access to open spaces and recreation facilities		X		
DRAFT GP (OCTOBER 2006) - CONSERVATION ELEMENT					
GP-CE-C.9	Access to Shoreline			X	
GP-CE-C.12	Beach and Shoreline Accessibility		X		
DRAFT GP (OCTOBER 2006) - MOBILITY ELEMENT					
GP-ME-A.1	Pedestrian safety and comfort	X	X		
GP-ME-A.2	Safe pedestrian routes	X	X		
GP-ME-A.3	Public education campaign	X	X		
GP-ME-A.4	Pedestrian accessibility	X	X		
GP-ME-A.5	Sidewalk design	X	X		
GP-ME-A.6	Interconnected pedestrian network	X	X	X	X
GP-ME-A.7	Pedestrian-oriented design	X	X	X	X
GP-ME-A.8	Mixed uses			X	X
GP-ME-A.9	Mobility, environmental, social and health benefits		X		X
GP-ME-B.3	Walking environment for transit users			X	X
GP-ME-B.9	Transit-supportive city land use planning			X	
GP-ME-C.3	Street layout and pedestrian connections			X	X
GP-ME-C.4	Improve operations and maintenance on city streets	X			
GP-ME-C.6	Minimize pedestrian conflicts at driveway curb cuts	X	X		
GP-ME-C.9	Multi-modal level of service			X	
DRAFT GP (OCTOBER 2006) -LAND USE AND COMMUNITY PLANNING ELEMENT					
GP-LU-H.5	Accessible social services		X		
GP-LU-H.6	Pedestrian linkages			X	
CITY COUNCIL POLICIES					
CP-200-06	Criteria for installation of traffic signals	X			
CP-200-07	Comprehensive pedestrian crossing policy	X		X	
CP-200-08	Criteria for installation of stop signs	X			
CP-200-12	Sidewalk maintenance	X	X		
CP-200-16	Accessible (audible) pedestrian traffic signals	X	X		
CP-200-18	Mid-block street light policy for developed areas	X	X		
CP-600-32	Centre City Streets Standards, Ped. Orientation & Access				X
CP-800-01	Installation of pedestrian separation structures	X	X		