Attachment 1

City of San Diego
Street Design Manual

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Attachment 2

CITY OF SAN DIEGO, CALIFORNIA
COUNCIL POLICY

SUBJECT: ~~Mid-block~~ Street Lighting Policy ~~for Developed Areas~~
POLICY NO.: 200-18
EFFECTIVE DATE:

BACKGROUND

Public rights-of-way play an important role in our communities; in addition to handling vehicular traffic, they are used for walking, bicycling, jogging, socializing, and a place where people gather for various reasons. They are used as access to transit stops, public parks, schools, shopping, and the like. Public street lighting is becoming more and more important to our quality of life. Street lighting facilitates safe operation of traffic, gives pedestrians a safer traveling environment, promotes night use of commercial shopping areas, and increases citizen perception of safety from crime. *Street lights fall under two categories; roadway lighting and pedestrian walkway or sidewalk lighting.*

There is a great deal of outreach in various communities in the form of workshops, forums, and meetings, all with a common purpose; to get a sense of what the public's issues and concerns are. One of the common themes heard at most of the meetings are dark streets *and sidewalks*. Concerns are expressed about inadequate lighting, particularly near transit stops. ~~,which are generally utilized by youths, seniors and the disabled; three social groups most reliant on public transportation and most vulnerable to criminal assault. It is also not just an issue of yellow lights, but a lack of the number of street lights.~~

A well-conceived street lighting system is a critical component for the successful achievement of a "City of Villages." The corollary is that livable communities go hand in glove with well-designed streets. In addition to improving visibility for vehicle operators and pedestrians, a good street lighting system promotes public safety by enhancing walkability. Moreover, public transit enjoys greater popularity by virtue of the nighttime comfort and safety a good street lighting system affords the transit patrons. ~~It should not be assumed though, that every neighborhood wants or needs change, and the lack of supplemental lighting by residents in some parts of San Diego combined with the desire of some people for a "country" feeling suggests that some neighborhoods might not want additional lighting.~~ *Diversity in lighting design and equipment is encouraged*

CITY OF SAN DIEGO, CALIFORNIA
COUNCIL POLICY

Where it enhances existing community character. Community plans are the appropriate policy vehicle for identifying these street lighting treatments.

PURPOSE

This policy~~, pertaining to mid-block street lighting spacing~~, is adopted to ~~increase~~ *provide adequate levels* of ~~street~~ lighting on ~~public streets~~ roadways~~, subject to the availability of funds~~ *and pedestrian walkways or sidewalks within the City's public right-of-way. The type of lighting fixture and its placement and illuminance should be carefully selected to achieve its intended purpose while minimizing light pollution, light trespass, and glare to drivers.*

POLICY

1. *Roadway Lighting*

- *Roadway lighting for traffic safety purposes shall at a minimum be provided at the following:*

    a. *Intersections*
    b. *Near the end of cul-de-sacs that exceed 200 feet in length*
    c. *Mid-block crosswalks*
    d. *Highway-rail at-grade crossings*
    e. *Major, urban major and prime arterial streets*
    f. *Other locations, such as abrupt changes in horizontal or vertical roadway alignment, where a bicycle path intersects with a street mid-block, and critical sections of streets where there is a demonstrated correlation between nighttime traffic accidents and lack of roadway lighting.*

2. *Pedestrian Walkway or Sidewalk Lighting*

    - *Pedestrian walkway or sidewalk lighting shall provide adequate lighting for pedestrians of all abilities. It should provide illuminance levels that allow detection of other pedestrians and objects along pedestrian walkways and sidewalks. Lighting should also allow pedestrians to quickly and accurately recognize cues to enable safe navigation. Communities shall be nighttime walkable with continuous pedestrian walkway or sidewalk lighting unless Community Planning Areas specifically request otherwise. However, all*

Community Planning Areas must provide continuous pedestrian walkway or sidewalk lighting at the following:

a. Commercial areas

b. Blocks within ¼ mile of: transit stops and transit stations, schools, libraries, community recreation centers, and neighborhood retail stores.

- *Contributions from other nearby storefront lighting, private lighting, sign lighting and/or reflections from structures on private property should not be considered as reasons to reduce the necessary lighting.*

- *Provisions of pedestrian walkway lighting in residential and commercial high-crime census tracts and within ¼ mile of transit stops and stations located in developed areas are considered priority for funding.*

- Agriculture-zoned land or open space may be exempt, at the discretion of the City ~~Engineer~~ Manager, from ~~mid-block~~ ~~street~~ *pedestrian walkway or sidewalk* lighting provisions. ~~In addition, exemptions may be granted where Community Planning Areas specifically request such due to community character.~~

3. *Street lighting above minimum standards including ornamental lighting shall require the formation of street lighting assessment districts in accordance with relevant Council policies. Custom poles, luminares, and spacing may be used.*

~~Subject to the availability of funds, mid-block street lighting shall be placed such that the spacing of street lights between intersections is no longer than 300 feet; except that, mid-block street lighting shall be spaced no greater than 150 feet within a quarter mile of all transit stops (bus and trolley), as well as in high crime residential and commercial districts.~~

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J. Street Lights

Street lights shall be provided in accordance with the approved Council Policy 200-18, *Street Lighting*. All street lights shall have a broad-spectrum light source, and shall be installed as follows:

1. Vehicular Roadway Lighting

Vehicular roadway lighting standards and mounting heights shall conform to City of San Diego Standard Drawing SDE-101 and shall be full cutoff, Type III, and shall be installed at the following locations:

a. Intersections – Roadway lighting at all intersections shall conform to Caltrans Traffic Manual.
b. Highway-rail at-grade crossings – Roadway lighting at all highway-rail crossings shall conform to Caltrans Traffic Manual.
c. Mid-block pedestrian crossings – One 27,500 lumens street light or City approved equivalent light, as applicable, shall be installed on each approach to the crosswalk. Refer to Appendix XX for typical installation.
d. Near the end of cul-de-sacs that exceed 200 feet in length – 16,000 lumens street light or City approved equivalent light, as applicable, shall be installed.
e. Other locations, such as at abrupt changes in horizontal or vertical roadway alignments and where Class I bicycle facility intersects with a street mid-block – Street lighting shall be provided as needed to provide a minimum of 0.6 horizontal footcandles at the centerline of the roadway.
f. Critical sections of streets where there is a demonstrated correlation between nighttime traffic accidents and lack of roadway lighting - Continuous roadway lighting shall be installed in conformance with Table 5-1.
g. Major, urban major and prime arterials – 27,500 lumens street lights or City approved equivalent lights shall be installed on both sides of the street at intervals not to exceed 300 feet.

2. Pedestrian Walkway or Sidewalk Lighting

Pedestrian walkway or sidewalk lighting shall provide adequate lighting for pedestrians of all abilities. It should provide illuminance levels that allow detection of other pedestrians and objects along pedestrian walkways and sidewalks. Lighting should also allow pedestrians to quickly and accurately recognize cues to enable safe navigation. Communities shall be nighttime walkable with continuous pedestrian walkway or sidewalk lighting unless Community Planning

Areas specifically request otherwise. However, all Community Planning Areas must provide continuous pedestrian walkway or sidewalk lighting at the following:

a. Commercial areas

b. Blocks within ¼ mile of: transit stops and transit stations, schools, libraries, community recreation centers, and neighborhood retail stores.

Lighting levels in walkway or sidewalk areas shall conform to the following:

- For commercial areas, the average maintained horizontal illuminance (FC) shall not be less than 0.9 footcandles, and shall not exceed illuminance uniformity ratio (UR) of 3:1 (FC_{Avg} : FC_{Min}).

- For mixed-use areas, the average maintained horizontal illuminance shall not be less than 0.6 footcandles, and shall not exceed illuminance uniformity ratio of 3:1 (FC_{Avg} : FC_{Min}).

- For residential areas, the average maintained horizontal illuminance shall not be less than 0.4 footcandles, and shall not exceed illuminance uniformity ratio of 3:1 (FC_{Avg} : FC_{Min}).

- In commercial areas, contributions from other nearby storefront lighting, private lighting, sign lighting and/or reflections from structures on private property should not be considered as a reason for reducing the sidewalk or walkway illuminance levels indicated above.

- Sidewalk or walkway lights shall have cutoff fixtures that minimize light pollution, light trespass, and glare to drivers

Further design guidelines can be found in the RP-8 publication, "*American National Standard Practice for Roadway Lighting*, " of the Illuminating Engineering Society of North America."

Agriculture-zoned land or open space may be exempt, at the discretion of the City Manager, from pedestrian walkway lighting provisions.

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Section 7. Traffic Calming

A. Purpose

This section is intended to provide design options for traffic calming on new streets and streets considered for retrofit. Some general design specifications are provided to assist designers in developing comprehensive streetscape plans for proposed development and redevelopment projects. It is emphasized that these are just guidelines and that innovative street designs that incorporate traffic calming are encouraged.

B. Overview

Traffic calming involves the use of various geometric features designed to reduce vehicle speeds or discourage shortcutting traffic. To achieve the desired effect of traffic calming, the effectiveness of such measures and their impacts should be evaluated on an area-wide basis.

Traffic calming is appropriate along circulation element roads as well as commercial and residential local streets. Local streets should be designed to function efficiently and safely, yet minimize the need for extensive traffic regulation, control devices, and enforcement. The function of the local street should be readily apparent to the user through its appearance and design.

Landscaping, street trees, street lighting, and street furniture may be used to create distinctive and pleasing streetscapes, which encourage sidewalk activity. These improvements may involve consideration of irrigation and long-term maintenance to be provided by maintenance assessment districts or other agreements with the City.

C. General Guidelines

The following general guidelines should be considered in traffic calming installations.

- Delays to emergency vehicles should be minimized by the appropriate placement and design of traffic calming devices. In some cases, certain traffic calming devices may not be appropriate.

- Traffic calming installations should not divert traffic to other local residential streets. Traffic calming installations should support the street classifications established in community plans. Traffic may be diverted from residential streets to classified through streets. The potential impacts of traffic diversion should be evaluated for all traffic calming installations.

- Traffic calming devices on designated transit routes should be limited to those that permit the efficient movement of transit vehicles.

- Traffic calming installations must meet State and Federal accessibility requirements.

- Traffic calming should not impair non-motorized users.

- Traffic calming installations must consider drainage.

D. Traffic Calming Techniques

Traffic calming measures generally fall into the following categories:

- Horizontal deflections (chicanes, mini circles, median slow points)
- Vertical deflections (road humps, speed tables/raised crosswalks)
- Intersection pop-outs
- Traffic diverters (semidiverters and diagonal diverters)
- Channelization

Enhancing the streetscape environment should have the same level of priority in the design scheme as traffic calming impacts. A general discussion of these categories follows along with more specific details and design guidelines for various traffic calming measures. The various traffic calming measures, their applicability, advantages and disadvantages are summarized in Table 7-1. Appendix XX contains typical layout of the various traffic calming devices.

E. Horizontal Deflections

Horizontal deflections are used to achieve speed reductions by breaking up the linear path of vehicle travel. Traffic calming designs that involve horizontal shifts in the travel way are inappropriate for major streets and arterials. Horizontal deflections include chicanes (mid-block), mini circles (intersections), and median slow points (mid-block and intersections).

Chicanes - A chicane is a channelization that causes a series of tight turns in opposite directions in an otherwise straight stretch of road. The combination of narrowed street width and the serpentine path of travel slows traffic. On new streets, chicanes narrow the street by widening the sidewalk or landscaped parkway. On streets considered for retrofit, raised islands are installed to narrow the street. The advantages of chicanes include: slow traffic, may create opportunity for landscaping, and tends not to divert traffic to nearby streets. Chicanes are inappropriate for use on streets classified as collector or higher, bus routes, emergency response routes, where there is a grade that exceeds 5%, or where there is limited stopping sight distance such as at the crest of a hill. Chicanes may cause some loss of on-street parking, may impact driveways, may increase emergency response time, or may affect drainage and street sweeping.

Mini Circles - A Mini circle is a raised circular island placed in the center of an intersection. Traffic yields on entry, then enters to the right, traveling around the circle counter-clockwise. A mini circle slows traffic on each approach, reduces right-of-way conflicts, creates a landscaping opportunity, and tends not to divert traffic to nearby streets. Mini circles are appropriate for usage on low volume local residential streets with alternative access points. Mini circles should not be used on streets classified as collector or higher, bus routes or emergency response route, where the grade exceeds 5% on any approach, or where there is limited stopping sight distance. A mini circle may impact large vehicles' turns or may increase emergency response time.

Median Slow Points - A median slow point is a small median or island placed in the center of a roadway that causes traffic to shift its path to the right in order to travel around it. It may be on an approach to an intersection or mid-block. If median slow points are installed at an intersection, the street should have alternative access points. A median slow point slows traffic, creates a pedestrian refuge area, creates a landscaping opportunity, and tends not to divert traffic to nearby streets. Median slow points may be used on two lane streets. It should not be used on streets classified as major or higher or where there is limited stopping sight distance. Median slow points may cause some loss of on-street parking or may impact large vehicles' turns when installed at intersections.

F. Vertical Deflections

Vertical deflections are an effective traffic calming technique for speed reductions and discouraging shortcutting on local streets. Vertical shifts are only appropriate on two-lane streets. Traffic calming designs that involve vertical shifts are inappropriate for collector streets, major streets and arterials. Vertical deflections include road humps and speed tables/raised crosswalks.

Road Humps - Road humps are rounded raised areas placed across the road. Road humps are approximately 12 feet long (in the direction of travel), 3.5 inches high, and parabolic in shape. It is usually constructed with a taper on each side within a foot or two of the gutter line to allow unimpeded drainage between the hump and curb. They are most effective when used in groups that are spaced close enough to avoid encouraging speeding between humps. Road humps are different from speed bumps. Speed bumps are much more abrupt, usually less than three feet in length, and are used in parking lots and private drives. Speed bumps are not used on public streets.

While primarily used for speed reduction, road humps can also result in the reduction of traffic volumes on streets where they are employed by diverting traffic to other nearby streets. Road humps should not be used on streets classified as collector or higher, emergency response routes, bus routes, where grade exceeds 5%, or where there is limited stopping sight distance. The disadvantages of road humps may include diverting traffic to other low volume local streets, increasing emergency response time, or increasing noise.

Speed Table/Raised Crosswalk - Speed tables are essentially flat-topped road humps often constructed with brick or other textured materials on the flat section. Speed tables are 3 1/2

inches high and 22 feet long in the direction of travel, with 6-foot ramps at the ends and a 10-foot field on top. The brick or other textured materials improve the appearance of speed tables and draw attention to them. Speed tables are less jarring than the standard 12 road humps. Speed tables are most effective when installed in groups of two or more, about 300 feet apart. Where extended from curb to curb and appropriately marked, speed tables serve as raised crosswalks. Raised crosswalks bring the street up to sidewalk level. Drainage requirements must be evaluated and addressed where raised crosswalks are installed.

Speed tables/raised crosswalks reduce vehicle speeds. Raised crosswalks enhance pedestrian safety. The disadvantages of speed tables/raised crosswalks may include diverting traffic to nearby low volume local streets, increasing noise and increasing emergency response times. Speed tables/raised crosswalks should not be installed on streets classified as collector or higher, emergency response routes, bus routes, where grade exceeds 5%, or where there is limited stopping sight distance.

G. Intersection Pop-outs

Intersection pop-outs are curb extensions that narrow the street at intersections by widening the sidewalks at the point of crossing. They are used to make pedestrian crossings shorter and reduce the visual width of long, straight streets. They also narrow the area of pavement in travel lane widths. Where intersection pop-outs are constructed by widening the landscaped planting strip, they can have a positive effect on the visual appearance of the neighborhood. Pop-outs can be used at intersections to create a street gateway effect visually announcing an entrance to a neighborhood. Intersection pop-outs must accommodate transit vehicles and emergency response vehicles. Pop-outs improve pedestrian visibility, create shorter pedestrian crossing width, and may reduce vehicle speeds. Pop-outs may impact large vehicle turns, may impact accessibility by transit vehicles or emergency response vehicles, and may require parking removal. Intersection pop-outs may be installed on local streets, collector streets and urban major streets. Pop-outs are inappropriate on major streets and primary arterials.

H. Traffic Diverters

Traffic diversion devices eliminate through trips on streets on which they are installed and divert those trips to other streets. There are several available traffic diversions designs that may be used to calm traffic. Traffic diverters are not primarily installed for the purpose of speed control. Diverters are best suited on long straight low volume local residential streets. Wherever traffic diversion techniques are employed, provision should be made for continuation of pedestrian and bicycle routing around or through the diversion. Care must be taken in design of diversion installations to allow for emergency vehicles. Diverters include semidiverters and diagonal diverters.

Semidiverters - A semidiverter is a barrier to traffic in one direction of a street, which permits traffic in the opposite direction to pass through. It is an alternative to one-way street operation for a block and it allows residents on the block limited two-way travel opportunity. A semi-diverter may be used on low volume local residential streets and it is best located at the end of a block to prevent entrance and allow exit. Semidiverters reduce cut-through motorized vehicle traffic, reduce pedestrian crossing widths, and create opportunity for landscaping. Semidiverters may divert traffic to other low volume streets, may increase trip lengths, may cause loss of parking, and may increase emergency response time. Semidiverters are inappropriate for use on emergency response routes, bus routes, or streets classified as collector or higher. No specific geometric features are included in this manual, since semidiverters are site specific and should be designed on a case-by-case basis.

Diagonal Diverters - Diagonal diverter is a barrier placed diagonally across an intersection to, in effect, converts the intersection into two unconnected streets, each making a sharp turn. The primary purpose of a diagonal diverter is to break up through traffic, thus making travel through a neighborhood difficult, while not actually preventing it. Diagonal diverters tend to be less successful in areas where heavy traffic on surrounding major streets makes the diverter-created maze of local streets still preferred by some drivers. Diagonal diverters should be clearly visible both during the day and night. Diagonal diverters reduce cut-through traffic, reduce vehicle conflicts, and create opportunity for landscaping. The disadvantages of diagonal diverters may include increasing out of direction travel, increasing trip lengths, causing loss of parking, diverting traffic to low volume streets, or impeding emergency vehicles. Diagonal diverters may be used on low volume local residential streets. Diagonal diverters are inappropriate for use on emergency response routes, bus routes, streets classified as collector or higher, where there is limited sight distance, or where there is a grade that exceeds 5%. No specific geometric features are included in this manual, since diagonal diverters are site specific and should be designed on a case-by-case basis.

I. Channelization

Channelization may be used on arterial streets to prevent cut-through traffic onto local streets or to control turning traffic in or out of a neighborhood. Channelization can be achieved through regulatory signs and pavement markings, landscaping, or raised channelization islands aimed at motorized, non-motorized, or pedestrian traffic. Channelization may be designed to prevent cut-through traffic, reduce speed, create opportunity for landscaping, control turning traffic in and out of a neighborhood, or physically guide pedestrians. The disadvantages of channelization may include creating out-of-direction travel, increasing trip lengths, increasing emergency response time, or impacting accessibility. No specific geometric features are included in this manual, since channelization devices are site specific and should be designed on a case-by-case basis.

Table 5-1
Horizontal Illuminance and Uniformity Ratio for
Continuous Vehicular Roadway Lighting

Area Type / Street Class	Commercial		Mixed		Residential	
	FC	UR	FC	UR	FC	UR
Primary/Major	2.0	3:1	1.4	3:1	1.0	3:1
Collector	1.2	3:1	0.9	3:1	0.6	3:1
Local	0.9	3:1	0.6	3:1	0.4	3:1

Where:
FC – Average maintained horizontal illuminance in footcandles
UR – Uniformity Ratio, $FC_{Avg} : FC_{Min}$

Notes:

1. Street Lights shall have a broad-spectrum light source with full cutoff, Type II.
2. Roadway lighting standards and mounting heights shall conform to City of San Diego Standard Drawing SDE-101.
3. Further design guidelines can be found in the RP-8 publication, "*American National Standard Practice for Roadway Lighting*, " of the Illuminating Engineering Society of North America."