THE CITY OF SAN DIEGO

Transportation & Storm Water Design Manuals

Street Design Manual

March 2017 Edition

The City of SAN DIEGO

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List of Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
BMPs	Best Management Practices
CalTrans	California Department of Transportation
CAMUTCD	California Manual on Uniform Traffic Control Devices
CCT	Correlated Color Temperature
FC	Foot-Candle
FHWA	Federal Highway Administration
IES	Illuminating Engineering Society of North America
LOS	Level of Service
MTS	Metropolitan Transit System
NACTO	National Association of City Transportation Officials
NCHRP	National Cooperative Highway Research Program
PCC	Portland Cement Concrete
ROW	Right of Way
SANDAG	San Diego Association of Governments
SDMC	San Diego Municipal Code
TOD	Transit Oriented Development
LED	Light =-Emitting Diode

Introduction

"Community streets are public rights-of-way, which unite neighborhoods, provide access for motorists and non-motorists, and promote neighborhood identity, health, comfort, and safety." -Moorish and Brown, *Planning to Stay*

Streets play a major role in shaping the form of the urban environment. The quality of the street experience is a key element in the quality of a neighborhood. The City's 1989 *Progress Guide and General Plan* contains language that is still relevant that describes the function of the City's street system as follows:

> Streets serve a variety of purposes. One is for the circulation of people, vehicles, goods, and services (utilities). Streets also serve as shopping corridors, restaurant rows, linear parks, residential front yards, extensions of office lobbies, ceremonial gathering places, parade grounds, racing courses, display areas, entertainment strips, etc. The street is really the City, organized along a corridor. It is a continuous forum for gathering where all those activities have their overture, making city life what it is. It has economic, social, aesthetic, political, ecological—even philosophical—implications. And all this is in addition to providing a right-of-way for people and things.

The City's current *General Plan* with its City of Villages strategy continues the tradition of calling for streets to be designed for all users of the right-of-way and recognizes streets as an important element in shaping our urban form and improving our neighborhood quality by:

- Balancing the needs of emergency vehicles with everyday traffic concerns—such as vehicle speeding and pedestrian safety—through street design policy.
- Promoting an interconnected street network that includes pedestrian and bicycle facilities where topography and land form permit.
- Creating a more attractive and safe pedestrian environment through the promotion of an active streetscape and the use of public art and artistic elements.
- Reducing peak energy demand through the incorporation of urban heat island reduction measures into the appropriate site and street design guidelines, landscape standards, and building codes.
- Promoting pedestrian- and transit-friendly design of City streets.
- Providing capacity and operational improvements to streets to minimize congestion and focus on persons and goods, not just vehicles.

These are the guiding principles of the Street Design Manual.

The purpose of the Street Design Manual is to provide information and guidance for the design of the public right-of-way that recognizes the many and varied purposes that a street serves. The Street Design Manual is intended to assist in the implementation of the *General Plan*, the *Strategic Framework Element*, the *Transit-Oriented Development Design Guidelines*, and the *Land Development Code*. In addition, it is intended to assist in the implementation of the special requirements established through community plans, specific plans, precise plans, or other City Council-adopted policy and/or regulatory documents.

Applicability

These guidelines are applicable to newly developing areas and to older areas that are undergoing major revitalization and redevelopment. In areas with sensitive habitat or unusual and difficult terrain, these guidelines may be modified as appropriate.

In historic and older, developed neighborhoods, the existing character of the streets should be maintained and enhanced. In these older neighborhoods, nonstandard street widths are frequently in place in many locations. Existing street designs and configurations not illustrated in this manual may be considered appropriate for continued use in such neighborhoods. The National Association of City Transportation Officials (NACTO) Urban Street Design Guide, Urban Bikeway Design Guide, and Transit Street Design Guide may be referenced when designing an existing road for traffic calming, bike facilities, and for retrofitting for all modes of travel. Sound engineering judgement should be applied to protect public health, safety and welfare, subject to approval of the City Engineer. Final decision should consider future maintenance cost, in perpetuity.

This manual establishes guidelines to carry out the City's street design functions. It does not establish a legal standard for such functions nor is it intended to do so. Moreover, these guidelines do not supersede requirements and policies established through community plans, specific plans, precise plans,and City standard drawings, or other City Council-adopted policy and/or regulatory documents; rather, they are designed to work in concert with them.

Note: All drawings included in this manual are for illustrative purposes only and should not be used as design or construction plans.

How to Use This Manual

The Street Design Manual is divided into six chapters:

- Chapter 1: Roadway & Alley Design
- Chapter 2: Pedestrian Design
- Chapter 3: Traffic Calming
- Chapter 4: Street Lighting
- Chapter 5: Parkway Configurations
- Chapter 6: Design Standards

It is important to understand how all six sections work. All six elements should be considered in order to design an effective street system. This manual complements the *Transit-Oriented Development Design Guidelines* and substantiates the importance of site planning in the design of an effective street system.

Each of the street classifications described in this manual includes references to Chapter 5 which indicates the appropriate parkway configuration for the type of street.

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Chapter 1

Roadway & Alley Design

1.1. Roadways

The width and configuration of the roadways indicated in this manual are designed to provide safety and accommodation for all modes of travel. Factors considered are safety, accessibility, and connectivity to promote walking, cycling, and transit use while providing reasonable conditions for the estimated future average daily traffic (ADT) and on-street parking needs, which reflects the policies in the City of San Diego General Plan and the City of Villages Strategy.

- Bike facilities can be designed based on the "City of San Diego Bicycle Facilities Design Guidelines". Consideration for alternative bike treatments consistent with NACTO's Urban Bikeway Design Guide and Federal Highway Administrations (FHWA's) Separated Bike Lane Planning & Design Guide may be made on a case by case basis in order to promote safer and attractive bikeway facilities.
- All dimensions for cross sections with raised medians shown in Chapter 1 of this manual assume the use of standard curb with gutter for medians.
- Traffic calming devices can include chicanes, traffic circles, median slow points, road lumps, speed tables, raised crosswalks, intersection pop-outs, semi-diverters, or channelizations. Additional information can be found in Chapter 3, "Traffic Calming" and in NACTO's Urban Street Design Guide.
- The ADTs corresponding to the various LOSs included in the City of San Diego's Traffic Impact Study Manual are guidelines to correlate the quality of traffic service with typical sections of different street classifications. The ADT should not be used as the sole factor in determining the appropriate street classifications, since other factors play an important role in shaping the operating conditions on a facility. Designers are encouraged to perform analysis using Highway Capacity Manual methodologies to assist in determining appropriate levels of service for their street projects.

1.2. Alleys

An alley is a secondary means of access usually lying along the rear of property, the front of which abuts on and has primary access from a street. The following design specifications apply (see Figures 1–1 and 1–2):

- Alleys should not intersect streets of four-lane urban major or higher classification.
- Alleys are to be improved 20 feet wide within a 20-foot right-of-way. Where utility services, fire hydrants, etc. are located in the alley, the right-of-way must be widened as required. At the intersection of two alleys, a triangular area at the corner, 20 feet on each side, shall be improved and included in the right-of-way.
- Maximum grade is 15 percent. Minimum curve radius is 100 feet or as needed to accommodate commercial and emergency vehicle access and provide for 15 mph minimum sight distance.
- Curb ramps shall be installed on both sides of an alley entrance in the sidewalk path of travel.
- Alleys shall be constructed in accordance with City of San Diego Standard Drawings.
- Alley setbacks shall comply with SDMC Chapter 13, Article 1, Division 4.

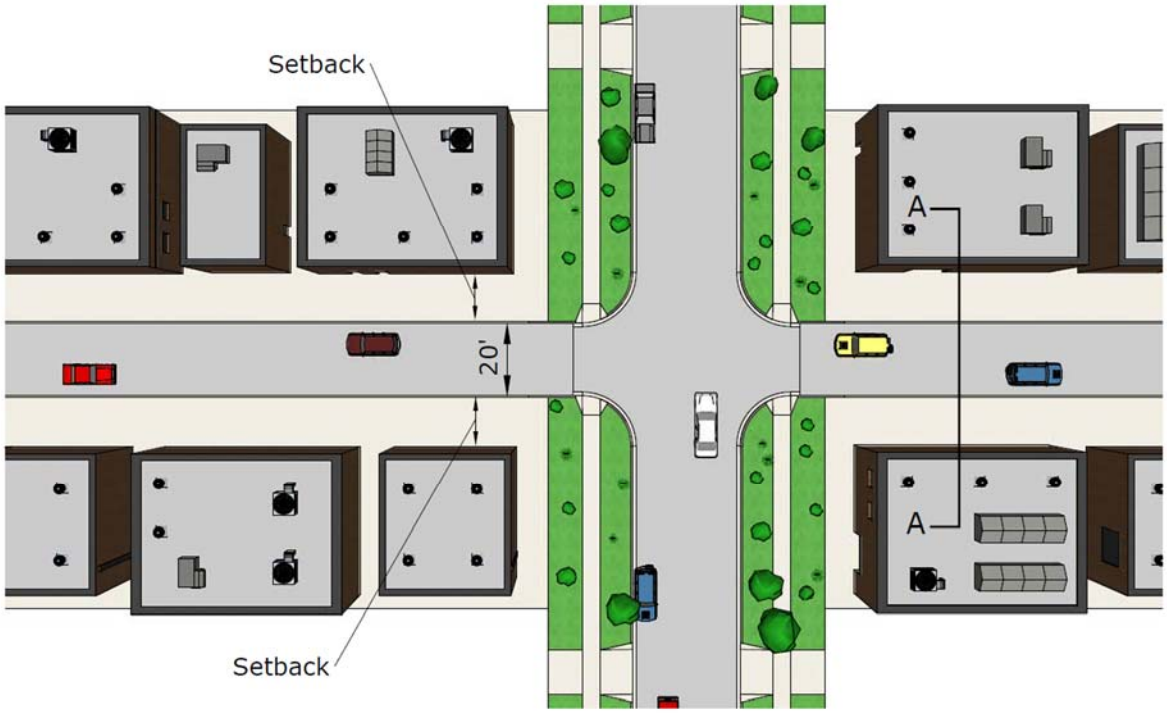


FIGURE 1-1. PLAN: ALLEY

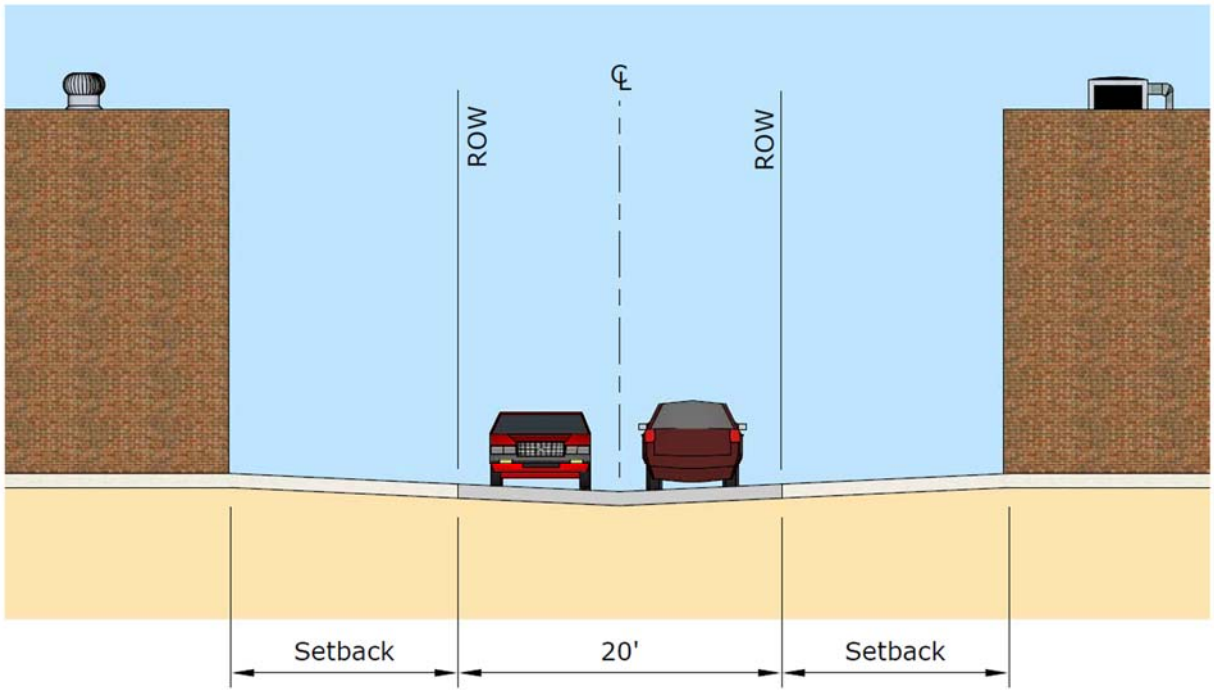
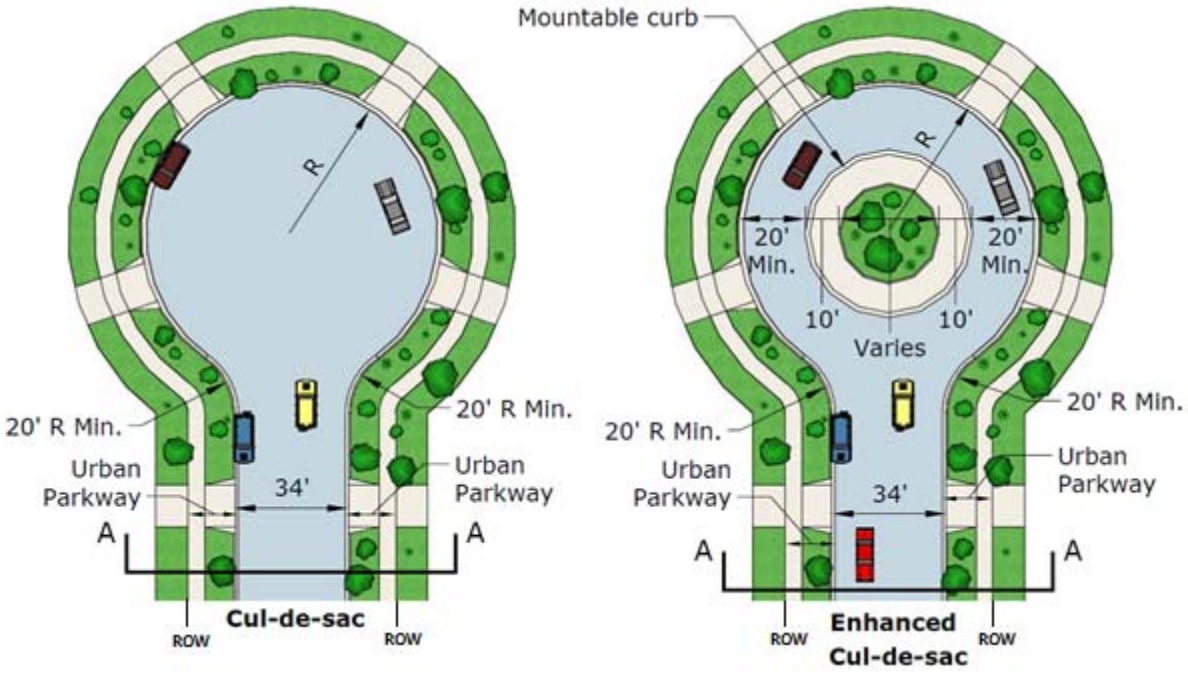


FIGURE 1-2. SECTION A-A: ALLEY

1.3. Residential Streets

All Figures are for illustrative purposes and all signing and striping are subject to the most recent adopted edition of the CA MUTCD or as appropriate by reviewer. Figures 1–3 through 1–8 and Tables 1–1 through 1–3 illustrate the design specifications for cul-de-sacs, low-volume residential local streets, and residential local streets.

1.3.1 Cul-De-Sac



Note: Not to scale. Refer to Geometric Design, Section 6.1.5.
On-street parking should be prohibited on refuse collection days.

FIGURE 1-3. PLAN: CUL-DE-SAC AND ENHANCED CUL-DE-SAC

TABLE 1-1. CUL-DE-SAC SPECIFICATIONS

Width, Right-of-Way Reduced Width[1] Single-loaded[2]	54 ft. – 64 ft. 52 ft. – 62 ft. 48 ft. – 58 ft.
Design ADT[3]	200
Width, Curb-to-Curb[4] Reduced Width[1] Single-loaded	34 ft. 32 ft. 28 ft.
Maximum Grade	15%
Minimum Curve Radius	100 ft.
Land Use **Parkway Options[5]**	Large Lot Single Dwelling Residential, Single Dwelling Residential, Low Density Multiple Dwelling Residential, Open Space-Park Urban Parkway Configurations see Figure 5–1, 5–3, 5–4
Land Use **Parkway**	School, Church, or Public Building Urban Parkway Configuration see Figure 5–2

[1] Reduce width only where cul-de-sac is less than 300 feet long and is greater than 600 feet from a canyon rim.

[2] Construct sidewalks on both sides of street, including single-loaded cul-de-sacs.

[3] Refer to Chapter 6, "Design Standards," section 6.1.5.4 for cul-de-sacs serving more than 200 ADT.

[5] Figure 5–1 parkways shall be installed only in areas where a cul-de-sac is adjacent to natural open space.

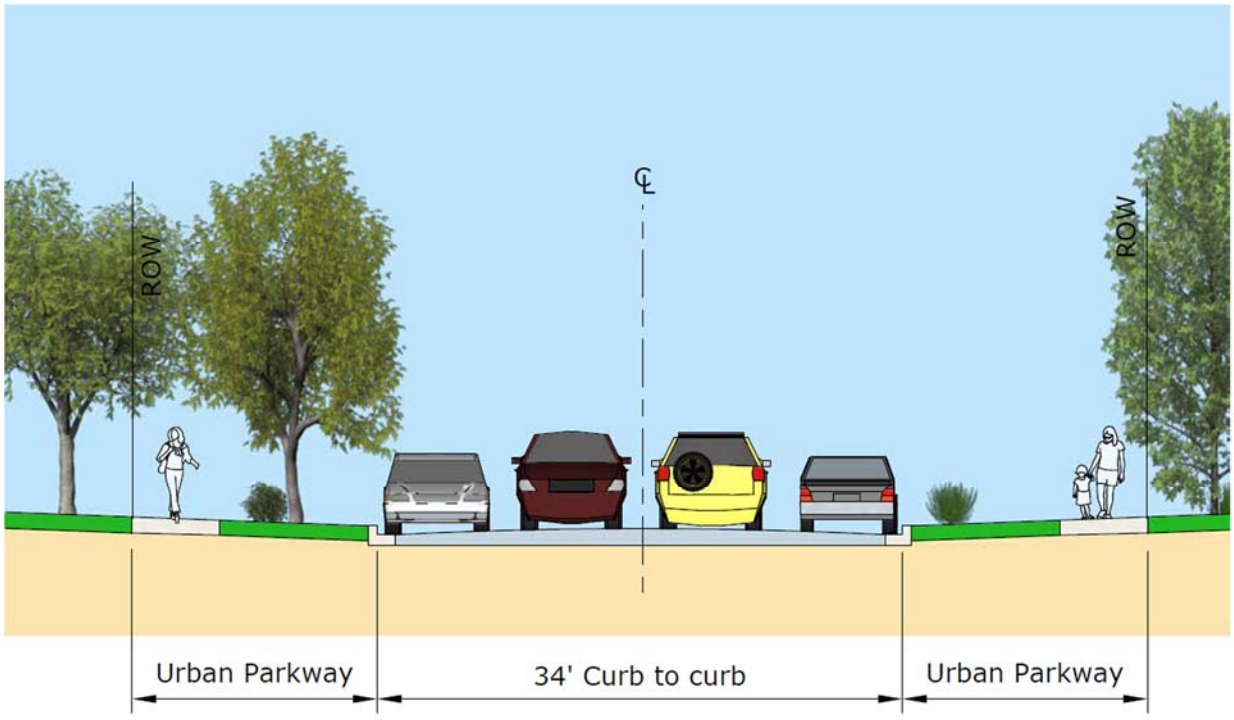


FIGURE 1-4. SECTION A-A: CUL-DE-SAC

1.3.2 Low-Volume Residential Local Street

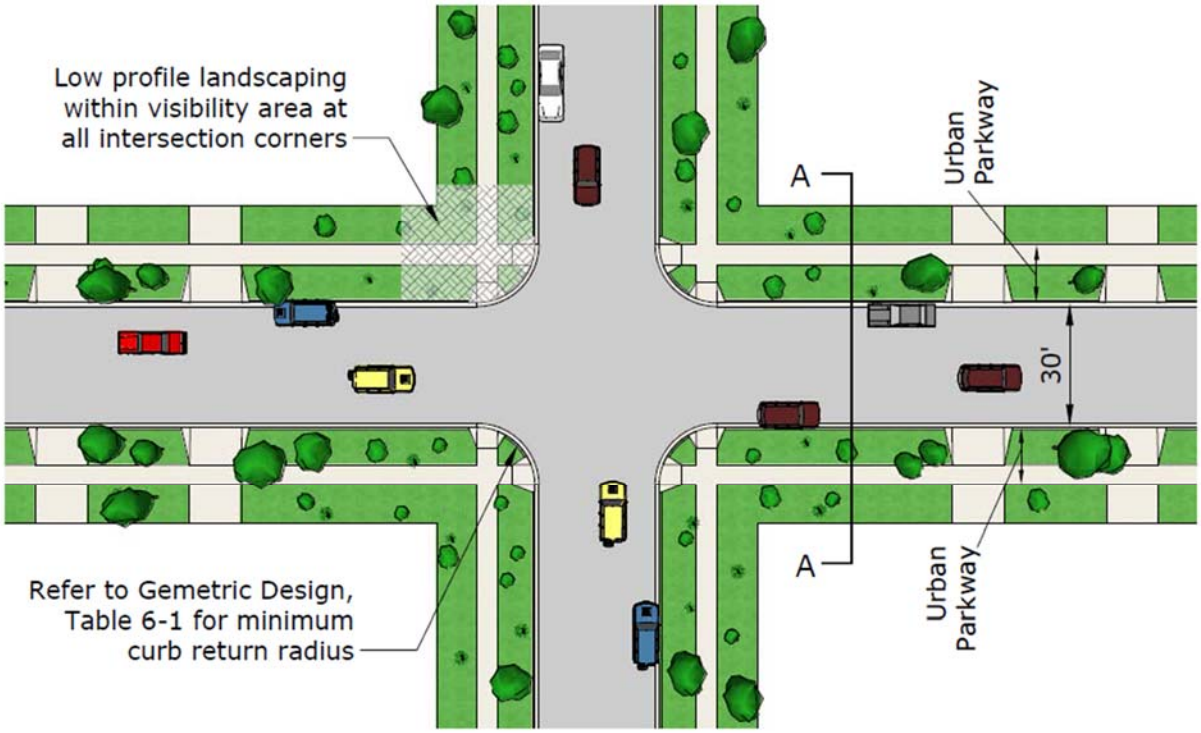


FIGURE 1-5. PLAN: LOW VOLUME RESIDENTIAL LOCAL STREET

TABLE 1-2. LOW-VOLUME RESIDENTIAL LOCAL STREET SPECIFICATIONS

Width, Right-of-Way Increased Width[1] Single-loaded[2]	50 ft. – 60 ft. 52 ft. – 62 ft. 48 ft. – 58 ft.
Design ADT	700
Width, Curb-to-Curb[3,4] Increased Width[1] Single-loaded	30 ft. 32 ft. 28 ft.
Maximum Grade	15%
Minimum Curve Radius	100 ft.
Land Use **Parkway Options**[5]	Large Lot Single Dwelling Residential, Single Dwelling, Residential, Low Density Multiple Dwelling Residential, Open Space-Park Urban Parkway Configurations see Figure 5–1, 5–3, 5–4
Land Use **Parkway**	School, Church, or Public Building Urban Parkway Configuration see Figure 5–2

[1] Increase width where block is greater than 600 feet long, is less than 600 feet from a canyon rim, and there is a single access point.

[2] Construct sidewalks on both sides of street, including single-loaded streets.

[4] Where curb-to-curb width is 30 feet, bypass zones of 75 feet in length should be provided at intervals of 150 feet by removal of parking to provide for emergency response vehicles.

[5] Figure 5-1 parkways shall be installed only in areas where a street is adjacent to natural open space.

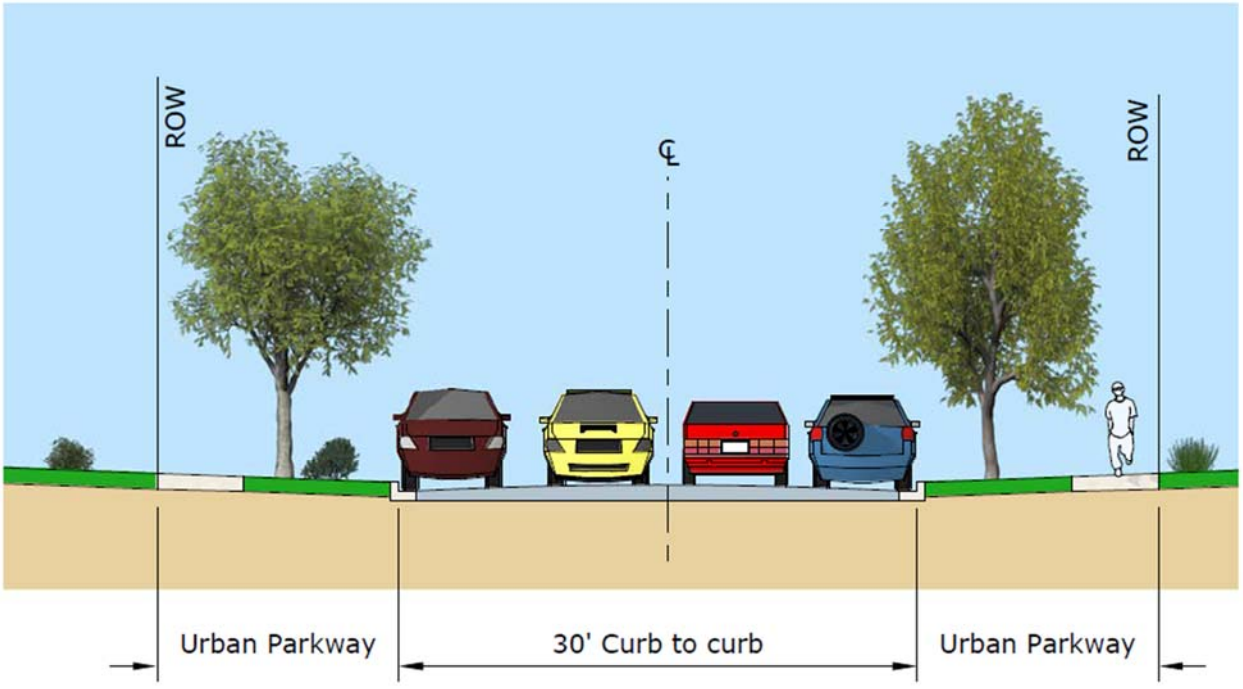


FIGURE 1-6. SECTION A-A: LOW-VOLUME RESIDENTIAL LOCAL STREET

1.3.3 Residential Local Street

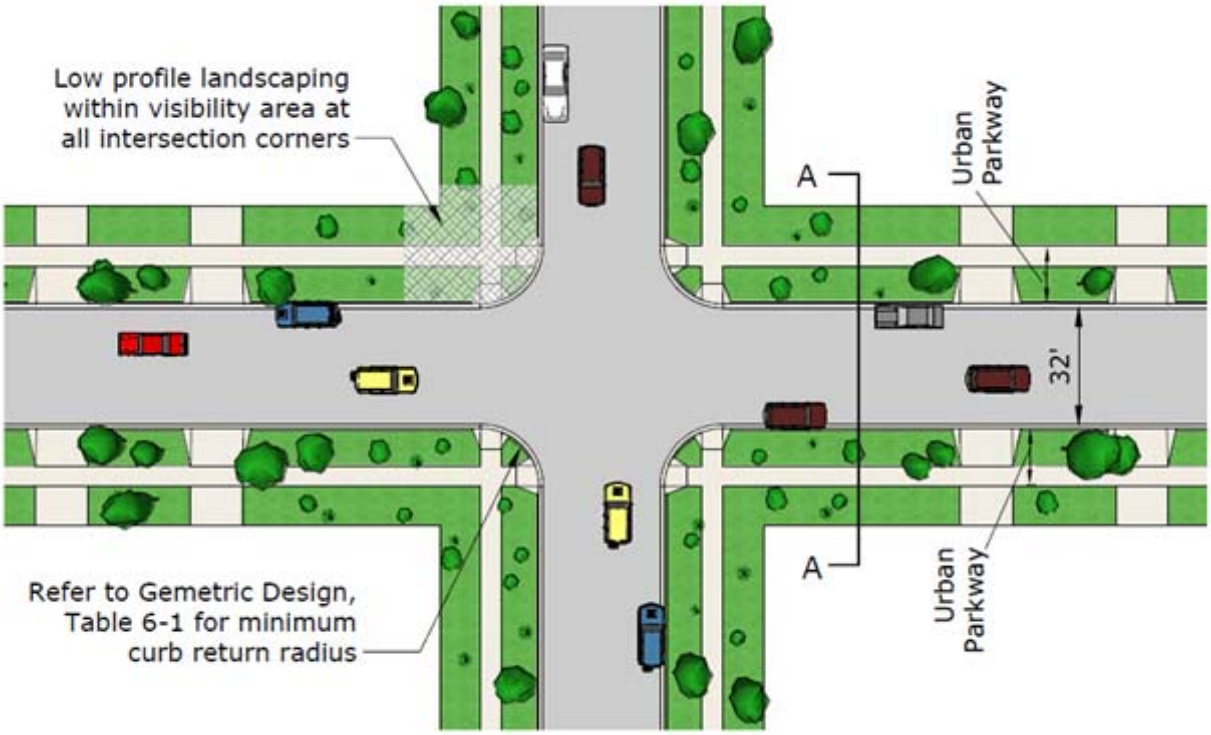


FIGURE 1-7. PLAN: RESIDENTIAL LOCAL STREET

TABLE 1-3. RESIDENTIAL LOCAL STREET SPECIFICATIONS

Width, Right-of-Way Single-loaded[1,2]	52 ft. – 62 ft. 48 ft. – 58 ft.
Design ADT	1,500
Width, Curb-to-Curb[3] Single-loaded	32 ft. 28 ft.
Maximum Grade	15%
Minimum Curve Radius	100 ft.
Land Use **Parkway Options**[4]	Large Lot Single Dwelling Residential, Single Dwelling Residential, Multiple Dwelling Residential, Local Mixed-Use, Open Space-Park Urban Parkway Configurations see Figure 5–1, 5–3, 5–4
Land Use **Parkway**	School, Church, or Public Building Urban Parkway Configuration see Figure 5–2

[1] Single-loaded street not permitted in Medium-to-Very High Density Multiple Dwelling Residential areas.

[2] Construct sidewalks on both sides of street, including single-loaded streets.

[3] Curb-to-curb widths may be increased to 44 feet to allow for angle parking on one side and parallel parking on the other side of the street or 52 feet for angle parking on both sides of the street. Angle parking should be installed in accordance with Council-approved traffic engineering policies. Angle parking layout should include provisions that allow access to refuse containers.

[4] Figure 5–1 parkways shall be installed only in areas where a street is adjacent to natural open space.

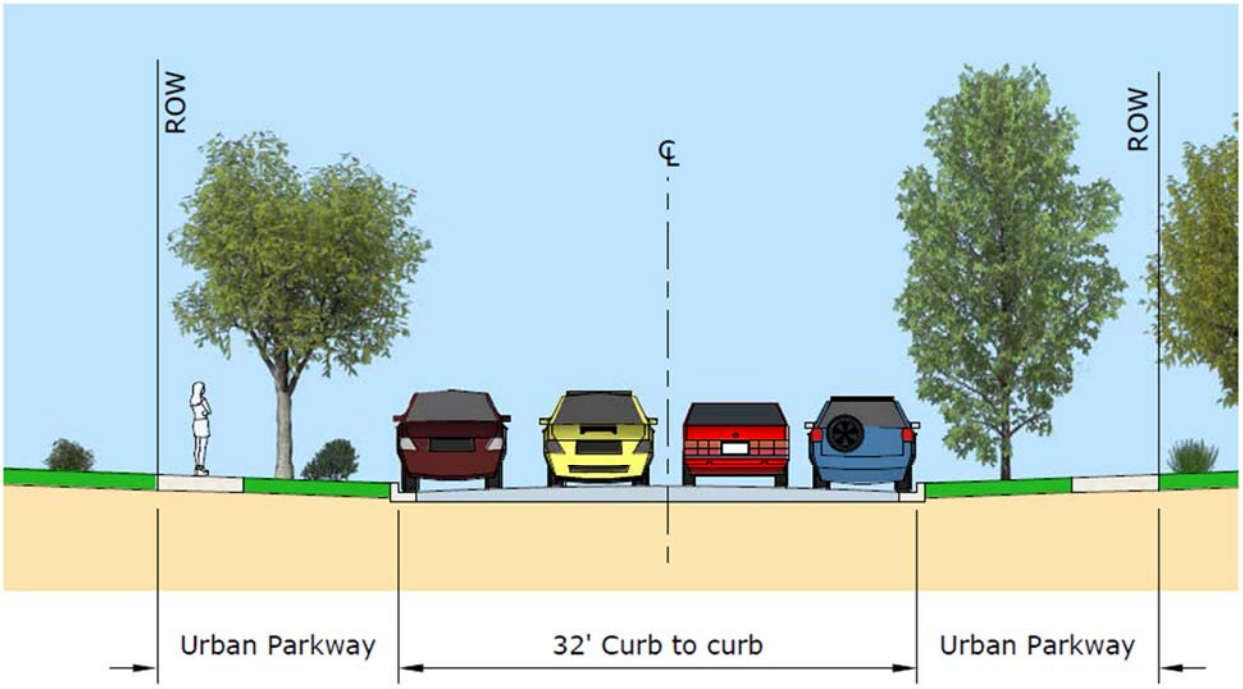


FIGURE 1-8. SECTION A-A: RESIDENTIAL LOCAL STREET

1.4. Commercial Streets

All Figures are for illustrative purposes and all signing and striping are subject to the most recent adopted edition of the CA MUTCD or as appropriate by reviewer. Figures 1–9 through 1–16 and Tables 1–4 through 1–5 below illustrate the design specifications for commercial local streets and industrial local streets.

1.4.1 Commercial Local Street

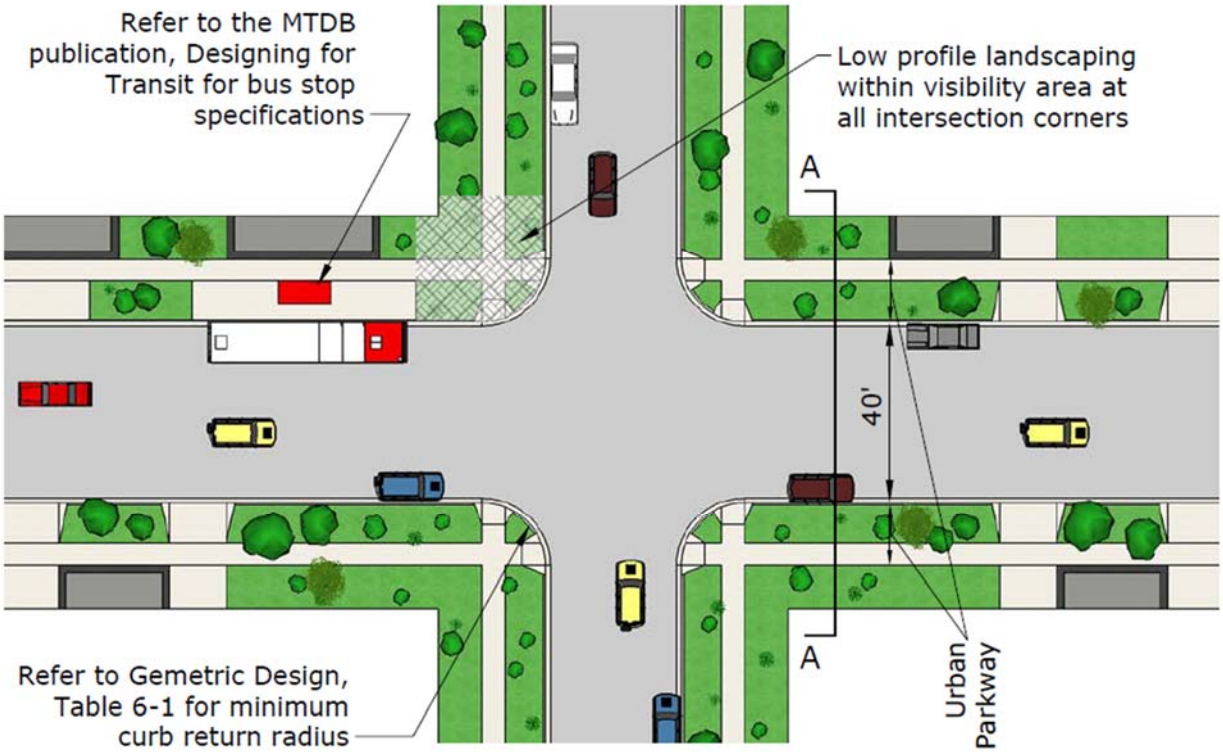


FIGURE 1-9. PLAN: COMMERCIAL LOCAL STREET WITH PARALLEL PARKING ON BOTH SIDES

TABLE 1-4. COMMERCIAL LOCAL STREET SPECIFICATIONS

Width, Right-of-Way	60 ft. – 92 ft.
Design ADT	2,000
Design Speed	25 mph
Width, Curb-to-Curb[1,2] with parallel parking on both sides with parallel/angle parking with angle parking on both sides	 40 ft. 44 ft. 52 ft.
Maximum Grade	8%
Minimum Curve Radius	290 ft. (85 m)
Land Use **Parkway Options**	Commercial, Open Space-Park, School, Church, or Public Building, Scientific Research Urban Parkway Configurations see Figure 5–2, 5–6 through 5–9

[1] Angle parking layout should include provisions that allow access to refuse containers.

[2] Angle parking should be installed in accordance with Council-approved traffic engineering policies.

Note: Reverse Angle Parking or Back-in Angle Parking should be considered on streets designated for bikeways.

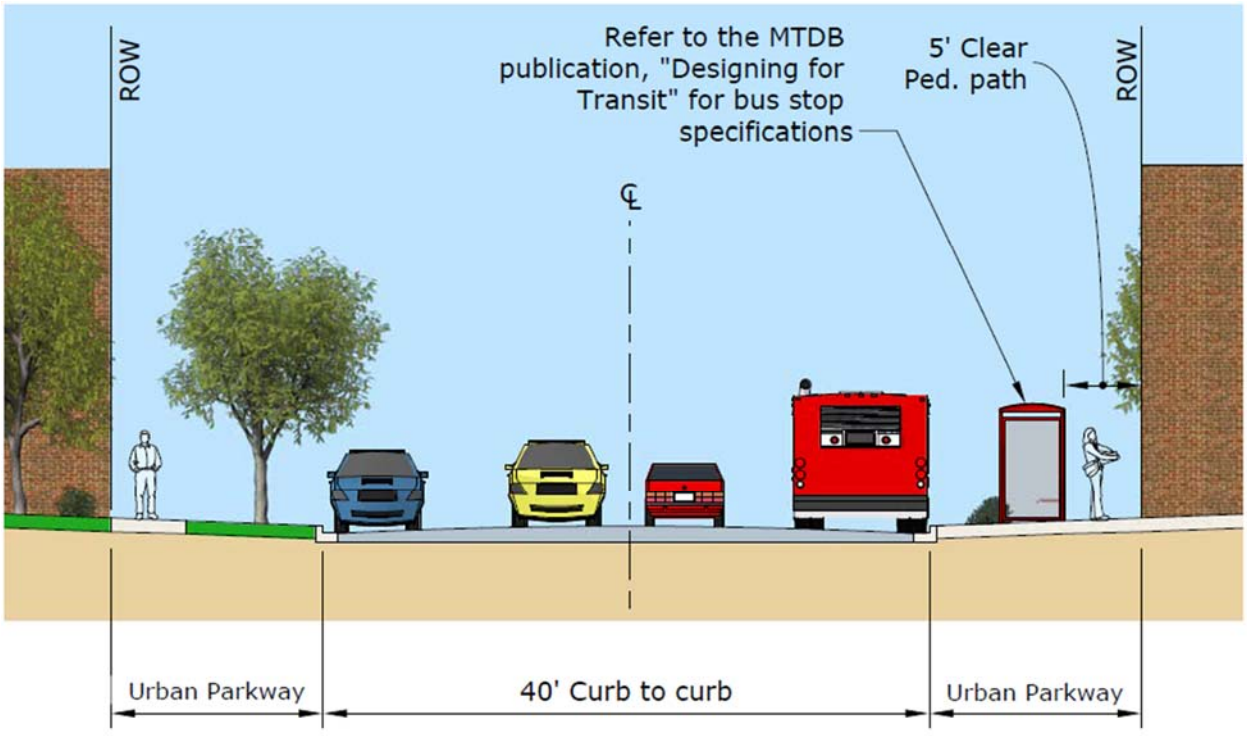


FIGURE 1-10. SECTION A-A: COMMERCIAL LOCAL STREET WITH PARALLEL PARKING ON BOTH SIDES

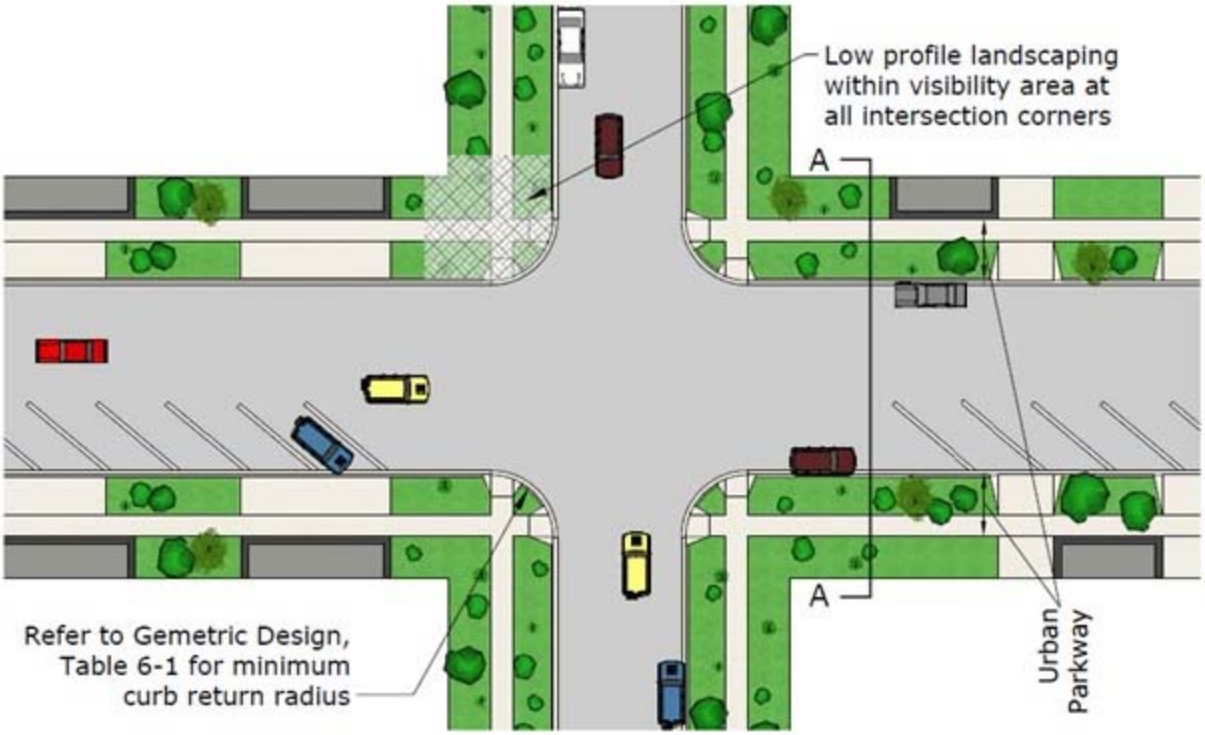


FIGURE 1-11. PLAN: COMMERCIAL LOCAL STREET WITH DIAGONAL/PARALLEL PARKING

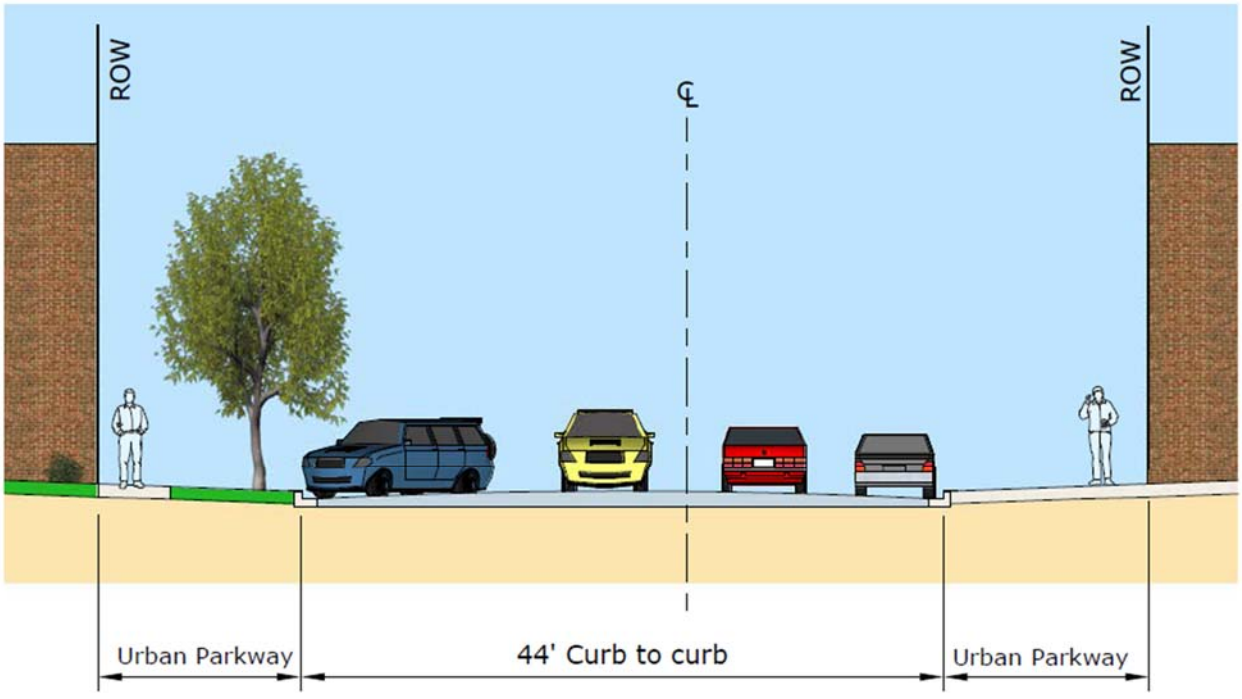


FIGURE 1-12. SECTION A-A: COMMERCIAL LOCAL STREET WITH DIAGONAL/PARALLEL PARKING

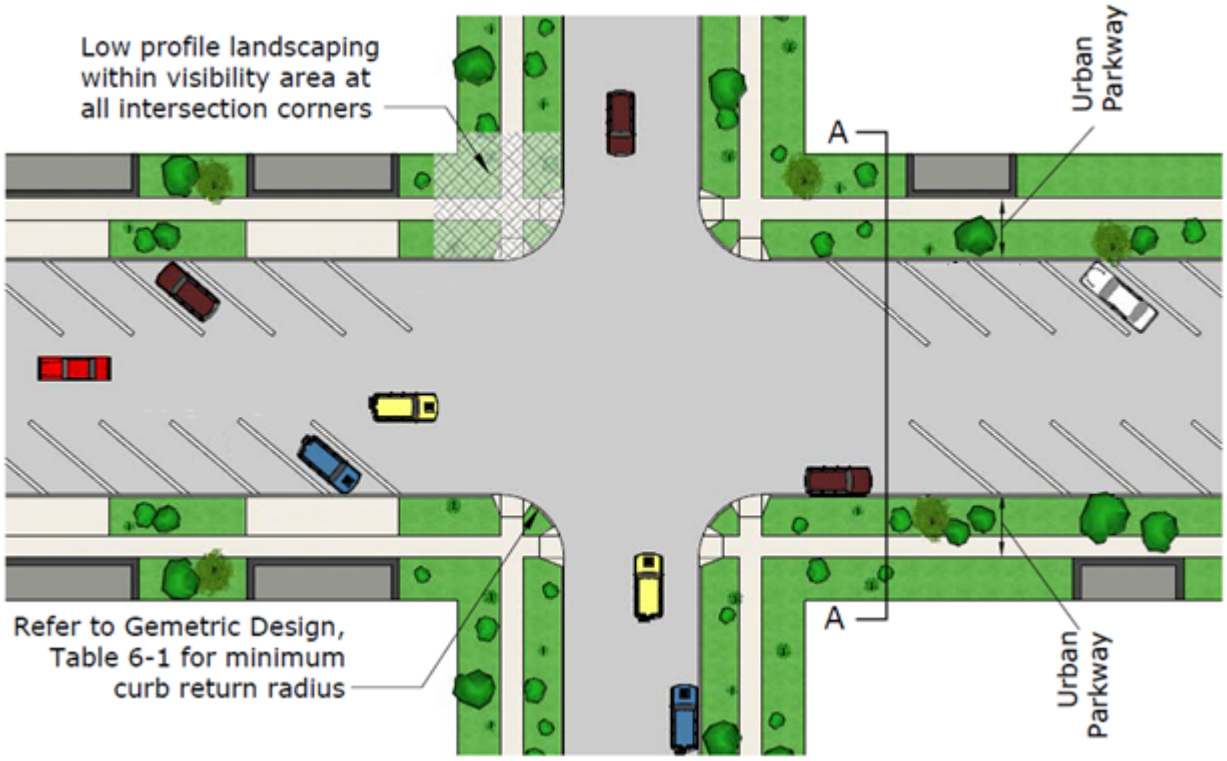


FIGURE 1-13. PLAN: COMMERCIAL LOCAL STREET WITH DIAGONAL PARKING ON BOTH SIDES

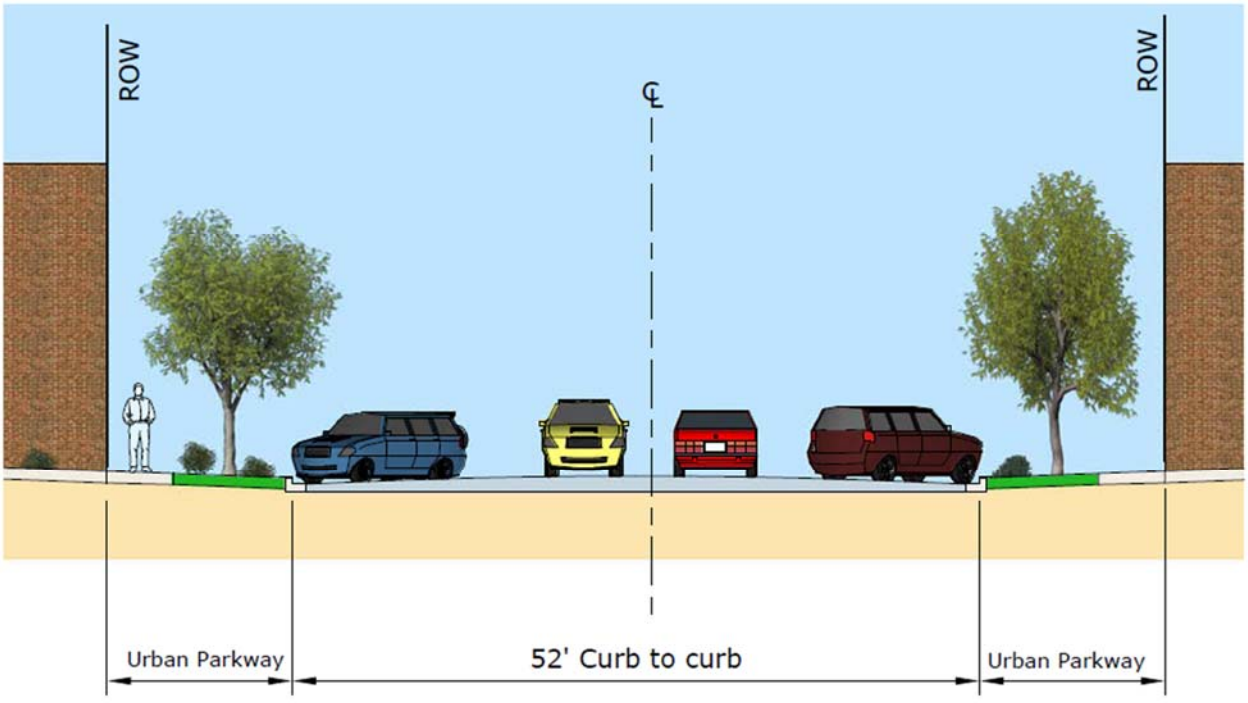


FIGURE 1-14. SECTION A-A: COMMERCIAL LOCAL STREET WITH DIAGONAL PARKING ON BOTH SIDES

1.4.2 Industrial Local Street

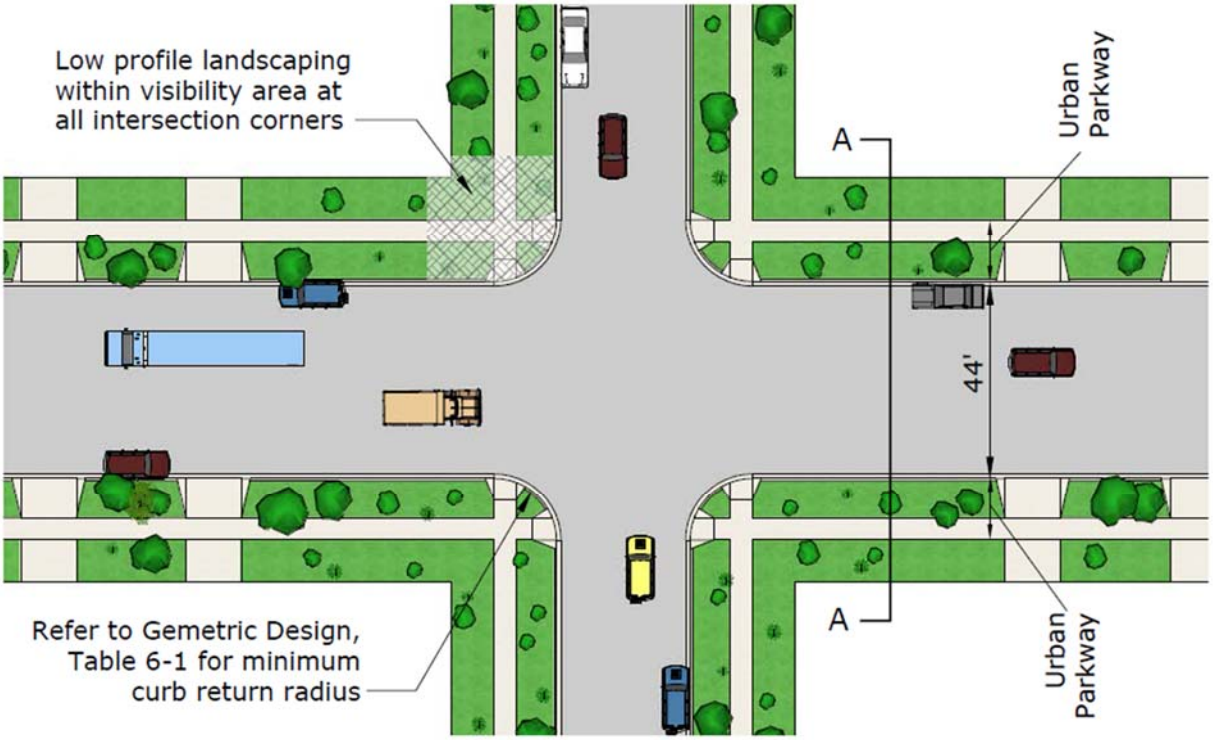


FIGURE 1-15. PLAN: INDUSTRIAL LOCAL STREET

TABLE 1-5. INDUSTRIAL LOCAL STREET SPECIFICATIONS

Width, Right-of-Way	64 ft. – 74 ft.
Design ADT	2,000
Design Speed	25 mph
Width, Curb-to-Curb	44 ft.
Maximum Grade	8%
Minimum Curve Radius	290 ft.
Land Use **Parkway Options**	Industrial Urban Parkway Configurations see Figure 5–2, 5–3, 5–4

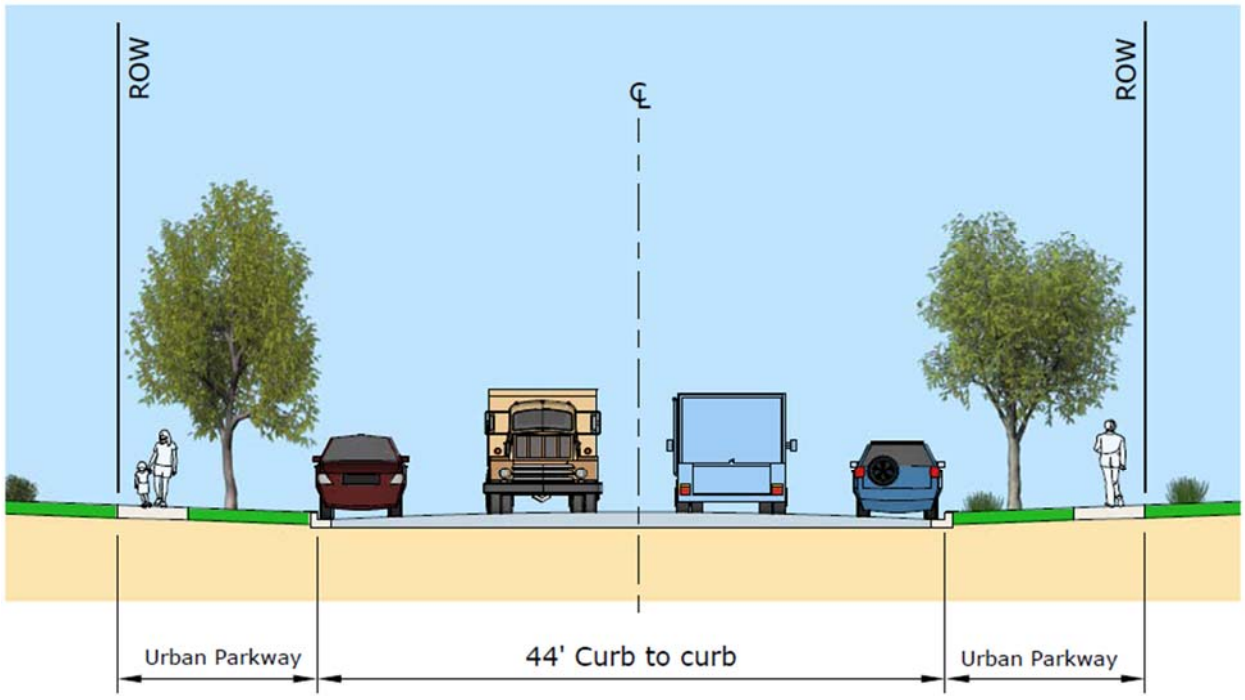


FIGURE 1-16. SECTION A-A: INDUSTRIAL LOCAL STREET

1.5. Collector Streets

All Figures are for illustrative purposes and all signing and striping are subject to the most recent adopted edition of the CA MUTCD or as appropriate by reviewer. Figures 1–17 through 1–26 and Tables 1–6 through 1–10 illustrate the design specifications for two-lane sub-collector streets, twolane collector streets, twolane collector streets with twoway left turn lanes, twolane industrial collector streets, and fourlane urban collector streets with twoway left turn lanes.

1.5.1 Two Lane Sub-Collector

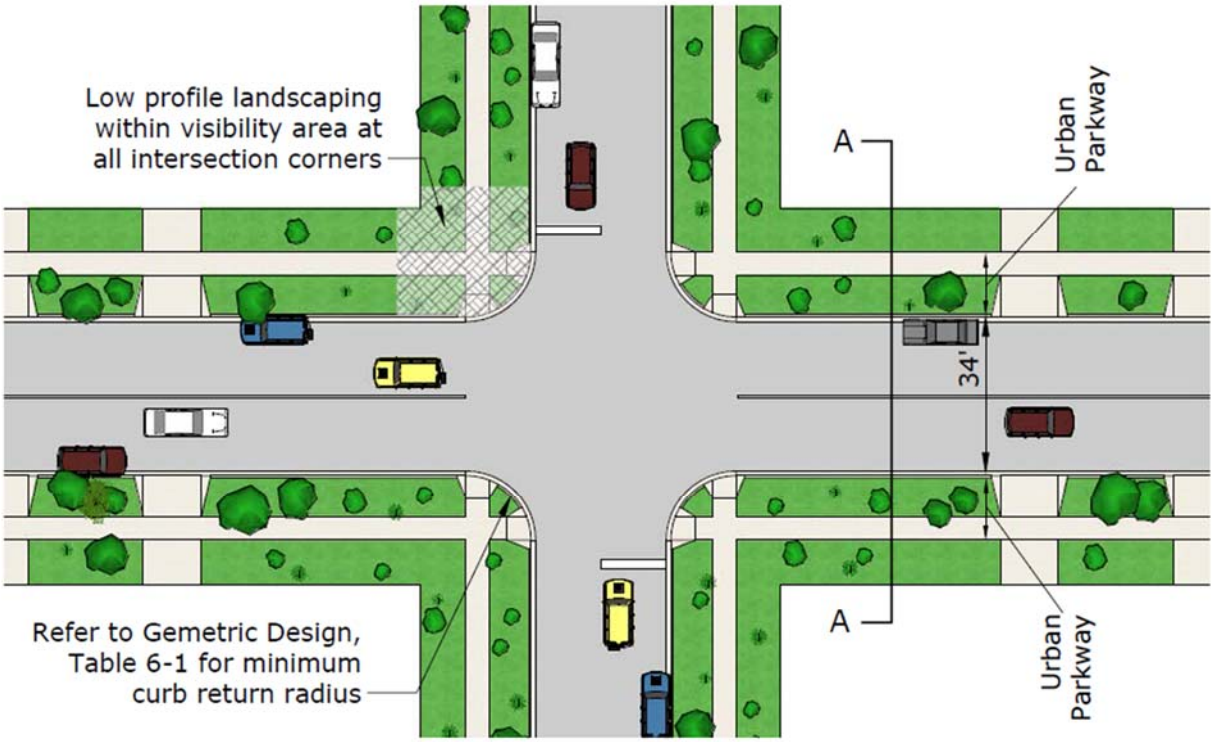


FIGURE 1-17. PLAN: TWO LANE SUB-COLLECTOR

TABLE 1-6. TWO-LANE SUB-COLLECTOR SPECIFICATIONS

Width, Right-of-Way	54 ft. – 74 ft.
Design ADT	2,200
Design Speed	30 mph
Width, Curb-to-Curb	34 ft.
Maximum Grade	10% (8% in commercial area)
Minimum Curve Radius	500 ft. above 6% grade 450 ft. at or below 6% grade
Land Use **Parkway Options**[1]	Large Lot Single Dwelling Residential, Single Dwelling Residential, Low Density Multiple Dwelling Residential, Open Space-Park, Medium-to-Very High Density, Multiple Dwelling Residential Urban Parkway Configurations see Figure 5–3 and 5–4
Land Use **Parkway Options**	Neighborhood Commercial, Community Commercial, School, Church, or Public Building Urban Parkway Configurations see Figure 5–2, 5–6 through 5–9

[1] Where building setback is zero, Figure 5–4 parkways should be installed.

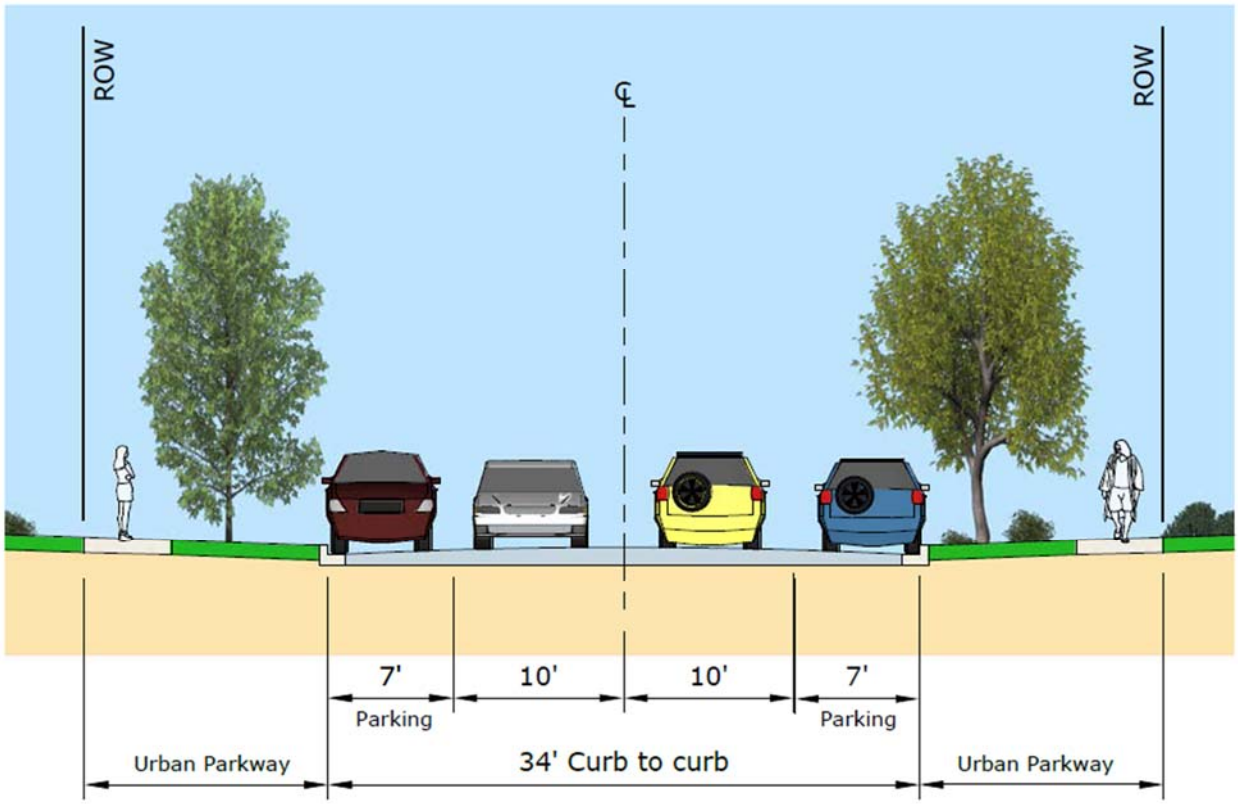


FIGURE 1-18. SECTION A-A: TWO LANE SUB-COLLECTOR

1.5.2 Two-Lane Collector

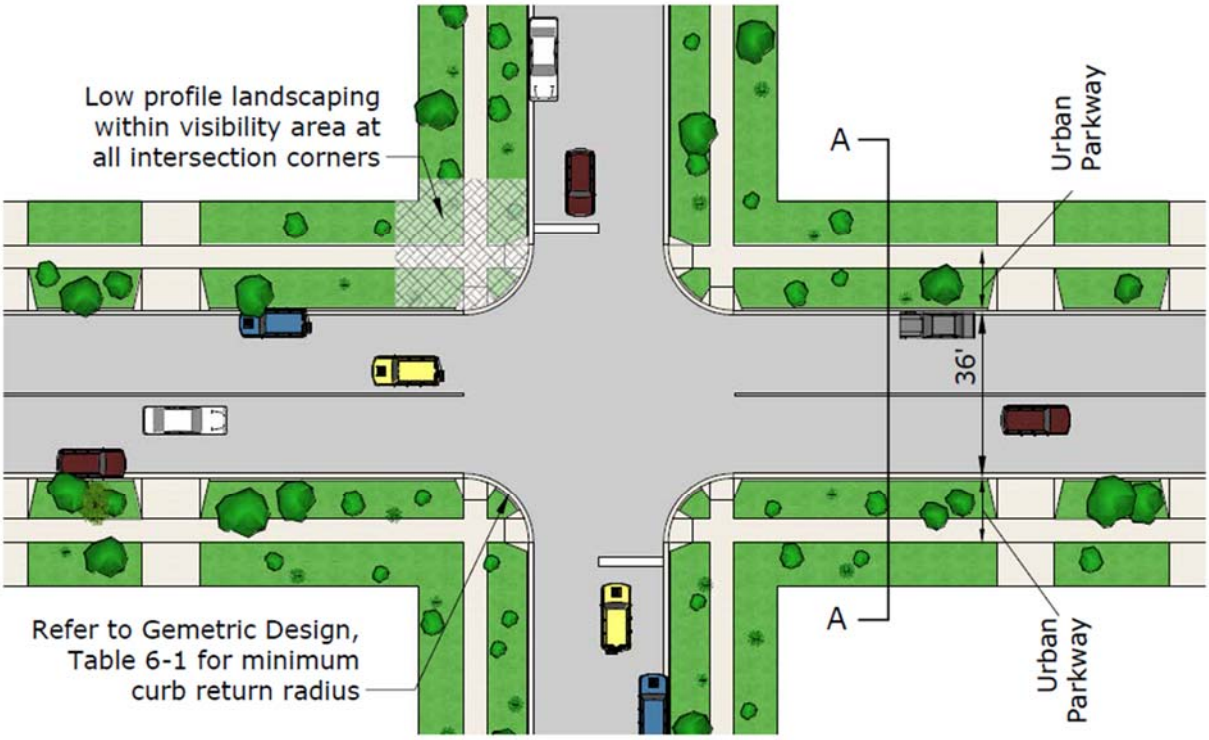


FIGURE 1-19. PLAN: TWO LANE COLLECTOR

TABLE 1-7. TWO-LANE COLLECTOR SPECIFICATIONS

Width, Right-of-Way (with added bike lanes)	60 ft. – 86 ft. 70 ft. – 96 ft.
Design ADT LOS C LOS D	 5,000 6,500
Design Speed	30 mph
Width, Curb-to-Curb (with added bike lanes)	36 ft. 46 ft.
Maximum Grade	10% (8% in commercial area)
Minimum Curve Radius	500 ft. above 6% grade 450 ft. at or below 6% grade
Land Use **Parkway Options**	Large Lot Single Dwelling Residential – no front yards, Single Dwelling Residential – no front yards, Low Density Multiple Dwelling Residential – no front yards, Open Space-Park Urban Parkway Configurations see Figure 5–3, 5–4
Land Use **Parkway Options**	Commercial, School, Church, or Public Building Urban Parkway Configurations see Figure 5–6 through 5–9

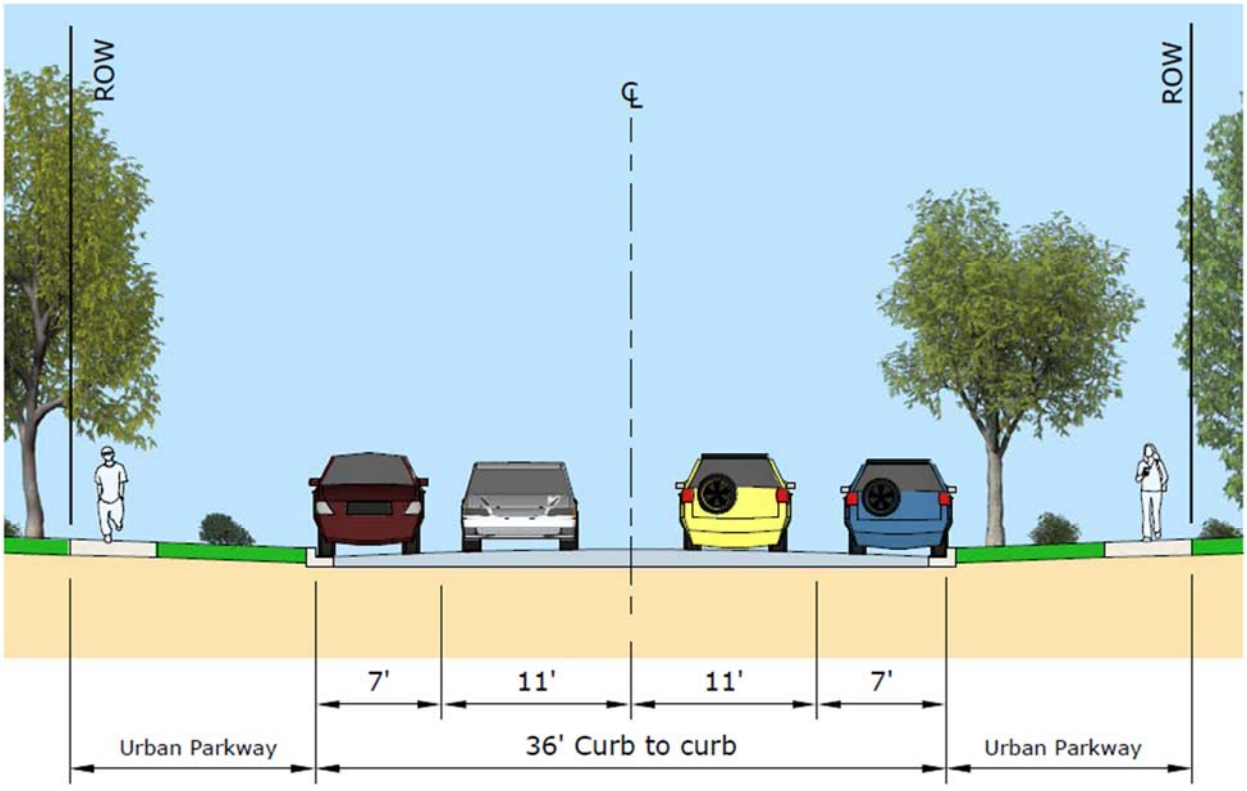


FIGURE 1-20. SECTION A-A: TWO LANE COLLECTOR

1.5.3 Two-Lane Collector with Two-Way Left-Turn Lane

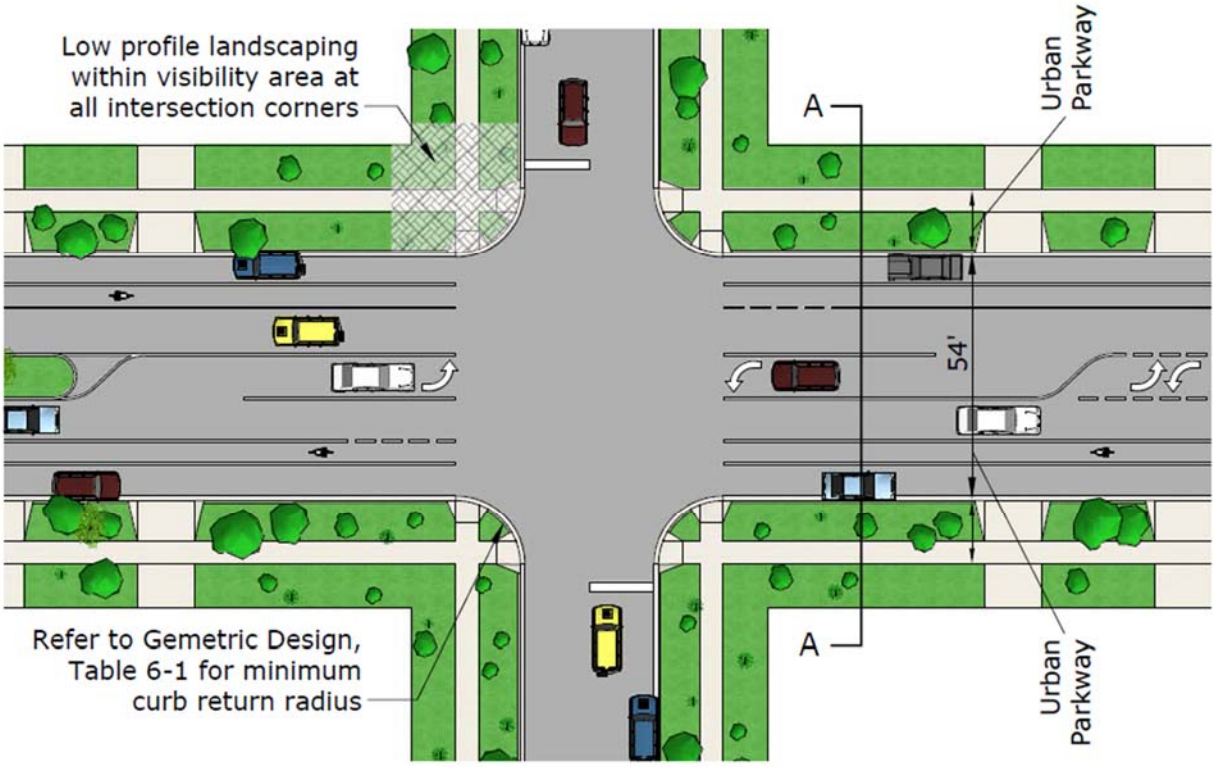


FIGURE 1-21. PLAN: TWO-LANE COLLECTOR WITH TWO-WAY LEFT-TURN LANE

TABLE 1-8. TWO LANE COLLECTOR WITH TWO WAY LEFT TURN LANE SPECIFICATIONS

Width, Right-of-Way	78 ft. – 94 ft.
Design ADT LOS C LOS D	 10,000 13,000
Design Speed	35 mph
Width, Curb-to-Curb	54 ft.
Maximum Grade	8%
Minimum Curve Radius	610 ft. with no superelevation 470 ft. with 2% (min.) superelevation 380 ft. with 6% (max.) superelevation
Land Use **Parkway Options**	Single Dwelling Residential – no front yards, Low Density Multiple Dwelling Residential – no front yards, Open Space-Park, Medium to Very High Density, Multiple Dwelling Residential Urban Parkway Configurations see Figure 5–3, 5–4
Land Use **Parkway Options**	Neighborhood Commercial, Community Commercial, Regional Commercial, Commercial Offices Visitor Commercial, School, Church, Public Building Urban Parkway Configurations see Figure 5–6 through 5–9
Land Use **Parkway Options**	Pedestrian-Oriented Commercial Retail, Urban Village Commercial Retail Urban Parkway Configurations see Figure 5–6 through 5–9

Note: Two-way left-turn lane shall be considered only for streets of limited length where intersections are closely spaced or where there is extensive driveway access. For all other conditions, raised center medians should be considered to address access management and community beautification. Where a raised center median is installed, access provisions across the median for emergency vehicles should be provided at 300 ft. intervals.

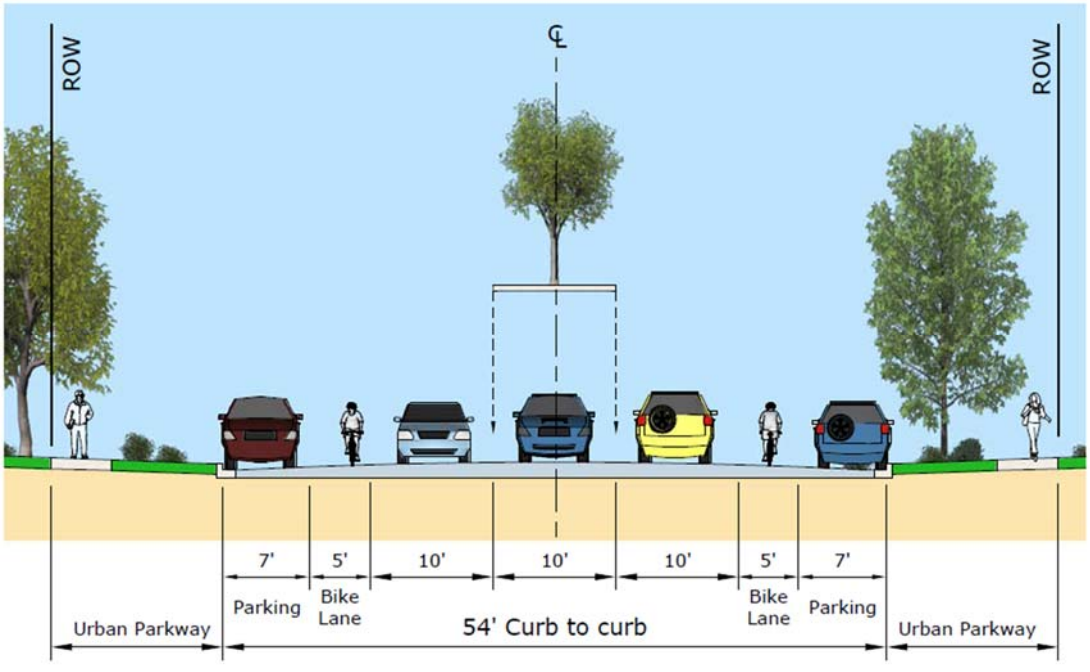


FIGURE 1-22. SECTION A-A: TWO LANE COLLECTOR WITH TWO WAY LEFT TURN LANE

1.5.4 Two-Lane Industrial Collector

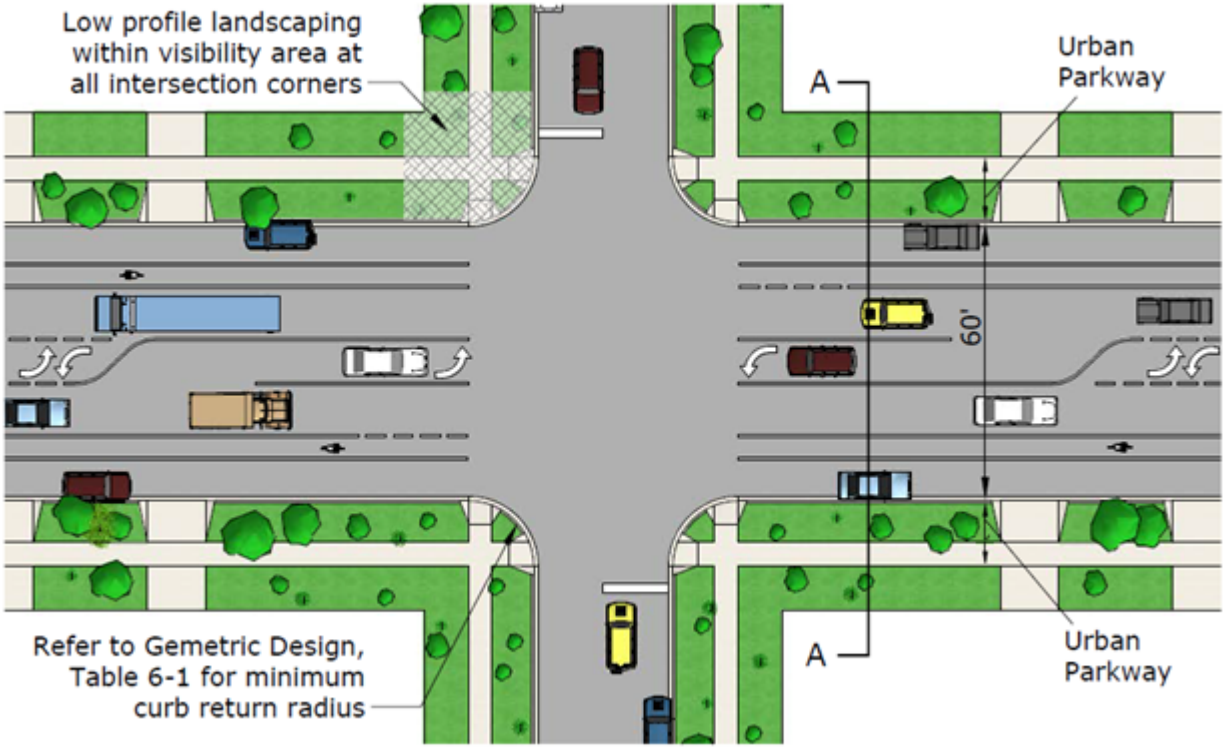


FIGURE 1-23. PLAN: TWO-LANE INDUSTRIAL COLLECTOR

TABLE 1-9. TWO LANE INDUSTRIAL COLLECTOR SPECIFICATIONS

Width, Right-of-Way	80 ft. – 90 ft.
Design ADT LOS C LOS D	 5,000 6,500
Design Speed	30 mph
Width, Curb-to-Curb	60 ft.
Maximum Grade	8%
Minimum Curve Radius	430 ft. with no superelevation 340 ft. with 2% (min.) superelevation 300 ft. with 4% (max.) superelevation
Land Use **Parkway Options**	Industrial Urban Parkway Configurations see Figure 5–2, 5–3, 5–4

Note: Two-way left-turn lane shall be considered only for streets of limited length where intersections are closely spaced or where there is extensive driveway access.

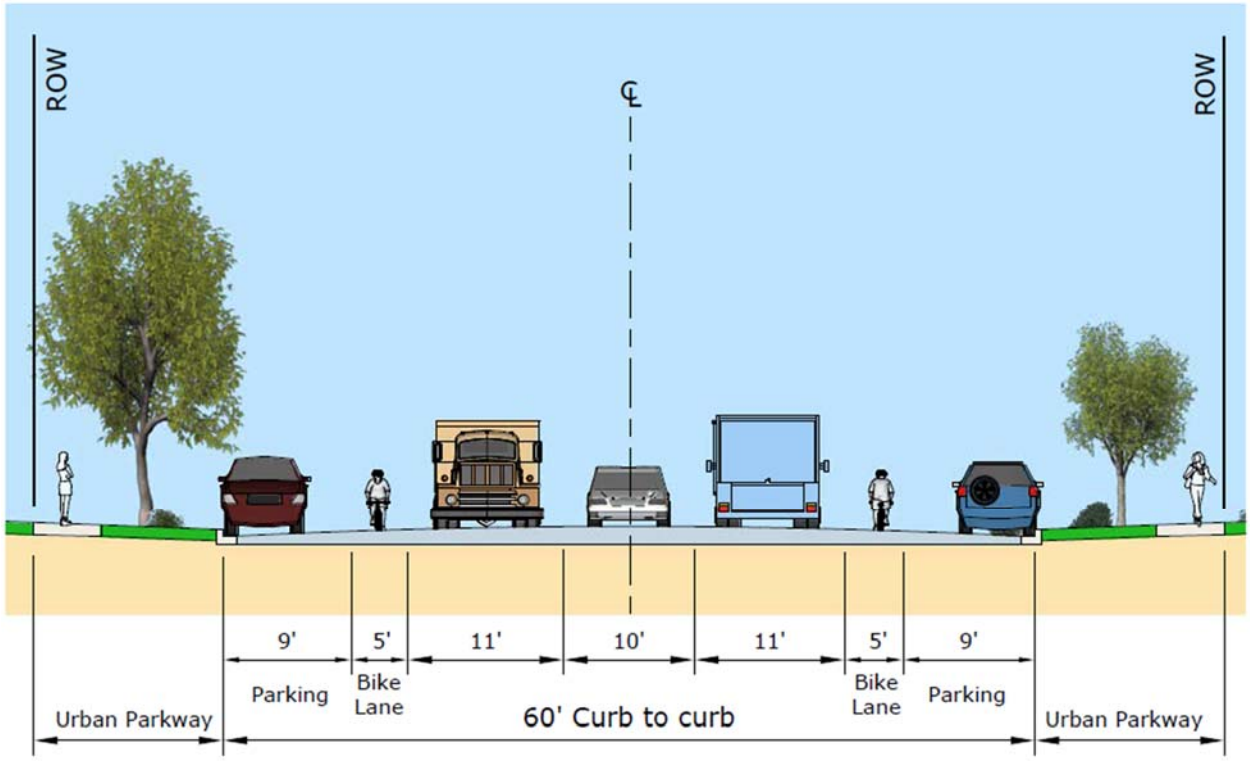


FIGURE 1-24. SECTION A-A: TWO LANE INDUSTRIAL COLLECTOR

1.5.5 Four-Lane Urban Collector with Two-Way Left-Turn Lane

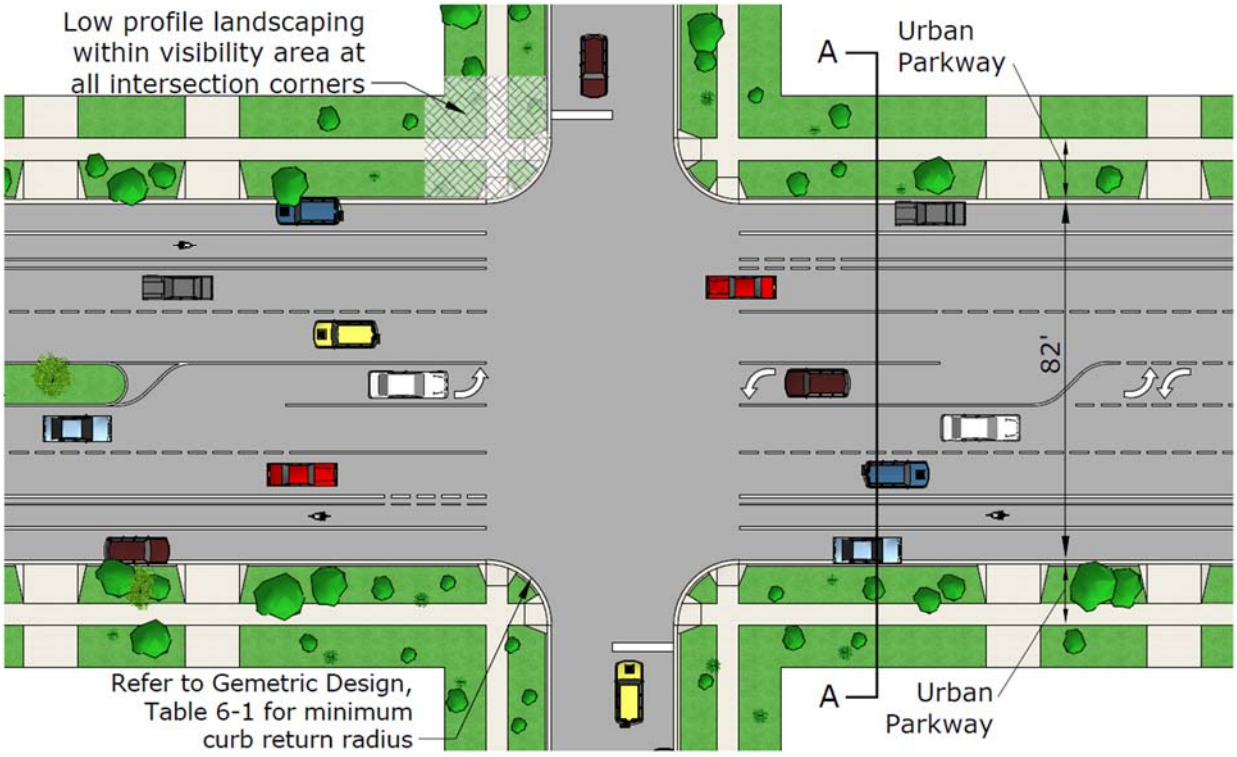


FIGURE 1-25. PLAN: FOUR-LANE URBAN COLLECTOR WITH TWO-WAY LEFT-TURN LANE

TABLE 1-10. FOUR LANE URBAN COLLECTOR WITH TWO WAY LEFT TURN LANE SPECIFICATIONS

Width, Right-of-Way	110 ft. – 122 ft.
Design ADT LOS C LOS D	 20,000 25,000
Design Speed	35 mph
Width (includes bike lanes), Curb-to-Curb	82 ft.
Maximum Grade[1]	8%
Minimum Curve Radius	610 ft. with no superelevation 470 ft. with 2% (min.) superelevation 380 ft. with 6% (max.) superelevation
Land Use **Parkway Options**	Single Dwelling Residential – no front yards, Low Density Multiple Dwelling Residential – no front yards, Open Space-Park, Industrial, Medium-to-Very High Density Multiple Dwelling Residential – no front yards Urban Parkway Configuration see Figure 5–4
Land Use **Parkway Options**	Neighborhood Commercial, Community Commercial, Regional Commercial, Commercial Offices, Visitor Commercial, School, Church, Public Building Urban Parkway Configurations see Figure 5–6 through 5–9
Land Use **Parkway Options**	Pedestrian-Oriented Commercial Retail, Urban Village Commercial Retail Urban Parkway Configurations see Figure 5–6 through 5–9

Note: Two-way left-turn lane shall be considered only for streets of limited length where intersections are closely spaced or where there is extensive driveway access.

[1] Whenever topographic constraints would cause excessive slope heights or create unmitigatable landform impacts, the maximum street grade may exceed 8% for no-fronting property, up to a maximum of 10%, subject to approval of the City Engineer.

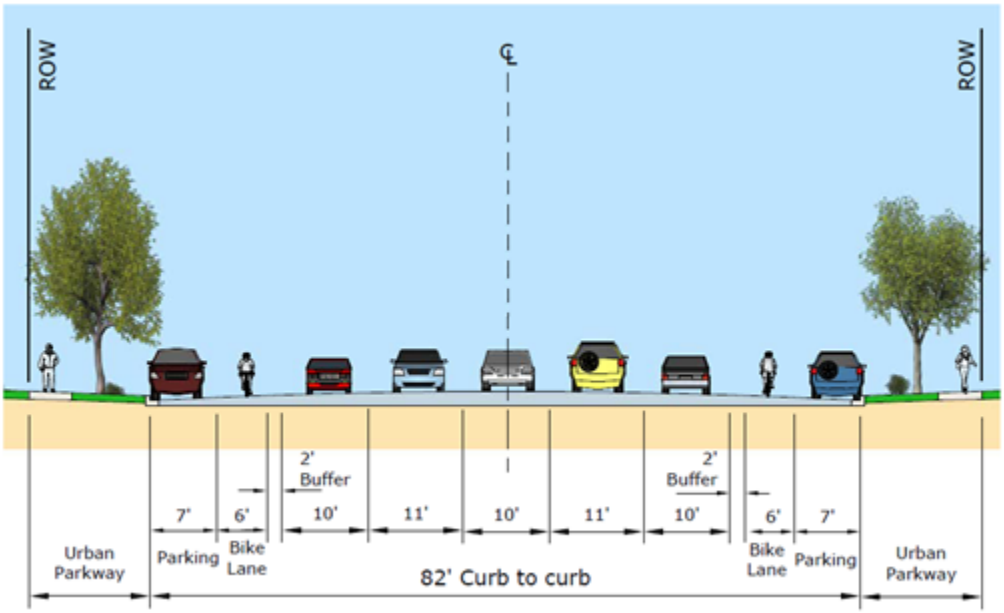


FIGURE 1-26. SECTION A-A: FOUR-LANE URBAN COLLECTOR WITH TWO-WAY LEFT-TURN LANE

1.6. Major Streets

All Figures are for illustrative purposes and all signing and striping are subject to the most recent adopted edition of the CA MUTCD or as appropriate by reviewer. Figures 1-27 through 1-34 and Tables 1-11 through 1-14 below illustrate the design specifications for four-lane urban major streets, four-lane major streets, six-lane urban major streets, and six-lane primary arterial streets.

1.6.1 Four-Lane Urban Major

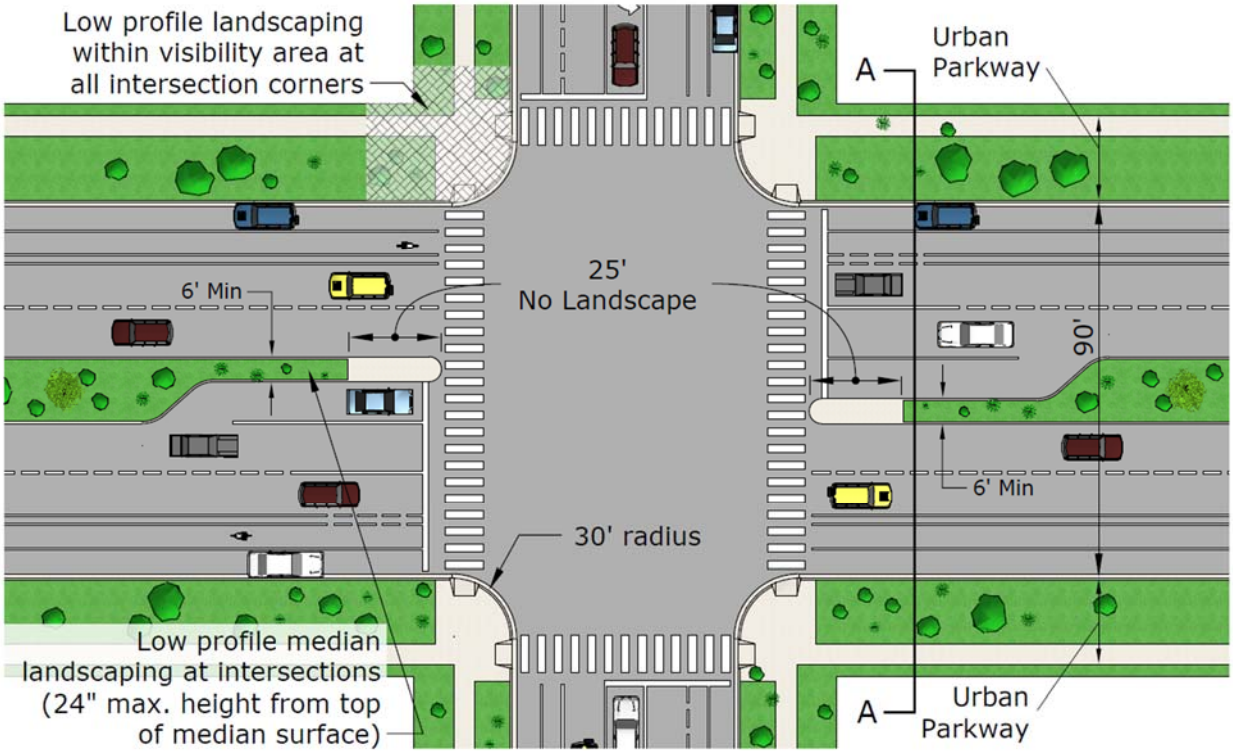


FIGURE 1-27. PLAN: FOUR-LANE URBAN MAJOR

TABLE 1-11. FOUR-LANE URBAN MAJOR SPECIFICATIONS

Width, Right-of-Way	118 ft. – 130 ft.
Design ADT LOS C LOS D	 30,000 35,000
Design Speed	45 mph
Width (includes bike lanes and 16 ft. raised center median), Curb-to-Curb[1]	90 ft.
Maximum Grade	7%
Minimum Curve Radius	1,090 ft. with no superelevation 830 ft. with 2% (min.) superelevation 660 ft. with 6% (max.) superelevation
Land Use **Parkway Options**	Single Dwelling Residential – no front or side yards, Multiple Dwelling Residential – no front or side yards, Neighborhood Commercial, Community Commercial, Regional Commercial, Commercial Office, Visitor Commercial, School (high school and above), Church, Public Building, Urban Village Commercial Retail, Industrial Urban Parkway Configurations see Figure 5–4, 5–6 through 5–9

Note: Four-Lane Urban Major street classification is applicable to streets of limited length, where intersections are closely spaced, where there is extensive driveway access, or in other situations where the speed is expected to be 45 mph or less.

[1] Widen additional 10 ft. at approaches to intersecting four- or six-lane streets to provide a minimum of 250 ft. of two-lane left-turn storage, exclusive of transitions. Receiving lanes for dual lefts shall be 12 ft. wide. In instances where supporting information exists, such as an approved traffic impact study, showing clearly that dual left-turn lanes would not be warranted, the standard curb-to-curb width may be permitted.

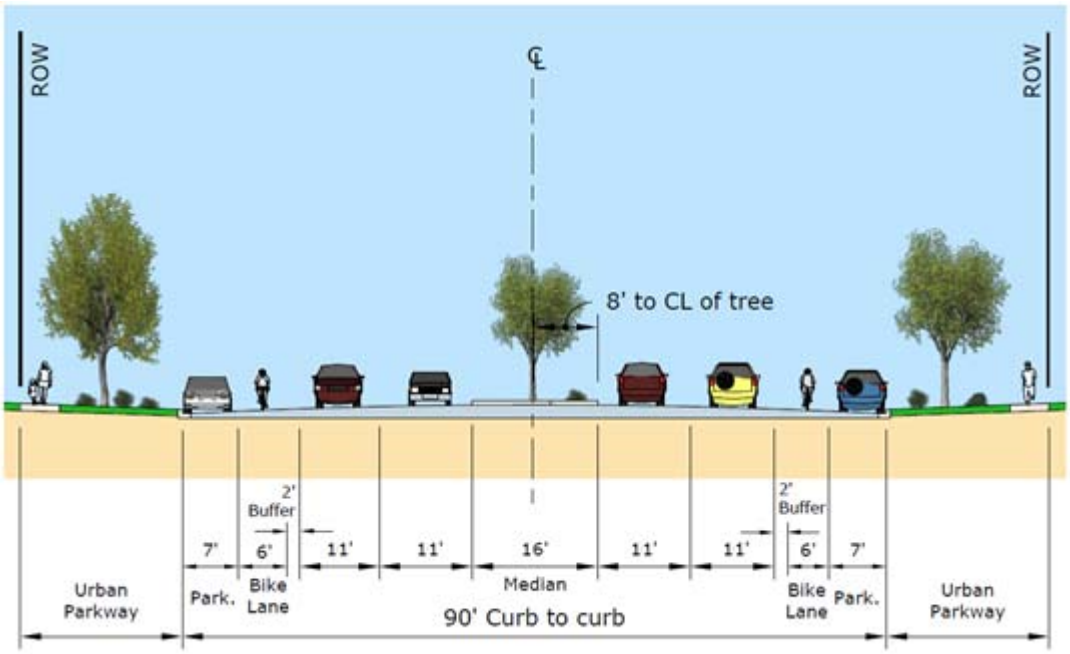


FIGURE 1-28. SECTION A-A: FOUR-LANE URBAN MAJOR

1.6.2 Four-Lane Major

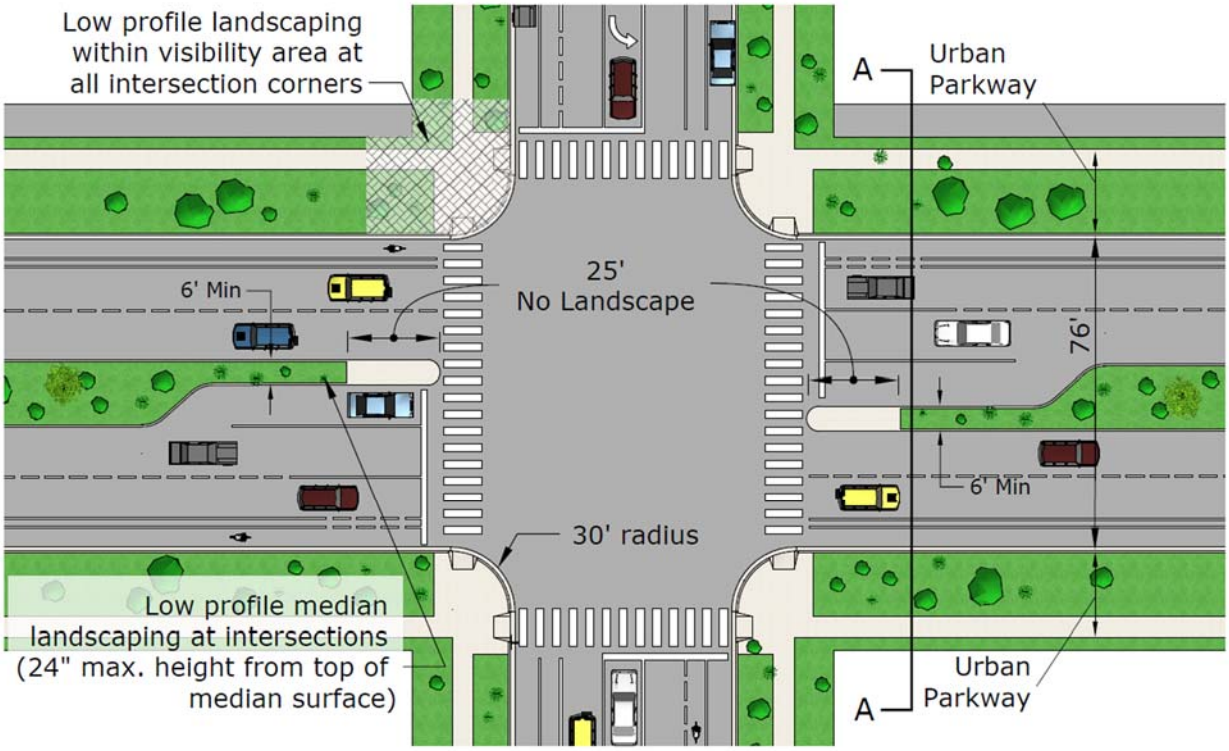
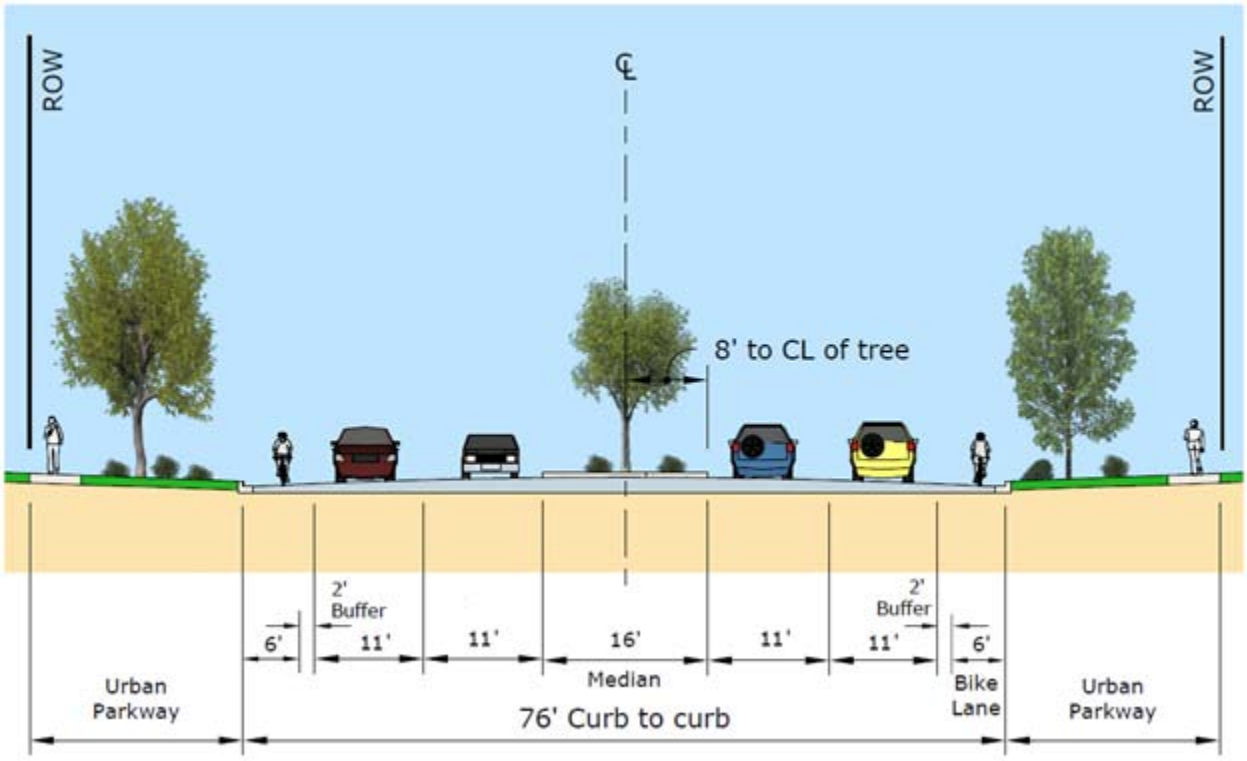


FIGURE 1-29. PLAN: FOUR-LANE MAJOR

TABLE 1-12. FOUR-LANE MAJOR SPECIFICATIONS

Width, Right-of-Way	120 ft.
Design ADT LOS C LOS D	 30,000 35,000
Design Speed	55 mph
Width (includes bike lanes and 16 ft. raised center median), Curb-to-Curb[1]	76 ft.
Maximum Grade	7%
Minimum Curve Radius	1,850 ft. with no superelevation 1,350 ft. with 2% (min.) superelevation 880 ft. with 10% (max.) superelevation
Land Use **Parkway Options**	Single Dwelling Residential – no front or side yards, Multiple Dwelling Residential – no front or side yards, Community Commercial – no front yards, Regional Commercial, Commercial Office, Visitor Commercial, Church, Public Building, Industrial, Open Space Urban Parkway Configuration see Figure 5–5

[1] Widen additional 10 ft. at approaches to intersecting four- or six-lane streets to provide a minimum of 250 ft. of two-lane left-turn storage, exclusive of transitions. Receiving lanes for dual lefts shall be 12 ft. wide. In instances where supporting information exists, such as an approved traffic impact study, showing clearly that dual left-turn lanes would not be warranted, the standard curb-to-curb width may be permitted.



Note: Striping indicated above is for standard cross sections with a standard gutter of 1.5 feet. For existing non-standard curbs with no gutter refer to the City's latest Bicycle Facilities Design Guidelines for striping.

FIGURE 1-30. SECTION A-A: FOUR-LANE MAJOR

1.6.3 Six-Lane Urban Major

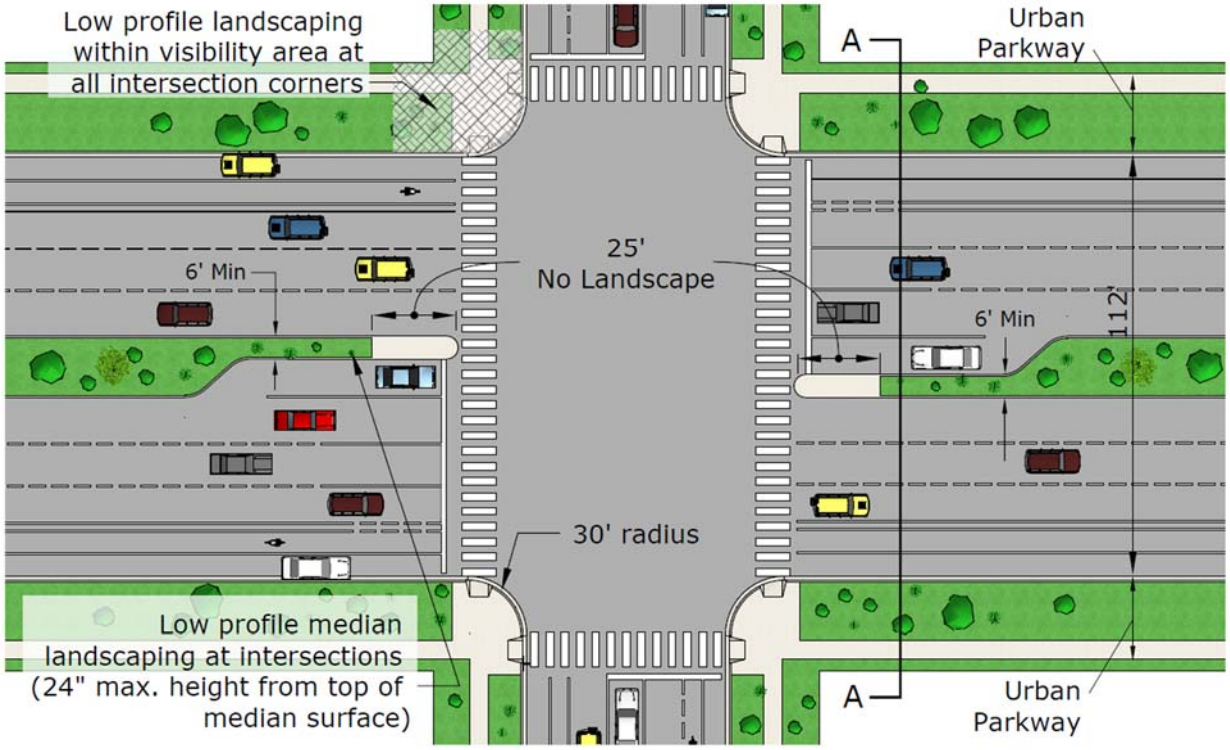


FIGURE 1-31. PLAN: SIX-LANE URBAN MAJOR

TABLE 1-13. SIX-LANE URBAN MAJOR SPECIFICATIONS

Width, Right-of-Way	140 ft. – 152 ft.
Design ADT LOS C LOS D	 40,000 45,000
Design Speed	45 mph
Width (includes bike lanes and 16 ft. raised center median), Curb-to-Curb[1]	112 ft.
Maximum Grade	7%
Minimum Curve Radius	1,090 ft. with no superelevation 830 ft. with 2% (min.) superelevation 660 ft. with 6% (max.) superelevation
Land Use **Parkway Options**	Single Dwelling Residential – no front or side yards, Multiple Dwelling Residential – no front or side yards, Community Commercial, Regional Commercial, Commercial Office, Visitor Commercial, School (high school and above), Church, Public Building, Urban Village Commercial Retail, Industrial, Open Space Urban Parkway Configurations see Figure 5–4, 5–6 through 5–9

Note: Six-Lane Urban Major street classification is applicable to streets of limited length, where intersections are closely spaced, where there is extensive driveway access, or in other situations where the speed is expected to be 45mph or less.

[1] Widen additional 10 ft. at approaches to intersecting four- or six-lane streets to provide a minimum of 250 ft. of two-lane left-turn storage, exclusive of transitions. Receiving lanes for dual lefts shall be 12 ft. wide. In instances where supporting information exists, such as an approved traffic impact study, showing clearly that dual left-turn lanes would not be warranted, the standard curb-to-curb width may be permitted.

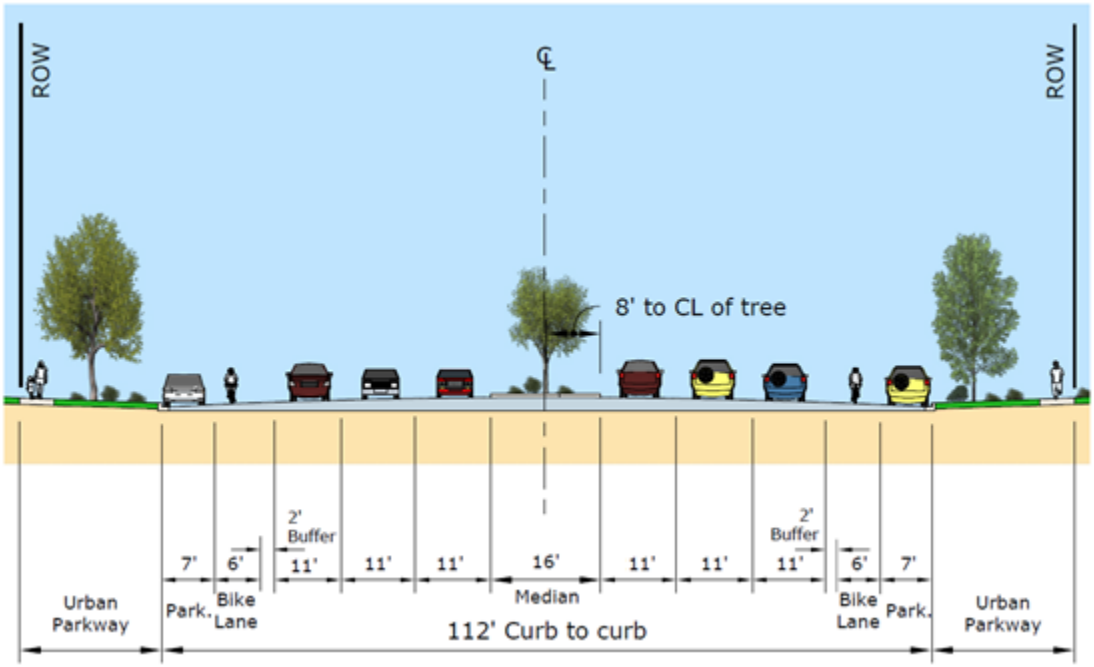


FIGURE 1-32. SECTION A-A: SIX-LANE URBAN MAJOR

1.6.4 Six-Lane Primary Arterial

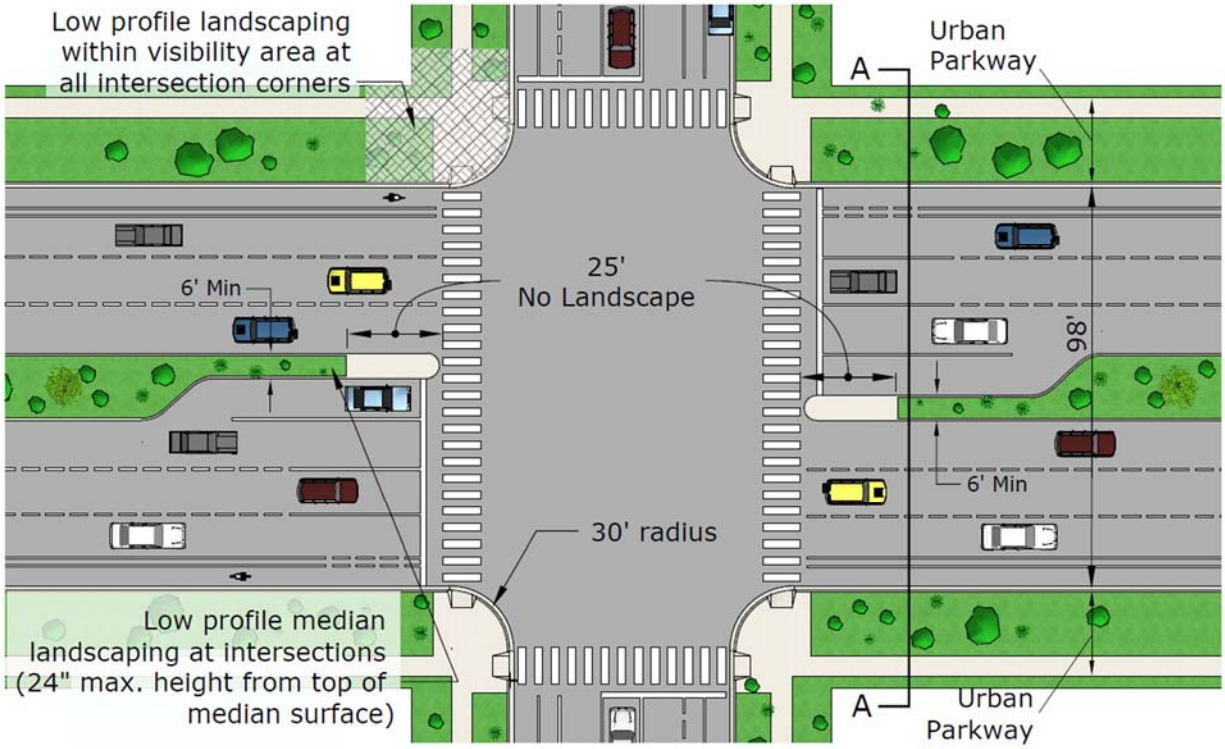
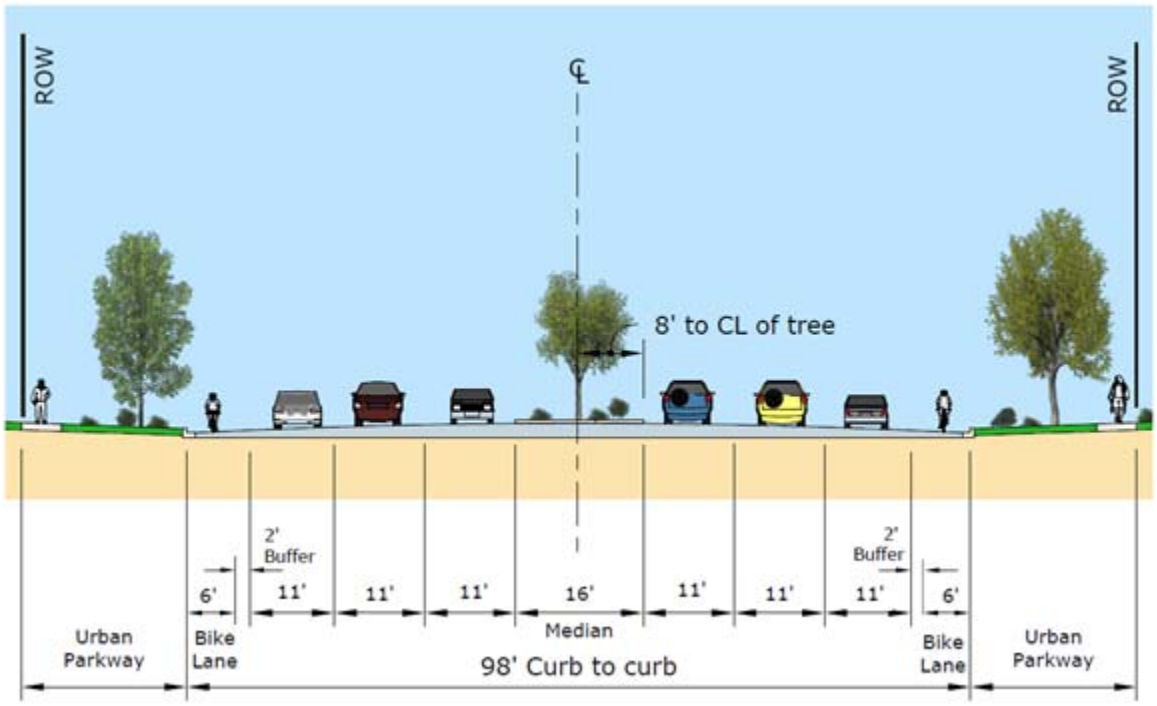


FIGURE 1-33. PLAN: SIX-LANE PRIMARY ARTERIAL

TABLE 1-14. SIX-LANE PRIMARY ARTERIAL SPECIFICATIONS

Width, Right-of-Way	142 ft.
Design ADT LOS C LOS D	 50,000 55,000
Design Speed	55 mph
Width (includes bike lanes and 16 ft. [raised center median), Curb-to-Curb[1]	98 ft.
Maximum Grade	6%
Minimum Curve Radius	1,850 ft. with no superelevation 1,350 ft. with 2% (min.) superelevation 880 ft. with 10% (max.) superelevation
Land Use	Large Lot Single Dwelling Residential – no front or side yards, Single Dwelling Residential – no front or side yards, Multiple Dwelling Residential – no front or side yards, Community Commercial – no front yards, Regional Commercial, Commercial Office, Visitor Commercial, Church – no front yards, Public Building – no front yards, Industrial – no front yards, Open Space
Parkway Options	Urban Parkway Configuration see Figure 5–5

[1] Widen additional 10 ft. at approaches to intersecting four- or six-lane streets to provide a minimum of 250 ft. of two-lane left-turn storage, exclusive of transitions. Receiving lanes for dual lefts shall be 12 ft. wide. In instances where supporting information exists, such as an approved traffic impact study, showing clearly that dual left-turn lanes would not be warranted, the standard curb-to-curb width may be permitted.



Note: Striping indicated above is for standard cross sections with a standard gutter of 1.5 feet. For existing non-standard curbs with no gutter refer to the City's latest Bicycle Facilities Design Guidelines for striping.

FIGURE 1-34. SECTION A-A: SIX-LANE PRIMARY ARTERIAL

1.7. Rural Roads

All Figures are for illustrative purposes and all signing and striping are subject to the most recent adopted edition of the CA MUTCD or as appropriate by reviewer. Figures 1-35 through 1-38 and Tables 1-15 and 1–16 below illustrate the design specifications for rural local roads and rural collector roads.

1.7.1 Rural Local Road

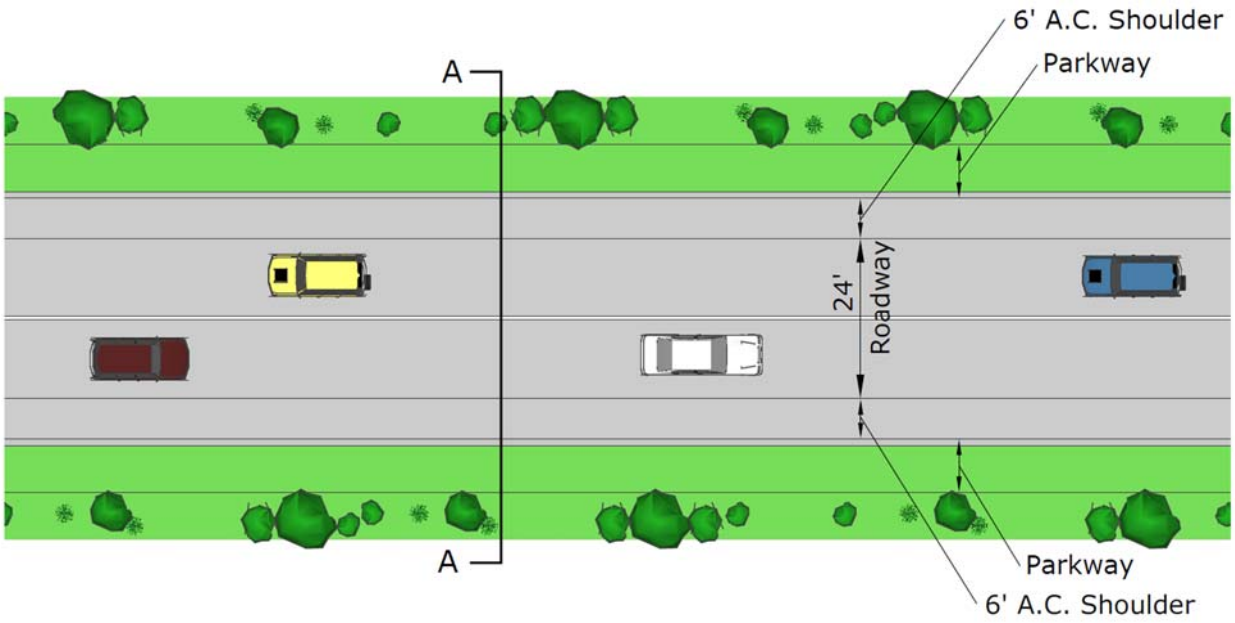


FIGURE 1-35. PLAN: RURAL LOCAL ROAD

TABLE 1-15. RURAL LOCAL ROAD SPECIFICATIONS

Width, Right-of-Way	60 ft.
Design ADT	1,500
Design Speed	30 mph
Width of Traveled Way	24 ft.
Maximum Grade	15%
Minimum Radius	430 ft. with no superelevation 340 ft. with 2% (min.) superelevation 300 ft. with 4% (max.) superelevation
Land Use	Large Lot Single Dwelling Residential (>2.5 acres), Agriculture, Open Space-Park, Open Space-Conservation, Open Space-Floodplain
Parkway Options	Rural Parkway Configurations see Figure 5–10 through 5–12

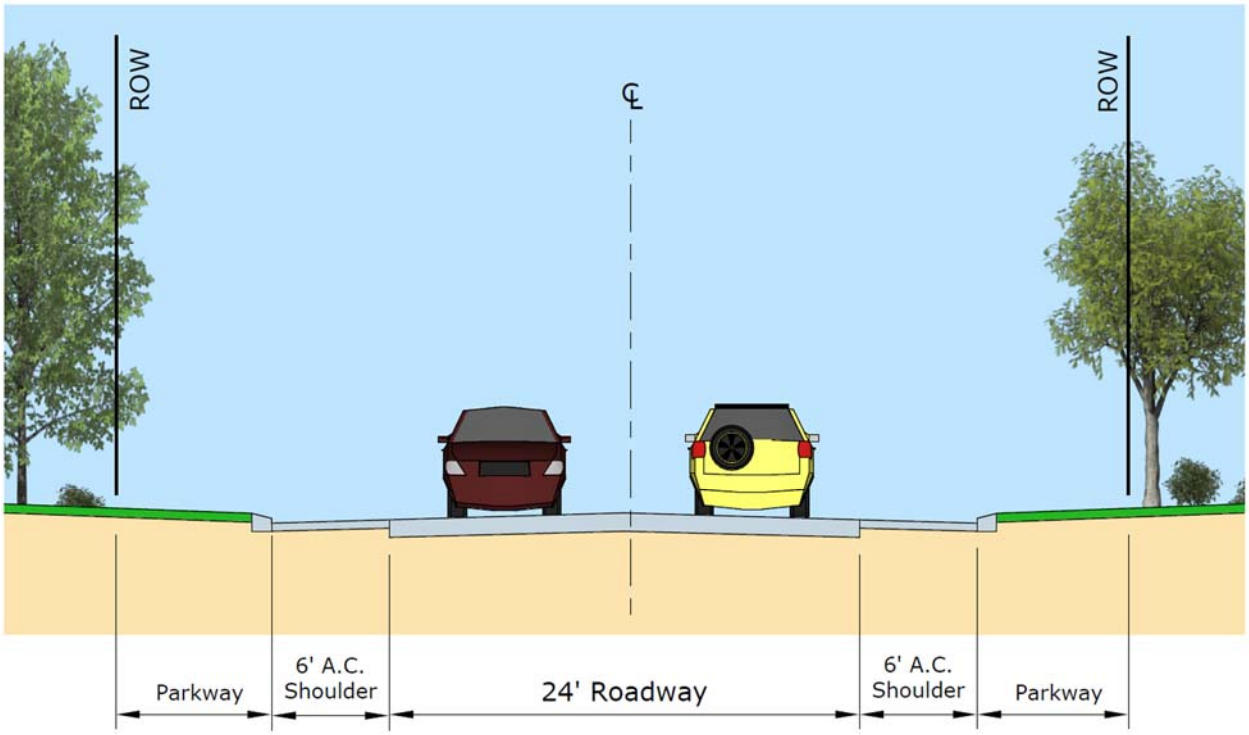


FIGURE 1-36. SECTION A-A: RURAL LOCAL ROAD

1.7.2 Rural Collector Road

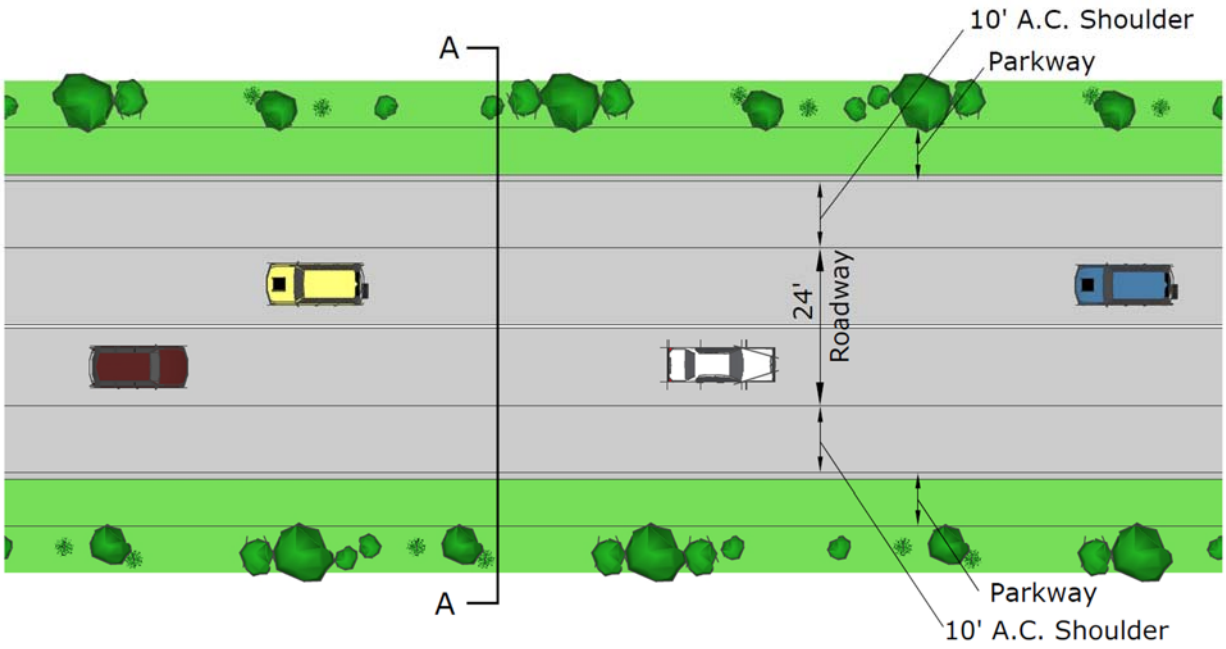


FIGURE 1-37. PLAN: RURAL COLLECTOR ROAD

TABLE 1-16. RURAL COLLECTOR ROAD SPECIFICATIONS

Width, Right-of-Way	80 ft. – 96 ft.
Design ADT	7,500
Design Speed	55 mph
Width of Traveled Way	24 ft.
Maximum Grade	4% in flat terrain 5% in rolling terrain 7% in mountainous terrain
Minimum Radius	1,850 ft. with no superelevation 1,350 ft. with 2% (min.) superelevation 970 ft. with 8% (max.) superelevation
Land Use **Parkway Options**	Large Lot Single Dwelling Residential (>2.5 acres), Agriculture Open Space-Park, Open Space-Conservation, Open Space-Floodplain Rural Parkway Configurations see Figure 5–13, 5–14

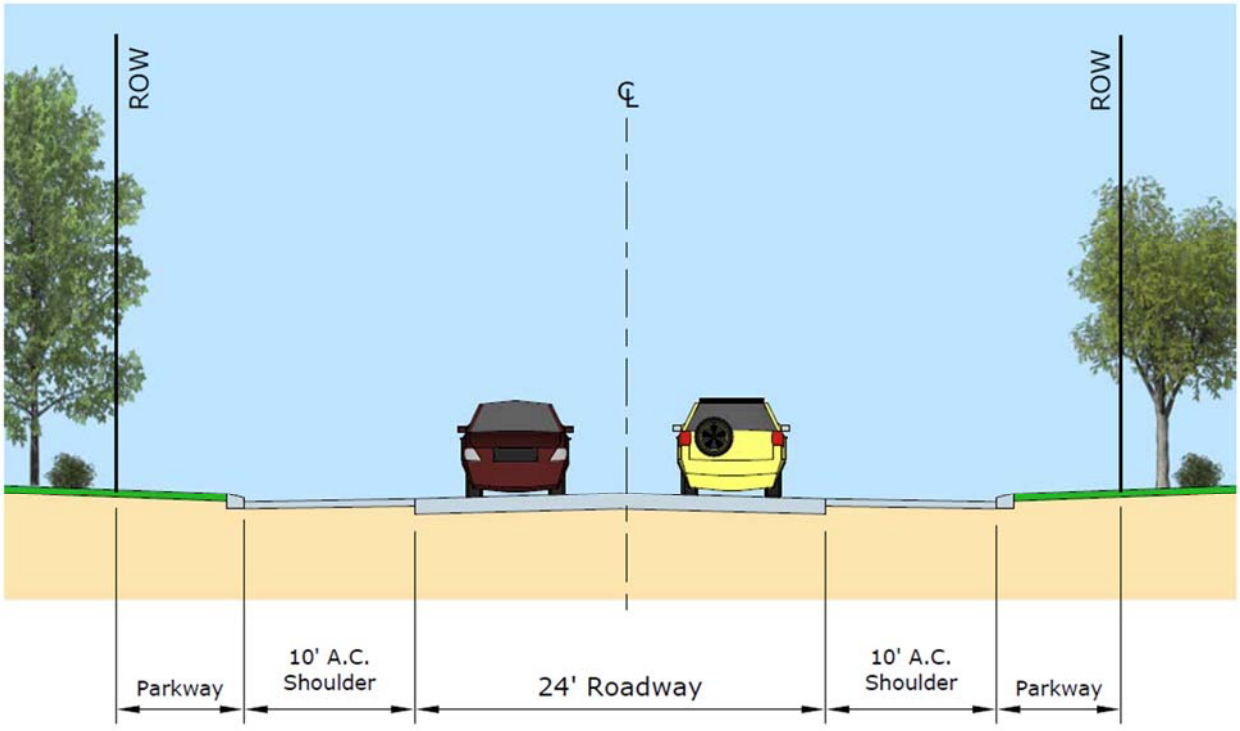


FIGURE 1-38. SECTION A-A: RURAL COLLECTOR ROAD

1.8. Facilities without the Automobile

1.8.1 Shared Pedestrian/Bikeway Facilities

Figure 1–39 and 1-40 and Table 1–17 illustrate the design specifications for shared pedestrian/bikeway facilities.

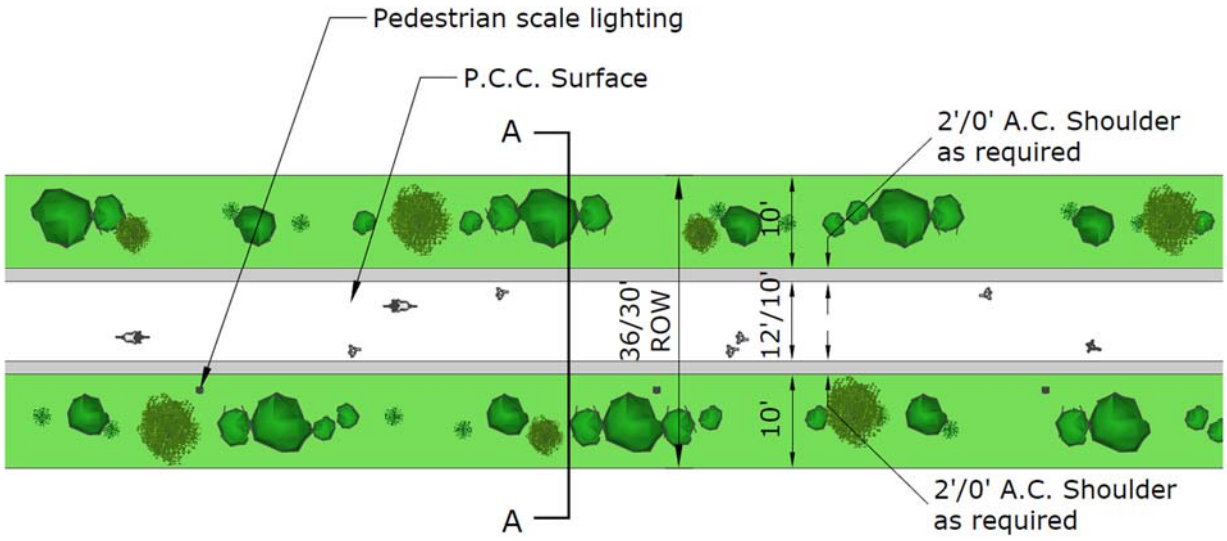


FIGURE 1-39. PLAN: FACILITIES WITHOUT THE AUTOMOBILE

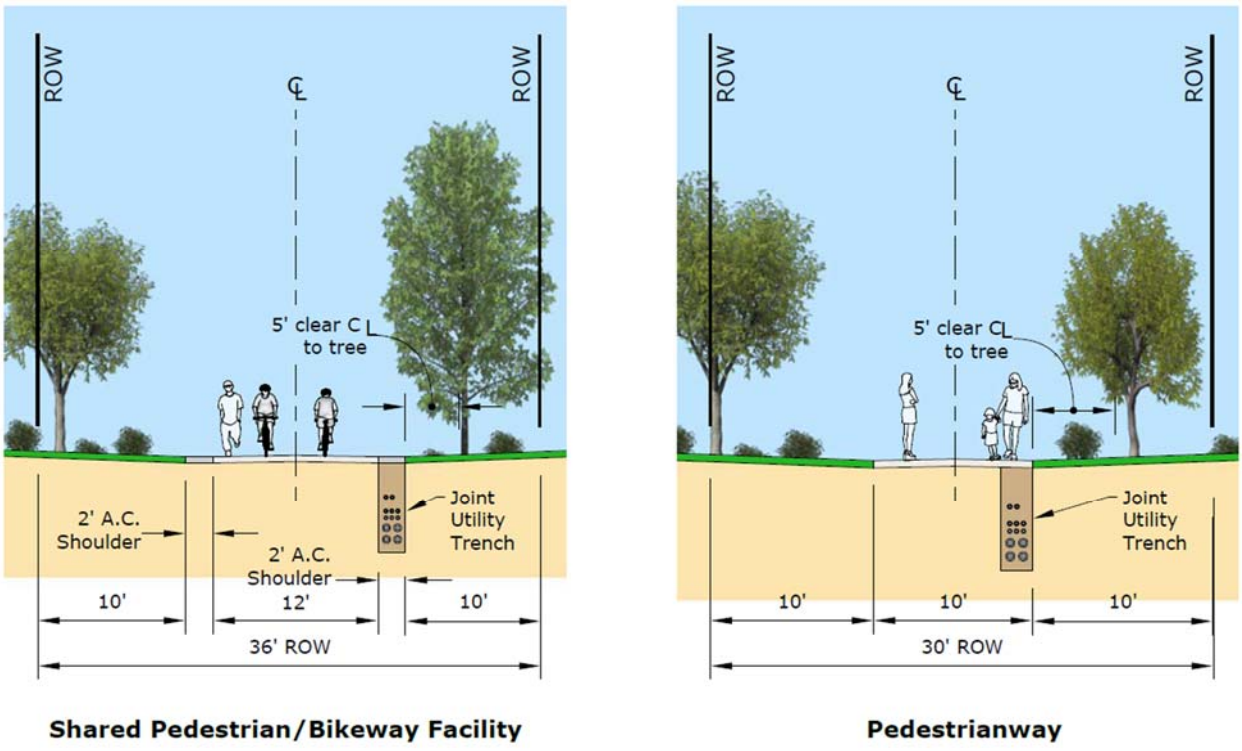


FIGURE 1-40. SECTION A-A: FACILITIES WITHOUT THE AUTOMOBILE

TABLE 1-17. SHARED PEDESTRIAN/BIKEWAY SPECIFICATIONS

Width, Right-of-Way[1,2]	36 ft.
Width of Traveled Way[3]	12 ft.
Width of Shoulder[4]	2 ft.
Maximum Grade	5%
Street Trees	Permitted
Street Lights	Pedestrian Scale
Utilities	One side
Land Use	Single Dwelling Residential – no front yards, Multiple Dwelling Residential – no front yards, Open Space – Park, Commercial – no front yards, Urban Village – no front yards, Industrial Park – no front yards, Small Lot Industrial – no front yards

[1] ROW of 30 ft. is required for pedestrianways only.

[2] Where ROW is constrained, parkway width may be reduced to 6 ft.

[3] Width of traveled way of 10 ft. is required for pedestrianways.

[4] Shoulders are not required for pedestrianways.

1.8.2 Bikeways

Bikeways are to be provided in accordance with adopted community plans and the City's Bicycle Master Plan and should be continuous, leading to all major activity centers. At a minimum, bikeway design should reference Caltrans, Highway Design Manual, CA MUTCD, and AASHTO Guide for the Development of Bicycle Facilities. Consideration for alternative treatments consistent with the NACTO Urban Bikeway Design Guide and the City of San Diego Bicycle Facility Design Guidelines will be made on a case-by-case basis in order to promote safer and more attractive bikeway facilities.

1.8.3 Transitways

Table 1–18 and Figure 1–41 illustrate the design specifications for transitways.

TABLE 1-18. TRANSITWAY SPECIFICATIONS

Width, Right-of-Way	56 ft. – 68 ft.
Design Speed	20 mph
Width, Curb to Curb	28 ft.
Maximum Grade	8%
Minimum Curve Radius	65 ft.
Street Lights	Pedestrian scale, both sides
Land Use **Parkway Options**[1]	Medium-to-Very High Density Multiple Dwelling Residential – no front yards, Commercial Office – no front yards Urban Parkway Configurations see Figure, 5–7
Land Use **Parkway Options**	Pedestrian-Oriented Commercial Retail, Urban Village Commercial Retail Urban Parkway Configurations see Figures, 5–9

[1] Refer to the MTS publication, Designing for Transit, for more information.

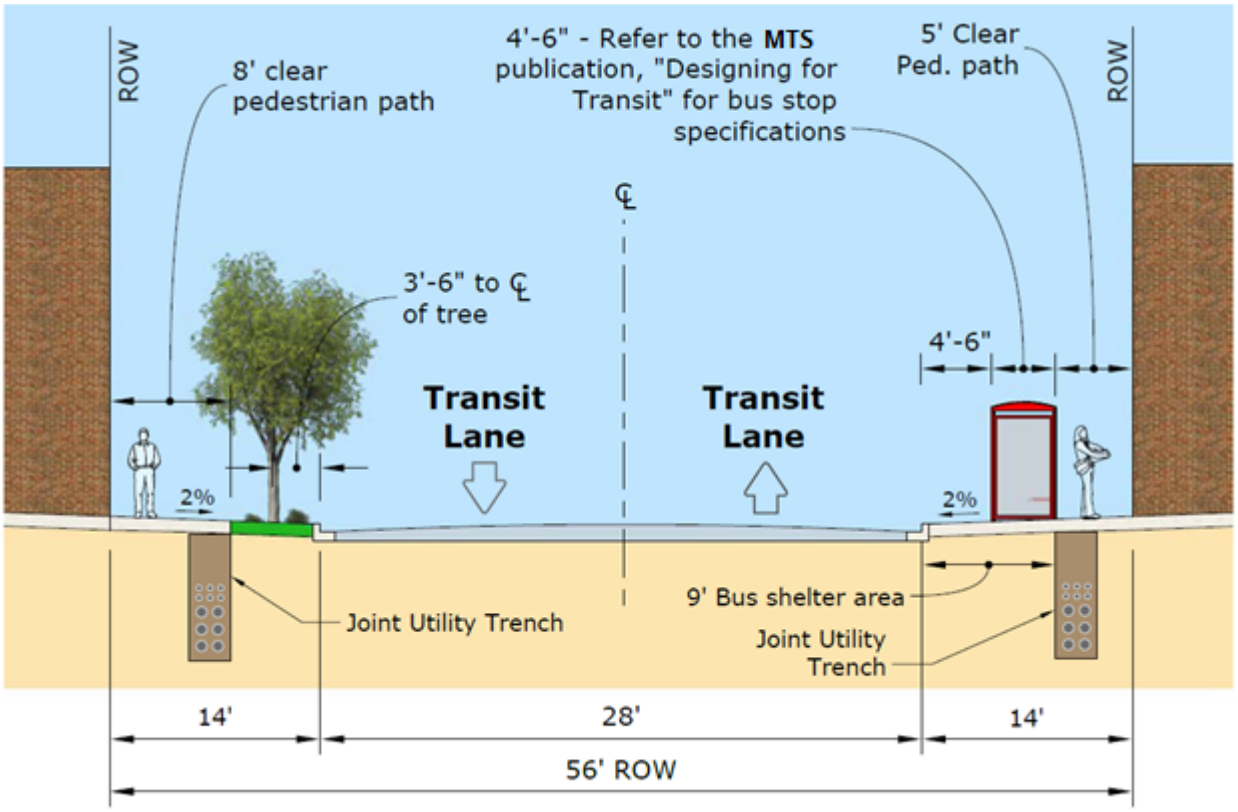


FIGURE 1-41. SECTION A-A: TRANSITWAY

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Chapter 2

Pedestrian and Accessibility Design

The General Plan was comprehensively updated by unanimous vote of the City Council in 2008. The Plan states that land use and street design recommendations that benefit pedestrians also help promote use of alternatives to automobile travel and contribute to the overall quality, vitality, and sense of community of our neighborhoods. Policies designed to support walking and pedestrians are also intended to benefit overall accessibility.

The policies in the latest General Plan address safety, accessibility, connectivity, and walkability goals. These policies encourage collaboration with appropriate community groups and other interested private and public sector groups or individuals to design and implement safe pedestrian routes to schools, transit, and other highly frequented destinations. They also require City streets to have adequate sidewalk widths and clear paths of travel, and bike facilities.

There have been numerous studies that demonstrate a strong link between public health and the built environment, with the healthiest communities exhibiting many of the same types of features that are central to the City of Villages strategy.

The City of Villages strategy calls for a convenient, efficient, and attractive multimodal transportation system in which pedestrians, bicycles, and transit vehicles are accommodated in addition to automobiles. This system should improve mobility for San Diegans by providing competitive—even preferred—alternatives to the automobile for many trips in the region. The strategy, as a policy, recommends: *Promote pedestrian, cycling, and transit-friendly design of City streets.*

In addition to the General Plan, there is also the Pedestrian Master Plan that includes a comprehensive analysis of community's existing pedestrian conditions and needs. The Plan identifies pedestrian routes to activity centers and infrastructure improvement projects along these routes. The plan is a key resource when considering pedestrian projects that promote pedestrian safety, walkability, mobility, and neighborhood quality.

Who Are Pedestrians?

Pedestrian is used throughout these guidelines to include people who walk, sit, stand in public spaces, or use a wheelchair—be they children, teens, adults, elderly, people with disabilities, workers, residents, shoppers, or people-watchers. **Pedestrian-oriented design is accessible design for all people**.

The principal issue in the design of a pedestrian-supportive street is how to allocate its space (e.g., How much space is required to satisfy the needs of pedestrians? How much space is required to create active public space for deliveries? How much space is required to provide for parking, bicycles, and vehicular movement?).

The sections that follow discuss the pedestrian experience at street level, including:

- Creating a Pedestrian Realm;
- Street Design;
- Intersection Design and Operations;
- Pedestrian Crossings (including residential street crossings and mid-block crosswalks);
- Island Passageways;
- Sight Distance; and
- Sidewalks for Overpasses, Underpasses, and Highway On/Off Ramps).

2.1. Understanding ADA and Designing for Various Disabilities and Ages

The following discussion focuses on the accessibility needs and requirements as defined by both federal and state (California Title 24) accessibility standards.

Millions of persons in the United States have some sort of permanent or temporary disability caused by injury, age, or illness. The Americans with Disabilities Act (ADA) was signed into law on July 26, 1990. This civil rights law assures that a person with disabilities will have full access to all public facilities—primarily to public transit, public buildings and facilities, and along public rights-of-way.

It is essential, however, that the design of pedestrian facilities take into account the abilities and disabilities of **all** pedestrians. Mobility impairment is but one classification of disability; others are sensory deficits (the sight and hearing impaired) and cognitive impairments (those with diminished ability to process information, including language barriers).

Since 1971, the State of California has mandated within its Health and Safety Codes Section 19956.5 that sidewalks and walks shall be made accessible to and usable by persons with disabilities. The *CA Unruh Civil Rights Act* (Civil Code Section 51) says, "A violation of the right of any individual under the ADA shall constitute a violation of this act."

2.1.1 Grades

The following considerations are to be made for grades:

1. There should be enough sidewalk cross slope for adequate drainage. The maximum cross slope shall be 1.5 percent, per the City of San Diego Standard Drawings.
2. Along walkways, pedestrian ways, and shared pedestrian/bikeway facilities, long, steep grades should have level areas every 400 feet for the pedestrian to stop and rest. In areas where it is impossible to avoid steep grades, an alternative route should be provided.

2.1.2 Sidewalks

The following considerations are to be made for sidewalks:

1. Minimum unobstructed sidewalk width shall be 5 feet (including 6-inch top of curb). Exceptions may be made by the City Engineer to reduce sidewalk to a minimum of 3.5 feet because of right-of-way (ROW) restrictions, natural barriers, or other existing conditions. The minimum width should be expanded when there is either a vertical barrier fronting the sidewalk or a vehicle travel lane.
2. Sidewalks with continuous gradients shall have resting areas 5 feet in length at intervals of 400 feet maximum. The resting area shall be at least as wide as the walk. The slope of the resting area in all directions not to exceed 1.5 percent.
3. If the clear width of the sidewalk is less than 4 feet, level passing spaces shall be provided at intervals of 200 feet maximum. Passing spaces shall be either:
    a. A space 60 inches minimum x 60 inches minimum, or
    b. An intersection of two walking surfaces providing a T-shaped* space, where the base and arms of the T-shaped space extend 48 inches minimum beyond the intersection. See Figure 2–1 for illustration of T-shaped space.

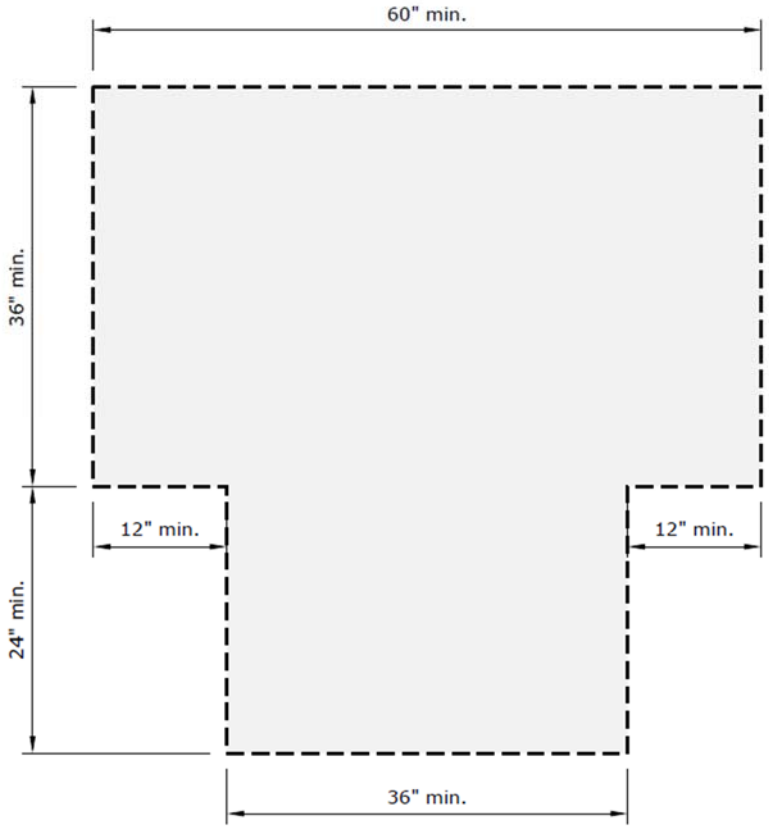

FIGURE 2-1. T-SHAPED TURNING SPACE

c. The turning space shall be a T-shaped space within a 60 inch square minimum with arms and base 36 inches wide minimum. Each arm of the T shall be clear of obstructions 12 inches minimum in each direction and the base shall be clear of obstructions 24 inches minimum. The space shall be permitted to include knee and toe clearance complying with accessibility regulations only at the end of either the base or one arm.

4. Warning Curbs: A 6-inch high warning or concrete curb shall be provided along the sidewalk monolithic curb edge where there is an abrupt change in elevation exceeding 4 inches in a vertical dimension along adjacent surfaces. A warning curb is not required between a sidewalk and an adjacent street or driveway or when a guardrail or handrail is provided with a guiderail centered 2 inches minimum and 4 inches maximum above the surface of the sidewalk.

2.1.3 Curb Ramps at Intersections

The following considerations are to be made for curb ramps at intersections:

1. At new intersections, curb ramp shall be in line with the direction of crosswalks, with two curb ramps per corner to be considered to the maximum extent feasible unless existing constraints, conditions, or other extraneous circumstances deemed appropriate by the City Engineer prevent two-curb ramp design. If a single curb ramp is allowed, it must be placed in the center to allow pedestrian access to either direction of the sidewalks.If crossing is allowed for only one direction, a single direction curb ramp can be installed.
2. Curb ramps shall be installed in accordance with the City of San Diego Standard Drawings.
3. Curb ramps or full cut-throughs 60 inches in width minimum with truncated domes should be provided at the channelization and island passageways. Refer to the City of San Diego Standard Drawings for additional information.
4. Storm drainage inlets should be placed on the uphill side of the curb ramps to prevent standing water at corner.
5. Directional Curb Ramp: Where a Type B and Type D curb ramp cannot be used at corners with bigger radius and the pedestrian travel way is directional, a modified directional curb ramp shall be used at these areas. See Figure 2–2 and incorporate the following requirements on improvement plans:
   a. Prior to design, analyze the drainage pattern at the corner to ensure ponding will not occur at the bottom landing.
   b. Provide an enlarged detail on the plans.
   c. Indicate the slopes along the top and bottom landings.
6. Curb ramps shall be installed at all legal crosswalks (marked or unmarked) at all intersections unless technically infeasible.

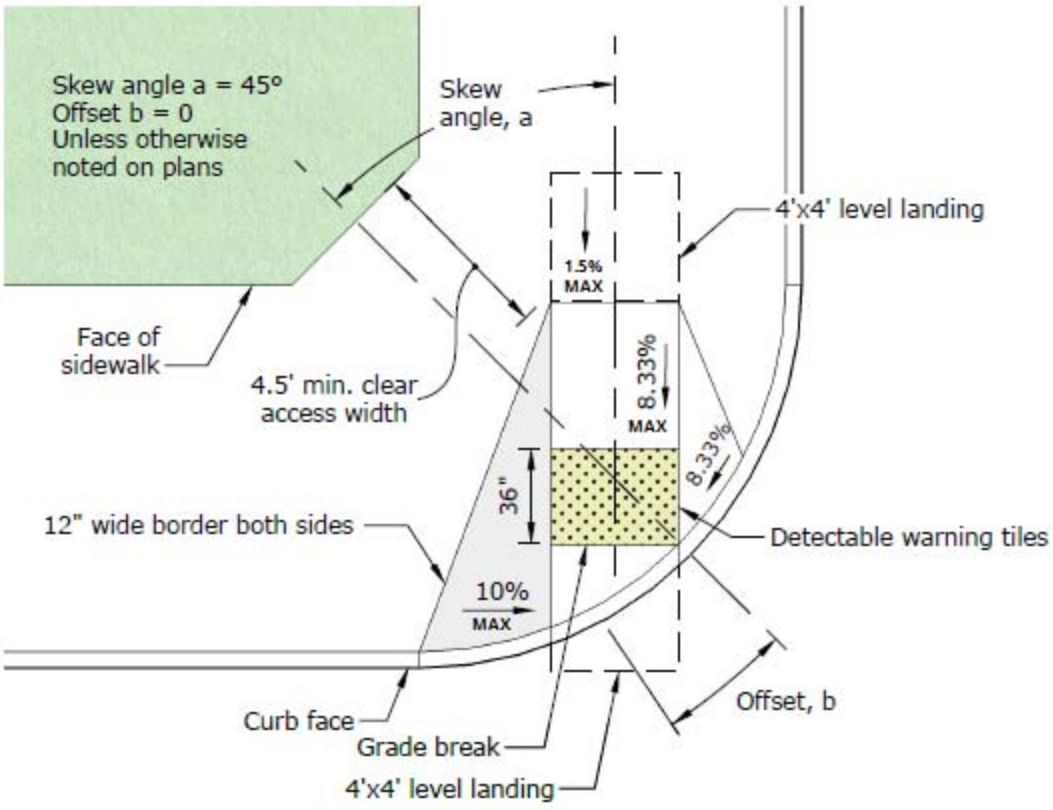

FIGURE 2-2. DIRECTIONAL CURB RAMP

2.1.4 Surfaces

The following considerations are to be made for surfaces:

1. All surfaces should be stable, firm, and slip resistant with a minimum static coefficient of friction of 0.5.
2. Surface treatments that include irregular surfaces (e.g., cobblestone) can be difficult to navigate and should be avoided within the primary walkway area. Low profile textured surfaces are acceptable.
3. Surfaces along accessible routes shall be free of gratings whenever possible. For gratings located in the surface of any of these areas, grid openings in gratings shall be limited to 0.5 inches in the direction of pedestrian traffic flow.

2.2. Creating a Pedestrian Realm

Safe and direct sidewalk connections are of key importance to creating a pedestrian-friendly environment. Sidewalks should support activities that will occur in the area and provide a comfortable place for pedestrians to take part in various activities. However, creating a high-quality pedestrian realm that supports and encourages walking takes much more than simply providing sidewalks.

The design of the sidewalk and the elements within it and the location and design of buildings are just some of the additional considerations of creating a pedestrian-supportive environment. Furthermore, walking provides more opportunities to observe details than any other form of transport. Landscape and architectural details are therefore necessary to sustain interest for pedestrians as well as to provide a safe, comfortable experience.

2.2.1 Sidewalk Design

Sidewalks are not merely thoroughfares for pedestrians. They are also important social spaces where people interact and walk together, catch a bus, window shop, or have a cup of coffee at a café. Sidewalks must be wide enough to accommodate movement in addition to amenities (such as seating) that facilitate social interaction. This makes sidewalks more comfortable and appealing, which can encourage uses that increase security.

2.2.2 Issues to Consider

The following are general issues to consider when creating a pedestrian realm:

- When additional ROW is available, widening sidewalks, public gathering places and on-street parking, both of which significantly improve the pedestrian experience should be considered.
- Increased buffering between vehicular traffic and abutting properties created by wider sidewalks or local access lanes makes the street more attractive for buildings to front directly onto the street.
- Appropriate sidewalk widths should be provided given the use and amount of activity that is expected.
- Materials should be selected with consideration for maintenance and long-term appearance.
- Obstructions and conflict points should be minimized.

2.2.3 New Development versus Retrofit

The following considerations should be made for new or retrofitted sidewalks:

- Dimensions of an existing sidewalk can be increased either through the acquisition of additional ROW, zoning a setback requirement for new development to create additional pedestrian space, or through a reduction in curb-to-curb roadway width where applicable. Another alternative to reducing roadway width in these cases could be to revise the parking from parallel to diagonal, which slows speeds and creates opportunities for an improved pedestrian environment.
- New streets must balance the needs of all users in determining ROW width.

2.2.4 Relation to Transit

The following should be considered in relation to transit:

- The “footprint” of and access to transit facilities such as bus shelters must be considered in the design of sidewalks.

- Sidewalks must connect transit facilities with the adjacent uses within walking distance of the station or bus stop.
- Review MTS publication, "Designing for Transit" as well as these guidelines in relation to pedestrian access to transit facilities.

2.2.5 Establishing "Zones"

The Sidewalk Corridor is typically located within the street ROW between the curb and building face and/or property line. The sidewalk corridor is composed of four distinct zones (see Figure 2–3 for illustration):

- the Edge Zone
- the Furnishings Zone
- the Throughway Zone
- the Frontage Zone

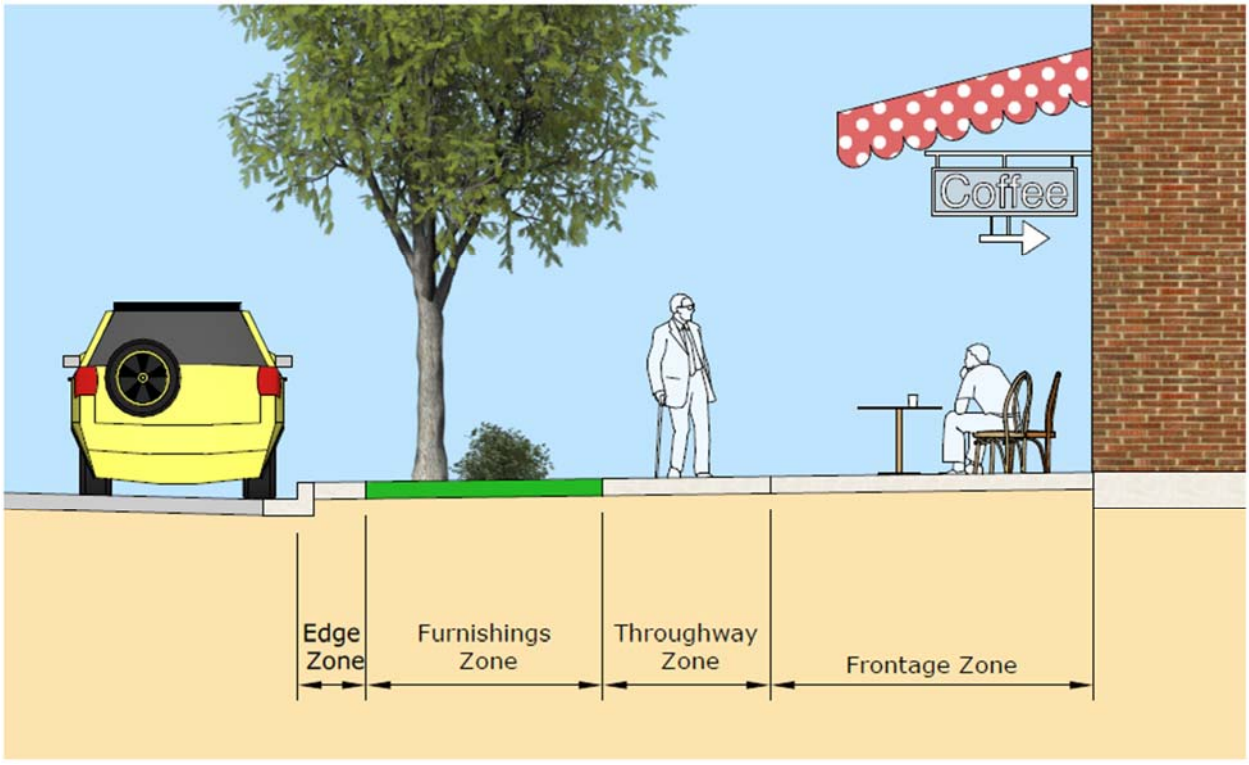

FIGURE 2-3. PEDESTRIAN SIDEWALK ZONES

2.2.5.1 Edge Zone

The Edge Zone (sometimes referred to as the "Curb Zone") is the interface between the roadway and the sidewalk. At a minimum, this zone includes the 6-inch wide curb. In more active, mixed-use areas with on-street parking, this zone should be a minimum of 1 foot 6 inches to accommodate the door swing of a parked car to prevent conflict with elements within the Furnishing Zone.

At transit stops with shelters, this zone should be widened to 5 feet to provide wheelchair access to the shelter. (In constrained conditions, transit shelters are available with partially open sides, allowing the Edge Zone to be reduced to 2 feet, 6 inches.) Providing a pop-out for the entire length of the transit stop is also an effective way to increase Edge Zone width.

2.2.5.2 Furnishings Zone

The Furnishings Zone also accommodates street trees and landscaping. It is the zone that provides the buffer between the active pedestrian walking area, the Throughway Zone, and street traffic. Street trees, street furniture, utility poles, parking meters, fire hydrants, bicycle racks, and the like are consolidated in this zone to keep them from being obstacles in the Throughway Zone.

Planting in this zone must comply with the standards and guidelines in this manual and the Landscape Technical Manual, particularly in the case of street tree well dimensions. The placement of the aforementioned elements must comply with the Land Development Code, San Diego Municipal Code, and applicable Council policies. Generally, any landscaping installed within the right-of-way is to be maintained by a Maintenance Assessment District or the adjacent property owner.

Installing pedestrian pop-outs is an effective way to increase sidewalk space for street furniture and other features. The dimension of the Furnishings Zone must consider the speed of traffic and whether street parking is provided (an effective buffer).

2.2.5.3 Throughway Zone

The Throughway Zone is intended for pedestrian travel only and should be entirely clear of obstacles, including driveway aprons. This zone should be at least 5 feet wide. For high pedestrian volume areas, additional width should be provided. “Overhanging” elements such as awnings, store signage, bay windows, etc. may occupy this zone as long as there is a clear distance under them of at least 8 feet.

2.2.5.4 Frontage Zone

The Frontage Zone is the area adjacent to the property line that may be defined by a building façade, landscaping, or a fence. Generally, pedestrians do not feel comfortable moving at a full pace directly along a wall; because of this, the minimum frontage zone should be 1 foot 6 inches in these situations. This is also the zone where pedestrians slow down and window-shop and enter and exit buildings. Adjacent businesses may use this zone for outdoor displays and seating, and municipalities must ensure there is adequate space to accommodate these uses without impeding the Throughway Zone.

Architectural elements that encroach into the street (e.g., awnings, stairs, front stoops, artistic elements, planters, marquees, etc.) may also occupy this zone. These elements add vitality and visual interest to the street but nevertheless must comply with local, state, and federal regulations.

Where no Furnishing Zone exists, elements that would normally be sited there (e.g., benches, light poles, signals, trash cans, etc.) may occupy the Frontage Zone in order to keep the Throughway Zone clear and maintain at least minimum ADA requirements.

Where the sidewalk passes a parking lot, there should be some type of buffer (e.g., a hedge or low wall) in order to maintain a more aesthetic frontage along the sidewalk and prevent parked vehicles from overhanging onto the Frontage Zone

2.3. Street Design

At a site and detail design level, the design of streets must consider the mobility and safety of the pedestrian. Maximizing traffic capacity and speeds are not the dominant consideration in street design, particularly in pedestrian-oriented areas.

2.3.1 Issues to Consider

The following are general issues that should be considered in street design:

- A prevailing condition in much of the San Diego region is the location of buildings set back from the street, which can result in a built environment that encourages traffic to travel at higher speeds.
- While it can be important to buffer residential neighborhoods from adjacent busy and noisy streets, the need to buffer should be balanced with the need for pedestrians to easily get from the neighborhood to transit or uses along busy streets.
- Wide lanes encourage higher speeds on streets that can then divide a community.
- Frequent curb cuts along a street both impede traffic flow and create more conflict points between autos and pedestrians, thus reducing the effectiveness of sidewalks as a pedestrian realm.
- Throughout the San Diego region, there are canyons and mesas that make pedestrian connections difficult to achieve.
- The warm, mild climate of San Diego throughout most of the year creates opportunities to make pedestrian travel a realistic option for many people.
- For new road design, all rules, regulations, standards, and City policies apply. When a new roadway creates a new intersection with an existing road, the intersection and the curb ramps must be designed and built to all accessibility design standards to allow for smooth transitions to adjoining sidewalks as well as ensuring proper drainage is provided.

2.3.2 ADA Accessibility

Pedestrian facilities must comply with ADA standards and California Title 24 accessibility regulations and take into account the entire range of disability categories. These regulations create a better pedestrian environment, particularly for seniors and persons with disabilities.

2.3.3 New Development versus Retrofit

These guidelines and standards describe the minimum desirable improvements in most cases within new developments; in many cases, discussions of tradeoffs between different needs are discussed to help the reader identify the compromises that may be necessary in the retrofitting of existing streets and developments.

- Improvements to accessibility should be considered on both sides of the street.
- Neighborhoods evolve over time and the public ROW configuration has an influence as to what type of development occurs.

- Prior to improvements to an existing street, utilities (e.g., lighting, electrical, and storm drains) should be identified and either incorporated into the design or relocated to provide access as required by the ADA and California Title 24 regulations.

2.3.4 Relation to Transit

The following considerations are to be made in relation to transit:

- All streets that are directly served by transit should also be designed or retrofitted to serve pedestrians because there must be adequate facilities to access transit.
- Streets, sites, and buildings within an area that is walkable to transit stops should be designed or retrofitted to serve pedestrians.
- Transit stops must be served with curb ramps at both sides of the bus stops at the adjacent intersections as required by the ADA and California Title 24 regulations.

2.3.5 Guidelines

The following guidelines should be followed for street design:

1. Parallel routes serving all forms of traffic should be considered when resulting curb-to-curb width may not accommodate all other forms of traffic (e.g., a dedicated bicycle or transit lane, a parking lane, or a travel lane).
2. The number of pedestrian crossings should be maximized in order to prevent a street from becoming a barrier in the community.
3. More frequent intersections along arterial roads (even if they only provide right-in and right-out access for cars, couple with an overall interconnected system of roads within the grid of arterial streets should be built in new development. This will allow better transit coverage and pedestrian access as well as improved overall circulation and community aesthetics.
4. Access Control Plans should be developed for new and existing streets that consolidate access points to adjacent properties, either through local access lanes, shared easements, or establishment of access via less-busy cross streets.
5. For retrofitting or improving existing ROWs, sidewalks should be constructed. Where the existing ROW is too narrow to accommodate sidewalk construction, additional ROW or public walkway easement should be acquired or the existing roadway narrowed but maintained in accordance with established minimum roadway standards.

2.4. Intersection Design and Operations

The word *intersection* means more than just the meeting of two or more streets. It can also mean the intersection of two different modes of travel. It is where multi modes of transportation (bike, pedestrian, auto, transit) converge, sometimes in conflict. It is because of this that intersections are often the most vital areas along a street. They are the point of most conflicts between vehicles, pedestrians, and bicycles.

Intersections must be designed with pedestrian safety and accessibility in mind. If pedestrians are either prohibited from crossing or discouraged from crossing, walking as a mode of travel is

hampered. The spacing of intersections or crossing points is also an important element in the creation of a supportive pedestrian environment.

This section describes how intersections can be made more pedestrian-friendly by reducing crossing distances and improving visibility for both pedestrians and drivers. Detailed discussion of specific crossing designs and elements is included in Section 2.5, "Pedestrian Crossings."

2.4.1 Issues to Consider

The following are general issues that should be considered for intersection design:

- Pedestrians should be made as visible as possible because multiple conflict points for vehicles and pedestrians exist at intersections.
- Intersections that minimize pedestrain crossing distance and crossing time reduce the exposure to traffic and pedestrian/vehicular conflicts.
- Drivers traveling at a slower rate of speed have more time to process and react to pedestrian conflicts at intersections.

2.4.2 ADA Accessibility

Pedestrian facilities (including curb ramps, signal equipment, etc.) must comply with ADA standards and California Title 24 regulations and take into account the entire range of disability categories.

2.4.3 New Development versus Retrofit

- Prior to improvements to an existing intersection, utilities (e.g., lighting, electrical, and storm drains) should be identified and either incorporated into the design or relocated.
- New intersections provide the opportunity to clarify new forms of traffic control that may create a more pedestrian-friendly setting.

2.4.4 Relation to Transit

The location and design of transit stops at intersections should consider the access needs of adjacent land uses that generate pedestrian demand for transit as well as pedestrian and traffic safety issues at the intersection.

2.5. Pedestrian Crossings

One of the most effective means of turning an important corridor into a community "spine" or "seam" rather than a community "divider" is providing for safe street crossings. Guidelines for installation of marked crosswalks at uncontrolled intersections and mid-block crossings are contained in Council Policy 200-07, "Marked Crosswalk Criteria at Uncontrolled Locations".

2.5.1 Issues to Consider

The following are general issues that should be considered for pedestrian crossings, including residential street crossings and mid-block crosswalks:

- The width of the street, the geometry of the intersection, the timing of signalization, and the frequency of crossing opportunities all play important roles in achieving a pedestrian-friendly environment.
- Crossing opportunities should be provided at regular and convenient intervals.
- Marked crosswalks are useful in channelizing pedestrian crossing activity at specified locations.
- Marked crosswalks identify appropriate crossing locations for pedestrians and alert drivers to the possible presence of pedestrians.
- The use of marked crosswalks is generally considered appropriate at signalized intersections where pedestrian activity occurs.
- Street width and traffic speed can be mitigated with the use of sidewalk pop-outs.
- Some pedestrians may become overconfident or be less aware of vehicles when crossing in a marked crosswalk; therefore, marked crosswalks should not be used indiscriminately.

2.5.2 Accessibility

Appropriate curb ramps must be provided at all pedestrian crossings and island passageways.

2.5.3 Relation to Transit

All transit stops require that pedestrians be able to cross the street safely and within proximity to the stop.

2.5.4 Guidelines

The following guidelines should be followed for pedestrian crossings:

1. The width of all crosswalks shall be a minimum of 10 feet wide or per dimensions specified by the ADA and California Title 24 regulations. Unless small-scale intersection conditions dictate otherwise, widths shall be increased where there is greater pedestrian activity.
2. Adequate lighting at the levels specified in Chapter 4, “Street Lighting”, should be present.
3. The installation of crosswalks shall conform to Council Policy 200-07 and in accordance with CA MUTCD.
4. Marked crosswalks should be provided at all signalized intersections where pedestrian crossing is allowed.
5. Curb ramps shall be provided at all crosswalks. If a raised median extends into the crosswalk, the median nose should be relocated out of the crosswalk or an island passageway with truncated domes must be provided through the median.

2.5.5 Residential Street Crossings

2.5.5.1 Issues to consider

- Enhanced pedestrian crossings in residential neighborhoods are a key component of pedestrian-oriented street design and lead to both improved pedestrian safety and the livability of the neighborhood.
- Residential street crossings are often combined with traffic-calming measures that are designed to maintain low vehicle speeds, such as raised crosswalks, chicanes, and gateway narrowings (see Chapter 3, "Traffic Calming").
- Enhanced pedestrian crossings in residential neighborhoods may not be used if traffic volumes are low enough that pedestrians are comfortable crossing at any location.

2.5.5.2 Guidelines

- Enhanced pedestrian crossing measures should be considered in residential neighborhoods where a demonstrated crossing demand exists.
- On residential streets that experience excessive vehicle speeds, enhanced pedestrian crossings should be combined with traffic-calming measures such as pop-outs.

2.5.6 Mid-Block Crosswalks

2.5.6.1 Issues to consider

- Mid-block crosswalks provide convenient crossing locations for pedestrians when other crossing opportunities are distant or where there is a presence of concentrated mid-block pedestrian crossing demand.
- Guildelines for installation of mid-block crossings are contained in the Council Policy 200-07, "Marked Crosswalk Criteria at Uncontrolled Locations."

2.5.6.2 Guidelines

1. Crosswalks at uncontrolled intersections and mid-block crosswalks shall be installed in accordance with Council Policy 200-07.
2. Mid-block crosswalks shall be well illuminated (refer to Chapter 4, "Street Lighting").
3. A curb ramp shall be provided at each end of the crosswalk.
4. Curb extensions may be considered at the crosswalk to enhance pedestrian crossing visibility and reduce crossing distance.
5. If mid-block crosswalks are signalized, accessible pedestrian signals and devices shall be installed.
6. On streets that experience excessive vehicle speeds, enhanced pedestrian crossings should be combined with traffic calming measures such as raised crosswalks or curb extensions.

2.6. Island Passageways

Island passageways in wide or busy streets improve safety for pedestrians and vehicles. They are defined as areas within an intersection or between lanes of traffic where pedestrians may safely walk until vehicular traffic clears, allowing them to cross a street. Another benefit to pedestrians is that it can significantly reduce delay in crossing unsignalized intersections because pedestrians need only search for vehicles in one direction at a time.

2.6.1 Issues to Consider

In general, island passageways work best on wider streets with long pedestrian crossing times and exposure to vehicular traffic or on streets with speeds higher than 35 mph.

2.6.2 Accessibility

Island passageways are particularly useful for slower pedestrians such as the very young, the elderly, or those with mobility disabilities. Where it is not possible to include ramps and waiting pads that meet accessibility requirements waiting areas should be at-grade with the roadway (channels).

2.6.3 New Development versus Retrofit

Island passageways may be installed at intersections or mid-block locations deemed appropriate through engineering studies. They should be considered from the outset of design for intersections that are either complex, irregular in shape, excessively wide, or in areas where children and the elderly are expected to cross frequently.

2.6.4 Relation to Transit

The use of island passageways should be considered where transit is “running” with the street ROW, particularly in station areas.

2.6.5 Guidelines

The following guidelines should be followed for island passageways:

1. Island passageways with truncated domes shall be designed per the City of San Diego Standard Drawings.
2. Pedestrian island passageways should be well illuminated.

2.7. Sight Distance

More often than not, sight distance is discussed only from the standpoint of the driver, not the pedestrian. This is of particular concern at crosswalk locations where parked cars, utility poles, street furnishings, or landscapes can obstruct the line of sight for pedestrians.

2.7.1 Issues to Consider

Streets that support pedestrian movements allow for the placement of elements such as trees and medians with landscaping. The presence of such elements creates a slower speed environment that is more conducive to pedestrian travel. These elements shall be placed in such a way that adequate sight distance is provided for all users of the public ROW.

All pedestrian crossing facilities in the City shall take into consideration Council Policy 200-07, "Marked Crosswalk Criteria at Uncontrolled Locations."

2.7.2 Relation to Current Standards and Practices

- AASHTO Green Book recommends a 90-degree angle of roadways whenever possible.
- The CalTrans Highway Design Manual defines stopping sight distance requirements based on the approaching speed of vehicles (Section 201.3). These standards range from 125 feet for speeds of 20 mph to 360 feet for speeds of 45 mph on flat terrain.

2.7.3 Guidelines

The following guidelines should be followed for sight distance:

1. Parking restrictions near crosswalks should be considered to remove potential obstructions to the pedestrian's line of sight, particularly for young children and those in wheelchairs.
2. When street furnishings or other objects that obstruct view cannot be relocated, curb extension or other treatments should be considered.

2.8. Sidewalks for Overpasses, Underpasses, and Highway On/Off Ramps

Access on an overpass across a highway is often along a narrow sidewalk where the pedestrian is against a wall or guardrail and is highly exposed and vulnerable to speeding traffic. The unappealing environment of underpasses is often exacerbated by poor lighting and obscured sightlines. Pedestrian access across on- and off-ramps can also be difficult because drivers are preoccupied with making the transition between the highway and the street network.

The overpass discussion is applicable to all bridges with pedestrian access, and the overpass and underpass discussions are applicable to grade-separated railroad crossings.

2.8.1 Overpasses and Underpasses

2.8.1.1 Issues to Consider

Overpasses and underpasses are required to be accessible. Pedestrian ramps or elevators may be incorporated as part of the access elements. Pedestrian ramps may require a considerable amount of land for installation and elevators may have potential security and maintenance issues.

2.8.1.2 New Development versus Retrofit

Seek opportunities to widen sidewalks when retrofits occur.

2.8.1.3 Guidelines

The following guidelines should be followed:

1. Minimum widths for walkways on over and underpasses should follow the guidelines for sidewalk width.
2. Underpasses should have a daytime illuminance minimum of 10 footcandles achievable through artificial and/or natural light provided through an open gap to sky between the two sets of highway lanes and a nighttime level of 4 footcandles.
3. Consider acoustics measures within underpasses to reduce noise impacts to pedestrians and bicyclists.

2.8.2 Highway On/Off Ramps

2.8.2.1 Issues to Consider

Pedestrian safety measures should be considered where drivers are in the process of "transitioning" from high-speed highways to local streets.

2.8.2.2 New Development versus Retrofit

- Many existing highway access points have been designed with limited provision for pedestrian access along the local streets and the resulting situations often leave little space for retrofit.
- New highway access improvements such as reducing the turning radii should be considered to address pedestrian and bicycle safety and access issues.

2.8.2.3 Guidelines

The following guidelines should be followed:

1. Free-flowing highway entrance and exit ramps shall not be constructed in areas where pedestrians are expected.
2. A right angle intersection should be provided where the highway on/off ramp meets the cross street to improve visibility for both motorists and pedestrians as well as to reduce the pedestrian crossing distance.

Chapter 3

Traffic Calming

This chapter is intended to provide design options for traffic calming on new streets and streets being considered for retrofit. Some general design specifications are provided to assist designers in developing comprehensive streetscape plans for proposed development and redevelopment projects.

3.1. 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.

Landscaping, street trees, street lighting, and street furniture are other methods of traffic calming that also create distinctive and pleasing streetscapes that 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.

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.

3.2. General Guidelines

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

- Traffic calming installations must meet State and Federal accessibility requirements.
- Traffic calming devices and landscaping shall be developed so that they do not conflict with water, sewer, or City of San Diego fiber optic facilities. Proposals to relocate utility facilities or review alternative designs shall be coordinated with the Water and Sewer Development Section.
- 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, such as collector

street or major 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 should not impair the mobility of non-motorized users on the street.
- Traffic calming installations must address drainage, sight distance, and location of underground utilities.
- All traffic calming installations are encouraged to have a landscape element that includes trees and shrubs consistent with the Landscape Standards. Installations are contingent upon having maintenance responsibilities being identified. If traffic calming devices include decorative pavement, it shall comply with the Design Standards in Section 6.2.4 of this Manual.

3.3. Traffic Calming Techniques

Traffic calming strategies generally fall into the following categories:

- Horizontal deflections (e.g., chicanes, traffic circles, median slow points/chokers)
- Vertical deflections (e.g., road lumps, speed tables, and raised crosswalks)
- Intersection pop-outs
- Traffic diverters (e.g., semi-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 techniques.

Traffic calming features such as median slow points or chokers, chicanes, traffic circles, and intersection pop-outs may be provided in accordance with this design manual. Road lumps or speed tables may be installed by the City on existing streets under some circumstances. For other tools and detailed information on traffic calming features, refer to the City of San Diego Traffic Calming Program Handbook, maintained by the Transportation Storm Water Department. Designers are required to review such guidelines for additional detailed information regarding traffic calming devices.

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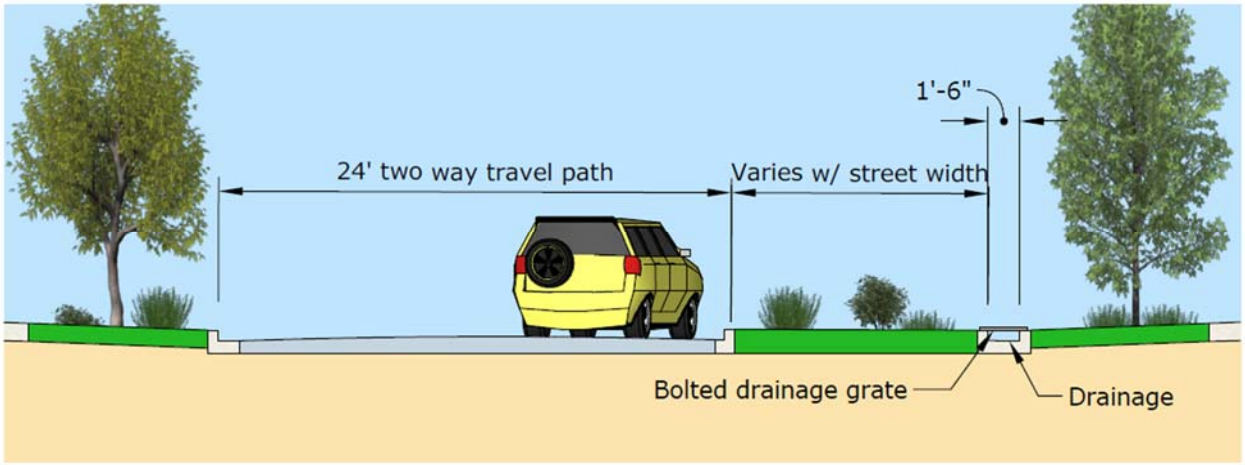
3.3.1 Horizontal Deflections

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 multilane collector streets, major streets, and arterials. Horizontal deflections include chicanes (mid-block), traffic circles (intersections), and median slow points (mid-block and intersections).

3.3.1.1 Chicanes

A chicane is a channelization that causes a series of tight turns in opposite directions in an otherwise straight stretch or road (see Figure 3–1). 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.



Note:
[1] Spacing of chicane segments depend on site considerations, e.g. driveway locations.
[2] Island plantings should not obscure driver's view of chicane traffic (24" maximum height).
[3] Stamped concrete may be used in the chicane island.
[4] Bicycles are to use the same path as motor vehicles, not the drainage channel.

FIGURE 3-1. SECTION A-A: CHICANE

The advantages of chicanes include slower traffic, potential opportunity for landscaping, and a tendency not to divert traffic to nearby streets. Chicanes are inappropriate for use on streets classified as collector or higher, bus routes or emergency response routes, where there is a grade that exceeds 5 percent, 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.

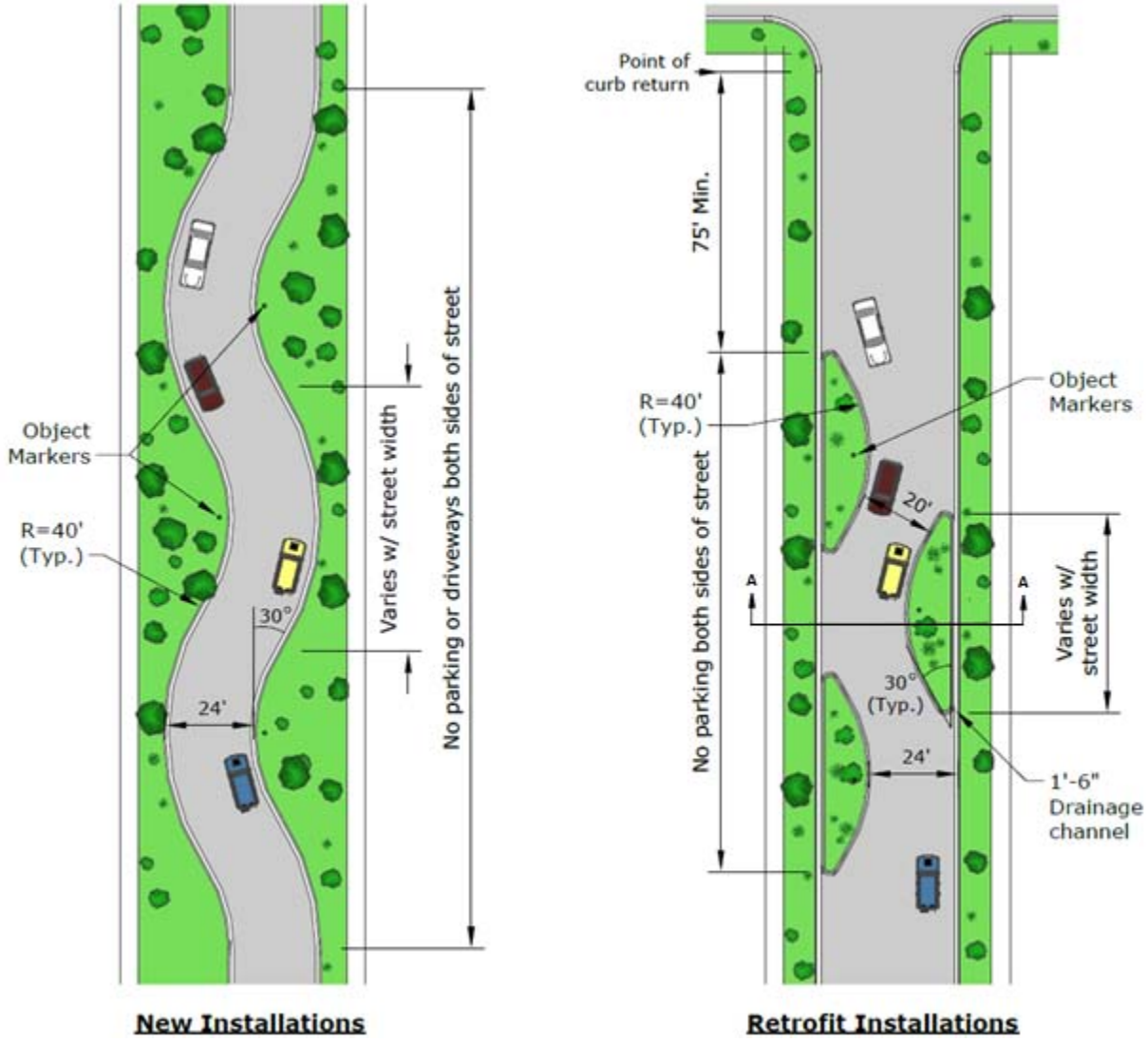
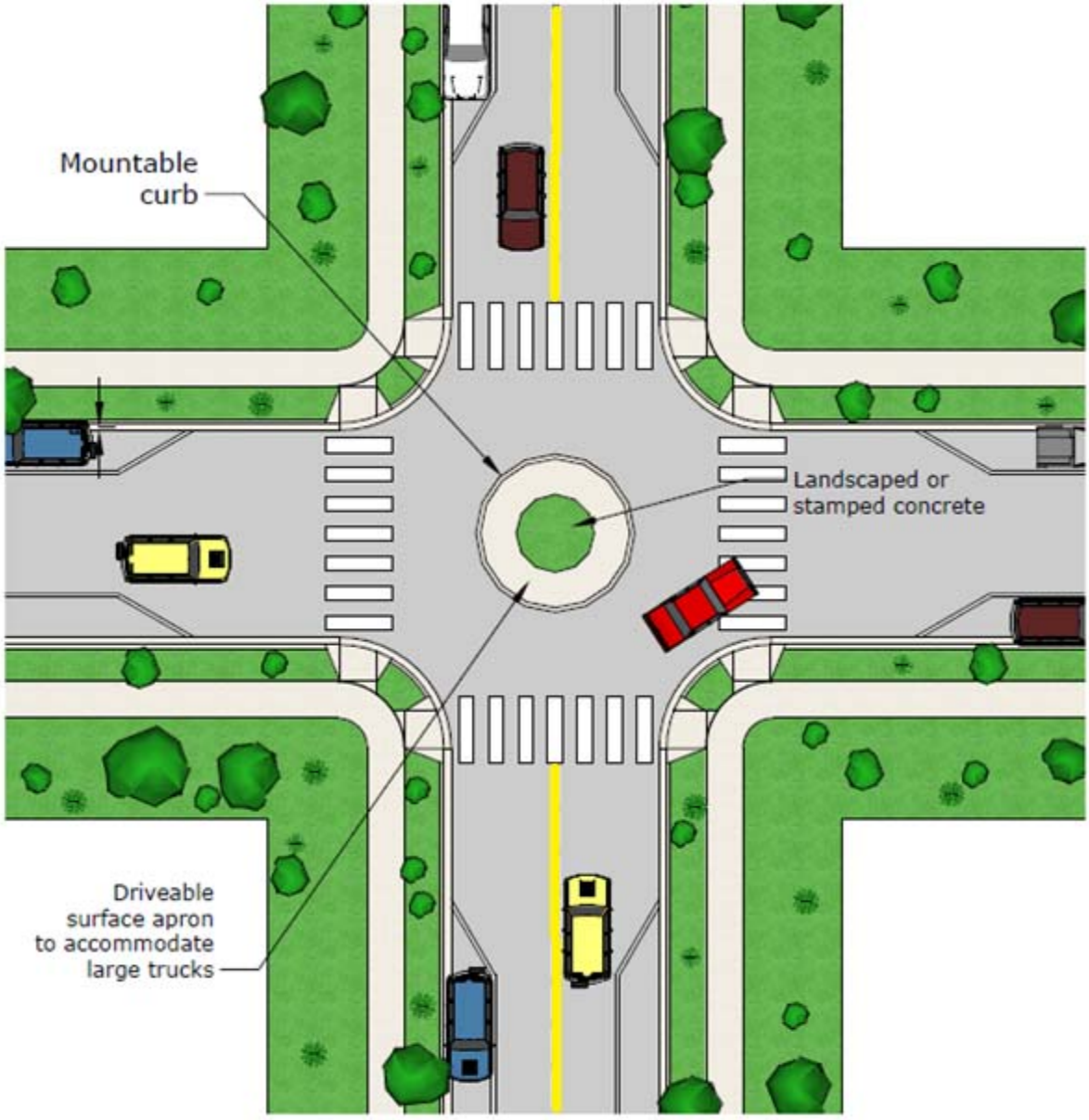


FIGURE 3-2. PLAN: CHICANE

3.3.1.2 Traffic Circles

A traffic 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 counterclockwise (see Figure 3–3). A traffic circle slows traffic on each approach, reduces ROW conflicts, and tends not to divert traffic to nearby streets.

Traffic circles are appropriate for usage on residential and collector streets with alternative access points. Traffic circles should not be used on streets classified as major or higher, bus routes or emergency response routes, where there is a grade that exceeds 5 percent, or where there is limited stopping sight distance such as at the crest of a hill. A traffic circle may impact large vehicles' turns or may increase emergency response time. Specific geometric features are not included in this manual because traffic circles are site specific and should be designed on a case-by-case basis. See Section 6.2.13 for Roundabouts.



Note: Refer to CA MUTCD for appropriate pavement markings and signage

FIGURE 3-3. PLAN: TRAFFIC CIRCLE

3.3.1.3 Median Slow Points/Chokers

A median slow point or choker 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 (see Figure 3–4). It may be on an approach to an intersection or mid-block. If median slow points/chokers are installed at an intersection, the street should have alternative access points.

A median slow point/choker slows traffic, creates a pedestrian refuge area, creates a landscaping opportunity, and tends not to divert traffic to nearby streets. Median slow points/chokers may be used on two-lane streets. They should not be used on streets classified as major or higher or where there is limited stopping sight distance. Median slow points/chokers may cause some loss of on-street parking or may impact large vehicles' turns when installed at intersections.

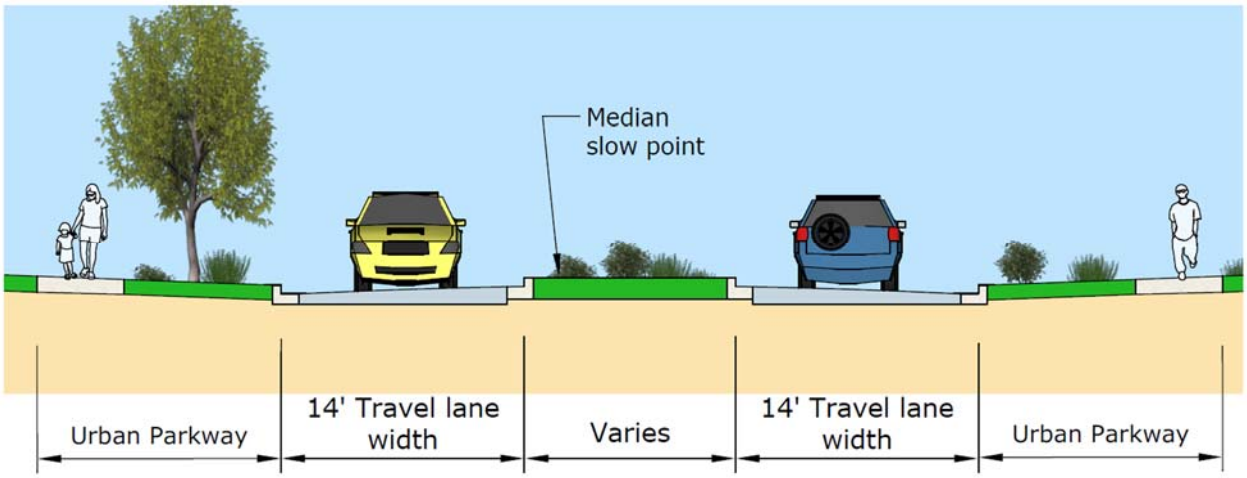
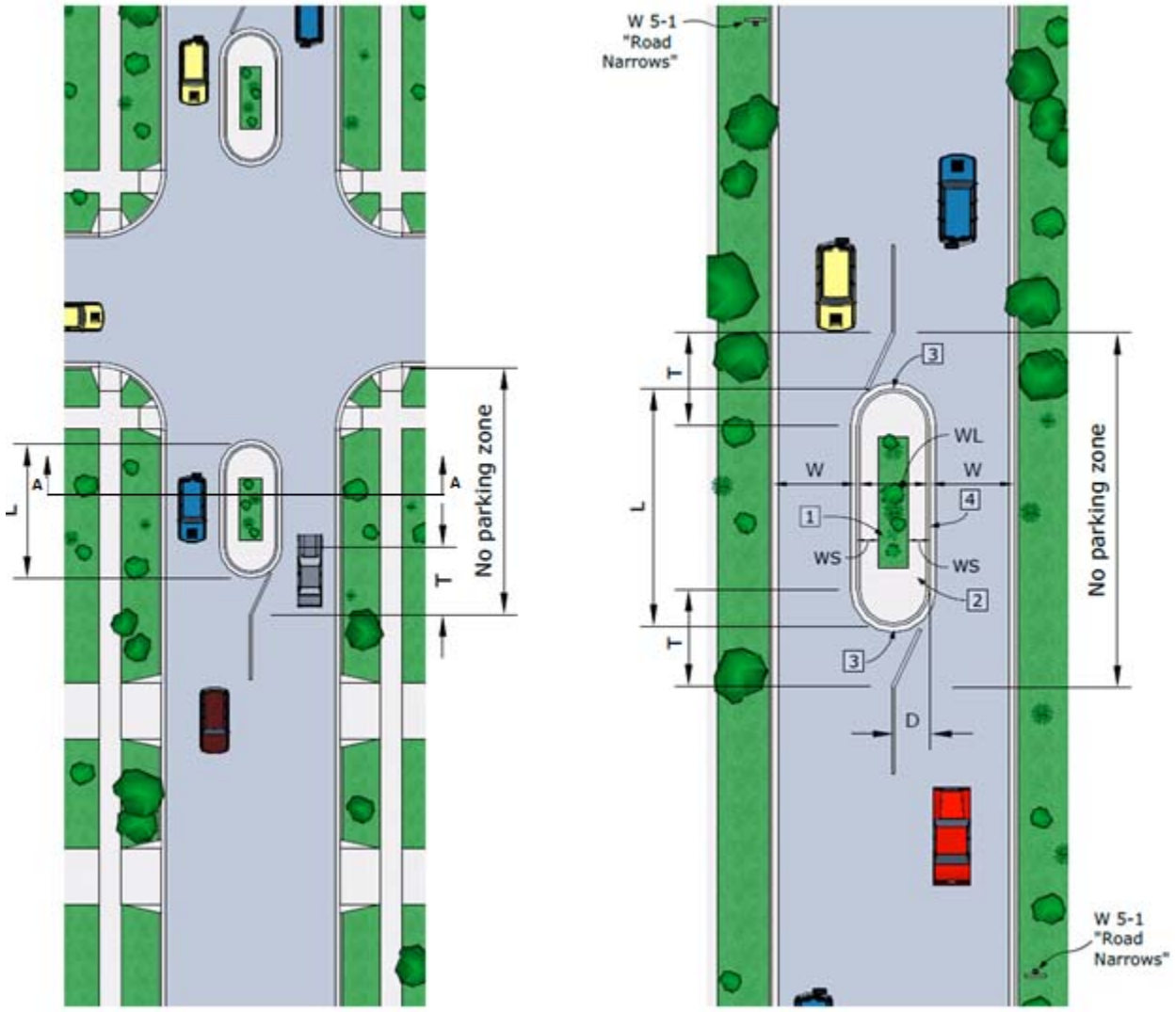


FIGURE 3-4. SECTION A-A: MEDIAN SLOW POINT



Legend

1 area that may be landscaped (landscape, irrigation, and long term maintenance must be considered by a maintenance assessment district or other agreements with the City of San Diego)

2 stamped concrete

3 yellow painted island nose

4 6" curb

W - Travel lane width - 14'
WL - Width of slow point (varies depending on street width)
WS - For landscaped slow point, 2' typical
L - Length of slow point, varies depending on parking and driveways
D - Horizontal deflection

$T = \frac{(DxS^2)}{60}$ Where:
D = deflection in feet
S = 85th percentile speed in mph

FIGURE 3-5. PLAN: MEDIAN SLOW POINT

3.3.2 Vertical Deflections

Vertical deflections are an effective traffic calming technique for speed reductions and discouraging shortcutting on local streets. Traffic calming designs that involve vertical shifts are inappropriate for collectors, major streets, and arterials. Vertical deflections include road lumps and speed tables/raised crosswalks.

3.3.2.1 Road Lumps

Road lumps are rounded, raised areas placed across the road. Road lumps are approximately 12 feet long (in the direction of travel), 3.5 inches high, and parabolic in shape. They are usually constructed with a taper on each side within 1 or 2 feet of the gutter line to allow unimpeded drainage between the lump and curb. Road lumps have cut-outs placed in them so that an emergency vehicle can pass through lumps instead of going over them (see Figure 3–6 and 3–7).

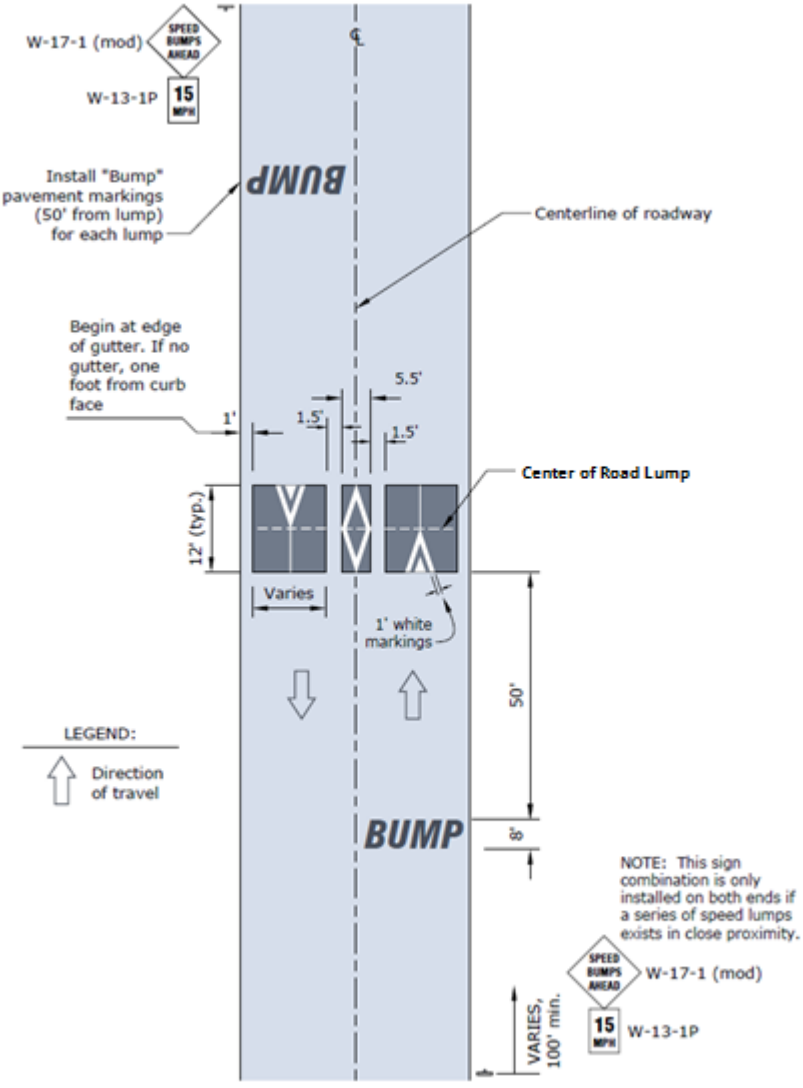


FIGURE 3-6. PLAN: ROAD LUMPS

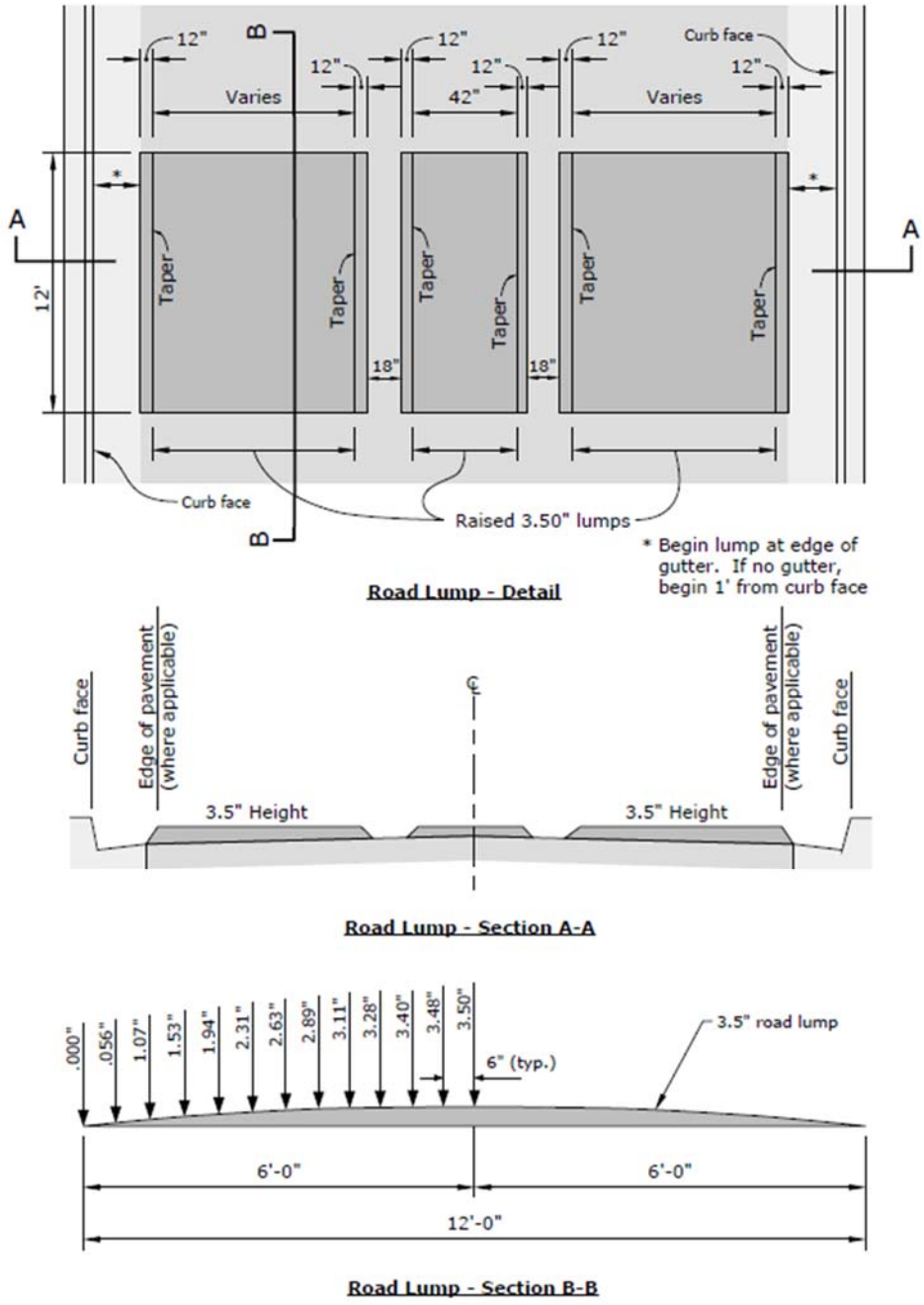
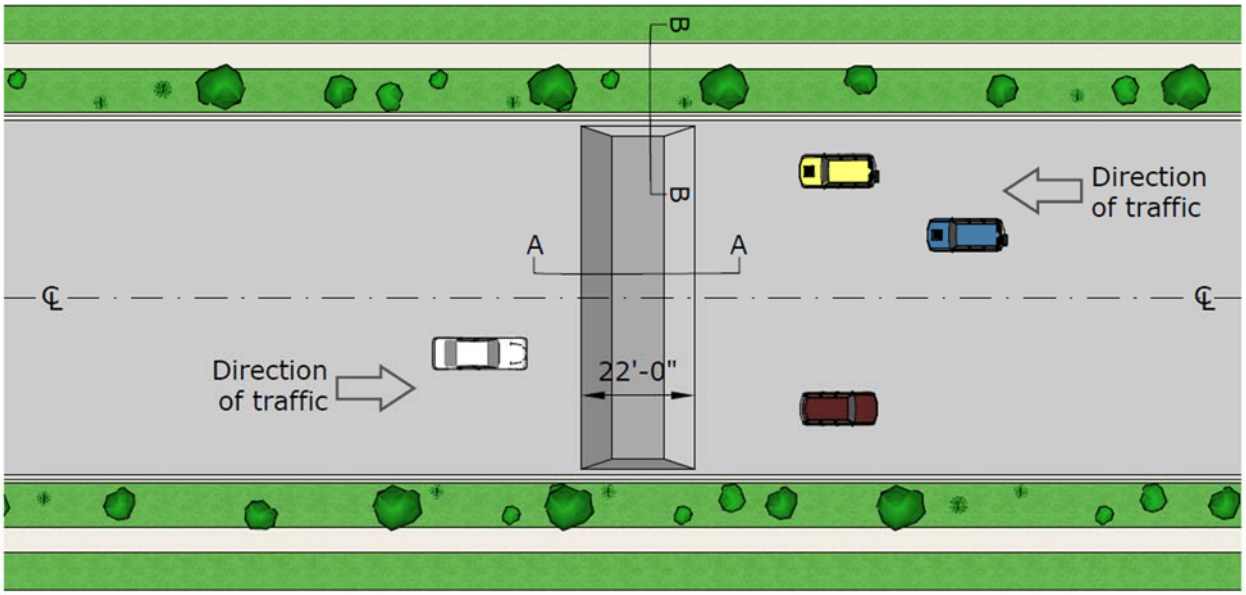


FIGURE 3-7. SECTION A-A: ROAD LUMPS

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

3.3.2.2 Speed Tables/Raised Crosswalks

Essentially, speed tables are flat-topped road lumps often constructed with concrete, brick, or other textured materials on the flat section. Speed tables and raised crosswalks are 3.5 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 concrete, brick, or other textured materials improve the appearance of speed tables/raised crosswalks and draw attention to them. Speed tables are less jarring than the standard 12-foot road lumps. They 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. Drainage requirements must be evaluated and addressed where raised crosswalks are installed (see Figures 3–8 through 3–12).



Note: Drainage requirements must be evaluated and addressed.

FIGURE 3-8. PLAN: SPEED TABLE

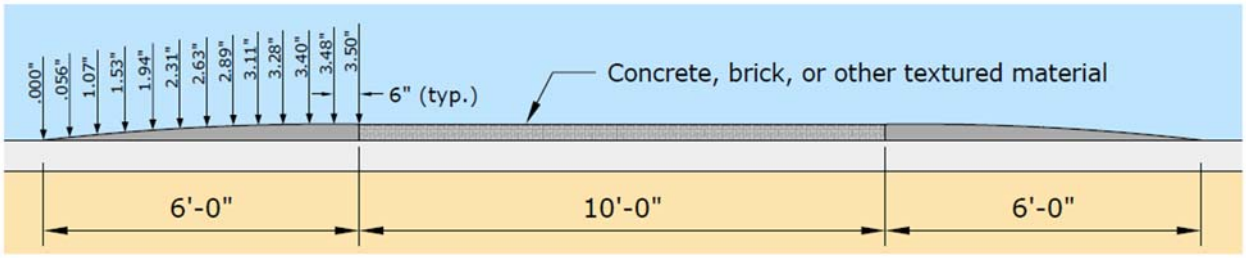


FIGURE 3-9. SECTION A-A: SPEED TABLE PITCH

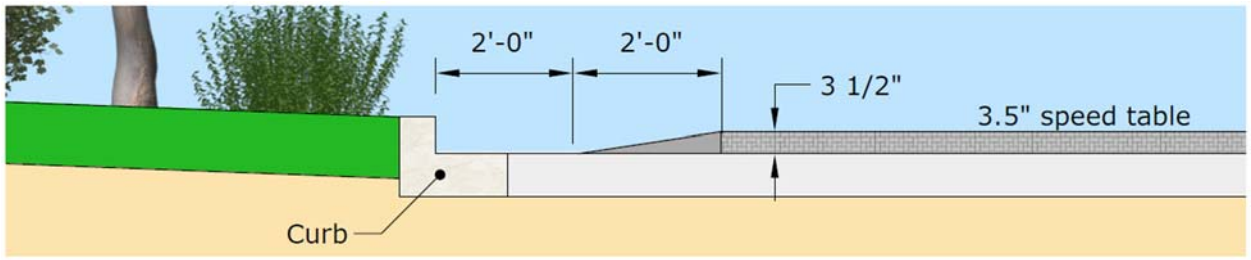
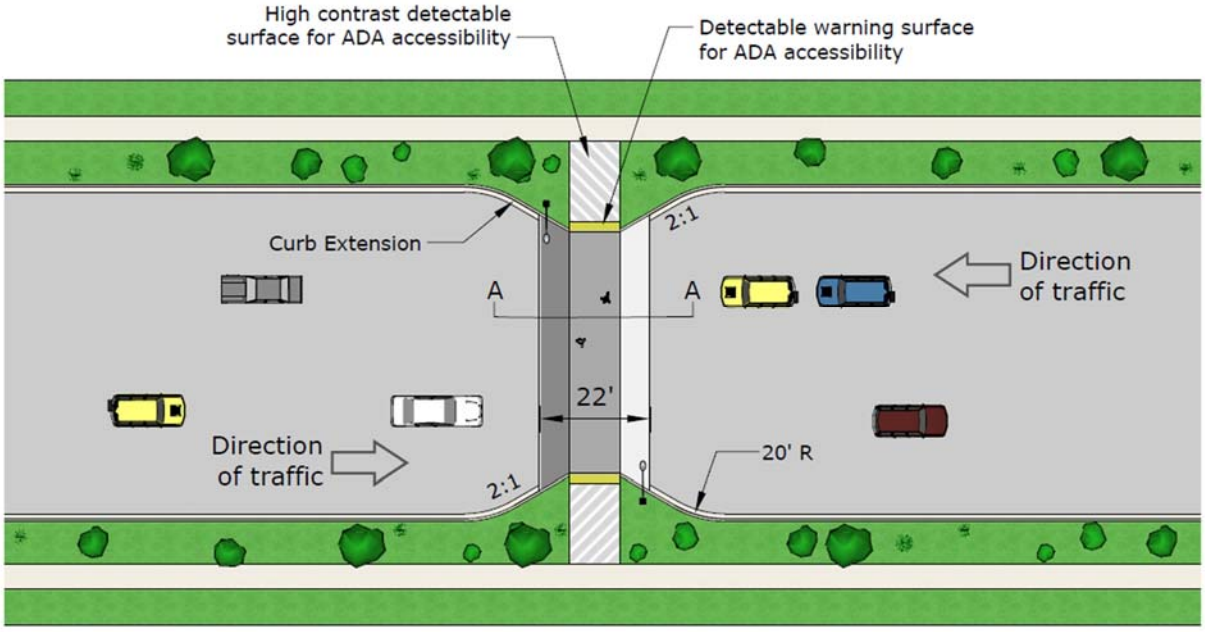


FIGURE 3-10. SECTION B-B: SPEED TABLE



Note:
1. Drainage requirements must be evaluated and addressed.
2. Crosswalks should meet traffic enineering requirements approved by the City Council.
3. Refer to Council Policy 200-07.
4. Refer to CAMUTCD for appropriate signs and markings.

FIGURE 3-11. PLAN: RAISED CROSSWALK

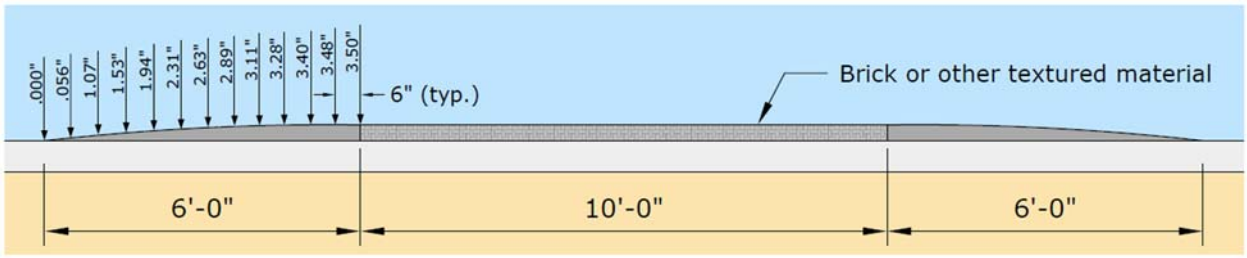


FIGURE 3-12. SECTION A-A: RAISED CROSSWALK

Speed tables and 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, bus routes or emergency response routes, where there is a grade that exceeds 5 percent, or where there is limited stopping sight distance.

3.3.3 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. 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 bicyclists, transit vehicles, and emergency response vehicles (see Figure 3–13).

Pop-outs improve pedestrian visibility and create shorter pedestrian crossing width, and they may reduce vehicle speeds. Pop-outs may impact large vehicle turns, may impact accessibility by transit or emergency response vehicles, and may require parking removal. Intersection pop-outs may be installed on local streets, collector streets, and urban major streets. Minimal geometric features are included in this manual because intersection pop-outs are site-specific and should be designed on a case-by-case basis.

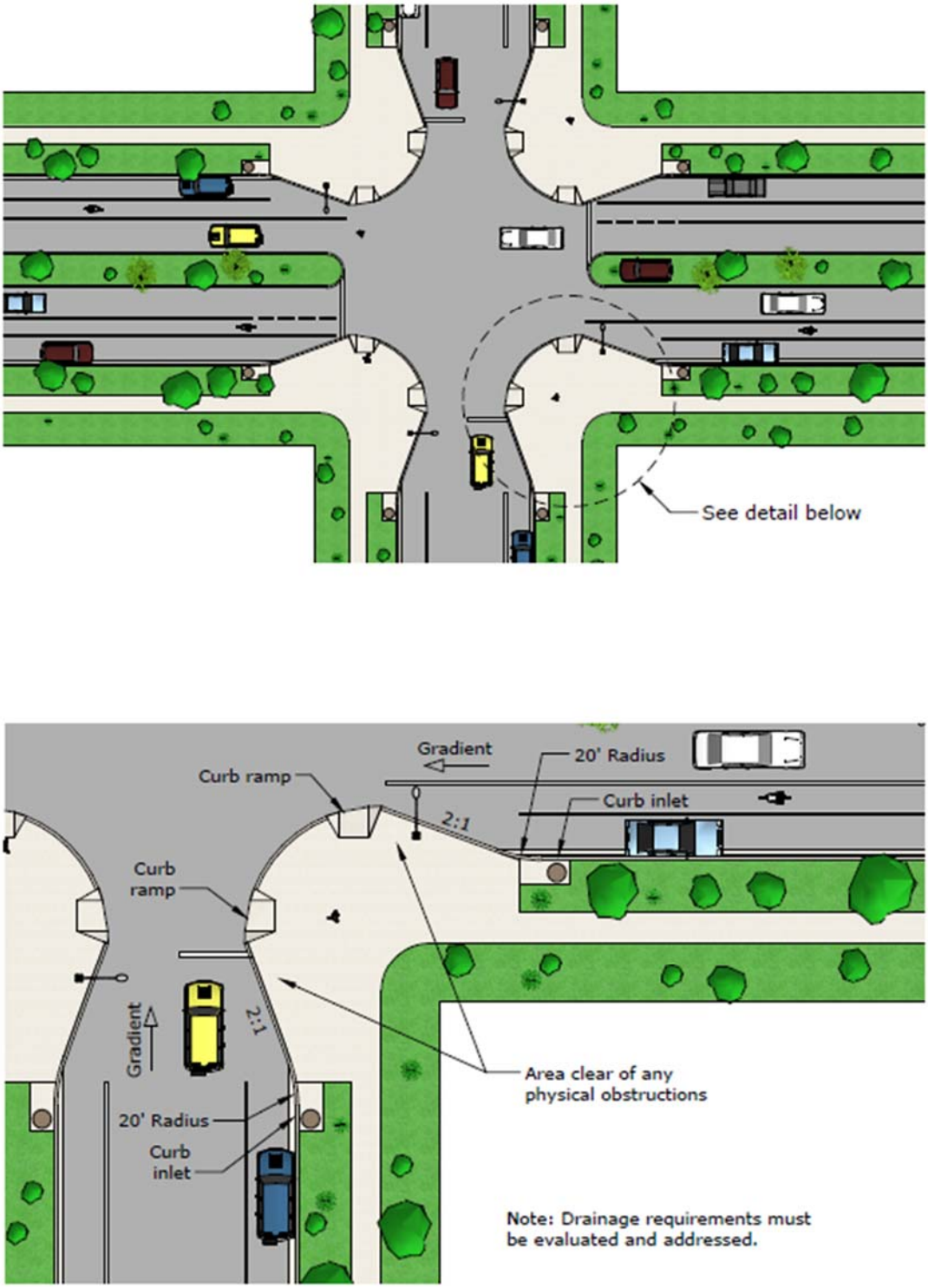


FIGURE 3-13. PLAN: INTERSECTION POP-OUT

3.3.4 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 diversion 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.

3.3.4.1 Semi Diverters

A semi diverter is a barrier to traffic in one direction of a street that 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. Semi diverters reduce cut-through motorized vehicle traffic, reduce pedestrian crossing widths, and create opportunity for landscaping (see Figure 3–14).

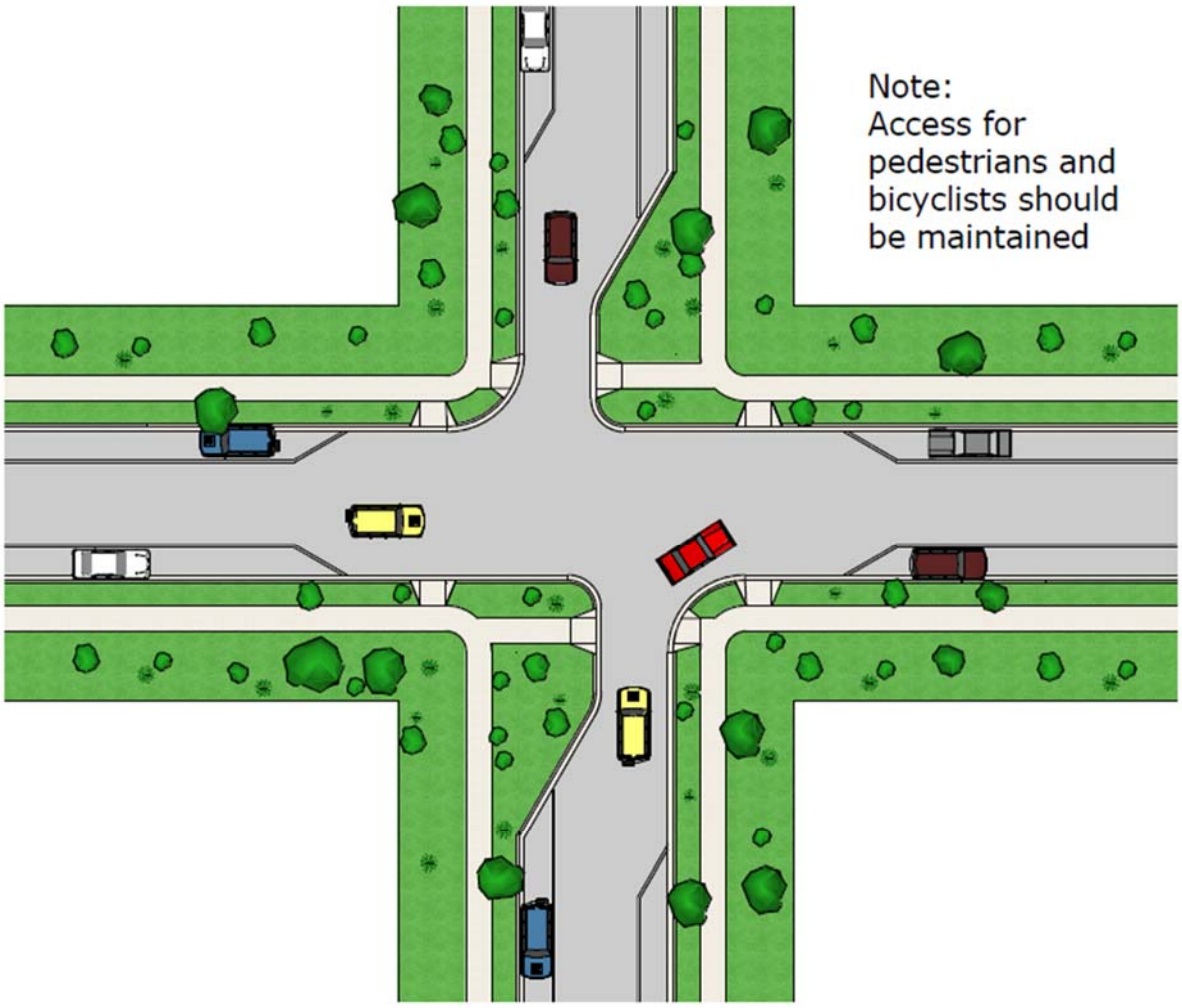


FIGURE 3-14. PLAN: SEMI DIVERTER

Semi diverters may divert traffic to other low-volume streets, may increase trip lengths, may cause loss of parking, and may increase emergency response time. Semi diverters are inappropriate for use on bus or emergency response routes or on streets classified as collector or higher. No specific geometric features are included in this manual because semi diverters are site-specific and should be designed on a case-by-case basis.

3.3.5 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. In addition to preventing cut-through traffic, channelization may be designed to reduce speed, create opportunities for landscaping, control turning traffic in and out of a neighborhood, and to physically guide pedestrians (see Figure 3–15).

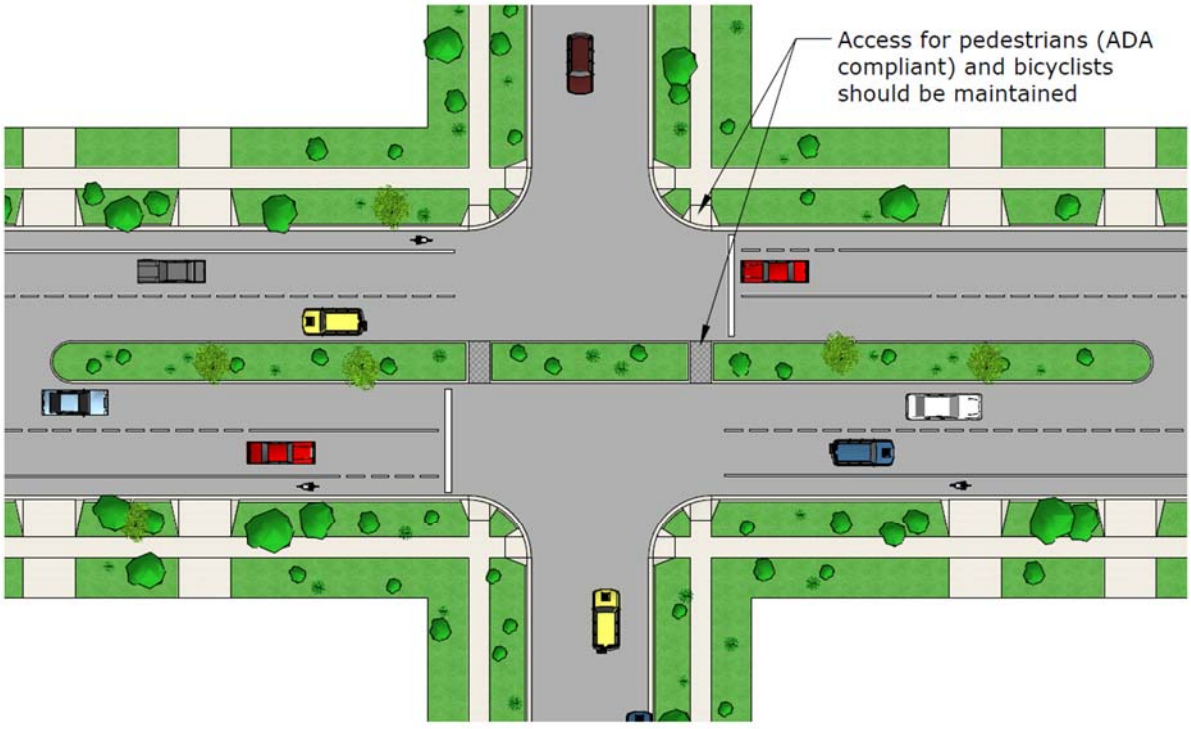


FIGURE 3-15. PLAN: CHANNELIZATION

The disadvantages of channelization may include creating out-of-direction travel, increasing trip lengths, increasing emergency response time, and impacting accessibility. No specific geometric features are included in this manual because channelization devices are site-specific and should be designed on a case-by-case basis.

Chapter 4

Street Lighting

4.1. General

a. All street lighting shall be broad spectrum light sources no greater than 4000K Correlated Color Temperatures (CCT) except for areas that are designated for a maximum of 3000K CCT within 35 miles radius of Palomar observatory. Refer to "San Diego 3000 and 4000 Kelvin CCT Map" in Council Resolution R-306251.

b. Street Luminaires shall be as defined in the City of San Diego Approved Materials List.

c. Street Lighting Standards, arms, bases, and mounting heights shall conform to the City of San Diego Standard SDE-101 for intersection and mid-block lighting.

d. Locations of additional poles to be determined by special conditions.

4.2. Intersection Street Lighting

a. Lighting shall be installed at all street intersections and shall conform to Table 4-1.

b. Street Lighting at Signalized Intersections shall conform to Chapter 9 of the Caltrans Traffic Manual.

TABLE 4-1. STREET LIGHTING AT NON-SIGNALIZED INTERSECTIONS

Street A **Street B**	**B1** Local residential streets (any width) and collector or higher streets up to and including 40 feet wide, curb to curb	**B2** Collector or higher streets greater than 40 feet and up to and including 52 feet wide, curb to curb	**B3** Collector or higher streets greater than 52 feet wide, curb to curb
A1 Local residential streets (any width) and collector or higher streets up to and including 40 feet wide, curb-to-curb	**A1 to B1** Install (1) pole with a Type Y-INT luminaire on the far right corners of the wider street	**A1 to B2** Same as A2 to B1	**A1 to B3** Same as A3 to B1
A2 Collector or higher streets greater than 40 feet and up to and including 52 feet wide, curb-to-curb	**A2 to B1** Install (2) poles with a Type Z-INT luminaire on both far right corners of the wider street	**A2 to B2** Same as A2 to B1	**A2 t B3** Same as A3 to B2
A3 Collector or higher streets greater than 52 feet wide, curb-to-curb	**A3 to B1** Install (2) poles with a Type Z-INT luminaire on both corners of the wider street and (2) poles with a Type Y-INT luminaire on both corners of the narrower street.	**A3 to B2** Install (4) poles with a Type Z-INT luminaire on each corner.	**A3 to B3** Same as A3 to B2

Note:

1. Refer to Sections "4.1. General" and "4.2. Intersection Street Lighting" for additional information.

Reference:

Luminaire Type	Min. Required Luminaire	Street Light Distribution	
Type X	3500 Lumens, Min.	Type II	
Type Y-INT	6500 Lumens, Min.	Type III	
Type Y-MID	6500 Lumens, Min.	Type II	
Type Z-INT	11000 Lumens, Min.	Type III	
Type Z-MID	11000 Lumens, Min.	Type III	

4.3. Mid-Block Street Lighting

Mid-block street lighting shall be installed as follows:

a. **On Residential and collector streets**,

   1) Within 1,320 feet of a transit stop

   OR

   2) In a residential or commercial district within a high-crime census tract staggered at 150 foot intervals, or else staggered at 300 foot intervals.

b. **On Four-Lane Urban Major or higher classification streets with center medians:**

   1) Within 1,320 feet of a transit stop

   OR

   2) In a residential or commercial district within a high-crime census tract on both sides of the street at 150 foot intervals, or else on both sides of the street not to exceed 300 foot intervals.

c. **Near the end of a cul-de-sac that exceeds 150 feet in length,**

   1) Within 1,320 feet of a transit stop

   OR

   2) In a residential or commercial district within a high-crime census tract or else near the end of a cul-de-sac that exceeds 200 feet in length.

d. One light on each side of the street at a-grade railroad crossings to illuminate the side of the train facing the motorist

e. Immediately adjacent to areas of high pedestrian activity, including schools, parks transit centers, access to transit, and commercial and recreational facilities that draw large numbers of pedestrians.

f. At other locations, such as at abrupt changes in horizontal or vertical alignment, as determined by the City Engineer.

4.3.1 Exempt Areas

Agriculture-zoned or natural open space land may be exempted from midblock street lighting provisions, at the direction of the City Engineer.

4.3.2 Luminaires

Mid-block street lighting shall use fully shielded (Type U0) luminaires and shall conform to the following:

1. Type X, for alleys.
2. Type Y-MID, for local residential streets (any width) and streets classified as collector or higher with curb-to-curb width up to and including 40 feet.

3. Type Z-MID, for streets classified as collector or higher with curb-to-curb width greater than 40 feet up to and including 52 feet.
4. Type Z-MID as applicable, for streets classified as collector or higher with curb-to-curb width greater than 52 feet.
5. At the end of a cul-de-sac, use a Type Y-INT luminaire to minimize impact to houses adjacent to luminaire.

4.4. Pedestrian-Scale Lighting

Where pedestrian-scale lighting is installed, sidewalk or walkway lighting shall be continuous, shall provide adequate lighting for pedestrians of all abilities, and shall conform to the following:

1. In commercial areas, the average maintained horizontal illuminance (FC) on the sidewalk or walkway shall be as shown in the current version of IES-RP-8 for High Pedestrian Conflict areas (Pedestrian Only).
2. In mixed-use areas, the average maintained horizontal illuminance on the sidewalk or walkway shall be as shown in the current version of IES-RP-8 for Medium Pedestrian Conflict areas.
3. In residential areas, the average maintained horizontal illuminance on the sidewalk or walkway shall be as shown in the current version of IES-RP-8 for Low Pedestrian Conflict areas.
4. In commercial areas, contributions from other nearby storefront lighting, private lighting, sign lighting, and/or reflections from structures on the private property should not be considered a reason for reducing the sidewalk or walkway illuminance levels indicated above.
5. Sidewalk or walkway lights shall have shielded fixtures that keep light pollution, trespass, and glare to drivers to a minimum, as approved by the City Engineer. Manufacturer models for sidewalk and walkway lighting shall be approved by the City Engineer.
6. Agriculture-zoned land or open space may be exempt, at the discretion of the City Engineer, from pedestrian scale lighting provisions.
7. Further design guidelines can be found in the current version of RP-8 publication of the Illuminating Engineering Society of North America, “America National Standard Practice for Roadway Lighting.”
8. Energy code regulations for exterior lighting are in the current version of California’s Title 24 regulations
9. All street lighting shall have shielding to cutoff illumination above an angle 90 degrees above the nadir.

4.4.1 Post Top Luminaires

The following post top luminaires and poles have been standardized for use in the City. Refer to City of San Diego Standard Drawings, Standard Specifications Section 700, and Approved Materials List. Pole shall match luminaire color. All new and replacement luminaires shall be LED.

a. Type A1(luminaire on street side) & A2(luminaire on sidewalk side), 'Gateway', Dual Acorn style on decorative Pole with dual arm support assembly
   - Distribution: One Type III & One Type V
   - BUG: U2 Max.
   - Lumens: 5900 Lumens, Min each
   - Color: CCDC Blue
   - Light Center Height: 21'-9"
   - Pole: Std. Dwg. # SDE-105

b. Type AP, 'Asian Pacific', Single Hexagonal style on decorative pole
   - Distribution: Type V
   - BUG: N/A
   - Lumens: 5900 Lumens, Min.
   - Color: RAL#6028
   - Light Center Height: 16'-0"
   - Pole: Std. Dwg. # SDE-106

c. Type C, 'Standard', Single Acorn style on decorative pole.
   - Distribution: Type V
   - BUG: U2 Max.
   - Lumens: 5900 Min
   - Color: CCDC Blue
   - Light Center Height: 12'-0"
   - Pole: Std. Dwg. # SDE-108

d. Type CE, 'Enhanced', Single Acorn style on decorative pole with extended luminaire support assembly.
   - Distribution: Type V
   - BUG: U2 Max.
   - Lumens: 5900 Min.
   - Color: CCDC Blue
   - Light Center Height: 16'-3"
   - Pole: Std. Dwg. # SDE-109

e. Type CL, 'Little Italy', Same as CE except dark green color.
   - Distribution: Type V
   - BUG: U2 Max.

- Lumens: 5900 Min.
- Color: RAL#6005, Dark Green
- Light Center Height: 16'-3"
- Pole: Std. Dwg. # SDE-109

f. Type G, 'Gaslamp', five head, globe style on decorative pole with five arm luminaire support assembly.

- Distribution: Type V, each head.
- BUG: N/A
- Lumens: 4,000 Min, each head.
- Color: Federal Standard #27038 Black
- Light Center Length: 18'-0: to Top Head
- Pole: Std. Dwg. # SDE-110

g. Type T, 'Teardrop', Dual hung style on decorative pole with dual arm support assembly.

- Distribution: Type III
- BUG: U3 Max.
- Lumens: 6900, Min., each
- Color: CCDC Blue
- Light Center Length: 20'-6"
- Pole: Std. Dwg. # SDE-111

4.4.2 Center City Street Lighting Application Guidelines

Pedestrian street lights should be located approximately **seventy-five (75)** to **ninety-five (95) feet apart**; with three lights located on each 200-foot block frontage and four lights located on each 300-foot block frontage. Street lights should be staggered on opposite sides of the street (Figure 4-1). When installed near street trees using **four (4) foot** by **six (6) foot** tree grates, the street lights are to be installed **two (2) feet** from the back of curb, measured from the back of curb to center of the pole base. When installed near street trees using **five (5) foot** by **five (5) foot** tree grates, the street lights are to be installed **two and a half (2½) feet** from the back of curb, measured from the back of curb to center of the pole base.

4.4.3 Street Light Conformance

1. Design of street lighting systems shall conform to Section 209 Electrical Components of the "Greenbook" Standard Specifications for Public Works Construction, National Electric Code, Standard Special Provisions for Street Lighting and Traffic Signal Systems for the City of San Diego, Caltrans Standard Plans, applicable amendments, and this Manual.
2. All luminaires shall be LED.

3. All luminaire designs shall minimize upward light were possible and shall conform to the 'U' ratings above.

4.4.4 Center City Luminaires and Poles

The street lighting program for downtown includes Type C - Standard, Type CE - Enhanced Standard, Type A - Gateway, Type G - Gaslamp, Type AP - Asian Pacific, and Type T - Tear-Drop Lights. These light standards are designed primarily for mid-block lighting. All signalized intersections shall utilize cobra head style luminaires on Type 15 standards per City requirements. Operation of the street light systems shall be network controlled unless otherwise noted.

4.4.5 Street Lighting Classifications

1. District Street Lights (See Figure 4-2):

District	Street Light
Ballpark District, Columbia, Core, Cortez, East Village, Marina	TYPE C Standard Light (SDE-108)
Gaslamp Quarter	TYPE G Gaslamp Light (SDE-110)
Horton Plaza	TYPE A Gateway Light (SDE-105)
Little Italy	TYPE CL Little Italy Light (SDE-109)

2. Special Street Lights (See Figure 4-3):

District	Street Light
4th Ave. (Broadway to C St.), 5th Ave. (Broadway to C St.), 6th Ave. (Broadway to C St.), Kettner Blvd. (Ash St. to Laurel St.)	TYPE CE Enhanced Standard Light (SDE-109)
3rd Ave. (Market St. to J St.), Island Ave. (2nd Ave. to 6th Ave.)	TYPE AP Asian Pacific Light (SDE-107)
C St. (west of Park Blvd.)	Special per MTS (Induction Shoebox Lights)
J St. (6th Ave. to 14th St.)	TYPE A Gateway Light (SDE-105)

3. Gateway Street Lights (See Figure 4-4):

District	Street Light
1st Ave., 10th Ave. (south of Ash St.), 11thAve., A St., Ash St., F St. (east of 6th Ave.), Front St., G St. (west of 4th Ave. and east of 6th Ave.), Grape St., Hawthorn St., Laurel St., Pacific Highway	TYPE A Gateway Light (SDE-105)

4. Ceremonial Street Lights (See Figure 4-5):

District	Street Light
Broadway, Cedar St. (west of 1st Ave.), Imperial Ave., Market St. (west of 4th Ave. and east of 6th Ave.)	TYPE A Gateway Light (SDE-105)
Harbor Dr.	Under Port of San Diego jurisdiction
Park Blvd.	TYPE T Tear-Drop Light (SDE-111)

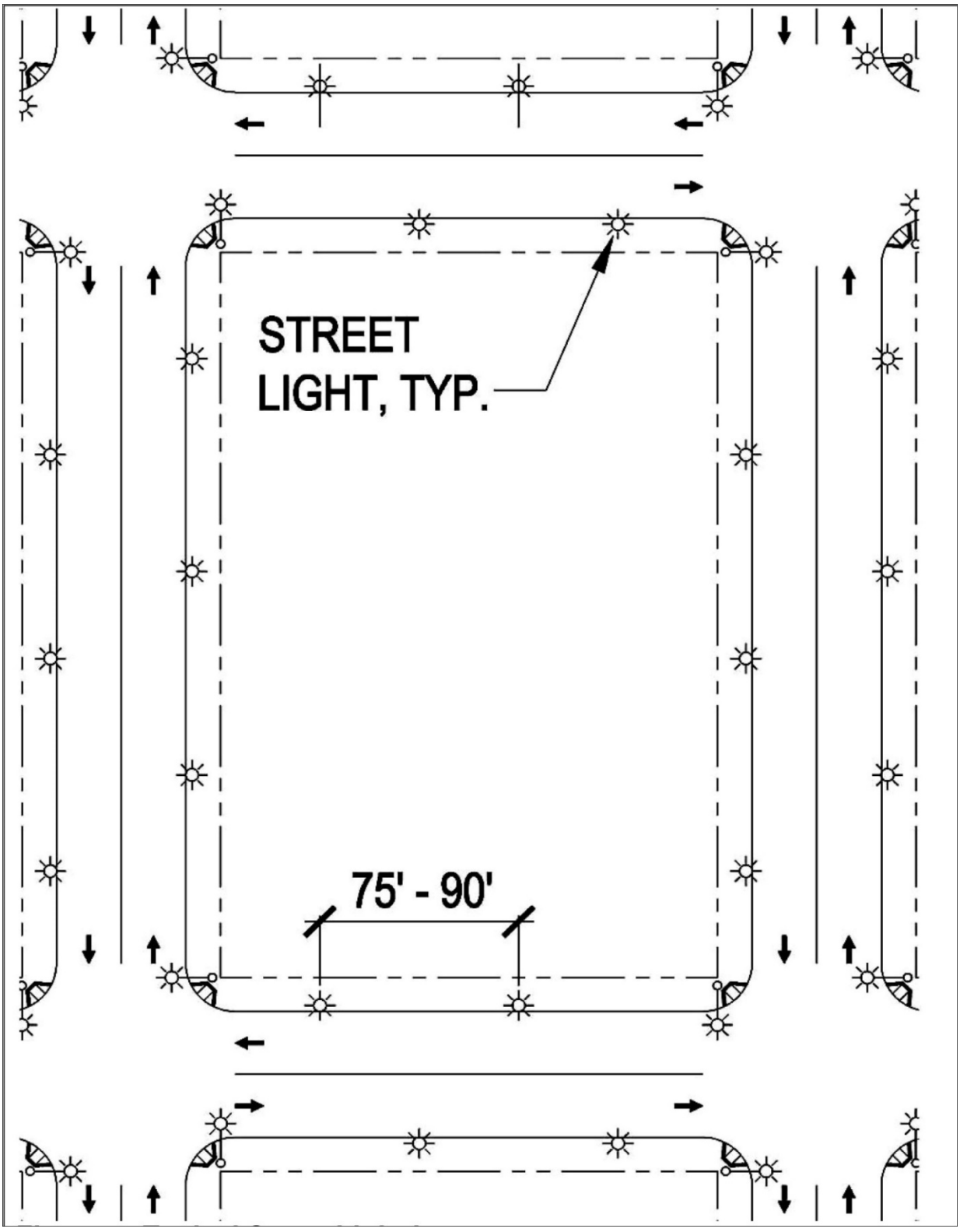


FIGURE 4-1. TYPICAL CENTER CITY STREET LIGHT LAYOUT

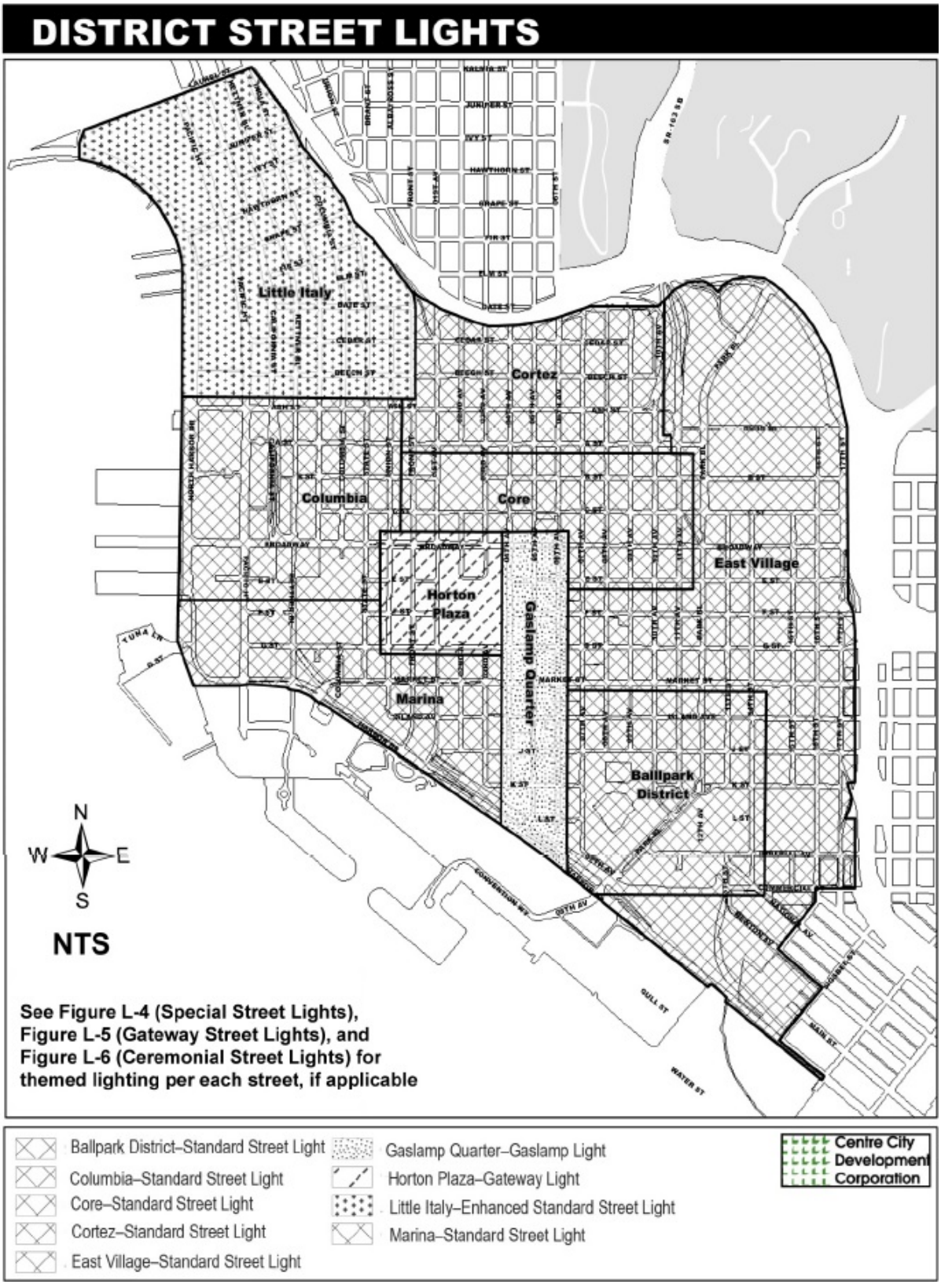


FIGURE 4-2. DISTRICT STREET LIGHTS

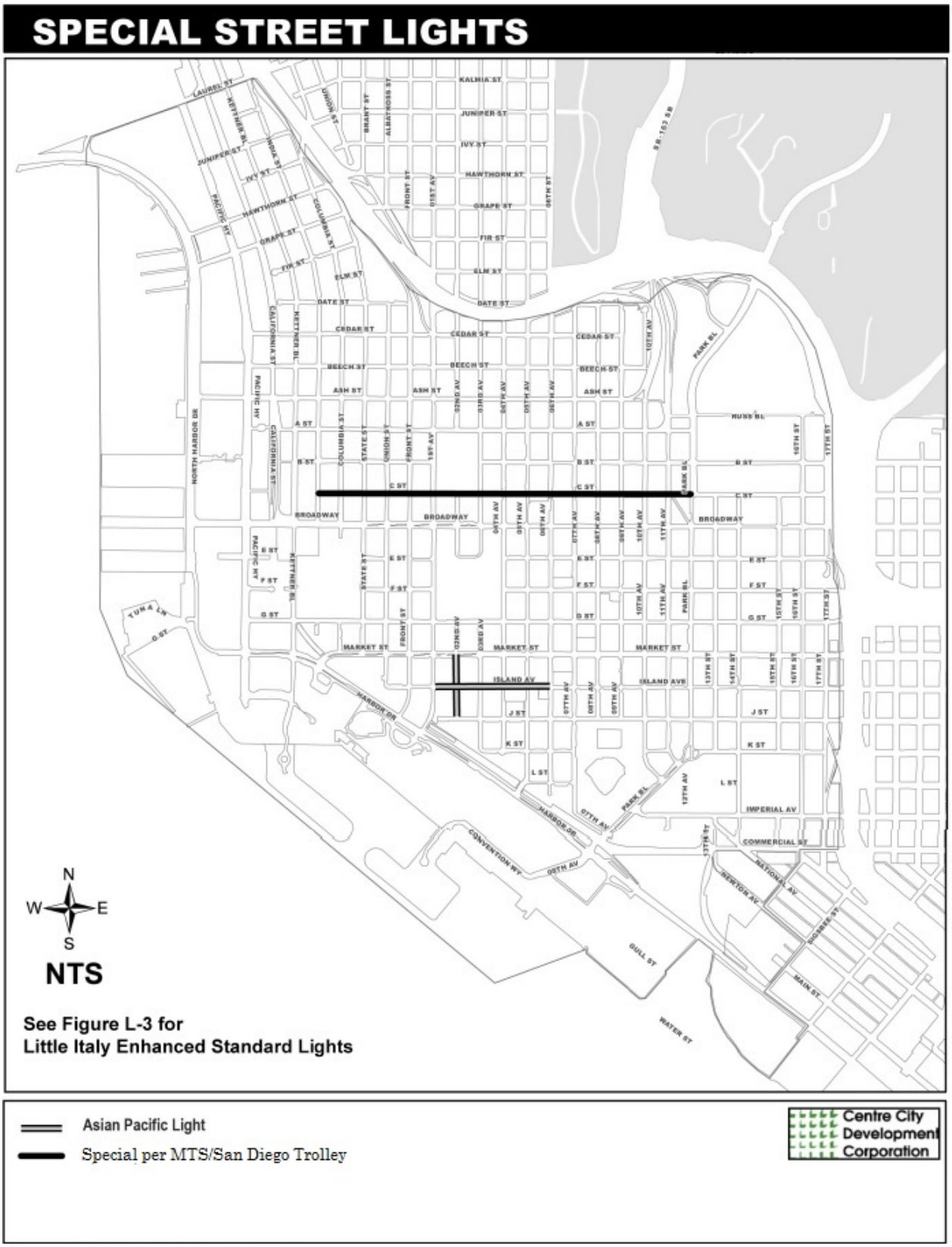


FIGURE 4-3. SPECIAL STREET LIGHTS

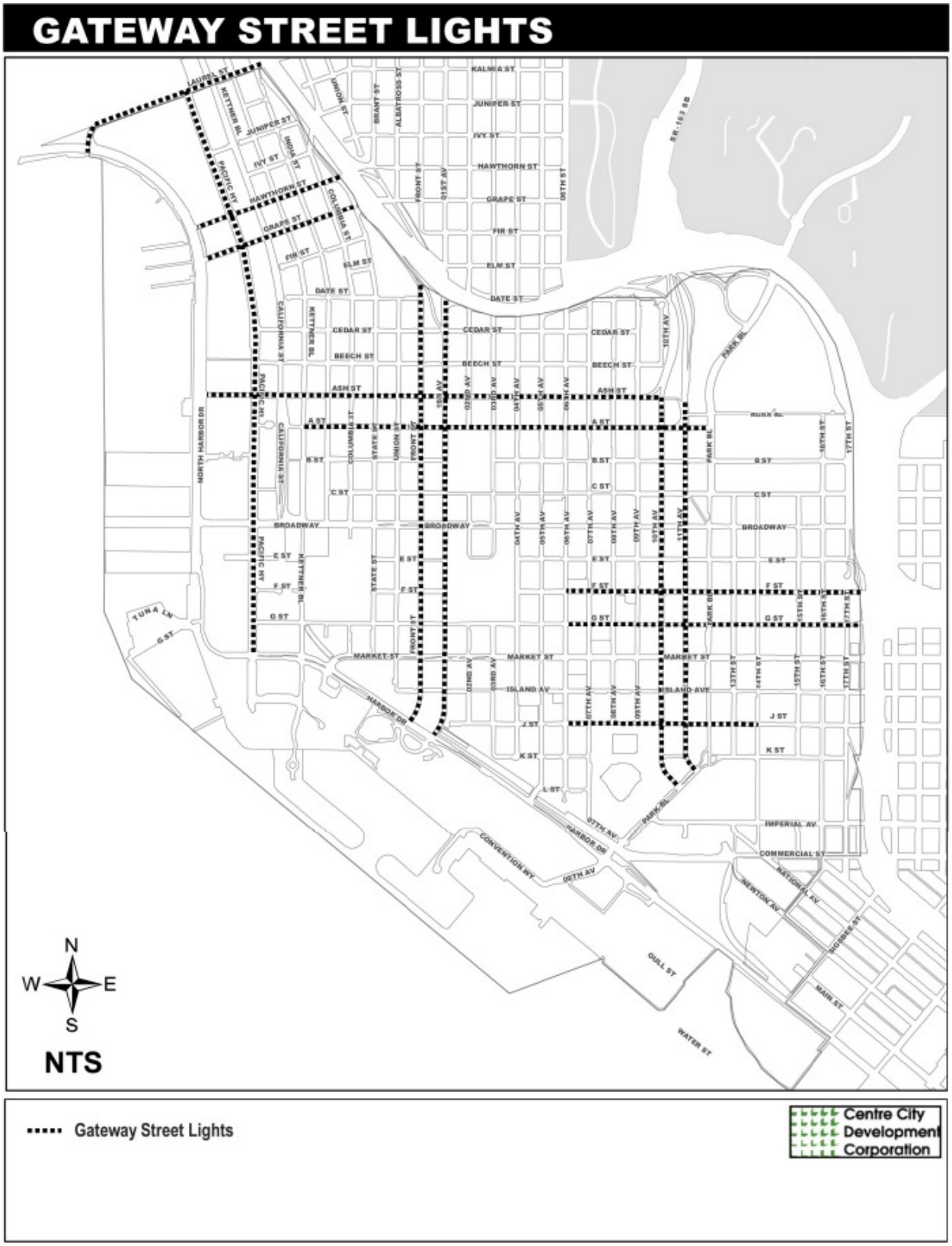


FIGURE 4-4. GATEWAY STREET LIGHTS

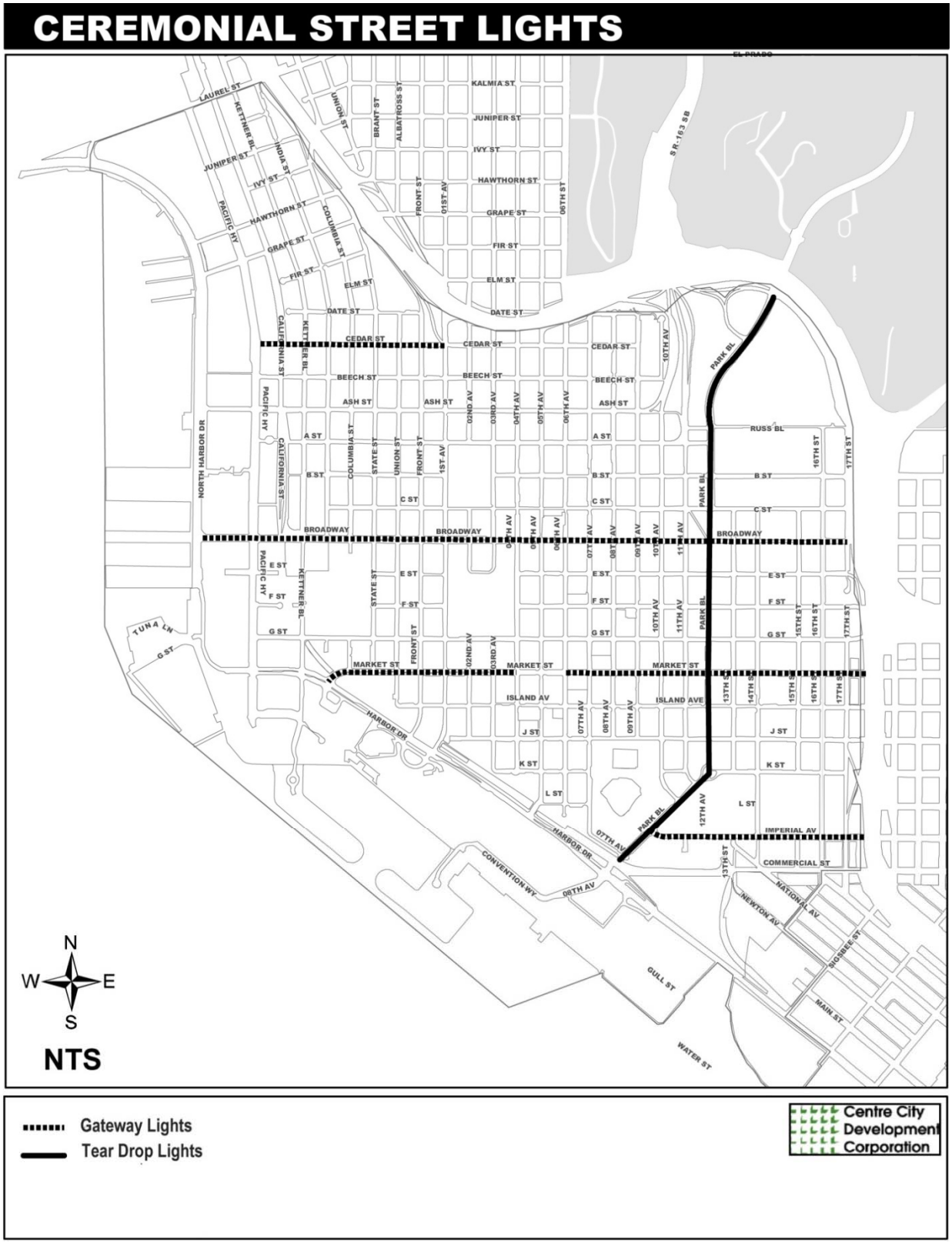


FIGURE 4-5. CEREMONIAL STREET LIGHTS

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Chapter 5

Parkway Configurations

This chapter contains illustrations for urban and rural parkway configurations.

5.1. Urban Parkway Configurations

Figures 5–1 through 5–9 illustrate relevant urban parkway configurations.

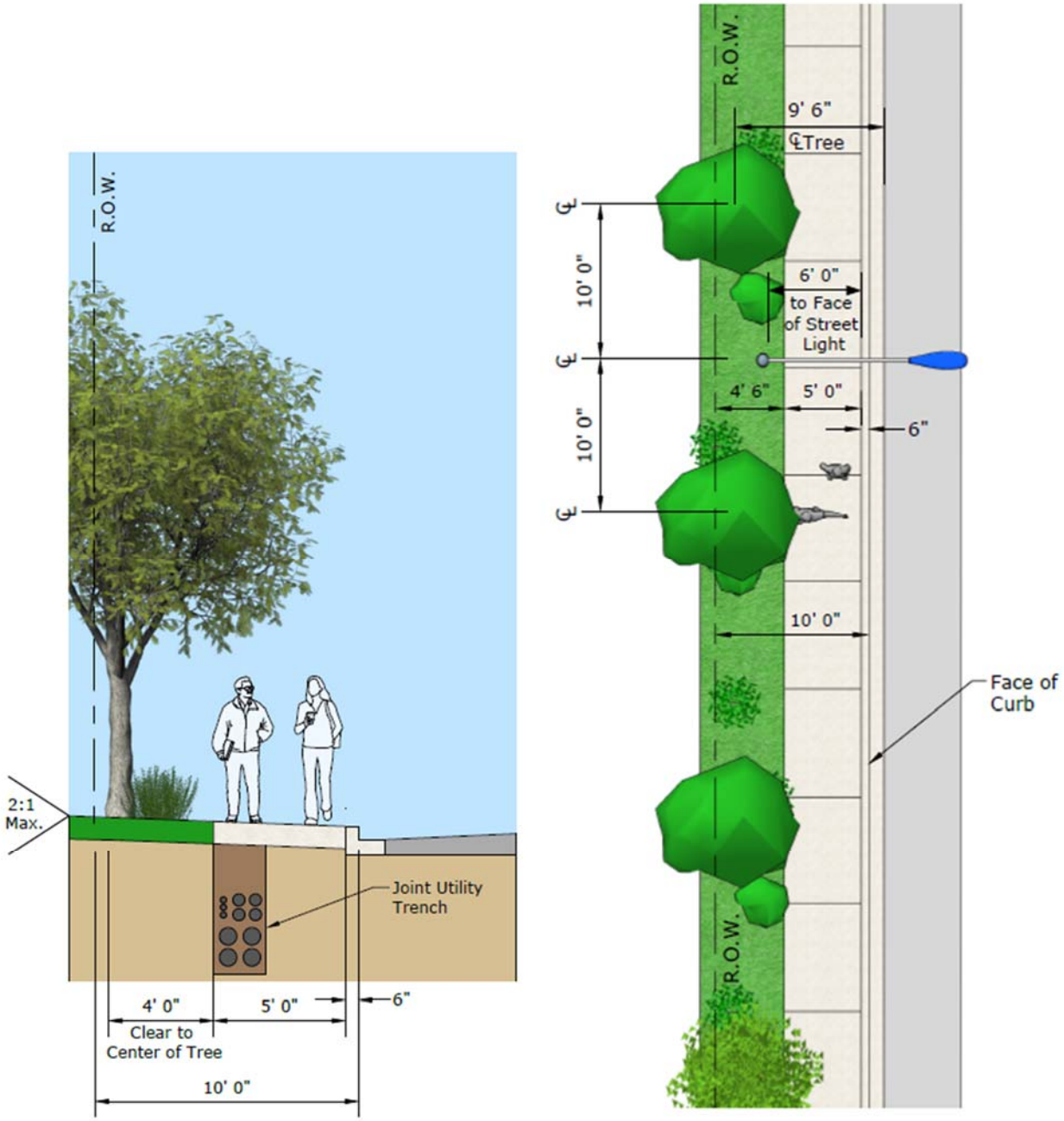


FIGURE 5-1. 10' PARKWAY – CONTIGUOUS SIDEWALK

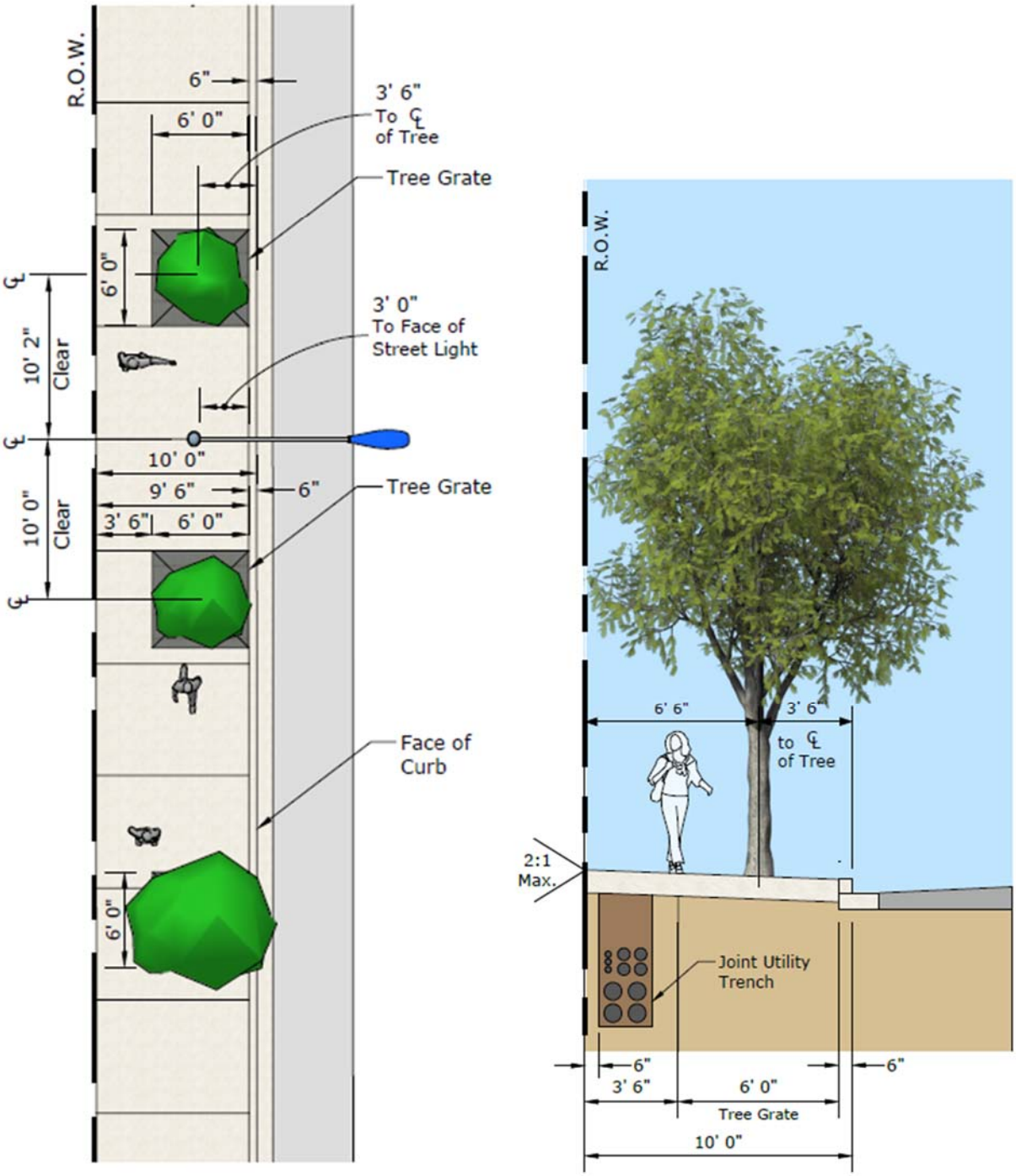


FIGURE 5-2. 10' PARKWAY WITH TREE GRATES

Notes:
1. All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.

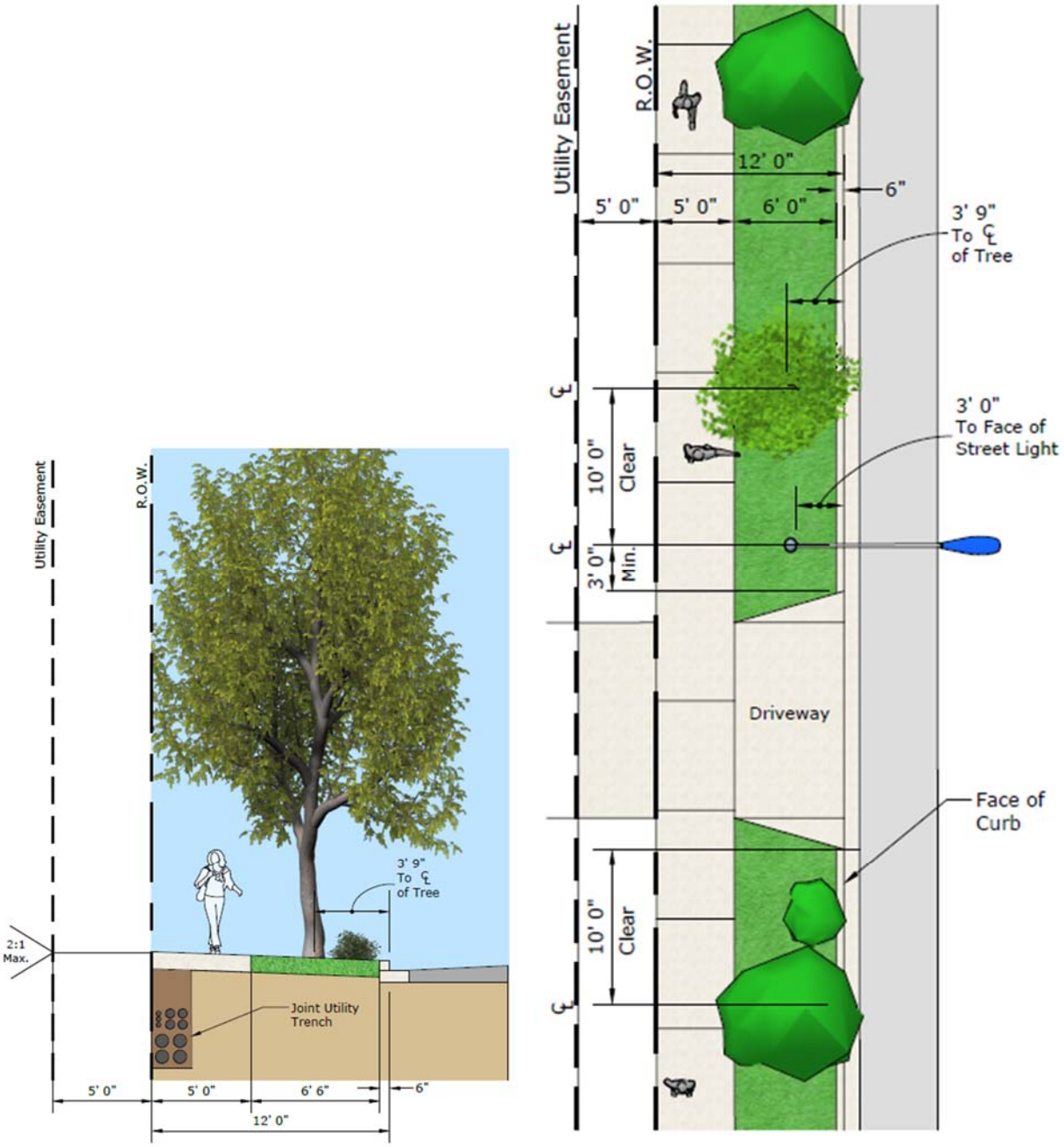


FIGURE 5-3. 12' PARKWAY- NON-CONTIGUOUS SIDEWALK

Notes:

Reference SDG-164 for required clearance for obstructions near driveways.

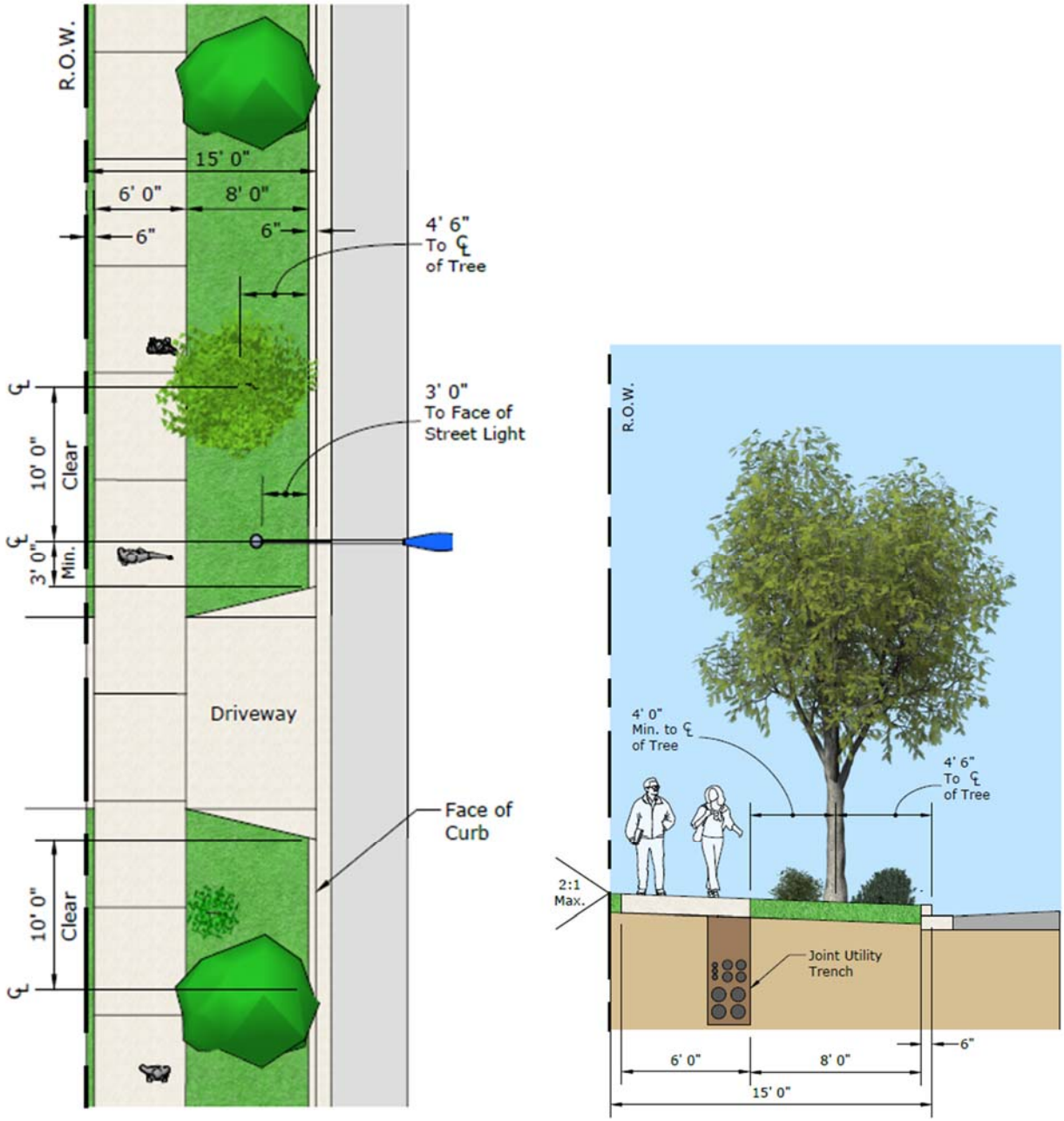
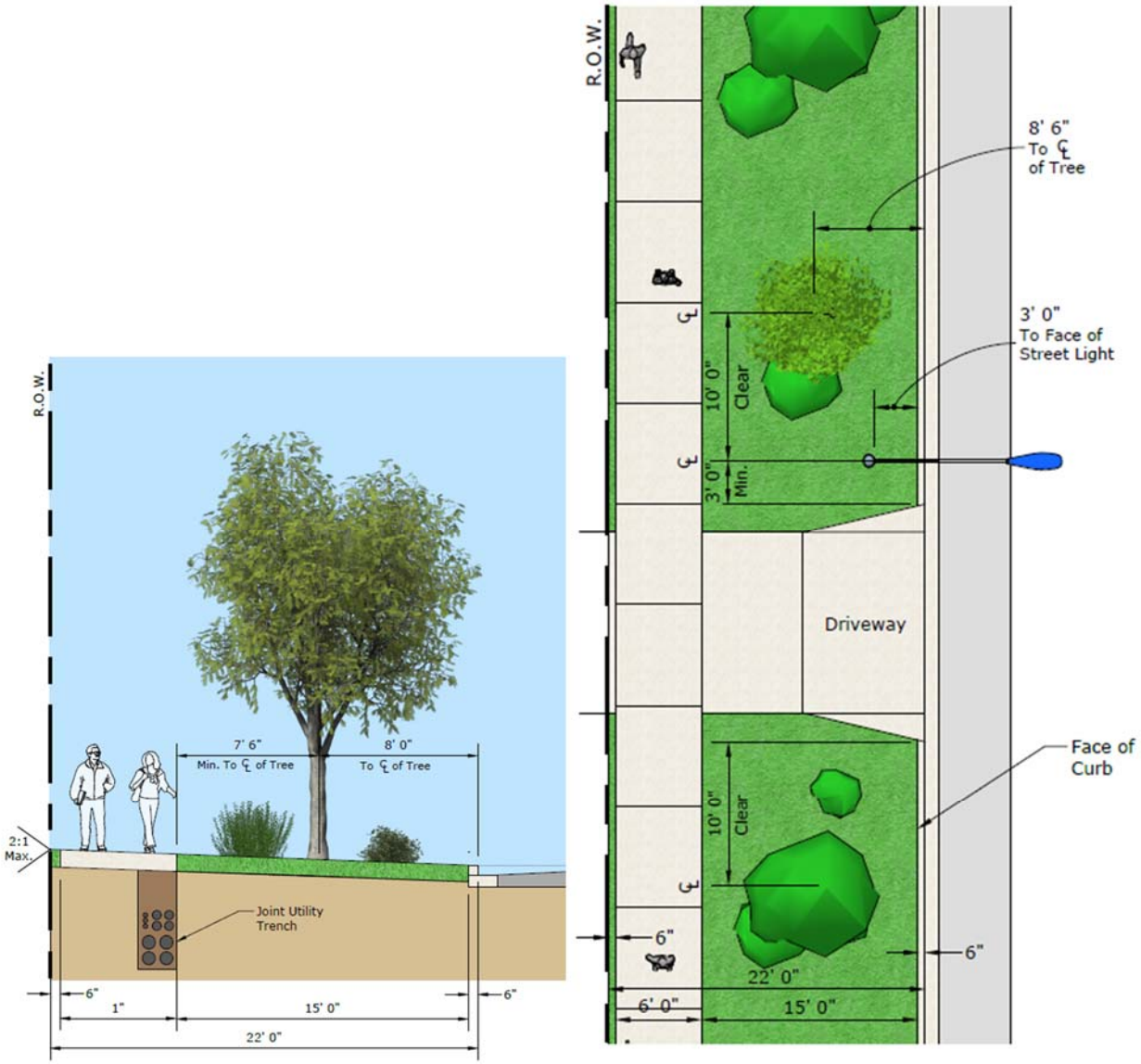
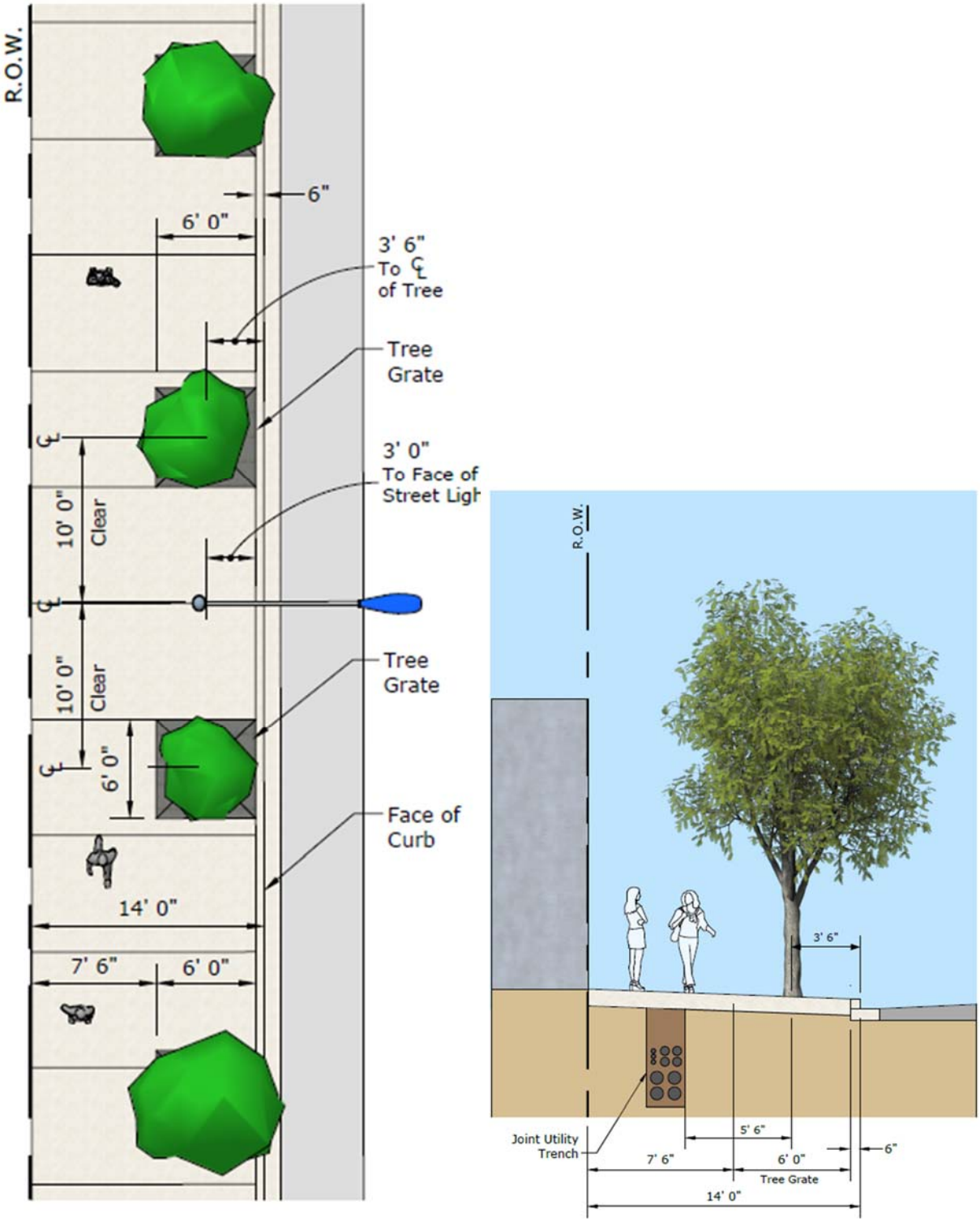


FIGURE 5-4. 15' PARKWAY NON-CONTIGUOUS SIDEWALK



Note:
1. Alternate configuration of sidewalk and landscape strip may be installed subject to approval of the City Engineer.

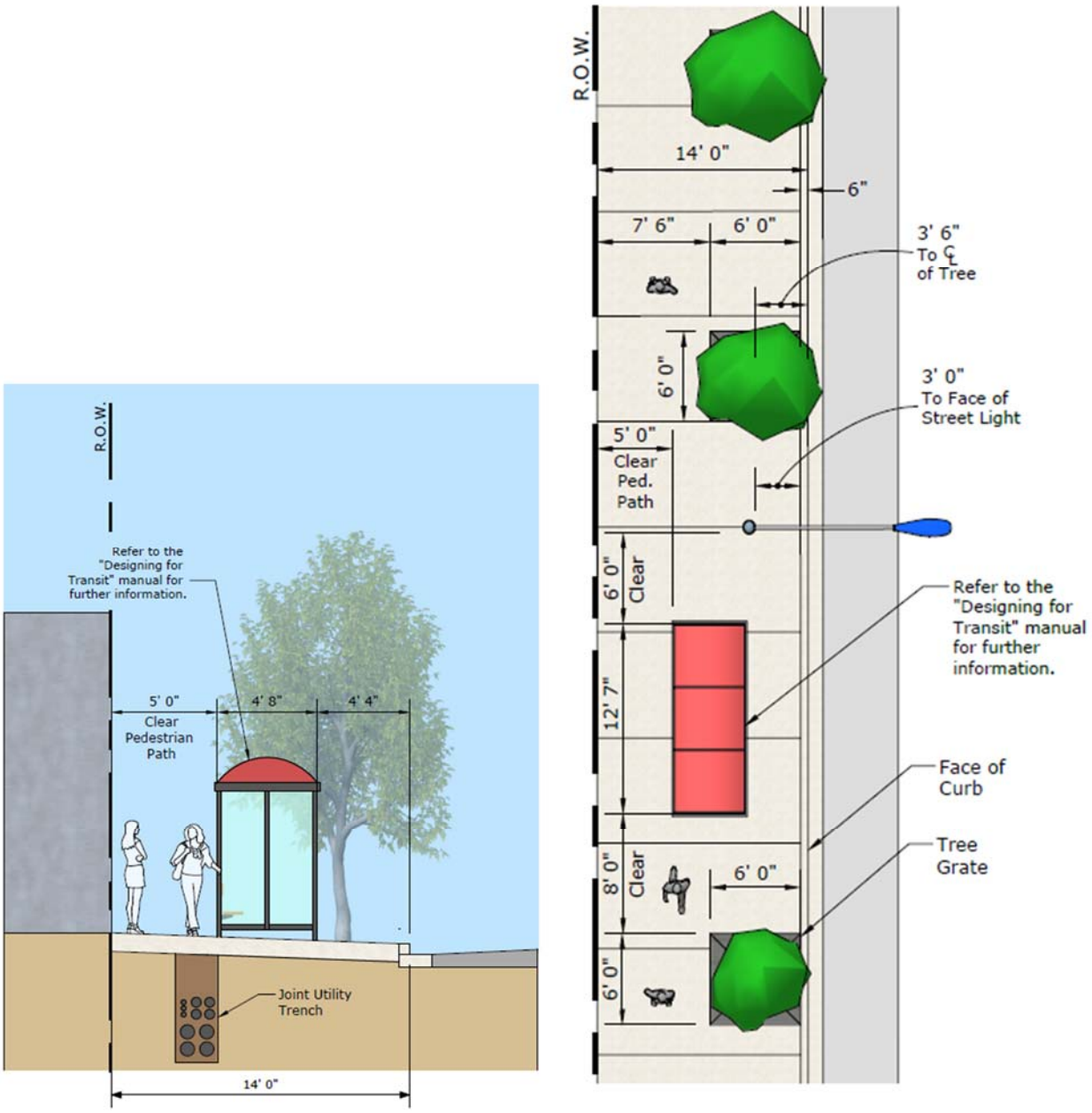
FIGURE 5-5. 22' PARKWAY NON-CONTIGUOUS SIDEWALK



Note:

1. Where storefront furniture is provided, the clear pedestrain passage way shall not be less than 5'-0".
2. All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.

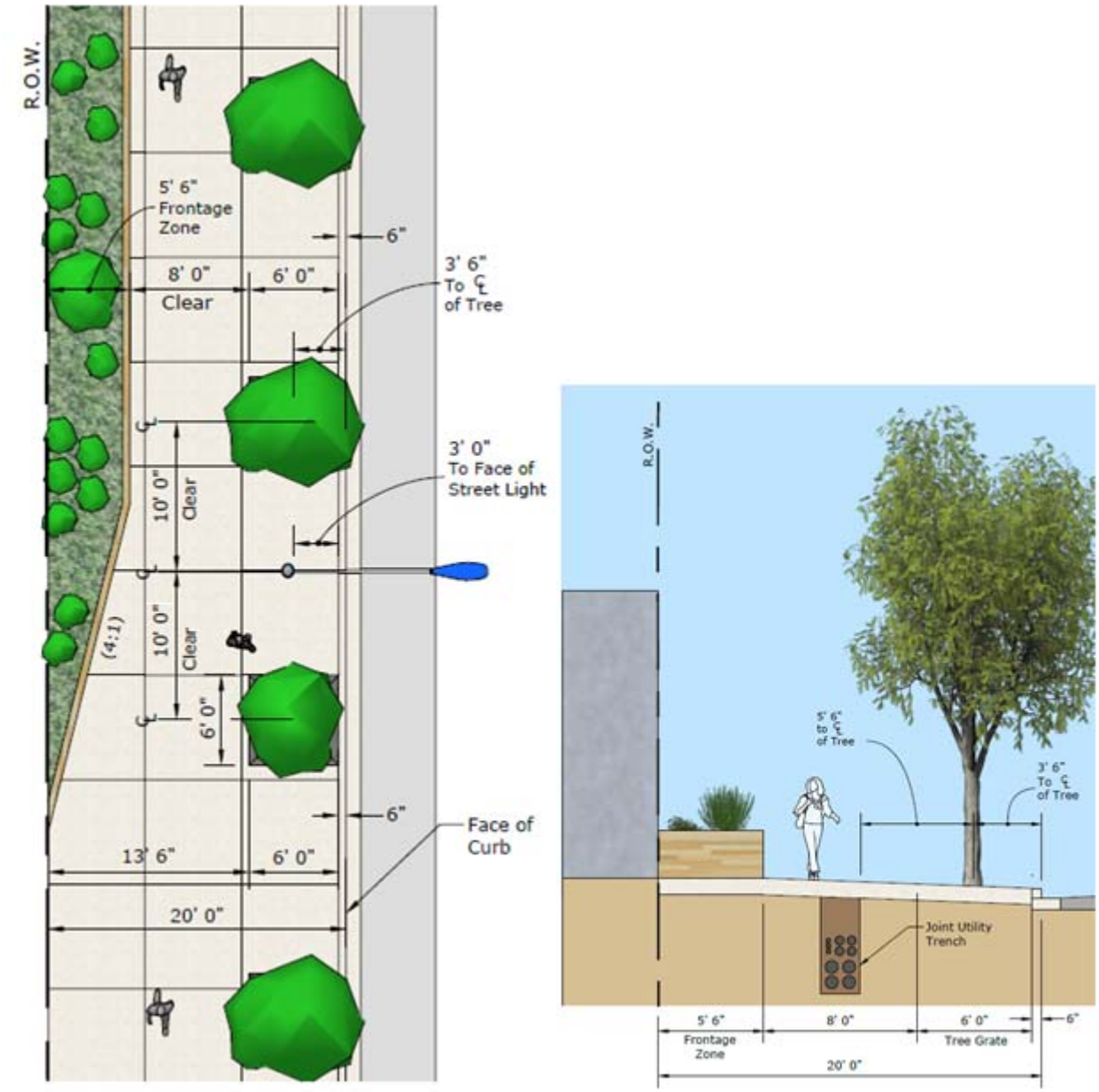
FIGURE 5-6. 14' PARKWAY WITH TREE GRATES



Note:

1. Where storefront furniture is provided, the clear pedestrain passage way shall not be less than 5'-0".
2. All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.

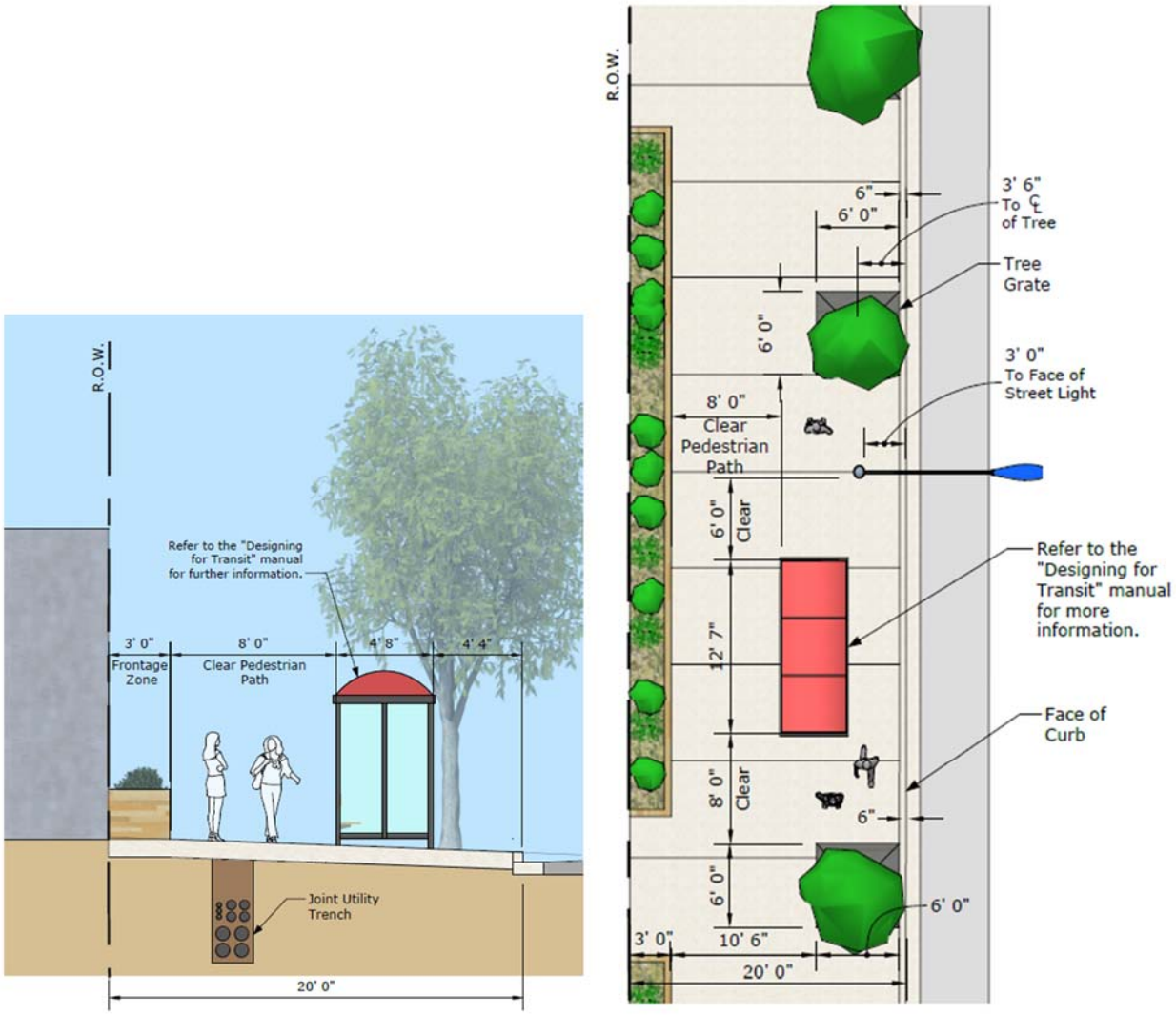
FIGURE 5-7. 14' PARKWAY WITH TREE GRATES (TRANSIT AREA)



Note:

1. Where storefront furniture is provided, the clear pedestrain passage way shall not be less than 8'-0".
2. All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.

FIGURE 5-8. 20' PARKWAY WITH TREE GRATES



Note:

1. Where storefront furniture is provided, the clear pedestrain passage way shall not be less than 8'-0".
2. All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.

FIGURE 5-9. 20' PARKWAY (TRANSIT AREA)

5.2. Rural Parkway Configurations

Figures 5–10 through 5–13 illustrate relevant rural parkway configurations.

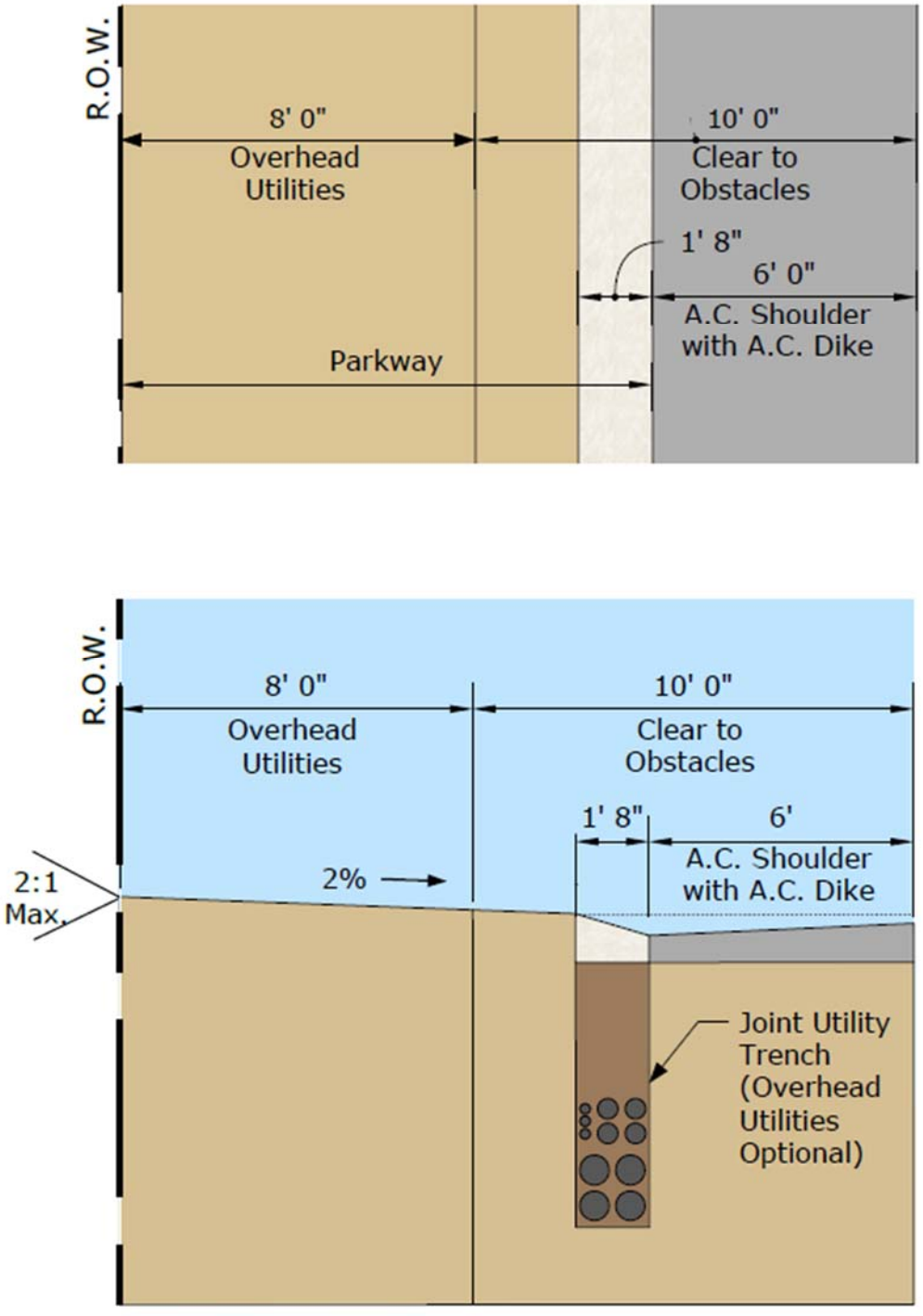


FIGURE 5-10. 12' RURAL PARKWAY

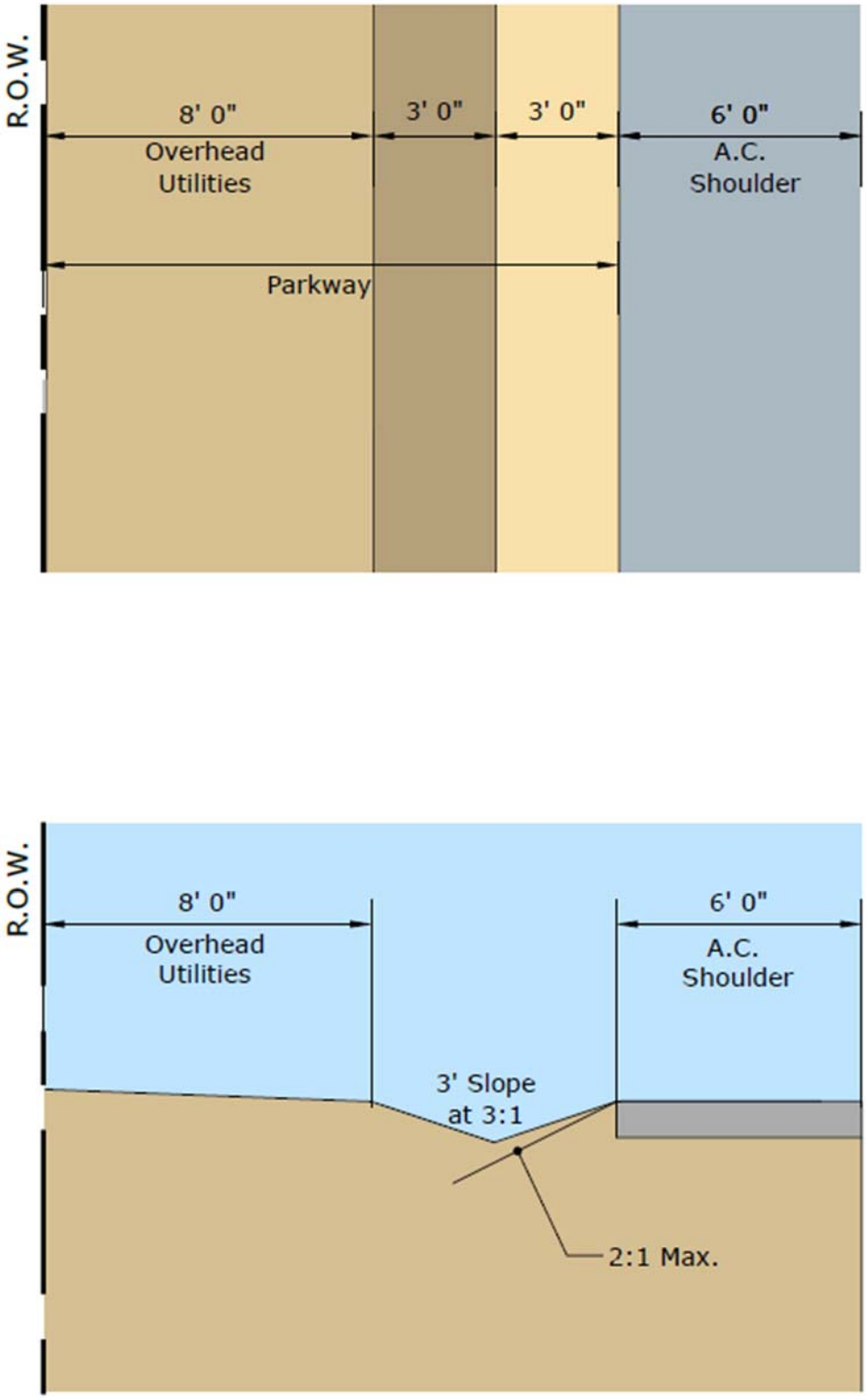


FIGURE 5-11. 14' RURAL PARKWAY

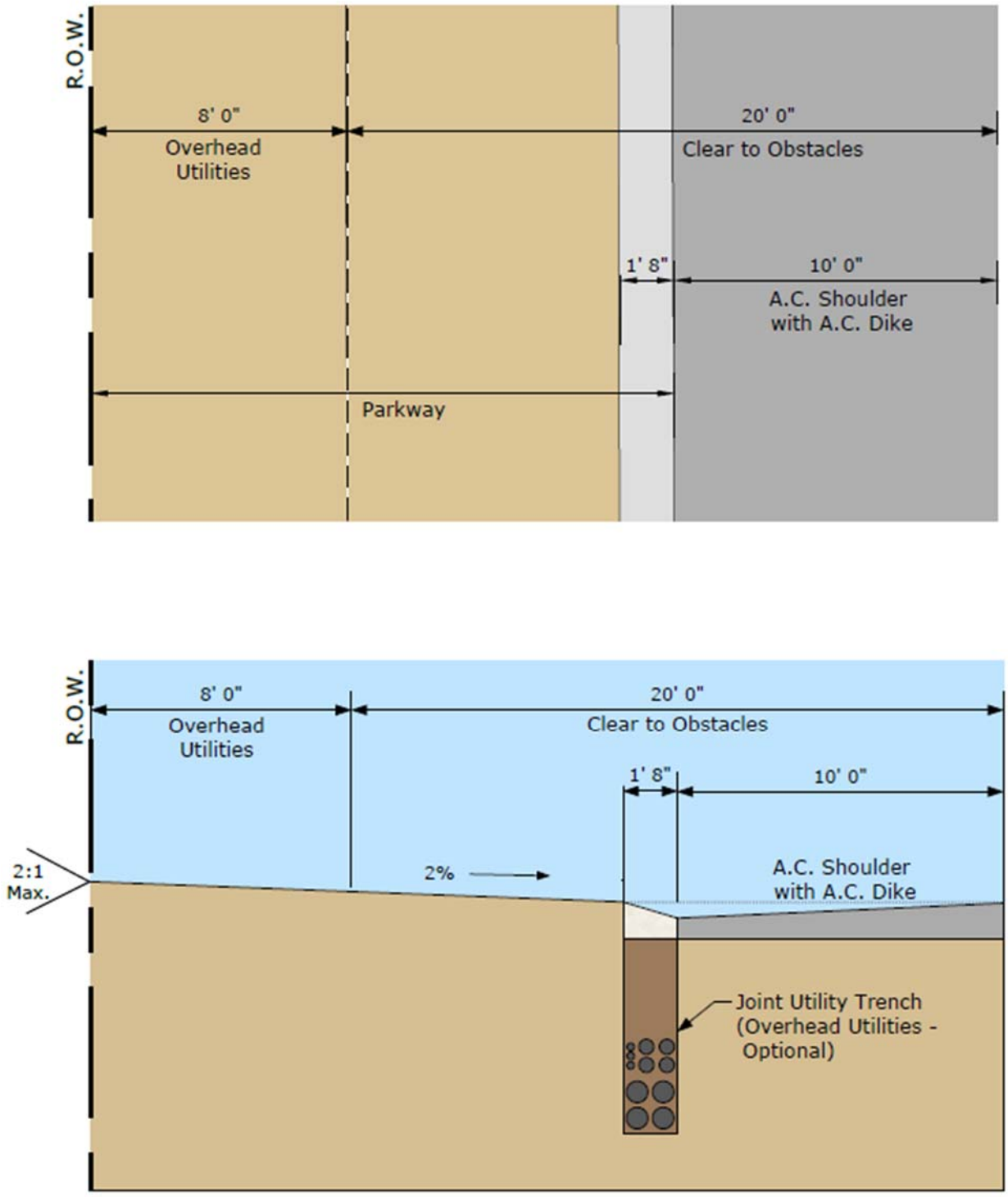


FIGURE 5-12. 18' RURAL PARKWAY

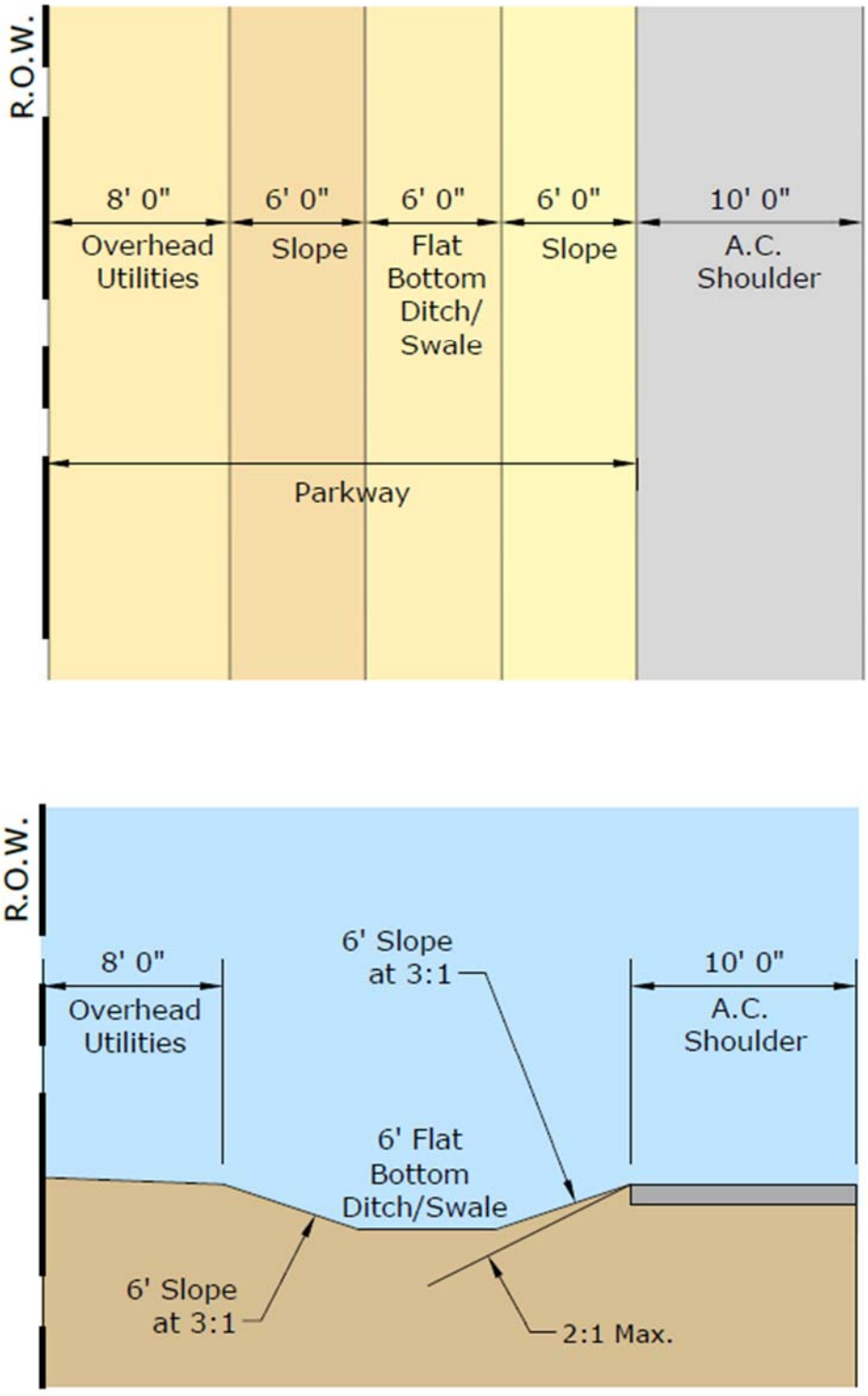


FIGURE 5-13. 26' RURAL PARKWAY

Chapter 6

Design Standards

6.1. Geometric Design

6.1.1 Horizontal Curves

The following design standards should be considered for horizontal curves:

1. Minimum curve radii with and without superelevation are shown in Chapter 1, "Roadway & Alley Design," for the various classifications of streets. These radii are derived from the CalTrans Highway Design Manual's Maximum Comfortable Speed on Horizontal Curves chart.
2. Superelevation
    a. Local streets and two-lane residential collectors should not generally be superelevated at curves.
    b. Superelevation is allowed on other street classifications as required to maintain the design speed along curves and adhere to maximum comfortable speed criteria.
    c. When superelevation is required, the minimum amount permitted is plus 2 percent. The maximum superelevation permitted, regardless of circumstances, is 4 percent for design speeds of 30mph and lower, 6 percent for urban classifications with design speeds between 35mph and 45mph, and 10 percent for rural classifications and for design speeds of 50mph and higher.
    d. Superelevation must be designed to show length, transition, and crown runoff. Design must follow CalTrans standards as provided in its Highway Design Manual, Chapter 200.
    e. Superelevation shall extend uniformly from the flow line of the gutter on the high side of the street to the lip of the gutter on the low side of the street, keeping the standard slope of the gutter on the low side unchanged. This shall also include the slope of median gutters, if any, as shown in The City of San Diego Standard Drawing SDG-154.
    f. All streets not superelevated shall be crowned at 2 percent.
3. Sight distance on horizontal curves shall be determined from CalTrans Highway Design Manual Figure 201.6, "Stopping Sight Distance on Horizontal Curves."
4. Compound curves are prohibited.
5. Reversing Curves
    a. Reversing curves are permitted; however, for all streets other than local streets, they must be separated by a tangent length adequate to provide safety of travel.

b. For non-superelevated reversing curves, the tangent length provided shall be compatible with probable driving speed, type of vehicle use, and individual curve radius and length.

c. Superelevated reversing curves shall be separated by tangents sufficient to contain all of the superelevation runoff required.

6. Knuckles may be approved on an exception basis for residential cul-de-sacs with 200 ADT or under, intersecting at right angles plus or minus 5 degrees. Knuckles should not be used in lieu of providing a 100-foot minimum curve radius required on residential cul-de-sacs.

7. Sharp horizontal curves must not begin near the top of pronounced crest vertical curves or near the low point of pronounced sag vertical curves.

6.1.2 Vertical Curves

The following design standards should be considered for vertical curves:

1. Vertical curves shall be designed to the current CalTrans Highway Design Manual Stopping Sight Distance based on design speed.

2. For local streets, the minimum acceptable vertical curve is 10 feet of curve for each 1 percent difference in grade.

3. Vertical curves leading into intersections shall be designed such that the grade immediately approaching a cross gutter is no greater than 4 percent.

4. Sight distance on vertical curves shall be determined from CalTrans Highway Design Manual 201.4, "Stopping Sight Distance on Crest Vertical Curves" and Figure 201.5, "Stopping Sight Distance on Sag Vertical Curves."

6.1.3 Intersections

The following design standards should be considered for intersections:

1. Streets are to intersect at 90-degree angles or as close as practicable.

2. Two streets intersecting opposite sides of a third street are to have the same points of intersection or else their centerlines are to be separated by a minimum of 120 feet for local streets and a minimum of 200 feet for all other streets on the third street.

3. Median breaks for intersections along major streets with other streets of collector or higher classification shall be no closer than 0.25 miles.

4. Full access intersections of local streets with major streets should be kept to a minimum, and such intersections shall be at least 500 feet apart, measured between centerlines, and shall be farther apart where turn pockets dictate longer spacing. The need for left-turn storage may require a greater distance. Pedestrian access to transit and adjacent commercial uses should be considered in major street intersection spacing.

5. Local streets should not intersect primary arterials.

6. Maximum grade across intersections along local and two-lane sub-collector and two-lane collector streets shall not exceed 8 percent and along four-lane streets and greater shall not exceed 5 percent.

7. Curb return radius should accommodate the expected amount and type of traffic and allow for safe turning speeds at intersections. Curb return radius shall be installed in accordance with Table 6–1.

TABLE 6-1. CURB RETURN RADIUS

	Local Residential	Collector	Major
Local Residential	15 ft.	20 ft.	30 ft.
Collector	20 ft.	25 ft.	30 ft.
Major	30 ft.	30 ft.	30 ft.

Note: Curb return radius for all other intersections not covered in Table 6–1 shall be determined by the appropriate reviewer.

8. Sight distance at intersections must consider the following factors: grades, curvature, and superelevation.
   a. The minimum corner sight distance at an intersection of a street (public or private) or multiple dwelling residential/commercial/industrial driveway with a collector or higher classification street shall be in conformance with AASHTO Standards.
   b. Adequate sight distances at intersections and along horizontal curves must be maintained. A sight distance easement that requires fences, monuments, signs, landscaping, walls, and slopes or any other obstruction at and beyond the ROW line to be eliminated, kept below 36 inches, or set back is only acceptable when relocation of the intersection or redesign of the curve does not permit adequate sight distance.
9. The City Engineer or designee may prohibit parking at critical locations.
10. The City Engineer or designee may control access along major streets at critical locations.

6.1.4 Transitions

The following design standards should be considered for transitions:

1. No pavement widening transition is required to increase the number of travel lanes beyond that needed for drainage flow.
2. When reducing the number of through travel lanes, the paved section shall undergo a transition as follows:
   a. For $V \geq 45$ mph, $L = W \times V$
   b. For $V \leq 40$ mph, $L = W \times V^2/60$

   (where V = design speed, in miles per hour; W = width of roadway transition, in feet; L = transition length, in feet)

6.1.5 Cul-de-Sacs

The following design standards should be considered for cul-de-sacs.

6.1.5.1 Objectives

1. Cul-de-sacs can be used to minimize encroachments into steep topography or other sensitive environmental features. However, when utilizing cul-de-sacs, care should be taken to design an interconnected street pattern within a residential neighborhood in order to provide, to the maximum extent feasible, direct pedestrian/bicycle routes to local destinations.
2. In an effort to encourage walking, bicycling, and transit as a viable means of transportation within residential neighborhoods, cul-de-sacs may be utilized within a subdivision so long as the development does not result in a circuitous street system that unnecessarily inhibits pedestrian circulation, discourages transit service, or causes added traffic impacts to other residences within the neighborhood.

6.1.5.2 Connections/Access

1. When a cul-de-sac exceeds 150 feet in length and/or pedestrian or bicycle circulation is being or will be significantly impacted and the traffic levels on neighboring streets are being or will be degraded, additional design features should be considered including (but are not limited to):
    a. Providing for pedestrian and bicycle connections through the cul-de-sac, or
    b. Provide for pedestrian and bicycle connections through the interconnection of the bulb of the cul-de-sac with an adjacent local street. These options should be considered in order to provide access to adjacent streets or to adjacent land uses such as open space, parks, trails, or commercial areas.
2. The design of pedestrian and bicycle access ways should address the following to provide for the safety of users:
    a. Length should be kept to a minimum.
    b. Adequate lighting should be provided.
    c. Landscaping, fences, grade differences, or other obstructions should not hinder visibility into the access way from adjacent streets and properties.
    d. Surrounding land uses should be designed to provide surveillance opportunities from those uses into the access way, such as with the placement of windows.
    e. Emergency vehicle access should be provided in cases where external surveillance is inadequate.

6.1.5.3 Industrial and Commercial Areas

1. Turnaround curb radius shall be 55 feet.
2. Such cul-de-sacs shall be limited to 500 feet in length from property line of the intersecting street to end of the bulb unless there are clearly defined topographic conditions requiring greater lengths. In such instances, intermediate turnarounds or secondary emergency vehicle only access may be required.

6.1.5.4 Residential Areas

1. Cul-de-sacs serving more than four dwelling units or over 150 feet in length require a turnaround. Cul-de-sacs of 150 feet or less shall be developed such that access can be provided without backing onto streets intersecting the cul-de-sacs.
2. Turnaround curb radius shall be 50 feet.
3. Turnaround curb radius may be reduced to 35 feet if cul-de-sac length is less than 150 feet, measured to the end of the bulb.
4. Residential cul-de-sacs are limited to a maximum of 200 ADT unless there are clearly defined topographic constraints that require greater volumes. Intermediate turnarounds shall have a 50-foot radius. In all cases, intermediate turnarounds and/or special design may be required to accommodate access by emergency vehicles and/or emergency evacuations.

6.2. Street Element Design

Most design details, location requirements, pavement computations, and construction methods are included in the latest edition of City of San Diego Standard Drawings, "Greenbook", and "Whitebook".

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6.2.1 Street Requirements

Curb-to-curb width is the distance from face-of-curb to face-of-curb, as shown in the San Diego Regional Standard Drawings.

6.2.2 Drainage

Street drainage is covered in detail in the Drainage Design Manual and Storm Water Standards.

6.2.3 Medians

The following design standards should be considered for medians:

1. All center medians shall be raised, bounded by 6-inch B-2 concrete curbs and surfaced with stamped concrete or concrete as called for in the City of San Diego Standard Drawings.
2. Landscaped medians shall conform to the City of San Diego Standard Drawings. Maintenance for landscaped medians shall be provided for through a maintenance assessment district or by other agreement with the City of San Diego.
3. All median noses shall be painted yellow.

6.2.4 Pavement

The following design standards should be considered for pavement:

1. Streets shall be paved with asphalt concrete over cement-treated base, concrete, or full-depth asphalt concrete in accordance with City of San Diego Standard Drawings or with a comparable structural section approved by the City Engineer or designee.
2. PCC pavement is required for streets with grades greater than 12 percent.

3. The same pavement section is required in shoulders as well as driving lanes, except for rural road classifications.
4. Concrete bus pads are required for all bus stops along transit corridors and shall consist of 9 inches of PCC pavement. Refer to the Metropolitan Transit Development Board "Designing for Transit" Guidelines for other dimensions.
5. Raised pavement markers are required for all streets of collector or greater classification. Installation and criteria must be according to the latest edition of the California Manual on Uniform Traffic Control Devices (CA MUTCD).
6. Stamped concrete or other types of decorative paving will be permitted in the traveled roadway of a public and/or private street, provided all of the following conditions are met:
    a. At signalized intersections to designate pedestrian crosswalks (brick pavers, but not stamped concrete, may be used);
    b. The street grade is 8 percent or less; and
    c. Maintenance is assured by either an encroachment removal agreement or by inclusion in an assessment district.

    Construction plans shall be prepared by a Registered Civil Engineer and shall indicate the location, color, type of material, and stamping pattern. Decorative paving may be allowed at other locations through the deviation from standard process process (see Appendix G).
7. Stamped concrete or other types of decorative paving will not be permitted at uncontrolled intersections to designate pedestrian crosswalks or at locations where it might appear to be a pedestrian crosswalk, in cross-gutters or gutters, or to be used to delineate pedestrian ramps. Stamped concrete and other types of decorative paving are permitted at other locations designated and marked as pedestrian crosswalks.
8. Engineers are cautioned that use of stamped concrete in residential areas may cause adverse community reaction due to noise where the roadway is immediately adjacent to dwelling units.

6.2.5 Rolled Curbs

Rolled curbs are not permitted on publicly dedicated streets, except that rolled or mountable curb may be permitted in situations such as pop-outs or roundabouts. Rolled curb may be used on private driveways where the grade does not exceed 5 percent.

6.2.6 Right-of-Way (ROW)

The portion of the right-of-way beyond curbs shall slope upward away from the street at 1.5 percent grade.

6.2.7 Sidewalks

6.2.7.1 Widths

The following design standards should be considered for sidewalk widths:

1. Minimum widths are set forth in Chapter 5, "Parkway Configurations," for various street classifications.
2. The width of a contiguous sidewalk is measured from the back of the curb.
3. Sidewalk widths are intended to be clear widths. Where fire hydrants, street furniture, or other above-ground appurtenances reduce such width, additional sidewalk should, if feasible, be constructed around the obstacles.
4. Where feasible, the location of transit stops and shelters shall be determined and the sidewalk width shall be 10 feet where shelters are proposed. Other bus stop locations shall provide 8 feet of sidewalk. The wider sidewalk widths for bus shelters shall extend for 25 feet parallel to the curb measured from the bus stop sign. This will provide adequate clearance to accommodate bus lifts for persons with disabilities. Refer to MTS Designing for Transit for additional information.
5. Sidewalks with continuous gradients shall have resting areas 5 feet in length at intervals of 400 feet maximum. The resting area shall be at least as wide as the walk. The slope of the resting area in all directions shall be 1.5 percent.
6. If the clear width of the sidewalk is less than 5 feet, then level passing spaces shall be provided at intervals of 200 feet maximum. Passing spaces shall be either:
    a. A space 60 inches minimum by 60 inches minimum; or
    b. An intersection of two walking surfaces providing a T-shaped space, where the base and arms of the T-shaped space extend 48 inches minimum beyond the intersection. For an illustration of T-shaped spaces, see Chapter 2, "Pedestrian Design," section 2.1.2, "Sidewalks."

6.2.7.2 Locations

The following design standards should be considered for sidewalk locations:

1. Sidewalk areas within curb returns are to be completely paved at all collector, major, and primary arterial intersections, and at other intersections where significant pedestrian volumes are anticipated.
2. A variation or transition in sidewalk location from that recommended above shall be considered to achieve consistency with existing adjacent sidewalks.
3. Transitions should be four-to-one.

6.2.7.3 Curb Ramps

The following design standards should be considered for sidewalk curb ramps:

1. All sidewalk installations (including replacements) are to include curb ramps (installation or replacement) at curbed intersections, T intersections, and alley aprons.
2. Two curb ramps per corner are required at new intersections. The curb ramps shall be in line with the direction of crosswalks.
3. All crosswalks at intersections (marked or unmarked) shall have a curb ramp at each end.

4. A single curb ramp may be installed at the center of each sidewalk corner of an intersection that is going to be retrofitted.
5. Sidewalks and curb ramps are to be designed and installed per the City of San Diego Standard Drawings.

6.2.7.4 Innovative Sidewalks

Innovative sidewalks may be considered for area enhancement and to avoid existing features such as trees. They may be approved on an individual basis provided they are located within the street ROW and maintenance of the area between the sidewalk and curb is provided by special assessment district or other agreement with the City of San Diego. All other requirements shown in Standard Drawings, such as 1.5 percent fall, between property line and face of curb, should be complied with. Sidewalks and the pedestrian path shall be parallel to the curb to the greatest extent possible.

6.2.7.5 Construction

The following design standards should be considered for sidewalk construction:

1. Sidewalks shall be constructed in accordance with City of San Diego Standard Drawings.
2. Utility access panels within sidewalks must be slip resistant and flush mounted, and they must not include holes greater than 0.25 inches.
3. Throughout the city, contractors stamp the work with their names and the date of construction on the sidewalk. In addition to the contractors' stamp, the name of the street is often imprinted into the curb. In many of the city's older neighborhoods these street names may not be the current names of the streets. However, these markers are an indicator of the age of a particular neighborhood and provide a sense of continuity and history for the residents. When existing sidewalks are being repaired or replaced, care must be taken to retain in place these stamps and imprints or to place them near the new sidewalk work.

6.2.8 Landscape Requirements

Street trees are urban infrastructure whose value is recognized in many of the City's land use policy documents. These documents call for street tree plantings to achieve various goals, including:

- Establishing and preserving neighborhood character
- Encouraging commercial revitalization
- Creating a comfortable pedestrian environment
- Reduce the urban heat island effect
- Capture and reduce storm water runoff
- Sequester carbon and reduce pollution.

Requirements for street trees and other landscaping in the ROW, refer to the citywide Landscape Regulations (San Diego Municipal Code Section 142, Chapter 14, Article 2, Division 4) and the associated Land Development Manual-Landscape Standards.

The citywide Landscape Regulations address requirements such as the quantity, distribution, size, selection, and approval of plant material, including street trees. The Landscape Standards establishe standards, guidelines, and criteria for all landscaping in the public ROW such as locational criteria (distance of trees from the face of curb for certain street classifications and speeds, and from traffic signals, signs, and underground facilities), plant selection, maintenance, median landscaping, irrigation, and electrical services.

For all street trees and landscape plantings in roadway islands, watering and maintenance will be assured through an agreement with the City, such as a street tree permit, encroachment removal and maintenance agreement, or maintenance assessment district.

6.2.9 Driveways

The following design standards should be considered for driveways:

1. Access to private property from public and private streets shall be by standard concrete driveways. Curb returns with curb ramps are required at signalized driveways. Driveway width shall be consistent with the Land Development Code. Driveways shall be designed such that access can be provided without backing onto streets that are collector or higher. Driveways shall be designed and constructed per the City of San Diego Standard Drawings.
2. No driveway access is normally permitted to a primary arterial. Should a lot have frontage only on a primary arterial, driveway access limited only to right turns in and out will be permitted at locations and under conditions specified by the City Engineer and may require a dedicated lane.
3. Median breaks for driveway access to major streets will not normally be permitted unless all of the following conditions exist:
    a. The property to be served is a major traffic generator and has a continuous frontage of 1,200 feet or more along the major street and is situated between streets that intersect the major street from the side occupied by the property.
    b. The median opening is not less than 600 feet from an intersection with a major or collector street.
    c. The median opening is not less than 400 feet from an intersection with a local street. The need for left-turn storage may require a greater distance.
    d. The median opening is greater than 600 feet from any other existing or proposed mid-block median opening.
    e. All costs (e.g., base material, surfacing, traffic safety street lighting, traffic signals, reconstruction or utility relocation) required by a mid-block opening will be borne by the requesting party.

6.2.10 Guardrail and Other Safety Devices

The following design standards should be considered for guardrails and other safety devices:

1. All guardrail installations must be done in conformance with the latest edition of the State of California Traffic Manual, the AASHTO Roadside Design Guide, the City of San Diego Standard Drawings.
2. Guardrails may be required at certain locations for safety purposes in accordance with guidelines in the State of California Traffic Manual.
3. Reflectors and other safety structures may be required when necessary for public safety.
4. When guardrails are warranted at fire hydrant locations, guardrails shall be installed in a manner so as to not interfere with the operation of such hydrants.

6.2.11 Street Name Signs

Metal street name signs on metal posts are required at each intersection, at any point of street name change, and at midpoint in blocks over 2,000 feet in length, in conformance with City of San Diego Standard Drawings. New street names and street name changes shall follow the procedures contained in the San Diego Municipal Code Chapter 12, Article 5, Division 11. A private street sign within public ROW shall be the same color as public street signs, with the letters *PVT* or the word *Private* written on it in place of the City logo.

6.2.12 Intersection Control

Where two or more streets intersect, some form of traffic control is usually needed to define the ROW of the vehicles entering the intersection. This control can take the form of yield signs, stop signs on the minor street, all-way stop control, a traffic signal, or a roundabout.

When deciding what type of control an intersection should have, follow CalTrans Intersection Control Evaluation (Traffic Operations Policy Directive 13-02). When expansion or addition of one type of traffic control is considered, this evaluation ensures a comparison with other types of traffic control and the no-build scenario on the basis of system impacts, safety and mobility benefits for all modes, and life-cycle costs.

Stop signs and all-way stop controls are installed according to City Council Policy 200-8. Traffic signals are installed according to City Council Policy 200-6, except that references within Council Policy 200-6 to the Caltrans Traffic Manual should be read as referring to the latest version of the CA-MUTCD. These Council policies prescribe warrants based on City, State of California, and federal standards. The warrants take into consideration vehicular and pedestrian volumes, accident history, traffic safety, the transportation system, and other relevant factors.

For efficient signal coordination, intersections controlled by traffic signals should be spaced approximately one-fourth mile to one-half mile apart.

Roundabouts are an intersection control device that reduces intersection conflict points and can reduce speeds without significantly increasing travel time.

6.2.13 Roundabouts

Roundabouts are significantly different from traffic circles. While traffic circles are appropriate on 25 mph or slower local streets, roundabouts can handle as much traffic as comparable to traffic signals. Where space is constrained and speeds are 30 mph or slower and few trucks need to turn at the intersection, mini-roundabouts could be used in place of traffic circles. The defining elements of roundabouts, include splitter islands, truck aprons, and separated pedestrian crossings, can be found in National Cooperative Highway Research Program (NCHRP) Report 672 Section 1.2 and 1.3. Signs, striping, and markings at roundabouts are to comply with the CA MUTCD. Other suggested references are as follows:

- http://www.dot.ca.gov/hq/oppd/hdm/pdf/english/chp0400.pdf
- http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_672.pdf

6.2.14 Street Furniture

The following design standards should be considered for street furniture:

1. Street furniture and above-ground appurtenances placed in the public ROW shall conform to the requirements set forth in the ADA, California Title 24 regulations, the San Diego Municipal Code and applicable policies, regulations, and standards.
2. Maintenance shall be assured by either an Encroachment Maintenance and Removal Agreement or by inclusion in a maintenance assessment district.
3. Street furniture and above-ground appurtenances shall be located in a fashion that preserves the safety, integrity, and layout of the pedestrian passageway and assures that the right of the public to use the public sidewalk is not unreasonably restricted.
4. Bicycle racks, where placed in the public ROW, should be sited in a well-lit area as close to building entrances and regular foot traffic as possible without restricting or encroaching onto pedestrian-accessible routes. The rack must support the bicycle frame (not the wheel) at two points of contact and permit the use of a U-shaped lock to secure the frame and one wheel. The rack must be positioned to provide 2 feet by 6 feet of space per bicycle.

6.3. Private Streets and Private Drives

6.3.1 Private Streets

The following design standards should be considered for private streets:

1. Private streets may be utilized where there is a homeowners association established that will maintain the street system.
2. The entrance to private streets shall advise the public of the non-dedicated status of the street system and shall have an entrance design that visibly reinforces the private access. At a minimum, absent other design features, this design shall consist of signage designating the street as private. Such entrances must be provided with adequate visitor parking and turnaround facilities.

3. Private streets shall be designed and constructed to the same structural, geometric, lighting, and drainage standards as dedicated streets. Private streets with parking on both sides of the street shall have a minimum curb-to-curb width of 34 feet.
4. General utility easements will be required over private streets. Width of easement should be consistent with street ROW.
5. The private street name sign shall be in accordance with the City of San Diego Standard Drawings.

6.3.2 Private Drives

The following design standards should be considered for private drives:

1. Private drives, where permitted in lieu of either dedicated or private streets, must be designed to allow direct access to all developed areas of the project.
2. Private drives serving as fire lanes shall be designed with a turning radius of 50 feet.
3. Minimum private drive width shall be consistent with the Land Development Code.
4. Private drives shall be designed and constructed per the City of San Diego Standard Drawings.

6.3.3 Walkways

A system of improved all-weather walkways must be provided connecting each dwelling unit to street sidewalks within and adjacent to the development and to major points of pedestrian attraction within the development.

6.3.4 Parking on Private Streets and Drives

The following design standards should be considered for parking on private streets and drives:

1. Parking shall meet the requirements established by the applicable zone as contained in the Land Development Code, the ADA, and California Title 24 accessibility regulations.
2. An unobstructed minimum distance of 25 feet from the circulation drive curb to the structure or carport area and not less than 20 feet from the back of sidewalk shall be provided.
3. Parking bays, both parallel and perpendicular, may be utilized on low-volume residential streets. Such facilities would normally be included within the ROW or private street easement and would be maintained as part of the street. Where a sidewalk is located on the same side of the roadway as the parking bay, a continuous walkway must be maintained either by restricting parking within five feet of the extended curb line or by providing an improved walkway around the parking bay. All parking bays shall accommodate full-size vehicles.

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References

Federal Government and Other National Sources

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Glossary of Terms

ADT (Average Daily Traffic): the number of vehicles to pass a given point on a roadway during a 24-hour period on an average day of a given year. Existing volumes may be measured with a recording device (machine counter) placed on the roadway. Existing volumes may also be estimated, or future volumes forecast, with the aid of computerized travel models representing existing or future land use and transportation networks.

Concrete/P.C.C./A.C.: terms and abbreviations used to describe the materials used in the construction of roadways, bridges, and sidewalks. *Concrete* and *P.C.C.* refer to Portland cement concrete, a material consisting of Portland cement, coarse and fine aggregates, and water. *A.C.* refers to asphaltic concrete, a material consisting of asphalt cement, coarse aggregates, and fine aggregates.

Design Speed: the maximum safe speed that can be maintained over a specified section of roadway when conditions are so favorable that the design features of the roadway govern.

Easement: an interest in land owned by another that entitles its holder to a specified limited use or enjoyment.

Horizontal Curve: a geometric design feature of a roadway that provides a smooth change in direction to the left or right.

Low Profile Landscaping: plantings with mature height of 24 inches.

Major Street/Minor Street: descriptive terms of the relative traffic volumes on two streets at an intersection. The major street carries the higher volume of traffic and is usually wider than the minor street. At a T-intersection, the major street is the through street and the minor street forms the stem of the "T."

Median: the part of the roadway, wider than a double yellow line, that separates opposing directions of traffic. It is usually raised and delineated by curbs and may be landscaped. It may also be depressed or level with the traffic lanes.

Parkway: the part of the street between the face of the curb (or edge of the traveled way) and the ROW line.

Passing Sight Distance: the distance required for a vehicle to safely overtake a slower vehicle on a two-lane roadway by maneuvering into the lane of opposing traffic and then back into the right lane when past the slower vehicle. It is rarely provided on urban streets, but it is common on rural roads in flat or rolling terrain.

Pedestrian-Scale Lighting: adequate and aesthetically pleasing lighting should be provided for safety, security, and a greater sense of comfort for pedestrians of all abilities, allowing them to quickly and accurately recognize cues that will enable their safe navigation. The appropriate height for pedestrian lighting is between 12 and 20 feet. Light standards may also be combined on one post. Low, pedestrian-oriented lights can be affixed to a post and direct light onto sidewalks while the same post may also accommodate auto-oriented lights directed at roadways.

Precise Plan: a detailed, long-term plan for the development of a sub-area of a community plan. Generally, a precise plan would include a residential neighborhood, commercial area, industrial area,

or some geographical area sharing common facilities or problems. Usually a precise plan proposes specific land uses for each parcel and is often based on a detailed grading plan. In some instances, very specific proposals relative to the layout of buildings, parking, and landscaping are included within the precise plan. A precise plan is adopted by resolution.

Right-Of-Way (ROW): the property dedicated for public roadway.

Single Loaded Street: a street serving property (front yard or side yard) on one side only, with no need for access (to a rear yard or to open space) or parking on the other side.

Specific Plan: a tool to implement a general or community plan (policy documents). The minimum contents of a specific plan are stipulated by state law. At various degrees of detail, specific plans address land use, infrastructure, development standards, and implementation measures. Specific plans are adopted by ordinance.

Stopping Sight Distance: the distance required for a vehicle traveling at a particular speed to come to a safe stop to avoid colliding with an object in the roadway. It is measured with a driver's eye height of 3.50 feet (1070 mm) above the roadway and an object height of 6 inches (150 mm) above the roadway. The distance includes vehicular travel during the driver's perception of and reaction to the object and the vehicular travel during braking.

Street Tree: a tree adjacent to a street and located within the public ROW.

Transit-Oriented Development (TOD): a mixed-used community within a typical 2,000-foot (600 m) walking distance of a transit stop and core commercial area. The design, configuration, and mix of uses emphasize a pedestrian-oriented environment and reinforce the use of public transportation without ignoring the role of the automobile. TODs mix residential, retail, office, open space, and public uses within a comfortable walking distance, making it convenient for residents and employees to travel by transit, bicycle, by foot, or by car.

Transit: the carrying of passengers in a bus or trolley along a regularly scheduled route for a fixed, basic fare.

Traveled Way: the lanes of a street or roadway in which the moving vehicles travel. Does not include shoulders or parking lanes.

Vertical Curve: a geometric design feature of a roadway that provides a smooth transition between an ascending grade and a descending grade, or vice versa. A *crest* vertical curve begins with an ascending grade and ends with a descending grade. A *sag* vertical curve begins with a descending grade and ends with an ascending grade.

Visibility Areas: specified areas along intersection corners that should be clear of obstructions that might block a driver's view of pedestrians and potentially conflicting vehicles. The dimensions of visibility areas depend on the design speeds of the intersecting roadways and the types of traffic control used at the intersections.

Index of Terms

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APPENDICES

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Appendix A

Street Classification

A.1. Functional Classification

1. **Alley**: A roadway, usually unnamed, which primarily provides secondary vehicular access to the rear and side entrances of abutting property. It should be a minimum of 20 feet and a maximum of 24 feet in width.
2. **Private Street**: A street that primarily provides direct access to abutting property. It carries low vehicular movement, low-to-heavy pedestrian movement, and low-to-moderate bicycle movement. It has the same overall standards, design, and construction as a public street with the exception that the responsibility for maintenance is private.
3. **Pedestrianway/Bikeway**: A facility that primarily provides for pedestrian and bicycle circulation between two closely-spaced (250 feet or less) streets. It has a walkway/riding surface and landscaping, and may include pedestrian-scale lighting and an underground utility corridor.
4. **Bike Path**: A facility that provides exclusively for bicycle circulation along major corridors. It has an all-weather riding surface.
5. **Transitway**: A street that primarily provides for moderate-to-heavy transit movement and moderate-to-heavy pedestrian movement in a pedestrian-transit mall setting, with commercial retail, food service, and entertainment uses. It has a narrow transit roadway, wide sidewalks, street trees, traffic safety street lighting, and landscaping. It may include planter boxes, pedestrian-scale lighting and other pedestrian amenities, and an underground utility corridor.
6. **Local Street**: A street that primarily provides direct access to abutting property. It carries low vehicular movement, low-to-heavy pedestrian movement, and low-to-moderate bicycle movement. It has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may include landscaping, pedestrian-scale lighting, and underground utilities.
7. **Collector Street**: A street that primarily provides movement between local/collector streets and streets of higher classification; secondarily, it provides access to abutting property. It carries low-to-moderate vehicular movement, low-to-heavy pedestrian movement, moderate-to-heavy bicycle movement, and low-to-moderate transit movement. It has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may also include landscaping, pedestrian-scale lighting, and underground utilities.
8. **Major Street**: A street that primarily provides network connecting vehicles and transit to other major streets and primary arterials and to the freeway system; secondarily, it provides access to abutting commercial and industrial property. It carries moderate-to-heavy vehicular

movement, low-to-high pedestrian and bicycle movement, and moderate-to-high transit movement. It has a raised center median, street trees, traffic safety street lighting, and sidewalks; it may include landscaping, pedestrian-scale lighting, underground utilities, on-street parking, and/or bike lanes.

9. **Primary Arterial**: A street that primarily provides a network connecting vehicles and transit to other primary arterials and to the freeway system. It carries heavy vehicular movement while providing low pedestrian movement and moderate bicycle and transit movements. It has a raised center median, bicycle lanes, street trees, traffic safety street lighting, sidewalks, and no access from abutting property. It may include underground utilities.
10. **Rural Local Road**: A road in agricultural, natural open space, and large lot (greater than 2.5 acres) residential areas that primarily provides direct access to abutting property. It carries low vehicular movement, low pedestrian movement, and low bicycle movement. It may include traffic safety street lighting and underground utilities. It typically does not have sidewalks or landscaping.
11. **Rural Collector Road**: A road in agricultural, natural open space, and large lot (greater than 2.5 acres) residential areas that primarily provides movement between local and collector roads and roads or streets of higher classification; secondarily, it provides access to abutting property. It carries low-to-moderate vehicular movement, low pedestrian movement, low-to-moderate bicycle movement, and low transit movement. It may include traffic safety street lighting and underground utilities. It typically does not have sidewalks or landscaping.

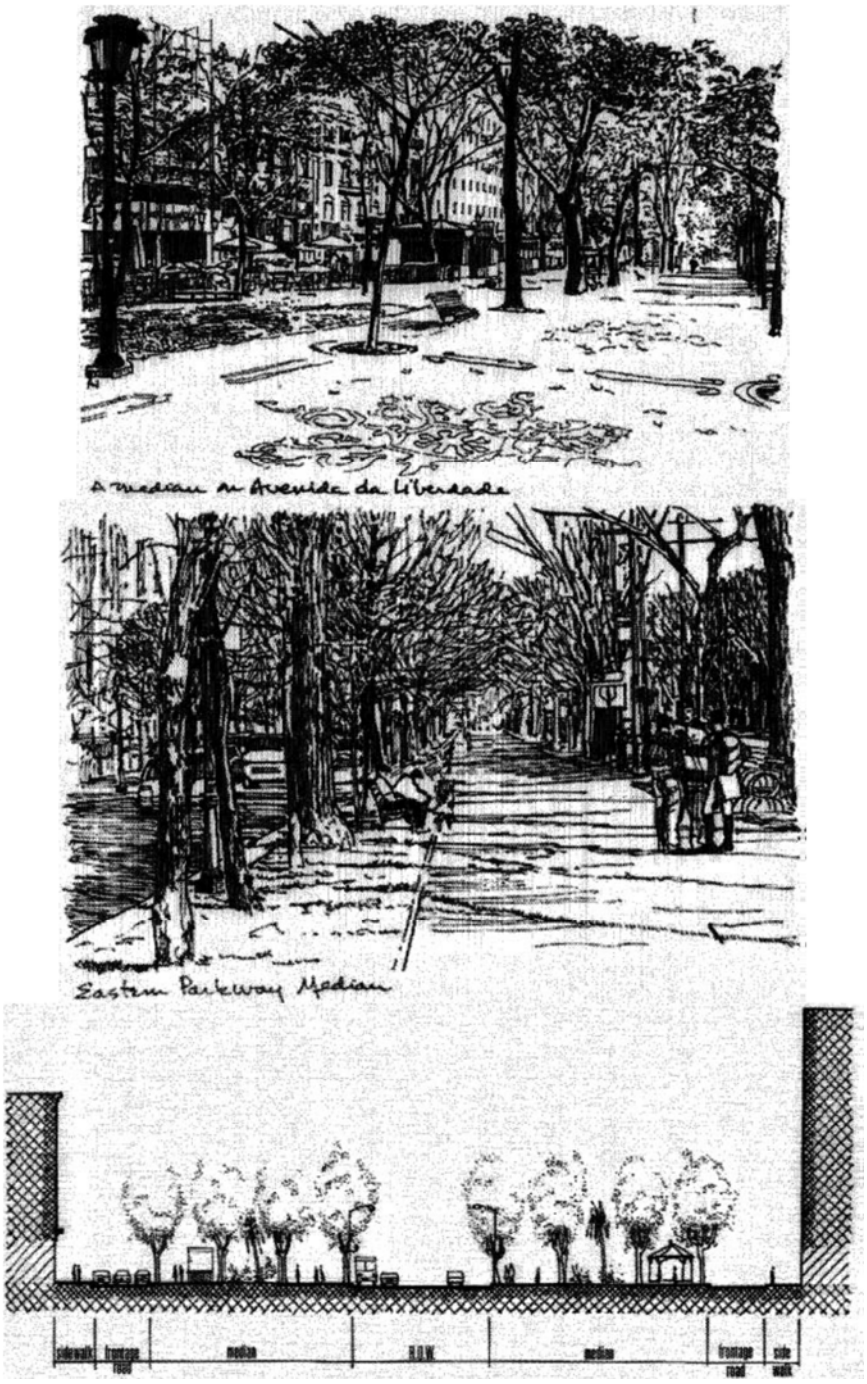
A.2. Boulevards

The Progress Guide and General Plan and various community plans designate certain streets as being of great importance to a community and recommend special treatment to recognize this. The Bay-Park Link and Broadway in Centre City are two such examples.

The recommendations may call for the street to be designed as a *boulevard*, which is defined as "a street or promenade planted with trees." *The Boulevard Book* describes three boulevard types:

1. A street with a wide central landscaped median flanked on either side by roadways and sidewalks. The central median may be a pedestrian promenade or planted with grass.
2. A street with a wide central roadway and broad, tree-lined sidewalks along each side.
3. A multi-way boulevard is designed to separate through traffic from local traffic and, often, to provide special pedestrian ways on tree-lined malls. It is characterized by a central roadway of at least four lanes for generally fast and non-local traffic. On either side of this roadway are tree-lined medians that separate it from parallel, one-way side access roads for slow-moving traffic.

Each street designated as a boulevard will require a unique and specialized design treatment; therefore, no standards are provided in this Street Design Manual. Boulevard designers are referred to the design and policy guidelines found in *The Boulevard Book.*



Source: Allan B. Jacobs et al., *The Boulevard Book* (2000).

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Appendix B

Land Use

B.1. Open Space

Land protected for outdoor recreation and education, for scenic and visual enjoyment, and for controlling urban form and design. Environmentally sensitive lands are also preserved in open space.

1. **Open Space Park:** Public parks and facilities, once they are dedicated as park land, and providing for various types of recreational needs of the community.
2. **Open Space-Conservation:** Land preserved for the purpose of protecting natural and cultural resources and environmentally sensitive lands.
3. **Open Space-Floodplain:** Land within floodplains where development is controlled to protect the public health, safety, and general welfare, and land areas identified by the flood insurance rate maps on file with the City of San Diego Development Services Department.

B.2. Agriculture

Areas that are rural in character and are designated for agricultural uses or are not designated for long-term agricultural use but are awaiting development at urban intensities. Includes all types of agricultural uses and some minor agricultural sales.

B.3. Residential

1. **Large Lot Single Dwelling Residential:** Single dwelling units on large lots with some accessory agricultural uses. Applies to areas that are rural in character. Lots are greater than 2.5 acres. Densities are 0.4 dwelling units per acre or less.
2. **Single Dwelling Residential:** Single dwelling units on individual lots that have a variety of lot sizes and residential product types. Lot sizes range from 3,000 square feet to 2.5 acres. Densities range from 0.4 dwelling units per acre to 8.7 dwelling units per acre.
3. **Low Density Multiple Dwelling Residential:** Two dwelling units per lot, with lot sizes ranging from 4,000 square feet to over 6,000 square feet and densities up to 21.8 dwelling units per acre. Includes townhouse developments with densities up to 19.8 dwelling units per acre.
4. **Medium- to Very High-Density Multiple Dwelling:** More than 2 dwelling units per lot with densities ranging up to 217.8 dwelling units per acre.

B.4. Commercial

Includes a wide range of uses for the employment, shopping, services, recreational, and lodging needs of the residents of and visitors to the City of San Diego. Also includes mixed-use development.

1. **Neighborhood Commercial**: Smaller scale, lower-density developments that are consistent with the character of the surrounding residential areas. May include mixed-use (commercial/residential). Primarily located along local and selected collector streets.
2. **Pedestrian-Oriented Commercial Retail**: Developed in a pedestrian-oriented pattern. A functional, convenient, and pleasant environment has been created for people arriving on foot, bicycle, and transit. Also accessible by the automobile.
3. **Community Commercial**: Developments with community-serving commercial services, retail uses of moderate intensity and small-to-medium scale. Includes shopping centers and auto-oriented strip commercial areas. Primarily located along collector streets, major streets, and public transportation lines.
4. **Regional Commercial**: Has the broadest mix of retail, wholesale, commercial service, and business/professional office uses. Includes large scale, high intensity developments. Primarily located along arterials, major streets, and major public transportation lines.
5. **Commercial Office**: Includes employment uses together with limited complementary retail and medium-to-high density residential development.
6. **Visitor Commercial**: Provides for the lodging, dining, and recreational needs of both tourists and the local population.
7. **Urban Village**: A compact pattern of land use including housing, public parks and plazas, offices, stores, and major transit stops on the existing and planned transit system, where pedestrian and bicycle activity is desired. Urban Villages are characterized by interconnected streets, building entries along the street, and architectural features and outdoor activities that encourage pedestrian and bicycle activity and transit accessibility. Urban Villages have their highest intensity of development focused near transit and have a mix of land uses convenient to residents and employees.

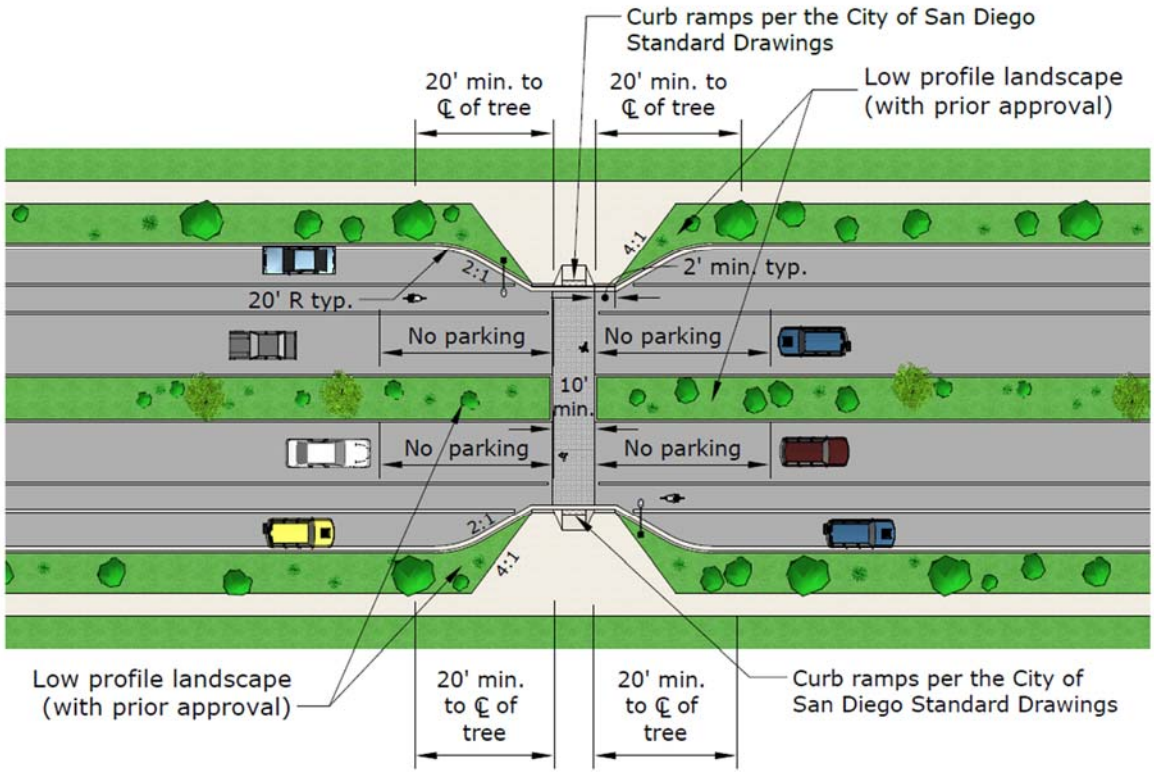
B.5. Industrial

Includes a wide range of industrial/manufacturing activities.

1. **Industrial Park:** Includes high-quality science and business park development in a campus-like environment characterized by comprehensive site design and substantial landscaping.
2. **Small Lot Industrial:** Small-scale industrial activities within urbanized areas

Appendix C

Midblock Pedestrian Crosswalk



NOTES:

1. Refer to CAMUTCD for appropriate pavement markings and signage.
2. Drainage requirements must be evaluated and addressed.
3. Crosswalks must meet traffic requirements per City Council Policy 200-07.
4. "No Parking" shall be determined based on visibility requirements.
5. Placement of landscaping shall be consistent with the Landscape Technical Manual and shall allow for sight distance requirements.
6. Curb extensions as shown may be installed to improve pedestrian visibility and reduce crossing distance.

Figure C-1. Midblock Pedestrian Crosswalk

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Appendix D

Summary of Traffic Calming Measures

Table D-1. Traffic Calming Measures

Category	Traffic Calming Device	Description	Applicability	Advantages	Disadvantages
Horizontal Deflections	Chicanes	A channelization that causes a series of tight turns in opposite directions in an otherwise straight stretch of road	May be used on local streets. Inappropriate for use on: • Streets classified as collector or higher • Bus routes • Emergency response routes • -Where there is limited stopping sight distance • Where there is a grade that exceeds 5%	• Slows traffic • Creates opportunity for landscaping • Tends not to divert traffic to nearby streets	May: • Cause some loss of on-street parking • Increase emergency response time • Impact driveways • Affect drainage and street sweeping
	Traffic Circles	A raised circular island placed in the center of an intersection	May be used on two-lane streets with alternative access points. Inappropriate for use on: • Streets classified as major or higher • Bus routes • Emergency response routes • Where there is limited sight distance • Where there is a grade that exceeds 5%	• Slows traffic on each approach • Creates landscaping opportunity • Reduces ROW conflict • Tends not to divert traffic to nearby streets	May: • Impact large vehicles' turns • Increase emergency response time

Category	Traffic Calming Device	Description	Applicability	Advantages	Disadvantages
	Median Slow Points	A small median or island placed in the center of a roadway; causes traffic to shift its path to the right in order to travel around it. May be installed on an approach to an intersection or mid-block.	May be used on two-lane streets. If installed at an intersection, street should have alternative access points Inappropriate for use on: • Streets classified as major or higher • Where there is limited stopping sight distance	• Slows traffic • Creates pedestrian refuge area • Creates landscaping opportunity • Tends not to divert traffic to nearby streets	May: • Cause some loss of on-street parking • Impact large vehicles' turns when placed at intersections

Category	Traffic Calming Device	Description	Applicability	Advantages	Disadvantages
Vertical Deflections	Road Lumps	Rounded raised areas placed across the road, approximately 12 feet long, 3.5 inches high, and parabolic in shape. Most effective when used in groups spaced appropriately to discourage speeding between lumps.	• May be used on local streets. • Inappropriate for use on: - Streets classified as collector or higher - Bus routes - Emergency response routes -Where there is limited stopping sight distance - Where there is a grade that exceeds 5%	• Slows traffic • Discourages short-cutting	May: • Divert traffic • Increase noise • Increase emergency response time
	Speed Tables	Flat-topped road lumps often constructed with concrete or other textured materials on the flat section. They have a gentler effect on buses than road lumps.	• May be used on local streets. • Inappropriate for use on: - Streets classified as collector or higher - Emergency response routes - Where there is limited stopping sight distance - Where there is a grade that exceeds 5%	• Slows traffic • Discourages short-cutting	May: • Divert traffic • Increase noise • Increase emergency response time • Impact buses
	Raised Crosswalks	An extension of speed table where street is brought up to sidewalk level.	• May be used on local streets. • Inappropriate for use on: - Streets classified as collector or higher - Emergency response routes - Where there is limited stopping sight distance - Where there is a grade that exceeds 5%	• Slows traffic • Discourages short-cutting • Enhances pedestrian safety	May: • Divert traffic to nearby streets • Increase noise • Increase emergency response time • Impact buses • Require special drainage considerations

Category	Traffic Calming Device	Description	Applicability	Advantages	Disadvantages
Intersection Pop-Out	Intersection Pop-Outs	Curb extensions that narrow the street at intersections by widening the sidewalks at the point of crossing. Can be used at intersections to create a street gateway effect visually announcing an entrance to a neighborhood.	• May be used on local streets, collector streets, or urban major streets.	• Improve pedestrian visibility • Create shorter pedestrian crossing width • May reduce vehicle speeds	May: • Impact large vehicles' turns • Impact accessibility by transit vehicles and emergency vehicles • Require parking removal
Traffic Diverters	Semi-Diverters	Barriers placed at the end of a block that prevent entrance by blocking traffic in one direction of a street that allow exit by permitting traffic in the opposite direction to pass through. They include provisions for emergency vehicles and continuation of pedestrian or bicycle routing.	• May be used on low-volume local residential streets. • Inappropriate for use on: - Emergency response routes - Bus routes Streets classified as collector or higher	• Reduce cut-through traffic • Reduce pedestrian crossing widths • Create opportunities for landscaping	May: • Divert traffic to other low-volume streets • Increase trip lengths • Cause loss of parking • Increase emergency response time
Channelization	Regulatory Signs, Markings, Landscaping, or Raised Islands Aimed at Motorized, Non-Motorized, or Pedestrian Traffic	Channelization may be achieved through ROW controls at intersections, controls affecting or restricting the direction or speed of traffic, or design features that physically restrict the movement of traffic.	Channelization is site-specific and should be evaluated on a case-by-case basis.	• Prevent cut-through traffic • Reduce speed • Create opportunities for landscaping • Control turning traffic in/out of a neighborhood • Physically control pedestrian movements	May: • Increase trip lengths • Impact emergency response time • Impact accessibility

Appendix E

Green Infrastructure (GI) and Street Design

The intent of this appendix is to provide developers, project engineers, and planners with ideas for GI that could potentially be incorporated into the design of streets to address adverse impacts to water quality associated with storm water runoff. It is important to note that other City regulations, including but not limited to the latest version of the Storm Water Standards Manual, will dictate the mandatory applicability criteria and site design, source control, and treatment control requirements related to development projects, including streets.

Certain GI discussed in the appendix may not be appropriate for a street classification due to constraints associated with site conditions.

E.1. Site Design GI for Roadways

E.1.1. Descriptions of GI for Rural Swale System Roadway Classifications

Rural swale systems are a combination of street design elements that allow for surface drainage while simultaneously protecting the roadway edge, organizing parking and allowing for driveway access (see BASMAA, 1999). A section of a typical rural swale system is illustrated in Figure E–1. As shown in the figure, curb and gutter are not required. The street is crowned to direct runoff to shoulders where it is collected into a vegetated swale or gravel shoulder. The rural swale system would be appropriate for Private Street, Rural Local Road, and Rural Collector Road classifications.

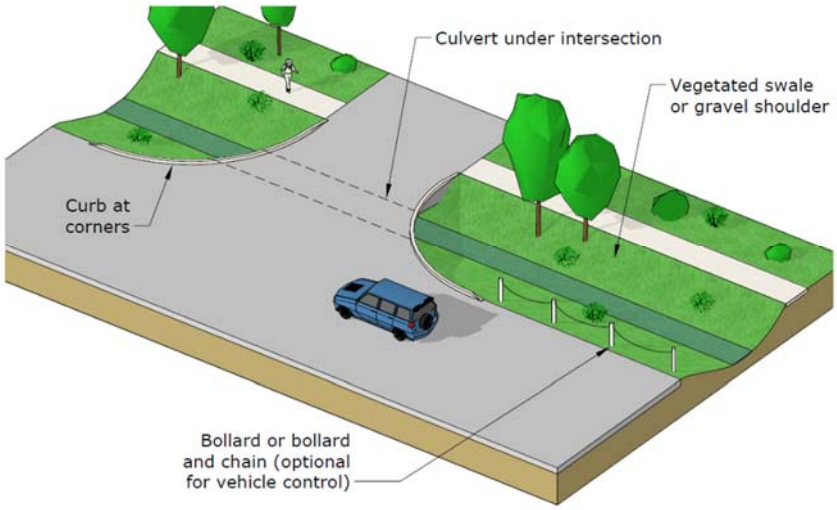

Figure E-1. Rural Swale System Diagram (BASMAA, 1999)

E.1.2. Description of GI for Concave Medians

Conventional medians are normally designed as a convex surface to shed water onto adjacent pavement and into a curb and gutter system. Concave medians reverse this relationship by designing the median to receive runoff. A diagram and section of a typical concave median is shown in Figure E–2

The landscaped median can be designed as a landscaped swale or biofilter to treat runoff. Catch basin and underground storm drain systems may be required for over flows depending on the infiltration conditions and the duration that water is retained (see BASMAA, 1999).

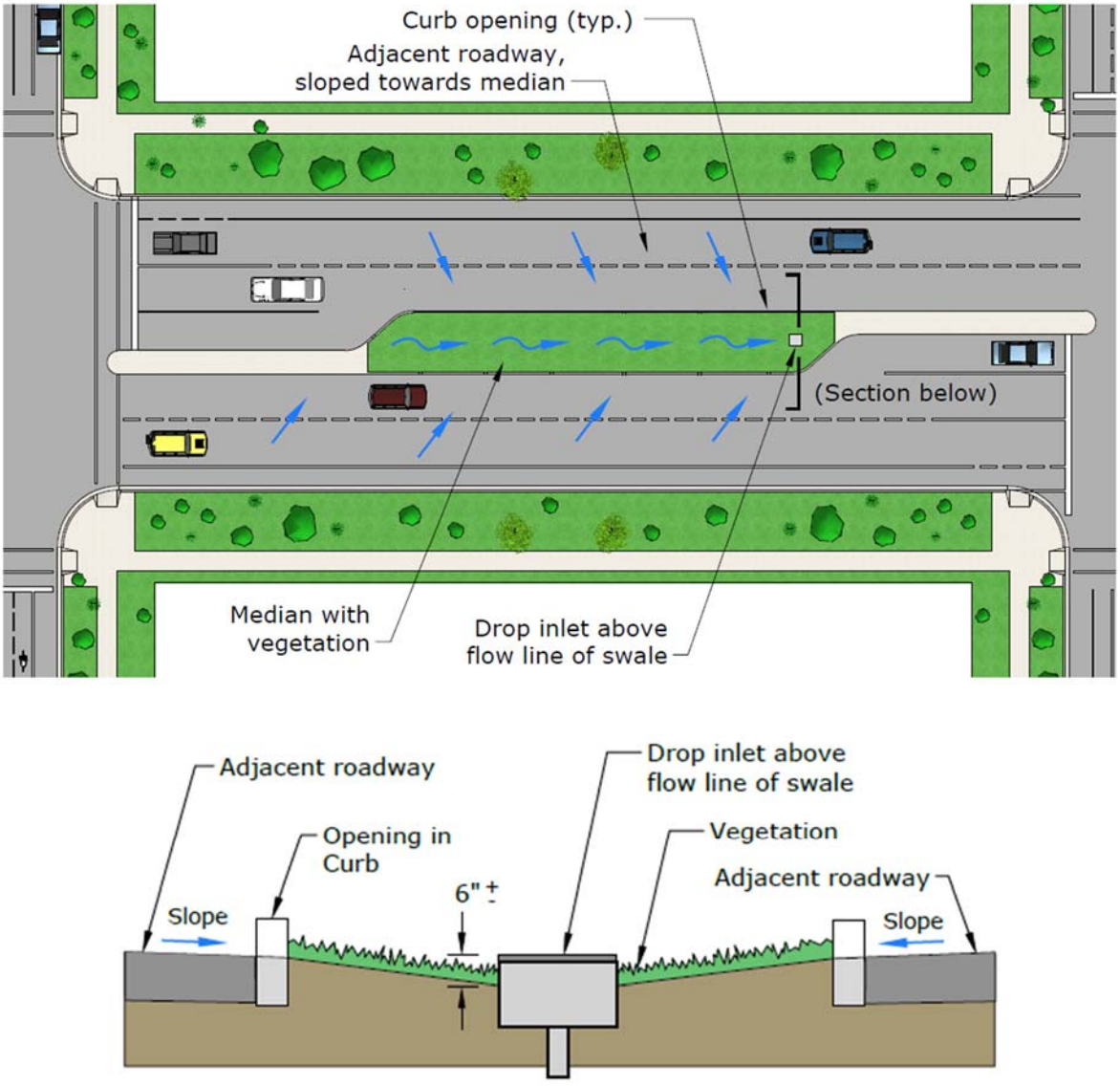

Figure E-2. Concave Median Diagram and Section (BASMAA, 1999)

Note: Conditions, dimensions, and materials shown are typical. Modifications may be required for proper application; consult qualified professional.

E.1.3. Description of GI for Cul-de-Sacs

Typical cul-de-sacs are paved across their entire diameter. This large impervious area adds to environmental degradation by increasing runoff. Adding a landscaped area in the center of the cul-de-sac (see Figure E–3) can reduce impervious land coverage by 30-40 percent, depending on configuration, while maintaining the required turning radius.

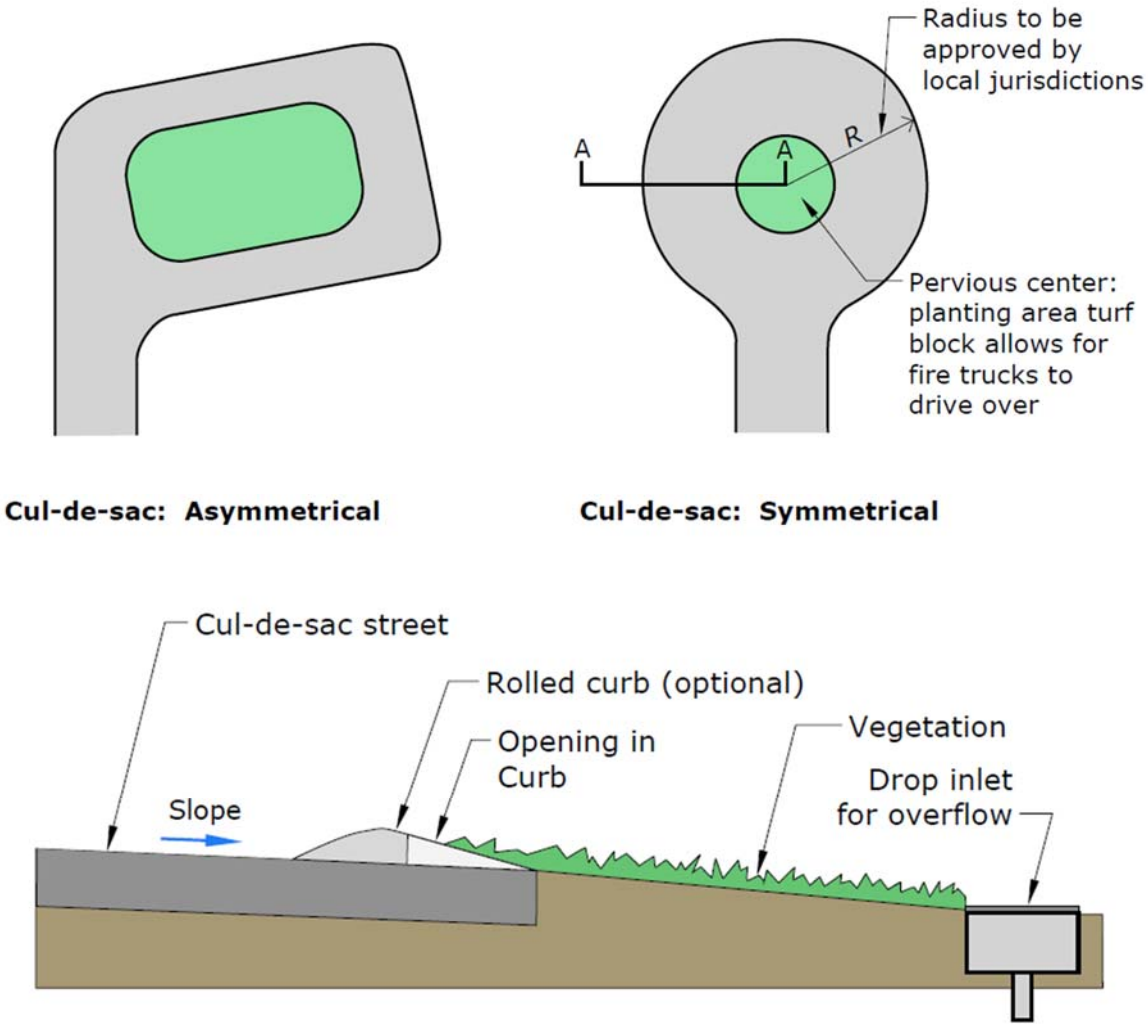

Figure E-3. Cul-de-Sac GI (BASMAA, 1999)

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Appendix F

Transit

The General Plan and the Climate Action Plan require that the City promote and encourage public transit on our streets. The design of all streets that include transit stops, transit routes, or are identified for public transit in the Regional Transportation Plan, need to be coordinated with the San Diego Association of Governments and the San Diego Metropolitan Transit System in order to provide enhancements and improved accessibility for public transit. This may include transit lanes, curb pop-outs or bays at transit stations, median transit lanes or stations, and special designs to combine a transit street with a bikeway.

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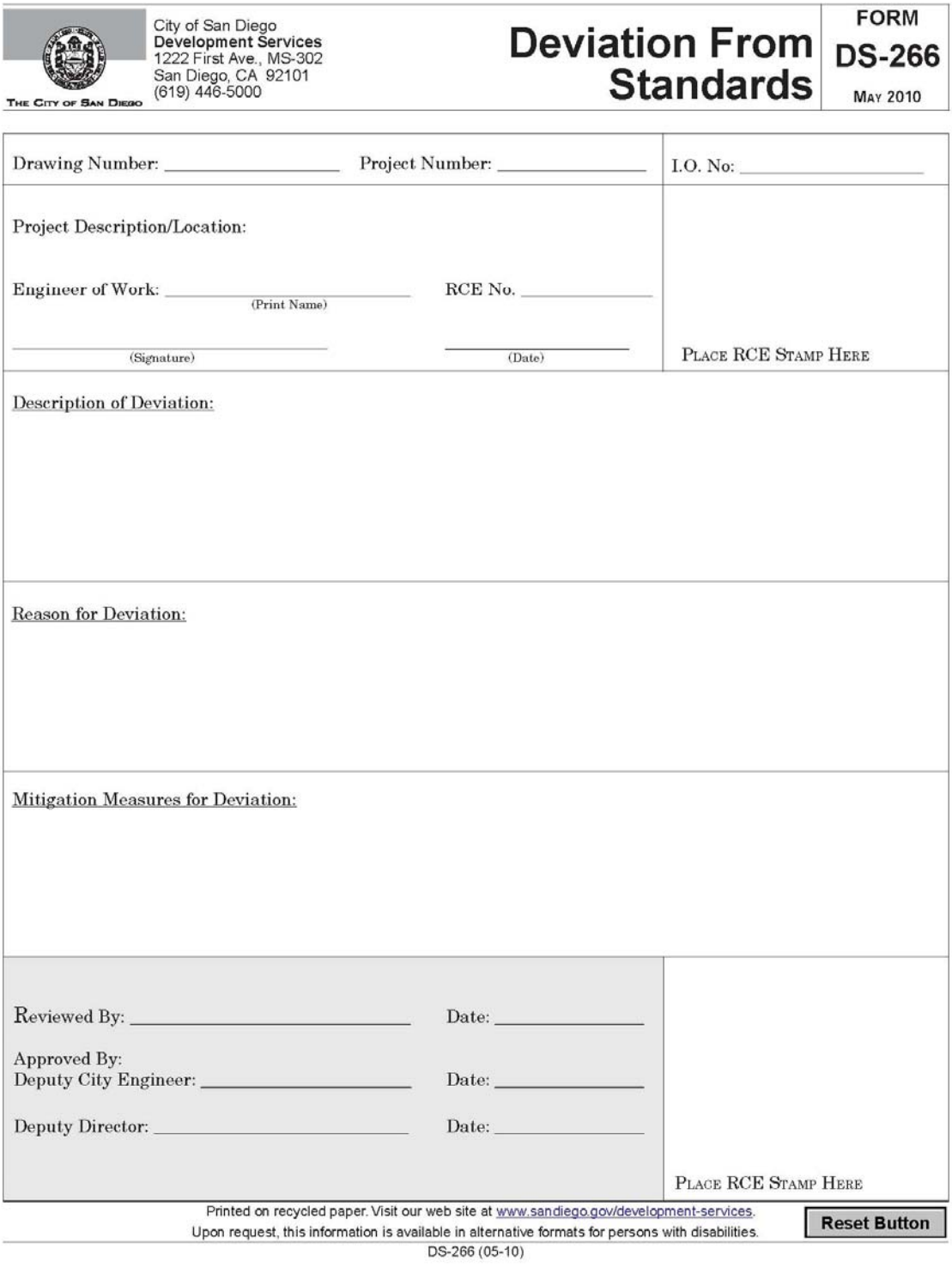
Appendix G

Deviation from Standards Form



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1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Deviation From Standards

FORM
DS-266
MAY 2010

Drawing Number: _____ Project Number: _____ I.O. No: _____

Project Description/Location:

Engineer of Work: _____ (Print Name) RCE No. _____

_____ (Signature) _____ (Date)

PLACE RCE STAMP HERE

Description of Deviation:

Reason for Deviation:

Mitigation Measures for Deviation:

Reviewed By: _____ Date: _____

Approved By:
Deputy City Engineer: _____ Date: _____

Deputy Director: _____ Date: _____

PLACE RCE STAMP HERE

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Reset Button

DS-266 (05-10)

Figure G-1. Deviation from Standards Form

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