Report

Typical Sections

City of
Middleton, WI

December 2006

Report for

City of Middleton, Wisconsin

Typical Sections

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SECTION 1
TYPICAL SECTIONS

1.01 PURPOSE

The City of Middleton seeks to develop a set of standard street cross sections for the design of new and reconstructed streets. The purpose of these standards are: (1) to provide consistency in addressing the mobility needs of transportation system users; (2) to take advantage of the positive impacts that a transportation system can have on providing mobility; and (3) to improve the quality of life for citizens within neighborhoods and commercial areas. Street design has been shown to be a community asset when approached with consideration of adjacent land uses and aesthetic enhancement potential. Roadway rights-of-way need to be considered as public transportation corridors that accommodate cars, trucks (including emergency responders), transit, pedestrians, bicyclists (both recreational and commuter riders), and people that work or live on adjacent properties. Each of these users has different needs:

Transportation User	Needs
Cars	Minimal traffic delays Minimal conflicts
Trucks	Minimal traffic delays Direct routes Wide lanes and large curb radii Loading/unloading accessibility
Transit	Minimal traffic delays Wide lanes and large curb radii Bus stop accessibility
Pedestrians	Traffic buffers Aesthetic surroundings Reduced traffic conflicts Sidewalk system directness and continuity Convenient pedestrian crossings
Bicyclists	Reduced traffic conflicts Direct travel routes Well-connected network of bike routes
Adjacent Land Uses	Direct street accessibility Landscaping On-street parking

The principal national roadway design criteria used by transportation designers are described in the American Association of State Highway and Transportation Officials (AASHTO) publication entitled *A Policy on Geometric Design of Highways and Streets*. This document focuses on rural and high speed highway facility design but also includes design recommendations for urban roadways. The policies set forth by AASHTO provide flexibility in design requirements that in many cases are overlooked by roadway designers. The roadway cross section designs recommended in this report are based on, and are consistent with, the following national transportation engineering and planning association guidelines:

American Association of State Transportation and Highway Officials (AASHTO)
Institute of Transportation Engineers (ITE)
Urban Land Institute (ULI)
Congress for the New Urbanism (CNU)

It becomes a community's prerogative to decide how these guidelines are applied to their street system based on the priorities of different transportation users and quality of life goals set by each community. Street design can affect traffic volumes, roadway safety, noise, pedestrian conflicts, aesthetics, and connectivity. Low-volume, quiet, and low-speed local streets with tree canopies, sidewalks and on-street parking create livable neighborhood atmospheres. Arterial and collector streets with on-street parking, traffic buffers for pedestrians, reduced pedestrian crossing widths, bike lanes, transit shelters, and tree-lined sidewalk terraces can create streets that serve to balance the needs of all users.

1.02 CROSS SECTION CLASSIFICATION

The recommended typical sections have been developed based on functional classification and adjacent land uses. The categories include:

Local Neighborhood Streets

- Low volume with parking on one side (< 500 vpd).
- Low volume with parking on both sides (500 to 1,000 vpd).

Collector Streets

- Residential with parking on both sides (1,000 to 10,000 vpd).
- Commercial/Industrial with parking on both sides (1,000 to 10,000 vpd).

Main Street Commercial Corridor with parallel or angle parking on both sides.

Arterial Streets

- Two lanes with parking on both sides.
- Four lanes undivided without parking.
- Four lanes divided without parking.
- Four lanes divided with parking on both sides.
- Six lanes divided without parking.
- Six lanes divided with parking on both sides.

Schematics of the recommended street cross sections are included in the Appendix at the end of this report.

The following street cross sections are intended to provide templates for the design of new and reconstructed streets in the City of Middleton. Street cross sections are generally described as follows.

A. Local Neighborhood Streets

Local neighborhood streets are intended to provide direct access to adjacent land uses. These streets should be designed for low traffic speeds and volumes to support a comfortable walking, cycling, and living environment. They should have short block lengths (less than 600 feet, as noted in the City's *Traffic Impact Analysis Guidelines*) to create connectivity and minimize the need for traffic to focus on one or two streets. Short blocks also create a better walking environment by providing numerous direct routes through a neighborhood. Individual driveways are the norm along local neighborhood streets except in higher density multifamily housing areas where shared driveways are recommended.

Use of the low volume cross section with on-street parking on one side only is applicable to areas with less than four residential dwelling units per acre, more than one street connection for

redundant emergency responder access, and alternative parallel routes to balance area street system traffic demand. The most common neighborhood street design cross section is for low-volume traffic conditions with parking on both sides. Densities along these streets should be four or more dwelling units per acre with sufficient garage and driveway parking space to permit on-site parking of three vehicles per unit.

B. Collector Streets

Collector streets are divided into residential and commercial/industrial classifications. Either of these collector classifications may carry transit routes.

Residential collectors serve as primary access routes into neighborhoods and retain the characteristic low speeds and pedestrian and driveway activity that occurs on local neighborhood streets. As collectors, these streets will normally exhibit higher traffic volumes than local neighborhood streets. There is a tendency for traffic to speed on these facilities because drivers want to access the higher speed arterial street system. For this reason, residential collectors should be posted at 25 mph and be constructed with traffic-calming slow points such as center islands, traffic circles with narrowing, or gateway treatments at connections to the arterial street system.

Commercial/industrial collector streets are intended to provide land access to manufacturing and related land uses that generate daily trucking and delivery vehicle activity. Traffic volumes on commercial/industrial collectors are typically lower than found on residential collectors. Corner radii should be bigger on commercial/industrial collectors with these facilities designed for posted speed limits of 35 mph. The adjacent land uses should provide adequate off-street parking. On-street parking is typically provided for short-term parking and deliveries that occur after normal business hours. Numerous driveway conflicts and pedestrian activity on commercial/industrial collectors is typically much less than expected on residential collectors. Where possible, driveways should be shared along these streets with sufficient off-street parking provided for truck loading/unloading, service vehicles, and customer and employee vehicles. Commercial/industrial collectors should have direct access to the arterial street system but they should not run through residential areas.

C. Main Street Commercial Corridors

Main street corridors are principal destinations and can have adjacent mixed retail, residential, and office land uses. These corridors will typically occur on minor arterial or collector facilities. Main streets are designed to be pedestrian friendly with active on-street parking turnover. As such, sidewalks are wider with building faces located near the street right-of-way. The typical lawn terrace is replaced with an amenity zone for street furniture, trees, planters, and related streetscape treatments. Based on traffic volume levels, main streets should typically be two lanes wide with on-street parking. If traffic volumes exceed 13,000 vpd, consideration may be given to a wider cross section with two lanes plus a two-way left-turn lane and on-street parking or a four-lane cross section if necessary. Corner bump outs or median refuge islands are encouraged to

maximize pedestrian crossing safety on main street roadway segments. Corners with regular truck or transit turning movements normally would not be designed with bump outs. Channelized right-turn lane islands should be discouraged at main street intersections. The posted speed should not exceed 25 mph along these corridors.

When possible, roadway design should consider the use of angle parking to maximize local business accessibility. Angle parking has been shown to double the number of parking stalls compared to parallel parking. ”Back in” angle parking is a relatively new concept but is proving to be easier to perform for drivers (very similar to a parallel parking maneuver) and increases driver visibility of oncoming traffic and bicyclists when exiting a parking stall. The FHWA and WisDOT are very much opposed to angle parking, and in some cases, will not participate in travel lane construction if angle parking is permitted.

D. Arterials

Arterial streets serve numerous functions from carrying high volumes of traffic to providing access to adjacent land uses. With these many demands there are multiple cross sections available to serve different volumes of traffic. A constant with all arterial cross sections in the City of Middleton is recognition of all user needs. All arterial street cross sections should include sidewalks and tree-lined lawn terraces to buffer pedestrians from through traffic. Where adjacent commercial or residential development exists, on-street parking should be provided on all roadways with a posted speed limit of 35 mph or less. Bike lanes should also be included on all City arterials with a posted speed limit of 35 mph or less. When the posted speed limit exceeds 35 mph, off-street bike paths should be constructed and on-street parking should be eliminated.

1.03 SUMMARY

The range of street cross sections shown in this report is intended to recognize the needs of all users and adjacent land uses. The City roadway network provides public transportation corridors for vehicular traffic movement, transit, pedestrians, bicyclists, and adjacent land access. New roadways and reconstruction of existing roadways should be constructed with these needs in mind. The design of specific street projects should consider the following three step process:

1. Define the land use context.
2. Define the transportation context.
3. Define the street type and cross section.

Right-of-way requirements for the construction of new arterial and collector streets should be obtained for the ultimate roadway cross section but consideration should be given to constructing a narrower through lane cross section until traffic demand grows to levels requiring additional through traffic lanes. In some cases, with reconstruction of existing street cross sections, it will be necessary also to identify tradeoffs between different street elements to fit within an existing right-of-way or, when feasible, increase the right-of-way without negatively affecting adjacent land uses.

The recommended typical sections that have been developed consider the land use and transportation context of the various street classifications as it relates to pedestrian and bicyclist needs versus traffic efficiency needs for increased capacity. Providing a high level of service for pedestrian and bicyclist facilities is a priority in land use areas of residential and commercial development. This consideration is applied to the typical sections, even though pedestrian and bicycle volumes will vary along Middleton's streets.

APPENDIX
TYPICAL CROSS SECTIONS

APPENDIX –TYPICAL CROSS SECTIONS

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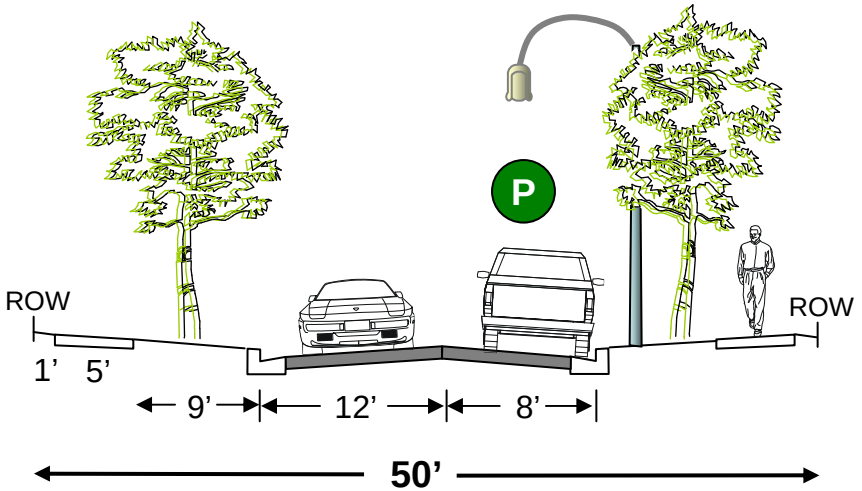
Typical Street Sections (Not to Scale)
Local Neighborhood Streets

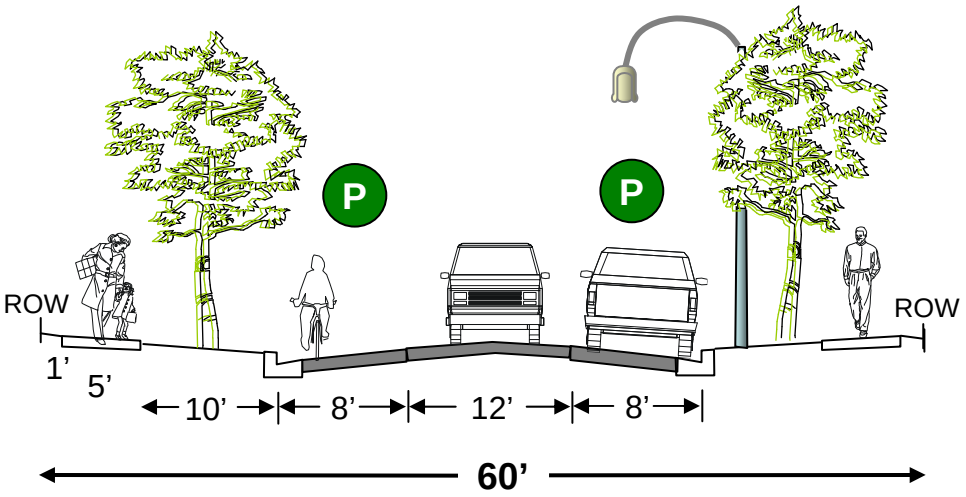
Low Volume Street
20 Foot Wide Roadway
Parking on One Side

- 2-way traffic to share driving lane
- Less than 500 vpd
- Less than 4 units/acre
- Redundant emergency access
- Alternative routes available
- Bike lanes to be added per approved bicycle plan or direction from plan commission (add 10 feet to ROW)



Low Volume Street
28 Foot Wide Roadway
Parking on Two Sides

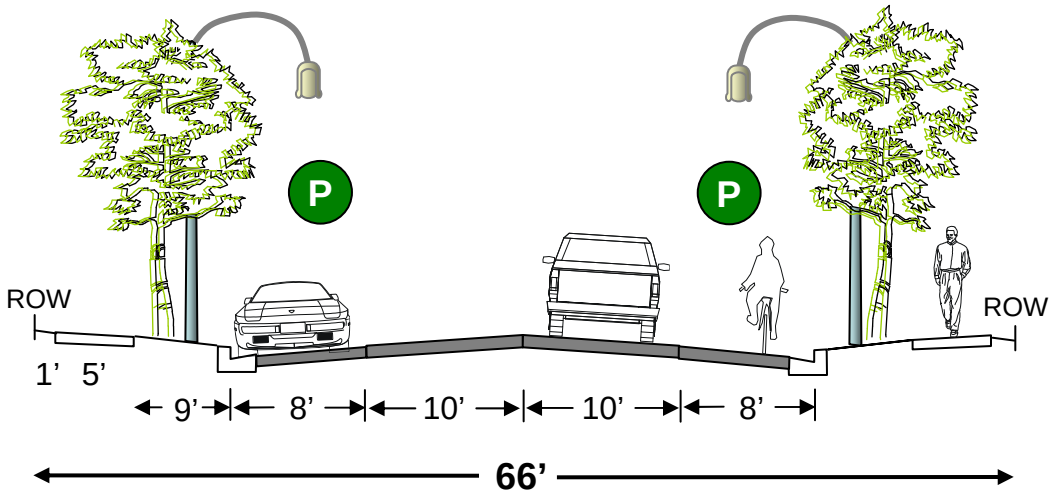
- 2-way traffic to share driving lane
- Typically 500 vpd to 1,000 vpd
- 4 units/acre or more
- On-site parking for at least 3 vehicles/unit
- Bike lanes to be added per approved bicycle plan or direction from plan commission (add 10 feet to ROW)



APPENDIX
Typical Street Sections (Not to Scale)
Collector Streets

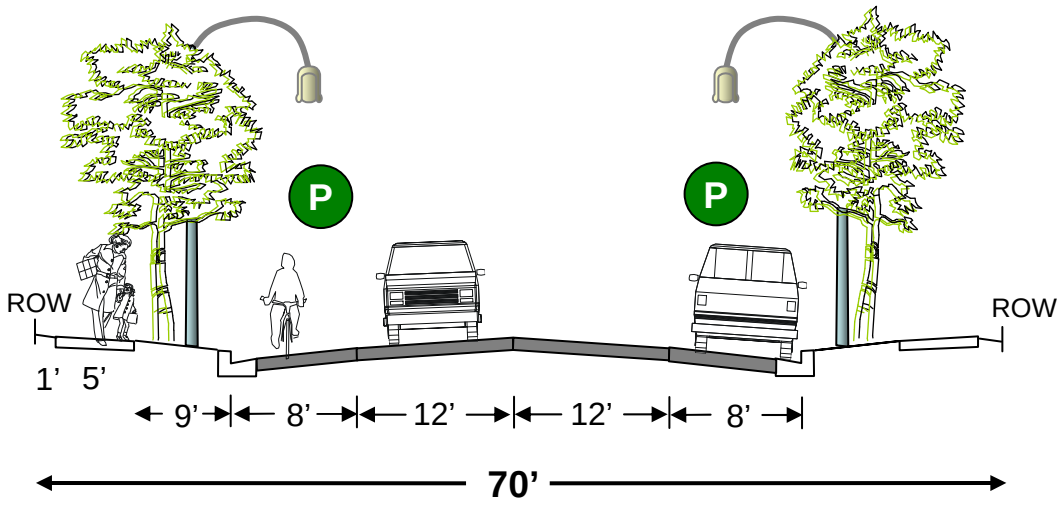
Residential Collector
36 Foot Wide Roadway

- Post at 25 mph
- Typically 1,000 to 10,000 vpd
- Construct with traffic calming slow points
- Bike lanes to be added per approved bicycle plan or direction from plan commission (add 10 feet to ROW)



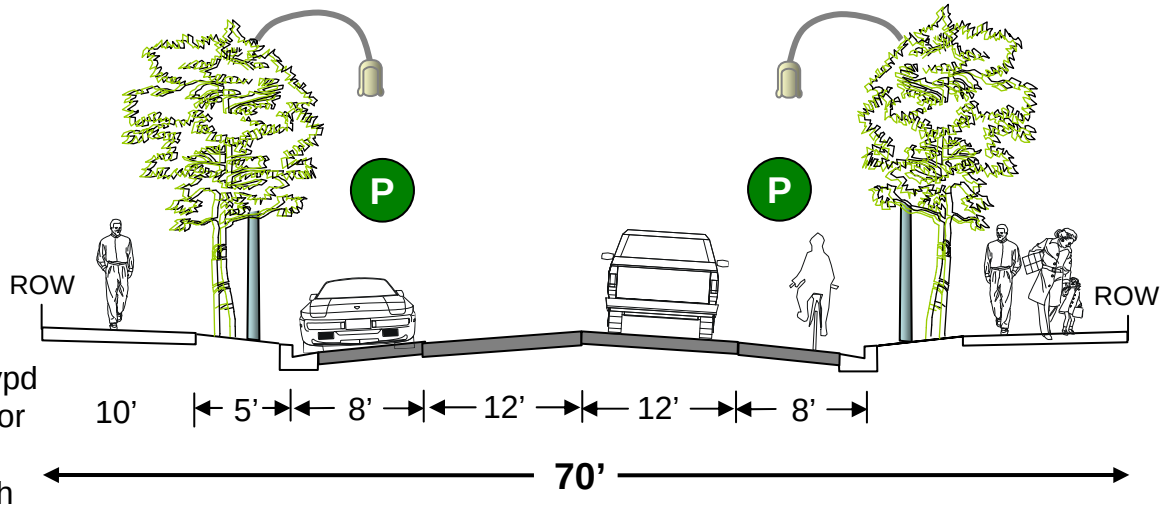
Industrial Collector
40 Foot Wide Roadway

- Post at 35 mph
- Typically 1,000 to 10,000 vpd
- Provide large corner radii
- Provide shared driveways
- Provide parking on site
- Bike lanes to be added per approved bicycle plan or direction from plan commission (add 10 feet to ROW)



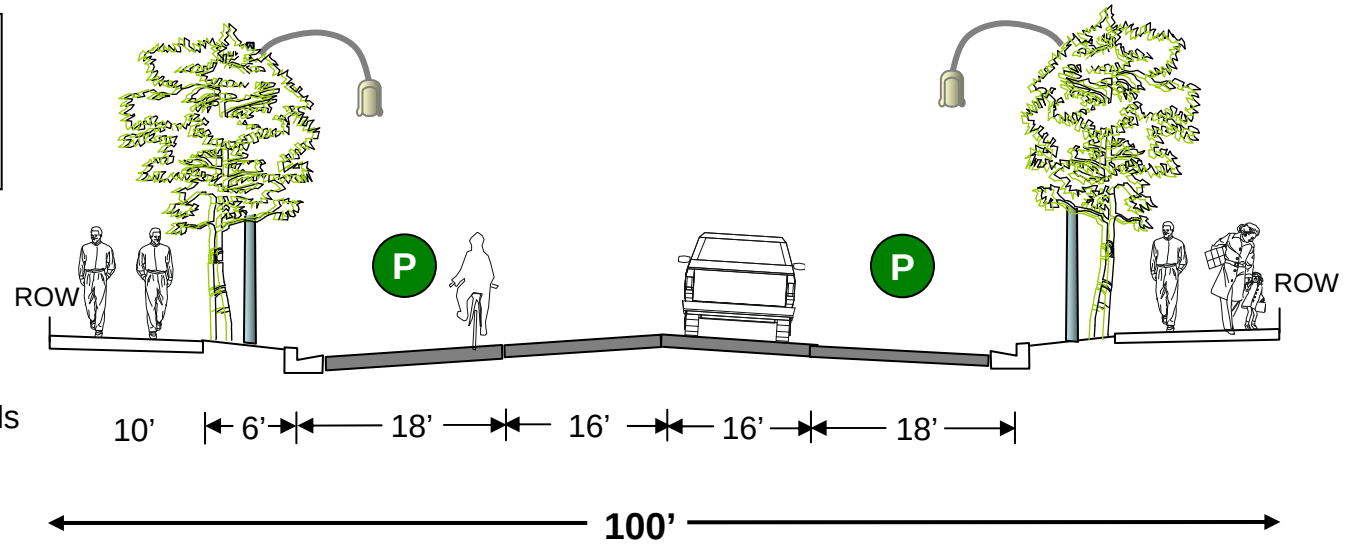
APPENDIX
Typical Street Sections (Not to Scale)
Main Streets

Main Street
40 Foot Wide Roadway
Commercial Corridor



- Post at 25 mph
- Building faces near right-of-way
- Active on-street parking turnover
- Wide terracesfor amenities
- See text of report if volume exceeds 13,000 vpd
- Provide center refuges or corner bump-outs for pedestrian safety
- Provide engineered soil to support tree growth
- Bike lanes to be added per approved bicycle plan, or direction from plan commission (add 10 feet to R/W)

Main Street
68 Foot Wide Roadway
With Angle Parking

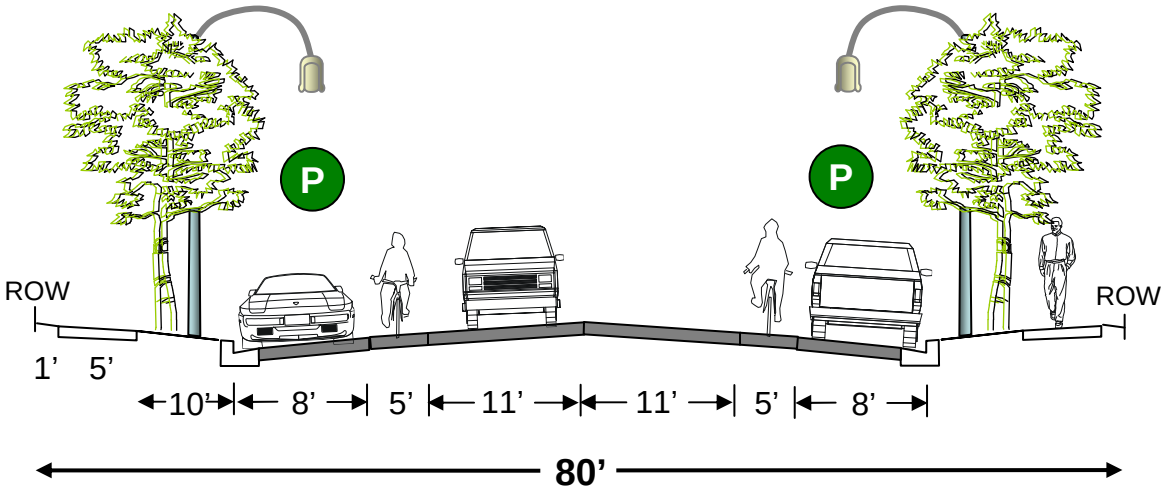


- Post at 25 mph
- Building faces near right-of-way
- Consider back-in angle parking (45 degrees)
- Wide terracesfor amenities
- See text of report if volume exceeds 13,000 vpd
- Provide center refuges or corner bump-outs for pedestrian safety
- Provide engineered soil to support tree growth
- Bike lanes to be added per approved bicycle plan, or direction from plan commission (add 10 feet to R/W)

APPENDIX
Typical Street Sections (Not to Scale)
Arterial Streets

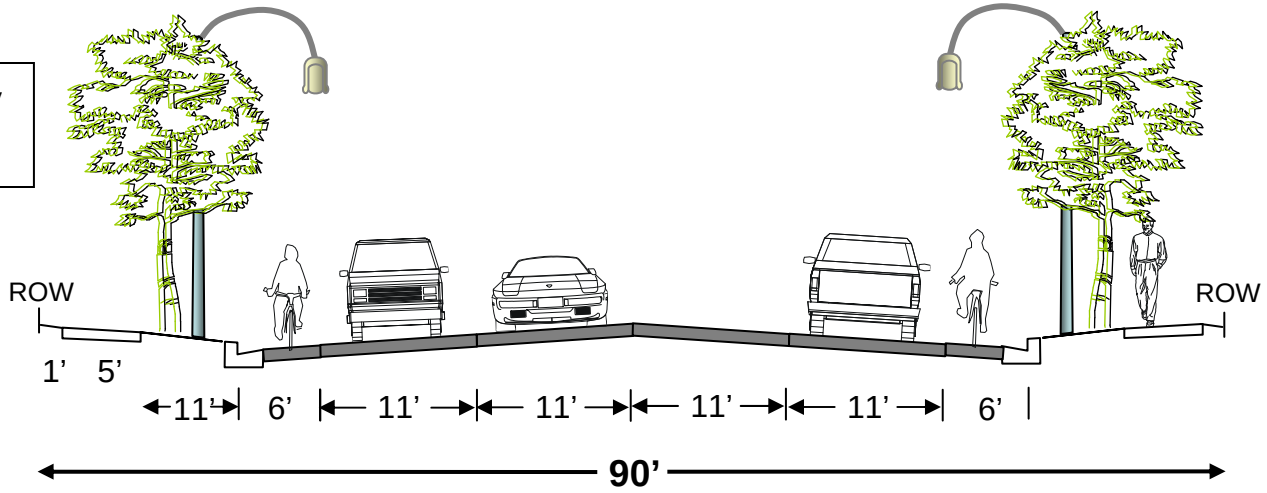
48 Foot Wide Roadway
2-lanes with Parking

- Parking/bike lanes omitted if posted above 35 mph



56 Foot Wide Roadway
4-lanes without Parking

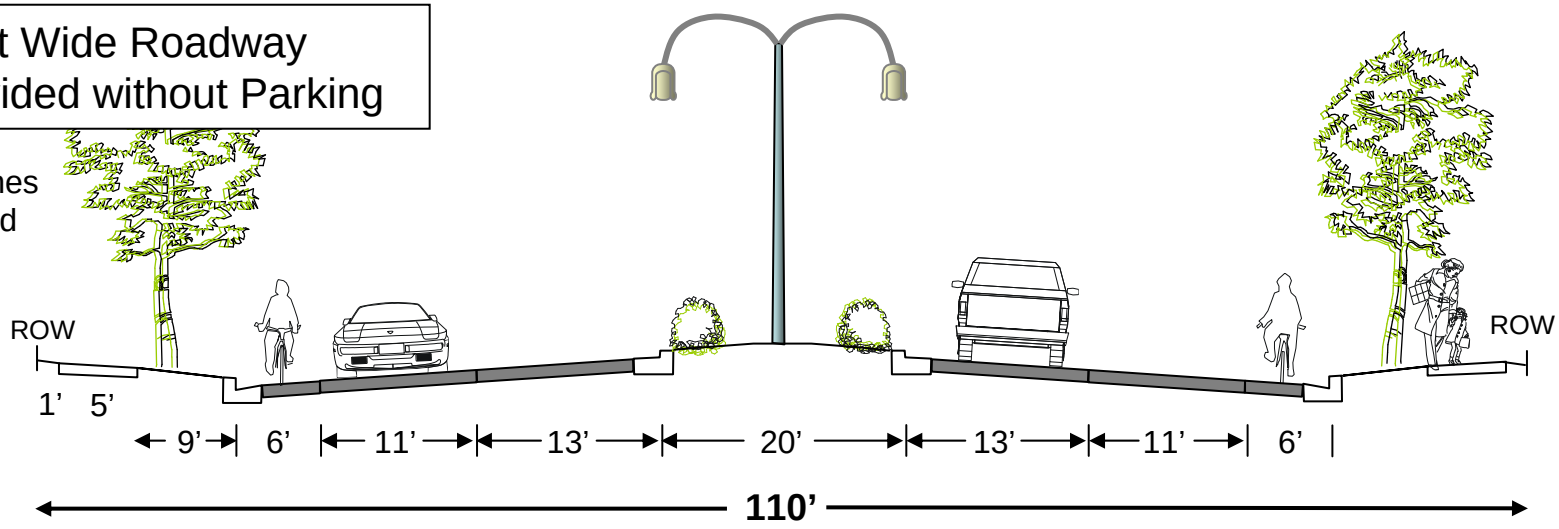
- Parking/bike lanes omitted if posted above 35 mph



APPENDIX
Typical Street Sections (Not to Scale)
Arterial Streets

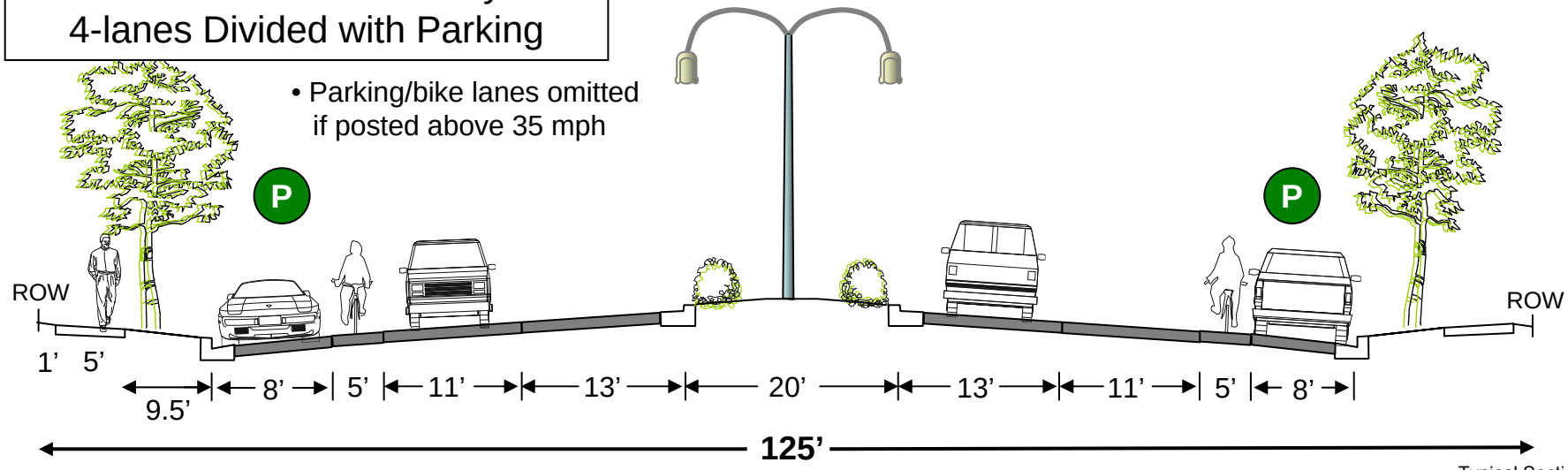
80 Foot Wide Roadway
4-lanes Divided without Parking

- Parking/bike lanes omitted if posted above 35 mph



94 Foot Wide Roadway
4-lanes Divided with Parking

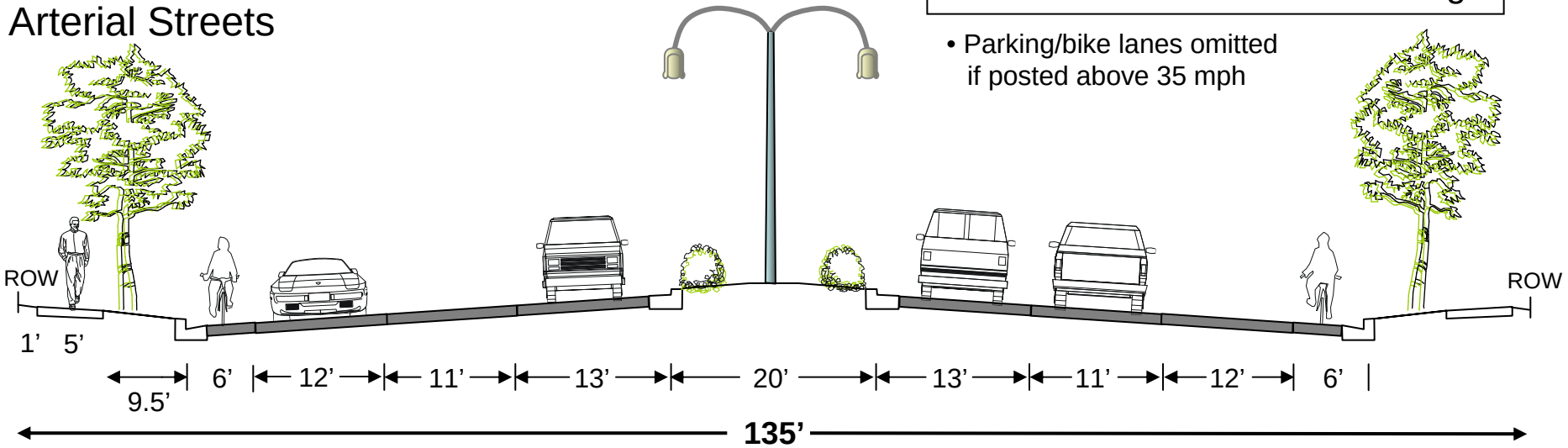
- Parking/bike lanes omitted if posted above 35 mph



APPENDIX
Typical Street Sections (Not to Scale)
Arterial Streets

104 Foot Wide Roadway
6-lanes Divided without Parking

- Parking/bike lanes omitted if posted above 35 mph



116 Foot Wide Roadway
6-lanes Divided with Parking

- Parking/bike lanes omitted if posted above 35 mph