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Guidelines for the Design of Multiple Roadway Boulevards

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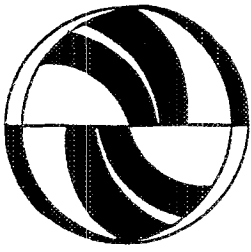
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Authors

Jacobs, Allan B.
Rofe, Yodan Y.
Macdonald, Elizabeth

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**Guidelines for the Design of Multiple
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Allan B Jacobs
Yodan Y Rofé
Elizabeth Macdonald

Reprint
UCTC No 500

The University of California
Transportation Center
University of California
Berkeley, CA 94720

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University of California
Transportation Center

108 Naval Architecture Building
Berkeley, California 94720
Tel. 510/643-7378
FAX: 510/643-5456

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Guidelines for the Design of Multiple Roadway Boulevards

Allan B. Jacobs
Yodan Y. Rofé
Elizabeth Macdonald

Institute of Urban and Regional Development
University of California
Berkeley, CA 94720

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The focus of our concern is a specific type of boulevard, the multiple roadway boulevard, which is designed to separate through traffic from local traffic. It consists of a central roadway, generally at least four lanes wide and used for fast and non-local traffic, and tree-lined medians, access lanes and walkways on either side.

During the 1980s and the early 1990s, several proposals to design multiple roadway boulevards in U.S. cities have fallen victim to objections that they would be unsafe. In particular, the concerns were that traffic and parking lanes would be too narrow and that complicated intersections would be dangerous.

During field research for the book *Great Streets*, we spent considerable time on a variety of boulevards, mostly in Paris and Barcelona. We spent hours at intersections, observing them and the nature of driver and pedestrian movements. To us, the boulevards did not appear to be particularly dangerous. Rather, our overwhelming impression was that people adapted to what was there and did so safely. Most important, these streets were delightful places to be. Pedestrians, local motorists and through traffic all seemed to get along together.

To investigate the safety question further, we studied a number of existing boulevards in the U.S. and Europe. The Esplanade in Chico, Calif., K Street, in Washington, D.C., the Grand Concourse and Ocean Parkway in New York City, Southern Parkway in Louisville, Ky., Avenue Montaigne and Boulevard Courcelles in Paris, and the Paseo de Gracia and the Diagonal in Barcelona.

Our studies included statistical analyses of traffic and accident data on these streets and nearby control streets. We also conducted extensive behavior observations at intersections, counted traffic and turning movements, measured the physical environments and reviewed hours of time-lapse photography.¹

A central finding of our research was that multiple roadway boulevards are not less safe than other major arterials, in fact, they can be safer when they are well designed. To be sure, not all boulevards are safe, and design has a lot to do with that, but the same can be said of any street type.

An essential point about boulevards is that they provide for all uses of the street — access to property, through and local traffic, crossing movements, pedestrian and motorist activity, public transit — in a balanced way. The best boulevards accomplish this by establishing an extended pedestrian realm that includes tree-lined medians, access roads and sidewalks that all function at the pace of pedestrians.

Two other findings are especially significant. If today's engineering standards and norms are followed in matters like lane widths, reductions in conflict points, sight lines at intersections (leading to tree removal) and intersection design, then we can by and large kiss these gracious streets good-bye. Engineering standards have been damaging to existing boulevards and have inhibited the development of new ones.

Second, boulevards do not fit neatly into the prevailing list of functional categories of streets — collector streets, local streets and so on — a doctrine that precisely rules out what boulevards can do so well, mix traffic types. All of this bodes terribly for the Esplanades, Ocean and Eastern Parkways and Avenue Montaignes of the world.

We followed that study with a second, "Multiple Roadway Boulevards: Case Studies and Design Guidelines."² The guidelines, a synopsis of which follow, establish in precise terms what we mean by well-designed boulevards, the essential qualities that make them work well. Our purpose is to advance boulevards as part of an alternative paradigm for the design of city transportation systems, one that maintains access and multi-functionality at all levels of scale and all modes of movement.

Notes

1 For a complete account of our research and findings, see Allan B. Jacobs, Yodan Y. Rofé and Elizabeth Macdonald, "Boulevards: A Study of Safety, Behavior and Usefulness," *IURD Working Paper 625* (Berkeley University of California, Berkeley Institute for Urban and Regional Development, 1994). See also Jacobs, Rofé and Macdonald, "Another Look at Boulevards," *Places* 10:1 (Summer 1995).

2 Jacobs, Rofé and Macdonald, "Multiple Roadway Boulevards: Case Studies and Design Guidelines," *IURD Working Paper 652* (Berkeley University of California, Berkeley, Institute for Urban and Regional Development, 1995). This paper is excerpted from that study.

Both studies cited in this article can be obtained by contacting the Institute for Urban and Regional Development, (510) 642-4874.

Our research involved detailed study and design (or redesign) of six case-study streets, some currently boulevards, others not, that exemplify different contexts appropriate for boulevard design (such as Geary Boulevard in San Francisco for transit and the presently problematic Grand Concourse and Queens Boulevard). We showed alternative designs to local professional officials to hear their concerns and responses and to bring out central issues.

Finally, we formulated 16 guidelines, all of which follow in abbreviated form. They are informed by conclusions from the first study as well as insights gained through the design process itself.

There is an elusiveness to wholeness, particularly in regard to multiple-roadway boulevards. No one or two specific qualities are what make the best boulevards work well or are singularly responsible for increasing or decreasing safety. Rather, it is a combination of characteristics, most having to do with design and some with regulations, working together, that account for the best boulevards.

On narrow side access roads with slow speeds, vehicles approach intersections slowly and carefully, which makes the multiple and complex turning movements at intersections safer. When drivers know that the intersections are complex, they travel more slowly and carefully on side streets and access roads. Slow vehicle movement on access roads encourages pedestrians to stroll along them or jaywalk, which, in turn, causes drivers to proceed more cautiously.

The parts are all interrelated. Isolating individual elements of a boulevard design — such as little or no provision for double parking or delivery vehicles, or trees coming right up to an intersection — as being unsafe and proposing modifications that would presumably make them work better just doesn't work. Mostly, these proposals are likely to be counterproductive in terms

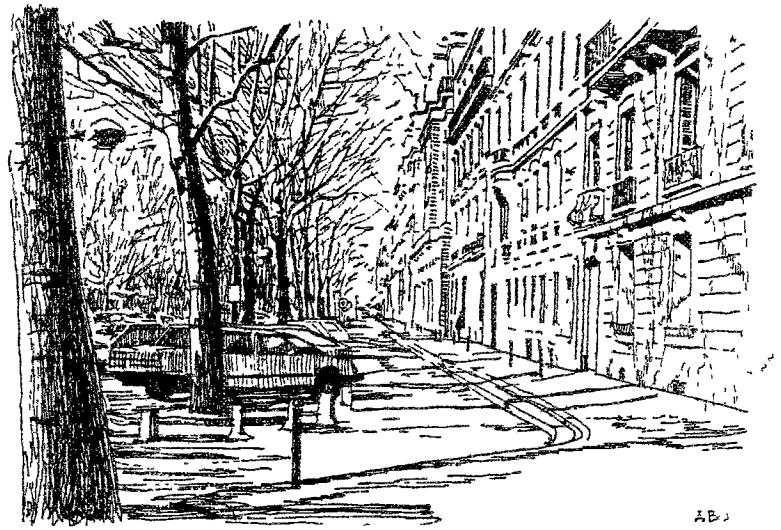
of what has been observed as qualities of the best boulevards. A holistic view is difficult, but essential.

Boulevards are great streets when they are well designed, well built and well maintained. They capture the imagination because they are grand and worldly. They are optimistic statements about the potential and the magic of urban places. Though initially built by strong and unified city governments partly as symbols of power and the establishment of the order of cities over land, they have since evolved beyond their authoritarian origins.

Streets like the Esplanade in Chico, the Paseo de Gracia in Barcelona and Ocean Parkway in Brooklyn also speak of the ordinary day-to-day life of the people inhabiting them. It is the unique balance between the needs of through travel, which reflects the needs of the city as a whole and the needs of automobile and pedestrian access, which reflects the needs of the local community, that has enabled these boulevards to become pleasant settings for everyday life.

The key to making boulevards happen and overcoming the possible conflicts with user groups, professionals, fire marshals, public works directors and many others, is in excellence of design and in understanding and communicating to all involved that the special thing about boulevards is that they cater to many needs and purposes and that they do so in a balanced way. Although boulevards may not meet everyone's expectations all of the time, well designed ones are usually a vast improvement over today's arterial roads, where only the fast-moving automobile's needs are acknowledged and met.

Guidelines

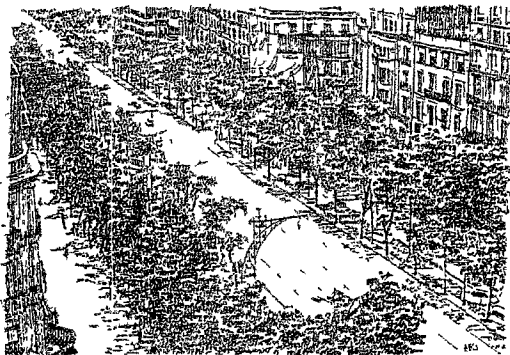


2 Boulevard Courcelles, Paris

1

Location, context and uses of multiple-roadway boulevards

- Where there is a need to carry both through traffic and local traffic
- Streets that, by virtue of size and/or location, are or can become significant elements in the city.
- Where there is a significant amount of traffic (an ADT of about 10,000 seems a reasonable minimum)
- Where abutting uses face the street with direct pedestrian access from the street, or where there is a potential to do so
- Where there is either a significant number of pedestrians that need to cross the street or a potential to do so



1 Paseo de Gracia, Barcelona

2

Boulevards do not make sense where buildings do not face the street

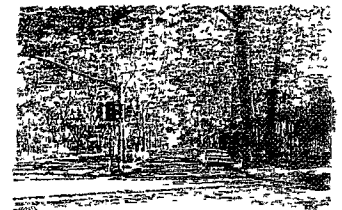
- Wherever possible, buildings on boulevards should face the street and have direct pedestrian access from the sidewalk. A boulevard configuration can help abate the negative impacts of traffic on uses that face a busy traffic artery. On existing arterials, where buildings face away from the street, permitting new buildings to face the street may open new opportunities for conversion of parking lots to more useful development
- Special opportunities exist where boulevards border on parks or if only one side of a street has street-facing buildings

3

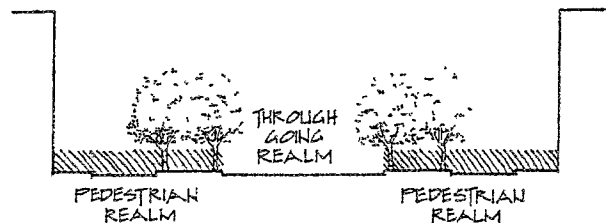
Boulevard realms and overall size

- Boulevards are made up of two realms: the through-going realm and the pedestrian realm
- A minimum of 40 feet is needed for the through lanes
- A right-of-way of 100 feet is the feasible minimum for boulevard design, allowing a central roadway that is 40 feet wide, flanked by 30-foot pedestrian realms on either side
- Right-of-way dimensions of between 125 feet and 210 feet allow more flexibility in the design of a boulevard, especially more generous pedestrian realms
- The establishment of a strong pedestrian realm is of primary importance to the creation of a well-functioning and safe boulevard. On the best boulevards, the total area given to the pedestrian realm is never less than fifty percent of the total width of the right-of-way.

Sketches by Allan B. Jacobs
Diagrams by Elizabeth Macdonald



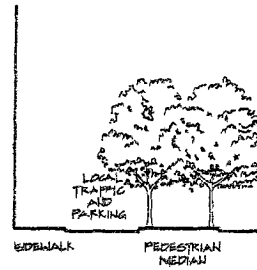
The Esplanade, Chico, Calif



3 Boulevard realms



5 Avenue Montaigne, Paris



Elements of the pedestrian realm

4

The through-going central realm

- A minimum of two lanes in each direction is needed to serve substantial amounts of traffic.
- Parking along the median should be discouraged
- Left-turn lanes can be accommodated in an alternating lane in the center
- If necessary and possible, devote the lane next to the median to public transit. Public transit is best accommodated in the center, to facilitate speed and to accommodate the large vehicle size
- It is advisable to provide a refuge for pedestrians in the center of the boulevard. This can be as little as a wide bollard

5

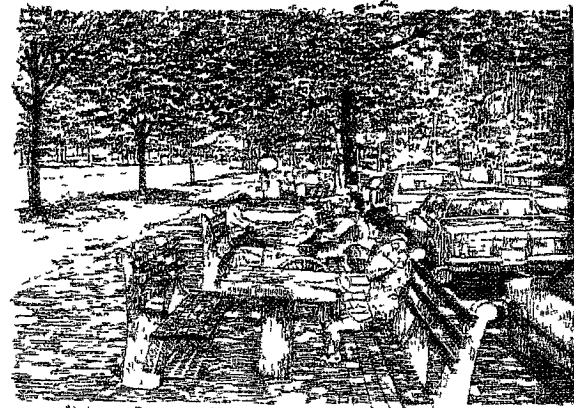
The pedestrian realm

- Sidewalks can be relatively narrow. The access roadway can serve as a spillover area when pedestrian traffic is heavy.
- Lighting scaled for pedestrians can be provided on medians or sidewalks and should be frequent, low in height and warm in color
- Medians can accommodate many amenities, such as transit stops, subway entrances, kiosks, benches, flowers and fountains, all of which encourage crossings between the sidewalk and median.
- A slight rise of the access road from the center realm can help define the pedestrian realm.

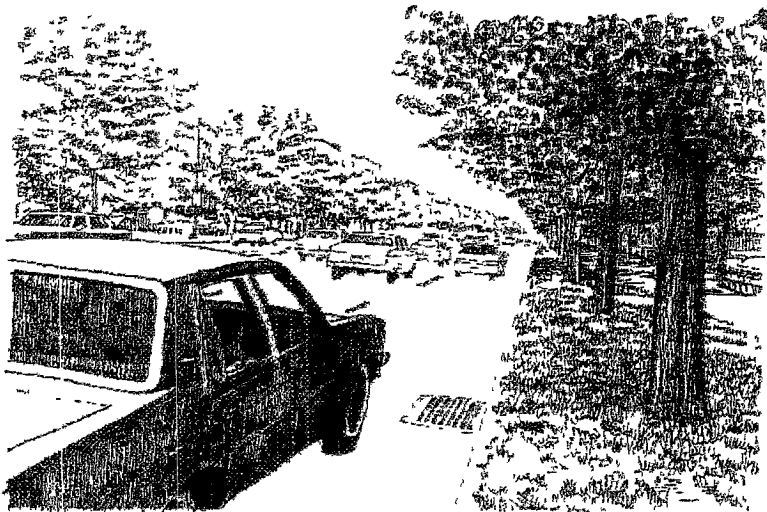
6

Continuous tree-lined medians

- The median can be a minimum of five feet up to a maximum of 40 to 50 feet. It must be wide enough to accommodate a lane of closely spaced, fairly large trees.
- The most important element in the median is the line of trees: one or two rows, closely spaced, uninterrupted and reading all the way to the intersection
- Bus or streetcar stops should be on the median.
- Many elements can enliven medians.
- Medians can be paved or not paved
- Regularly spaced and frequent benches are important.



6 Ocean Parkway, Brooklyn



4 Ocean Parkway, Brooklyn



7 Cours Mirabeau, Aix-en-Provence



9

7

Rows of trees and tree spacing

- It is important that the trees be closely spaced and that they continue all the way to the intersection, with a maximum preferred spacing of 25 feet. A minimum spacing of 12 feet is possible.
- Deciduous trees are preferable; they give shade in the summer yet allow sun into the street in the winter.
- Trees with dense foliage below eye level should not be used.
- The arrangement of trees depends largely on the width of the median. Many patterns are possible, but the continuous line is necessary.

8

Public transport

- The lane next to the median is the best location and may be considered as a dedicated public transport lane where there is strong usage.
- Light rail can run in the curb lane of the center roadway or on the median.
- Stops on the medians will encourage pedestrian use of the medians and will encourage other useful amenities on it.
- If a subway system exists, medians are good locations for entrances.

9

Parking

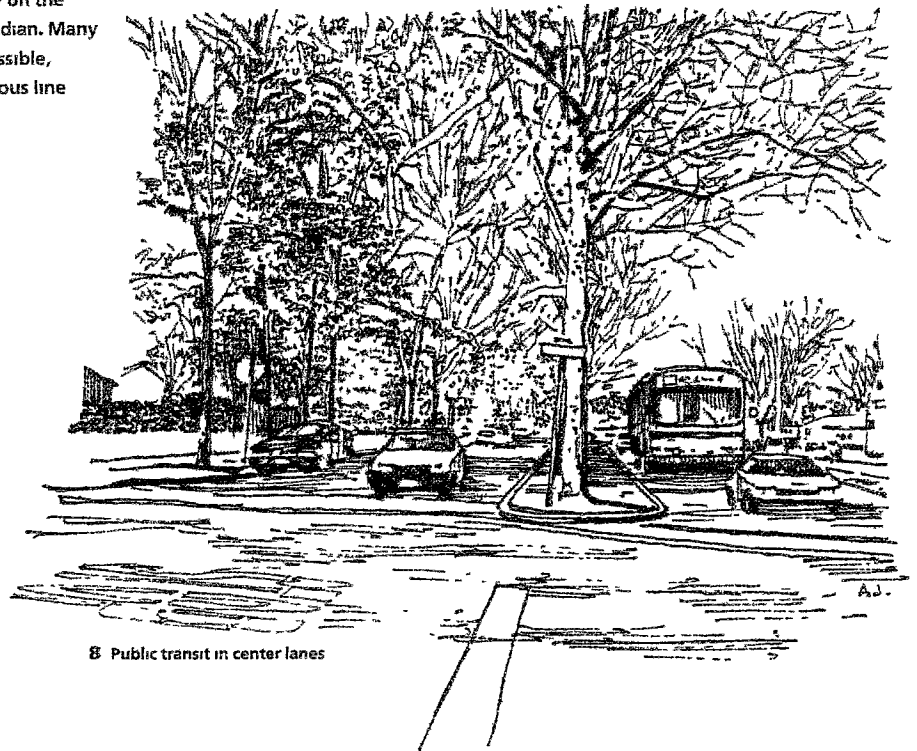
- Access roads can include one or two rows of parallel parking.
- Parking lanes should be narrow, six or seven feet is possible and eight or nine feet is the maximum.
- An angled parking lane can be incorporated into a wide median.
- If more parking is needed, it can be provided by lineal underground parking garages beneath the central roadway, with entry and egress from the access road.

10

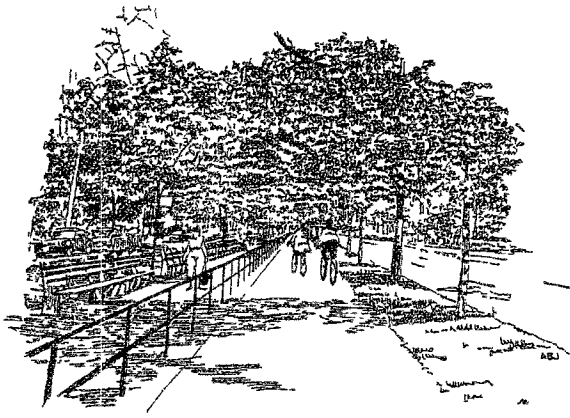
Lane widths

- It is more difficult to achieve the definition of the pedestrian realm when lanes are wide (12 feet and 13 feet) on the access roads.

Access Roadway	MIN	MAX
Parking Lane	6'	9'
Inside Lane	7'	11'
Center Thoroughway	MIN	MAX
Curb Lane	9'	13'
Inside Lane	8'	12'
Left-turn Lane	8'	12'



8 Public transit in center lanes



11 Ocean Parkway, Brooklyn

11

Bicycle lanes

- Local bike traffic can easily be incorporated on the access lanes within the pedestrian realm.
- Cyclists will use the realm much like pedestrians, with disregard to the direction of movement, and will do so safely
- Designated bicycle lanes for faster-moving cyclists can be incorporated into a designated path, or as the first lane in the center roadway next to the median

12

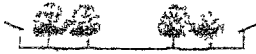
Distribution of pedestrian space between sidewalk and median

- It is better for sidewalks to be slightly congested with pedestrian traffic to appear empty
- If space is limited, consider making the sidewalk narrow and the median wide, making it function more as a linear park while keeping the sidewalks alive with people
- A closely spaced line of trees on the sidewalk can reinforce the difference between the center and the sides by creating a canopy enclosure above the access roadway

12



Narrow access road, wide median

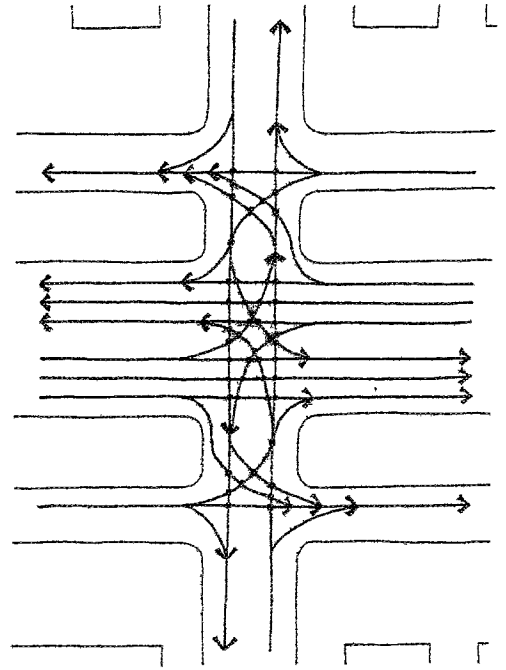


Wide access road, narrow median

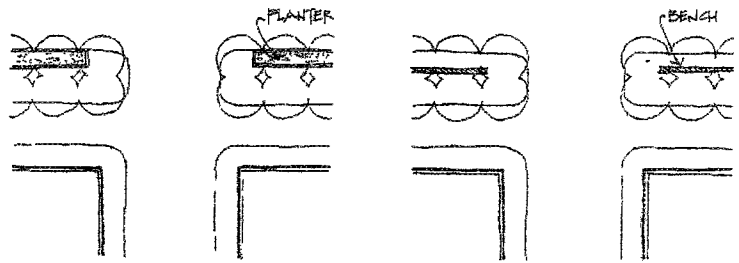
13

Intersection design

- All turning and weaving movements can be allowed at intersections unless there is a compelling reason to do otherwise
- Priority is given first to center through traffic, then to crossing traffic, then to movement on the access road
- Turning radii are determined primarily to allow pedestrians ease in crossing intersections.
- The most straightforward intersection arrangement is straight medians that extend more or less as far into the intersection as the edge of the sidewalk
- Access roads may be designed to return to the central roadway immediately before and after the intersection



13 Turning movements and conflict points at a boulevard intersection

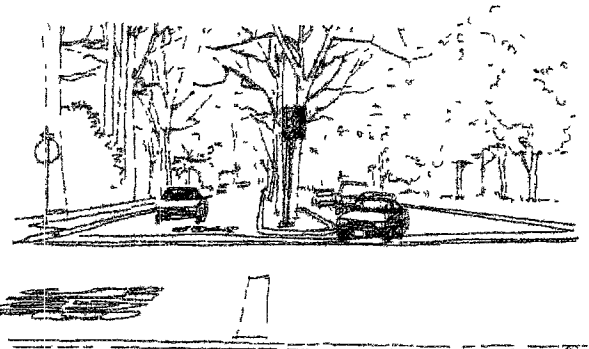


15 Locations for planters and benches in the median

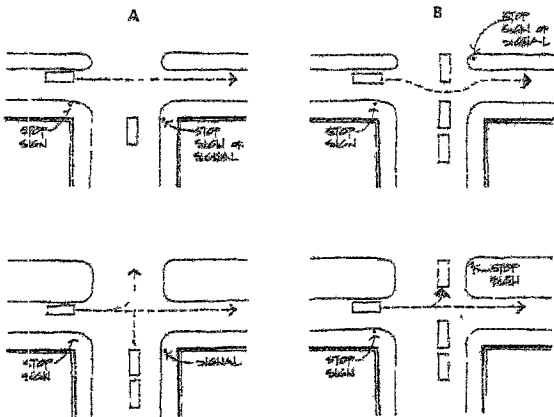
14

Traffic controls

- As a rule, through traffic on the center roadway is given first priority. Through traffic is uncontrolled or controlled with traffic lights.
- At unsignalized intersections, both the cross-street and accessway will be controlled by stop signs, so that while traffic coming from the center roadway can proceed without stopping, traffic on cross streets and accessways must be sure the route is clear before proceeding
- On boulevards with narrow medians, the stop sign or signal controlling the cross-street may be located at the sidewalk or at the median. When control is at the sidewalk, the accessway will remain clear of waiting cars



Traffic or signalled through-going lanes has priority over traffic on signed access lanes



14 Sign or signal controls for traffic on cross-streets can be located on the sidewalk where it intersects the median (A), or on the medians themselves (B). If they are on the medians, traffic on the access lanes must be sure the route is clear before proceeding as shown in the lower diagrams

15

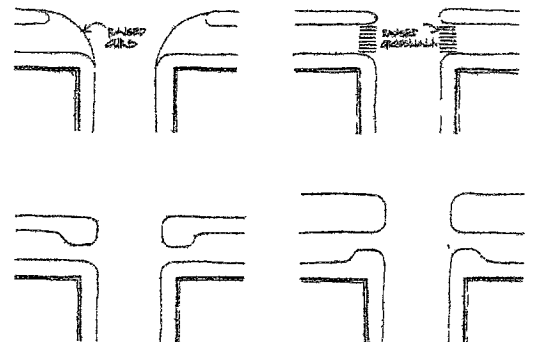
Benches and planters on the median discourage mid-block crossings

- If blocks are long, run benches or planters without interruption between intersections on the side of the median closer to the central roadway
- Plants must be tall enough and dense enough to discourage walking through them
- When raised planting beds are used, their walls can double as seating spaces

16

Differentiating the roadways

- Methods employ the basic principle of establishing a strong boundary to the pedestrian realm by requiring cars to move slowly as they move into it
- A slight rise (about one inch) at the entrance to the accessway increases the definition of the pedestrian realm, as can a change in paving
- Raising crosswalks marks them more strongly



16 Strategies for differentiating the pedestrian realm