TEXAS TRANSPORTATION INSTITUTE
THE TEXAS A&M UNIVERSITY SYSTEM

Project Report 4365-2
Project 0-4365: Urban Intersection Design Guidance

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Summary of Issues in Intersection Design

Intersections are an important part of a highway facility because the efficiency, safety, speed, cost of operation, and capacity of the facility depend on the intersection design to a great extent. Each intersection involves through- or cross-traffic movements on one or more of the highways and may involve turning movements between these highways. Such movements may be facilitated by various geometric designs and traffic controls, depending on the type of intersection.

Designers need current information regarding intersection design in an easily accessible and user-friendly format in order to design intersections that are both functional and effective.

The prime objective of TxDOT Project 0-4365 is to produce a reference document, the *Intersection Design Guide*, which will provide TxDOT and other interested parties with useful and practical information on operations and design for intersections.

Phase One Activities

The project is a three-year effort and is structured into two phases. Phase I took place during the initial 12 months of the project, and this report summarizes the first-year activities. During Phase I, researchers focused on gaining an understanding of the myriad of transportation-related issues associated with intersections through one-on-one interviews, focus groups, and a review of current references available regarding intersections. These material and literature reviews were used to develop a draft of the *Guide*.

Major Issues and Findings

The major issues found in the focus groups and interviews covered various aspects of design, construction, and operations. These issues were widely held to be concerns for both designers and engineers developing urban intersection designs. The findings from the focus groups and interviews were used to refine the *Guide's*

outline. Following are the chapters to be included in the *Guide*:

1 – Intersection Function

2 – Design Control and Criteria

3 – Design Elements

4 – Cross Section

5 – Roadside

6 – Drainage

7 – Street Crossing

8 – Signals

9 – Markings

10 – Signs

11 – Influences from Other Intersections

The findings will also be considered as sections are developed for the *Guide*. Key findings from the Phase I activities are listed below, and examples are included in Table 1.

- Compliance with Americans with Disabilities Act (ADA) requirements and the conflict between those requirements and other design elements were concerns of many of the engineers and designers contacted. Designers reported conflicts between the desirable locations for pedestrian crosswalks (and attendant curb ramps) and signal poles, curb inlets, controller cabinets, etc. This conflict is indicative of the generally restricted amount of room available in the immediate area of urban intersections.
- The availability of right-of-way (ROW) to accommodate urban intersection requirements was another issue that concerned many of those contacted. Conflicts with existing utilities found during construction were commonly cited as a concern in the placement of traffic signal poles. Difficulty in obtaining sufficient ROW and satisfying future needs at intersections was also a major concern.
- Traffic control devices were cited as concerns, with wide-ranging issues related to their selection, placement, and operation. Interactions with intersection layout, together with concerns about traffic signal operations, were frequently cited.
- How to effectively remove water from the intersection while satisfying other intersection needs was frequently mentioned.
- Intersection layout issues also received a considerable amount of discussion. The use of turn lanes was a particular concern for urban intersections, with a variety of operational and design practices discussed.

Recommendations for Future Tasks

Designers could use real-world examples of intersection designs to assist with the designing of future intersections. The second phase of the project will include identifying examples for the design and operation of intersections, developing refinement of the guidelines, and conducting field studies (as selected by the Project Advisory Committee). This work will occur during the second and third years of the project.

Disclaimer

The contents of this report reflect the views of the authors, who are solely responsible for the facts and accuracy of the data, the opinions, and the conclusions presented herein. The contents do not necessarily reflect the official view or policies of the Texas Department of Transportation or the Federal Highway Administration. This report does not constitute a standard or regulation, and its contents are not intended for construction, bidding, or permit purposes. This report was prepared by Kay Fitzpatrick (TX-86762), Angelia H. Parham (TX-87210), and Mark D. Wooldridge (TX-65791).

Table 1. Examples of Major Issues

	**Signals:** hardware placement, pedestrian ramps and crossings, storage, right-turn lanes, where to place signal heads, design of islands, etc.
	**Design:** median design, appropriate sight distance, left-turn bay designs, curb returns, driveway design, distance to railroad tracks, etc.
	**ADA:** conflicts among curb ramps, sidewalks, and other roadway features, etc.

Drainage: how to keep curb ramps clean and water (or mud) from collecting at the bottom, and how best to drain water near an intersection

ROW: determination of and obtaining adequate ROW at intersections (What if you need to widen the roadway?)

For More Details . . .

Related Reports
Report 4365-1, Issues to Consider in Developing an *Intersection Design Guide*

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