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EFFECTS OF HIGHWAY BYPASSES ON RURAL COMMUNITIES AND SMALL URBAN AREAS

This RRD is a staff digest of a study conducted as part of NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems," for which the Transportation Research Board is the agency conducting the research. The Principal Investigator responsible for this project is Sally D. Liff, Manager, Synthesis Studies, serving under the Studies and Information Services Division of the Board. Dr. Jesse Buffington and Ms. Katie Womack, of the Texas Transportation Institute were responsible for data collection, initial analyses and report preparation. Dr. Andrew C. Lemer conducted additional analyses and prepared the final text.

INTRODUCTION

In the late fall of 1964, a new highway bypass around Cherokee, Iowa (1990 population 6,026) opened to traffic. Local business people had actively opposed the construction, fearing that traffic diverted from the main route through town would take sales with it. Just over two decades later, the former owner of a clothing store in Cherokee echoed the views of many others in the town when he concluded that he and others had over-reacted: the bypass did not hurt retail sales. Considering the reduced traffic and accidents experienced along the through route since the bypass was opened, one citizen of Cherokee termed the bypass a "godsend." *(1)*.

In Littlefield, Texas (1990 population 6,489) opinion remained divided on that town's bypass, opened the same year as Cherokee's. Despite a nationally recognized downtown revitalization effort and attempts to capitalize on the town's distinction as the birthplace of country music star Waylon Jennings, service stations, restaurants, and grocery stores in Littlefield closed. Business shifted to a new shopping center on the bypass, where a new residential area also was developed *(2)*.

For much of the 20th Century, the U.S. highway network has grown and evolved, and throughout much of that evolution the issues of highway bypasses have challenged decision makers. Transportation planners seek to improve transportation system efficiency by constructing bypasses, while people in the towns to be bypassed protest the diversion of traffic that some view as their source of livelihood. Such issues are particularly acute in rural communities and small urban areas, where highway oriented development may account for a substantial proportion of the local economy.

RESEARCH OBJECTIVES AND SCOPE

The purpose of this synthesis project was to review the state of knowledge about (a) the impacts of highway bypasses on rural communities and urban areas of less than 50,000 population and (b) current practices in using that knowledge in the planning of bypass development. To the extent that the potential impacts of a bypass can be foreseen, it may be possible to mitigate adverse consequences that the bypass may entail.

Defining the Term

As the term is generally used, a bypass highway—also referred to as a highway bypass or simply a "bypass"—is meaningful only within the context of a

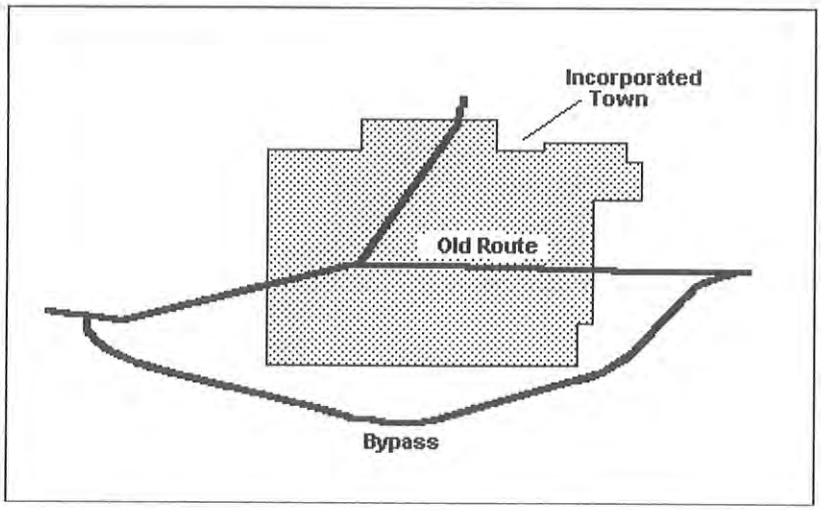

Figure 1. Typical configuration of a bypass.

developed area through which a pre-existing road passes. As an older existing route approaches a town, a bypass splits off and passes along the fringe of the town to circumvent all or most of the portions of the town that are developed, and then ties back into the older route from which it originated, on the other side of town. *(3)*. (See Figure 1)

There are variations on this usage. The bypass may terminate at a route different from the one at which it originated, although a short bypass segment tying two highways together on the same side of town is usually referred to as a "spur." The new route may not simply bypass the town but actually run for long distances more-or-less parallel to the older highway. The new route may thereby bypass several towns. Some practitioners consider any highway improvement that redirects through traffic off an existing route to avoid the central business district to be a bypass. Regardless of their specific geometry, however, bypasses are associated primarily with smaller areas. *(4)*

Considering Impacts

This project considered the observable impacts of highway bypasses and the procedures used to plan bypasses to achieve the greatest positive impact. In both research and planning, impact estimation and assessment comprise two distinct activities: the former seeks to identify and measure the economic and environmental consequences of developing a bypass, the latter judges whether those consequences are desirable or could be made more so.

State transportation agencies plan and build most bypasses, albeit sometimes in response to local initiatives. They do so for various reasons, e.g., to reduce traffic congestion and accident hazard along the old route, to reduce travel time of through traffic, and to improve environmental conditions within the bypassed area. Many of the objections to bypasses, when they occur, are raised by local businesses, and not without some cause. Anecdotal evidence from towns such as Littlefield and some research studies have indicated that bypasses can indeed have adverse consequences for local businesses, particularly in places with populations below 1,000 people. Researchers have often acknowledged, however, that many complex factors influence local economic activity. It is difficult to draw definitive statistical conclusions. *(2,5,6)* In any case, as the studies of several hundred bypasses reviewed in this project demonstrated (e.g., see Appendices A and B), the estimated impacts of bypasses are broader than business alone.

Study Scope

This project included two principal tasks: (1) A survey questionnaire to all U.S. state and Canadian provincial departments of transportation solicited past studies on the topic and surveyed agency practices regarding planning of bypasses; 47 states and 6 provinces responded. (2) A review of published literature and agency-supplied studies yielded information on issues of concern, research methods, and results of analyses of the impacts of bypasses (e.g., observations of conditions before and after bypass construction). More than

190 publications were reviewed—predominantly products of transportation agency staff or academic researchers mostly funded by transportation agency programs—from North America and Europe, dating from 1950 onward. Many of these before and after studies were funded by the Federal Highway Administration (FHWA). Reflecting the smaller role that bypass construction plays in most agency operations, as compared to the early years of development of the U.S. and Interstate highway systems, fewer than one-fifth of the publications reviewed appeared within the past 10 years. This combination of commentary of agency practitioners and the literature reviewed, as summarized in this digest, provide a representative view of the current understanding of the impacts of bypasses and practices in bypass planning.

IMPACT STUDY DATA AND ANALYSIS METHODS

Nearly 92 percent of the bypassed areas included in the literature review had populations (at the time of the reported analysis) below 20,000 people. The bypass routes were distributed about equally between U.S. Interstate (or Canadian equivalent) and U.S. primary, state, or other route systems not necessarily designed to Interstate highway standards.

The average length of bypasses for which case study information was available was nearly six miles, and the distance between the old and new routes averaged just more than 1.3 miles. Most of the old through routes were two-lane roads, while bypasses typically had four lanes. At the time of study, i.e., some years after the bypasses opened to traffic, researchers found that average daily traffic (ADT) levels on the older routes had declined, on average, by approximately 50 to 70 percent.

Reasons for Bypasses

Table 1 summarizes the reasons cited in reviewed reports for constructing bypasses. The frequency with which these reasons are cited differs somewhat from transportation agency responses to the survey administered as part of this study. Safety issues, in particular, accounted for approximately 22 percent of the reasons agencies cited for building bypasses, while congestion and related issues accounted for 42 percent of reasons cited.

The reasons cited for building bypasses provide the initial framework for assessing the impacts of those bypasses, in terms of whether they fulfilled their purposes. Other impacts may be considered as well, however, and could be more significant to the community where the bypass is constructed, e.g., changes in economic conditions. Responses to the survey of highway agencies indicated that economic issues accounted for some 43 percent of the reasons for concern raised by communities where bypasses were considered.

TABLE 1 Reasons for constructing bypasses, as a percentage of all reasons cited

Reasons cited	Frequency of citing (percent)
Relief of traffic congestion in the bypassed community	54
Rerouting of traffic	27
Noise reduction	5
Traffic safety improvement	4
Enhance access to tourism resources or "downtown"	8

Data Sources

The principal types of data collected for impact studies, as cited in the literature, indicate this emphasis on business conditions. Table 2 lists these principal types of data. Data for bypass impact studies typically are gathered primarily from standard sources such as the U.S. Census, state economic development agency

TABLE 2 Typical bypass impact study areas

Types of data collected for impact assessment	Frequency of citing (percent)
Population	100
Business levels (e.g., sales)	93
Land use	65
Land value	46
Employment	32
Traffic	52
Environmental conditions	4
Financial resources (e.g., project cost)	5

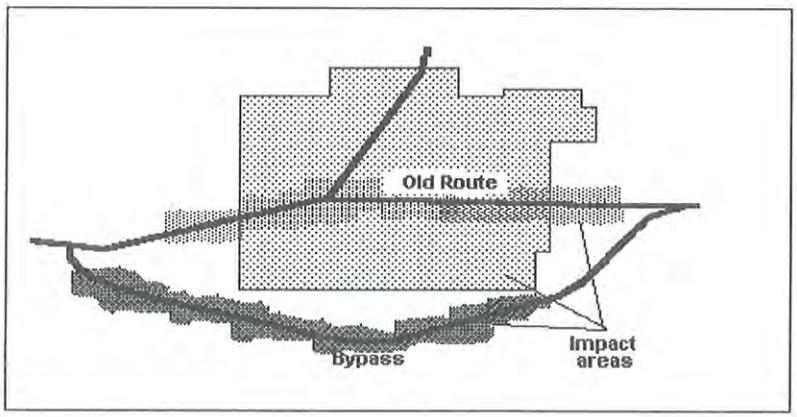

Figure 2. Typical bypass impact study areas.

files, state department of transportation files, and local government agency or chamber of commerce records. Approximately one-third of the studies reviewed included collection of primary data (e.g., from surveys and interviews). Such primary data are for the most part anecdotal, providing an interpretive richness sometimes lacking in strictly statistical studies.

Impact Study Methods

Methods used to study the impacts of bypasses range from judgments gathered in unstructured interviews and mail-surveys of local opinion to sophisticated statistical analyses of data on population, retail sales, land values, and other factors anticipated to respond to changes in highway system characteristics. Impacts are inferred both by comparison of conditions before and after the construction of a specific bypass and by comparison of conditions in the bypassed community with those in similar communities where bypasses have not been constructed. Some studies seek to distinguish among changes occurring along the old route, along the new bypass route, and within the community as a whole. (See Figure 2) The studies reviewed here generally reflect classical economic models of land markets and business input-output relationships, although these theoretical bases for analysis are seldom explicitly cited.

Appendix A presents statistics on changes in business sales and land values in 83 places, in 19 states, where bypasses were constructed. These statistics, drawn from a variety of studies, may represent different time periods, economic conditions, and geographic settings. Not all categories of data were collected for all cases. Nevertheless, comparisons among these studies are instructive, as will be discussed in a later section of this digest.

In some studies where statistical analyses are employed, data from several communities were combined or "pooled" to create a single database. For example, the study may investigate the aggregate impact of a new route bypassing several communities within a highway corridor. Such analyses may have a sound statistical basis, yet still obscure distinctive impacts that occur as a result of the specific coincidence of factors characterizing any particular community.

IMPACTS ASSOCIATED WITH BYPASSES

Bypass impact studies have typically considered data for time periods of less than 10 years following opening of the new route to traffic. No unambiguous criteria have been identified for establishing the minimum time period required to establish what are the impacts of a bypass. Considering the underlying processes involved (e.g., travel behavior change, land development, and other sources of impact), studies based on less than a 5-year period are likely to yield information limited to such impacts as shifts in business levels, traffic, and those environmental conditions (e.g., noise levels) that may respond quickly to the highway system changes.

Population Change

While population statistics are widely considered in bypass impact studies, relating population changes to a specific bypass is difficult. Observing population trends typically requires longer time periods than those incorporated in impact studies, in part because many studies rely on the decennial federal census for data. More than three-quarters of the 75 cases for which population changes were considered showed increases in total

population following construction of a bypass. These studies did not collect data at a level that would permit estimation of the degree to which overall population growth was influenced by the bypass.

Some studies (2) have considered whether population is important as an indicator of a community's susceptibility to impact from bypass construction. Statistical analyses have yielded at best only weak confirmation of this hypothesis, although business sales growth in larger communities does seem to respond less to a new bypass than is the case in smaller areas. (See Table 3)

Business Activity

A majority of studies of specific communities indicate that a community's overall business activity, as measured by gross annual sales, grows more rapidly where bypasses have been constructed. This result is clearly observable when a bypassed community is compared to a similar community in which no bypass was constructed (i.e., a control area). Of 50 cases included in Appendix A, for example, for which data were collected for a bypassed community and a comparable control area, only 17 cases (34 percent) exhibited higher rates of sales growth in the control areas, e.g., Waxahachie, Texas.

In 21 of the study cases, comparisons may be made between those businesses on or in the vicinity of the bypass and those in the comparable control area (an entire community without a bypass). The comparison shows that in 11 cases (52 percent), the control area exhibited faster sales growth, e.g., Conroe, Texas. However, in four of these 11 cases, e.g., Rolla, Missouri, sales growth in the bypassed community overall exceeded the control area. Sales declined in the community overall in only eight of the 71 bypassed communities (11 percent) for which these statistics were presented, e.g., Miles, Michigan.

It might be expected that sales of traffic-serving businesses (e.g., gas stations) along the old route generally would be most adversely affected by a bypass. Declining sales for such businesses were in fact observed in 18 of 61 cases (30 percent), e.g., Superior Fork, Montana. In only one of the 16 of these cases where the comparison may be made, e.g., Cascade, Montana, did average sales of businesses in the bypassed community overall decline. In five of the seven cases where sales declined for traffic-serving businesses and where statistics were presented for overall business along the old bypassed route, sales of business overall actually increased, e.g., Lebanon, Indiana. In 11 of the 52 cases for which the comparison can be made, sales growth of traffic-serving businesses along the old

TABLE 3 Average annual growth in business sales in the vicinity of bypasses.

Cases examined	Population ranges		
	less than 5,000	5,000 to 10,000	10,000 and greater
Businesses along bypassed route: Traffic-serving vs. all businesses			
Number of cases	25	25	15
Average percent increase in sales			
Traffic-serving businesses	2.7%	4.7%	0.3%
All businesses	5.1%	3.8%	2.9%
Percent of cases where sales at traffic-serving businesses declined	24%	28%	33%
All businesses in study area: Bypassed area vs. control area			
Number of cases	34	22	16
Average percent increase in sales			
Bypassed area	5.8%	6.1%	3.2%
Control area	2.8%	3.3%	2.3%
Percent of cases where sales at bypassed-area businesses declined	12%	9%	13%

route exceeded the growth for all business in the study area as a whole, e.g., Mason, Michigan.

Detailed studies made for the Texas Department of Transportation (7–13) traced the fate of individual businesses. Of the traffic-serving businesses located along the old routes prior to construction of bypasses, cases were reported where as many as 36 percent closed following bypass construction. A similar range of new businesses, however, opened during the same study periods. For businesses not primarily traffic-serving, no more than one-quarter of businesses closed, while some cases exhibited nearly 90 percent increases in numbers of businesses. Along the new bypass routes, the numbers of new businesses showed substantial increases in virtually all cases.

The similarly detailed study considered the fate of individual businesses in 11 communities in Iowa and 10 in Minnesota that had bypasses opened since 1979. (*14*) Sales tax information was supplemented with a survey of individual business owners (in the Iowa cities only). While sales tax receipts suggested a gradual decline in sales strength for businesses in bypassed communities (e.g., auto dealerships, restaurants, general services, and general merchandise businesses), none of the results were statistically significant. The survey revealed that respondents believed—by a two-to-one margin—that business had not been adversely affected by the bypass. The level of positive response increased with the number of years since the bypass was opened to traffic.

Employment

Only a few studies considered employment data at a level that permits inference of bypass impact. More than three-quarters of these cases (36 of 47) exhibited an increase in study-area employment following completion of a bypass.

Land Use and Values

Because the bypass influences land access, particularly in the areas through which the new bypass runs, land use and land value might be expected to show substantial change following bypass construction. Within virtually all communities studied, the amount of land in commercial or industrial use did in fact increase along both existing routes (93 of 98 cases) and new bypasses (11 of 13 cases).

Land value increases along the new bypass were observed in all instances reviewed (68 cases). Twenty-two such cases are included in Appendix A. Along the older existing routes, increases were observed in 47 of 50 cases, and the three cases with declines (all are shown in Appendix A) were small; e.g. Bennettsville, South Carolina, had the largest decline, 2.4 percent, along the existing route. Increases in land values reported along the new bypass route were generally substantial and in only one case, e.g., Chester, South Carolina, did they not substantially exceed increases along the old route. Pooled-data studies showed results consistent with these findings, i.e., that communities experience land value increases following construction of a bypass.

Some studies noted that property-tax (and sales-tax) revenues may rise in those areas where new development occurs. Such increases are linked directly to land use and business activity.

Other Impacts

Other environmental and community related impacts cited in bypass studies are summarized in Table 4. As listed in Table 4, these impacts typically are reported in favorable terms.

TABLE 4 Community related impacts cited in literature, in order of decreasing frequency of citation

- Improved traffic circulation
- Traffic safety
- Increased access to city
- New investment and development
- New home construction
- Downtown parking-space increase
- Reduced air and noise pollution
- Improved recreational facilities
- Road not a barrier to the community

Not all studies mentioned community related impacts. Of 149 single-community studies reviewed, more than 30 percent considered only business conditions and no other dimension of impact. A similar proportion of the communities included in pooled-data analyses were subjected to this one-dimensional impact estimation.

ASSESSED IMPACT OF BYPASSES

Virtually all studies of bypass impact present a catalog of observed and anticipated changes in economic and social conditions in the community, using the dimensions shown in Tables 2, 3, and 4. Such changes

TABLE 5 Summary of conclusions on "overall" impact of bypass construction

	Community population			
Level of Impact	< 5,000	5,000–9,999	10,000–39,999	Total
Overall community				
No. of studies	71	42	28	141
% positive	86	93	93	89
% no impact	4	5	0	4
% negative	10	2	7	7
Old-route, traffic-serving businesses				
No. of studies	43	28	17	88
% positive	26	36	29	30
% no impact	21	27	12	22
% negative	53	36	59	49

as increases in business sales, new land development, improved traffic circulation, and others shown in these tables generally are taken to be favorable. There are only limited explicit surveys of opinions held by residents of the bypassed areas or others, regarding whether bypass impact is positive. Such surveys are largely anecdotal and not amenable to statistical analysis.

Balance of Overall Impact

The assessment of "overall" impact of bypass construction seems from these studies to be significantly influenced by analysts' judgment. The selection of impacts to be analyzed and the style in which results are presented in study reports reflect this influence.

Table 5 summarizes the conclusions drawn in the studies reviewed. In fewer than ten percent of the communities where bypasses had been constructed (10 of 141 cases) was the overall impact of the bypass, communitywide, concluded to be unfavorable. The judgment was based primarily on business sales, and in more than half the cases no other dimension of impact was considered. The communities typically were in remote locations.

Differential Impact by Location

Seven of the ten communities found to have experienced negative impacts communitywide had populations of fewer than 5,000 people. Communities in this size category represented about half of the areas for which impact studies were reviewed.

Those studies that considered the impacts on businesses located along the bypassed routes illustrated the more detrimental impacts of bypasses. As Table 5 illustrates, analysts concluded that nearly half of the areas studied (43 of 88 cases) experienced overall negative impacts on old-route, traffic-serving business. It is noteworthy, however, that this percentage is not greater for what is anticipated to be the most vulnerable group of businesses.

Reported interviews with political leaders in bypassed communities suggested that the judgment that impacts were positive overall may have depended on the community's ability to extend its political boundaries—and thus its taxing authority—to encompass new development along the bypass and to return a share of benefit to the businesses and residents remaining in the community defined by the prebypass boundaries. Others, constrained by law or other factors, would be more limited.

PROJECTING AND MITIGATING ADVERSE IMPACT

As previously noted statistics indicate (Table 1 and accompanying discussion), agencies responsible for the planning and development of bypasses are motivated primarily by perceived needs to relieve traffic congestion and safety hazards. Agencies reported that supporting data employed in making decisions about bypass

planning come largely from analyses of traffic demand, safety, and economic or environmental studies. Research on observed impact of bypasses, of the type reviewed in this study, was seldom cited as a basis for planning and decision making. Agencies express concerns that experience is not comparable (e.g., because of changes in underlying economic conditions or unique characteristics of areas being studied) or that long-term trends have not been established. In addition, survey respondents cited lack of reliable data and analytical models as reasons for not undertaking bypass impact studies prior to construction.

However, there may be other reasons. One survey respondent highlighted the adversarial relationships between the state transportation agency and local political leadership that may develop when bypasses are considered: "Politicians are the ones that block the building of bypasses." The "undue" attention to negative impacts of proposed bypasses is another reason that agency personnel may prefer not to attempt to conduct formal impact studies.

Agencies nevertheless report a variety of measures to avoid or mitigate the adverse impacts of a bypass. Table 6 lists the most frequently cited measures. The research literature provides no particular guidance on whether such measures have significant effect on bypass impact.

TABLE 6 Impact mitigation measures reported in survey of state and provincial agencies

Signage: business-route designations, advertising and logo identification, "trailblazing" to bypassed and connecting routes
Bypassed-area access improvements, e.g., via connecting routes, service and frontage roads, interchanges, reconstructions of old routes
Public and community involvement in planning

CONCLUSIONS

While the literature reviewed for this study makes it clear that bypass impacts are a less widespread concern now than in years past, recent studies as well as the survey responses of state and provincial transportation agencies indicate that issues related to highway bypasses continue to occur. There is nevertheless no clear consensus on study procedures and analysis methods that should be used in bypass impact studies. Trend analyses, econometric studies, and informal surveys are regularly employed to review the impacts of past construction, but transportation agency personnel for the most part judge the results to have limited value in planning and design decision making.

While there is evidence that businesses along the older bypassed routes may suffer loss of sales, the overall assessed impact even on these vulnerable locations seems to be limited or inconclusive. Many of the cases where areas experienced declining sales or other indicators of adverse impact are attributable to broad demographic and economic trends unrelated to the highway bypass.

The studies reviewed in this project suggest that, for the most part, bypasses seem to have favorable impact on rural communities and small urban areas but evidence in these studies is often weak. Interviews and surveys of residents and businesses indicate that bypasses increase development potential along the fringe areas served by the new route, and at the same time relieve congestion, safety hazards, and other undesirable conditions in the central areas from which traffic is diverted.

The comments of local residents, supported by statistics on sales, indicate that in most cases adverse effects on otherwise viable bypassed businesses appeared to be largely recouped by improved ambiance for patrons and residents in the community, although individual businesses may suffer when a new bypass is opened. In some instances, the combined effect of lost sales by several businesses in a bypassed community may signal a broader decline in older "main street" business district, but in such cases, competition from other communities and general changes in economic conditions make it difficult to identify the bypass as the sole cause.

Valuable assistance in the preparation of this Digest was provided by a Topic Panel consisting of Louis H. Adams, Civil Engineer III, New York State Department of Transportation, Corridor Planning & Project Scoping Section; George Gundersen, Director, Bureau of System Planning, Wisconsin Department of Transportation; Gregory King, Chief, History and Community Studies Branch, California Department of Transportation, Environmental Program; Brenda Kragh, Social Science Analyst, Federal Highway Administration, Office of Environment & Planning; C. Ian MacGillivray, Director, Engineering Division, Iowa Department of Transportation; Daniel Otto, Economics Department, Iowa State University; Montie G. Wade, Research Engineer, Texas Transportation Institute; Kenneth E. Cook, Senior Program Officer, Transportation Research Board, (Retired).

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APPENDIX A

RESULTS FROM SELECTED BYPASS STUDIES

City, State, and Population size class		Change in gross sales (%), businesses. . .				Change in land values (%)	
		on or in vicinity of bypassed route		in larger study area			
		Traffic-serving	All business	Bypassed area	Control area	On or near old route	On or near new route
Fordyce, Arkansas	1	3.1	3.3	4.2			
Auburn, California	1	2.3		4.4	3.5		
Camarillo, California	2	2.3		3.0	2.5	24.0	
Delano, California	3			0.4		7.6	
El Monte, California	2	7.3		3.7	1.9		
Escondido, California	2	1.0		5.9	3.5		
Fairfield, California	1	12.6		15.3	11.3	6.8	
Folsom, California	1	0.7		0.5	1.4		
Petaluma, California	3	-5.0		0.6	-3.0		
Temple, California	1	-3.8	-1.0	1.1	-3.0		
Tulare, California	3	-5.8		2.7	0.6		
Jonesboro, Georgia	1	3.7	18.1	24.4	8.2	-0.2	11.6
Tifton, Georgia	2	21.8	1.5	13.0	2.0		
Albia, Iowa	2	4.4	6.7	6.2	6.3		
Boone, Iowa	3	0.1	1.1	3.9	3.7		
Centerpoint, Iowa	1			4.3	3.5		
Chariton, Iowa	2	-0.3	-0.3	1.3	1.7		
Corning, Iowa	1		-0.3	1.4	1.7	2.0	
Elkader, Iowa	1			1.9	3.6		
Independence, Iowa	2			5.0	3.6		
Jefferson, Iowa	1	2.0	3.0	2.0	3.0		
Newton, Iowa	3	1.0	4.2	2.0	2.0		
Red Oak, Iowa	2	1.1	3.3	5.7	3.2		
Stuart, Iowa	1	-2.0		2.0	2.0		
Walker, Iowa	1			-0.6	3.5		
Webster, Iowa	2			4.7	1.8		
Clinton, Illinois	2	8.8		10.4	7.9		
Heyworth, Illinois	1	8.8		6.3	-17.0		
Maroa, Illinois	1	12.3		3.0	-10.0		
Kokomo, Indiana							100.0
Lebanon, Indiana	2	-20.0	4.0	4.0			75.0
Adrian, Michigan	3	1.5		1.9	-1.4		
Hart, Michigan	1	0.2		2.8	1.3		
Holland, Michigan	3	1.4		-0.8	1.1		
Mason, Michigan	1	9.2		6.9	4.3		
Miles, Michigan	3	2.0	-1.7	-1.4	2.1		
Zeeland, Michigan	1	4.0	3.0	2.0	-1.4		
Austin, Minnesota	3	3.0		2.7	1.0		

City, State, and Population size class		Change in gross sales (%), businesses. . .				Change in land values (%)	
		on or in vicinity of bypassed route		in larger study area			
		Traffic-serving	All business	Bypassed area	Control area	On or near old route	On or near new route
Fairbault, Minnesota	3	2.6	5.5	6.8	4.0		
Fergus, Minnesota	3	-1.1		3.9	4.8		
Luverne, Minnesota	1	NA	0.4	9.0	12.0		
Manhatten, Minnesota	1	8.8		6.8			
Rolla, Missouri	3	3.0	3.0	9.5	6.1		
Cascade, Montana	1	-4.6		-2.2			
Deerlodge, Montana	1	-5.0		11.1	12.0		
Lima, Montana	1			-2.1			
Saint Ignate, Montana	1			3.3			
Superior Fork, Montana	1	-1.0		10.0			
Jamestown, North Carolina							3.8
Valley Circle, North Carolina							3.8
Jamestown, North Dakota	3	5.1		5.5	5.2		
Valley City, North Dakota	2	4.5		4.7	5.2		
Circlesville, Ohio	2	58.9	2.0	2.2		14.2	
Clairsville, Ohio	1	0.4	4.3	3.7		16.0	
Pigua, Ohio	2	1.2	2.5	2.0		-0.3	
Blackwell, Oklahoma	2	2.6		-3.0			0.3
Braman, Oklahoma	1			12.6			
Guthrie, Oklahoma	2	2.6		8.3			8.2
Muhall, Oklahoma	1			18.1			
Orlando, Oklahoma	1			-12.7			
Perry, Oklahoma	2	5.7		21.0			8.2
Tomhawa, Oklahoma	1	6.5		21.7			2.3
Tripp, South Dakota	1	0.1	13.4				
Bennettsville, South Carolina	2	-4.0				-2.4	22.2
Chester, South Carolina			2	-1.5		3.7	1.3
Easley, South Carolina	2	22.0				1.4	37.3
Lake City, South Carolina	2	0.4				10.5	
Seneca, South Carolina	2	0.1				1.5	10.4

City, State, and Population size class		Change in gross sales (%), businesses. . .				Change in land values (%)	
		on or in vicinity of bypassed route		in larger study area			
		Traffic-serving	All business	Bypassed area	Control area	On or near old route	On or near new route
Beresford, South Dakota	1			13.0			
Kadoka, South Dakota	1	3.3	5.0	4.5	8.8		
Tripp, South Dakota	1			4.7	6.2		
Tyndall, South Dakota	1	2.5	6.0	2.6	4.5		
Huntsville, Texas	3			8.2	2.9		
Chambers County, Texas						11.1	19.1
Conroe, Texas	2	-8.3	3.0	4.0	4.4	15.6	28.4
East of Houston, Texas							13.0
Huntsville, Texas	3	0.3	6.7			0.8	48.9
Merkel, Texas	1	-1.8	6.3	8.3		1.0	4.9
Rockwall, Texas	2		-2.4	-1.0	-1.4	1.8	18.2
Temple, Texas	3	-0.1	3.8	4.8	3.7		229.7
Waxahachie, Texas	3	-3.8	0.8	1.0	2.2		2.9
American Fork, Utah	2	-0.2		1.8	-0.8		
Lexington, Virginia	2	-1.6		7.0		2.0	5.5

Population size classes: 1 = less than 5,000; 2 = 5,000 to 10,000; 3 = greater than 10,000

APPENDIX B

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