TRAFFIC SAFETY EVALUATION

IH30 - OAKLAND WESTBOUND

EXIT RAMP

FORT WORTH, TEXAS

Prepared for

State Department of Highways and
Public Transportation

District 2

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Fort Worth, Texas 76115

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EXECUTIVE SUMMARY

The interfacing of a one-lane major freeway exit ramp and a parallel two-way collector roadway is a very difficult, if not impossible, task. The number of potential vehicle conflict points increases approximately 100 percent over the standard one-way frontage road configuration.

The westbound Interstate 30 (IH30) exit ramp to Oakland Boulevard and the intersection of Bridge Street east of Oakland Boulevard in Fort Worth have required special roadway/intersection design and traffic controls for the safety of the users. Even with these special considerations, a total of 80 accidents has been reported in the vicinity of the IH30 exit ramp. This total is for the three-year period of 1985, 1986, and 1987. The resulting average three-year accident rate is 3.9 accidents per million entering vehicles.

Approximately 34 percent of the reported accidents were right-angle accidents occurring at the merge point of the westbound exit ramp and the westbound Bridge Street traffic. The reported major contributing factor was the failure of IH30 westbound exiting traffic to yield the right-of-way to the westbound traffic on Bridge Street.

Several factors were identified as contributing to the primary causes of these accidents. These factors are:

1) The angle of the IH30 westbound exit ramp traffic at the Bridge Street intersection requires the driver to search approximately a 150-degree field of vision to identify approaching vehicles.

2) The alignment of the westbound travel lanes, east of the intersection, may cause confusion in identifying proper lane occupancy of approaching vehicles.

3) The multiple conflict points that involve the eastbound left-turn traffic and other private driveway activity in close proximity to this area may also cause driver confusion.

Two other distinct accident patterns were identified. First, five single vehicle accidents occurred which were associated with water accumulating in a low section of Bridge Street east of the IH30 exit ramp. No mention of this as a major contributing factor has been recorded since May, 1988, so it is assumed that this problem has been corrected.

The second pattern noted was the high number of accidents occurring under night-time conditions at the Oakland Boulevard/Bridge Street intersection and the intersection of the IH30 exit ramp and eastbound Bridge Street traffic. Approximately 52 percent and 50 percent of the reported night-time accidents occurred at these locations, respectively.

This review and problem identification has led to the recommendation that IH30 westbound exit ramp traffic be provided with a non-merge configuration at Bridge Street westbound. In order to accomplish this, it is recommended that the eastbound left turn into the shopping center be closed. A westbound two-lane left turn will also be required for Bridge Street traffic at Oakland Boulevard.

The addition of a separate lane and double westbound left-turn lanes will allow the IH30 exiting traffic to proceed with a minimum of conflicts. The resulting weave area will be approximately 450 feet from the merge point to the Oakland Boulevard intersection. The provision of the double westbound left-turn lane at Oakland Boulevard will accommodate both the demand on Bridge Street and that from the IH30 exit ramp.

The elimination of eastbound left turns may cause concern. However, the same access to and from the commercial development, in the northeast quadrant of the intersection, will be available from Oakland Boulevard.

The level of street lighting was not measured. The study area was reviewed by engineering personnel during several evening periods and no deficiencies in the existing lighting program were observed.

The recommended traffic safety program, when implemented, will have the direct impact of reducing the high potential for accidents at the merge point of the IH30 westbound exiting traffic and westbound Bridge Street traffic. Although the resulting weaving distance between the point of merge of the IH30 westbound exit ramp and Oakland Boulevard intersection is below the desirable distance, the vehicle demand can be accommodated with minimal conflicts.

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INTRODUCTION

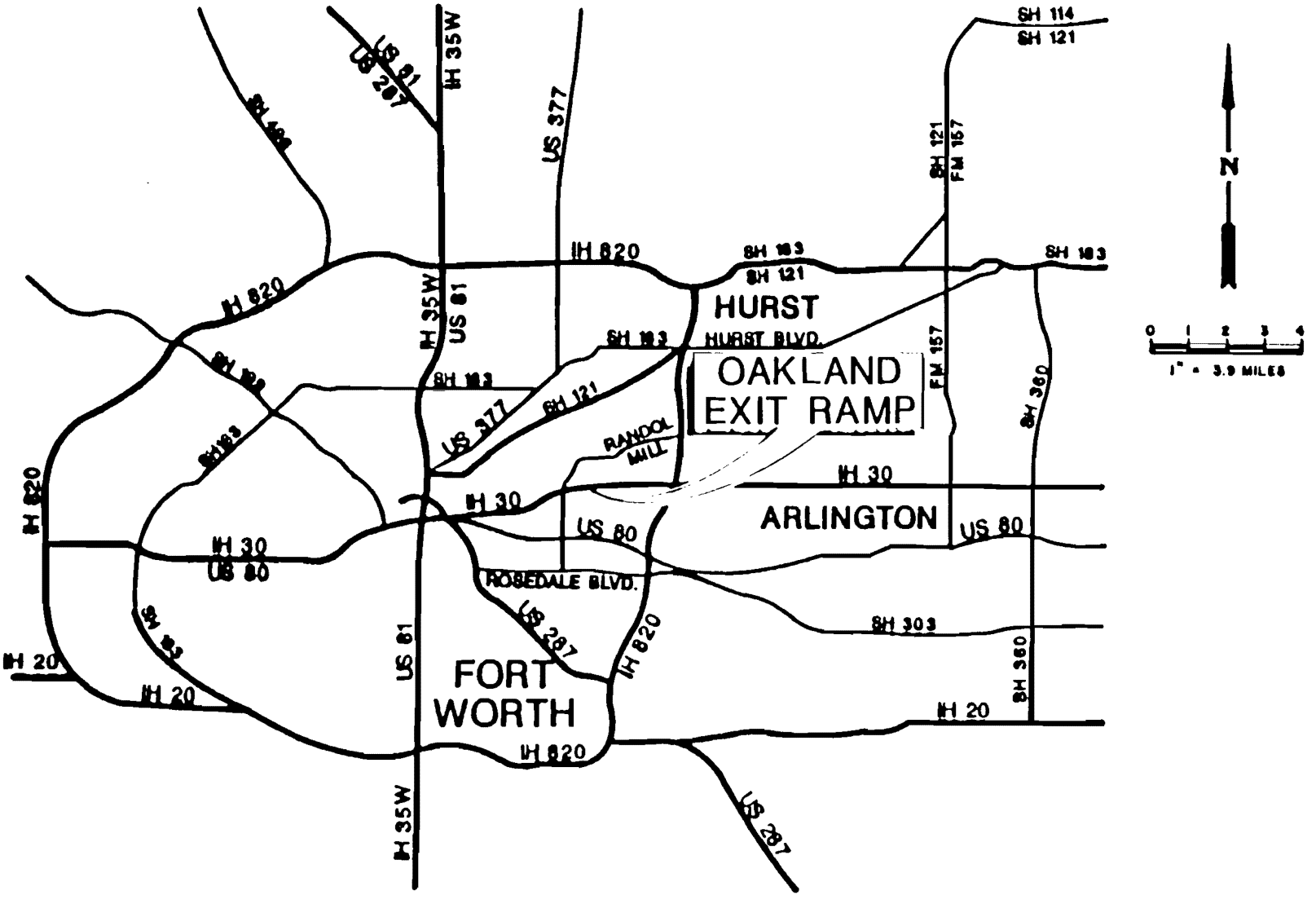
Oakland Boulevard is a major north-south arterial in the eastern section of the City of Fort Worth (see Figure 1). A grade separation over IH30 is provided. Interstate Highway 30 is a vital link between the Cities of Fort Worth and Dallas.

Interstate Highway 30 was originally constructed as the Dallas-Fort Worth Turnpike. The original west toll plaza was located east of Oakland Boulevard. Free entrance and exit ramps were provided at the Oakland Boulevard interchange to accommodate U-turns and provide area access at the end of the toll facility.

PURPOSE OF STUDY

The westbound exit ramp from IH30 to Oakland Boulevard is unique due to the intersection of a one-lane major freeway exit ramp and a parallel two-way collector roadway. Bridge Street is a four-lane east-west collector that parallels IH30 along the north side of the corridor.

The westbound exit ramp intersects Bridge Street approximately 450 feet east of the Oakland Boulevard intersection. Due to the resulting intersection design, the westbound exiting traffic is controlled by a stop sign. East-west traffic on Bridge Street is favored. This condition has resulted in numerous vehicle accidents with many injuries occurring within the area of the exit ramp and the Bridge Street intersection. In recognizing the need for improved safety of the motoring public, the State Department of Highways and Public Transportation (SDHPT) is seeking: 1) a solution to reduce and/or eliminate



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DISTRICT 2

FIGURE 1

LOCATION MAP

FORT WORTH, TEXAS

the number and severity of accidents, and 2) to provide sufficient roadway capacity to accommodate the increasing traffic demands within this corridor.

LIMITS OF STUDY

When addressing the roadway and traffic controls necessary to meet the two objectives mentioned above, it is essential that consideration be given to the Oakland Boulevard-Bridge Street intersection; therefore, the area of Bridge Street from Oakland Boulevard on the west to a point approximately 300 feet east of the exit ramp intersection has been evaluated.

Traffic counts were conducted on Bridge Street and the IH30 westbound exit ramp. These counts were for a 24-hour time interval. Accident data was also collected and analyzed for this section. Each of these items will be discussed in detail in the following sections.

EXISTING CONDITIONS

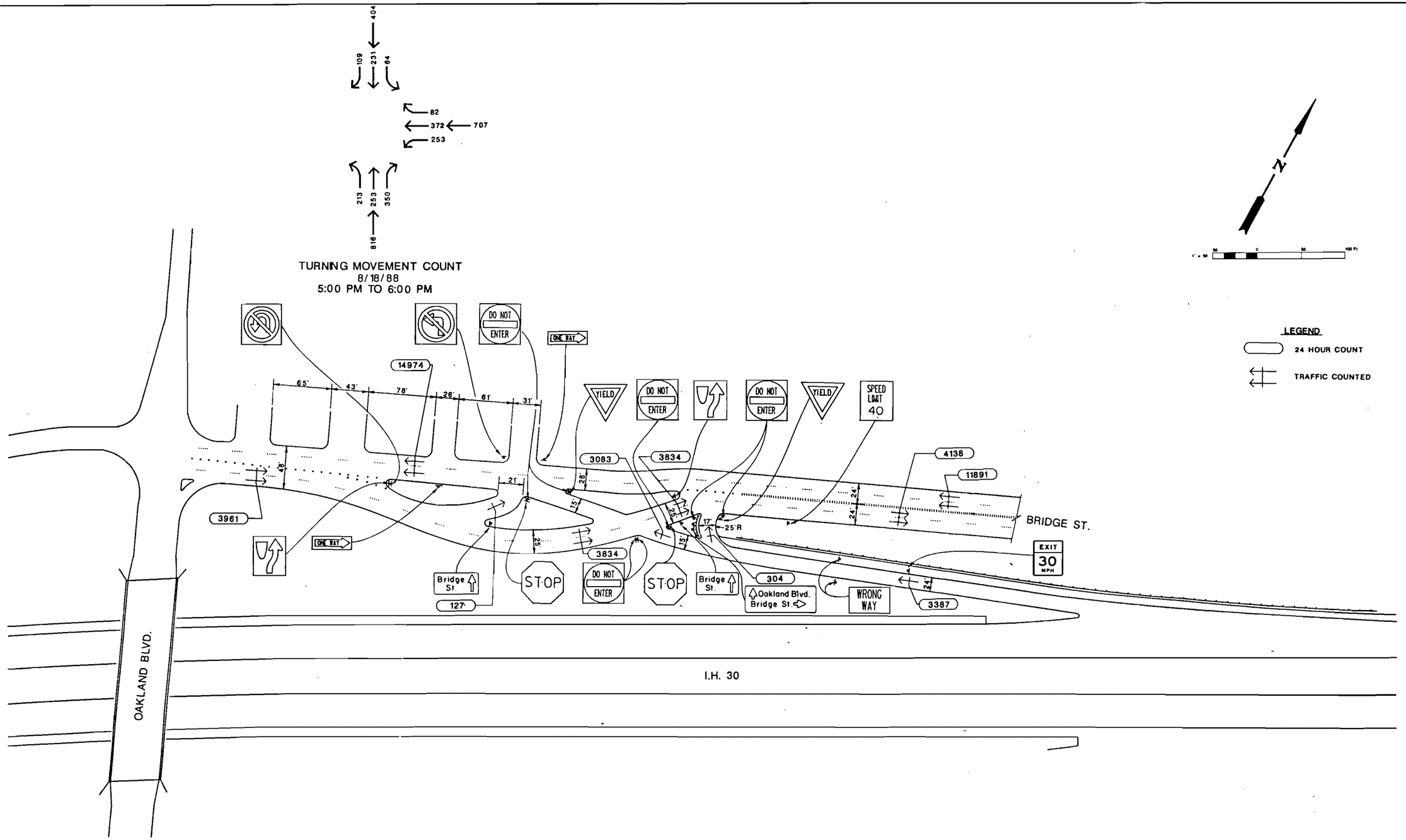
The intersection of a major one-way, one-lane exit ramp with a two-way, four-lane arterial required special roadway design and traffic signing to accommodate the traffic demands and provide a safe level of operations. Although the original design was completed by or for the Texas Turnpike Authority, the responsibility for the safety and operations is now the responsibility of the SDHPT.

ROADWAY GEOMETRICS

The existing intersection of the IH30 westbound exit ramp and Bridge Street occurs within an area of Bridge Steet that has been divided to accommodate channelized median islands for easy roadway identification. Figure 2 shows the existing roadway/intersection configuration.

Four private driveways are along the north curb line of Bridge Street between the intersection of the IH30 westbound exit ramp and Oakland Boulevard. Two of these driveways provide ingress and egress to the service station located in the northeast corner of the Oakland Boulevard intersection. The other driveway provides access to and from a community shopping center fronting on Oakland Boulevard north of Bridge Street.

Twelve-foot travel lanes are provided on Bridge Street. The exit ramp has a 15-foot travel lane, a six-foot improved shoulder on the inside and a three-foot shoulder along the outside. A 17-foot-wide U-turn (westbound exit ramp to eastbound Bridge Street) lane has been provided. Metal beam guard fence is along the right edge of the existing shoulder as well as along the U-turn



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DISTRICT 2

FIGURE 2

EXISTING CONDITIONS
I.H. 30 – OAKLAND WESTBOUND EXIT RAMP

FORT WORTH, TEXAS

lane.

The design of the channelized median islands separates the eastbound and westbound traffic on Bridge Street. Two lanes are retained for east and west traffic, respectively. The eastbound traffic is provided with a 21-foot left-turn lane to enter the eastern most private drive to the shopping center (see Figure 2).

The horizontal alignment of Bridge Street is offset approximately 17 feet to the north, east of the IH30 westbound exit ramp intersection. This offset occurs very abruptly for westbound motorists. Eastbound motorists exit the channelized medians, return to the four-lane non-divided roadway, and do not notice the alignment shift.

Bridge Street generally follows the natural grade line within this area. The low point is located near the intersection of the westbound exit ramp U-turn lane and Bridge Street. IH30 is generally constructed on a fill section with the exit ramp descending to meet Bridge Street.

The IH30 westbound exit ramp maintains a 15-foot roadway to merge with the westbound travel lanes of Bridge Street. The merge occurs in the same area of the eastbound left-turn lane and the private drive on the north.

Northbound traffic on Oakland Boulevard is provided with two lanes across the IH30 structure. A third lane is designated as a left-turn lane shared by northbound and southbound traffic. The south approach of Oakland Boulevard at Bridge Street has a "high type" right-turn lane and a mandatory

left-turn lane. A single southbound travel lane is also provided.

The north approach of Oakland Boulevard has two lanes in each direction. The departure roadway to the west is a direct access ramp to IH30 westbound. A two-lane, one-way ramp tapers to one lane at the freeway gore area.

TRAFFIC SIGNS

Twenty regulatory signs and three guide signs are within this area. These signs conform to the Texas Manual of Uniform Traffic Control Devices (TMUTCD) and are shown in Figure 2.

The posted speed limit for the exit ramp is 30 miles per hour (mph). The posted speed limit for Bridge Street is 40 mph. The 40 mph speed limit sign is east of the exit ramp intersection.

Exit ramp traffic is required to stop at the eastbound roadway and to yield at the westbound roadway and the U-turn lane.

A "ONE WAY" sign (R6-1R) and "NO LEFT TURN" symbol (R3-2) signs are at the private drives for exiting motorists. A "NO U-TURN" symbol (R3-4) sign is at the west end of the divided section. Additional R4-7 (divided roadway keep right symbol) signs are at each end of the divided roadway section.

"DO NOT ENTER" (R5-1) and "WRONG WAY" (R5-1a) signs are located along the exit ramp to warn motorists of possible dangers. These signs are placed in conformance with the TMUTCD.

The three guide signs have white lettering on green background. They identify routes of Bridge Street and give direction to Oakland Boulevard.

EXISTING TRAFFIC

Automatic traffic recorders were used to collect information on current usage of the roadways and intersections within this area. These recorders registered the number of vehicles crossing a specific point for each 15-minute interval for a 24-hour period. Table 1 presents the summary of these counts which are shown in Figure 2.

Approximately 3,400 vehicles were recorded on the westbound exit ramp. Bridge Street, east of this intersection, had an average 24-hour count of 16,029 vehicles. Only 4,138 of these vehicles were eastbound. The remaining traffic was westbound.

Counts recorded on Bridge Street between the IH30 westbound exit ramp and Oakland Boulevard recorded 14,974 and 3,961 vehicles for westbound and eastbound traffic, respectively. Computed 24-hour volumes for the eastbound left turn into the private driveway were 127 vehicles and 304 vehicles for the U-turn lane.

Actual counts were conducted on four separate days. Counts were made on Tuesday, March 21 and Wednesday, March 22, 1989. Several of the locations were also counted on Tuesday, March 14 and Monday, April 24, 1989. The counts made on March 14, 1989 were higher than those made on March 21 and 22, 1989.

This difference is reflected in the impact of Nolan High School located east

TABLE 1

1989 24-HOUR TRAFFIC COUNTS
IH-30 Exit Ramp/Bridge Street
Fort Worth, Texas

Location	Date of Count	24-Hour Traffic Count Unadjusted	Adjusted(1)
IH30 Westbound Exit Ramp, east of U-turn lane	3/14	3,508	3,508
	3/21	2,941	3,238
	3/22	3,106	3,420
Average			3,387
IH30 Westbound Exit Ramp, west of U-turn lane	3/21	2,800	3,083
Average			3,083
Bridge Street (Eastbound), west of left turn lane	3/21	4,081	4,493
	4/24	4,049	4,049
	4/24(2)	3,341	3,341
Average			3,961
Bridge Street (eastbound), west of IH30 Exit Ramp	3/14	15,741	15,741
	3/22(3)	11,910	13,113
	3/22(4)	14,595	16,069
Average			14,974
Bridge Street (eastbound), east of IH30 Exit Ramp	3/14	3,805	3,805
	3/21	3,456	3,805
Average			3,805(5)
Bridge Street (westbound), east of IH30 Exit Ramp	3/14	9,245	9,245
	3/22	12,285	13,525
Average			11,385(5)
Bridge Street (eastbound), east of left turn lane	4/24(6)	3,867	3,867
	4/24(6)	3,800	3,800
Average			3,834

(1) Counts conducted on Tuesday, March 21 and Wednesday, March 22 adjusted (+10.1%) for impact of school traffic based upon eastbound Bridge Street, east of IH 30 Exit Ramp.
(2) Eastbound Bridge Street west of Oakland Street intersection.
(3) Westbound Bridge Street west of 1st Drive and IH30 Exit Ramp.
(4) Westbound Bridge Street west of 2nd Drive and IH30 Exit Ramp.
(5) Adjusted average 24-hour traffic to reflect total of 4/24 counts (3,805 to 4,035 and 11,385 to 11,891 shown on Figure 2).
(6) Two counters set at eastbound Bridge Street east of left turn to parking lot to verify count.

of this intersection on Bridge Street. During the week of March 20, Nolan High School students were on "spring break" with limited activity at the school. Therefore, actual counts recorded on March 21 and 22, 1989 have been increased to reflect a typical school day.

An additional turning movement count was obtained from the SDHPT. This count conducted at the Oakland and Bridge Street intersection was completed on August 18, 1989. The count was for the period of 5:00 p.m. to 6:00 p.m.

The average 1989 hourly count for the same interval is 1,102 vehicles. This demand is based on an average 303 vehicles from the IH30 exit ramp and 799 vehicles from Bridge Street and associated drives. Based on the same percentage of left and right turns at the intersection, an estimate of 74 vehicles exiting from IH30 would want to turn right at Oakland and 229 vehicles would want to turn left.

Observations were made at various times throughout the day, including the peak usage hour, of the number of vehicles approaching the existing stop sign on the IH30 exit ramp. The reference point selected for this survey was the first existing street illuminaire located upstream of the U-turn lane on the exit ramp. This location was approximately 110 feet or five car lengths from the existing stop sign. Although the arrival rate did not exceed the observed storage length several shorter queues were observed.

The random arrival rate of exiting motorists from IH30 did not produce a substantial queue during any period of observation. Motorists were able to come to a complete stop and proceed across eastbound Bridge Street with minimal delays.

ACCIDENT EXPERIENCE

Approximately 80 accidents within a three-year period have been reported to have occurred within the limits of this study. Individual police accident reports prepared by the City of Fort Worth Police Department were obtained. Computer printouts of statistical accident data were also obtained from the Texas Department of Safety.

These reports indicated a total of 25 accidents was reported in 1986, while 31 accidents were reported in 1987. Twenty-four accidents were recorded in 1985. A complete list of reported accidents is contained in Table 2.

TYPE OF ACCIDENTS

The three-year record of accidents indicated no fatal accidents. Seventeen of these accidents involved personal injuries, with two involving pedestrians. Approximately 79 percent of the accidents or 63 accidents did physical damage to the vehicles only.

Table 3 presents a yearly summary of reported accidents by severity. The consistency of occurrences on a yearly basis indicates the severity of the problem. The total reported injury accidents is average five per year. The average property damage accidents is 21 per year. This represents a 1988 accident rate of 3.3 accidents per million entering vehicles.

The report of pedestrian accidents recorded in 1987 is suspect. According to the police report, a March 18, 1987, 10 p.m. accident was possibly an injury claimed for the purpose of obtaining money from an insurance company. It was

TABLE 2

ACCIDENT SUMMARY

I-30 - OAKLAND WESTBOUND EXIT RAMP
FT. WORTH , TEXAS

DATE	TIME	SEVERITY OF ACCIDENT: FATAL	PED. INJ.	OTH. INJ.	PROP. DAM.	TYPE OF ACCIDENT: SIDE SWIPE	REAR END	FIXED OBJECT	PEDESTRIAN	RIGHT ANGLE	CONTRIBUTING FACTOR: FAILED TO YIELD ROW	BACK UNSAFELY	CHANGED LANES UNSAFELY	UNDER INFLUENCE - ALCOHOL	DISREGARD SIGNAL / SIGN	IMPAIRED SIGHT	DRIVER INATTENTION	FAILED TO CONTROL SPEED	FOLLOWING TO CLOSE	IMPROPER TURN	UNKNOWN	WATER LOG SPOT	LIGHT CONDITION: DAYLIGHT	NIGHT	WEATHER: CLEAR / CLOUDY	RAIN	SLEET / SNOW	PAVEMENT CONDITION: DRY	WET	ICE / SNOW
1 11 86	6P			X			X																	X		X			X	
1 14 86	7P			X		X					X													X		X			X	
1 31 86	8A			X						X	X													X		X			X	
2 3 86	5P			X						X					X									X			X		X	
2 26 86	12N			X						X					X									X		X			X	
3 2 86	1A			X		X								X										X		X			X	
3 20 86	6A			X						X	X				X									X		X			X	
4 13 86	9P	X									X													X		X			X	
5 4 86	10P	X						X										X				X		X		X			X	
5 16 86	9P			X			X					X												X		X			X	
5 17 86	12N			X				X														X		X		X			X	
5 26 86	11A			X			X											X						X		X			X	
5 29 86	2A			X						X	X													X		X			X	
6 10 86	2P			X			X											X						X		X			X	
6 16 86	7A			X						X	X													X		X			X	
6 20 86	3P	X								X	X													X		X			X	
7 28 86	6P			X						X	X													X		X			X	
8 14 86	7P			X						X	X													X		X			X	
8 24 86	6P			X				X									X	X				X		X		X			X	
9 5 86	12N			X						X	X													X		X			X	
11 2 86	10P			X						X								X						X		X			X	
11 4 86	5P			X						X	X													X		X			X	
11 7 86	5P			X		X														X				X		X			X	
11 10 86	4P			X				X										X				X		X		X			X	
11 18 86	12N	X								X	X													X		X			X	
1986 TOTAL		4		21		3	4	4		14	11	1	2		3		1	6	1	1		4		18	9	20	5		19	6
2 1 87	5P			X						X	X													X		X			X	
2 20 87	6P			X						X	X													X		X			X	
2 23 87	8P			X			X																	X		X			X	
2 26 87	6P		X				X																	X		X			X	
3 2 87	7P			X						X	X													X		X			X	
3 4 87	5P			X			X								X									X		X			X	
3 9 87	8A			X			X																	X		X			X	
3 10 87	7P		X							X	X													X		X			X	
3 16 87	8P	X							X												X			X		X			X	
3 18 87	10P	X							X		X													X		X			X	
3 19 87	5P			X			X																	X		X			X	
3 23 87	6P			X		X									X									X		X			X	
5 9 87	10P		X							X						X				X				X		X			X	
5 28 87	5P			X				X										X						X		X			X	
6 9 87	2P		X					X						X				X						X		X			X	
6 22 87	6P			X						X	X													X		X			X	
7 4 87	5P			X						X	X													X		X			X	
7 7 87	7A			X						X	X													X		X			X	
7 21 87	3P		X							X	X													X		X			X	
8 2 87	5P			X						X					X									X		X			X	
8 3 87	5P			X		X									X									X		X			X	
8 21 87	7P			X						X	X													X		X			X	
9 3 87	7A			X		X									X									X		X			X	
9 9 87	6P			X		X									X									X		X			X	
9 13 87	12N			X						X	X													X		X			X	
9 20 87	5A			X						X	X													X		X			X	
10 2 87	11P			X						X	X													X		X			X	
10 19 87	12P			X						X					X									X		X			X	
11 15 87	5P			X						X					X									X		X			X	
12 3 87	5A	X					X											X						X		X			X	
12 14 87	12N			X		X					X				X									X		X			X	
1987 TOTAL		2	8	23		8	5	2	2	16	13			6	3	3	1	1	6	2	1	1	1	21	10	27	4		23	8
2 19 88	5P			X			X												X					X		X			X	
3 16 88	5P			X						X	X													X		X			X	
3 25 88	5P			X		X								X										X		X			X	
3 25 88	11P			X		X					X														X	X			X	
4 15 88	1P			X						X	X													X		X			X	
5 10 88	7A			X			X													X				X		X			X	
6 4 88	6A			X			X												X					X		X			X	
6 14 88	11A			X		X								X										X		X			X	
7 4 88	12N			X		X									X									X		X			X	
7 16 88	12N			X						X									X					X		X			X	
7 17 88	1P	X								X	X													X		X			X	
8 24 88	3P	X								X	X													X		X			X	
8 29 88	5P		X				X													X				X		X			X	
9 17 88	2A	X								X	X													X		X			X	
9 17 88	10A		X							X	X													X		X			X	
10 1 88	5P		X				X												X					X		X			X	
10 8 88	5P		X							X	X													X		X			X	
10 24 88	7P	X					X						X											X		X			X	
11 17 88	9P			X						X	X													X		X			X	
12 7 88	5P			X			X												X					X		X			X	
12 9 88	10P			X						X	X														X	X			X	
12 15 88	11A			X						X	X													X		X			X	
12 25 88	6P	X								X	X														X	X			X	
1988 TOTAL		5		16		4	7			12	12	1	2		1			4	3					17	6	23			23	
THREE YEAR TOTAL		2	15	62		13	16	6	2	42	36	2	10	4	6	1	2	16	8	2	1	5		54	25	70	9		65	14

TABLE 3

ACCIDENT SUMMARY
BY
SEVERITY OF ACCIDENT

IH30 - Oakland Westbound Exit Ramp
Fort Worth, Texas

	1986	1987	1988
Fatal	0	0	0
Pedestrian Injury	0	2	0
Other Injury	4	6	5
Property Damage	21	23	19
Total	25	31	24

reported and verified by witnesses that the pedestrian waited for the vehicle invloved to start moving and ran into the left front of the moving vehicle, then claimed a back injury. Due to this questionable report, no further detailed analysis was made of the 1987 pedestrian accidents.

Approximately 53 percent of the three-year accident experience involved a right-angle accident as indicated in Table 4. Sixteen accidents or 20 percent were classified as rear-end type of accidents. Seventeen percent were identified as sideswipe. It should be noted that all accidents occurring within the merge area of the IH30 westbound exit ramp traffic and westbound Bridge Street traffic were classified as right-angle accidents. The remaining ten percent involved fixed objects or pedestrians.

LOCATION OF ACCIDENTS

Figure 3 is a graphical representation of the accidents listed in Table 2. Twenty-six of the accidents have occurred within the merge area of the IH30 westbound exit ramp and westbound Bridge Street. This figure is approximately 34 percent of the reported accidents. Eight accidents (ten percent) have occurred at the intersection of the westbound ramp and eastbound roadway. Five of these were rear end accidents.

Twenty accidents are associated with the Oakland Boulevard/Bridge Street intersection. Nine of these accidents were right-angle and six were rear end type of accidents. Two pedestrian accidents were associated with this intersection.

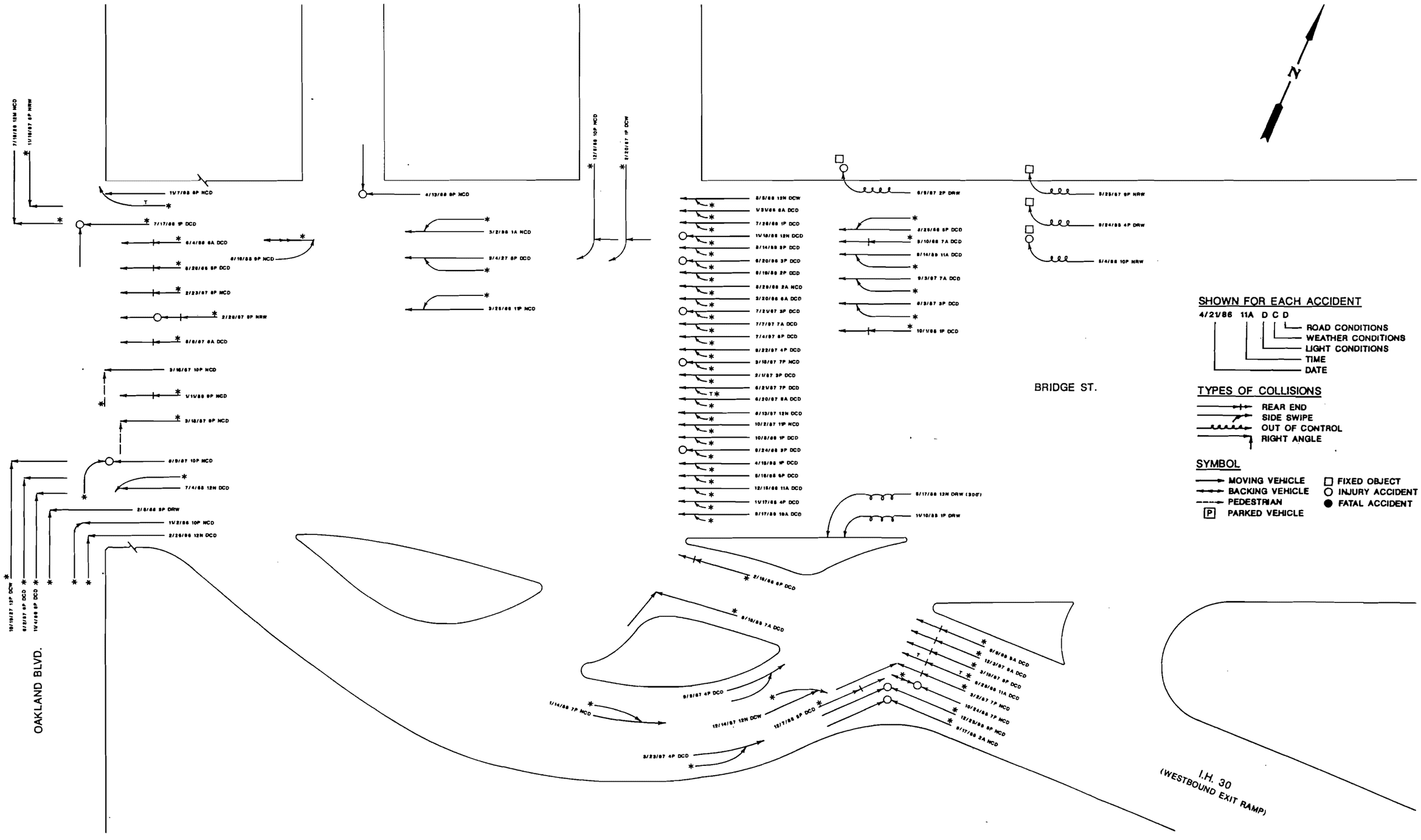
Only four accidents were identified as being related to the driveway

TABLE 4

ACCIDENT SUMMARY
BY
TYPE OF ACCIDENT

IH30 - Oakland Westbound Exit Ramp
Fort Worth, Texas

	1986	1987	1988
Side Swipe	3	6	5
Rear End	4	5	7
Fixed Object	4	2	0
Pedestrian	0	2	0
Right Angle	14	16	12
TOTAL	25	31	24



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DISTRICT 2

FIGURE 3

ACCIDENT EXPERIENCE
I.H. 30 – OAKLAND WESTBOUND EXIT RAMP

FORT WORTH, TEXAS

operations of entering or exiting traffic. All were right-angle accidents. Five accidents were one-car accidents. All occurred east of the westbound ramp and Bridge Street intersection.

The remaining 14 accidents were considered mid-block accidents, generally involving a sideswipe. Four were eastbound and eight were westbound. The other two were westbound rear-end accidents occurring east of private drive.

ACCIDENT EVALUATION

The high rate of accidents occurring at the merge point of the IH30 westbound exit ramp and westbound Bridge Street has been identified as a problem area. The contributing factor for all except one of these accidents was listed as failure to yield right-of-way. The one exception was recorded as failure to control speed. For each accident, the motorist exiting from IH30 was identified as the responsible driver.

Several factors may be considered as contributing to the cause of these accidents. First, the angle of the IH30 westbound exit ramp traffic requires the driver to search approximately 150-degree field of vision to identify approaching vehicles. Second, the alignment of westbound travel lanes east of the intersection may cause confusion in identifying proper lane occupancy. Third, the multiple conflict points that exist with the introduction of the eastbound left-turn and private driveway traffic may also cause driver confusion.

Approximately 50 percent of these accidents have occurred between 12 noon and 5:00 p.m. This would indicate that the orientation of the intersection

movement is not subject to the influence of the location of the sun. It was further noted that only one of these accidents occurred under wet pavement conditions. It was not raining at the time of the accident.

A total of 54 accidents or 68 percent occurred during daylight conditions. The remaining were nighttime accidents, with 19 of the accidents occurring between 6 p.m. and 10 p.m.

Seventy (or 89 percent) of the accidents occurred in clear or cloudy weather conditions. No accidents related to sleet or snow were reported. Eighty-three percent of the accidents occurred when the pavement was considered dry.

Two other distinct patterns were found in the review of the accidents. First, the five single vehicle accidents were all associated with water accumulating in the low section of Bridge Street. No mention of this as a major contributing factor has been recorded since May 28, 1988. Therefore, it is assumed that this condition has been corrected. The second pattern is the high number of accidents occurring under nighttime conditions at the Oakland Boulevard/Bridge Street intersection. Approximately 52 percent of the accidents at this location occurred under nighttime conditions. These represent 44 percent of all of the nighttime accidents. The other location is the westbound approach from the IH30 exit ramp and eastbound Bridge Street. Approximately 50 percent of these accidents occurred at night.

A discussion of the recommended solutions to individual accident causes is presented in the next section.

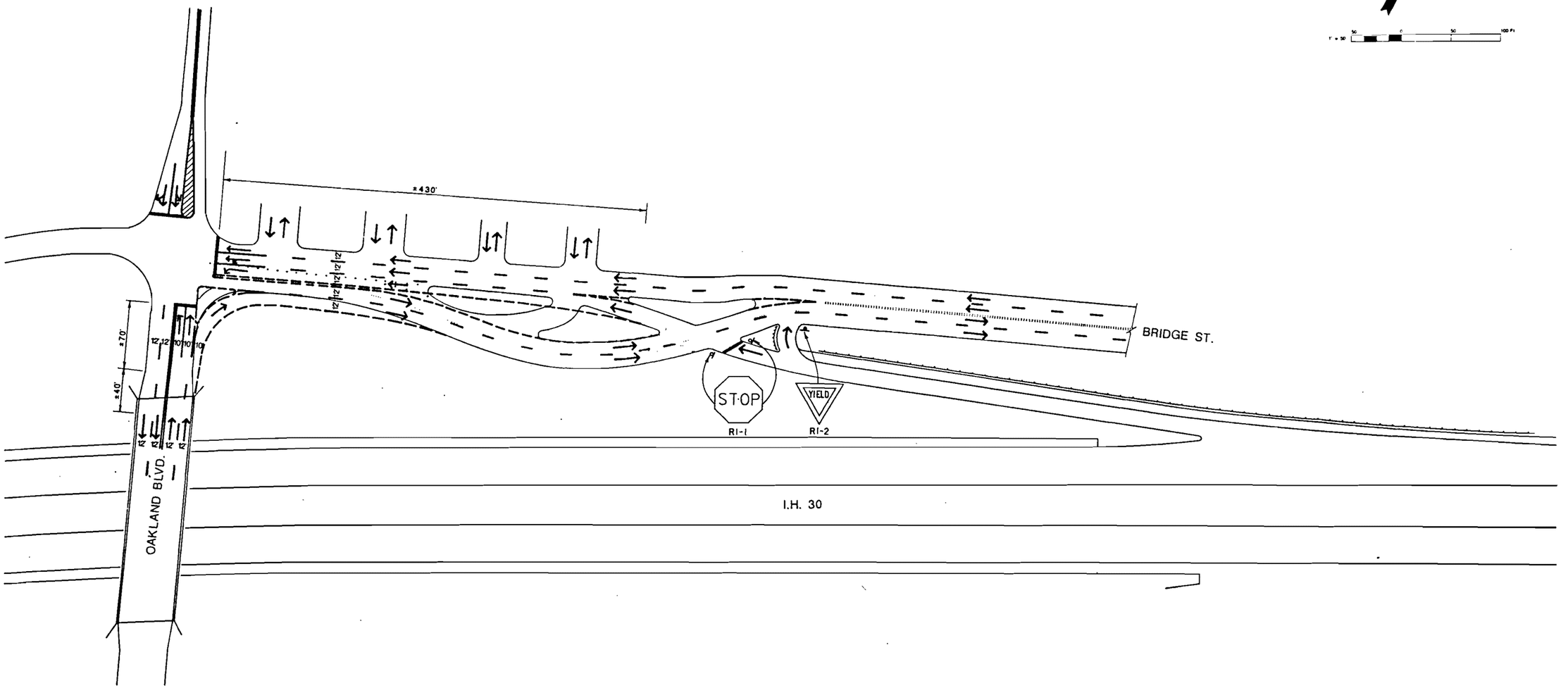
RECOMMENDATIONS

Consideration of the elimination of the stop condition on the exit ramp was given high priority. However, the low volume (approximately 280 peak hour demand) on the exit ramp and on eastbound Bridge Street (411 vehicles) would not justify the reversal of the stop traffic controls. The fact that only eight accidents occurred in the three-year period under the current traffic control plan further emphasizes the adequacy of the control methods at this location. Therefore, this analysis went beyond the matter of traffic control to evaluate alternative roadway geometrics and traffic operation plans to improve the safety of this intersection.

PROPOSED IMPROVEMENTS

A large number of accidents occur at the merge point of the IH30 exit ramp and westbound Bridge Street. The contributing factors, as presented in the accident evaluation section of this report, can be minimized with the addition of a separate lane for westbound IH30 exiting traffic as shown in Figure 4. This new lane would then eliminate the need to merge at the existing point. However, several other areas of the existing roadway and traffic control plan would be affected.

First, the restricted distance (approximately 430 feet) between the existing merge point and the Oakland Boulevard intersection will remain or be reduced. This is not enough distance to allow for the elimination of the new lane match to the original two-lane approach. The addition of this lane as a mandatory left-turn lane at Oakland Boulevard would accommodate over 75 percent the of exiting traffic from IH30. The second lane should be identified as an optional



Lockwood, Andrews & Newnam, Inc.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 2

FIGURE 4

RECOMMENDED IMPROVEMENTS
I.H. 30 – OAKLAND WESTBOUND EXIT RAMP

FORT WORTH, TEXAS

through lane or left-turn lane. It is estimated that this lane would accommodate approximately 400 vehicles during the p.m. peak hour. Approximately 220 vehicles would be expected to turn left at Oakland Boulevard, with the remaining proceeding west on the IH30 entrance ramp. The curb lane can be expected to accommodate the remaining 400 vehicles and to provide for right-turn and through movements at the intersection.

Interstate Highway 30 traffic wanting to turn right would need to cross and weave with two lane of traffic to complete these desired movements. As noted in the existing traffic section of this report, it is estimated that approximately 75 vehicles would desire to make this movement during the peak hour of demand. An estimated level-of-service of "C" or better can be maintained within this area.

Another important element of design that must be considered is the alignment of the new westbound lane. It is recommended that the new roadway width be added between the existing roadway and IH30 mainlanes. Additional widening may be accomplished on Oakland Boulevard. Adding a right-turn lane for northbound to eastbound traffic would add a required fifth lane on the south approach. This additional lane allows the changing of lane configurations across the Oakland Boulevard overpass. Provision for two lanes in each direction should be available. Therefore, the proposed double left turn for westbound traffic would have two 12-foot lanes exiting on the south approach.

There would also be a mandatory left-turn lane and an optional left and through lane on the south. The free right-turn lane should begin at the north bridge abutment and be provided with a generous turning radius. The added

lane should also be an exclusive eastbound lane to allow southbound left turns and northbound right turns to proceed simultaneously.

The final roadway geometric recommendation requires the closing of the left-turn lanes for eastbound vehicles on Bridge Street. Closing of this lane reduces the need to cross three lanes of westbound traffic and reduces the potential conflicts in the new merge/weave area of Bridge Street and the IH30 exit ramp traffic.

This design will require the relocation or elimination of a few traffic signs. It will also require additional signs and pavement markings tp identify the exclusive turn lanes. However, the only signal changes would involve the addition of new loop detectors on the east approach. No other major traffic control changes are anticipated.

SUMMARY

The implementation of these low cost improvements will have a direct impact on reducing the number and severity of accidents. These improvements will affect the primary accident areas of the existing westbound merge point and the intersection of Bridge Street and Oakland Boulevard.

Maintaining the existing stop condition on the IH30 exit ramp will not be expected to reduce the existing level-of-service or safety of the intersection of IH30 exiting traffic and Bridge Street. Only when the westbound exiting traffic leaves the stop condition will substantial improved safety and operations be realized.

The added number of lanes and final lane configurations should also provide an equal, if not better, level-of-service with improved safety. Therefore, it is recommended that the SDHPT begin roadway/intersection improvement plans for early implementation of these recommendations.

APPENDIX A

24-HOUR TRAFFIC COUNTS

Appendix A-1
VEHICLE VOLUME COUNTS

LOCATION:
START DATE AND TIME: 03/14/89 6:00 P.M.
END DATE AND TIME: 03/15/89 6:00 P.M.

	OAKLAND EXIT*		BRIDGE ST.**		BRIDGE ST.		BRIDGE ST.***	
	WEST BOUND	WEST BOUND	WEST BOUND	WEST BOUND	EAST BOUND	EAST BOUND	WEST BOUND	WEST BOUND
HOUR BEGINS	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	11	44	28	131	17	71	46	225
12:15	12	36	11	126	7	64	36	245
12:30	9	63	14	153	9	56	32	268
12:45	9	49	13	146	9	51	38	257
1:00	6	42	9	141	9	49	16	257
1:15	9	41	14	134	6	48	32	264
1:30	5	47	15	122	4	52	25	212
1:45	6	41	4	136	6	62	14	236
2:00	5	53	4	139	5	45	9	217
2:15	3	62	11	102	2	42	21	176
2:30	11	37	11	132	6	44	29	214
2:45	4	50	14	116	8	60	21	216
3:00	5	72	9	214	5	76	18	339
3:15	3	45	7	160	1	93	20	236
3:30	2	61	2	153	2	86	17	264
3:45	3	71	7	173	2	67	14	291
4:00	2	65	9	150	0	79	22	291
4:15	4	72	8	145	2	90	11	254
4:30	7	66	8	129	7	84	26	242
4:45	3	86	14	142	3	90	26	263
5:00	5	84	10	162	4	107	23	305
5:15	7	96	14	190	7	110	26	351
5:30	3	74	33	148	3	75	55	285
5:45	8	88	50	131	4	93	71	299
6:00	16	77	68	142	9	73	92	199
6:15	12	89	91	120	8	48	129	223
6:30	23	81	158	132	19	72	223	225
6:45	25	81	133	163	25	66	212	279
7:00	40	50	172	143	31	69	301	242
7:15	40	70	232	117	55	56	351	190
7:30	68	55	300	97	90	46	458	203
7:45	78	37	289	88	121	38	470	148
8:00	62	35	214	84	50	29	335	158
8:15	58	26	198	89	46	40	286	160
8:30	50	26	188	76	36	33	281	125
8:45	65	29	186	46	51	58	260	111
9:00	47	25	150	70	45	38	183	109
9:15	46	22	124	75	33	58	222	115
9:30	51	20	105	55	29	38	184	104
9:45	42	11	98	60	37	37	147	79
10:00	40	25	95	59	38	37	180	90
10:15	46	19	101	41	39	33	176	66
10:30	33	24	124	36	25	24	215	77
10:45	30	18	94	45	28	31	168	75
11:00	42	12	95	39	29	24	172	65
11:15	48	15	106	41	38	10	197	69
11:30	50	15	126	42	68	14	212	67
11:45	35	13	114	30	53	18	195	58
TOTAL	1188	2320	3880	5365	1131	2674	6297	9444

*OAKLAND EXIT RAMPS COUNTS WERE MADE ON 03/15/89 TO 03/16/89.
**BRIDGE ST. TRAFFIC EAST OF DRIVEWAY AND RAMP.
***BRIDGE ST. TRAFFIC WEST OF DRIVEWAY AND RAMP.

Appendix A-2
VEHICLE VOLUME COUNTS

LOCATION:
START DATE AND TIME: 03/21/89 6:00 P.M.
END DATE AND TIME: 03/22/89 6:00 P.M.

	IH30 EXIT RAMP				BRIDGE STREET			
	WEST BOUND	WEST BOUND	WEST* BOUND	WEST* BOUND	EAST BOUND	EAST BOUND	EAST** BOUND	EAST** BOUND
HOUR BEGINS	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	7	46	8	45	17	81	13	63
12:15	20	36	18	32	8	79	11	65
12:30	8	41	8	43	13	66	11	50
12:45	4	53	3	47	4	66	7	49
1:00	10	48	11	49	6	70	5	61
1:15	5	52	4	47	9	59	8	62
1:30	5	35	4	31	1	46	2	46
1:45	7	51	4	48	8	53	8	48
2:00	3	48	3	46	1	35	1	34
2:15	5	33	5	39	6	70	7	50
2:30	2	44	2	36	9	62	8	53
2:45	7	62	7	61	1	68	2	59
3:00	2	47	2	44	3	71	3	61
3:15	2	49	2	50	5	59	5	54
3:30	4	48	5	52	5	76	4	65
3:45	6	58	7	54	2	91	2	75
4:00	0	70	0	64	0	72	0	59
4:15	0	50	0	53	8	81	8	67
4:30	2	59	2	52	4	97	3	74
4:45	3	70	3	76	4	92	4	77
5:00	3	63	7	63	4	138	4	107
5:15	8	83	4	92	3	152	2	116
5:30	8	80	7	72	9	121	8	97
5:45	7	59	9	57	8	103	5	82
6:00	12	67	11	68	5	110	7	54
6:15	13	52	13	46	10	78	8	78
6:30	12	45	9	41	27	91	21	77
6:45	26	81	26	52	20	56	18	56
7:00	34	39	34	39	25	76	20	66
7:15	33	36	34	30	23	55	20	53
7:30	42	31	35	29	29	49	29	43
7:45	40	31	39	32	52	35	39	36
8:00	38	31	39	26	62	64	45	46
8:15	48	25	43	25	49	48	41	42
8:30	27	22	29	16	33	50	27	45
8:45	47	23	42	21	44	49	42	37
9:00	41	26	39	30	44	38	37	37
9:15	29	34	24	32	38	46	39	41
9:30	43	20	43	21	35	42	29	36
9:45	41	15	36	15	33	34	31	36
10:00	55	20	48	19	43	37	42	40
10:15	40	21	41	18	25	37	21	34
10:30	37	12	36	13	43	22	37	19
10:45	31	15	22	13	44	16	41	15
11:00	31	5	31	6	40	26	30	20
11:15	38	14	40	9	59	16	49	23
11:30	28	9	27	8	57	26	45	23
11:45	59	9	63	9	78	16	62	14
TOTAL	973	1968	929	1871	1056	3025	911	2545

*WEST OF RIGHT TURN TO EAST BOUND BRIDGE ST.
**EAST OF RAMP RIGHT TURN TO EAST BOUND BRIDGE ST.

Appendix A-3
VEHICLE VOLUME COUNTS

LOCATION:
START DATE AND TIME: 03/22/89 7:00 P.M.
END DATE AND TIME: 03/23/89 7:00 P.M.

	BRIDGE STREET				BRIDGE STREET		I30 EXIT RAMP	
	WEST* BOUND	WEST* BOUND	WEST** BOUND	WEST** BOUND	WEST*3 BOUND	WEST*3 BOUND	WEST BOUND	WEST BOUND
HOUR BEGINS	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	40	146	46	188	38	173	7	32
12:15	35	207	51	240	33	221	17	47
12:30	37	206	41	255	29	218	12	52
12:45	16	231	17	255	11	250	5	50
1:00	19	185	23	236	19	206	3	55
1:15	15	188	21	242	20	213	5	50
1:30	23	215	25	267	24	248	4	48
1:45	17	233	25	283	14	231	7	57
2:00	18	184	21	225	19	205	6	48
2:15	20	184	25	223	19	203	5	47
2:30	16	191	20	250	15	207	7	49
2:45	14	137	15	185	13	173	4	36
3:00	11	169	15	198	12	170	2	53
3:15	9	140	10	176	4	176	5	47
3:30	4	145	7	177	5	161	3	44
3:45	15	168	14	213	18	190	2	68
4:00	7	185	5	239	10	186	0	68
4:15	6	151	11	194	8	164	1	47
4:30	18	139	21	171	17	138	4	54
4:45	16	187	21	234	10	201	9	68
5:00	16	198	20	250	24	203	6	67
5:15	30	203	30	253	30	212	4	79
5:30	42	209	58	264	54	198	5	95
5:45	58	215	57	259	59	207	11	76
6:00	87	210	102	265	96	207	15	83
6:15	128	185	154	231	151	181	17	68
6:30	191	164	205	216	207	178	14	57
6:45	189	181	219	220	204	182	24	63
7:00	239	188	270	234	235	139	30	45
7:15	219	156	246	183	217	124	28	41
7:30	282	151	338	166	318	105	30	42
7:45	277	106	321	130	290	91	30	33
8:00	216	107	262	122	241	76	28	42
8:15	217	113	253	146	223	88	45	40
8:30	221	107	288	135	230	89	55	26
8:45	170	92	196	102	181	65	34	31
9:00	170	82	218	101	180	81	46	22
9:15	148	89	191	108	161	77	41	18
9:30	173	76	211	101	197	62	38	20
9:45	157	92	200	102	163	87	48	16
10:00	167	76	221	88	185	73	48	15
10:15	164	63	195	82	160	74	40	16
10:30	164	86	222	119	165	84	50	23
10:45	150	97	188	106	160	74	46	18
11:00	157	55	218	59	199	52	37	12
11:15	154	42	193	55	180	46	29	6
11:30	155	57	200	67	152	49	58	10
11:45	160	62	194	77	177	70	43	14
TOTAL	4857	7053	5904	8692	5177	7108	1008	2098

*WEST BOUND BRIDGE STREET WEST OF FIRST DRIVE AND EXIT RAMP.
**WEST BOUND BRIDGE STREET WEST OF SECOND DRIVE AND EXIT RAMP.
*3WEST BOUND BRIDGE STREET EAST OF DRIVES AND EXIT RAMP.

Appendix A-4
VEHICLE VOLUME COUNTS

LOCATION:
START DATE AND TIME: 04/24/89 5:00 P.M.
END DATE AND TIME: 04/25/89 5:00 P.M.

	BRIDGE STREET							
	EAST* BOUND	EAST* BOUND	EAST** BOUND	EAST** BOUND	EAST* BOUND	EAST* BOUND	EAST*3 BOUND	EAST*3 BOUND
HOUR BEGINS	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	15	60	10	52	15	60	4	41
12:15	11	46	14	65	11	44	11	64
12:30	17	63	8	56	14	58	8	40
12:45	9	46	9	60	10	49	8	55
1:00	10	57	7	43	9	51	10	47
1:15	7	39	6	38	6	43	2	40
1:30	5	40	3	48	6	39	9	37
1:45	4	49	4	57	3	46	1	32
2:00	4	50	8	71	5	50	4	43
2:15	9	65	4	73	8	63	6	41
2:30	4	66	6	71	4	64	6	63
2:45	7	70	11	69	6	70	2	55
3:00	10	61	6	72	11	60	9	54
3:15	5	67	4	59	5	69	6	63
3:30	4	56	4	68	4	55	6	50
3:45	4	67	2	83	3	68	2	49
4:00	2	77	4	94	3	76	3	57
4:15	4	91	1	79	4	88	3	84
4:30	1	77	4	78	1	79	1	67
4:45	4	75	2	115	4	73	1	79
5:00	2	109	3	104	2	102	4	108
5:15	3	100	8	109	3	110	3	95
5:30	9	108	4	102	9	98	3	85
5:45	4	94	5	98	4	97	5	101
6:00	5	89	7	70	5	86	3	81
6:15	7	69	14	72	7	71	7	76
6:30	14	66	25	61	13	62	9	55
6:45	25	62	31	66	19	65	14	45
7:00	29	63	64	54	35	61	21	48
7:15	61	51	83	45	55	51	34	59
7:30	80	41	121	40	80	40	57	36
7:45	119	38	56	56	120	36	88	37
8:00	60	52	57	50	59	54	94	22
8:15	59	44	35	42	52	43	47	42
8:30	37	43	34	61	44	43	48	47
8:45	31	51	40	74	28	47	25	34
9:00	41	64	22	54	38	66	29	51
9:15	26	55	39	33	28	52	31	49
9:30	45	34	38	42	40	36	21	35
9:45	33	42	38	48	33	41	34	30
10:00	33	44	46	33	33	41	33	34
10:15	46	35	34	29	43	35	26	31
10:30	31	28	45	25	30	29	26	30
10:45	47	25	44	30	48	25	36	27
11:00	40	29	38	25	38	28	37	16
11:15	37	22	44	21	37	22	36	25
11:30	40	21	62	8	36	18	27	19
11:45	57	9	73	19	53	12	46	16
TOTAL	1157	2710	1227	2822	1124	2676	946	2395

*EAST BOUND BRIDGE STREET EAST OF LEFT TURN TO PARKING LOT
**EAST BOUND BRIDGE STREET WEST OF LEFT TURN TO PARKING LOT
*3EAST BOUND BRIDGE STREET AT OAKLAND STREET INTERSECTION

APPENDIX B

PHOTOGRAPHICS

IH30 WB EXIT RAMP (LOOKING WEST)

IH30 WB EXIT RAMP (LOOKING EAST)

IH30 WB EXIT RAMP/BRIDGE STREET INTERSECTION
(LOOKING EAST)

BRIDGE STREET (LOOKING EAST)

IH30 WB EXIT RAMP/BRIDGE STREET INTERSECTION
(LOOKING EAST)

BRIDGE STREET (LOOKING WEST)

IH30 WB EXIT RAMP END TREATMENT
(LOOKING SOUTHEAST)

IH30 WB exit ramp U-TURN LANE
(LOOKING NORTH)

PRIVATE DRIVE (LOOKING SOUTHEAST)

OAKLAND BOULEVARD/BRIDGE STREET INTERSECTION
(LOOKING WEST)

IH30 WB EXIT RAMP TO BRIDGE STREET EB

BRIDGE STREET LOOKING WEST AT IH30 WB EXIT RAMP