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16. Abstract <p>The objective of this study was to collect site-specific information, specifically regarding traffic classification counts and vehicle weights, at or near special-use activity centers. Report 420-3F (1) contains the complete results of these field studies. Commodities examined in the traffic classification counts were: timber, produce, grain, beef cattle, limestone, and sand/gravel. Vehicle weight data were collected using portable weigh-in-motion (WIM) systems. In the weight studies, these same commodities were included with one addition -- oilfield activities. The results of these studies are reported herein along with information to relate site-specific information to total district activity and total statewide activity.</p> <p>Reference Section numbers noted throughout the Executive Summary correspond to sections in the full report, Report 420-3F. Traffic counts cited in this document were taken from State Department of Highways and Public Transportation Annual Count Maps.</p>					
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RESULTS OF SPECIAL-USE TRUCK DATA COLLECTION

EXECUTIVE SUMMARY

by

Dan R. Middleton

Research Report 420-3F
Research Study Number 2-18-85/8-420
Identification of Special-Use Truck Traffic

Sponsored by

Texas State Department of Highways and Public Transportation
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TEXAS TRANSPORTATION INSTITUTE
The Texas A&M University System
College Station, Texas

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TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 OBJECTIVE	1
1.2 DEFINITION OF SPECIAL-USE TRAFFIC	1
1.3 DESCRIPTION OF DATA COLLECTION PROCESS	1
2.0 FIELD STUDY RESULTS	3
2.1 TIMBER	3
2.1.1 CLASSIFICATION COUNTS	3
2.1.1.1 Particle Board Mill, Site No. 110	3
2.1.1.2 Particle Board Mill, Site No. 111	3
2.1.1.3 Pulpwood Mill, Site No. 120	4
2.1.1.4 Pulpwood Mill, Site No. 121	5
2.1.1.5 Plywood Mill, Site No. 130	5
2.1.1.6 Plywood Mill, Site No. 131	6
2.1.1.7 Plywood Mill, Site No. 132	6
2.1.1.8 Plywood Mill, Site No. 133	7
2.1.1.9 Sawmill, Site No. 140	7
2.1.1.10 Sawmill, Site No. 141	8
2.1.1.11 Sawmill, Site No. 142	8
2.1.1.12 Sawmill, Site No. 143	9
2.1.1.13 Sawmill, Site No. 144	9
2.1.1.14 Sawmill, Site No. 145A	10
2.1.2 WEIGH-IN-MOTION RESULTS FOR TIMBER	11
2.2 PRODUCE	12

2.2.1	CLASSIFICATION COUNTS	12
2.2.1.1	Produce Distributor, Site No. 200	12
2.2.1.2	Produce Distributor, Site No. 201	12
2.2.1.3	Produce Distributor, Site No. 202	13
2.2.1.4	Produce Distributor, Site No. 203	13
2.2.1.5	Produce Distributor, Site No. 204	13
2.2.1.6	Produce Distributor, Site No. 205	14
2.2.2	WEIGH-IN-MOTION RESULTS FOR PRODUCE	15
2.3	GRAIN	16
2.3.1	CLASSIFICATION COUNTS	16
2.3.1.1	Grain Elevator, Site No. 300	16
2.3.1.2	Grain Elevator, Site No. 301	16
2.3.1.3	Grain Elevator, Site No. 302	16
2.3.1.4	Grain Elevator, Site No. 303	17
2.3.1.5	Grain Elevator, Site No. 304	17
2.3.1.6	Grain Elevator, Site No. 305	18
2.3.1.7	Grain Elevator, Site No. 306	18
2.3.1.8	Grain Elevator, Site No. 307	18
2.3.1.9	Grain Elevator, Site No. 308A	19
2.3.1.10	Grain Elevator, Site No. 309A	19
2.3.1.11	Grain Elevator, Site No. 310	20
2.3.1.12	Grain Elevator, Site No. 311	20
2.3.1.13	Grain Elevator, Site No. 312A	21
2.3.2	WEIGH-IN-MOTION RESULTS FOR GRAIN	22

2.4 BEEF CATTLE	23
2.4.1 CLASSIFICATION COUNTS	23
2.4.1.1 Cattle Feedlot, Site No. 400	23
2.3.1.2 Cattle Feedlot, Site No. 401	23
2.4.1.3 Cattle Feedlot, Site No. 402	24
2.4.1.4 Cattle Feedlot, Site No. 403	24
2.4.1.5 Cattle Feedlot, Site No. 404	24
2.4.1.6 Cattle Feedlot, Site No. 405	25
2.4.1.7 Cattle Feedlot, Site No. 406	25
2.4.1.8 Cattle Feedlot, Site No. 407	26
2.4.1.9 Cattle Feedlot, Site No. 408	26
2.4.1.10 Cattle Feedlot, Site No. 409	27
2.4.1.11 Cattle Feedlot, Site No. 410	27
2.4.2 WEIGH-IN-MOTION RESULTS FOR BEEF CATTLE	28
2.5 LIMESTONE	29
2.5.1 CLASSIFICATION COUNTS	29
2.5.1.1 Limestone Quarry, Site No. 500	29
2.5.1.2 Limestone Quarry, Site No. 501	29
2.5.1.3 Limestone Quarry, Site No. 502A	30
2.5.1.4 Limestone Quarry, Site No. 503	30
2.5.1.5 Limestone Quarry, Site No. 504A	30
2.5.1.6 Limestone Quarry, Site No. 505A	31
2.5.1.7 Limestone Quarry, Site No. 506	31
2.5.1.8 Limestone Quarry, Site No. 507A	32

2.5.1.9	Limestone Quarry, Site No. 508	32
2.5.1.10	Limestone Quarry, Site No. 509	33
2.5.1.11	Limestone Quarry, Site No. 510A	33
2.5.1.12	Limestone Quarry, Site No. 511	33
2.5.1.13	Limestone Quarry, Site No. 512	34
2.5.1.14	Limestone Quarry, Site No. 513	34
2.5.1.15	Limestone Quarry, Site No. 514	35
2.5.1.16	Limestone Quarry, Site No. 515	35
2.5.2	WEIGH-IN-MOTION RESULTS FOR LIMESTONE	36
2.6	SAND AND GRAVEL	37
2.6.1	CLASSIFICATION COUNTS	37
2.6.1.1	Sand/Gravel Pit, Site No. 600	37
2.6.1.2	Sand/Gravel Pit, Site No. 601	37
2.6.1.3	Sand/Gravel Pit, Site No. 602	38
2.6.1.4	Sand/Gravel Pit, Site No. 603	38
2.6.1.5	Sand/Gravel Pit, Site No. 604A	38
2.6.1.6	Sand/Gravel Pit, Site No. 605	39
2.6.1.7	Sand/Gravel Pit, Site No. 606	39
2.6.1.8	Sand/Gravel Pit, Site No. 607A	40
2.6.1.9	Sand/Gravel Pit, Site No. 608A	40
2.6.1.10	Sand/Gravel Pit, Site No. 609A	41
2.6.1.11	Sand/Gravel Pit, Site No. 610A	41
2.6.1.12	Sand/Gravel Pit, Site No. 611	42
2.6.1.13	Sand/Gravel Pit, Site No. 612	42

2.6.1.14 Sand/Gravel Pit, Site No. 613A	42
2.6.1.15 Sand/Gravel Pit, Site No. 614	43
2.6.2 WEIGH-IN-MOTION RESULTS FOR SAND/GRAVEL	43
2.7 OILFIELD ACTIVITIES	45
2.7.1 WEIGH-IN-MOTION RESULTS FOR OILFIELD ACTIVITIES .	45
3.0 CONCLUSIONS	46
4.0 REFERENCES	48

LIST OF TABLES

<u>Tables</u>	<u>Page</u>
2.1.1.1 Traffic Classification Counts for Site 110	3
2.1.1.2 Traffic Classification Counts for Site 111	4
2.1.1.3 Traffic Classification Counts for Site 120	4
2.1.1.4 Traffic Classification Counts for Site 121	5
2.1.1.5 Traffic Classification Counts for Site 130	5
2.1.1.6 Traffic Classification Counts for Site 131	6
2.1.1.7 Traffic Classification Counts for Site 132	6
2.1.1.8 Traffic Classification Counts for Site 133	7
2.1.1.9 Traffic Classification Counts for Site 140	7
2.1.1.10 Traffic Classification Counts for Site 141	8
2.1.1.11 Traffic Classification Counts for Site 142	8
2.1.1.12 Traffic Classification Counts for Site 143	9
2.1.1.13 Traffic Classification Counts for Site 144	9
2.1.1.14 Traffic Classification Counts for Site 145A	10
2.1.2.1 Timber Cumulative Weights	11
2.2.1.1 Traffic Classification Counts for Site 200	12
2.2.1.2 Traffic Classification Counts for Site 201	12
2.2.1.3 Traffic Classification Counts for Site 202	13
2.2.1.4 Traffic Classification Counts for Site 203	13
2.2.1.5 Traffic Classification Counts for Site 204	14
2.2.1.6 Traffic Classification Counts for Site 205	14
2.2.2.1 Produce Cumulative Weights	15
2.3.1.1 Traffic Classification Counts for Site 300	16
2.3.1.2 Traffic Classification Counts for Site 301	16
2.3.1.3 Traffic Classification Counts for Site 302	17
2.3.1.4 Traffic Classification Counts for Site 303	17
2.3.1.5 Traffic Classification Counts for Site 304	18
2.3.1.6 Traffic Classification Counts for Site 305	18
2.3.1.7 Traffic Classification Counts for Site 306	18
2.3.1.8 Traffic Classification Counts for Site 307	19
2.3.1.9 Traffic Classification Counts for Site 308A	19
2.3.1.10 Traffic Classification Counts for Site 309A	20
2.3.1.11 Traffic Classification Counts for Site 310	20
2.3.1.12 Traffic Classification Counts for Site 311	21
2.3.1.13 Traffic Classification Counts for Site 312A	21
2.3.2.1 Grain Cumulative Weights	22
2.4.1.1 Traffic Classification Counts for Site 400	23
2.4.1.2 Traffic Classification Counts for Site 401	23
2.4.1.3 Traffic Classification Counts for Site 402	24
2.4.1.4 Traffic Classification Counts for Site 403	24
2.4.1.5 Traffic Classification Counts for Site 404	25
2.4.1.6 Traffic Classification Counts for Site 405	25

LIST OF TABLES (continued)

<u>Table</u>	<u>Page</u>
2.4.1.7 Traffic Classification Counts for Site 406	26
2.4.1.8 Traffic Classification Counts for Site 407	26
2.4.1.9 Traffic Classification Counts for Site 408	27
2.4.1.10 Traffic Classification Counts for Site 409	27
2.4.1.11 Traffic Classification Counts for Site 410	28
2.4.2.1 Cattle Cumulative Weights	28
2.5.1.1 Traffic Classification Counts for Site 500	29
2.5.1.2 Traffic Classification Counts for Site 501	29
2.5.1.3 Traffic Classification Counts for Site 502A	30
2.5.1.4 Traffic Classification Counts for Site 503	30
2.5.1.5 Traffic Classification Counts for Site 504A	31
2.5.1.6 Traffic Classification Counts for Site 505A	31
2.5.1.7 Traffic Classification Counts for Site 506	32
2.5.1.8 Traffic Classification Counts for Site 507A	32
2.5.1.9 Traffic Classification Counts for Site 508	32
2.5.1.10 Traffic Classification Counts for Site 509	33
2.5.1.11 Traffic Classification Counts for Site 510A	33
2.5.1.12 Traffic Classification Counts for Site 511	34
2.5.1.13 Traffic Classification Counts for Site 513	35
2.5.1.14 Traffic Classification Counts for Site 514	35
2.5.1.15 Traffic Classification Counts for Site 515	36
2.5.2.1 Limestone Cumulative Weights	36
2.6.1.1 Traffic Classification Counts for Site 600	37
2.6.1.2 Traffic Classification Counts for Site 601	37
2.6.1.3 Traffic Classification Counts for Site 602	38
2.6.1.4 Traffic Classification Counts for Site 603	38
2.6.1.5 Traffic Classification Counts for Site 604A	39
2.6.1.6 Traffic Classification Counts for Site 605	39
2.6.1.7 Traffic Classification Counts for Site 606	40
2.6.1.8 Traffic Classification Counts for Site 607A	40
2.6.1.9 Traffic Classification Counts for Site 608A	41
2.6.1.10 Traffic Classification Counts for Site 610A	41
2.6.1.11 Traffic Classification Counts for Site 611	42
2.6.1.12 Traffic Classification Counts for Site 612	42
2.6.1.13 Traffic Classification Counts for Site 613A	43
2.6.1.14 Traffic Classification Counts for Site 614	43
2.6.2.1 Sand and Gravel Cumulative Weights	44
2.7.1.1 Petroleum Cumulative Weights	45

1.0 INTRODUCTION

1.1 OBJECTIVE

The objective of this study was to collect site-specific information, specifically regarding traffic classification counts and vehicle weights, at or near special-use activity centers. Report 420-3F (1) contains the complete results of these field studies. Commodities examined in the traffic classification counts were: timber, produce, grain, beef cattle, limestone, and sand/gravel. Vehicle weight data were collected using portable weigh-in-motion (WIM) systems. In the weight studies, these same commodities were included with one addition -- oilfield activities. The results of these studies are reported herein along with information to relate site-specific information to total district activity and total statewide activity.

Reference Section numbers noted throughout this Executive Summary correspond to sections in the full report, Report 420-3F. Traffic counts cited in this document were taken from State Department of Highways and Public Transportation Annual Count Maps.

1.2 DEFINITION OF SPECIAL-USE TRAFFIC

The term "special-use" has been coined to give specific designation to truck traffic which is atypical in travel patterns, trip lengths, and axle loads. The travel patterns of these vehicles tend to be cyclical in nature, with the same trip being made in some cases several times in the same day. Trip lengths are relatively short, usually less than one hundred miles. The origin and destination may remain the same month after month, but usually either the origin or the destination will change after a period of time. Axle loads, although generally not well documented, are in many cases greater than normally expected. Finally, special-use truck traffic in many cases experiences seasonal variations due to rainfall or the harvest season, as in the agricultural commodities.

1.3 DESCRIPTION OF DATA COLLECTION PROCESS

Site-specific vehicle classification counts were conducted by manual methods, utilizing two persons at each site in most cases. Appendix A of Report 420-3F contains the count forms and interview forms used. Data collected included a) the number of vehicle-trips entering and exiting the activity center by vehicle type tallied by 15 minute intervals and b) vehicle-trips passing the count location on the state or local jurisdiction roadway. Trucks counted in the second category were further broken down into special-use vehicles and other vehicles in order to assess the full impact of special-use activity centers. Spreadsheets for each site are included in Appendix B of Report 420-3F. The count period was typically daylight hours only for a time period of 8 to 12 hours each day. One-day counts were conducted on randomly selected dates. Study crews studied each activity center at least one full day, and usually two to four days. Office interviews supplemented field counts on the same day the count was conducted in order to compare the count information with interview questions which attempted to quantify average or typical conditions. The predominant direction of approach for loaded special-use trucks was recorded for many sites; however, for some locations this direction

changed often due to changing trip origins. The size element sometimes provided in this summary for activity centers (small, medium, large) is subjectively based on the magnitude of total activity, comparisons with competing centers, and industry information regarding productivity ranges.

For vehicle weights, portable weigh-in-motion systems were used. The initial site-selection process used the following criteria: a) locations near activity centers previously identified for classification counts, b) locations with high truck volumes, c) locations with a smooth approach roadway profile, and d) locations with truck speeds over 40 miles per hour. Previous experience with the WIM systems dictated that a sample size of 50 to 100 trucks in a day's time was desirable in order to achieve a reasonably reliable sample. Speeds less than 40 mph yielded erroneous weights in most cases. Weight data gathering was usually continued for a time period of one work day, from about 8 a.m. to 4 p.m. For commodity movement which continued into the night (e.g. produce), data collection also continued. Results presented herein are a composite of day and night activities in those cases.

The portable WIM system had some shortcomings. Traffic control was a concern during setup and removal of the loops and mat in the traffic lane. Truckers often avoided the mat in low volume situations where there was little or no opposing traffic. The system was calibrated at a remote site and then used at several data collection sites before recalibration. In tests previously conducted where calibration was done on-site, accuracy of ± 10 percent for gross vehicle weights and ± 15 percent on axle groups with 95 percent confidence has been found. However, for this study where calibration was accomplished off-site, it was not possible to determine any systematic shift in results. No attempt was made in the field to physically compare WIM results reported herein with statically determined weights. Therefore, none of the truck weight results reported herein have been adjusted, even if they appeared to be higher or lower than expected.

2.0 FIELD STUDY RESULTS

2.1 TIMBER

2.1.1 CLASSIFICATION COUNTS

2.1.1.1 Particle Board Mill, Site No. 110

Site No. 110 includes the total traffic generated by two mills -- a plywood mill and the desired particle board mill. Because both mills used the same entrance and a separation of traffic generated by the two was not possible, the field counts represent total trips generated by both mills. It was not possible through the interview process to get information about the particle board mill by itself. Therefore, the two were combined, with more information provided in Report 420-3F (1) on the plywood mill. Access to this site was provided by a U.S. Highway with an average daily traffic (ADT) of 12,500 vehicles per day (1986). Field data collected in 1988 indicate that the percentage of trucks on this roadway increased from 17 percent to 23 percent due to the influence of special-use activities in the area. The 3-S2 was the dominant truck type on the roadway at 75 percent of total trucks. The site had access to a railroad which hauled finished products from the site. Table 2.1.1.1 provides a summary of results based on field data collection.

Table 2.1.1.1 Traffic Classification Counts for Site 110
(Plywood Mill and Particle Board Mill)¹

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
1/13/84	650	27	4	244	5	930	11%	89%	70%	30%
7/30/86	879	36	0	261	0	1176	12%	88%	75%	25%
4/28/88	437	74	8	353	0	872	19%	81%	50%	50%

¹ Approximately 45 percent of total daily 3-S2 truck trips shown above are generated by the particle board mill.

2.1.1.2 Particle Board Mill, Site No. 111

Site No. 111 includes a plywood operation, a sawmill, and the desired particle board mill. There was no practical way during field data collection to isolate one part of the total operation. Therefore, traffic counts shown in Table 2.1.1.2 include all three elements of the site. This site is also served by a railroad which hauls finished products away from the mill. Access to this site is provided by a Farm-to-Market Highway with an average daily traffic (ADT) of 13,800 vehicles per day (1986). Field data collected in 1986 indicate that the percentage of trucks on this roadway increased from 1 percent to 6

percent due to the influence of special-use activities in the area. The 3-S2 was the dominant truck type at 85 percent of total trucks. Table 2.1.1.2 provides a summary of results based on field data collection.

Table 2.1.1.2. Traffic Classification Counts for Site 111
(Sawmill, Particle Board Mill and Plywood Mill)¹

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
5/23/85	1610	22	9	344	0	1985	8%	92%	81%	19%
10/28/86	1192	5	7	321	0	1525	4%	96%	78%	22%
10/29/86	1153	8	34	431	0	1626	9%	91%	71%	29%

¹ Approximately 33 percent of total daily truck trips shown above are generated by the particle board mill.

2.1.1.3 Pulpwood Mill, Site No. 120

Site No. 120 is a large pulpwood mill. Table 2.1.1.3 is a summary of field data collection results showing the number of trips generated by this activity center over a time period from about 6 a.m. to 6 p.m. on the dates shown. This mill is served by a railroad which hauls finished products from the mill, but hauls no raw materials into the mill. Access to this mill is provided by a U.S. Highway with a 1988 average daily traffic (ADT) of 15,000 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 7 percent to 10 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 63 percent.

Table 2.1.1.3 Traffic Classification Counts for Site 120 (Pulpwood Mill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
5/1/85	1012	37	27	235	1	1312	21%	79%	77%	23%
10/21/86	1093	38	30	332	0	1493	17%	83%	73%	27%
10/22/86	1005	29	29	351	0	1414	14%	86%	71%	29%

2.1.1.4 Pulpwood Mill, Site No. 121

Site No. 121 is a large pulpwood mill. Table 2.1.1.4 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This mill is served by a railroad which hauls finished products from the mill, but hauls no raw materials into the mill. Access to this mill is provided by a State Highway with a 1986 average daily traffic (ADT) of 10,900 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 6 percent to 12 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 77 percent.

Table 2.1.1.4 Traffic Classification Counts for Site 121 (Pulpwood Mill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
1/13/84	1796	53	52	360	15	2276	22%	78%	79%	21%
9/29/86	1592	56	19	447	0	2114	14%	86%	75%	25%
9/30/86	1511	63	27	463	0	2064	16%	84%	73%	27%

2.1.1.5 Plywood Mill, Site No. 130

Site No. 130 is a large plywood mill. This is the only plywood mill studied which uses hardwood; all others use softwood. Table 2.1.1.5 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This mill is served by a railroad which hauls finished products from the mill, but hauls no raw materials into the mill. Access to this mill is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 1,900 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 2 percent to 8 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 56 percent.

Table 2.1.1.5 Traffic Classification Counts for Site 130 (Plywood Mill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	2-S2	Total	SU	Comb	Cars	Trucks
6/5/86	299	13	0	41	0	353	24%	76%	85%	15%
10/15/86	626	11	8	38	3	686	32%	68%	91%	9%
10/16/86	738	30	18	67	3	856	41%	59%	86%	14%

2.1.1.6 Plywood Mill, Site No. 131

Site No. 131 is a large plywood mill. Table 2.1.1.6 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This mill is served by a railroad which hauls finished products from the mill, but hauls no raw materials into the mill. Access to this mill is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 2,000 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 4 percent to 29 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 94 percent.

Table 2.1.1.6 Traffic Classification Counts for Site 131 (Plywood Mill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
5/13/85	402	3	2	384	0	791	1%	99%	51%	49%
10/7/86	327	8	1	420	0	756	2%	98%	43%	57%
10/8/86	324	10	1	379	0	714	3%	97%	45%	55%

2.1.1.7 Plywood Mill, Site No. 132

Site No. 132 is a large plywood mill. Table 2.1.1.7 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 1,300 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 7 percent to 29 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 88 percent.

Table 2.1.1.7 Traffic Classification Counts for Site 132 (Plywood Mill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
6/4/85	1010	6	0	280	88	1384	2%	98%	73%	27%
9/24/86	579	4	0	236	5	824	2%	98%	70%	30%
9/25/86	601	2	0	245	8	856	1%	99%	70%	30%
4/28/88	454	1	8	171	7	641	5%	95%	71%	29%

2.1.1.8 Plywood Mill, Site No. 133

Site No. 133 is a large plywood mill. Table 2.1.1.8 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This mill is served by a railroad which hauls finished products from the mill, but hauls no raw materials into the mill. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 1,600 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 10 percent to 29 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 88 percent.

Table 2.1.1.8 Traffic Classification Counts for Site 133 (Plywood Mill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Truck
5/22/85	598	10	46	210	0	864	21%	79%	69%	31%
7/29/86	626	8	18	289	0	941	8%	92%	66%	34%
7/30/86	615	4	26	237	0	972	8%	92%	63%	37%

2.1.1.9 Sawmill, Site No. 140

Site No. 140 is a medium-sized sawmill. Table 2.1.1.9 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 3,100 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 6 percent to 10 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 60 percent.

Table 2.1.1.9 Traffic Classification Counts for Site 140 (Sawmill)

Date	Vehicle Classification					% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Total	SU	Comb	Cars	Truck
5/21/85	123	3	15	54	195	25%	75%	63%	37%
7/31/86	187	21	10	70	288	31%	69%	65%	35%
8/01/86	153	4	6	28	191	26%	74%	80%	20%

2.1.1.10 Sawmill, Site No. 141

Site No. 141 is a large sawmill. Table 2.1.1.10 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This mill is served by a railroad which hauls finished products from the mill, but hauls no raw materials into the mill. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 1,500 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 8 percent to 11 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 79 percent.

Table 2.1.1.10 Traffic Classification Counts for Site 141 (Sawmill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
6/04/85	650	7	7	250	0	914	5%	95%	71%	29%
8/07/86	733	0	7	093	1	834	7%	93%	88%	12%
8/12/86	683	0	7	135	0	825	5%	95%	83%	17%

2.1.1.11 Sawmill, Site No. 142

Site No. 142 is a large sawmill. Table 2.1.1.11 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This mill is not served by a railroad. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 4,000 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 2 percent to 24 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 76 percent.

Table 2.1.1.11 Traffic Classification Counts for Site 142 (Sawmill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
6/05/85	232	4	15	114	0	365	14%	86%	64%	36%
8/13/86	221	1	7	56	0	285	12%	88%	78%	22%
8/14/86	226	1	15	147	0	389	10%	90%	58%	42%

2.1.1.12 Sawmill, Site No. 143

Site No. 143 is a small sawmill. Table 2.1.1.12 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 4,100 vehicles per day. Field data collected in 1986 indicate that the number of trucks on the roadway increased due to special-use activities, but the percentage was unchanged (rounding). The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 83 percent.

Table 2.1.1.12 Traffic Classification Counts for Site 143 (Sawmill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
6/06/85	204	9	18	16	0	247	63%	37%	83%	17%
10/02/86	176	1	10	33	0	220	25%	75%	80%	20%
10/03/86	174	4	11	34	0	223	31%	69%	78%	22%

2.1.1.13 Sawmill, Site No. 144

Site No. 144 is a small sawmill. Table 2.1.1.13 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This mill is not served by a railroad. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 13,600 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 10 percent to 12 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 83 percent.

Table 2.1.1.13 Traffic Classification Counts for Site 144 (Sawmill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
5/17/85	192	0	4	20	0	216	17%	83%	89%	11%
7/29/86	131	1	4	17	0	153	23%	77%	86%	14%
4/27/88	187	1	12	60	19 ¹	279	14%	86%	67%	33%

2.1.1.14 Sawmill, Site No. 145A

Site No. 145A is a large sawmill. Table 2.1.1.14 is a summary of field data collection results showing the number of trips generated by this activity center over a time period from about 6 a.m. to 6 p.m. on the dates shown. This mill is served by a railroad, although mill officials estimated only one percent of outgoing products are shipped by rail. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 3,400 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 1 percent to 7 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 71 percent.

Table 2.1.1.14 Traffic Classification Counts for Site 145A (Sawmill)

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
8/05/86	193	0	5	141	2	341	3%	97%	57%	43%
8/06/86	180	0	9	105	2	296	8%	92%	61%	39%
4/06/88	149	2	10	103	1	265	10%	90%	56%	44%

2.1.2 WEIGH-IN-MOTION RESULTS FOR TIMBER

Cumulative distribution plots provided in Report 420-3F, Volume 1, have been summarized in Table 2.1.2.1. No adjustments have been made to any of the raw weight data collected by the weigh-in-motion systems. Calibration of the system was checked on a regular basis or when weights varied significantly from typical expected weights of a particular vehicle class.

Table 2.1.2.1 Timber Cumulative Weights

W - I - M SUMMARY							
Commodity Timber	Site No.	Percentage Weights					
		50	85	90	95	98	100
Single Axle SU-1	110	5.7	9.7	10	15.6	19.3	20
	121	5	10.3	11.7	16.6	20.7	22
	140	8.7	12	15.3	19.3	26.3	28
3-S2	110	7	8.5	9	9.5	12.5	16
	121	6.2	7.5	7.7	8	8.7	10
	133	8.8	9.7	9.9	11	11.7	12
Tandem Axle SU-2	110	18.3	32.5	33.3	34.5	36.7	40
	121	18.3	25	30	33.3	36.7	40
	133	24	40	43.3	51.7	61.7	65
3-S2	110	18.3	29	30	33.3	35	50
	121	15	29	31.7	34	36.7	50
	133	36	41.7	43.3	44	46.7	55
	140	26.7	38.3	41	43.3	44	45
	140	23.3	32.5	35	38.3	41.7	45
Gross Vehicle Weight SU-2	110	25	39	41	43.3	44	45
	121	23.5	34	41	43.3	45	50
	133	32	50	52.5	55	66.7	70
3-S2	110	43.4	65	68.3	70	73.4	98.3
	121	35	64	68	71.7	74	80
	133	72.5	85	88	92	95	105

2.2 PRODUCE

2.2.1 CLASSIFICATION COUNTS

2.2.1.1 Produce Distributor, Site No. 200

Site No. 200 is a large produce distributor. Table 2.2.1.1 is a summary of field data collection results showing the number of trips generated by this activity center over a time period from about 7 a.m. to 12 midnight on the dates shown. Access to this activity center is provided by a four-lane arterial urban street with a 1986 average daily traffic (ADT) of 19,000 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 2 percent to 3 percent due to special-use activities.

Table 2.2.1.1 Traffic Classification Counts for Site 200

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
5/28/85	315	257	84	0	21	677	94%	6%	46%	54%
3/29/88	243	71	2	84	4	404	45%	55%	60%	40%

2.2.1.2 Produce Distributor, Site No. 201

Site No. 201 is a large produce distributor. Table 2.2.1.2 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 12 midnight on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 12,000 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 2 percent to 5 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 31 percent.

Table 2.2.1.2 Traffic Classification Counts for Site 201

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
3/31/88	555	83	59	99	51	847	49%	51%	66%	34%

2.2.1.3 Produce Distributor, Site No. 202

Site No. 202 is a medium-sized produce distributor. Table 2.2.1.3 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 12 midnight on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 5,400 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 2 percent to 4 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 41 percent.

Table 2.2.1.3 Traffic Classification Counts for Site 202

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
4/01/88	403	48	36	89	2	578	48%	52%	70%	30%

2.2.1.4 Produce Distributor, Site No. 203

Site No. 203 is a small produce distributor. Table 2.2.1.4 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 12 midnight on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 2,400 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 4 percent to 6 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 46 percent.

Table 2.2.1.4 Traffic Classification Counts for Site 203

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
4/01/88	110	10	37	16	0	173	75%	25%	64%	36%
5/30/85	17	18		11	0	46	62%	38%	37%	63%

2.2.1.5 Produce Distributor, Site No. 204

Site No. 204 is a small produce distributor. Table 2.2.1.5 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 12 midnight on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 740

vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 6 percent to 16 percent due to special-use activities.

Table 2.2.1.5 Traffic Classification Counts for Site 204

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
5/28/85	155	33	2	35	8	233	45%	55%	66%	34%
3/30/88	354	40	15	20	17	446	60%	40%	79%	21%

2.2.1.6 Produce Distributor, Site No. 205

Site No. 205 is a produce "freezer operation." This is the only freezer operation studied. Table 2.2.1.6 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 7 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 960 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 5 percent to 12 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 48 percent.

Table 2.2.1.6 Traffic Classification Counts for Site 205

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb.	Cars	Trucks
4/06/88	272	20	15	18	4	329	68%	32%	83%	17%
6/13/85	164	12	0	2	0	178	93%	7%	92%	8%

2.2.2 WEIGH-IN-MOTION RESULTS FOR PRODUCE

Cumulative distribution plots provided in Report 420-3F, Volume 1, have been summarized in Table 2.2.2.1. No adjustments have been made to any of the raw weight data collected by the weigh-in-motion systems. Calibration of the system was checked on a regular basis or when weights varied significantly from typical expected weights of a particular vehicle class.

Table 2.2.2.1 Produce Cumulative Weights

W - I - M SUMMARY							
Commodity Produce	Site No.	Percentage Weights					
		50	85	90	95	98	100
Single Axle SU-1	281	8.7	22	23.3	25.4	30.6	32
	281	6.7	14	17.3	20	22	24
SU-2	83	6.3	10.7	11.8	13.3	14.3	16
3-S2	281	11	14.7	16	18.7	22	26
Tandem Axle SU-2	281	14	28.5	31.7	36.7	38.3	40
	83	14	26.7	28.3	31.7	35	45
3-S2	281	26.7	43.3	46.7	51.7	56.7	65
	281	26.5	34.5	35.7	38.3	39	40
3-S2	83	16	29	31	33.3	35	40
	Gross Vehicle Weight SU-1	281	16	26	28.3	30	33.3
83		14	18.5	19	20	21.7	25
SU-2	281	21	38.3	40	43.3	48.3	55
	83	19	31.7	34	41.7	44	55
3-S2	281	71.7	105	116.7	136.7	143.4	145
	281	63.3	77	79	81	83.3	85

2.3 GRAIN

2.3.1 CLASSIFICATION COUNTS

2.3.1.1 Grain Elevator, Site No. 300

Site No. 300 is a medium-sized grain elevator. Table 2.3.1.1 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 10 a.m. to 6 p.m. on the dates shown. This elevator is not served by a railroad. Access to this activity center is provided by a State Highway. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 20 percent to 24 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 67 percent.

Table 2.3.1.1 Traffic Classification Counts for Site 300

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb.	Cars	Trucks
7/27/88	444	23	48	121	0	636	37%	63%	70%	30%

2.3.1.2 Grain Elevator, Site No. 301

Site No. 301 is a small grain elevator. Table 2.3.1.2 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 10 a.m. to 11 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 4,800 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 14 percent to 15 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 60 percent.

Table 2.3.1.2 Traffic Classification Counts for Site 301

Date	Vehicle Classification					% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Total	SU	Comb.	Cars	Trucks
7/14/88	39	11	22	10	82	77%	23%	48%	52%

2.3.1.3 Grain Elevator, Site No. 302

Site No. 302 is a large grain elevator. Table 2.3.1.3 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 6 p.m. on the dates shown. Grain hauled to this site by truck is loaded onto to ships for shipment elsewhere. Access to this activity center is provided

by a two-lane city street which functions as a major collector. It had a 1986 average daily traffic (ADT) of 2,000 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 23 percent to 42 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 37 percent.

Table 2.3.1.3 Traffic Classification Counts for Site 302

Date	Vehicle Classification					% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Total	Su	Comb.	Cars	Trucks
7/18/85	53	0	20	613	686	3%	97%	8%	92%
7/13/88	174	2	14	580	770	3%	97%	23%	77%

2.3.1.4 Grain Elevator, Site No. 303

Site No. 303 is a large grain elevator. Table 2.3.1.4 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 11 p.m. on the dates shown. Grain hauled to this elevator was loaded onto ships for shipment elsewhere. The average daily traffic (ADT) of the city street serving this site was 2,000 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 23 percent to 42 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 37 percent.

Table 2.3.1.4 Traffic Classification Counts for Site 303

Date	Vehicle Classification					% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Total	Su	Comb.	Cars	Trucks
7/11/88	76	7	69	30	182	72%	28%	42%	58%
7/17/85	39	0	202	168	409	55%	45%	10%	90%

2.3.1.5 Grain Elevator, Site No. 304

Site No. 304 is a medium-sized grain elevator. Table 2.3.1.5 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 10 a.m. to 11 p.m. on the dates shown. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 1,200 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 8 percent to 25 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the SU-1 at 63 percent.

Table 2.3.1.5 Traffic Classification Counts for Site 304

Date	Vehicle Classification					% of Trucks		% of Total		
	Autos	SU-1	SU-2	3-S2	Other	Total	Su	Comb	Cars	Trucks
7/14/88	20	0	17	0	0	37	100%	0%	54%	46%
7/18/85	74	257	0	52	4	287	82%	18%	19%	81%

2.3.1.6 Grain Elevator, Site No. 305

Site No. 305 is a small grain elevator. Table 2.3.1.6 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 12 noon to 10 p.m. on the dates shown. This elevator is not served by a railroad. Access to this activity center is provided by a State Highway.

Table 2.3.1.6 Traffic Classification Counts for Site 305

Date	Vehicle Classification				% of Trucks		% of Total		
	Autos	SU-1	SU-2	3-S2	Total	Su	Comb	Cars	Trucks
7/19/85	22	6	123	67	218	66%	34%	10%	90%

2.3.1.7 Grain Elevator, Site No. 306

Site No. 306 is a small grain elevator. Table 2.3.1.7 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 10 a.m. to 9 p.m. on the dates shown. The dominant truck type on the roadway (special-use vehicles included) was the SU-2 at 41 percent.

Table 2.3.1.7 Traffic Classification Counts for Site 306

Date	Vehicle Classification					% of Trucks		% of Total		
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb.	Cars	Trucks
9/24/85	50	41	50	20	12	173	74%	26%	29%	71%

2.3.1.8 Grain Elevator, Site No. 307

Site No. 307 is a medium-sized grain elevator. Table 2.3.1.8 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 8 a.m. to 6 p.m. on the dates shown. This elevator is served by a railroad which hauls grain from the site. Access to this activity center is provided by a

State Highway. The dominant truck type on the roadway (special-use vehicles included) was the SU-2 at 41 percent.

Table 2.3.1.8 Traffic Classification Counts for Site 307

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb.	Cars	Trucks
9/26/85	57	28	46	22	15	168	67%	33%	34%	66%

2.3.1.9 Grain Elevator, Site No. 308A

Site No. 308A is a small grain elevator. Table 2.3.1.9 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 6 p.m. on the dates shown. This elevator is not served by a railroad. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 3,700 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 43 percent to 44 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 61 percent.

Table 2.3.1.9 Traffic Classification Counts for Site 308A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb.	Cars	Trucks
9/25/85	56	18	45	24	16	159	61%	39%	35%	65%
10/15/87	32	0	0	37	0	69	0%	100%	46%	54%

2.3.1.10 Grain Elevator, Site No. 309A

Site No. 309A is a medium-sized grain elevator. Table 2.3.1.10 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 10 a.m. to 11 p.m. on the dates shown. Access to this activity center is provided by a two-lane loop roadway with a 1986 average daily traffic (ADT) of 2,000 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 7 percent to 20 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the SU-2 at 64 percent.

Table 2.3.1.10 Traffic Classification Counts for Site 309A

Date	Vehicle Classification					% of Trucks		% of Total	
	Auto	SU-1	SU-2	3-S2	Total	SU	Comb.	Cars	Trucks
7/14/88	77	2	89	33	201	73%	27%	38%	62%

2.3.1.11 Grain Elevator, Site No. 310

Site No. 310 is a large grain elevator. Table 2.3.1.11 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 10 a.m. to 11 p.m. on the dates shown. This elevator is served by a railroad which transports grain from the elevator. Access to this activity center is provided by a U.S. Highway and a Farm-to-Market Highway.

Table 2.3.1.11 Traffic Classification Counts for Site 310

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb.	Cars	Trucks
7/16/85	103	175	245	132	4	659	75%	25%	16%	84%

2.3.1.12 Grain Elevator, Site No. 311

Site No. 311 is a small grain elevator. Table 2.3.1.12 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 10 a.m. to 11 p.m. on the dates shown. This elevator is served by a railroad. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 8,800 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 15 percent to 16 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 82 percent.

Table 2.3.1.12 Traffic Classification Counts for Site 311

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb.	Cars	Trucks
7/15/85	35	116	0	40	2	193	73%	27%	18%	82%
7/19/88	39	11	17	43	0	110	39%	61%	35%	65%

2.3.1.13 Grain Elevator, Site No. 312A

Site No. 312A is a medium-sized grain elevator. Table 2.3.1.13 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 10 a.m. to 11 p.m. on the dates shown. This elevator is served by a railroad. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 6,200 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 7 percent to 12 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 42 percent.

Table 2.3.1.13 Traffic Classification Counts for Site 312A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb.	Cars	Trucks
7/13/88	92	6	86	31	0	215	75%	25%	43%	57%

2.3.2 WEIGH-IN-MOTION RESULTS FOR GRAIN

Cumulative distribution plots provided in Report 420-3F, Volume 1, are summarized in Table 2.3.2.1. No adjustments have been made to any of the raw weight data collected by the weigh-in-motion systems. Calibration of the system was checked on a regular basis or when weights varied significantly from typical expected weights of a particular vehicle class.

Table 2.3.2.1 Grain Cumulative Weights

W - I - M SUMMARY							
Commodity Grain	Site	Percentage Weights					
		50	85	90	95	98	100
Single Axle SU-1	I-37	5.5	9	9.9	14.2	16.3	18
	181	7.2	13	14	15	16	18
Tandem Axle SU-2	I-37	15	27.5	30	32	33.4	35
3-S2	I-37	13.4	26.9	30	32.3	34	38.4
	181	26.7	40.8	42.5	44	45	50
	181	17.5	34	35.8	37.5	39	40
	SH-44	17.5	34	35.8	38.4	39	40
Gross Vehicle Weight SU-1	181	15.8	23	24	25.3	28.4	30
	I-37	19.8	36	38.4	40.8	46.7	50
3-S2	I-37	31	60	65	71.7	76.7	80
	181	55	90.5	92.5	94	96.7	100
	181	40	73.4	75	77	79	80
	SH-44	45	78.4	80.3	83	84.5	85

2.4 BEEF CATTLE

2.4.1 CLASSIFICATION COUNTS

2.4.1.1 Cattle Feedlot, Site No. 400

Site No. 400 is a medium-sized beef cattle feedlot. Table 2.4.1.1 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 8 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 500 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 41 percent to 47 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 51 percent.

Table 2.4.1.1 Traffic Classification Counts for Site 400

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Truck
4/08/87	92	4	107	28	0	231	80%	20%	40%	60%
11/11/87	65	7	0	60	5	137	10%	90%	47%	53%

2.4.1.2 Cattle Feedlot, Site No. 401

Site No. 401 is a small beef cattle feedlot. Table 2.4.1.2 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 8 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 210 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 2 percent to 33 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 67 percent.

Table 2.4.1.2 Traffic Classification Counts for Site 401

Date	Vehicle Classification					% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Total	SU	Comb.	Cars	Trucks
8/20/86	32	19	21	3	75	44%	56%	43%	57%

2.4.1.3 Cattle Feedlot, Site No. 402

Site No. 402 is a large beef cattle feedlot. Table 2.4.1.3 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 8 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 450 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 5 percent to 29 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 50 percent.

Table 2.4.1.3 Traffic Classification Counts for Site 402

Date	Vehicle Classification					% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Total	SU	Comb.	Cars	Trucks
10/19/87	55	1	0	54	110	2%	98%	50%	50%
4/20/88	65	8	0	80	153	9%	91%	42%	58%

2.4.1.4 Cattle Feedlot, Site No. 403

Site No. 403 is a large beef cattle feedlot. Table 2.4.1.4 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 8 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 270 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 46 percent to 53 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 67 percent.

Table 2.4.1.4 Traffic Classification Counts for Site 403

Date	Vehicle Classification						% of Total		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
4/7/87	54	16	0	50	43	163	15%	85%	33%	67%
11/9/87	85	14	0	117	0	216	11%	89%	39%	61%

2.4.1.5 Cattle Feedlot, Site No. 404

Site No. 404 is a small beef cattle feedlot. Table 2.4.1.5 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 7 p.m. on the dates shown. Access to this activity center is

provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 340 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 9 percent to 23 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 83 percent.

Table 2.4.1.5 Traffic Classification Counts for Site 404

Date	Vehicle Classification						% of Total		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
8/20/85	27	0	0	24	0	51	0%	100%	53%	47%
4/10/87	31	0	0	19	0	50	0%	100%	62%	38%

2.4.1.6 Cattle Feedlot, Site No. 405

Site No. 405 is a medium-sized beef cattle feedlot. Table 2.4.1.6 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 7 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 360 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 32 percent to 33 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 47 percent.

Table 2.4.1.6 Traffic Classification Counts for Site 405

Date	Vehicle Classification						% of Total		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
11/13/87	51	4	0	24	2	81	13%	87%	63%	37%

2.4.1.7 Cattle Feedlot, Site No. 406

Site No. 406 is a medium-sized beef cattle feedlot. Table 2.4.1.7 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 8 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 210 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 18 percent to 52 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was

the 3-S2 at 52 percent.

Table 2.4.1.7 Traffic Classification Counts for Site 406

Date	Vehicle Classification					% of Total		% of Total	
	Autos	SU-1	SU-2	3-S2	Total	SU	Comb.	Cars	Truck
10/20/87	17	2	4	0	23	100%	0%	74%	26%
10/28/87	54	12	54	38	158	63%	37%	34%	66%

2.4.1.8 Cattle Feedlot, Site No. 407

Site No. 407 is a small beef cattle feedlot. Table 2.4.1.7 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 8 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 7 percent to 18 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the SU-1 at 56 percent.

Table 2.4.1.8 Traffic Classification Counts for Site 407

Date	Vehicle Classification					% of Total		% of Total	
	Autos	SU-1	SU-2	3-S2	Total	SU	Comb.	Cars	Truck
4/19/88	35	27	6	0	68	100%	0%	51%	49%

2.4.1.9 Cattle Feedlot, Site No. 408

Site No. 408 is a medium-sized beef cattle feedlot. Table 2.4.1.9 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 8 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 4,800 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 42 percent to 43 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 80 percent.

Table 2.4.1.9 Traffic Classification Counts for Site 408

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
8/22/85	59	5	149	34	28 ¹	275	71%	29%	21%	79%
10/14/87	69	2	2	90	8	171	4%	96%	40%	60%

¹ Type of Vehicle 2-S2

2.4.1.10 Cattle Feedlot, Site No. 409

Site No. 409 is a large beef cattle feedlot. Table 2.4.1.10 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 8 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 970 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 5 percent to 22 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 77 percent.

Table 2.4.1.10 Traffic Classification Counts for Site 409

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
8/22/85	114	18	9	124	4	269	17%	83%	42%	58%
4/06/87	136	0	0	117	0	253	0%	100%	54%	46%
6/30/87	83	12	0	72	0	167	14%	86%	50%	50%

2.4.1.11 Cattle Feedlot, Site No. 410

Site No. 410 is a large beef cattle feedlot. Table 2.4.1.11 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 8 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 470 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 38 percent to 45 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 55 percent.

Table 2.4.1.11 Traffic Classification Counts for Site 410

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
10/13/87	60	5	1	96	1	163	6%	94%	37%	63%

2.4.2 WEIGH-IN-MOTION RESULTS FOR BEEF CATTLE

Cumulative distribution plots provided in Report 420-3F, Volume 1, are summarized in Table 2.4.2.1. No adjustments have been made to any of the raw weight data collected by the weigh-in-motion systems. Calibration of the system was checked on a regular basis or when weights varied significantly from typical expected weights of a particular vehicle class.

Table 2.4.2.1 Cattle Cumulative Weights

W - I - M SUMMARY							
Commodity Cattle	Site	Percentage Weights					
		50	85	90	95	98	100
Single Axle SU-1	408	7.4	17.5	18	18.8	19.5	20
	3-S2						
	404	9	10.7	11.4	12	18	22
	408	9.2	10.8	11.4	11.6	11.8	12
	409	9	11.2	14	17.5	18.8	20
Tandem Axle 3-S2	404	30	39.5	41.7	44.5	53.4	58.3
	408	18.4	38.4	40	43.4	46.7	51
	409	35	43.7	44.5	47	48.7	50
	Gross Vehicle Weight						
	404	71.7	91	94	102	108.6	110
	408	42.5	86.8	90	95.1	100	105

2.5 LIMESTONE

2.5.1 CLASSIFICATION COUNTS

2.5.1.1 Limestone Quarry, Site No. 500

Site number 500 is a small limestone quarry. Table 2.5.1.1 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This quarry is served by a railroad which hauls limestone away. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 4,300 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 5 percent to 12 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the SU-1 at 41 percent.

Table 2.5.1.1 Traffic Classification Counts for Site 500

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
9/11/86	39	3	12	70	0	124	18%	82%	31%	69%

2.5.1.2 Limestone Quarry, Site No. 501

Site number 501 is a small limestone quarry. Table 2.5.1.2 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This quarry is served by a railroad which hauls limestone away. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 6,000 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 6 percent to 10 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the SU-2 at 81 percent.

Table 2.5.1.2 Traffic Classification Counts for Site 501

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
6/25/85	30	81	108	4	0	223	98%	2%	13%	87%
7/9/86	49	3	187	3	1	242	98%	2%	20%	80%

2.5.1.3 Limestone Quarry, Site No. 502A

Site number 502A is a medium-sized limestone quarry. Table 2.5.1.3 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a local road.

Table 2.5.1.3 Traffic Classification Counts for Site 502A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
10/14/86	130	34	163	81	0	408	71%	29%	32%	68%

2.5.1.4 Limestone Quarry, Site No. 503

Site number 503 is a large limestone quarry. Table 2.5.1.4 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 5 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 9,000 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 13 percent to 22 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 40 percent.

Table 2.5.1.4 Traffic Classification Counts for Site 503

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	2-S2	3-S2	Total	SU	Comb	Cars	Trucks
7/15/87	68	53	249	126	291	787	42%	58%	9%	91%
7/16/87	71	59	203	102	336	771	37%	63%	9%	91%

2.5.1.5 Limestone Quarry, Site No. 504A

Site number 504A is a medium-sized limestone quarry. Table 2.5.1.5 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 5 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 2,800 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 15 percent to 26 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 61 percent.

Table 2.5.1.5 Traffic Classification Counts for Site 504A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
4/08/86	62	4	25	179	6	276	14%	86%	22%	78%

2.5.1.6 Limestone Quarry, Site No. 505A

Site number 505A is a medium-sized limestone quarry. Table 2.5.1.6 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 5,500 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 9 percent to 14 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 63 percent.

Table 2.5.1.6 Traffic Classification Counts for Site 505A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
9/17/86	54	64	63	146	0	327	47%	53%	16%	84%
9/19/86	51	32	29	34	42	188	45%	55%	27%	73%

2.5.1.7 Limestone Quarry, Site No. 506

Site number 506 is a medium-sized limestone quarry. Table 2.5.1.7 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 5 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 2,000 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 9 percent to 26 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 63 percent.

Table 2.5.1.7 Traffic Classification Counts for Site 506

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	2-S1-2	Total	SU	Comb	Cars	Trucks
10/03/86	25	12	109	225	3	374	35%	65%	7%	93%
10/06/86	21	5	91	74	9	200	54%	46%	11%	89%

2.5.1.8 Limestone Quarry, Site No. 507A

Site number 507A is a medium-sized limestone quarry. Table 2.5.1.8 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by an urban street. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 16 percent to 21 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the SU-2 at 46 percent.

Table 2.5.1.8 Traffic Classification Counts for Site 507A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
7/17/86	141	28	144	149	66	528	44%	56%	27%	73%
7/18/86	154	34	156	174	55	573	45%	55%	27%	73%

2.5.1.9 Limestone Quarry, Site No. 508

Site number 508 is a small limestone quarry. Table 2.5.1.9 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 5 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 7,600 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 4 percent to 11 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 35 percent.

Table 2.5.1.9 Traffic Classification Counts for Site 508

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
9/17/86	4	4	5	70	0	83	11%	89%	5%	95%

2.5.1.10 Limestone Quarry, Site No. 509

Site number 509 is a medium-sized limestone quarry. Table 2.5.1.10 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 400 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 40 percent to 67 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 95 percent.

Table 2.5.1.10 Traffic Classification Counts for Site 509

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
6/18/85	71	18	0	101	32	222	12%	88%	32%	68%
9/08/86	44	0	0	210	27	281	0%	100%	16%	84%

2.5.1.11 Limestone Quarry, Site No. 510A

Site number 510A is a large limestone quarry. Table 2.5.1.11 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 33,000 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 8 percent to 15 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the SU-2 at 42 percent.

Table 2.5.1.11 Traffic Classification Counts for Site 510A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
6/10/86	342	222	985	152	10	1711	88%	12%	20%	80%
6/24/86	266	125	601	186	3	1181	79%	21%	22%	78%

2.5.1.12 Limestone Quarry, Site No. 511

Site number 511 is a small limestone quarry. Table 2.5.1.12 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center

is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 2,300 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 36 percent to 42 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 76 percent.

Table 2.5.1.12 Traffic Classification Counts for Site 511

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
8/27/86	23	13	78	47	2	163	65%	35%	14%	86%

2.5.1.13 Limestone Quarry, Site No. 512

This quarry is small, and provides limestone for the immediate surrounding area. Access to this activity center is provided by a County road. Records kept at this quarry indicated the following numbers of trips per day.

<u>VEHICLE TYPE</u>	<u>PEAK SEASON</u>	<u>OFF-PEAK SEASON</u>
Autos	10	10
SU-2	25	20
SU-2 W/Pup	94	37
3-S2	13	38

2.5.1.14 Limestone Quarry, Site No. 513

Site number 513 is a small limestone quarry. Table 2.5.1.13 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This quarry is served by a railroad which hauls limestone away. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 710 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 9 percent to 20 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 51 percent.

Table 2.5.1.13 Traffic Classification Counts for Site 513

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
6/13/85	59	12	0	146	0	217	8%	92%	27%	73%
9/29/86	98	20	38	107	0	263	35%	65%	37%	63%
9/30/86	93	18	03	141	0	255	13%	87%	36%	64%
4/05/88	71	14	03	123	29	240	10%	90%	30%	70%

2.5.1.15 Limestone Quarry, Site No. 514

Site number 514 is a large limestone quarry. Table 2.5.1.14 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This quarry is served by a railroad which hauls limestone away. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 4,000 vehicles per day. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 75 percent.

Table 2.5.1.14 Traffic Classification Counts for Site 514

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
8/12/86	317	46	30	753	102 ¹	1248	8%	92%	25%	75%
8/13/86	352	42	6	766	144 ²	1280	5%	95%	28%	72%

¹ Number of 2-S1-2 Vehicles

² Number of 3-2 Vehicles

2.5.1.16 Limestone Quarry, Site No. 515

Site number 515 is a large limestone quarry. Table 2.5.1.15 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 4,900 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 16 percent to 31 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 67 percent.

Table 2.5.1.15 Traffic Classification Counts for Site 515

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
6/17/85	106	11	87	638	38 ¹	880	13%	87%	12%	88%
4/09/86	39	5	12	471	172 ²	699	3%	97%	6%	94%

¹ Number of vehicles: 13 SU-2, 25 2-S2

² Number of 3-2 vehicles

2.5.2 WEIGH-IN-MOTION RESULTS FOR LIMESTONE

Cumulative distribution plots provided in Report 420-3F, Volume 1, are summarized in Table 2.5.2.1. No adjustments have been made to any of the raw weight data collected by the weigh-in-motion systems. Calibration of the system was checked on a regular basis or when weights varied significantly from typical expected weights of a particular vehicle class.

Table 2.5.2.1 Limestone Cumulative Weights

W - I - M SUMMARY							
Commodity Limestone	Site No.	Percentage Weights					
		50	85	90	95	98	100
Single Axle 3-S2	509	10	11.7	11.9	14	15.4	16
	513	9.4	11.7	12	21	23.4	25
Tandem Axle 3-S2	504A	32.4	38.5	38	40.3	43.4	45
	509	40	47	48.5	50.5	55	59
	513	30	41.8	43.4	44.8	48.4	50.5
	515A	27.8	33.2	34	34.8	36.7	39
Gross Vehicle Weight 3-S2	509	91	102	105	115.3	120	123.5
	515A	66	74	75.5	78.3	79.4	80
	513	75	90	93.4	100	121.7	133.4

2.6 SAND AND GRAVEL

2.6.1 CLASSIFICATION COUNTS

2.6.1.1 Sand/Gravel Pit, Site No. 600

Site number 600 is a medium-sized sand/gravel pit. Table 2.6.1.1 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 4,800 vehicles per day. Field data collected in 1985 indicate that the percentage of trucks on the roadway increased from 10 percent to 12 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 73 percent.

Table 2.6.1.1 Traffic Classification Counts for Site 600

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
6/14/85	37	0	0	107	0	144	0%	100%	26%	74%

2.6.1.2 Sand/Gravel Pit, Site No. 601

Site number 601 is a large sand/gravel pit. Table 2.6.1.2 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 3,600 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 4 percent to 25 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 56 percent.

Table 2.6.1.2 Traffic Classification Counts for Site 601

Date	Vehicle Classification							% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	2-S1	2-S2	Total	SU	Comb	Cars	Trucks
7/01/86	366	42	78	244	7	52	789	32%	68%	50%	50%
7/02/86	363	38	83	204	10	55	753	36%	64%	52%	48%

2.6.1.3 Sand/Gravel Pit, Site No. 602

Site number 602 is a small sand/gravel pit. Table 2.6.1.3 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 3,200 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 5 percent to 9 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 73 percent.

Table 2.6.1.3 Traffic Classification Counts for Site 602

Date	Vehicle Classification Total						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
10/27/86	36	2	4	52	12	106	9%	91%	34%	66%

2.6.1.4 Sand/Gravel Pit, Site No. 603

Site number 603 is a small sand/gravel pit. Table 2.6.1.4 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 370 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 8 percent to 23 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 66 percent.

Table 2.6.1.4 Traffic Classification Counts for Site 603

Date	Vehicle Classification Total						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
11/13/86	79	0	15	52	0	146	22%	78%	54%	46%
10/21/87	57	4	0	46	2	109	8%	92%	52%	48%

2.6.1.5 Sand/Gravel Pit, Site No. 604A

Site number 604A is a medium-sized sand/gravel pit. Table 2.6.1.5 is a summary of field data collection results showing the number of trips generated by this activity center

over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 3,600 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 11 percent to 25 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 85 percent.

Table 2.6.1.5 Traffic Classification Counts for Site 604A

Date	Vehicle Classification Total						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
11/10/86	0	0	4	92	0	96	4%	96%	0%	100%
11/11/86	8	1	0	107	0	116	1%	99%	7%	93%

2.6.1.6 Sand/Gravel Pit, Site No. 605

Site number 605 is a large sand/gravel pit. Table 2.6.1.6 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 5,100 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 13 percent to 41 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 88 percent.

Table 2.6.1.6 Traffic Classification Counts for Site 605

Date	Vehicle Classification Total						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
7/15/86	88	4	1	390	5	488	1%	99%	18%	82%
7/16/86	57	1	8	371	0	437	2%	98%	13%	87%

2.6.1.7 Sand/Gravel Pit, Site No. 606

Site number 606 is a large sand/gravel pit. Table 2.6.1.7 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This pit is served by a railroad which hauls sand and gravel away. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 2,600 vehicles per

day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 9 percent to 52 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 59 percent.

Table 2.6.1.7 Traffic Classification Counts for Site 606

Date	Vehicle Classification							% of Trucks		% of Total	
	Autos	SU-1	SU-2	2-S1	2-S2	3-S2	Total	SU	Comb	Cars	Trucks
7/09/86	31	22	54	0	26	194	327	26%	74%	9%	91%
7/10/86	30	7	57	0	40	143	277	26%	74%	11%	89%
7/11/86	50	12	72	3	30	190	357	28%	72%	14%	86%

2.6.1.8 Sand/Gravel Pit, Site No. 607A

Site number 607A is a small sand/gravel pit. Table 2.6.1.8 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a local road. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 0 percent to 73 percent due to special-use activities.

Table 2.6.1.8 Traffic Classification Counts for Site 607A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	2-S1	3-S2	Total	SU	Comb	Cars	Trucks
6/27/85	23	9	22	0	59	113	34%	66%	20%	80%
6/26/86	31	0	6	7	45	82	12%	88%	38%	62%
6/27/86	32	8	26	2	93	159	27%	73%	20%	80%
7/08/86	35	0	63	37	71	169	47%	53%	21%	79%

2.6.1.9 Sand/Gravel Pit, Site No. 608A

Site number 608A is a medium-sized sand/gravel pit. Table 2.6.1.9 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 1,350 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 18 percent to 41 percent due to special-use

activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 79 percent.

Table 2.6.1.9 Traffic Classification Counts for Site 608A

Date	Vehicle Classification							% of Trucks		% of Total	
	Autos	SU-1	SU-2	2-S1	3-S2	3-S2	Total	SU	Comb	Cars	Trucks
7/22/86	176	16	4	0	0	94	290	18%	82%	61%	39%
7/23/86	164	4	6	0	0	129	303	7%	93%	54%	46%
7/24/86	300	20	4	4	4	232	564	9%	91%	54%	46%

2.6.1.10 Sand/Gravel Pit, Site No. 609A

Site number 609A is a small sand/gravel pit. This pit is not served by a railroad. Access to this activity center is provided by a county road. According to plant officials, the number of trips generated by this pit on an average day are as given below.

40 Auto and Pick-Up
 20 3-S2
30 SU-2
 90 Total

2.6.1.11 Sand/Gravel Pit, Site No. 610A

Site number 610A is a small sand/gravel pit. Table 2.6.1.10 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. This pit is served by a railroad which hauls sand and gravel away. Access to this activity center is provided by a State Highway with a 1986 average daily traffic (ADT) of 3,000 vehicles per day. Field data collected in 1987 indicate that the percentage of trucks on the roadway increased from 8 percent to 10 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 79 percent.

Table 2.6.1.10 Traffic Classification Counts for Site 610A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Comb	Cars	Trucks
10/29/87	6	0	0	53	0	59	0%	100%	10%	90%

2.6.1.12 Sand/Gravel Pit, Site No. 611

Site number 611 is a medium-sized sand/gravel pit. Table 2.6.1.11 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 300 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 3 percent to 17 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 79 percent.

Table 2.6.1.11 Traffic Classification Counts for Site 611

Date	Vehicle Classification							% of Trucks		% of Total	
	Autos	SU-1	SU-2	2S-1	Other	3-S2	Total	SU	Comb	Cars	Trucks
7/08/86	65	0	92	1	8 ¹	69	235	57%	43%	29%	71%
4/14/88	52	8	24	0	2 ²	9	95	78%	22%	56%	44%

¹ Vehicle type 2-S2

² Vehicle type 2-S1-2

2.6.1.13 Sand/Gravel Pit, Site No. 612

Site number 612 is a small sand/gravel pit. Table 2.6.1.12 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 7 a.m. to 5 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 18,000 vehicles per day. Field data collected in 1988 indicate that the percentage of trucks on the roadway increased from 5 percent to 6 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 49 percent.

Table 2.6.1.12 Traffic Classification Counts for Site 612

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Com	Cars	Trucks
4/15/88	48	5	47	34	0	134	60%	40%	29%	71%

2.6.1.14 Sand/Gravel Pit, Site No. 613A

Site number 613A is a medium-sized sand/gravel pit. Table 2.6.1.13 is a summary

of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 5 p.m. on the dates shown. Access to this activity center is provided by a Farm-to-Market Highway with a 1986 average daily traffic (ADT) of 690 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 4 percent to 67 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 83 percent.

Table 2.6.1.13 Traffic Classification Counts for Site 613A

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	2-S1-2	Total	SU	Com	Cars	Trucks
10/28/86	17	9	12	102	0	140	17%	83%	12%	88%
10/29/86	30	7	12	134	6	189	12%	88%	16%	84%

2.6.1.15 Sand/Gravel Pit, Site No. 614

Site number 614 is a small sand/gravel pit. Table 2.6.1.14 is a summary of field data collection results showing the number of trips generated by this activity center over a time period of about 6 a.m. to 6 p.m. on the dates shown. Access to this activity center is provided by a U.S. Highway with a 1986 average daily traffic (ADT) of 1,800 vehicles per day. Field data collected in 1986 indicate that the percentage of trucks on the roadway increased from 12 percent to 28 percent due to special-use activities. The dominant truck type on the roadway (special-use vehicles included) was the 3-S2 at 65 percent.

Table 2.6.1.14 Traffic Classification Counts for Site 614

Date	Vehicle Classification						% of Trucks		% of Total	
	Autos	SU-1	SU-2	3-S2	Other	Total	SU	Com	Cars	Trucks
7/18/86	39	0	24	94	0	157	20%	80%	25%	75%

2.6.2 WEIGH-IN-MOTION RESULTS FOR SAND/GRAVEL

Cumulative distribution plots provided in Report 420-3F, Volume 1, are summarized in Table 2.6.2.1. No adjustments have been made to any of the raw weight data collected by the weigh-in-motion systems. Calibration of the system was checked on a regular basis or when weights varied significantly from typical expected weights of a particular vehicle class.

Table 2.6.2.1 Sand and Gravel Cumulative Weights

W - I - M SUMMARY							
Commodity Sand & Gravel	Site No.	Percentage Weights					
		50	85	90	95	98	100
Single Axle SU-1	601	7.7	19.3	20.8	24.2	26	28
	602	7.3	12.7	15.7	16.8	18	20
	602	6.7	13.8	16.2	17.7	19.3	24
3-S2	602	9.6	11.6	11.8	12	12.7	14
	602	8.9	10.9	11.7	11.9	12.7	14
	606	8.8	11.7	12.5	13	13.8	14
Tandem Axle 3-S2	601	19.8	46.7	49.8	52.5	57.5	65
	602	19.9	41.2	43.4	45	47.5	50
	602	19.9	37	40	43.2	45	55
	606	17.5	33.5	36.8	39.7	43.4	60
Gross Vehicle Weight SU-1	602	15.6	23.5	24.7	25.3	27.5	30
	602	46.6	92.5	95	98.3	101.5	105
3-S2	602	44.8	83.5	90	93.2	96.8	120
	606	39.4	78.7	83.5	106	116	120

2.7 OILFIELD ACTIVITIES

2.7.1 WEIGH-IN-MOTION RESULTS FOR OILFIELD ACTIVITIES

No weight data pertaining directly to oilfield vehicles existed prior to this data collection activity. Therefore, these vehicles were included in Report 420-3F. Project 299 evaluated other aspects of oilfield activities. Cumulative weight distribution plots provided in Report 420-3F, Volume 1, are summarized in Table 2.7.1.1. No adjustments have been made to any of the raw weight data collected by the weigh-in-motion systems. Calibration of the system was checked on a regular basis or when weights varied significantly from typical expected weights of a particular vehicle class.

Table 2.7.1.1 Petroleum Cumulative Weights

W - I - M SUMMARY							
Commodity Petroleum	Site	Percentage Weights					
		50	85	90	95	98	100
Single Axle SU-1	115		11.4	13.4	20	23.4	24
	115	7	13.5	15.8	18	21	22
	158	7.3	12	14	16.7	17.5	19.4
	158	7.2	11.5	13.4	18.7	21	23
	811		16	23.4	25.4	28.7	30
			7.4 12				
Tandem Axle 3-S2	115	23.4	36.5	38.5	41.7	43.8	45
	115	19	34.5	36.6	38.4	40	43.4
	115	19.5	34	36.7	39	43.4	49
	158	18.4	34	36.7	40	46	49
	158	20	33.4	35	38	40	44
	811	18	30.5	33.4	40	43.4	45
	811	14	36	39	42	44	45
	811	21	41	42.5	44	47	50
Gross Vehicle Weight SU-1 3-S2	115	16	24	26	30	33	35
	115	16.7	23.2	24	28.8	33.4	35
	158	16	21	22.5	24	24.8	25
	158	16	22.4	25	31.5	33.7	35
	115	50.5	77	79	84	88.4	90
	115	51	77.8	79	85	88.3	90
	115	48.3	76.7	78.3	80	88.3	90
	158	45	78.3	81.7	83.4	84.7	85
	158	43.4	73.6	75	80	83.5	85

3.0 CONCLUSIONS

The findings of Report 420-2 highlight the variability in the composition of traffic on all roadway types, even those which are similar by design and by classification. Count stations on Farm-to-Market roadways in the same general area within close proximity of each other indicated significant differences in the traffic stream. The same was found with other roadway types. The truck traffic mix tends to be industry specific, and therefore, the percentage of such vehicles in the traffic stream varies widely between locations on the same road class. This leads to the conclusion that knowledge of the vehicle mix generated by various industries is vitally important. Similarly, the axle distributions and weights are important in planning, designing, and maintaining the state's roadways.

The commodities identified in this study are important to the state of Texas. Their movement occurs throughout the state in every SDHPT district. Some of these commodities are moved by truck to ports for shipment abroad, while some are moved by truck across state lines to several hundred miles away. Some of the commodities such as gravel and limestone occur on a widespread basis throughout the state, while others such as timber, produce and beef cattle are concentrated in a particular region. The activity centers for aggregates, especially sand and gravel pits, are active or inactive depending on local demand, the economy, and other factors. Even when these operations are active for an extended period of time, their intensity is highly variable. This is obvious from the site-specific classification counts presented in this report.

Very little is known about seasonal variations and how they affect most of the special-use commodities. Some of the commodities such as timber and aggregates move year round, depending on demand and weather. Others such as grain and produce are very seasonal, experiencing a relatively short harvest season which causes a peak demand for trucks. Each special-use activity is somewhat unique. Much is still unknown about timber cutting activities and specific routes used, and interaction of trucks with other modes, especially in grain movement. Tracing the movement of special-use products and predicting their future deserves more evaluation.

Results of the field data collection phase of Project 420 should prove to be quite useful for evaluating site-specific impacts of any of the special-use commodities investigated. Information provided on statewide application indicates the relative intensities by county and SDHPT district. Findings of the study may not represent some of the smaller activity centers and/or those located away from high concentrations of a particular commodity. One example is cattle feedlots in the southern part of the state. Cattle typically have a longer feeding cycle there than they do in the Panhandle area. Study findings are not necessarily representative of commodity movement during off-peak seasons. Hauling of raw timber during the rainy season might be less intensive in terms of numbers of trips, but effects on pavements could be more detrimental. Extreme variability in number of trips generated is possible according to field studies as well as interview information.

Results of weigh-in-motion studies were inconsistent. Some of the results indicate that a high percentage of gross vehicle weights and axle weights exceed legal limits. At

other sites, the percentage of overweight vehicles was significantly less, according to WIM results. A portion of the difference between sites is due to variables unaccounted for, such as road profile, cross slope, and lack of calibration of the WIM system at each site. Day to day variation at the same sites was less pronounced. The trend in some cases was toward lighter weights (lower percent illegal) the second day when the same site was used two or more consecutive days. One explanation of the reduction may have been trucker awareness of the weighing operation after the first day.

According to results of the case study conducted on a heavily traveled highway near a timber mill, special-use timber traffic can cause a significant reduction in pavement life. Even on this U.S. Highway, the reduction in life of the pavement was about 12 years due to the additional loading imposed by timber traffic. It should be noted that the weigh-in-motion system was not calibrated at every site; therefore, accuracy estimates cannot be made. However, the methodology used in the case study is useful for application elsewhere. A thinner pavement such as that typically used on Farm-to-Market Highways would be impacted to an even greater degree, given the same number and weight of axle loadings.

4.0 REFERENCES

1. Mason, J.M. and D.R. Middleton, "Identification of Special-Use Truck Traffic," Research Report 420-1, Texas Transportation Institute, Texas A&M University, College Station, Texas, October 1985.