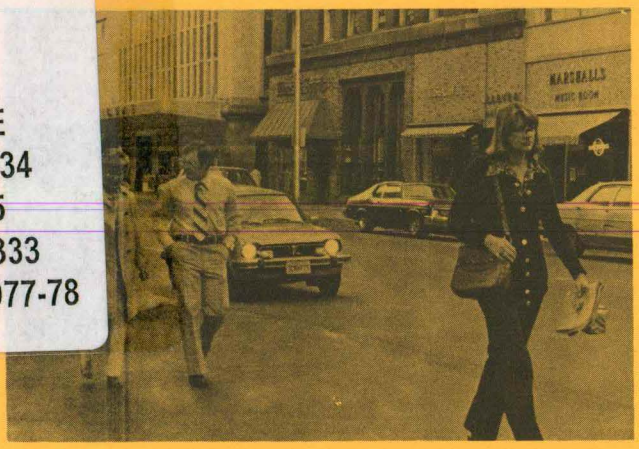

TRANSPORTATION SYSTEM MANAGEMENT

Des Moines Urbanized Area

1977 · 1978

ciralg

Central Iowa Regional Association of Local Governments

THE DES MOINES URBANIZED AREA

TRANSPORTATION SYSTEM MANAGEMENT PLAN

1977 - 78

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CHAPTER I Purpose of TSM

I. PURPOSE OF TSM

In the past, transportation planning was oriented toward long-range, capital-intensive highway programs designed to improve urban mobility. Today, however, the cost of constructing new transportation facilites, combined with an awareness of environmental problems (i.e. air pollution, energy consumption) has lead to a recognition that more efficient use needs to be made of existing transportation facilities.

These factors have lead the Federal Highway Administration and the Urban Mass Transportation Administration to require urban areas to develop Transportation System Management (TSM) Elements. These TSM Elements represent low-capital means of improving the existing transportation system. The TSM provides for an areawide approach to planning by integrating autos, public transit, bicycles and pedestrians into one urban transportation system. The objective of TSM is to coordinate these individual elements through operating, regulatory and service policies.

Among the possible types of actions that may be combined in the TSM Element are the following:

1. Actions to ensure efficient use of existing road space through
    - A. Traffic operations improvements to manage and control the flow of motor vehicles
    - B. Preferential treatment for transit and other high occupancy vehicles
    - C. Appropriate provision for pedestrians and bicycles including exclusive paths or lanes, pedestrian malls and bike storage areas
    - D. Management and control of parking
    - E. Changes in work schedules, fare structure and automobile tolls to reduce peak-period travel and to encourage off-peak use of transportation facilities and transit service

2. Actions to reduce vehicle use in congested areas.

   Actions under this category would include the promotion of high occupancy vehicles such as carpools and vanpools. Various pricing techniques may also be implemented to discourage the use of low occupancy vehicles in congested areas.

3. Actions to improve transit service

   Actions in this category include changes in routing and scheduling, pick up and drop off points and the provision of bus shelters, route maps and other amenities.

4. Actions to increase transit management efficiency

   Actions in this category include improved marketing techniques, cost accounting procedures and management information systems.

CHAPTER II Goals, Policies and Objectives

II. GOALS, POLICIES AND OBJECTIVES

Long Range Goals, Policies and Objectives

In any planning process the definition of goals, policies and objectives is an essential first step. Goals and policies are a set of guidelines which give the planning process an overall sense of direction. Objectives are lower order goals which, at least qualitatively, are capable of being measured. The long range goals, policies and objectives adopted by the Des Moines Transportation Policy Committee on August 18, 1976 are as follows:

GOAL

Provide for safe and convenient movement throughout the Area.

Provide facilities for modes of travel to meet the needs of different people.

POLICY

1. Combine streets, highways, mass transit, terminals, and parking facilities into a coordinated transportation system.

   OBJECTIVES

   a) To improve land-use transportation relationships.
   b) To properly provide an acceptable balance of the various elements of the transportation system.
   c) To provide opportunity for transfers from one transportation mode to another.
   d) To make the best use of financial resources.

POLICY

2. Coordinate the design of street and highway facilities with land development in the vicinity of intersections and interchanges.

   OBJECTIVES

   a) To provide for safe movement with minimal delay.
   b) To provide safe and convenient access with the highway system to major commercial centers, industrial parks, and residential areas.
   c) To minimize traffic conflicts on local streets.
   d) To make the best use of public expenditures for highway facilities.

POLICY

3. Provide flexibility for additions or modifications to the transportation system by basing right-of-way requirements on an evaluation of transportation needs 20 years ahead.

OBJECTIVES

a) To allow efficient and economical improvements and expansions.
b) To minimize future street disruptions by adjacent development.
c) To allow adaptation of new technology.

POLICY

4. Use the best available technology to manage traffic.

OBJECTIVES

a) To make the most effective use of existing facilities.
b) To develop a coordinated network of arterial streets throughout the metropolitan area.

POLICY

5. Improve transit systems in the region.

OBJECTIVES

a) To provide the most effective use of the transit dollar by coordinating all public and private transportation services.
b) To develop optimum local and "feeder" service.
c) To provide transit service to people who must use mass transit.
d) To develop a marketing program which provides a wider public acceptance of mass transit.

POLICY

6. Guide land development by providing a planned development program of transportation facilities.

OBJECTIVES

a) To relate land use types and densities of existing and planned transportation facilities.
b) To provide access to suburban employment centers from the central city.
c) To encourage construction of parking garages rather than the large surface lots.
d) To provide incentives for development of housing near the central business district.

POLICY

7. Conserve energy resources and abate pollution and congestion.

OBJECTIVES

a) To promote increased development and use of bikeways.
b) To provide improved pedestrian facilities in the central business district.
c) To develop abandoned rail right-of-ways as bikeways, roadways or hiking trails as appropriate.
d) To encourage staggered work hours and a four day work week where feasible to reduce peak-hour travel.
e) To encourage carpooling, transit, and other forms of ride sharing.

TSM Objectives

The TSM objectives selected are consistent with the long range goals, policies and objectives stated above. These short range TSM objectives serve three purposes:

(1) the identification of problems
(2) the selection of a range of TSM actions which need to be considered for study and/or implementation
(3) the development of measures of effectiveness or evaluation criteria for assessing the impact of TSM actions on objectives.

The following short range objectives selected by the Transportation Technical Committee are concerned with the safety of urban travel, the efficiency of the transportation system, the mobility of transportation disadvantaged groups and the environmental effects of transportation.

1. Reduction of injuries, deaths and property damage resulting from traffic accidents.

2. Improve level of service of urban travel.

3. Optimize the person and goods movement capacity of existing transportation facilities.

4. Reduce fuel consumed in urban travel.

5. Encourage alternatives to driving private automobiles.

6. Provide good quality, affordable transportation services to the elderly and handicapped.

7. Reduce automotive emissions and impacts.

CHAPTER III Identification of Problems

III. IDENTIFICATION OF PROBLEMS

The method of approach used for Transportation System Management (TSM) may vary from one study area to another. It depends upon the size, funding capacity and types of transportation problems in each urban area. The basic concept of TSM is described as the process of maximizing transportation service while minimizing capital cost.

One of the prerequisites of the TSM process is to determine the condition and quality of current transportation service. Such understanding will assist in identifying problems, assessing needs for improvement and evaluating probable benefits.

In order to measure the quality of traffic service in the Des Moines Study Area, the operating condition of the transportation system must be analyzed. A comprehensive analysis of the operating condition of a transportation system is a time consuming and complex study. Therefore, for the sake of simplicity the operations to be reviewed were limited as follows:

a) Intra-urban movement:	The quality of transportation service is measured within the Des Moines Urban Area. No measurement has been made of inter-city service quality.
b) People movement:	The measurement involves people movement only. No goods movement studies have been undertaken.
c) Auto/Transit:	Auto and transit are the basic travel modes available in the Des Moines Study Area. Transit service is measured in detail in a report entitled "Analysis of the MTA Operating System," July, 1977.
d) Parameters of measurement:	The quality of service will be measured in terms of time, safety and problem areas.
e) Indicators of the quality of service:	The indicators that are used to measure each perameter as described above are limited to those shown in Table 1.

TABLE 1

Time	Isochronal Map-developed from travel time surveys; Average peak hour stopped delay gathered on travel surveys
Safety	Traffic accident frequency Critical accident locations by adjusted accident rate
Problem Areas	Areas identified by the local governments as problem areas

Isochronal Map

Travel time studies were conducted along selected routes in the Des Moines Urban Area for the purpose of developing an isochronal map. An isochronal map as defined in this study is a map containing a group of one-minute increment time-contour lines from which the travel time from any point on a contour line to the center point is the same. The center point (zero minute) of the 1977 isochronal map was set at the intersection of Grand Avenue and Second Avenue.

The travel time from origin to destination was measured in terms of minimum travel following the minimum time path. For the 1977 Des Moines Study, the isochronal map was developed based on the 1977 travel time survey of 30 major arterials and the freeways. Approximately 300 selected check points (the majority of which are located on the surveyed routes) were used to develop the map. Travel times to designated locations on the map which were not survey check points were established by interpolation of survey data.

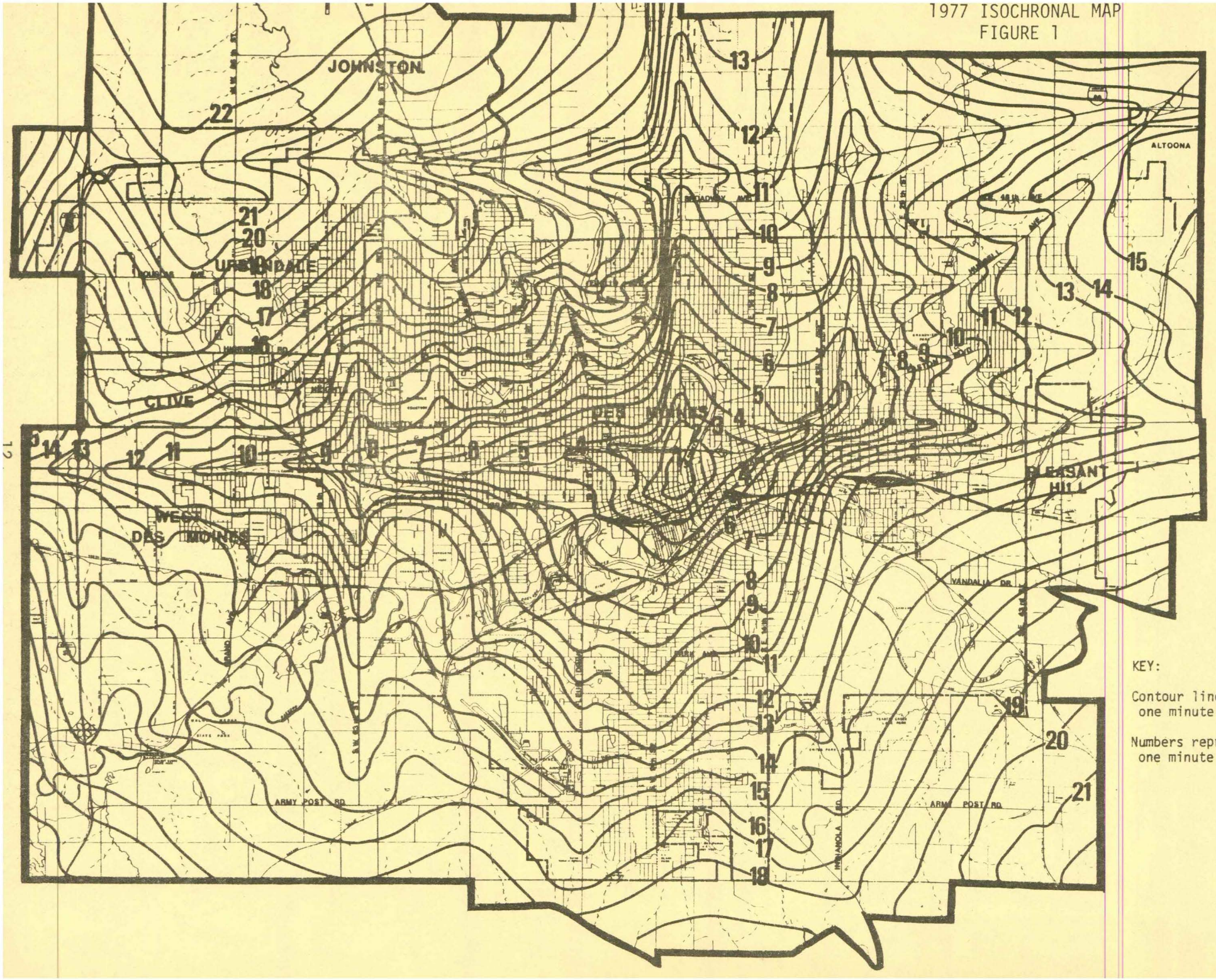
The 1977 isochronal map (Figure 1) is an indicator of service quality with respect to travel time. Such a comparison can provide an indication of service improvement (i.e. travel time) or deterioration since the last measurement. This comparison has been done by laying one isochronal map on top of another. Where the distance or gap between contour lines along a route is very close it indicates that congestion is present. A comparison of the 1973 and 1977 isochronal maps shows the following aspects:

1. Freeway I-235 continues to provide efficient service for east-west traffic movement.

2. On the average, more travel time is needed to travel on north-south routes than east-west routes.

3. Traffic congestion is present on SW 9th Street from McKinley to Army Post Road, on SE 14th Street from the Des Moines River to Park Avenue, on Merle Hay Road between Hickman Road and Aurora Avenue, and on Harding Road from Hickman to Douglas.

1977 ISOCHRONAL MAP
FIGURE 1



KEY:

Contour lines are in one minute intervals

Numbers represent the one minute intervals

Delay

Delay data was gathered in conjunction with the travel time surveys. The data gathered was average peak hour stopped time delay. This measurement is defined as the average time period that a vehicle is standing still in peak hour traffic due to any factor. Time delays due to acceleration and decleration time are not included in the calculation of delay. The following chart (1) indicates those areas where delay was encountered during the travel time surveys and the resulting average peak hour stopped time delay.

LOCATIONS OF DELAY

ROUTE	LOCATION OF DELAY	AVERAGE PEAK HOUR STOPPED TIME DELAY
E 14th	Intersection of E 14th and Broadway	45 "
	Intersection of E 14th and Army Post	46 "
6th	Intersection of 6th and Euclid	1' 15 "
Indianola	Intersection of Indianola and SE 14th	34 "
Keo/Forest/Beaver	Intersection of Beaver and Hickman	1' 5 "
	Intersection of Keo and 5th	36.5"
	Intersection of Beaver and Douglas	32.5"
Euclid/Douglas	Intersection of Beaver and Douglas	34 "
	Intersection of Merle Hay and Douglas	58 "
SE 5th	Intersection of SE 5th and Army Post	31 "
8th, 73rd, 72nd	Intersection of Douglas and 72nd	46 "
Merle Hay	Intersection of Merle Hay and Douglas	59 "
	Intersection of Merle Hay and Aurora	41 "
63rd	Intersection of 63rd and Grand	50 "
University	Intersection of University and E 14th	41 "
	Intersection of University and 2nd	37 "
	Intersection of University and 55th	44 "
	Intersection of University and 73rd	31 "
Hickman	Intersection of Hickman and Beaver	44 "
	Intersection of Hickman and Merle Hay	31 "
	Intersection of Hickman and 86th	55 "
	Intersection of Hicman and Harding	48 "
8th - 9th	Intersection of 9th and Grand	34 "
Park	Intersection of Park and E 14th	33 "
Fleur	Intersection of Fleur and Park	53 "
	Intersection of Fleur and Watrous	35 "
	Intersection of Fleur and Army Post	50 "
Hubbell Ave.	Intersection of Hubbell and East University	38 "
Grand	Intersection of Grand and 9th	29 "
	Intersection of Grand and 63rd	39 "
2nd	Intersection of 2nd and Euclid	50 "
	Intersection of 2nd and Madison	25 "
Vandalia and E 29th	Intersection of 29th and Euclid	44 "
Court and Dean	Intersection of Dean and E 13th Street	25.5"
	Intersection of Dean and E 14th Street	33 "
9th	Intersection of 9th and Park	26 "
	Intersection of 9th and Army Post Road	1' 26 "
Broadway	Intersection of Broadway and E 29th	34 "
	Intersection of Broadway and Hubbell	35 "
	Intersection of Broadway and E 14th	1' 18 "

Key: 'minutes-"seconds

Traffic Accidents

A major objective of the Des Moines Urban Area, as stated in Chapter II, is to reduce deaths and injuries resulting from traffic accidents. An analysis of the four previous years' accident records indicated that SE 14th Street (from Euclid to Army Post Road), and Army Post Road (from Fleur to SE 14th) had large increases in traffic accidents. These segments also experienced traffic volume increases. In the analysis which follows every intersection within the corporate limits of Des Moines having 15 or more accidents in 1976 and every intersection outside the corporate limits of Des Moines having 5 or more annual accidents are evaluated. It should be noted that the accident totals do not include accidents reported by the Highway Patrol and the Safety Department.

Accidents are tabulated in two separate ways: (1) by frequency of accidents (Chart 2 and Figure 2), and (2) by adjusted accident rate (Chart 3 and Figure 3). An adjusted rate is used, in addition to frequency, to determine critical accident locations. An intersection may have a high frequency of accidents because it has a large approach volume rather than because it is especially dangerous. Thus, intersections with a high frequency of accidents may not be the most hazardous.

Critical locations are determined by a method known as critical location rating by MEV (millions of vehicles entering the intersection). This is the ratio between the number of annual accidents and average daily traffic entering the intersection in millions.

The formula for determining critical accident locations can be written as follows:

$$\text{Accident rate} = \frac{N}{MEV}$$

N = Annual accidents

MEV = 1,000,000 vehicles entering an intersection

MEV is calculated by using the following formula:

$$\frac{.5\ (\text{ADT on all intersection legs})\ 365}{1{,}000{,}000}$$

It is recognized that the traffic patterns in the central urban area are different from those in the suburban and rural areas. Moreover, traffic accidents in the central urban areas are generally less sever and more numerous than those in the suburban and rural areas. Therefore, for the purpose of this study, an intersection within the Des Moines Corporate Limits is classified as a critical location if it has an accident rate greater than 3; 1.5 if the intersection is outside the Des Moines Corporate Limits.

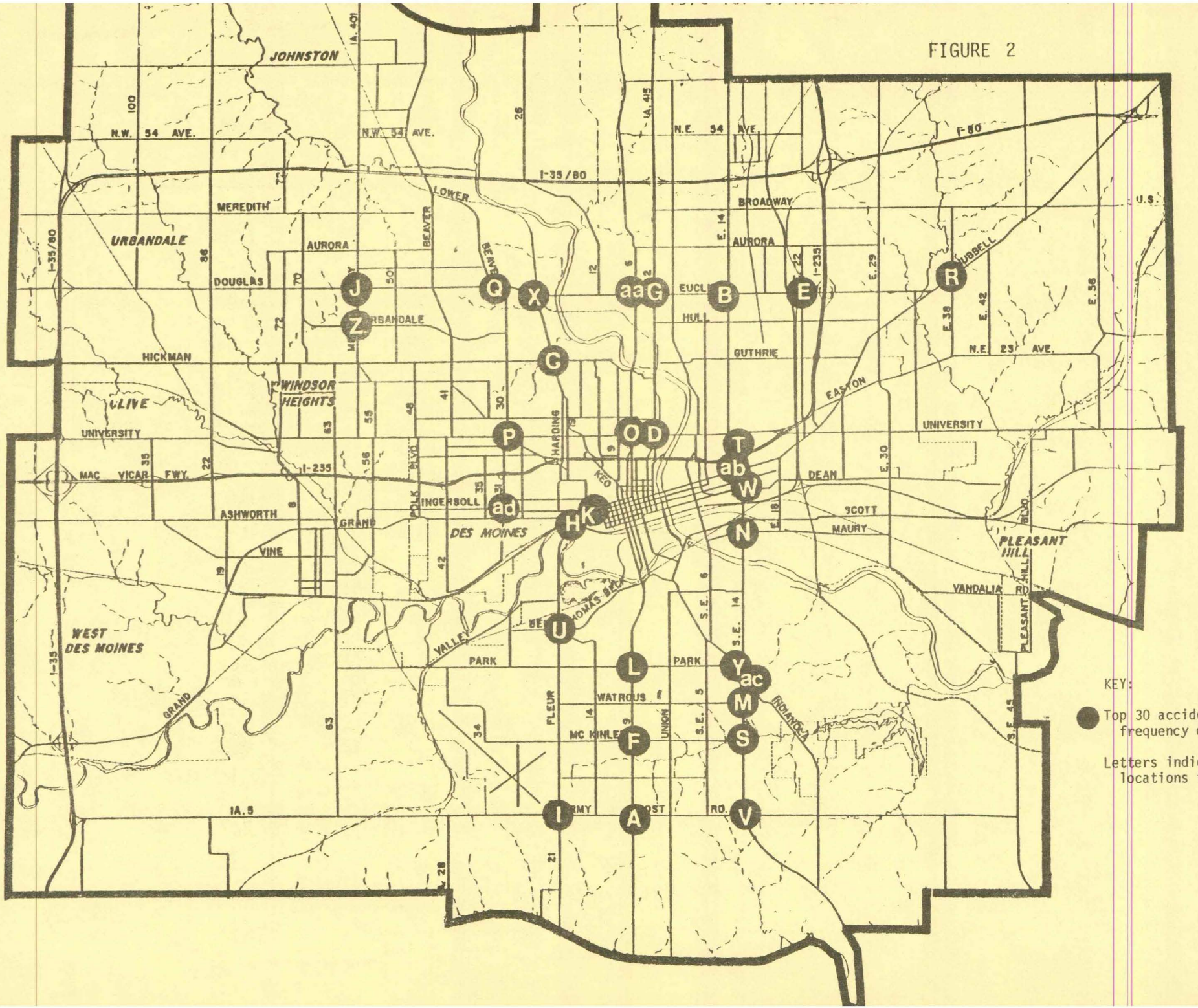
CHART 2

1976 TOP 30 ACCIDENT LOCATIONS BY FREQUENCY OF OCCURANCE

SYMBOL	LOCATION	NUMBER OF ACCIDENTS
*A	Army Post Road and SW 9th Street	54
B	Euclid Avenue and E 14th Street	47
C	Harding Road and Hickman Road	41
D	University Avenue and 2nd Avenue	40
E	Delaware and Euclid Avenue	39
F	McKinley Avenue and SW 9th Street	37
G	Euclid Avenue and 2nd Avenue	36
H	Fleur Drive and Grand-Locust	36
I	Army Post Road and Fleur Drive	35
J	Douglas Avenue and Merle Hay Road	35
K	Grand Avenue and E 15th Street	35
L	Park Avenue and SW 9th Street	35
M	Watrous Avenue and SE 14th Street	34
N	Maury Street and SE 14th Street	31
O	University Avenue and 6th Avenue	31
P	University Avenue and E 30th Street	30
Q	Beaver Avenue and Douglas Avenue	29
R	Hubbell Avenue and E 38th Street	29
S	McKinley Avenue and SE 14th Street	28
T	Maple Street and East 15th Street	27
U	Bell Avenue and Fleur Drive	26
V	Army Post Road and SE 14th Street	25
W	Court Avenue and East 15th Street	25
X	Euclid Avenue and Harding Road	24
Y	Indianola Road and Park Avenue	24
Z	Merle Hay Road and Urbandale Avenue	24
aa	Euclid Avenue and 6th Street	23
ab	Grand Avenue and E 14th Street	23
ac	Indianola Road and SE 14th Street	23
ad	Ingersoll Avenue and 31st Street	23

*Alphabetical order represents descending accident frequencies

FIGURE 2



KEY:

● Top 30 accident locations by frequency of occurance

Letters indicate accident locations found on Chart

CHART 3

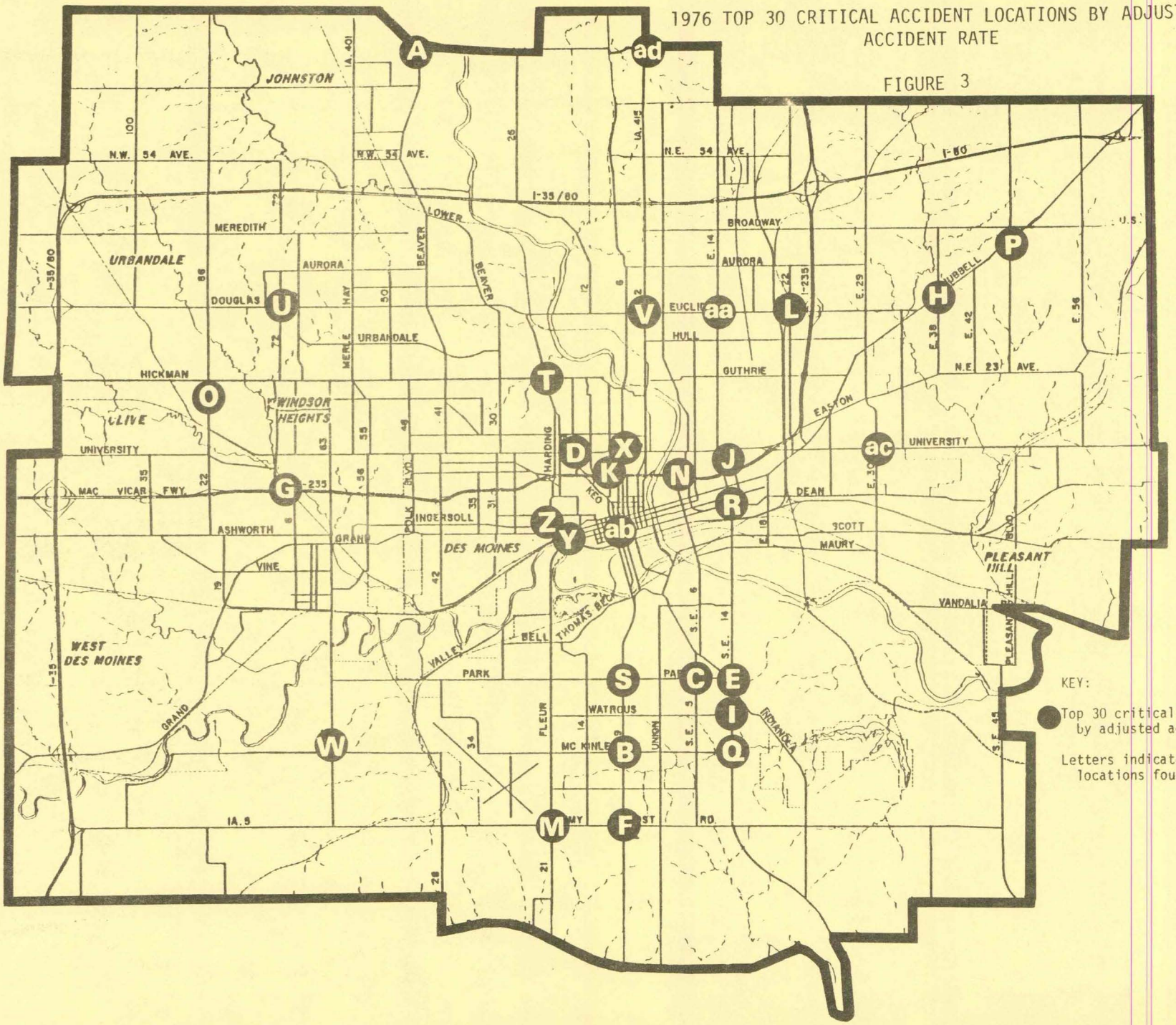
1976 TOP 30 CRITICAL ACCIDENT LOCATIONS BY ADJUSTED ACCIDENT RATE

MAP SYMBOL	LOCATION	UNADJUSTED ACCIDENT RATE	ADJUSTED ACCIDENT RATE*
A	Intersection of Beaver Avenue and 66th Avenue	6.10	4.60
B	Intersection of McKinley Avenue and SW 9th	7.36	4.36
C	Intersection of Park Avenue and SE 5th	6.86	3.86
D	Intersection of University Avenue and 13th Street	6.80	3.80
E	Intersection of Indianola Road and Park Avenue	6.19	3.19
F	Intersection of Army Post Road and SW 9th	5.88	2.88
G	Intersection of Rancho Grande and I-235 W. Enterance	4.30	2.80
H	Intersection of Hubbell Avenue and E 38th Street	5.11	2.11
I	Intersection of Watrous Avenue and SE 14th Street	4.54	1.54
J	Intersection of Maple Street and E 15th Street	4.37	1.37
K	Intersection of I-235 and 8th Street Exit	4.27	1.27
L	Intersection of Delaware and Euclid Avenue	4.17	1.17
M	Intersection of Army Post Road and Fleur Drive	4.17	1.17
N	Intersection of I-235 and Pennsylvania Avenue	4.02	1.02
O	Intersection of 86th Street and Summit Drive	2.49	.99
P	Intersection of NE 46th and Hubbell	2.41	.91
Q	Intersection of McKinley Avenue and SE 14th	3.89	.89
R	Intersection of Court Avenue and E 15th Street	3.86	.86
S	Intersection of Park Avenue and SW 9th Street	3.80	.80
T	Intersection of Harding Road and Hickman Road	3.75	.75
U	Intersection of Douglas and 72nd Street	2.22	.72
V	Intersection of Euclid and 2nd Avenue	3.57	.57
W	Intersection of SW 48th Avenue and SW 63rd Street	2.04	.54
X	Intersection of University Avenue and 6th Avenue	3.53	.53
Y	Intersection of Fleur Drive and Grand-Locust	3.53	.53
Z	Intersection of Harding Road and Ingersoll	3.53	.53
aa	Intersection of Euclid Avenue and E 14th	3.49	.49
ab	Intersection of Mulberry Avenue and 8th Street	3.49	.49
ac	Intersection of University Avenue and E 30th Street	3.47	.47
ad	Intersection of NE 66th Avenue and NW 2nd Avenue	1.92	.42

*The rate is adjusted by a geographical adjustment factor. Intersections within the corporate lines of Des Moines are adjusted by a factor of 3.0, while surrounding areas use 1.50.

1976 TOP 30 CRITICAL ACCIDENT LOCATIONS BY ADJUSTED ACCIDENT RATE

FIGURE 3

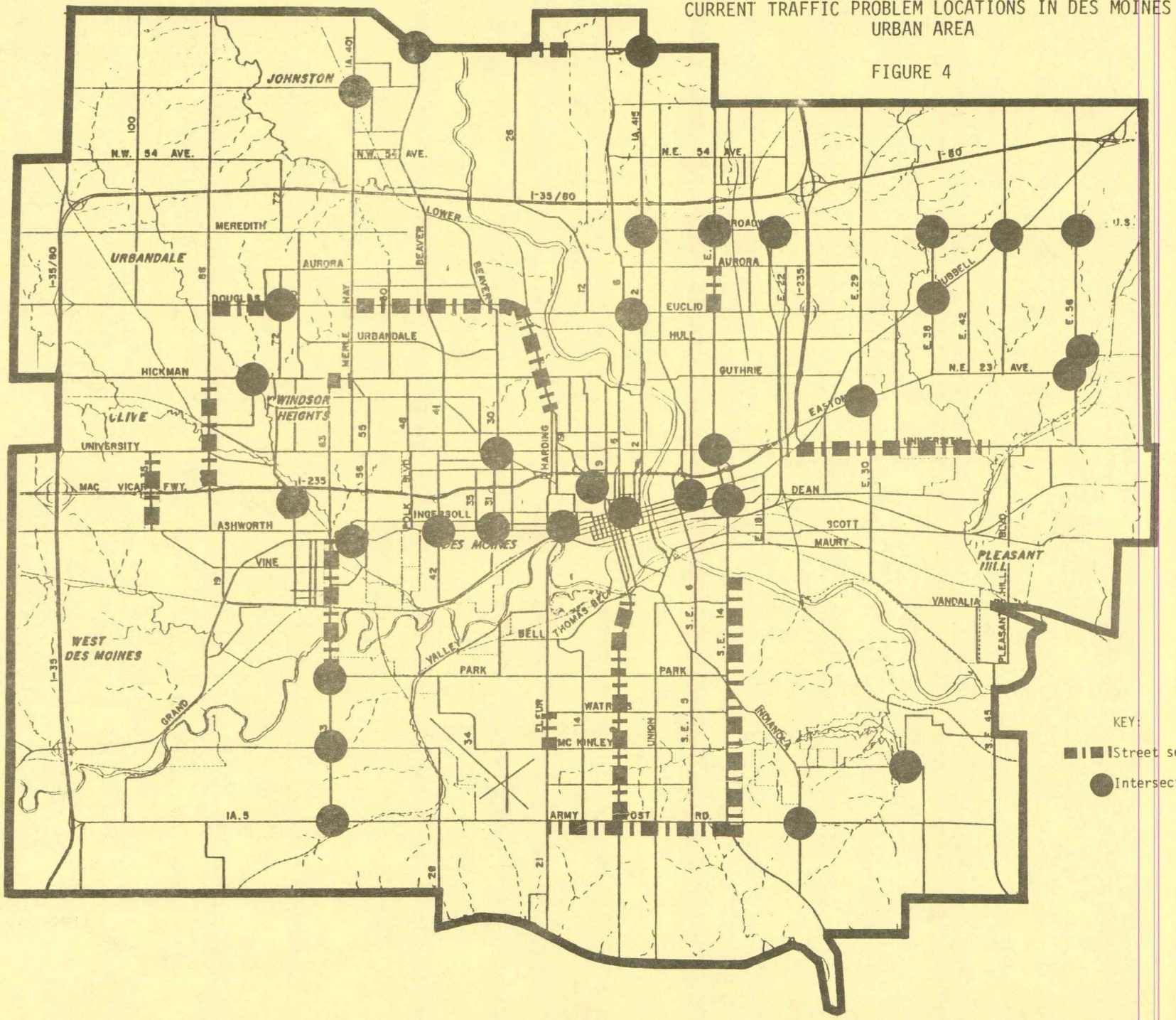


Traffic Problem Areas

A series of interviews with local traffic engineers and city administrators has identified the locations shown on Figure 4 as significant problem areas. Most of these locations are either intersections and/or combinations of intersections and mid-block street segments which need to be improved. The problems at these locations include traffic congestion and design problems such as inadequate turning-radii and narrow approach widths. These problems have a tendency to reduce overall travel speed and to increase load factors, volume/capacity ratios and accident frequencies.

CURRENT TRAFFIC PROBLEM LOCATIONS IN DES MOINES URBAN AREA

FIGURE 4



Transit

Existing Service

The Des Moines Metropolitan Transit Authority (MTA) is a municipal bus system owned by five cities: Des Moines, Clive, Urbandale, West Des Moines and Windsor Heights. The MTA receives its operating expenses from the five municipalities and State and Federal Grants. A Board of Directors composed of three members from Des Moines and one member each from the four suburbs is responsible for governing the MTA.

The MTA system has 90 buses with seating capacities ranging from 39-51 passengers. The fare charged for riding these buses is 50¢ for adults (18-59); passengers aged 60 + pay 25¢; handicapped persons of any age pay 25¢; children and students (ages 5 to 18) pay 35¢; and children under 6 years of age can ride free when accompanied by parent. Weekly adult passes cost $4.50 and monthly passes are $20. Free transfers can be obtained on all routes when the fare is paid.

There are 140 employees of the MTA: 96 operators, 7 unskilled laborers, 15 skilled craftsmen, 12 office and clerical workers, 2 dispatchers, 3 route supervisors, 1 maintenance and service supervisor, 1 purchasing manager, 1 transportation superintendent and 2 general manager staff persons.

Service is provided on eight regular routes, five express routes and special school routes, each of which varies in length and times of operation. Charts 4 and 5 summarize the route operating statistics of the MTA system.

CHART 4
ROUTE OPERATING STATISTICS - WEEKDAY

Route No.	Route Name	Round Trip Miles	No.of Round Trips	Total Daily Miles	Round Trip Running Time (Minutes)	Av.Bus Speed (MPH)	Headways (Min.) AM Peak	Mid Day	PM Peak	Operating Day Time Start	Time Close	No.of Buses Req.
1	Fairground/West Des Moines	35.79	35.75	1,279.50	136.0	15.71	15	30	15	5:30 AM	7:18 PM	10
2	Crocker/Scott	17.06	8.50	145.01	73.0	14.02	45	None	45	6:01 AM	6:25 PM	2
3	University/ Highland-Oak Pk.	23.26	36.25	837.45	102.4	13.63	15	30	15	5:38 AM	7:00 PM	8
4	Urbandale/E. 14th	27.90	34.25	956.80	106.0	15.79	15	30	15	5:52 AM	7:21 PM	8
5	Clark/E. 6th & 9th	24.25	33.00	808.39	95.3	15.26	15	35	15	5:50 AM	7:20 PM	7
6	W. 9th-Douglas/ Indianola-Lacona	33.22	36.00	1,191.00	129.0	15.45	15	30	15	5:30 AM	7:23 PM	10
7	Ft. Des Moines/ Walker	25.57	37.00	953.00	98.0	15.66	15	30	15	5:48 AM	7:17 PM	8
8	SW 14th-Porter/ University-2nd Ave.	14.30	14.00	189.00	54.0	15.89	30	None	30	5:50 AM	6:52 PM	2
	TOTAL LINE HAUL	201.35	234.75	6,360.15	793.7	15.22	15	30	15	5:30 AM	7:23 PM	55
9	Clive Express	20.90	3.00	31.30	39.3	31.91	--	--	30	7:10 AM	6:15 PM	3
9	Urbandale Express	22.85	3.00	34.50	41.0	33.44	--	--	30	7:08 AM	6:15 PM	3
9	West Des Moines Exp.	19.60	3.00	29.45	39.0	30.20	--	--	30	6:45 AM	6:05 PM	3
9	Windsor Hts. Exp.	23.40	3.00	34.95	43.0	32.65	--	--	30	6:44 AM	6:15 PM	3
9	Valley Express	22.45	3.00	33.70	38.3	35.17	--	--	30	6:44 AM	6:05 PM	3
	TOTAL EXPRESS	109.20	15.00	163.90	200.6	32.66	N/A	N/A	30	6:44 AM	6:15 PM	15
	Special School	N/A	N/A	292.2	N/A	N/A	N/A	N/A	N/A	6:13 AM	4:05 PM	N/A
	TOTAL SYSTEM	310.55	249.75	6,816.25	994.3	18.74	15	30	15	5:30 AM	7:23 PM	70

Source: MTA surveillance manual July, 1977

CHART 5

ROUTE OPERATING STATISTICS - SATURDAY

Route No.		Round Trip Miles	No. of Round Trips	Total Daily Miles	Round Trip Running Time (Minutes)	Av.Bus Speed (MPH)	Headways (Min.) AM Peak	Mid Day	PM Peak	Operating Day Time Start	Time Close	No. of Buses Req.
1	Fairground/West Des Moines	35.53	26	923.78	132	16.15	30	30	30	6:00 AM	7:18 PM	5
2	Crocker/Scott	11.39	8	91.12	48	14.23	60	60	60	8:36 AM	4:29 PM	1
3	University/ Highland-Oak Pk.	23.26	25	390.00	98	14.24	30	30	30	5:45 AM	7:00 PM	4
4	Urbandale/E. 14th	27.90	25	688.00	104	16.10	30	30	30	5:51 AM	7:12 PM	4
5	Clark/E. 6th & 9th	24.25	22	537.00	92	15.82	30	30	30	5:44 AM	7:20 PM	3
6	W. 9th-Douglas/ Indianola-Lacona	32.91	55	811.00	127	15.55	30	30	30	5:40 AM	7:23 PM	5
7	Fort Des Moines/ Walker	25.57	24	626.00	94	16.32	30	30	30	5:54 AM	7:15 PM	4
8	SW 14th-Porter/ University-2nd Ave.	-----	---	------	---	-----	--	--	--	-------	-------	-
	TOTAL SYSTEM	180.81	185	4,066.90	695	15.61	30	30	30	5:30 AM	7:23 PM	26

Source: MTA surveillance manual July, 1977

Each of the routes in Charts 4 and 5 has been divided into segments and evaluated in terms of productivity and efficiency. Productivity is measured by ridership, passengers per revenue mile, number of trips, passengers per trip and percent of vehicle capacity per trip. Efficiency is defined as the relationship between route operating cost and passenger revenue generated from the farebox and prepaid fare, and the subsidy per passenger trip required to maintain route performance at existing service levels. The purpose of these evaluation criteria is to identify unproductive or costly areas of service and to develop service modifications which can reduce costs while increasing ridership. The West Des Moines transit routes and the Urbandale bus service have been modified as a result of productivity and efficiency analyses. Details of these service modifications can be found in the MTA surveillance manual.

Studies of express commuter service to areas without transit service have also been conducted. The feasibility of express service to the Horizon East Apartment Complex, located at East 41st and Hubbell, and to the Meredith Corporation, located at 57th and Park Avenue has been analyzed. Charts 6 and 7 show route operating characteristics for these two routes.

In addition to the express bus studies, the MTA has implemented an on-going marketing program to attract more transit riders. This program involves both a transit incentive program and a vehicle rehabilitation program.

The incentive program has three parts, one of which enables the employer to directly subsidize up to 50% of their employees public transportation cost. The MTA offers participating employers a 5% discount on the price of weekly and monthly passes, and one month of free transportation to all employees who enroll

CHART 6

EXPRESS COMMUTER SERVICE EVALUATION

Impact on Annual System Ridership:

Route	Number of Passengers	Number of New Riders	% of Route Ridership	% of Increase or[1] Decrease In System Patronage
Horizons East	18,648	18,648	100.0%	.623
Meredith Corp.	17,892	17,892	100.0%	.598
TOTAL	36,540	36,540	100.0%	1.221

Impact on Annual System Revenue and Operating Cost:

Route	Revenue From New Riders	% of Route Revenue	% of Increase or[2] Decrease In System Revenue	% of Increase or[3] Decrease In Operating Cost
Horizons East	9,156	100.0%	.699	.103
Meredith Corp.	8,785	100.0%	.671	.099
TOTAL	17,941	100.0%	1.370	.202

1 - Based on Fiscal Year 1976/1977 estimated ridership of 2,993,287

2 - Based on Fiscal Year 1976/1977 passenger revenue of $1,309,229

3 - Based on Fiscal Year 1976/1977 operating costs of $2,986,770

Source: MTA surveillance manual July, 1977

CHART 7

Express Commuter Service Evaluation

Route Operating Characteristics

Route	Round Trip Revenue Miles	# of Trips	Total Revenue Miles	Estimated Number of Passengers	Passengers Per Trip	Passenger Revenue	Total Operating Cost	Level Of Service
Horizons East	10.3	4	41.2	74	18.5	36.47	48.62	am/pm peak
Meredith Corp.	9.9	4	39.6	71	17.8	35.07	46.73	am/pm peak
Total	20.2	8	80.8	145	18.13	71.54	95.35	am/pm peak

Estimated Route Productivity

Route	Number of Passengers	Passengers Per Trip	Passengers per Revenue Mile	Percent Of Vehicle Capacity
Horizons East	74	18.85	1.80	37.0
Meredith Corp.	71	17.8	1.78	35.6
Total	145	18.1	1.79	36.2

Estimated Route Efficiency

Route	Operating[1] Cost	Passenger Revenue	Percent of Breakeven	Subsidy Per Passenger Trip
Horizons East	48.62	36.47	75.0%	.164
Meredith Corp.	46.73	35.05	75.0%	.165
Total	95.35	71.52	75.0%	.164

[1]Based on operating cost per mile of $1.18

Source: MTA surveillance manual July, 1977

in the program for eleven of thirteen consecutive months. When the employer subsidy is combined with the promotional incentives an employee can realize a substantial reduction in his or her annual transportation costs.

The second facet of the incentive program is a payroll deduction plan which allows employees to pay for the cost of transit through regular payroll deductions. To encourage employees to enroll in this program several incentives were developed. Specifically, free transit passes good for two weeks were given to any employee who registered to participate in the programs and one month of free transportation was given employees who purchased monthly passes for eleven of thirteen consecutive months. All passes purchased by an employee from his or her employer were also discounted five percent.

A final phase of this incentive program involved an expansion of the outlets where transit schedule information and passes could be obtained. Major bank credit cards can be used to purchase bus passes at these outlets.

The vehicle rehabilitation program was designed to improve the physical appearance of older MTA buses. The aim of the program was to build a positive image of the transit system in the Des Moines Urbanized Area.

Problems with the Bus System

Problems as identified by the MTA include:

- Inefficient route segments that need to be modified.
- Lack of shelters at major route stops.
- Lack of coordination between transit service and trip demands for peak and non-peak hour trips.
- Conflicts between automobiles and buses at route stops and on streets in the Central Business District (CBD).

These problems may be addressed in the future.

Paratransit

One of the objectives of the TSM is to provide good quality, affordable transportation to the elderly and handicapped. There are approximately 40 agencies in the Des Moines Urbanized Area that are concerned with elderly and handicapped transportation. However, only the Special Service Transportation, Corp. and the Southeast Pioneer and Columbus transportation service have no eligibility restrictions for their participants, except for geographic service limitations.

Southeast Pioneer and Columbus (SEPAC) has been in operation three and one half (3½) years. It is governed by a six (6) member board, which consists of a chairman, a treasurer, a secretary and three (3) other members. Three of these board members are from the Southeast Service Area and three are from the Pioneer Columbus Area. SEPAC is funded by United Way but can only use its funds to maintain service; funds can not be used for service expansion. Individuals obtain transportation by phoning SEPAC. A dispatcher then determines when a vehicle can be sent to pick up the passenger.

The Special Service Transportation Corp., hereinafter referred to as SST Corp., is designed to expand service by consolidating and coordinating existing transportation services provided by various agencies in the Des Moines Area. The SST Corp. was incorporated on September 15, 1976 and began providing transportation services to the elderly and handicapped on January 31, 1977. Its Board of Directors consists of representatives of the Des Moines Metropolitan Transit Authority, Capitol Cab Company, Yellow Cab Company and two representatives from the City of Des Moines.

The SST Corp. receives transportation requests from participating agencies and private individuals. These individuals are then assigned to either MTA buses, SST Corp. vans or cabs. The SST Corp. dispatcher determines which means of transportation should be used based upon: the trip type (e.g. shopping, medical, etc.) time of trip, origin and destination of the trip, trip route, trip cost and the size and type of group.

An evaluation of TSM related paratransit services can be found in Chapter IV of the TSM. Further details on existing paratransit services can be found in Section I of the Des Moines Urbanized Area Elderly and Handicapped Transportation Study and in the Documentation of "Special Efforts" Transportation Planning for Semi and Non-Ambulatory Persons.

CHAPTER IV The Transportation System Management Plan

IV. THE TRANSPORTATION SYSTEM MANAGEMENT ELEMENT

TSM Actions Considered for the Des Moines Study Area

The identification of possible TSM actions for the Des Moines area was achieved with the cooperation of the Transportation Technical Committee. A comprehensive inventory of TSM actions was drawn up and a set of actions was then selected from the list. This selection was based upon funding constraints technical feasibility, political acceptability and the ability of actions to meet the objectives specified in Chapter II. The analysis produced the following list of TSM actions considered for the study area.

Definition of TSM Actions

1. Variable Work Hours - Staggered Work Hours

Under this system the employee's starting and quitting times occur more frequently than usual (e.g. 10 min., 15 min., rather than 30 min. intervals) and either before or after the normal peak period. A staggered work hour program, however, does not change the hours or the number of days the employees work.

Flexible Work Hours

Employees adjust their working schedules to fit their preferences. The hours worked include a block of time within which all employees must be present. This core time would be, for example, from 10:00 A.M. - 12:00 P.M. and from 1:00 P.M. - 3:00 P.M. Under a flex time arrangement, the work week remains at 40 hours. (The State Department of Transportation is presently using this system.)

2. 4-Day Work Week

4-day, ten hour schedule. Under this option all employees start work one hour earlier and leave one hour later.

4-day schedule in which less than 40 hours are worked per week. There are five scheduling options available under this type program. The options are as follows:

TABLE 2

FOUR-DAY WORK SCHEDULE	PERCENT OF FOUR DAY EMPLOYEES WORKING ON A GIVEN DAY					
	M	TU	W	TH	F	S
1. Equally rotated M-F	80	80	80	80	80	-
2. 1/2 M-TH; 1/2 TU-F	50	100	100	100	50	-
3. Equally rotated M-S	67	67	67	67	67	67
4. 1/3 M-TH; 1/3 TU-F; 1/3 W-S	33	67	100	100	67	33
5. 1/2 M-TH; 1/2 W-S	50	50	100	100	50	50

3. Peak-Hour Restriction

Trucks are permitted to load and unload only during off-peak travel periods. This action applies only to trucks which provide pick-up and delivery services.

4. Higher Parking Cost

A change of the parking rate structure to discourage parking. The parking rates may be structured to discourage long-term parking and encourage short-term parking or vice versa. A parking rate increase can also be used to discourage the use of the private automobile and encourage the use of other means of transportation.

5. Reduced Parking Fee for Carpools or Vanpools

Reduction of parking fees for carpools and vanpools for the work trip.

6. Reduced Bus Fares for Elderly and Handicapped and for Non-Peak Riders

Reduction of bus fares during all hours of bus operation for elderly and handicapped. Reduction of bus fares during off-peak periods for non-peak riders.

7. Transit Marketing

The direct transit marketing objectives are to increase transit patronage and to gain overall public support for the system. The marketing techniques range from public information service to advertising and promotional programs. The scale of programs depends upon the cost of implementation.

8. Transit Route Improvement

This action consists of both operational and physical improvements for the fixed route transit service. Operational improvements include but are not limited to

(a) bus scheduling,
(b) schedule reliability,
(c) route plan and layout,
(d) loading location.

Physical improvements include but are not limited to

(a) turning radii at intersections,
(b) radio service,
(c) preferential treatment for traffic control purposes.

9. Integration of Transit Services

Three different types of integration are possible:

(a) Institutional integration-mergers of fixed route and paratransit services.

(b) Operational integration:

(1) a single transit network which avoids, as far as possible, duplication of service
(2) a common fare structure
(3) a schedule which ensures that patrons can transfer between vehicles with a minimum of waiting time, and
(4) an areawide management information system.

(c) Physical integration-this includes the standardization of vehicles, fare collection equipment and joint use of rolling stock.

10. Carpools, Vanpools

Carpools and vanpools organized by employers through matching programs.

11. Removal of On-Street Parking

This action usually is implemented in the CBD. It involves either permanent removal of on-street parking space or restriction of on-street parking during peak-periods.

12. One-Way Street System

On a one-way street, all lanes of traffic move in the same direction.

13. Traffic Control Improvement

Traffic control on urban or rural streets include the following types of improvements:

(a) Lane markings
(b) Lighting projects
(c) Guardrails
(d) 2-way stop sign
(e) 4-way stop sign
(f) Isolated intersection signal control
(g) Open network control
(h) Closed network control

The signal control concepts for (f), (g) and (h) fall into two basic categories:

(a) pretimed control, and
(b) traffic-actuated control.

14. Unbalanced Flow

Reversible lanes are set up (during peak hours) to increase the capacity of the roadway in the direction of peak flow.

15. Eliminating Unnecessary Traffic Control Devices

The elimination of traffic control devices, particularly traffic signals and stop signs, that do not meet the warrants for such devices adopted by Federal and State agencies. Frequently unwarranted traffic control devices result from changing traffic patterns.

16. Signal Visibility Upgrading

The modernization of traffic signals by improving the visibility of the signals.

17. Intersection Improvement (Channelization)

The establishment of exclusive right or left turn lanes through painted or physical barriers.

18. Mid-block Improvement (2-way Left Turn Lanes)

Space is provided so that vehicles can pull out of through lanes and wait for an opportunity to turn left.

19. Mid-block Improvement (Access Control)

Barrier type medians that prevent mid-block left turns can be used, although this is not practical where access has already been granted. Another option is to provide access through a street layout that allows drivers to make a right turn properly after circling the block. The most desirable alternative is to provide access from a side street after turning left at an intersection.

20. Intersection widening

Widening may be achieved by removal of parking, the addition of one or more lanes to provide additional lanes for left and/or right turns and the improvement of intersection geometrics.

21. Pedestrian Walk and Pedestrian/Bicycle Safety Projects

Skywalks provide direct access between buildings, reducing pedestrian/vehicle conflict. The Des Moines Skywalk system will be located within the central business district, in an area bounded by 8th Street, 4th Street, Mulberry Avenue and Grand Avenue.

Bicycle safety projects consist of bikeways which are:

(a) totally separated from pedestrian and vehicular traffic
(b) on restricted rights-of-way, or
(c) on shared rights-of-way with pedestrians and/or vehicles.

Evaluation of 1978 TSM Projects

Measures of Effectiveness (MOE) or evaluation criteria (the terms are used interchangeably) have been developed so that impacts-positive and negative alike-of a TSM action on a particular objective can be determined. One requirement for estimating these impacts is that the MOEs be quantifiable. If evaluation criteria cannot be measured in any manner, they are not useful. This does not mean, however, that evaluation criteria must be quantifiable in a numerical sense to be of value. The impact of a TSM action on an MOE (and its associated objective) can still be assessed in a qualitative sense. We can say, for example, that one TSM action is likely to have a positive affect on an evaluation criteria, while another's affect will be negative, has no impact or is uncertain.

The assessment of local TSM projects was conducted in this qualitative manner. Each of the local projects was classified into the TSM actions that were considered for this area. Each TSM project (as classified by TSM action) was then analyzed to determine whether it had a positive impact, negative impact or no impact on a particular MOE. In some cases the impact of the project on a particular MOE could not be determined so its affect was unclear.

An assessment of the trade-offs among various TSM objectives and the cumulative impacts of combined TSM projects could not be made because quantitative data on the MOEs was unavailable. The following series of charts (8) evaluate each project's impact on the MOEs. Other charts in the appendix provide a list of additional MOEs. These MOEs provide at least a tentative means of assessing the impacts of TSM actions which have been considered but have not yet been implemented.

CHART 8 - (1)

KEY TO CHART: + = Positive impact on MOE - = Negative impact on MOE UNK = Impact unknown NI = No impact TSM PROJECT	TSM ACTION(S)	PROJECT COST	MEASURES OF EFFECTIVENESS									
			REDUCE THE NUMBER OF ACCIDENTS	DECREASE VOLUME/ CAPACITY RATIO	REDUCE DELAY TIME	INCREASE OVERALL TRAVEL SPEED	REDUCE VEHILCE MILES OF TRAVEL	INCREASE PASSENGERS PER TRIP	INCREASE ELDERLY & HANDICAPPED RIDERSHIP	INCREASE BUS SCHEDULE RELIABILITY	INCREASE AUTOMOBILE DRIVERS SHIFTED TO TRANSIT	REDUCE WAITING TIME
10 Transit Coaches (MTA	Transit Marketing	825,000	NI	NI	NI	NI	NI	+	+	+	+	NI
MTA Radio Modifications	Transit Route Improvements	6,000	UNK	NI	UNK	UNK	NI	NI	NI	+	NI	UNK
Communications (Paratransit)	Transit Route Improvements	1,818	UNK	NI	UNK	UNK	NI	NI	UNK	+	NI	+
2-16 Passenger vans with W.C. lift and 2 W.C. spaces	Integration of Transit Services	35,200	NI	NI	NI	NI	UNK	NI	+	NI	NI	+
Iowa Methodist Medical Center-Transportation services for the Elderly and Handicapped	Integration of Transit Services	20,512	NI	NI	NI	NI	UNK	NI	+	NI	NI	+
Harbach Blvd & NW 86th	Traffic Control Improvement	27,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
Pavement Marking Demonstration Project	Traffic Control Improvement	148,000	+	NI	UNK	UNK	NI	NI	NI	NI	NI	NI
Des Moines City wide Traffic Signals, Channelization & School Crossing Protection Program	Traffic Control Improvement	182,160	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 69 (E 14th St.) @ Grandview (1)	Traffic Control Improvement	7,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 69 (E 14th St.) @ Cleveland (1)	Traffic Control Improvement	8,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
(1) Part of the Des Moines City Wide Traffic Signals, Channelization & School Crossing Protection Program												

CHART 8 - (2)

KEY TO CHART:
+ = Positive impact on MOE
- = Negative impact on MOE
UNK = Impact unknown
NI = No impact

TSM PROJECT	TSM ACTION(S)	PROJECT COST	MEASURES OF EFFECTIVENESS: REDUCE THE NUMBER OF ACCIDENTS	DECREASE VOLUME/ CAPACITY RATIO	REDUCE DELAY TIME	INCREASE OVERALL TRAVEL SPEED	REDUCE VEHILCE MILES OF TRAVEL	INCREASE PASSENGERS PER TRIP	INCREASE ELDERLY & HANDICAPPED RIDERSHIP	INCREASE BUS SCHEDULE RELIABILITY	INCREASE AUTOMOBILE DRIVERS SHIFTED TO TRANSIT	REDUCE WAITING TIME
US 69 (E 14th St.) @ Aurora (1)	Traffic Control Improvement	23,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
Ia 163 (University) @ E 24th St.	Traffic Control Improvement	6,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
Ia 163 (University) @ E 15th St. (1)	Traffic Control Improvement	6,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
Ia 401 (Merle Hay) @ Madison (1)	Traffic Control Improvement	35,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 6 (Merle Hay) & Hickman & US 6 (Douglas) and Iowa 401 (Merle Hay) (1)	Traffic Control Improvement	3,210	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 6 (Euclid) & Harding Road (1)	Traffic Control Improvement	1,290	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 6 (Euclid) & Oliver Plaza (1)	Traffic Control Improvement	1,290	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 6 (Euclid) & 6th Avenue (1)	Traffic Control Improvement	1,290	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 6 (Euclid) & E 29th St. (1)	Traffic Control Improvement	640	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 6 (Euclid) & Ia 415 (2nd Ave.) (1)	Traffic Control Improvement	640	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 65/69 (E 14th St.) & Ia 163 (University) (1)	Traffic Control Improvement	2,570	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 65/69 (E 15th) & Grand (1)	Traffic Control Improvement	640	+	+	UNK	+	-	NI	NI	NI	NI	NI
(1) Part of the Des Moines City wide	Traffic Signals, Channelization & School	Protection Program										

CHART 8 - (3)

KEY TO CHART:
+ = Positive impact on MOE
- = Negative impact on MOE
UNK = Impact unknown
NI = No impact

TSM PROJECT	TSM ACTION(S)	PROJECT COST	MEASURES OF EFFECTIVENESS									
			REDUCE THE NUMBER OF ACCIDENTS	DECREASE VOLUME/ CAPACITY RATIO	REDUCE DELAY TIME	INCREASE OVERALL TRAVEL SPEED	REDUCE VEHILCE MILES OF TRAVEL	INCREASE PASSENGERS PER TRIP	INCREASE ELDERLY & HANDICAPPED RIDERSHIP	INCREASE BUS SCHEDULE RELIABILITY	INCREASE AUTOMOBILE DRIVERS SHIFTED TO TRANSIT	REDUCE WAITING TIME
Ia 163 (University) & E.21st St. (1)	Traffic Control Improvement	640	+	+	UNK	+	-	NI	NI	NI	NI	NI
Ia 163 (University) & Hubbell (1)	Traffic Control Improvement	1,290	+	+	UNK	+	-	NI	NI	NI	NI	NI
Ia 401 (Merle Hay) & Aurora (1)	Traffic Control Improvement	1,290	+	+	UNK	+	-	NI	NI	NI	NI	NI
I-235 & 42nd St. (1)	Traffic Control Improvement	640	+	+	UNK	+	-	NI	NI	NI	NI	NI
I-235 & 63rd St. (1)	Traffic Control Improvement	2,570	+	+	UNK	+	-	NI	NI	NI	NI	NI
Railroad Crossing on SE 44th Ave.	Traffic Control Improvement	25,500	+	+	+	+	NI	NI	NI	NI	NI	NI
Railroad Crossing on NE 66th Ave.	Traffic Control Improvement	25,500	+	+	+	+	NI	NI	NI	NI	NI	NI
Railroad Crossing on NE 51st Ave.	Traffic Control Improvement	25,500	+	+	+	+	NI	NI	NI	NI	NI	NI
Railroad Crossing on NW 58th Ave.	Traffic Control Improvement	25,500	+	+	+	+	NI	NI	NI	NI	NI	NI
McKinley Ave. from Walnut Woods to SW 63rd & SW 73rd from Ia 5 to SW 52nd Ave.	Traffic Control Improvement	95,000	+	+	UNK	NI	NI	NI	NI	NI	NI	NI
(1) Part of the Des Moines CIty Wide Traffic Signals, Channelization & School Crossing Protection Program												

CHART 8 - (4)

KEY TO CHART:
+ = Positive impact on MOE
- = Negative impact on MOE
UNK = Impact unknown
NI = No impact

TSM PROJECT	TSM ACTION(S)	PROJECT COST	MEASURES OF EFFECTIVENESS									
			REDUCE THE NUMBER OF ACCIDENTS	DECREASE VOLUME/ CAPACITY RATIO	REDUCE DELAY TIME	INCREASE OVERALL TRAVEL SPEED	REDUCE VEHILCE MILES OF TRAVEL	INCREASE PASSENGERS PER TRIP	INCREASE ELDERLY & HANDICAPPED RIDERSHIP	INCREASE BUS SCHEDULE RELIABILITY	INCREASE AUTOMOBILE DRIVERS SHIFTED TO TRANSIT	REDUCE WAITING TIME
8th St. @ Office Park Road	Traffic Control Improvement	35,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
35th St. @ University	Traffic Control Improvement	30,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
35th St @ Woodland	Traffic Control Improvement	35,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 65 @ Adventurland Dr.	Traffic Control Improvement	64,071	+	+	UNK	+	-	NI	NI	NI	NI	NI
Intersection Rebuilding NW 62nd/ NW 59th @ Ia 401	Traffic Control Improvement	177,130	+	+	UNK	+	-	NI	NI	NI	NI	NI
	Elimination of Unnecessary Traffic Control Devices		+	UNK	+	+	UNK	NI	NI	NI	NI	NI
	Intersection Improvements (Channelization)		+	+	+	+	UNK	NI	NI	NI	NI	NI
Army Post Road-SE 5th to SE 14th St.	Traffic Control Improvement	30,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
	Intersection Improvement (Channelization)	235,000	+	+	+	+	UNK	NI	NI	NI	NI	NI
Ia 5 (Army Post Road) @ SW 9th	Traffic Control Improvement	200,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
	Intersection Improvement (Channelization)		+	+	+	+	UNK	NI	NI	NI	NI	NI
Ia 163 (University) @ Ia 46 (E 30th)	Traffic Control Improvement	800,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
	Intersection Improvement (Channelization)		+	+	+	+	UNK	NI	NI	NI	NI	NI

CHART 8 - (5)

KEY TO CHART:

\+ = Positive impact on MOE
\- = Negative impact on MOE
UNK = Impact unknown
NI = No impact

TSM PROJECT	TSM ACTION(S)	PROJECT COST	MEASURES OF EFFECTIVENESS: REDUCE THE NUMBER OF ACCIDENTS	DECREASE VOLUME/ CAPACITY RATIO	REDUCE DELAY TIME	INCREASE OVERALL TRAVEL SPEED	REDUCE VEHILCE MILES OF TRAVEL	INCREASE PASSENGERS PER TRIP	INCREASE ELDERLY & HANDICAPPED RIDERSHIP	INCREASE BUS SCHEDULE RELIABILITY	INCREASE AUTOMOBILE DRIVERS SHIFTED TO TRANSIT	REDUCE WAITING TIME
University and NW 100th	Traffic Control Improvement		+	+	UNK	+	-	NI	NI	NI	NI	NI
	Intersection Improvements (Channelization)	64,500	+	+	+	+	UNK	NI	NI	NI	NI	NI
	Intersection Widening		+	+	UNK	+	-	NI	NI	NI	NI	NI
Minor Intersection Improvements and Signalization Upgrading	Traffic Control Improvement	80,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
	Intersection Widening	197,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
63rd St. @ Hickman Road	Traffic Control Improvement	20,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
	Intersection Widening	50,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
3rd St.-Court Ave. to Keosawua Way	Traffic Control Improvement	40,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
	Intersection Widening	95,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
86th St. & Hickman Rd. Intersection	Traffic Control Improvement	26,200	+	+	UNK	+	-	NI	NI	NI	NI	NI
	Intersection Widening	58,800	+	+	UNK	+	-	NI	NI	NI	NI	NI
Hickman Road, Merklin Way and Merle Hay Road	Signal Visibility Upgrading	2,000	+	NI	NI	NI	NI	NI	NI	NI	NI	NI
	Intersection Improvement (Channelization)	10,000	+	+	+	+	UNK	NI	NI	NI	NI	NI
Dixon Ave.-E. Hull Intersection Realignment	Intersection Improvement (Channelization)	145,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
US 69 (SE 14th St.) - Park Ave. to King Ave.	Mid-block Improvement (2-way left turn lanes)	(1) 200,000	+	+	+	+	NI	NI	NI	NI	NI	NI

(1) Part of project only (Right-of-Way)

CHART 8 - (6)

KEY TO CHART:
+ = Positive impact on MOE
- = Negative impact on MOE
UNK = Impact unknown
NI = No impact

TSM PROJECT	TSM ACTION(S)	PROJECT COST	MEASURES OF EFFECTIVENESS									
			REDUCE THE NUMBER OF ACCIDENTS	DECREASE VOLUME/ CAPACITY RATIO	REDUCE DELAY TIME	INCREASE OVERALL TRAVEL SPEED	REDUCE VEHILCE MILES OF TRAVEL	INCREASE PASSENGERS PER TRIP	INCREASE ELDERLY & HANDICAPPED RIDERSHIP	INCREASE BUS SCHEDULE RELIABILITY	INCREASE AUTOMOBILE DRIVERS SHIFTED TO TRANSIT	REDUCE WAITING TIME
9th St. - Center to University	Intersection Widening	234,000	+	+	UNK	+	-	NI	NI	NI	NI	NI
Intersection of SW 63rd and Park Ave.	Intersection Widening	75,000	+	+	+	+	+	NI	NI	NI	NI	NI
Street and Curb Intake Renovation	Pedestrian-Walk and Pedestrian-Bicycle Safety Projects	26,000	+	UNK	NI	UNK	+	NI	NI	NI	NI	NI
Downtown Skywalk System (1)	Pedestrian-Walk and Pedestrian-Bicycle Safety Projects	100,000	+	UNK	NI	UNK	+	NI	NI	NI	NI	NI
Ia 46 (E 30th) South of Dean Ave. Pedestrian Underpass (2)	Pedestrian-Walk and Pedestrian-Bicycle Safety Projects	89,000	+	UNK	NI	UNK	+	NI	NI	NI	NI	NI
West Des Moines Sidewalk Program - 22nd Street and Miscellaneous Locations	Pedestrian-Walk and Pedestrian-Bicycle Safety Projects	35,000	+	UNK	NI	UNK	+	NI	NI	NI	NI	NI
Paratransit Vehicle Equipment	Integration of Transit Services	82	NI	NI	NI	NI	NI	NI	+	NI	NI	NI
15 Passenger Van for Foster Grandparent	Integration of Transit Services	9,400	NI	NI	NI	NI	UNK	NI	+	NI	NI	+

(1) Part of project only (Engineering)
(2) Part of the Des Moines City Wide Traffic Signals, Channelization and School Crossing Protection Program

Each of the MOEs is related to one or more of the TSM objectives. Therefore, it is possible to indicate which of the objectives is achieved by a given TSM project. The following series of charts (9) show which objectives are achieved by the local TSM projects.

CHART 9 - (1)

X= Objective(s) that may be achieved by TSM Project TSM PROJECT	TSM ACTION	PROJECT COST	REDUCTION OF INJURIES, DEATHS AND PROPERTY DAMAGE RESULTING FROM TRAFFIC ACCIDENTS	IMPROVE LEVEL OF SERVICE OF URBAN TRAVEL	OPTIMIZE THE PERSON AND GOODS MOVEMENT CAPACITY OF EXISTING TRANSPORTATION FACILITIES	REDUCE FUEL CONSUMED IN URBAN TRAVEL	ENCOURAGE ALTERNATIVES TO DRIVING PRIVATE AUTOMOBILES	PROVIDE GOOD QUALITY AFFORDABLE TRANSPORTATION TO THE ELDERLY AND HANDICAPPED	REDUCE AUTOMOTIVE EMISSIONS
10 Transit Coaches (MTA)	Transit marketing	825,000		x			x		
MTA Radio Modifications	Transit Route Improvements	6,000		x					
Communications (Paratransit)	Transit Route Improvements	1,818		x				x	
2- 16-passenger vans w/W.C. lift and 2 W.C. spaces	Integration of Transit Services	35,200		x				x	
Iowa Methodist Medical Center-Transportation services for the Elderly and Handicapped	Integration of Transit Services	20,512		x				x	
Harbach Blvd. & NW 86th St.	Traffic Control Improvement	27,000	x	x	x	x			x
Pavement Marking Demonstration Project	Traffic Control Improvement	148,000	x						
Des Moines City Wide Traffic Signals, Channelization & School Crossing Protection Program	Traffic Control Improvement	182,160	x	x	x	x			x
US 69 (E 14th St) @ Grandview (1)	Traffic Control Improvement	7,000	x	x	x	x			x
US 69 (E 14th St) @ Cleveland (1)	Traffic Control Improvement	8,000	x	x	x	x			x
(1) Part of the Des Moines City Wide Traffic Signals, Channelization and School Crossing Protection Program									

CHART 9 - (2)

x=Objective(s) that may be achieved by TSM project TSM PROJECT	TSM ACTION	PROJECT COST	REDUCTION OF INJURIES, DEATHS AND PROPERTY DAMAGE RESULTING FROM TRAFFIC ACCIDENTS	IMPROVE LEVEL OF SERVICE OF URBAN TRAVEL	OPTIMIZE THE PERSON AND GOODS MOVEMENT CAPACITY OF EXISTING TRANSPORTATION FACILITIES	REDUCE FUEL CONSUMED IN URBAN TRAVEL	ENCOURAGE ALTERNATIVES TO DRIVING PRIVATE AUTOMOBILES	PROVIDE GOOD QUALITY AFFORDABLE TRANSPORTATION TO THE ELDERLY AND HANDICAPPED	REDUCE AUTOMOTIVE EMISSIONS
US 69 (E 14th St) @ Aurora (1)	Traffic Control Improvement	23,000	x	x	x	x			x
Ia 163 (E University) @ E 24th St. (1)	Traffic Control Improvement	6,000	x	x	x	x			x
Ia 163 (University) @ E 15th St. (1)	Traffic Control Improvement	6,000	x	x	x	x			x
Ia 401 (Merle Hay) @ Madison (1)	Traffic Control Improvement	35,000	x	x	x	x			x
US 6 (Merle Hay) & Hickman & US 6 (Douglas) and Ia 401 (Merle Hay) (1)	Traffic Control Improvement	3,210	x	x	x	x			x
US 6 (Euclid) & Harding Road (1)	Traffic Control Improvement	1,290	x	x	x	x			x
US 6 (Euclid) & Oliver Plaza (1)	Traffic Control Improvement	1,290	x	x	x	x			x
US 6 (Euclid) & 6th Avenue (1)	Traffic Control Improvement	1,290	x	x	x	x			x
US 6 (Euclid) & E 29th St. (1)	Traffic Control Improvement	640	x	x	x	x			x
US 6 (Euclid) & Ia 415 (2nd Ave.) (1)	Traffic Control Improvement	640	x	x	x	x			x
(1) Part of Des Moines City Wide Traffic Signals, Channelization & School Crossing Protection Program									

CHART 9 - (3)

x=Objective(s) that may be achieved by TSM Project TSM PROJECT	TSM ACTION	PROJECT COST	REDUCTION OF INJURIES, DEATHS AND PROPERTY DAMAGE RESULTING FROM TRAFFIC ACCIDENTS	IMPROVE LEVEL OF SERVICE OF URBAN TRAVEL	OPTIMIZE THE PERSON AND GOODS MOVEMENT CAPACITY OF EXISTING TRANSPORTATION FACILITIES	REDUCE FUEL CONSUMED IN URBAN TRAVEL	ENCOURAGE ALTERNATIVES TO DRIVING PRIVATE AUTOMOBILES	PROVIDE GOOD QUALITY AFFORDABLE TRANSPORTATION TO THE ELDERLY AND HANDICAPPED	REDUCE AUTOMOTIVE EMISSIONS
US 65/69 (E 14th) & Ia 163 (University) (1)	Traffic Control Improvement	2,570	x	x	x	x			x
US 65/69 (E 15th) & Grand (1)	Traffic Control Improvement	640	x	x	x	x			x
Ia 163 (University) & E 21st St. (1)	Traffic Control Improvement	640	x	x	x	x			x
Ia 163 (University) & Hubbell (1)	Traffic Control Improvement	1,290	x	x	x	x			x
Ia 401 (Merle Hay) & Aurora (1)	Traffic Control Improvement	1,290	x	x	x	x			x
I-235 & 42nd St. (1)	Traffic Control Improvement	640	x	x	x	x			x
I-235 & 63rd St. (1)	Traffic Control Improvement	2,570	x	x	x	x			x
Railroad Crossing on SE 44th Ave.	Traffic Control Improvement	25,500	x	x	x	x			x
Railroad Crossing on NE 66th Ave.	Traffic Control Improvement	25,500	x	x	x	x			x
(1) Part of Des Moines City Wide Traffic Signals, Channelization & School Crossing Protection Program									

CHART 9 - (4)

x= Objective(s) that may be achieved by TSM Project TSM PROJECT	TSM ACTION	PROJECT COST	REDUCTION OF INJURIES, DEATHS AND PROPERTY DAMAGE RESULTING FROM TRAFFIC ACCIDENTS	IMPROVE LEVEL OF SERVICE OF URBAN TRAVEL	OPTIMIZE THE PERSON AND GOODS MOVEMENT CAPACITY OF EXISTING TRANSPORTATION FACILITIES	REDUCE FUEL CONSUMED IN URBAN TRAVEL	ENCOURAGE ALTERNATIVES TO DRIVING PRIVATE AUTOMOBILES	PROVIDE GOOD QUALITY AFFORDABLE TRANSPORTATION TO THE ELDERLY AND HANDICAPPED	REDUCE AUTOMOTIVE EMISSIONS
Railroad Crossing on NE 51st Ave.	Traffic Control Improvement	25,500	x	x	x	x			x
Railroad Crossing on NW 58th Ave.	Traffic Control Improvmeent	25,500	x	x	x	x			x
McKinley Ave from Walnut Woods to SW 63rd & SW 73rd from Ia 5 to SW 52nd Ave.	Traffic Control Improvement	95,000	x	x					
8th St. @ Office Park Road	Traffic Control Improvement	35,000	x	x	x	x			x
35th St. @ University	Traffic Control Improvement	30,000	x	x	x	x			x
35th St. @ Woodland	Traffic Control Improvement	35,000	x	x	x	x			x
US 65 @ Adventureland Drive	Traffic Control Improvement	64,071	x	x	x	x			x
Intersection Rebuilding NW 62nd/NW 59th @ Ia 401	Traffic Control Improvement	177,130	x	x	x	x			x
	Elimination of Unnecessary Traffic Control Devices		x			x			x
	Intersection Improvement (Channelization)		x	x	x	x			x
Army Post Road-SE 5th to SE 14th St.	Traffic Control Improvement	30,000	x	x	x	x			x
	Intersection Improvement (Channelization)	235,000	x	x	x	x			x

CHART 9 - (5)

x= Objective(s) that may be achieved by TSM Project TSM PROJECT	TSM ACTION	PROJECT COST	REDUCTION OF INJURIES, DEATHS AND PROPERTY DAMAGE RESULTING FROM TRAFFIC ACCIDENTS	IMPROVE LEVEL OF SERVICE OF URBAN TRAVEL	OPTIMIZE THE PERSON AND GOODS MOVEMENT CAPACITY OF EXISTING TRANSPORTATION FACILITIES	REDUCE FUEL CONSUMED IN URBAN TRAVEL	ENCOURAGE ALTERNATIVES TO DRIVING PRIVATE AUTOMOBILES	PROVIDE GOOD QUALITY AFFORDABLE TRANSPORTATION TO THE ELDERLY AND HANDICAPPED	REDUCE AUTOMOTIVE EMISSIONS
Ia 5 (Army Post Rd) @ SW 9th	Traffic Control Improvement		x	x	x	x			x
	Intersection Improvement (Channelization)	200,000	x	x	x	x			x
Ia 163 (University) @ Ia 46 (E 30th St.)	Traffic Control Improvement		x	x	x	x			x
	Intersection Improvement (Channelization)	800,000	x	x	x	x			x
Minor Intersection Improvement and Signalization Upgrading (DSM)	Traffic Control Improvement	80,000	x	x	x	x			x
	Intersection Widening	179,000	x	x	x	x			x
63rd St. @ Hickman Rd.	Traffic Control Improvement	20,000	x	x	x	x			x
	Intersection Widening	50,000	x	x	x	x			x
3rd St.-Court Ave. to Keosauqua Way	Traffic Control Improvement	26,200	x	x	x	x			x
	Intersection Widening	58,800	x	x	x	x			x
Hickman Road, Merklin Way & Merle Hay Rd.	Signal Visibility Upgrading	2,000	x						
	Intersection Improvement (Channelization)	10,000	x	x	x	x			x
Dixon Ave.-E. Hull Intersection Realignment	Intersection Improvement (Channelization)	145,000	x	x	x	x			x
US 69 (E 14th)-Park Ave. to King	Mid-Block Improvement (2-way left turn lane)	200,000 (1)	x	x	x	x			x
9th St.-Center to University	Intersection Widening	234,000	x	x	x	x			x
Intersection of SW 63rd & Park Ave.	Intersection Widening	75,000	x	x	x	x			x
Street and Curb Intake Renovation	Pedestrian-Walk and Pedestrian-Bicycle Safety Projects	26,000	x			x			
(1) Part of project only (Right-of-Way)									

CHART 9 - (6)

x= Objective(s) that may be achieved by TSM Project

TSM PROJECT	TSM ACTION	PROJECT COST	REDUCTION OF INJURIES, DEATHS AND PROPERTY DAMAGE RESULTING FROM TRAFFIC ACCIDENTS	IMPROVE LEVEL OF SERVICE OF URBAN TRAVEL	OPTIMIZE THE PERSON AND GOODS MOVEMENT CAPACITY OF EXISTING TRANSPORTATION FACILITIES	REDUCE FUEL CONSUMED IN URBAN TRAVEL	ENCOURAGE ALTERNATIVES TO DRIVING PRIVATE AUTOMOBILES	PROVIDE GOOD QUALITY AFFORDABLE TRANSPORTATION TO THE ELDERLY AND HANDICAPPED	REDUCE AUTOMOTIVE EMISSIONS
(1) Downtown Skywalk System	Pedestrian-Walk and Pedestrian-Bicycle Safety Projects	100,000	x			x	x		
(2) Ia 46 (E 30th) South of Dean Ave. Pedestrian Underpass	Pedestrian-Walk and Pedestrian-Bicycle Safety Projects	35,000	x			x			
University and NW 100th	Traffic Control Improvement	64,500	x	x	x	x			x
	Intersection Improvement (Channelization)		x	x	x	x			x
	Intersection Widening		x	x	x	x			x
Paratransit Vehicle Equipment	Integration of Transit Services	82						x	
15 Passenger Van for Foster Grandparent	Integration of Transit Services	9,400		x				x	

(1) Part of the project only (Engineering)
(2) Part of the Des Moines City Wide Traffic Signals, Channelization & School Crossing Protection Program

On-Going Local Government TSM Programs

There are many on-going programs - in addition to the local projects scheduled for construction in 1978 - which fall into the TSM category. These programs are implemented by local governments when traffic problems become evident. Among these programs are:

The channelization of traffic to increase street capacity by providing exclusive left turn lanes. This separation of turning traffic and through traffic also contributes to intersection safety by reducing rear end and head on collisions.

The use of one way streets to increase capacity in the direction of peak flow. By reducing conflicts between left turning vehicles at intersections, safety is also improved. At present, one way streets are in operation throughout the urbanized area. Their use is most prevalent in the central business districts of Des Moines and West Des Moines.

Restrictions on CBD truck delivery during the evening peak hours (4 P.M. - 6 P.M.) to reduce traffic congestion. Traffic flow has also been improved by prohibiting all semi-truck unloading between 6 A.M. and 6 P.M.

The removal of on-street parking to improve level of service, reduce accidents and increase capacity. On residential streets parking restrictions are implemented when petitions are received from local residents. On arterial streets action is taken if warrants (i.e. vehicle volumes, accident experience) are met.

A street lighting modernization program on city and county roads to reduce the number of night time accidents.

A program of improved signalization and progressive timing to reduce accidents, to expedite the movement of traffic with a minimum of dealy and to increase the capacity of many streets and intersections. In addition, a right turn on red (RTOR) policy has been instituted in the Des Moines Urbanized Area to reduce delay on right turns through intersections. Left turn delay has also been reduced by permitting left turns on red. Such a policy has saved transportation related energy in the Des Moines Urban Area.

On-Going State TSM Programs

Carpool programs designed to alleviate congestion during peak hours of travel and to reduce the need for additional parking spaces during the day. Approximately 40 employers in the Des Moines Urbanized Area now have carpool programs.

The Iowa Department of Transportation (Iowa DOT) is sponsoring a ridesharing promotional program known as I-POOL. The program, which is administered by the DOT's Office of Transportation Research, is concentrating its initial efforts in the Ames - Des Moines region.

I-POOL began in the Spring of 1977. The program's initial carpool promotional efforts were with Iowa DOT and National Animal Disease Laboratory employees in Ames and State employees in Des Moines. I-POOL then broadened its scope in the Fall of 1977 to include employees of other area organizations. At this time, the program involves over forty employers in the Ames/Des Moines area. Efforts are underway to increase the number of employers participating in the program. Plans are also being made to establish a call-in telephone service so that I-POOL can provide carpool matching assistance for commuters who do not work for participating employers.

The main goal of I-POOL is to conserve gasoline by assisting commuters in forming or enlarging carpools. Reduction of air pollution and economic savings are additional potential benefits. Assistance in carpool formation or enlargement will be accomplished by putting commuters in touch with others who share similar work transportation needs. At this time, over 1,900 commuters have chosen to participate in the I-POOL match list program.

In addition to carpool formation, I-POOL is also encouraging public transit usage.* The work trip information collected should be of value to transit planners and will be available for that purpose.

Iowa DOT efforts to promote ridesharing are consonant with both State and National energy conservation efforts. In the 1975 Energy Policy and Conservation Act (PL94-163), for example, Congress specifies that in order to be eligible for energy conservation grants, State energy conservation plans must include programs to promote the availability and use of carpools, vanpools and public transit. Accordingly, carpool promotion is a key element in the Iowa Energy Policy Council's Energy Conservation Plan.

*For example, I-POOL developed and distributed a MTA system map and has also distributed Cy-Ride route and schedule information.

The increased ridesharing that should result from I-POOL can lead to substantial benefits. These benefits can accrue to the general public as well as to participating carpoolers and their employers. For example:

1. The benefits to the general public include:

   (a) Reduced congestion on streets and highways;
   (b) Reduced land requirements for auto related facilities;
   (c) Less air and noise pollution; and
   (d) Energy savings.

2. Benefits to participating employers include:

   (a) Good public relations;
   (b) Reduced employee tardiness and absenteeism;
   (c) Reduced traffic congestion at plant site;
   (d) Increased opportunity to recruit workers from areas with limited transit service;
   (e) Reduced parking facility requirements; and
   (f) A more positive attitude among employees toward their employer.

3. Carpoolers themselves benefit from:

   (a) Significant cost savings;
   (b) Reduced auto insurance rates;
   (c) Reduced mileage on their cars;
   (d) Less tension while commuting; and
   (e) Convenience.

One of the more interesting facets of increased ridesharing is that these benefits can be realized with only minor disruptions to normal day to day activities. The following page shows a list of firms participating in the I-POOL program.

FIRMS TO PARTICIPATE IN FALL I-POOL SURVEY 10/5/77

DES MOINES------

1. Des Moines Savings & Loan
2. Federal Reserve Bank
3. J.C. Penney-Valley West Mall
4. Bulk Mail Center
5. Bankers Life Company
6. Marquette Cement
7. Des Moines Register & Tribune
8. Employers Mutual Companies
9. Medicenter
10. Iowa Paint Manufacturing Company
11. Central National Bank
12. United Parcel Service
13. College of Osteopathic Medicine
14. Iowa Methodist Medical Center
15. Firestone Tire and Rubber
16. Vickers Petroleum
17. City of Des Moines
18. Continental Western Insurance
19. Super Valu Stores, Inc.
20. Great Plains Bag Corporation
21. IMT Insurance
22. Iowa Lutheran Hospital
23. Armstrong Rubber Company
24. Ruan Transport
25. American Federal Savings
26. Frye Copysystems
27. Farmland Industries (Coop)
28. General United Life
29. Central Life
30. Polk County
31. U.S. Post Office
32. Merle Hay Mall
33. Northwestern Bell Telephone
34. United Federal Savings
35. Equitable Life
36. American Republic Insurance
37. Meredith Corporation
38. Montgomery Ward-Merle Hay
39. Standard Oil
40. Richman Gordman

The Iowa DOT has developed, with the help of the state's transit operators, a comprehensive program to take the transit message to the public -- the message of transit's relationship to community planning, public service, energy efficiency, and economic alternatives.

Television and radio public service announcements, statewide market research opinion surveys, a handbook for the operators about marketing techniques, and other items have been developed and produced as an overall package intended to heighten the awareness of Iowa's citizens.

The entire program has been designed as a participatory one - the Iowa DOT's role is to represent public transit on a statewide general basis - the local operator's role is to tie in with the program and use his or her marketing funds to buy time and otherwise promote the specific characteristics of individual systems.

Pundzak/Dozier, a Des Moines marketing firm, prepared the media portion of the program (four 30-second television and four 60-second radio PSA's). The four major areas of current emphasis, while applicable to everyone, were produced for Iowa's citizens in particular:

1. Public transit is more energy efficient than automobiles.
2. Like other public services, some of our taxes are used to maintain transit services and these services should be supported.
3. The development, expansion or provision of public transit service should be considered an important part of total community planning, yet this is too often ignored.
4. Riding the bus can very well be more economical than buying a new or another car - consider the alternatives.

It would be difficult indeed for all of us to have an effective communication program without the cooperation of the media.

TSM Projects That Address Problem Areas

A number of the TSM projects address the problem areas (Figure 5) and/or the high accident locations (by frequency or by adjusted rate, Figures 6 and 7). See Figure 4 for the location of the problem areas identified by the local governments and the high accident locations. TSM projects shown on Figure 5 address the problem areas considered to be of the most significance. Local TSM projects not shown on Figure 5 address problems areas which are of a lesser significance. High accident locations and problem areas on Figures 5, 6 and 7 that have not been addressed by specific projects may be addressed through the on-going programs.

TSM PROJECTS THAT ADDRESS THE PROBLEM AREAS

A. University Ave. and NW 100th Street

B. Harbach Blvd. and NW 86th Street

C. Army Post Road - SE 5th to SE 14th Street

D. Hickman Road, Merklin Way and Merle Hay Road Intersection

E. Iowa 5 (Army Post Road) at SW 9th Street

F. US 65/69 (SE 14th) from Park Avenue to King Avenue

G. Iowa 163 (E. University) at Iowa 46 (E 30th)

H. US 6 (Hickman) at 86th Street

I. US 6 (Hickman) at 63rd Street

J. US 69 (NE 14th) at Aurora

K. Iowa 163 (E. University) at E 24th Street

L. Merle Hay Road and Hickman Road

M. Douglas and Merle Hay Road

N. Euclid and Harding Road

O. US 65/69 (E 14th Street) and Iowa 163 (University)

P. Iowa 163 (University) and Hubbell Avenue

Q. NW 62nd/NW 59th Court and Iowa 401

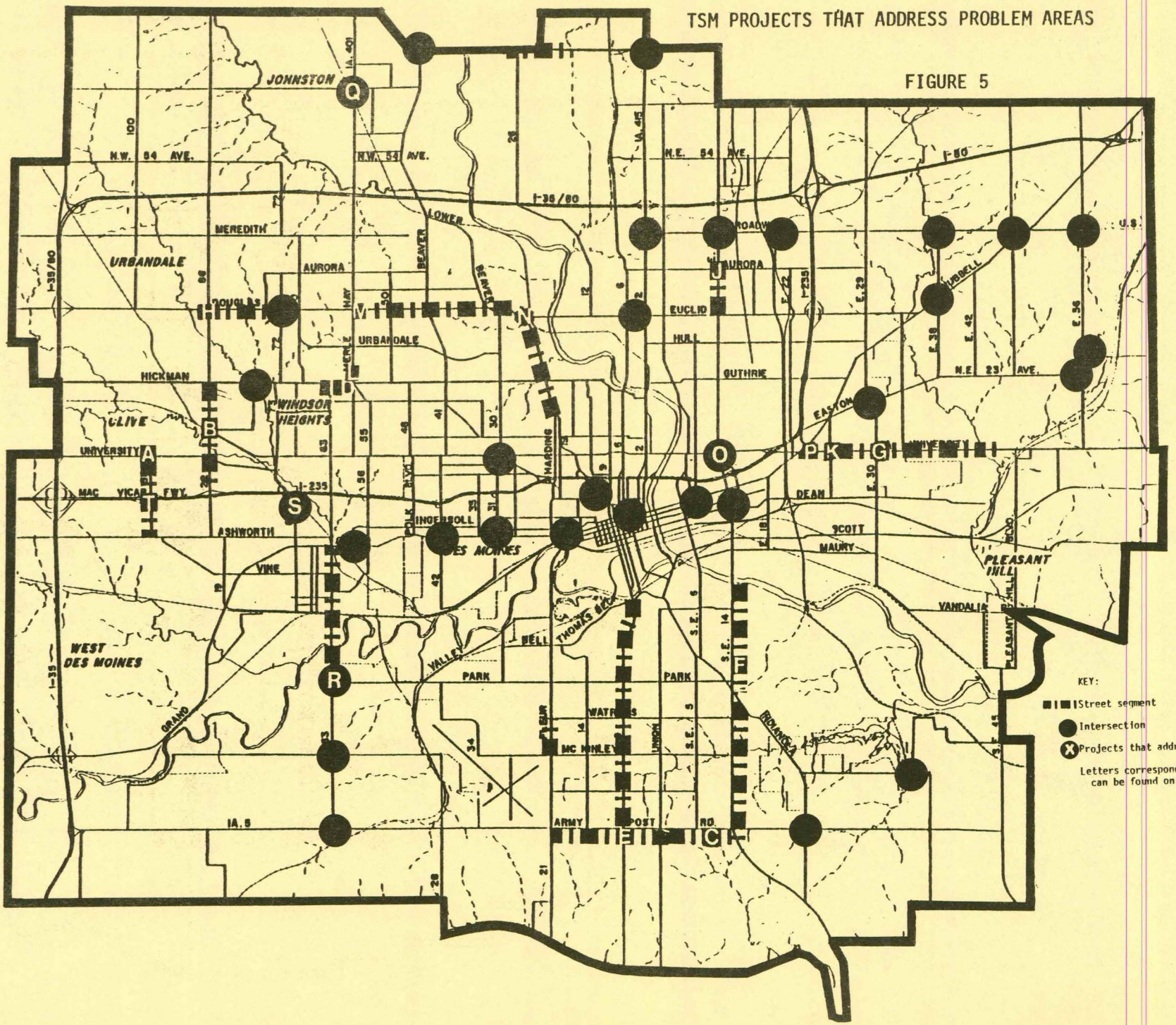
R. SW 63rd Street and Park Avenue

S. 8th Street (West Des Moines) at Office Park Road

T. 35th Street (West Des Moines) at Woodland

TSM PROJECTS THAT ADDRESS PROBLEM AREAS

FIGURE 5



TSM PROJECTS THAT ADDRESS ACCIDENT LOCATIONS BY FREQUENCY

A. Iowa 5 (Army Post Road) and SW 9th Street

B. US 6 (Euclid) and Iowa 415 (2nd Avenue)

C. US 6 (Douglas) and Iowa 401 (Merle Hay Road)

D. US 65/69 (E 15th) and Grand Avenue

E. Iowa 163 (University) and Iowa 46 (E 30th)

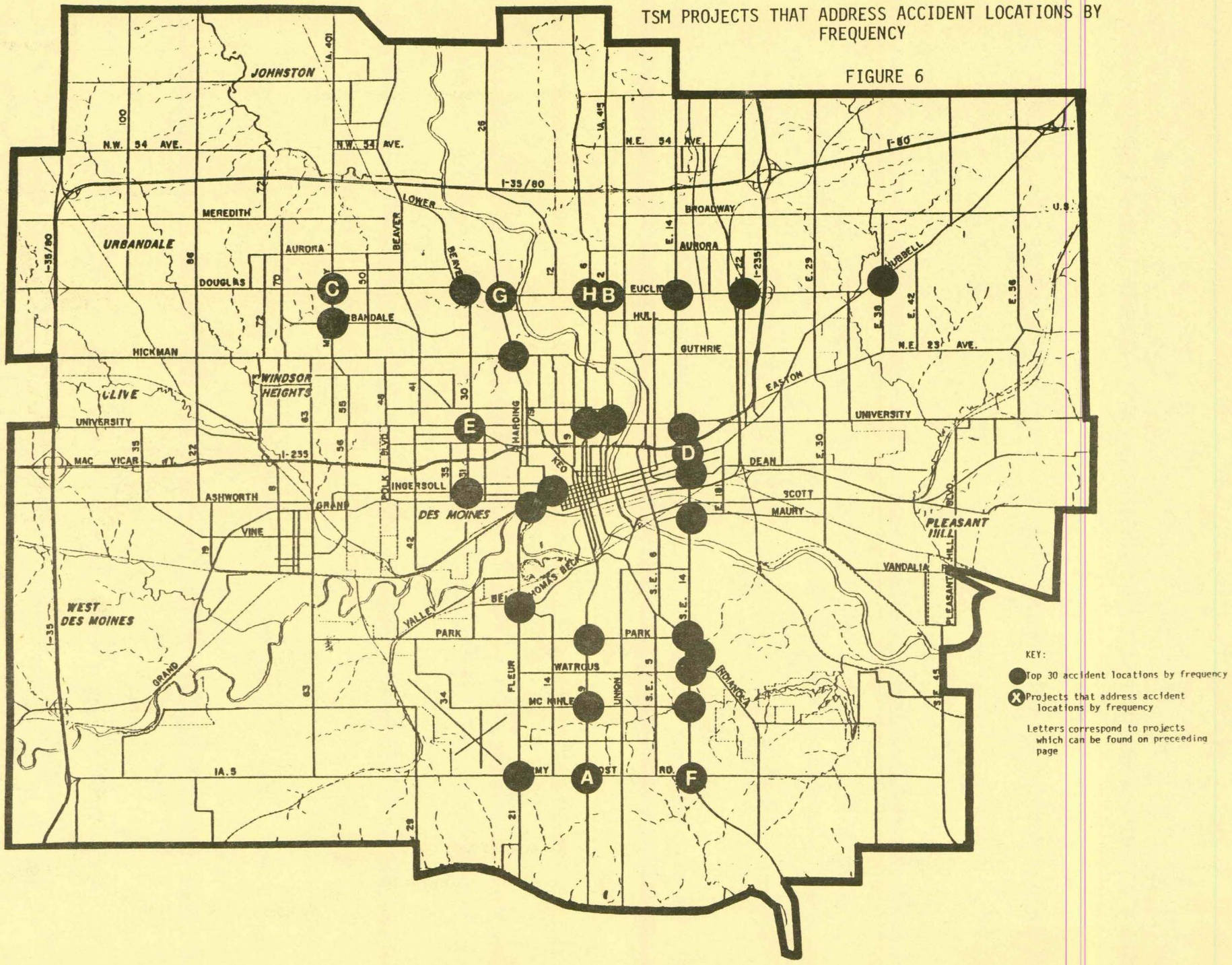
F. Army Post Road and SW 14th Street

G. US 6 (Euclid) and Harding Road

H. US 6 (Euclid) and 6th Avenue

TSM PROJECTS THAT ADDRESS ACCIDENT LOCATIONS BY FREQUENCY

FIGURE 6



TSM PROJECTS THAT ADDRESS ACCIDENT LOCATIONS BY ADJUSTED RATE

A. Iowa 5 (Army Post Road) and SW 9th Street

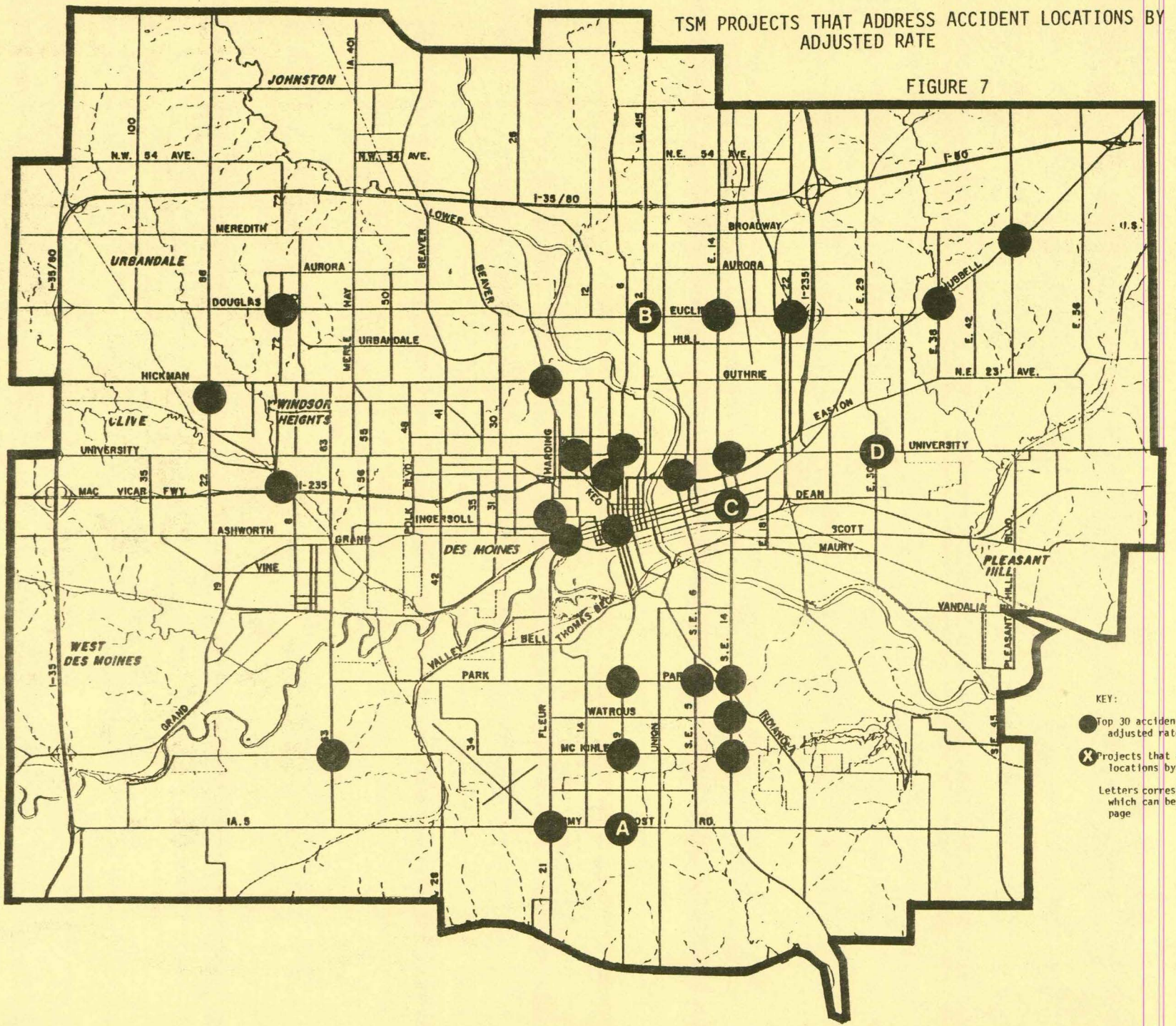
B. US 6 (Euclid) and Iowa 415 (2nd Avenue)

C. US 65/69 (E 15th) and Grand Avenue

D. University and East 30th

TSM PROJECTS THAT ADDRESS ACCIDENT LOCATIONS BY ADJUSTED RATE

FIGURE 7



CHAPTER V The Continuing TSM Planning Process

V. THE CONTINUING TSM PLANNING PROCESS

The TSM is a continuing process which needs monitoring and evaluation if it is to be successful. To aid in the preparation of future TSMs, a monitoring and evaluation methodology will be developed. Such factors as travel times along selected streets during peak and off peak periods and the volume/capacity ratios of major arterials will be monitored. A traffic counting program will be developed to gather the data needed for calculating volume/capacity ratios. Transportation-land use inter-relationships which could produce traffic problems in the next five years will also be considered.

In addition, evaluation criteria will be monitored to assess the individual and collective success of TSM projects. This evaluation will consist of before and after measurements of such things as vehicle delay and intersection capacity. Finally, the data obtained from evaluation activities will be analyzed in the light of selected objectives.

Over the course of several years these monitoring activities should make it possible to assess the effectiveness of implemented TSM projects and to indicate future TSM actions which should be considered.

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