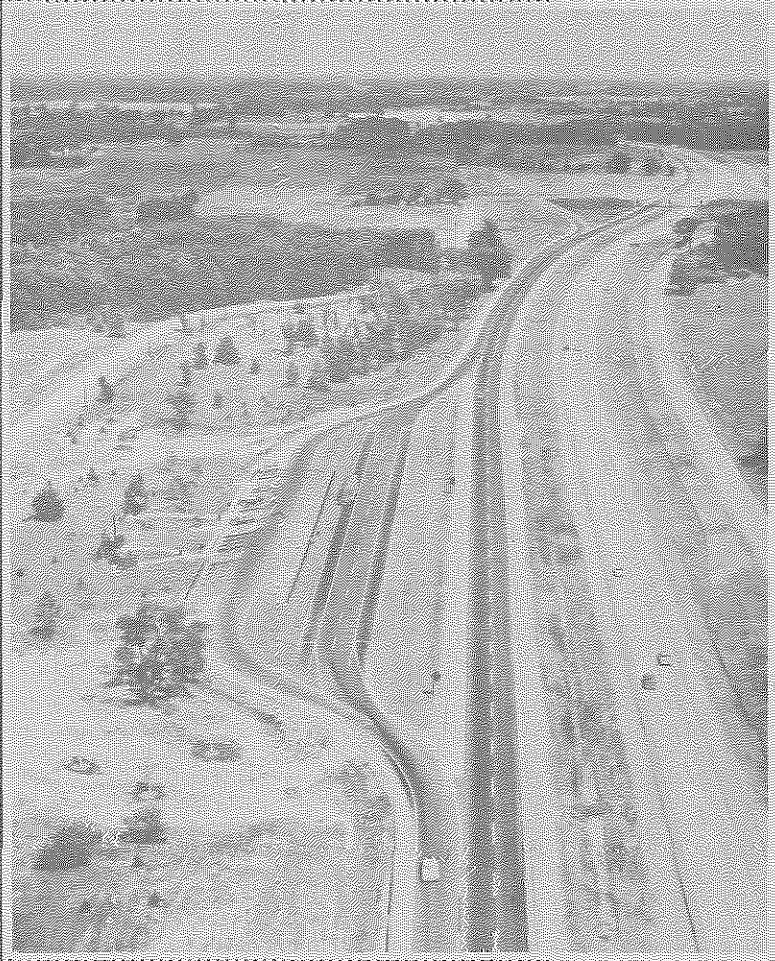
MAINTENANCE COST of REST AREAS in MICHIGAN



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MICHIGAN
STATE HIGHWAY DEPARTMENT

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MAINTENANCE COST OF REST AREAS IN MICHIGAN

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Lansing, Michigan

MAINTENANCE COST OF REST AREAS IN MICHIGAN

SYNOPSIS

A half-century of Michigan roadside rest area development is outlined, through completion of 98 opened or planned installations on Interstate and arterial freeways. Facilities and services offered at these rest areas are discussed, as well as desirable maintenance practices. Rest area maintenance costs are analyzed in terms of volume of use by freeway motorists. From the standpoint of unit cost per vehicle, investment in flush-toilet rest rooms, rather than chemical-type toilets, appears to be justified.

Michigan is believed to have pioneered the idea of rest stops or roadside parks some 45 years ago, starting with a few picnic tables and picnic stoves placed along the right-of-way in 1919. From this small beginning, the idea spread throughout the State and Nation. To these roadside picnic parks were eventually added parking areas, toilet facilities, and drinking water fountains. During the evolutionary period prior to the advent of the Interstate System, these parks had reached a level of development comparable to the standards of the rest areas now being provided on our Interstate and arterial freeways.

The justification for expenditure of highway purpose revenues for such service facilities as rest areas has been discussed extensively at various levels of government and definite policies and laws have been established. Nevertheless, the question keeps coming up from time to time, and although this subject falls outside the scope of this discussion,

we may include one quotation from Subsection C of Section 1 of the Federal Highway Act of 1938 as amended by Section 11 of the Federal Highway Act of 1940:

> Hereafter the construction of highways by the States with the aid of Federal funds may include such roadside and landscape development, including such sanitary and other facilities as may be deemed reasonably necessary to provide for the suitable accommodation of the public, all within the highway right of way and adjacent to publicly owned or controlled recreational areas of limited size and for provision for convenient and safe access thereto by pedestrian and vehicular traffic, as may be approved by the Public Roads Administration (Bureau of Public Roads).

Although the primary function of roadside parks has been the rest, relaxation, and enjoyment of tourists, the basic service of the rest areas, or "safety stops" as they are sometimes called, is accident prevention through minimizing fatigue and driver mesmerism.

In initial planning for construction of a system of rest areas on Michigan's Interstate System, a Citizens' Advisory Committee was formed to arrive at an economical formula for these facilities, including the Chief Maintenance Engineer as the Department's representative. During the Committee's discussions, he was asked to estimate the maintenance cost of these facilities. The Committee was given an estimate of $25,000 annually per rest area, based on the operation of movable bridges, the only related operation for which cost experience was available at that time. This $25,000 figure per rest area was based on including flush-type toilet facilities with, attendants on duty around the clock.

The Committee recommended construction of approximately 100 of these rest areas. Later, it was decided that the anticipated annual maintenance expenditure of $25,000 on each of these areas was too costly, and a decision was made to construct a less costly facility making use of chemical toilets housed in unheated, inexpensive structures, equipped with hand-operated drinking water fountains, and providing attendants intermittently only as required.

In the fall of 1960, Michigan placed three rest areas in operation on the Interstate System, all located on I 94, a route connecting Detroit and Chicago. These rest areas had additional facilities that motorists in Michigan had not encountered before, such as telephones and night lighting which had not been used at any of Michigan's roadside parks before this time.

Current Michigan planning envisions the construction of approximately 2,000 miles of arterial and Interstate freeways to be completed by 1972. On this system, a total of 98 rest areas are planned, of which 46 had been completed and placed in operation by the end of the 1964 construction season. When the program is completed there will be 58 on the Interstate System and 40 on State arterial freeways. Of the total 98, some 14 will be operated as combination tourist information stations and rest areas (Fig. 1).

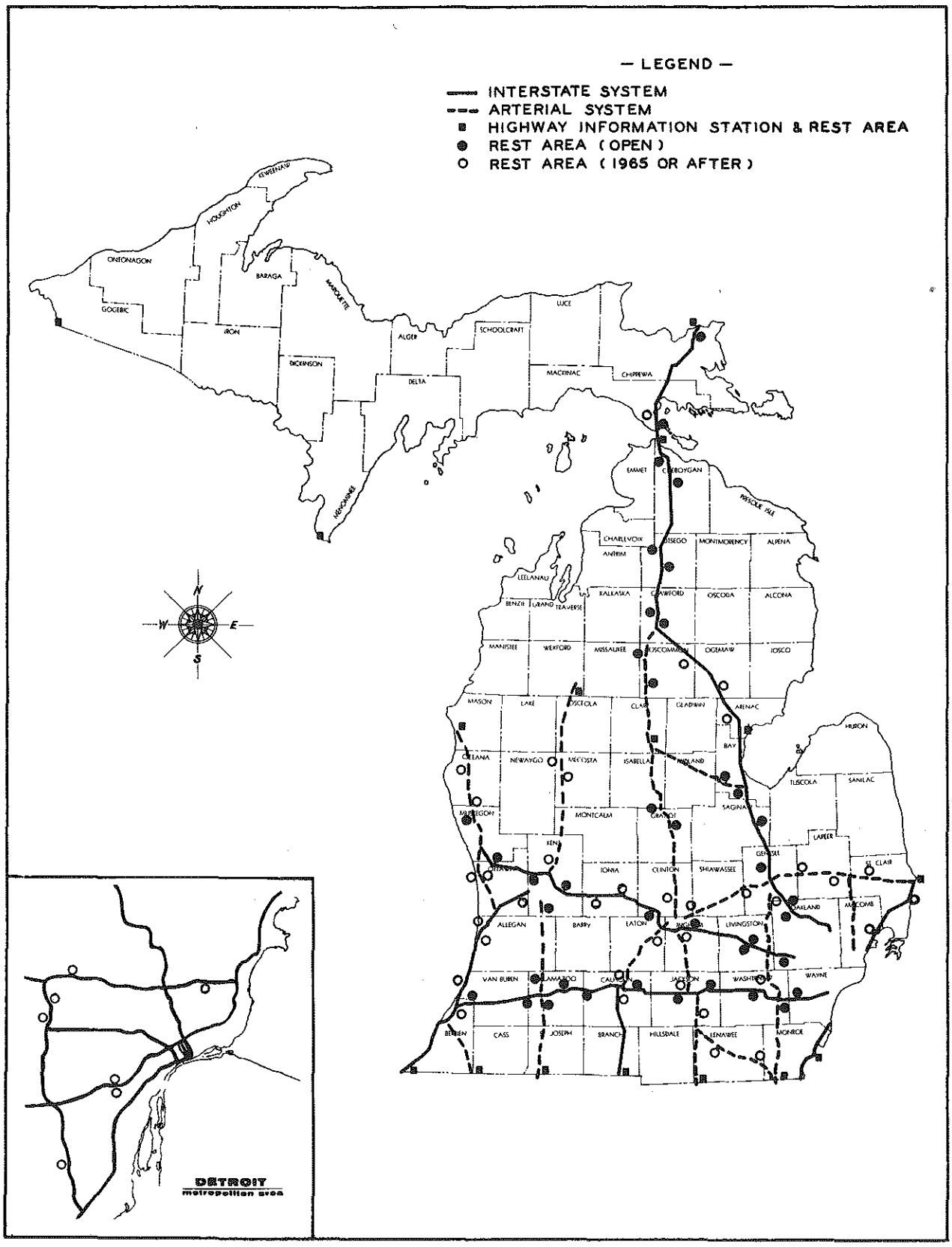

Figure 1. Locations of Michigan rest areas and information stations.

In 1961 Michigan conducted a Rest Area Survey to determine motorist desires, and a report was subsequently published. Rest areas at that time were in their infancy and there was very limited experience in their operation. However, notwithstanding the relatively small sampling made, certain trends of usage were reported. Certain data from that report are shown in Fig. 2, indicating the type of usage that the rest areas were receiving.

Before considering the scope of maintenance for these rest areas, a few basic design features should be understood. The areas vary in size from 8 to 28 acres (Fig. 3). In Michigan, the maximum size in which the Bureau of Public Roads will participate is 8 acres. The facilities include two separate chemical-type toilets, one or two drinking fountains, one or two telephones, a map board, from 5 to 10 picnic stoves, 20 to 25 picnic tables, and parking spaces for 50 cars and 24 trucks. There are from 2 to 4 acres of lawn-type grass areas and varying amounts of trees and shrubs. Our latest design makes use of much less shrubbery than the earlier areas constructed (Fig. 4).

The parking areas are 300 by 56 ft for passenger cars and 700 by 96 ft for trucks. With the accelerating and decelerating ramps each 1000 ft long, the rest areas stretch out over a distance of 3200 ft. The latest design requires portland cement concrete for parking areas, instead of the bituminous concrete formerly specified. The cost of the latest design

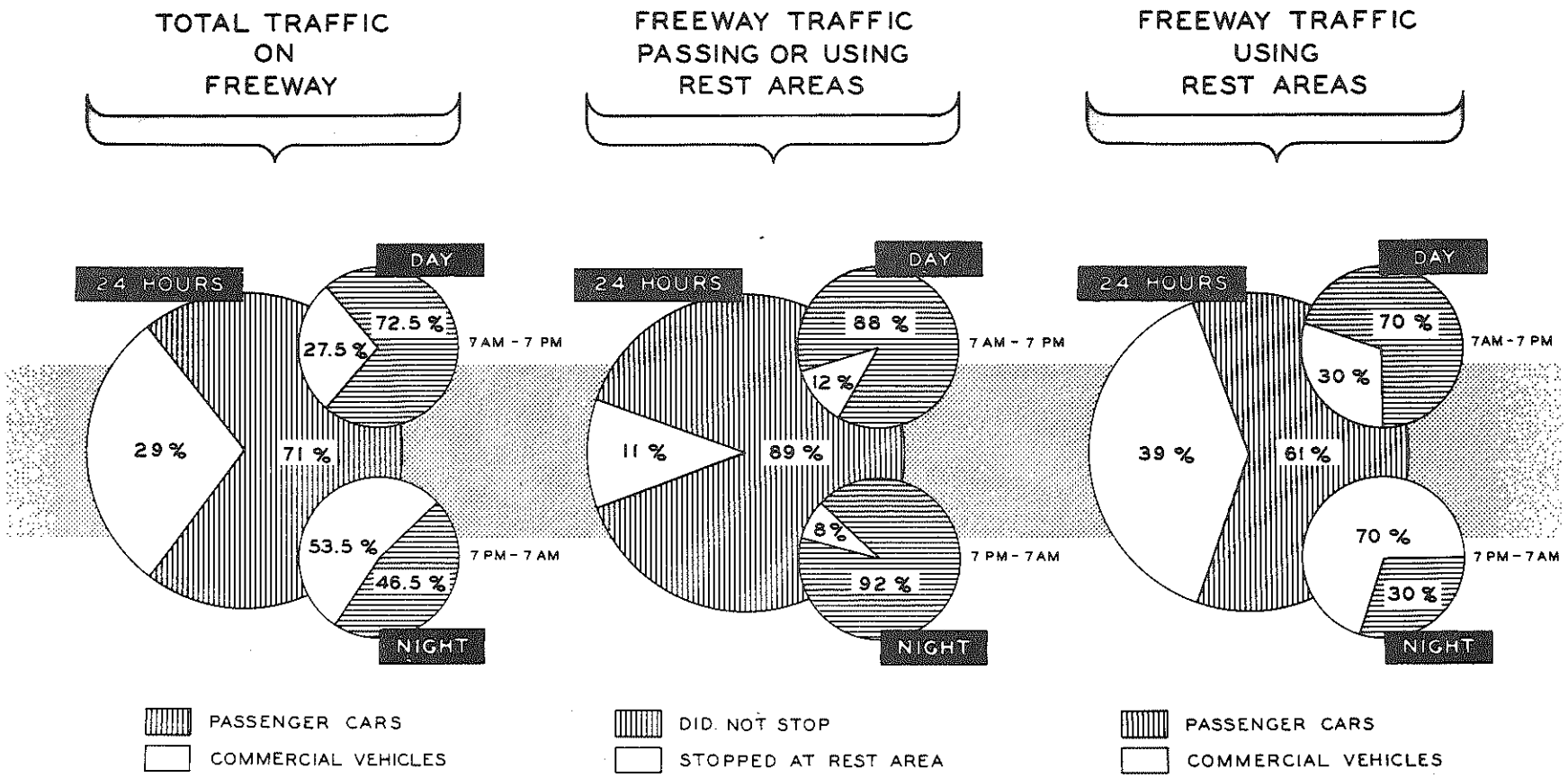

Figure 2. Freeway and rest area use data (based on 1961 Michigan survey).

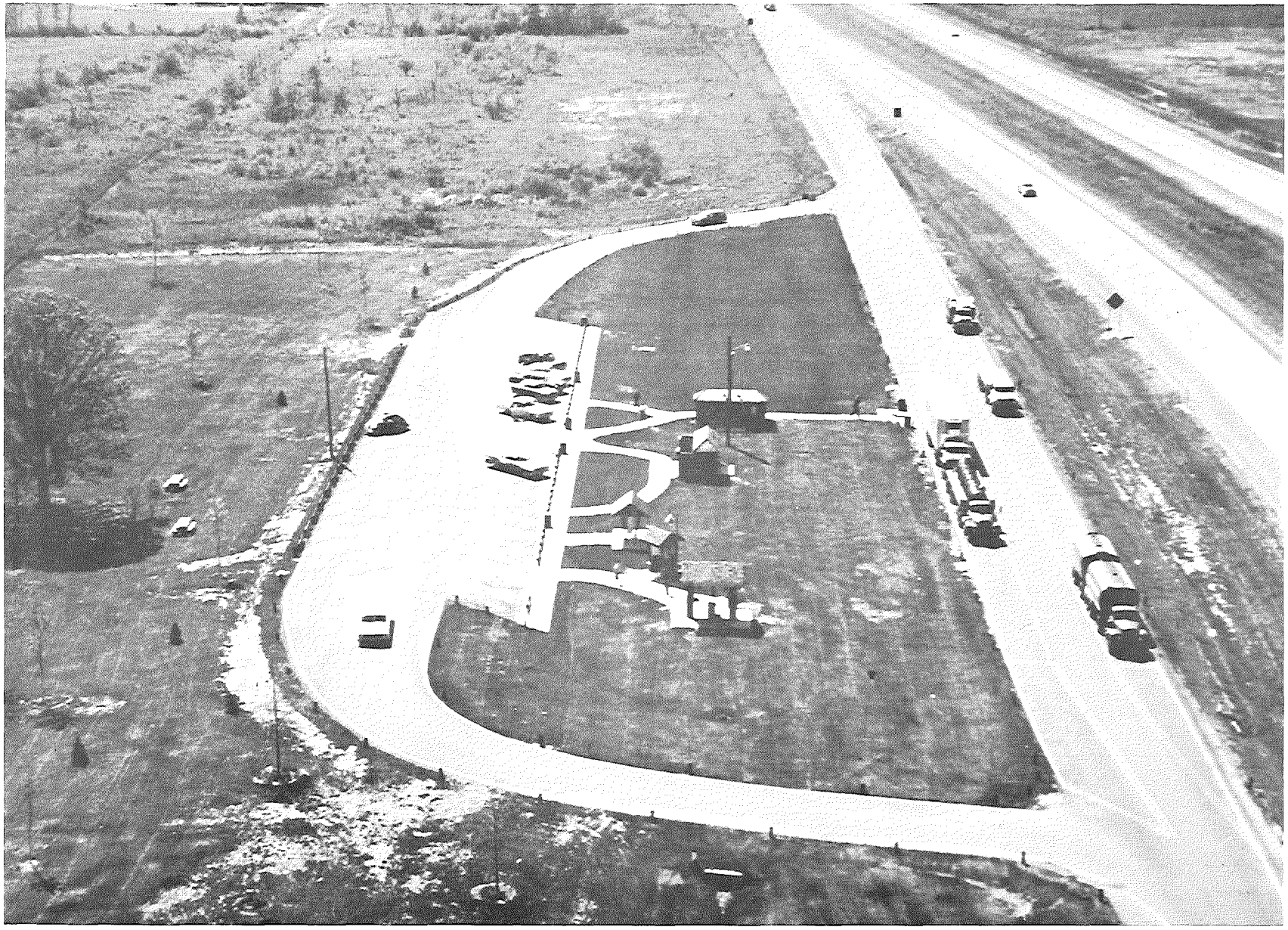

Figure 3. Aerial view of typical Michigan rest area, showing access ramp, parking areas, and distribution of user facilities.

Figure 4. Typical landscaping of rest area, including State Historical Commission marker (right).

is in the neighborhood of $175,000 per rest area (having chemical-type toilets).

Although our latest standard for design calls for chemical toilets, as has been stated, Michigan has built and placed in operation two rest areas making use of flush-type toilets. This was done after two years of experience with chemical-type facilities to obtain comparison of both capital outlay and maintenance cost. The first two years had indicated a motorist tolerance of the chemical toilet, at best, as being better than no facility at all. In some of the complaints the thought was expressed, in referring to the odoriferous character of chemical toilets, that we are now providing the motorist with a 20th Century highway and an 18th Century privy. Providing flush toilets increases the initial cost from $175,000 to approximately $190,000 per rest area. The additional $15,000 covers the cost of a masonry and steel building, heating facility, and pressure water system. Typical appearance of facilities of each type is shown in Fig. 5.

One major difference between operation of roadside parks on uncontrolled access trunklines and rest areas on the limited access freeways is that the roadside parks are closed at the end of the summer tourist season, while most of the rest areas are operated throughout the year. In four or five instances, we have closed rest areas during some winter months for economic reasons due to lack of use.

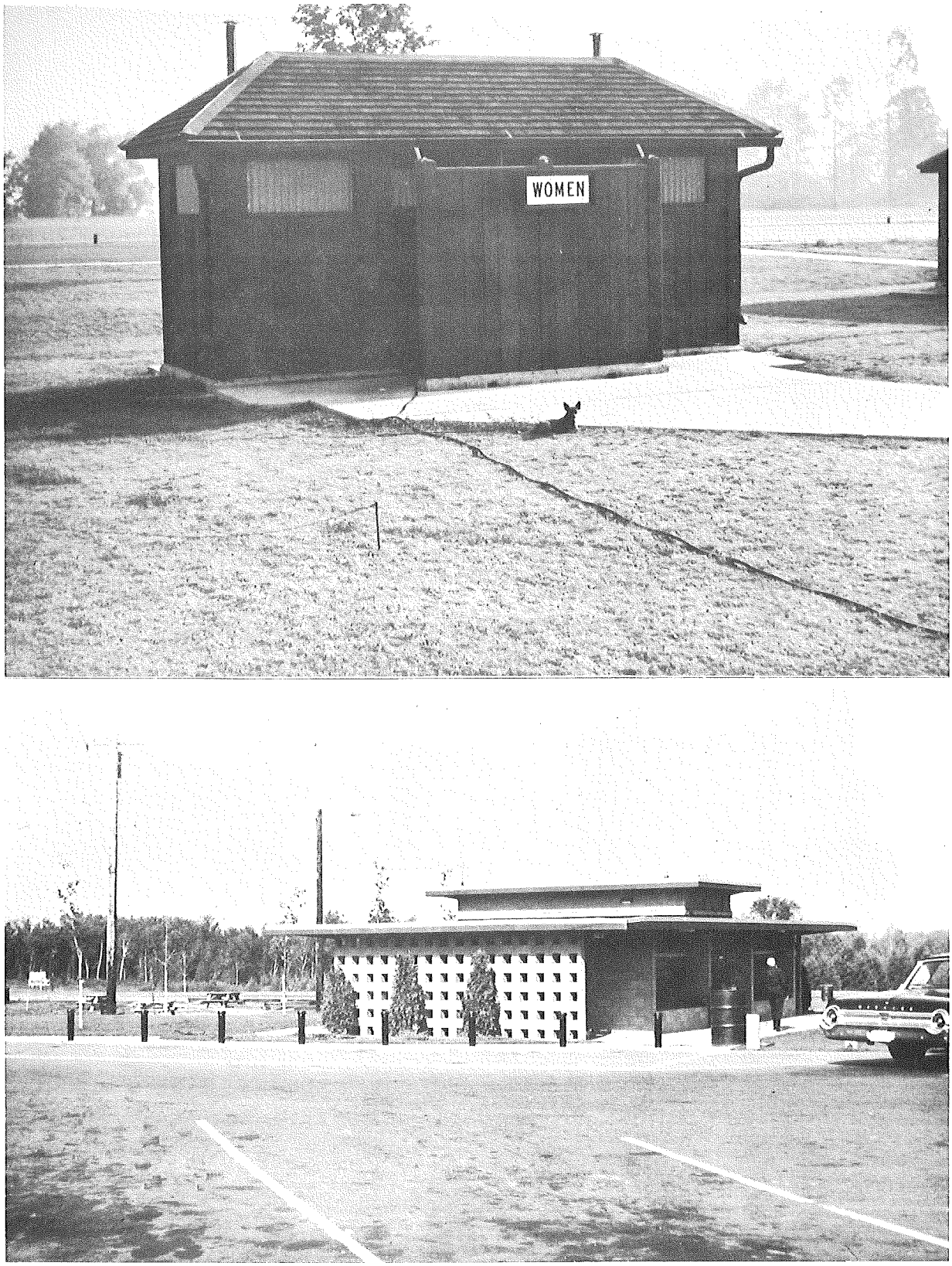

Figure 5. Typical chemical-type (top) and flush-type toilet enclosures.

Maintenance routine calls for an attendant to visit a rest area at least once daily, even at infrequently used areas. In some cases, two or three men may be occupied at least part of the day in performing various duties such as rubbish disposal, grassmowing, minor maintenance, and general clean-up. Fig. 6 reproduces an attendant's check list and indicates the frequency and character of maintenance performed.

Regrettably for the purpose of this report, Michigan does not keep maintenance cost records on rest areas in a neat package summarizing all of the various cost elements. Costs are recorded by control sections and activity codes. There is an activity code, "Maintenance of Tourist Facilities," to which only those functions are charged that do not fall within other standard activities. For example, the major portion of snow and ice control work performed in the rest area is charged to the activity code of "Snow and Ice Control" for the particular section on which the rest area is located. Grass cutting is charged to a standard activity code of "Roadside Mowing" and charged to the road section. Under this system it was necessary to average, prorate, and estimate some of the detailed expenditures that make up the overall maintenance costs.

Of the 38 rest areas operating in August 1964, only 26 are reported in Table 1, due to lack of a full year's operation or difficulty in obtaining reliable maintenance expenditure data. However, we were successful in obtaining a breakdown of total expenditures into labor, equipment, materials, and power for six of these areas.

MICHIGAN STATE HIGHWAY DEPARTMENT
OFFICE OF MAINTENANCE

ATTENDANTS' CHECK LIST

Form 429R

NOTE: Form to be made in duplicate and work items checked on dates performed. Original copy to supervisor at the end of each bi-weekly period.

Bi-Weekly Period _____

	S	M	T	W	T	F	S	S	M	T	W	T	F	S
DAILY														
1. Agitate tanks.														
2. Pick up debris.														
3. Sweep.														
4. Hose.														
5. Wash bowls, replace seats, etc.														
6. Mop.														
7. Fill dispensers.														
8. Remove writing.														
9. Spray insects.														
10. Check lights.														
11. Agitate tanks.														
WEEKLY														
1. Add deodorant.														
2. Check tank.														
BI-WEEKLY														
1. Check for required maintenance.														
2. Check vent pipes.														

_____
Attendant's Signature — Badge No.

Form 429

ATTENDANTS' CHECK LIST INSTRUCTIONS FOR TOILET BUILDING MAINTENANCE

DAILY

1. Agitate tanks upon arrival (10 revolutions minimum).
2. Pick up and dispose of debris in building.
3. Sweep toilet buildings. (Floors, walls and ceilings)
4. Hose down toilet buildings. (Floors, walls and ceilings)
5. Wash toilet bowl inside and outside with toilet bowl cleaner, wipe all areas dry, check toilet seat for cracks and loose fittings. When toilet seats can not be cleaned properly because of extensive wear, they should be replaced. Seat should be washed with disinfectant and dried.
6. Mop and squeegee floors dry.
7. Fill paper dispensers, being careful to interlock new supply with that remaining in dispenser. If dispensers are inoperative, repair or replace.
8. Remove writing from walls.
9. Spray for insects as required.
10. Check lights, including yard light and replace burned out bulbs.
11. Agitate tanks before leaving (10 revolutions minimum).

WEEKLY

1. Add deodorant as called for in charging instructions.
2. Check tank for pumping and if tank is full or odor from tank is particularly offensive, have tanks pumped.

BI-WEEKLY

1. Check buildings for painting, leaks in roof and other necessary maintenance.
2. Check vent pipe and replace when required.

TANK CHARGING PROCEDURE

1. Pump tank and clean completely.
2. Place a minimum of 8" of water in the tank.
3. Add one pail of crystals (45 lbs.) at the time of charging. The crystals shall be in solution when added. An additional 45 lbs. of crystals (in solution) shall be added when the tank reaches the half full point. DO NOT DUMP DRY CRYSTALS INTO TANK. Extreme care should be used in handling the caustic soda crystals because of harmful effects to eyes and exposed skin. Avoid fumes.
4. Four gallons of deodorant shall be mixed with four gallons of water and added to the tank when the tank is charged. One quart of deodorant mixed with one quart of water shall be added to the tank each week.

WARNING – WHEN MIXING THE SOLUTION, WATER SHALL BE ADDED TO THE SANI-SEPTIC – NOT THE SANI-SEPTIC TO THE WATER.

NOTE: Attendant shall complete form on reverse side of sheet.

Figure 6. Rest area attendant's check list.

TABLE 1
SUMMARY OF MICHIGAN REST AREA
ANNUAL COST AND USE DATA

Location	Thousand Vehicles Stopping	Contract or Direct Maintenance	Maintenance Costs					
			Labor	Equipment	Materials	Power (Lights)	Total	Per Vehicle
1. Ypsilanti	490	C	-----	-----	-----	----	$ 6,862	$0.014
2. Novi	399	C	-----	-----	-----	----	11,096	0.028
3. Grass Lake	303	C	$6,156	$3,240	$1,080	$324	10,800	0.035
4. Ann Arbor	300	C	-----	-----	-----	----	8,046	0.026
5. Clare*	268	C	-----	-----	-----	----	14,800*	0.046*
6. Oshtemo	267	D	6,298	2,645	2,539	748	12,131	0.045
7. Monroe*	264	C	-----	-----	-----	----	13,740*	0.043*
8. Battle Creek	238	D	3,021	861	1,733	----	5,615	0.024
9. Jackson	225	C	6,045	3,181	954	424	10,605	0.047
10. Galesburg	218	D	3,460	1,305	501	106	5,996	0.028
11. Marshall	196	D	4,413	953	2,887	168	8,258	0.042
12. Watervliet	181	D	-----	-----	-----	----	8,835	0.049
13. Grand Rapids	159	C	-----	-----	-----	----	8,581	0.053
14. Lansing	127	D	-----	-----	-----	----	9,208	0.072
15. Ithaca	124	C	-----	-----	-----	----	6,435	0.052
16. Alma	119	C	-----	-----	-----	----	6,290	0.053
17. Otsego	118	D	-----	-----	-----	----	10,427	0.088
18. Cascade	115	C	-----	-----	-----	----	6,084	0.053
19. Fruitport	107	C	-----	-----	-----	----	5,831	0.053
20. Grayling	104	C	-----	-----	-----	----	5,359	0.052
21. Houghton	78	C	-----	-----	-----	----	5,052	0.062
22. Frederic	77	C	-----	-----	-----	----	4,510	0.060
23. Higgins	76	C	-----	-----	-----	----	5,330	0.084
24. Vanderbilt	63	C	-----	-----	-----	----	4,390	0.069
25. Gaylord	62	C	-----	-----	-----	----	5,292	0.085
26. Mullett	40	C	-----	-----	-----	----	3,902	0.097
						Average	$7,826	$0.052
						Average, flush toilets		$0.0445

* Flush toilets

It should be pointed out that the rest areas reported in this table include some of the earliest design and some of the most recent. Consequently, they vary considerably in acreage, number of lights, amount of landscaping, types of equipment used by various contract organizations, distance from maintenance garage to the rest area, level of maintenance as performed by different organizations, climatic conditions, and classes and rates of labor. Maintenance is performed either directly by State forces or by contract with Counties or Cities. For example, the common labor rate can range from an hourly low of $1.56 to a high of $2.31, and at times semi-skilled classes such as truck drivers are used with a top hourly pay of $2.77 not including social benefits. This makes direct comparison of expenditures almost an impossibility.

Table 1 shows that annual expenditures for operating the 26 rest areas vary from a low of $3,902 to a high of $14,800, the average being $7,826. However, an interesting relationship becomes apparent when the expenditure per vehicle is plotted against the total number of vehicles using the rest areas, as shown in Fig. 7.

Notwithstanding the fact that these expenditures do not fall into a neat pattern or a mathematical function, and in view of the variables discussed, something of a pattern can be detected when these data are plotted graphically. After allowing for scatter of the individual points, the line drawn appears to be reasonable. There appears to be an inverse

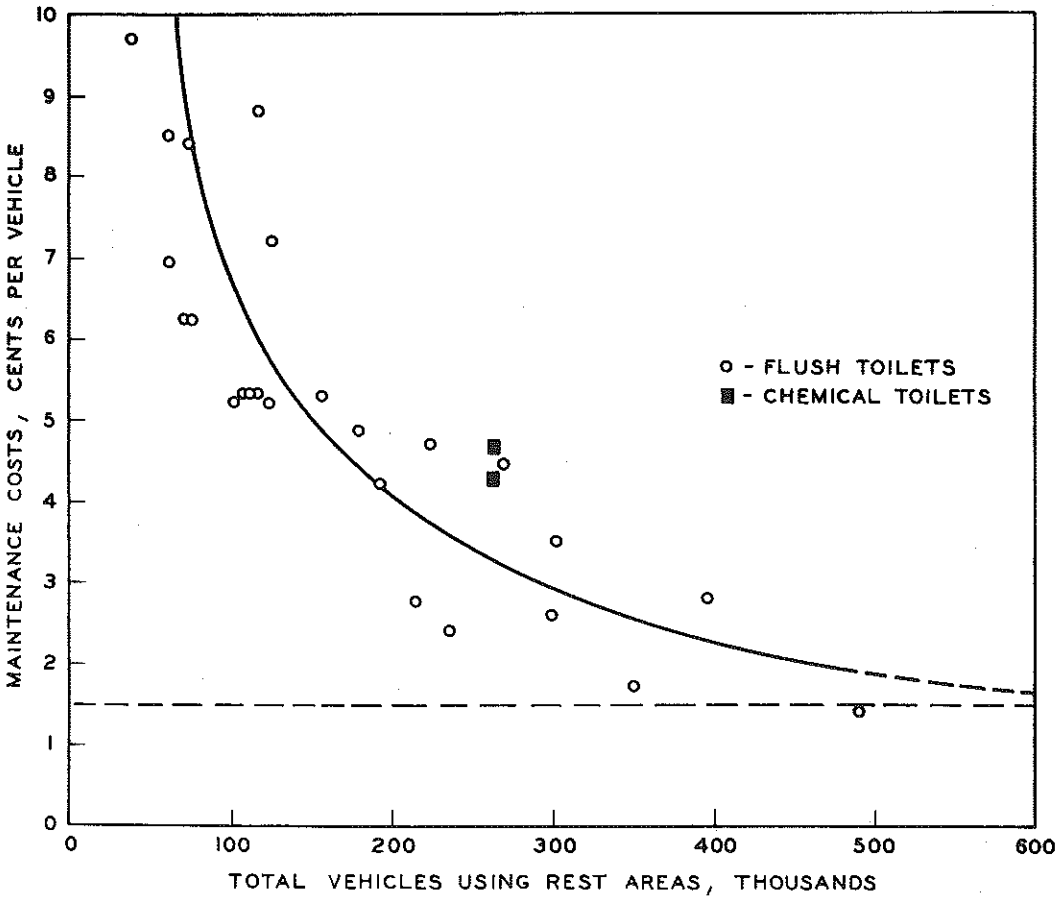

Figure 7. Rest area maintenance costs per vehicle.

relationship between the total number of vehicles and the expenditure per vehicle. Although from the data available it is not possible to extend this curve with any degree of accuracy, it is entirely possible that the curve may become asymptotic to a line paralleling the horizontal axis at a point representing 1.5 cents per vehicle. This point could be reached at an attendance figure of approximately 1,500,000 vehicles. The annual maintenance expenditure per rest area would then become approximately $25,000.

The writer, along with management, has been concerned about the anticipated high cost of operation of flush-type toilet facilities as compared to the less desirable chemical type. However, the data in this report seem to dispel those fears. It will be noted in Fig. 7 and Table 1 that the unit expenditure for the two rest areas having flush-type toilets falls within the general trend of the expenditure for the chemical toilet installations. These data point to at least two major conclusions:

First, although there is a considerable scatter in unit expenditures for each rest area, the trend curve seems fairly accurate considering the facts that all rest areas are not of identical design and that the maintenance is performed by widely varying routines.

Second, the unit cost of rest areas having flush-type toilets is in line with the unit cost of chemical-type installations.