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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM  
SYNTHESIS OF HIGHWAY PRACTICE

**20**

## REST AREAS

RESEARCH SPONSORED BY THE AMERICAN ASSOCIATION  
OF STATE HIGHWAY OFFICIALS IN COOPERATION  
WITH THE FEDERAL HIGHWAY ADMINISTRATION

AREAS OF INTEREST:  
ROADSIDE DEVELOPMENT  
MAINTENANCE, GENERAL

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NATIONAL ACADEMY OF SCIENCES—NATIONAL ACADEMY OF ENGINEERING

1973

## **NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM**

Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

In recognition of these needs, the highway administrators of the American Association of State Highway Officials initiated in 1962 an objective national highway research program employing modern scientific techniques. This program is supported on a continuing basis by funds from participating member states of the Association and it receives the full cooperation and support of the Federal Highway Administration, United States Department of Transportation.

The Highway Research Board of the National Academy of Sciences-National Research Council was requested by the Association to administer the research program because of the Board's recognized objectivity and understanding of modern research practices. The Board is uniquely suited for this purpose as: it maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; it possesses avenues of communications and cooperation with federal, state, and local governmental agencies, universities, and industry; its relationship to its parent organization, the National Academy of Sciences, a private, nonprofit institution, is an insurance of objectivity; it maintains a full-time research correlation staff of specialists in highway transportation matters to bring the findings of research directly to those who are in a position to use them.

The program is developed on the basis of research needs identified by chief administrators of the highway departments and by committees of AASHO. Each year, specific areas of research needs to be included in the program are proposed to the Academy and the Board by the American Association of State Highway Officials. Research projects to fulfill these needs are defined by the Board, and qualified research agencies are selected from those that have submitted proposals. Administration and surveillance of research contracts are responsibilities of the Academy and its Highway Research Board.

The needs for highway research are many, and the National Cooperative Highway Research Program can make significant contributions to the solution of highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement rather than to substitute for or duplicate other highway research programs.

## **NCHRP Synthesis 20**

Project 20-5 FY '72

ISBN 0-309-02202-9

L. C. Card No. 73-18390

**Price: \$3.60**

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The members of the advisory committee selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and, while they have been accepted as appropriate by the advisory committee, they are not necessarily those of the Highway Research Board, the National Research Council, the National Academy of Sciences, or the program sponsors.

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## **PREFACE**

There exists a vast storehouse of information relating to nearly every subject of concern to highway administrators and engineers. Much of it resulted from research and much from successful application of the engineering ideas of men faced with problems in their day-to-day work. Because there has been a lack of systematic means for bringing such useful information together and making it available to the entire highway fraternity, the American Association of State Highway Officials has, through the mechanism of the National Cooperative Highway Research Program, authorized the Highway Research Board to undertake a continuing project to search out and synthesize the useful knowledge from all possible sources and to prepare documented reports on current practices in the subject areas of concern.

This synthesis series attempts to report on the various practices without in fact making specific recommendations as would be found in handbooks or design manuals. Nonetheless, these documents can serve similar purposes, for each is a compendium of the best knowledge available concerning those measures found to be the most successful in resolving specific problems. The extent to which they are utilized in this fashion will quite logically be tempered by the breadth of the user's knowledge in the particular problem area.

# FOREWORD

*By Staff*

*Highway Research Board*

This report should be of special interest to roadside development planners and engineers, and others charged with the location, design, operation, and maintenance of highway rest areas. Information is offered on the rest-area needs of motorists, and on the fulfillment of these needs, as suggested by experience gained under a wide variety of conditions representative of most situations that have been encountered throughout the United States.

Administrators, engineers, and researchers are faced continually with many highway problems on which much information already exists either in documented form or in terms of undocumented experience and practice. Unfortunately, this information often is fragmented, scattered, and unevaluated. As a consequence, full information on what has been learned about a problem frequently is not assembled in seeking a solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem. In an effort to resolve this situation, a continuing NCHRP project, carried out by the Highway Research Board as the research agency, has the objective of synthesizing and reporting on common highway problems—a synthesis being identified as a composition or combination of separate parts or elements so as to form a whole greater than the sum of the separate parts. Reports from this endeavor constitute an NCHRP report series that collects and assembles the various forms of information into single concise documents pertaining to specific highway problems or sets of closely related problems. This is the twentieth report in the series.

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The rest areas that are becoming increasingly familiar to motorists traveling major highways, like the highways themselves, bear little resemblance to those of an earlier day. On important facilities offering primary service to high-speed long-distance travel, the simple combinations of roadside picnic table, trash can, and shade tree have been supplanted by far more complex facilities that offer a much wider range of desired services. Highway agencies, almost without exception, now recognize this type of rest area as an integral part of any complete highway system, affording an important contribution to the comfort, convenience, and safety of the motorist. Motorists, in turn, have come to expect rest areas of good quality, spaced at convenient intervals, and offering ample parking, clean and operable toilet and lavatory facilities, adequate table space and cooking equipment, and a variety of other commonly supplied utilities.

This report of the Highway Research Board records current practices in the development, operation, and maintenance of rest areas, and presents guidelines that past experiences suggest will produce, in most instances, generally acceptable fulfillment of motorist requirements. The selection of such individual items as spacing, location, size, parking facilities, buildings, convenience facilities, water supply, sewage disposal systems, and other items that experience has shown to be important, together with details of operation and maintenance, are discussed. Areas where existing information is inadequate and research is needed are identified.

To develop this synthesis in a comprehensive manner and to ensure inclusion of significant knowledge, the Board analyzed available information assembled from many highway departments and agencies responsible for highway planning, design, construction, operations, and maintenance. A topic advisory panel of experts in the subject area was established to guide the researchers in organizing and evaluating the collected data, and to review the final synthesis report.

As a follow-up, the Board will attempt to evaluate the effectiveness of this synthesis after it has been in the hands of its users for a period of time. Meanwhile, the search for better methods is a continuing activity and should not be diminished. An updating of this document is ultimately intended so as to reflect improvements that may be discovered through research and practice.

## **CONTENTS**

**1 SUMMARY**

**PART I**

**3 CHAPTER ONE Introduction**

**4 CHAPTER TWO Design**  
Spacing and Location  
Size  
Parking  
Sidewalks  
Buildings  
Convenience Facilities  
Utilities  
Multiple Uses  
Criteria, Standards, and Costs

**23 CHAPTER THREE Operation**  
Public Requirements  
Operating Policies and Procedures  
Personnel  
Equipment  
Operating Cost  
Welcome Centers  
Multiple-Use Participation

**29 CHAPTER FOUR Maintenance**  
Maintenance Policies and Procedures  
Personnel  
Equipment and Supplies  
Buildings  
Utilities  
Landscape Maintenance  
Pavements and Walks  
Other Facilities  
Multiple-Use Facilities

**31 CHAPTER FIVE Conclusions and Research Recommendations**  
Conclusions  
Research Recommendations

**PART II**

**34 APPENDIX A Selected Bibliography**

**35 APPENDIX B Summary Tabulation of Rest Area Data, by State**

**38 APPENDIX C Rest Area Design Guide**

## ACKNOWLEDGMENTS

This synthesis was completed by the Highway Research Board under the supervision of Paul E. Irick, Assistant Director for Special Projects. The principal investigators responsible for conduct of the Synthesis were Thomas L. Copas and Herbert A. Pennock, Special Projects Engineers.

Special appreciation is expressed to Earl A. Disque, Consultant on Land Use Planning and Designing, Ormond Beach, Fla., who, as special consultant to the Advisory Panel, was responsible for the collection of data and the preparation of the report.

Valuable assistance in the preparation of this synthesis was provided by the Topic Advisory Panel, consisting of Mark H. Astrup, Salem, Ore.; Frank J. Cope, Chief Landscape Architect, Division of Highways, Ohio Department of Transportation; Larry Isaacson, Chief, Landscape Staff, Scenic Enhance-

ment Division, Office of Environmental Policy, Federal Highway Administration; James F. Kelley, Maintenance Engineer, Massachusetts Department of Public Works; Samuel F. Lanford, Assistant State Engineer, Arizona Highway Department; C. O. Leigh, Maintenance Engineer, Virginia Department of Highways; John J. Ryan, Director, Landscaping Bureau, New York State Department of Transportation; and Foster A. Smiley, Maintenance Engineer, Iowa State Highway Commission.

A. G. Clary, Engineer of Maintenance, and L. F. Spaine, Engineer of Design, both of the Highway Research Board, assisted the Special Projects staff and the Advisory Panel.

Information on current practice and ongoing research was provided by many highway agencies. Their cooperation and assistance were most helpful.



# REST AREAS

## SUMMARY

Rest areas are now an integral element of limited-access and other highways to provide motorists a greater measure of safety and comfort. In the past, a rest area may have consisted of only a few picnic tables and trash containers at a shoulder turnout. Today, states are providing complete facilities, including ample parking spaces; toilet buildings with flush-type fixtures, lavatories, hand dryers, and drinking water; picnic tables and benches; shelters; cooking grills and fireplaces; public telephones; lighted, landscaped grounds; and the necessary systems for power supply, water supply, and sewage disposal.

The distance between rest areas varies, depending on such factors as traffic volume and topography; most states are locating rest areas at about one-half-hour driving time apart. Frequently, the first rest area encountered upon driving into a state will be combined with a welcome center to provide visitors with travel and service information in addition to the usual facilities.

Space devoted to parking depends on the volume and type of traffic on the highway. Several designs are used, although trucks and cars are usually separated. Specially marked spaces and curb ramps for use of the handicapped are frequently used.

Building size will be determined by the number of persons expected to use the rest area. The architectural style of the building may be uniform throughout a state or it may express the character of the region. Materials and fixtures used in the building are usually functional, vandal-resistant, easy to operate, and inexpensive to repair or replace. Electric hand dryers and linen roll towels are used more often than paper towels.

The convenience facilities found at rest areas (picnic tables, shelters, cooking grills, drinking fountains, etc.) are usually designed to reflect and complement the over-all architectural concept of the rest area. Public information services may be provided by maps, folders, and displays in building lobbies or at separate bulletin stands.

Most rest areas rely on drilled wells for the water supply and large tanks for storage. The water may be treated before storage or as it is used. Some states are using a reverse osmosis process to treat brackish well water for use in rest areas. In the future this process may allow reuse of waste water. There is a trend to use municipal water systems where practical.

The type of sewage treatment system that is used depends on the type of soil in the area, available land, proximity to a municipal system, and state, federal and local regulations. At least eleven different treatment systems are currently used. A number of states provide facilities for recreational vehicles to discharge their holding tanks. These facilities are usually connected to the rest area sewage system.

Power can usually be obtained from a local electric utility or, at remote rest areas, a power supply may be built on the site. Telephone service (pay phones) is usually provided and sometimes the custodian may have a radio link to nearby highway maintenance units or to local or state police.

Multiple use of sites is feasible in many locations where additional lands may be acquired with the cooperation of other public agencies. An example is a facility

in Montana where access is provided from the rest area to an adjacent U.S. Forest Service campground with fishing and boating facilities.

Guidelines used in design of rest areas have come from AASHO and FHWA. Site plans generally are developed by highway agency personnel. However, buildings are usually designed by consultants. Sometimes a standard building will be designed that can be adapted to each site by the highway agency. Costs of buildings vary, depending on size, location, materials, type of fixtures used, climate (heating and air conditioning), etc. It is important to recognize that a building with a higher first cost may be more resistant to wear and vandalism and may require less maintenance.

If a rest area is properly designed, it will operate in a safe manner with a minimum of supervision. This means that pavements have proper sight distances and turning radii, walks and paths have easy grades, adequate lighting is provided inside and out, signs are provided as needed, etc.

Most rest areas are manned by a single custodian on a one-shift basis, although there is a trend to 24-hour coverage at large rest areas on heavily traveled routes. The daily work routine of the custodian includes cleaning, mopping, and polishing of building interiors, and resupplying towels, toilet tissue, and soap. He will also be responsible for picking up waste material from picnic areas, walks, and roadways. He may also be required to operate irrigation systems and lighting if these are not automated.

Utility systems usually require little operational attention, as they are highly automated. In some states, law requires that a wastewater treatment system be operated and maintained by a licensed operator, and periodic training courses are conducted by state agencies.

Trash containers are positioned above ground in most states. Collection may be by highway personnel or by contract. A few states still maintain on-site incinerators.

The custodian (or a custodial crew) may be assigned to one rest area or to a pair of rest areas. In many states the custodian wears a uniform that is consistent in style and color throughout the state.

The custodian may also perform routine maintenance chores. These include replacement of window glass or screens, touch-up painting, repair or replacement of fixtures, and routine maintenance of picnic tables, shelters, trash collectors, etc. Major work that requires the service of electricians, plumbers, carpenters, or other skilled tradesmen may be requested as needed from the highway agency or hired under contract.

There is an immediate need for information on the types of wastewater treatment systems that will meet water quality standards proposed for 1983.

Up-to-date manuals and handbooks are needed for rest area design, operations, and maintenance. Because a manual cannot be written that will be applicable to the entire country, each state will need to modify any manual to meet geographic, climatic, and other conditions.

Improvement is needed in communication between the agencies directly concerned with rest area development and other agencies, such as EPA and state and local public health agencies, whose responsibilities affect the design and operation of rest areas. Similarly, there is research being performed in the field of water and sewage treatment for housing and industry that may have application to rest areas.

More data are needed concerning the numbers and types of vehicles that stop at rest areas (including numbers of persons per vehicle) in relation to total traffic, type of traffic, location of rest area, and other factors.

Research is also recommended on the need to provide additional motorist services, such as food and drink, in rest areas. If the need is found to be significant, changes in state and federal legislation may be required.

## CHAPTER ONE

# INTRODUCTION

The American system of public roads—Interstate, primary, and secondary—is second to none in the world in extent, functional efficiency, and engineering sophistication. On Interstate and other limited-access highways, particularly, these roads move people, vehicles, and products from place to place quickly, directly, and with increased safety. However, these same good qualities have been challenged by the phenomenal increase in traffic volumes in all classes—business, commercial, personal, and recreational. Traffic volume, high speed, and long-mileage trips have called attention to the need to improve motorists' safety and provide greater comfort.

Together with improved engineering qualities of highways, rest areas help to provide these greater measures of motorist safety and comfort.

Today's motorist—in private automobile, truck, or recreational vehicle—expects, and even demands, that rest areas be provided. Almost without exception, state highway agencies agree that rest areas should be an integral element in every complete highway facility.

The beginning of today's rest area program was a provision in the Federal-Aid Highway Act of 1938 that "... the States with the aid of Federal funds may include ... such sanitary and other facilities as may be deemed necessary to provide for the suitable accommodation of the public. . ." It was an intent and objective of the Act to increase motorist safety and comfort by providing occasional areas and facilities for stopping and resting.

Subsequent Federal-Aid Highway Acts, the Highway Trust Fund, and the Highway Beautification Act of 1965 have given authority, funding, and substance to the rest area program.

As of the summer of 1972 there were 1,214 rest areas open to the public on the Interstate System.\* More than 50 percent of these are fully developed facilities with toilets, drinking water, and other conveniences.

In the past, some states limited this development to the placing of picnic tables and trash containers under shade trees at shoulder turnouts along roadsides. Other states

provided reasonably complete waysides and rest stops along main highways.

Today, every state has prepared a master plan for development of its rest areas. The primary guidelines used to prepare the plans are the Federal Highway Administration (FHWA) "Instructions for Highway Beautification Cost Estimate," the 1968 AASHO "Guide on Safety Rest Areas," and FHWA's PPM's 80-1 and 90-3. These guides have a scope and flexibility that recognize a state's prerogative for initiative, a degree of tolerance for individual state policy decisions, and some latitude for engineering judgment in each specific situation.

For proper service to safety and comfort, a rest area on an Interstate or other limited-access highway (Fig. 1) should have access and exit ramps; parking areas for cars, trucks, and other types of vehicles; toilet buildings with flush-type fixtures, lavatories, hand-drying devices, and drinking water; picnic tables and benches; shelters; grills and/or fireplaces; walks; public telephones; information facilities; lighting; landscaped grounds; the necessary systems for water supply, sewage disposal, and power supply; and adequate operational and maintenance procedures to make the rest area as safe, useful, and attractive as possible.

During the relatively short time that an aggressive rest area program has been in progress, much knowledge and experience has been gained by the states and the FHWA regarding highway traffic and volumes, travelers' needs and inclinations, and the effect these have on rest area sizes, facilities, and costs. To some extent, in some states, the program is still in the "growing pains" period. Guidelines first promulgated by AASHO and FHWA, anticipating a growing and changing program, were written with considerable latitude and flexibility. They are being modified from time to time as circumstances warrant.

This synthesis report is limited to rest areas with sanitary facilities, located on Interstate and limited-access highways. Information on rest areas was requested from all the states and the District of Columbia. The responses have been tabulated and are contained in Appendix B. In addition, interviews were conducted with state officials in California, Florida, Illinois, Iowa, New Jersey, North Carolina, and Texas, as well as with FHWA officials in California, Florida, Illinois, Texas, and Washington, D.C.

\* GEEST, J. G., "1972 Update of the Rest Area Inventory and the 1971 Rest Area Usage Study," *Hwy. Planning Tech. Rep. No. 29*, FHWA (Feb. 1973) 23 pp.

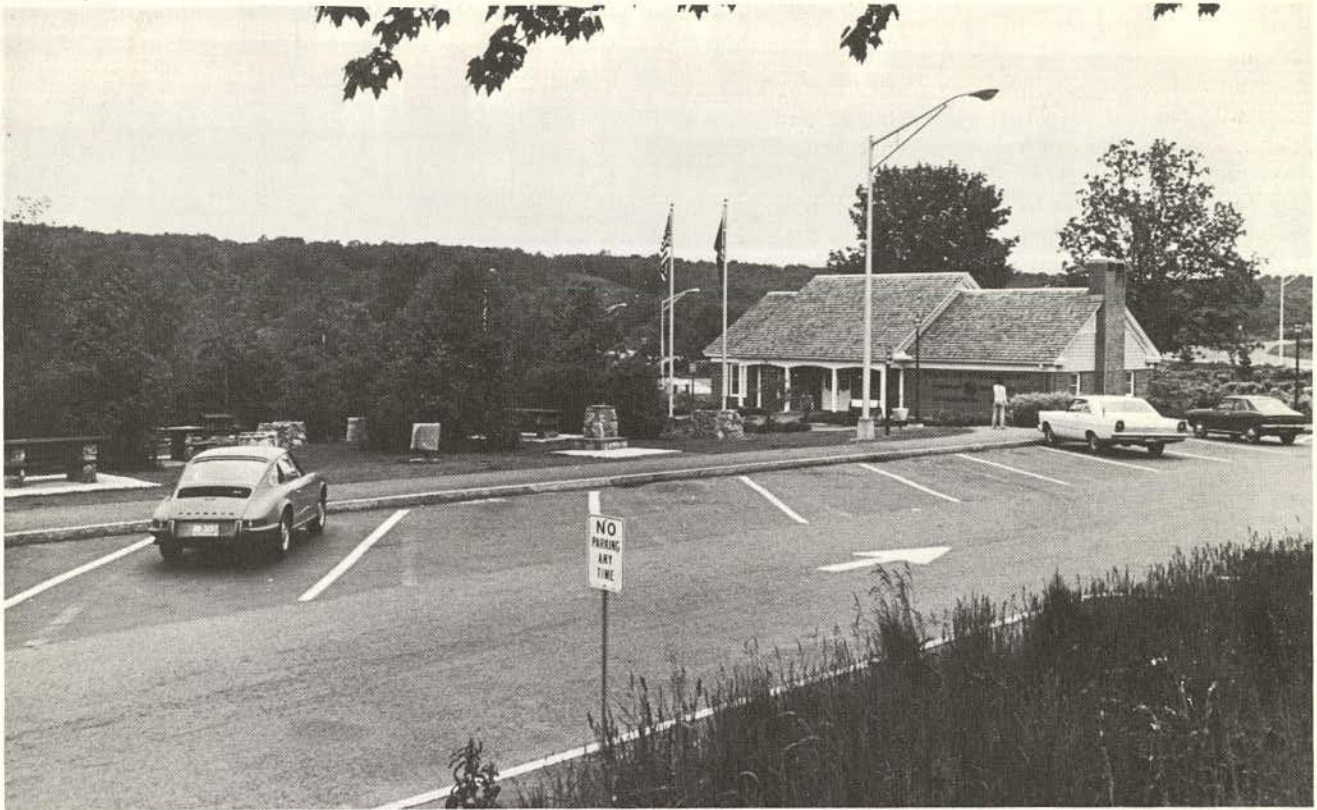


Figure 1. Typical rest area on limited-access highway (Connecticut).

## CHAPTER TWO

# DESIGN

### SPACING AND LOCATION

The distance between rest areas depends on many factors, such as traffic volume, topography, availability of satisfactory sites, distances between interchanges, and distances between available service facilities. The 1968 AASHO Guide recommends a spacing of about one-half-hour driving time.

In most states, rest areas are located at 30- to 40-mile (48 to 64 km) intervals. In one state, the planned interval of spacing is 50 to 70 miles (80 to 113 km); however, it is realized that this spacing may be too great.

Most rest areas are built in or are planned for rural areas. Often they are located as pairs, with each site serving one direction of traffic. Pairs are as near each other as possible for operational and maintenance considerations. In a few instances, rest areas are built in a widened median and one set of facilities serves both directions of traffic. In other instances, a rest area may be built at an interchange

so that access to the one facility may be provided for all directions of travel (Fig. 2).

Many states are collaborating and coordinating with each other in programs calling for rest areas with information services and facilities at or near state boundaries, largely to provide incoming state visitors with travel and service information in addition to the customary and expected facilities for safety and comfort (Fig. 3).

There is general belief that rest areas in urban locations may be justified on the basis of their providing the traveler with information concerning local traffic routes and destinations, visitor and motor services, historic and special attractions, and local special events. However, few rest areas have been built or are planned for urban sites.

The distance from an urban area has little effect on the percentage of traffic stopping in a rest area unless it is located between two large metropolitan areas where there is likely to be a lot of short-haul traffic.



## SIZE

On any given route, rest areas will, of necessity, vary in land area. For instance, the area needed for parking will vary with the design year, the forecast ADT, the class of traffic, and the types of vehicles. Other factors affecting land requirements include a state's prerogative to build a full facility initially or by stages, the availability of land because of terrain (mountainous, rolling, or flat), the cost of land, and the suitability of land for buildings and utilities because of topography and geology (for siting, potable water supply, and sewage disposal). Land in excess of actual physical needs may be acquired because of the benefit, from economic, operational, and maintenance viewpoints, of having full parcels rather than several remnants. Land may be acquired to serve as a screen or insulation, or to protect, conserve, or display some outstanding scenic, historic, or other resource.

Actual rest area sizes vary greatly. Texas rest area sites show a low range of 4 to 15 acres (16,000 to 60,000 m<sup>2</sup>); Iowa, a high range of 12 to 90 acres (48,000 to 364,000 m<sup>2</sup>) (includes a scenic overlook and a pedestrian access to an adjacent county park). Other states range as follows: California, 5 to 30 acres (20,000 to 122,000 m<sup>2</sup>); Florida, 5 to 55 acres (20,000 to 223,000 m<sup>2</sup>); Illinois, 6 to 54 acres (24,000 to 219,000 m<sup>2</sup>); New Jersey, 5 to 40 acres (20,000 to 162,000 m<sup>2</sup>); North Carolina, 25 to 30 acres (100,000 to 122,000 m<sup>2</sup>). At one location in Florida, the proposed multiple-use joint development of a combined rest area and an important archeological discovery may require 202 acres (817,000 m<sup>2</sup>).

## PARKING

Most states use the FHWA formula (Circ. Memo. dated Aug. 15, 1969) to determine the number of car and truck parking spaces. In some states, the formula may be modified and the ratio varied considerably, depending to some extent on the class of traffic, the type of vehicle, and the location of the rest area.

For example, some states, using an ADT of 10,000, provide parking spaces for 40 cars and 20 trucks. Another state, using the same ADT, provides spaces for 17 cars and 7 trucks. In still another state, provision is made for 30 cars, 18 trucks, and 8 to 10 cars with trailers. One highway agency, using a capacity chart formula plus some engineering judgment because of class and type of traffic and vehicle, provides spaces for cars and trucks at a ratio of about 3:1. Another state uses a ratio of about 4:1.

Sometimes an Interstate highway may traverse an area that has special scenic, historical, recreational, or other interest. Much of the land may be conserved or developed in a manner that attracts great numbers of recreational travelers for a limited time. Here, the ratio of parking spaces for passenger cars and recreational vehicles (campers, camper-trailers, boat-trailers, etc.) to trucks and truck-trailers may be very high.

Conversely, an Interstate highway may traverse an area that is basically nonscenic and has no direct historic, recreational, or other appeal. Its primary objective may be to move commercial traffic directly and quickly from one



Figure 2. Rest area at interchange (under construction).

place to another. Here the ratio of parking spaces may be strongly in favor of trucks and truck-trailers.

The design of parking areas varies greatly (Fig. 4). Where the right-of-way is relatively narrow, the design may be elongated, with parking for trucks parallel to the main travel way and on the highway side of the rest area. Parking for cars may be in the same parking area and may be parallel (Fig. 4b), diagonal, or at right angles, and on the toilet building side of the parking area.

Another design provides parallel or pull-through parking for trucks and trailers in front of the toilet building, and diagonal or right-angled parking for cars and campers at the sides or rear of the building (Figs. 4a and 4c). Where topography is an adverse factor, a relatively larger area may be required for roadways and parking spaces, and the spaces may be split into several parking areas. Where more than one parking area has been provided, the practice generally has been for trucks in front and cars in rear and/or at the sides of the toilet building. However, a better practice is to have truck parking in the rear. This enables the truck drivers to have a clearer view of merging traffic as they enter the rest area exit ramp.

All states are required to consider the use of rest areas by handicapped persons. Many rest areas provide several



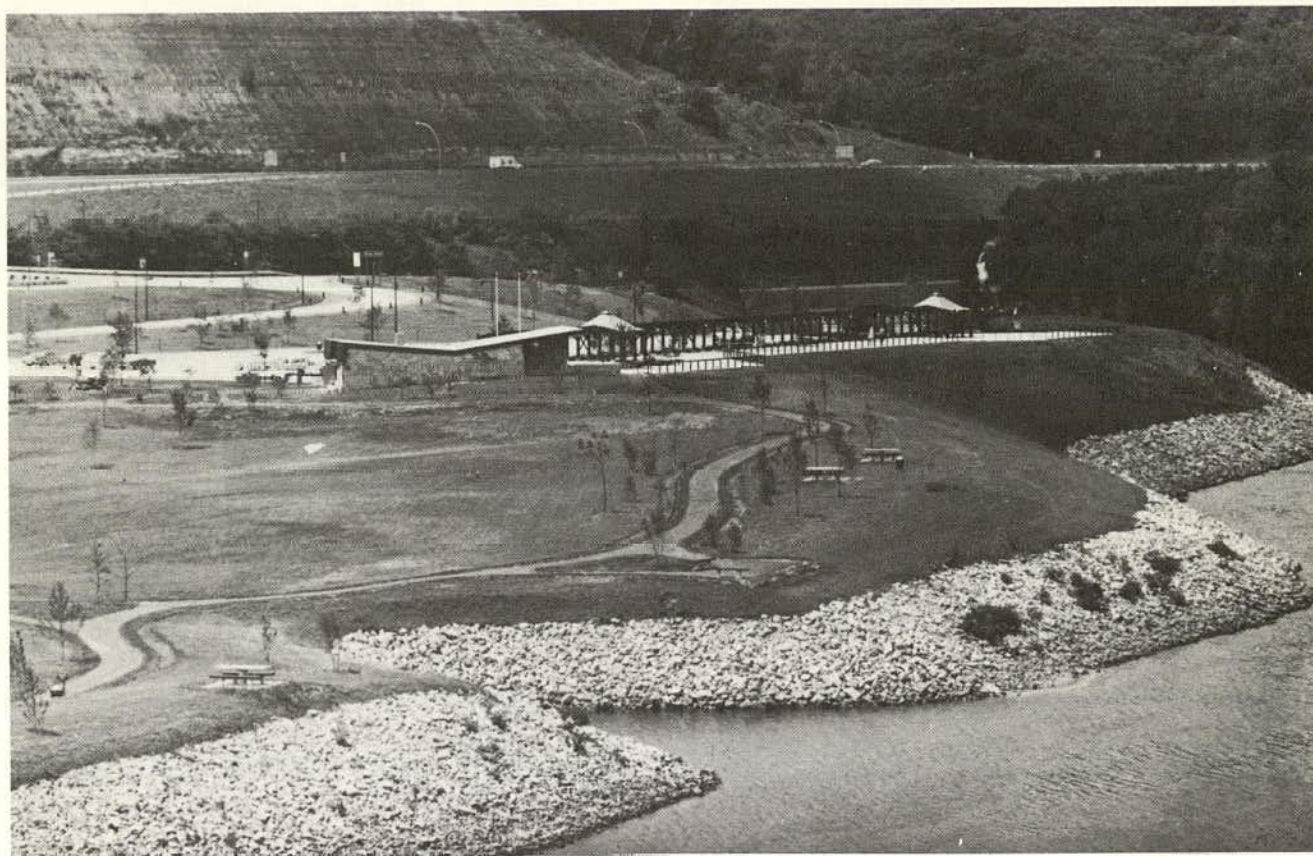


Figure 3. Rest area and welcome station (Minnesota).

car parking spaces that are specially marked and signed for the use of the handicapped and are located close to the toilet building (Fig. 5). Ramps are provided from pavement to sidewalk (Fig. 6) and from sidewalk to building.

#### SIDEWALKS

In most states, consideration is being given at the design stage to the movement of pedestrian traffic. With proper anticipation of direction and volume, walks and paths can be located and designed in a manner that will reduce operational and maintenance procedures and costs. For example, one state provided a 6-ft (1.8 m) wide sidewalk against the curb of a car parking area. It proved to be too narrow because of car bumper overhang. People were walking on the grassed area beyond the back edge of the sidewalk, creating problems in grounds maintenance. The sidewalk was widened to 10 ft (3 m) and the problem was solved.

#### BUILDINGS

Generally, within a state, rest area buildings vary in size and number of facilities because of the design year, location, ADT, and other factors.

Since 1966, there have been FHWA guidelines relating to federal participation in providing toilet buildings and fixtures. In keeping with the guidelines, some states prefer

a minimum approach to building design, providing only essential facilities. Some states include a lobby or porch (Fig. 7) for public information purposes, the size being based, generally, on the number of sanitary fixtures within the building. A current FHWA guideline (PPM 90-3, Landscape and Roadside Development, June 12, 1972) describes present federal policy and procedures for rest areas.

A number of rest areas, built early in the program and before much knowledge of motorists' needs and requirements had been acquired, have proved to be undersized and inadequate. Where possible, these rest areas are being expanded and improved on their present sites. If this is not possible or feasible because of land, water supply, sewage disposal, or other limitations, some existing toilet buildings and utilities are being upgraded, but not enlarged. Increased ADT volumes are being met by constructing additional rest areas on new sites located between existing areas. Many states use building plans that have been designed for expansion.

Depending on physical circumstances primarily, and on a state's policy to a lesser degree, some states prefer to build smaller rest area buildings on sites closer together; others prefer larger buildings on fewer sites.

Each state determines the character and quality of the rest area buildings and associated structures it proposes to construct. Many states use one identifying architectural





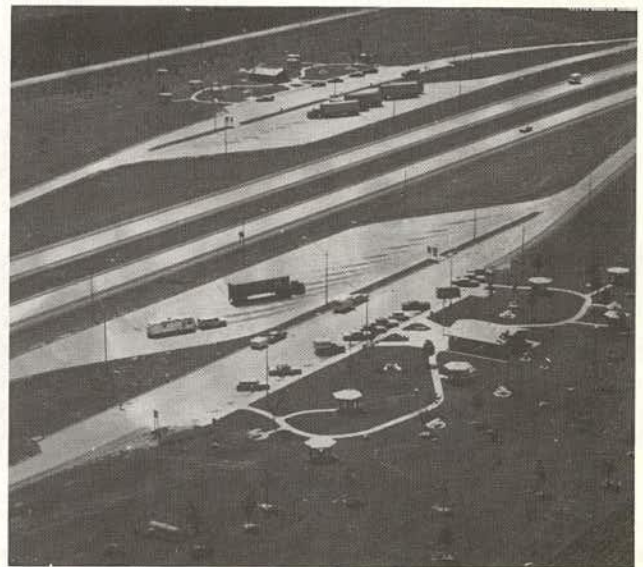
a. Trucks - Parallel  
Cars - Angle



b. Trucks - Parallel, mixed  
Cars - Parallel, mixed



c. Trucks - Pull through  
Cars - Angle



d. Trucks - Pull through  
Cars - Angle

Figure 4. Rest area parking.

style throughout the state, modifying the plan and size of a building to fit traffic and traveler needs. The architectural designs for some states express the historical heritage of that state (Fig. 8); others may express the general archi-

tectural character of a region (Fig. 9); others may be of contemporary style (Fig. 10); still others may combine the historical and the regional with the contemporary (Fig. 11).





Figure 5. Reserved parking for the handicapped.

A few states use several architectural motifs to suit several different regional patterns within a state. For example, North Carolina uses a colonial-classic style for its structures in coastal and tidewater regions and a pioneer-primitive style in its piedmont and mountainous regions (Fig. 12). Both styles are well suited to their environments and although their external appearances are quite different, the interior layouts may be quite similar.

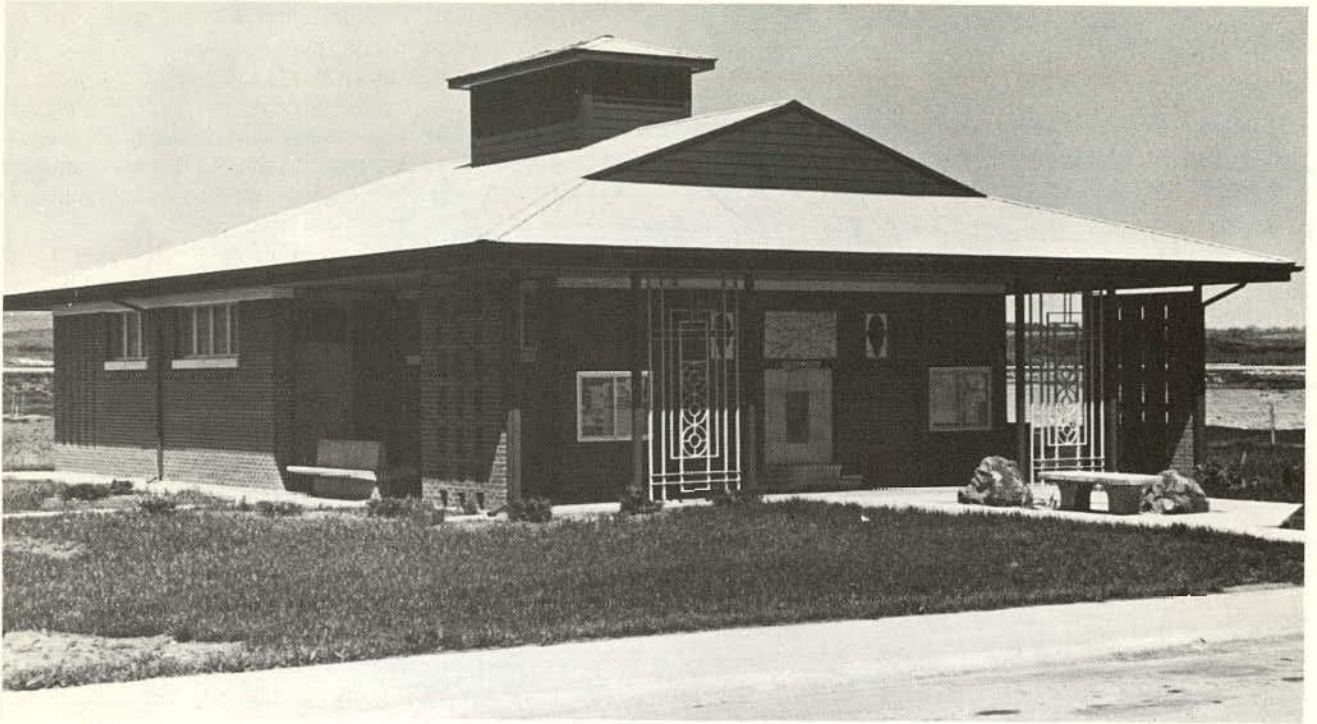
Exterior construction materials vary according to the architectural style of the building and state or local building code requirements. Materials used include wood, brick, stone, concrete block, or glass and steel. Interior materials will reflect to a great extent, particularly in lobbies, the same architectural style as the exteriors.

Within the toilet rooms, however, the practice is to use materials that are functional and utilitarian, vandal-resistant, and inexpensive to repair or replace. Toilet partitions usually have metal frames with metal or metal-covered wood panels and doors. Where wood has been used in older toilets, it is being replaced by metal. Partitions generally are secured to a wall and the floor, or sometimes to a wall and the ceiling. Floors are of quarry tile, fired brick, ceramic tile, terrazzo, or concrete with a special epoxy surface. Walls are of concrete or cinder block, ceramic tile, glazed structural tile, or, occasionally, brick. Ceilings usually are paneled with a lightweight, durable, fire-resistant material. Wood surfaces are painted or stained. Metal surfaces may be painted, bake-enameled, or anodized. Concrete or cinder block walls may be painted, or plastered and then painted.



Figure 6. Sidewalk ramp.





*Figure 7. Rest area toilet building with information porch (Kansas).*



*Figure 8. Toilet buildings and caretaker's residence (Arizona).*





Figure 9. Toilet building in mountain area (California).

Fittings, fixtures, and appliances usually are metal, recessed or flush with other surfaces as much as possible, vandal-resistant, easy to clean and operate, and easy and

inexpensive to maintain (Fig. 13). A few states use paper or linen towels and metal dispensers; most states use electric (air) hand dryers. Waste towel collectors may be



Figure 10. Proposed toilet building with inside information lobby (Minnesota).





Figure 11. Contemporary building with regional and historical style.

metal or plastic, free standing or built into walls. Toilets, urinals, and lavatories may be ceramic or metal and may be floor- or wall-mounted. Ceiling and wall lights, windows and frames, air-conditioning and heating vents usually are flush-mounted and made as vandal-resistant as possible. Some of these items are made so that they can be fastened into position from the back side of a partition wall or ceiling, thus reducing the chance of removal from the toilet room side. The manufacturers of bathroom products have a large market in supplying public buildings. They are aware of vandalism as a problem. Consequently, they are designing their products to be as vandal-resistant and easily serviced as possible.

Federal law now requires that all buildings, toilet rooms, devices, halls, and walks financed with federal funds be designed and built to enable the handicapped to use them without undue inconvenience. Included are ramps rather than steps, wide doors, wide toilet stalls, handrails, and grab bars (Fig. 14). Older facilities are being converted to meet this requirement.

Present designs for buildings may call for burglar- and fire-resistant storage rooms for supplies and equipment (Fig. 15). These rooms vary greatly in area (from 200 to 600 sq ft; 19 to 56 m<sup>2</sup>). Where older buildings had inadequate storage space, separate structures have been built for storage of supplies and equipment. In a few designs, air-conditioning and heating units have been supported from ceilings for greater use of storage room floor space.

In one state, the remoteness and isolation of the rest area has justified construction of a separate residence on the rest area site for the use of the custodian in protecting, operating, and servicing the rest area. The design and construction of the residence conforms with the total architectural design concept.

#### Welcome Centers

A number of states are providing welcome (or information) centers at state entrances on Interstate and some other limited-access highways (Fig. 16). A few have been built or are planned along the principal approaches to large metropolitan areas or to areas having significant scenic, historic, recreational, or other values. Welcome centers may be designed as separate developments within a rest area or may be combined with a rest area toilet building. The building space primarily is a lobby with related facilities intended for the dispensing of information to the traveling public. Limits of federal-aid participation are determined by current guidelines. Additional costs are financed by funds from other sources.

The designs of welcome centers follow several patterns. Some are designed and built as separate, self-sufficient buildings. Usually, they have a large lobby with counters; racks for folders, maps, etc.; chairs and tables for sitting, reading and writing; an office and storage room; toilets for the public and welcome center attendants; fireplaces (occasionally); small kitchens for attendants (occasionally); drinking fountains; public telephones; and air-conditioning and/or heating systems as regional conditions may warrant. They may have their own separate power, water supply, and sewage treatment systems.

A number of welcome centers are being designed and built as part of combination rest area-welcome centers. Here, the welcome center may contain all the elements of a separate structure except that all the toilets may be located in a separate section of the building. The storage room, power, air-conditioning and/or heating systems, and the water supply and sewage treatment systems may be used jointly.





a. Colonial Design for Coastal Areas



b. Rustic Design for Mountain Areas

*Figure 12. Matching rest area design to blend with adjoining community.*

#### CONVENIENCE FACILITIES

Convenience facilities found in most rest areas include picnic tables and benches—often with shelters (Fig. 17), bulletin stands (Fig. 18), drinking fountains, cooking grills (Fig. 19) or fireplaces, trash receptacles (Fig. 20), and exercise areas for pets (Fig. 21). For the most part, these facilities are designed and built to reflect and complement the over-all architectural concept of the rest area. For example, in a few states, the same architectural style and

materials are being used in the toilet buildings, bulletin stands, drinking fountains, trash collectors, shelters, picnic tables and benches, lighting standards, and sidewalks (Fig. 11). The result is a rest area having a completely integrated style and appearance. Other states may follow an identifiable style in the rest area building and a few of its related facilities but make no effort to relate the remaining facilities to the same style. Public information services are provided by maps, folders, and displays in building lobbies





Figure 13. Toilet room fixtures.

and vestibules (Fig. 22), by bulletin stands (Fig. 18), and by the personal services of welcome center personnel and rest area custodians.

## UTILITIES

Utility systems for rest areas include water supply, sewage treatment, power, and communications.

### Water Supply

The design of a water supply system for human consumption, sanitation, and irrigation varies according to the nature and source of the supply and the purpose of the system. Most rest areas rely on drilled wells (shallow or deep). In some regions, the type of soils and the structure of the rocks will ensure an adequate supply of water from shallow wells. Other regions will require deep wells. Several wells may be required for one rest area. The water may require treatment to make it potable, or it may be used untreated for sanitation or irrigation purposes. Depending on the adequacy and quality of the supply to meet normal and peak periods of demand, the water may be used directly, it may be treated and then used directly

without storage, it may be treated and then stored before use, or it may be stored first and then treated as used. Where the design requirements call for water storage, most states are using underground water tanks. A few are using ground-surface tanks or elevated tanks (Fig. 23). One state has a 10,000-gal (38,000 l) underground storage tank feeding into a 500-gal (1,900 l) treatment and hydro-pneumatic supply tank in the storage room of the rest area toilet building. Most states protect the water supply equipment (collecting, storage, and treatment areas; generators, pumps, gauges) by enclosing some or all of the units behind high wire fences or within safeguarded buildings or rooms.

Where feasible and economical, it is highly desirable to use a municipal system. Maintenance is minimal and supply and quality generally are assured. One state feels that a supply within about 3 miles (5 km) would obviate the need for wells. States that are relatively small in area and close to metropolitan developments may be able to rely fully on municipal water systems for rest areas.

Other sources of water supply are ponds, lakes, impoundments, springs, and streams. Where these sources are available, the design requirements may be comparable





### Signing

Figure 14. Provisions for the handicapped.

to those for wells, except that the water supply already is at the ground surface.

In some areas of the Southwest, water is in short supply, difficult and expensive to procure, highly mineralized, and in high demand. The possibility of reusing wastewater after proper treatment is of great interest. A process known as "reverse osmosis" shows promise (Fig. 24). It is a process whereby effluent can be treated to produce water for limited purposes. "Package" units are manufactured for this purpose. Some states are using or studying the reverse-osmosis method to treat brackish wellwater in their



Wide Stalls with Grab Bars

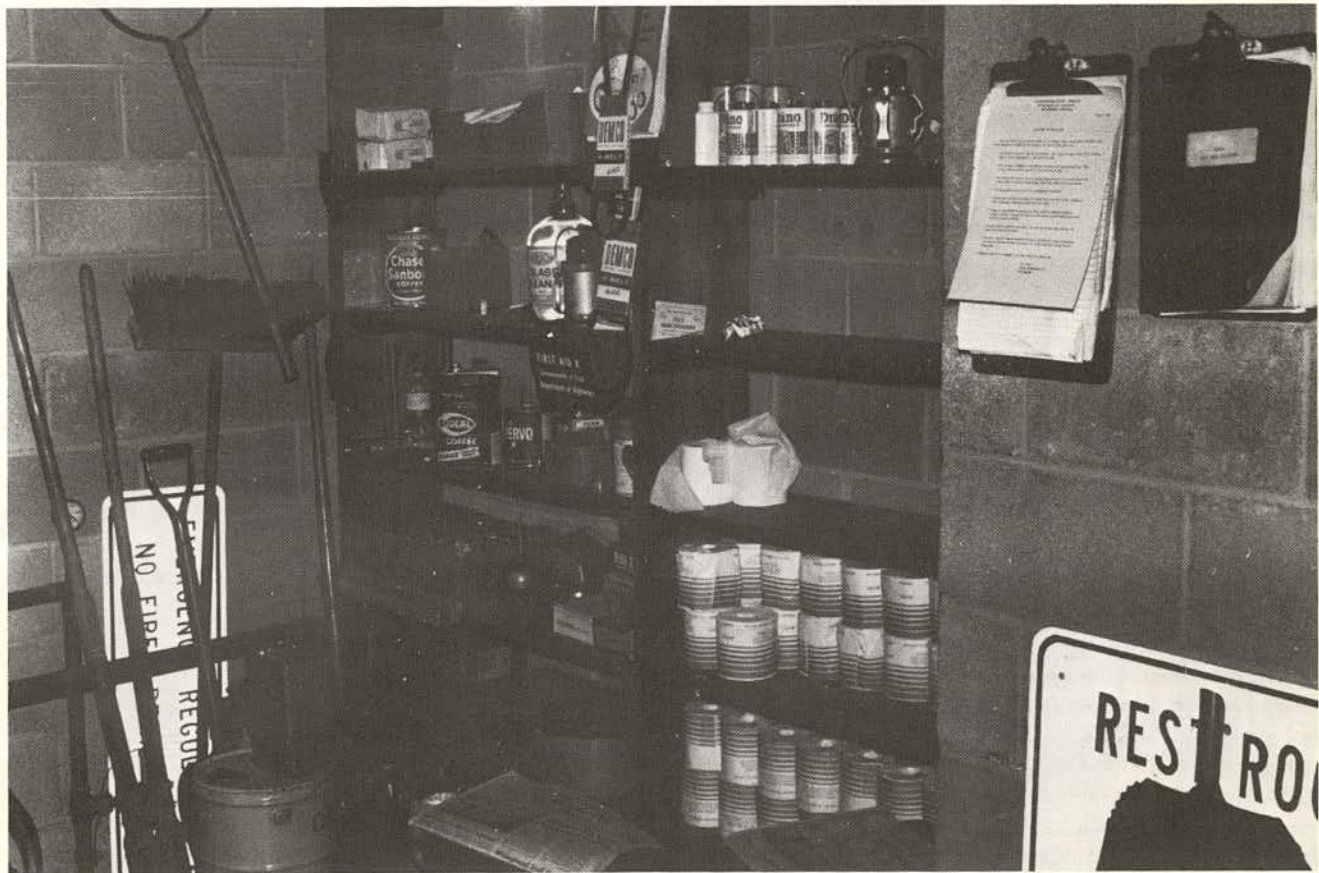


Figure 15. Burglar- and fire-resistant storage room for supplies and equipment.



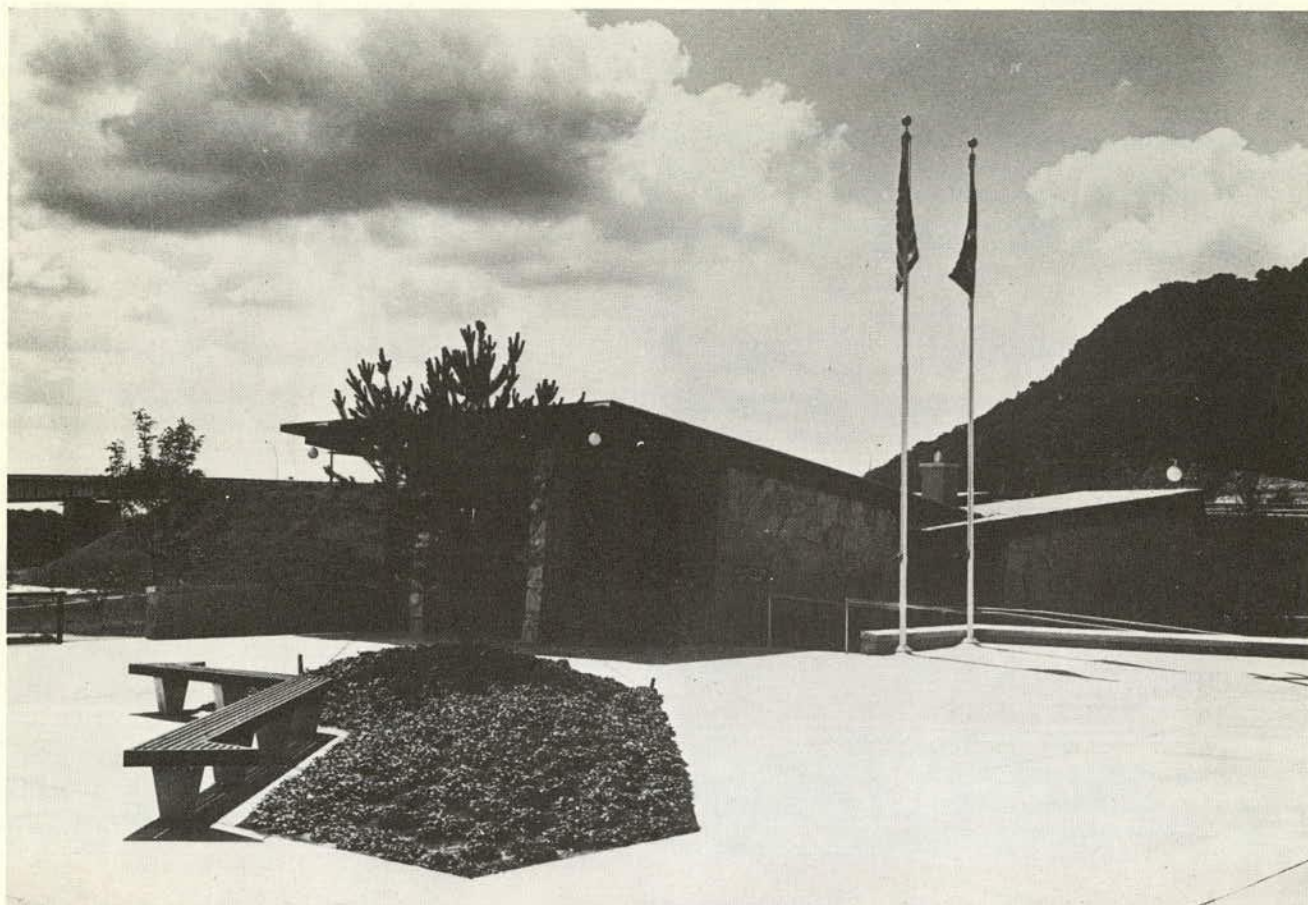


Figure 16. Rest area-welcome center (Minnesota).

rest areas. Several other states have shown interest in this method. Continuing research on this and other procedures is under way in several states and universities.

In a number of states, the water supply system has standby elements, such as extra wells, generators, pumps, storage, and treatment tanks.

In a few states, where a pair of rest areas are located close to each other and the water source is adequate, one water supply system serves both rest areas.

In all instances, the water supply systems designed for rest areas and the water used in these areas must meet state and federal regulations relating to environmental controls and public health.

#### Sewage Disposal

Sewage treatment systems for rest areas vary because of many factors: water supply, soil and rock composition and structure, available land area, proximity to a municipal disposal system, and state and federal environmental and public health restrictions.

For each rest area, local conditions and requirements are investigated and analyzed and motorists' requirements are determined in order to design a proper and adequate system for that area.

Today, states are using 11 different wastewater treatment systems, or variations of them, for rest area sanitary facilities. Several of these systems require a considerable area of land. In alphabetical order, these systems are:

- Chemical vault holding tank.
- Municipal sewage disposal system.
- Natural drainageways on adjacent public lands.
- Oxidation ditch waste treatment.
- Package treatment (aerobic or aeration) plant.
- Package treatment plant with tertiary treatment using sand filters or microscreens.
- Recirculating effluent mixed with mineral oil, then incineration.
- Reverse osmosis.
- Septic tank and leaching field.
- Spray irrigation for effluent disposal.
- Stabilization pond (sewage lagoon).

Because of potential odors and other factors, sewage treatment systems are located at a distance from the rest area building, welcome center, picnic, or other high public use areas. Special attention is given to adjacent water supplies. Sometimes one system may serve a pair of closely located rest areas.



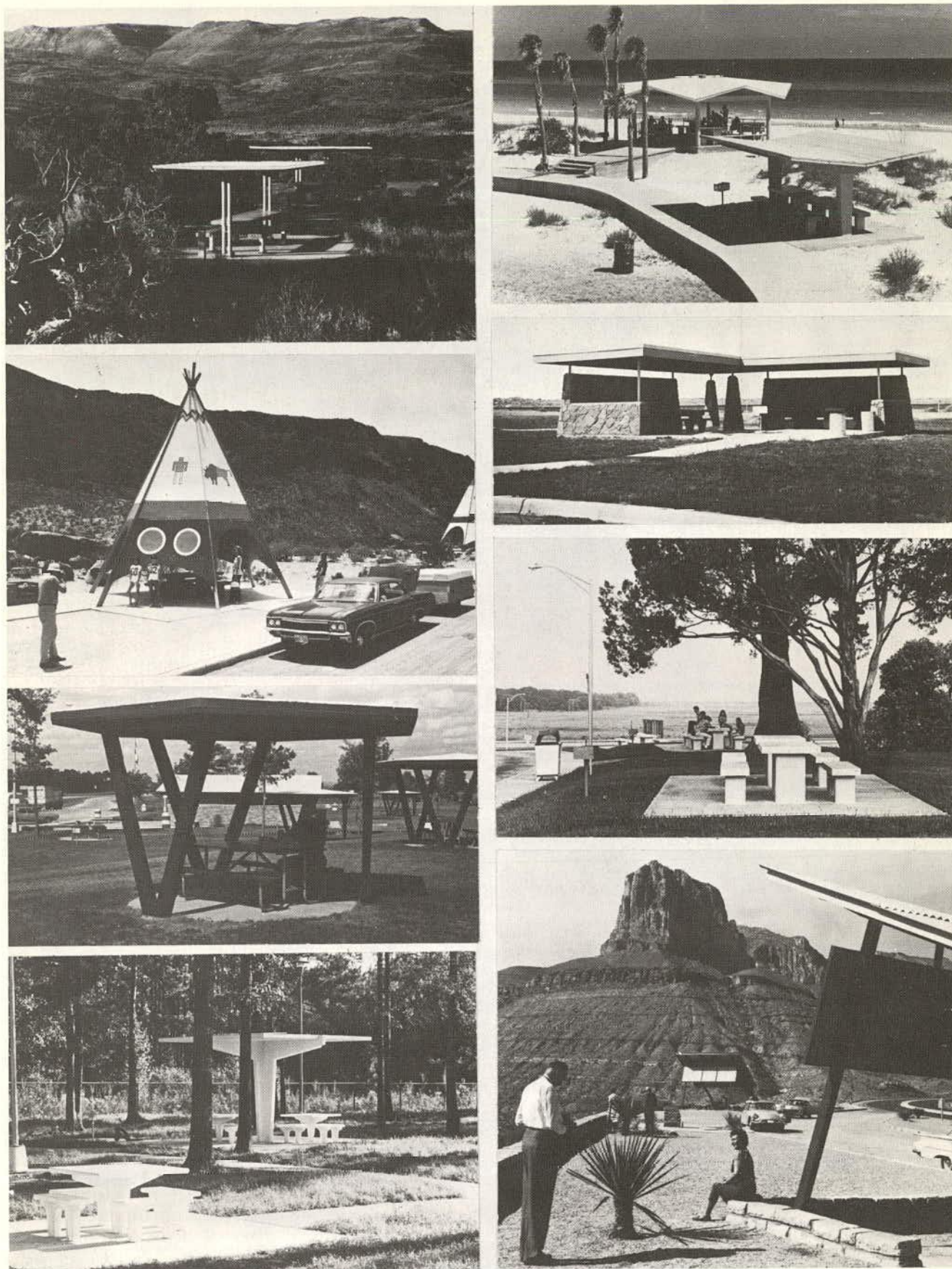


Figure 17. Picnic tables and shelters.





Figure 18. Bulletin stand.



Figure 20. "Pitch In" trash receptacle.

One state has found it necessary to replace ground absorption sewage treatment systems (septic tank-leach field) with aeration plants in 27 of the 28 rest areas in operation. In another state, some waste solids are being recirculated in a mixture of mineral oil and water, then incinerated. Some effluent is used for irrigation purposes in several states.

In all instances, the disposal of wastewater from whatever sewage treatment system is used must pass state and

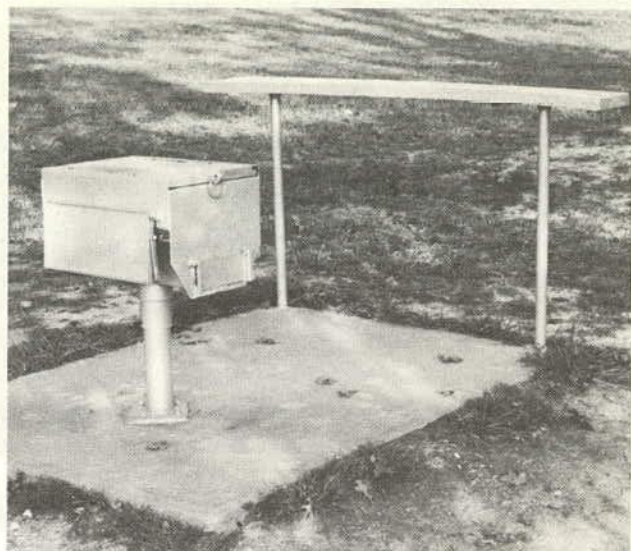


Figure 19. Cooking grill.



Figure 21. Pet exercise area.

federal requirements relating to environmental controls and public health.

A number of states are providing sewage disposal facilities for the use of recreational vehicles (Fig. 25). These are underground and usually located in pull-offs on the approach or exit ramps of parking areas. After discharging his holding tank, the recreational vehicle owner can flush the system. The sewage usually is disposed of by connecting the outfall to the rest area's sewage treatment system. Where these sewage disposal facilities are not available, there is a tendency for owners to use the right-of-way for discharge rather than to pay the charge imposed at campgrounds and service stations.





Figure 22. Information display and guest register.

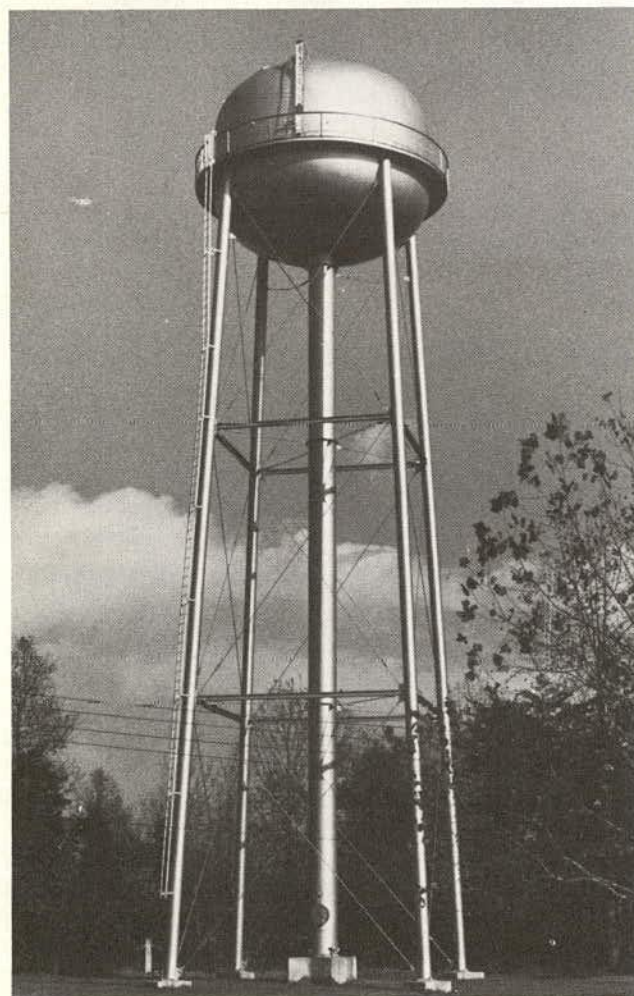


Figure 23. Elevated water storage tank for a rest area.

### Power Supply

Power supply to a rest area may be provided by a public power source or from a generating system designed and built on the site.

Often, power from a public source is brought overhead to a drop-pole at the rest area boundary and then taken underground to the toilet building for metering and distribution. Even if power must be brought in from a few miles away, it is usually less expensive and more reliable than on-site generators. For a remote rest area, an on-site power supply may be designed and built at ground level or in a sunken vault. It requires a generator (and possibly a standby unit), fuel storage, a transformer, and a current distribution system. As with other utility systems, if a pair of rest areas are located close to each other, one power supply system may be used for both units.

### Communications

A communications system may consist of telephones, radios, radiotelephones, or alarms for police protection, operations, and maintenance purposes.

Telephone service to a rest area usually may be obtained from whatever telephone system is operating in the region. Telephones are placed in building lobbies, on the outside walls of buildings, or in booths or receptacles located along sidewalks near parking areas (Fig. 26). If a rest area is a considerable distance from a telephone service line, the state highway agency may be requested to pay the cost of installing a line to the area.

Some states provide rest areas with radio service between the custodian's office and mobile highway maintenance units, district or central headquarters, and local or state highway police units.

### MULTIPLE USES

In some instances, where state policy permits, additional lands have been acquired for multiple use and joint development of facilities with public agencies other than the state highway department. Where this is being done, there are agreements relating the activities and responsibilities of the concerned agencies for design, operation, maintenance, and costs.

Some states have acquired parcels, remnants of parcels, or other areas of land as rights-of-way and scenic strips and have participated with other groups in providing recreational or other facilities of a limited nature within a rest area.

At a local level, on some Interstate beltways and urban extensions in or near urban areas, some states have worked with city and/or county park authorities in providing pedestrian accesses from rest areas to small sitting parks developed on public land adjacent to the rest area.

In some rural areas, borrow pits have been acquired and made into ponds for boating and fishing. In a few instances, there has been participation in the development





Figure 24. Reverse-osmosis water treatment unit (Arizona).

of boat launching ramps where a rest area is adjacent to a lake or a river.

As a case in point, an interagency agreement between the FHWA, the United States Forest Service, and the State of Montana permits and provides for accesses and an underpass from a pair of rest areas along I-90 to adjacent Forest Service campgrounds, fishing, boating, and other facilities along the Clear Fork River near Superior, Mont. (Fig. 27). Similar projects are proposed or are under way in other states.

In one state, scenic strips have been acquired along the sea and the rest areas are provided with additional facilities for picnicking and hiking at sand dunes and for swimming. In another state, federal and state agencies are collaborating in the development of an important archeological site near an Interstate rest area.

## CRITERIA, STANDARDS, AND COSTS

### Criteria and Standards

Early in the program of selecting and developing sites, buildings, utilities, and related elements of rest areas, FHWA and AASHO prepared guidelines describing certain criteria to be followed by the states. These guidelines have been modified from time to time as greater knowledge has been gained about motorists' needs and requirements. Each state was required to prepare a master plan showing proposed rest area locations based on a criterion of having a site every 30 to 40 min driving time apart. Another criterion required each site to be provided with safety, comfort, and convenience facilities for the traveling public. Criteria by FHWA gave guideline dimensions to such items as on- and off-ramps, parking areas and spaces, acreage of





Figure 25. Recreational vehicle sanitary facility (Connecticut).

sites, size of toilet buildings, number of toilet fixtures, walks, lighting, and landscaping.

Because the program was new and there was little precedent and limited knowledge relating to rest areas, the criteria issued generally were broad in scope and flexible in interpretation. Within its understanding and interpretation of the guidelines, each state has developed its own

criteria and standards for design, operation, and maintenance.

The Federal Government assists the states in the rest area program by providing some funds for planning, design, engineering, and construction, and by reviewing a state's plans before authorizing a project. After construction, operation and maintenance of a rest area are the responsibility of the state. Because of this responsibility, there is awareness by the states of the importance of considering operation and maintenance requirements during the design stage of project development. In most states, the designers consider rest area operation and maintenance requirements, but agree that greater attention and emphasis is warranted.

Rest area site plans and planting plans generally are developed by state highway agency personnel. Few have been prepared by consultants. The states prefer to hire persons trained and experienced in land use planning and design (landscape architects and landscape engineers), form them into a unit, and retain them as state employees for continuing service in roadside development. Often, the services of this unit can be applied not only to the design of rest areas but also to the landscape development aspects of all the roadsides within a state. Such a unit, being part of a state highway organization and having knowledge of that organization's policies and procedures, being experienced with its criteria and standards, being always available and constantly in service and under administrative control, can be of great benefit to a state professionally and economically.

In a few instances, landscape consultants have been



Figure 26. Telephone stand at parking area.





Figure 27. Rest area-campgrounds multiple use (Montana).

commissioned for specific projects, sometimes because of the special nature of the project and sometimes to reduce the work load of the regular state-employed landscape unit.

On the other hand, most states have commissioned the design of rest area buildings, welcome centers, and utility systems to architect-engineer consultants. In most instances, this is a one-time, short-term program. A state will have determined the number of rest area buildings and utility systems it needs and will have decided on an architectural theme and style. Consultants are then hired to prepare drawings in the proper architectural style and one or more plans of buildings and utility systems layouts.

The state then chooses the style and the plans that best fulfill the state's desires and objectives. The same architectural style may then be used consistently throughout the state, using one or more building floor plans or utility system layouts that will satisfy traffic, motorists' needs and requirements, and rest area site conditions. Whatever building and/or utility plan is selected for use at a particular rest area site is fitted to that site by the state-employed unit designing the site plan.

A few highway agencies have full-time, state-employed architects or architectural units. These persons or groups usually have responsibilities beyond those of designing

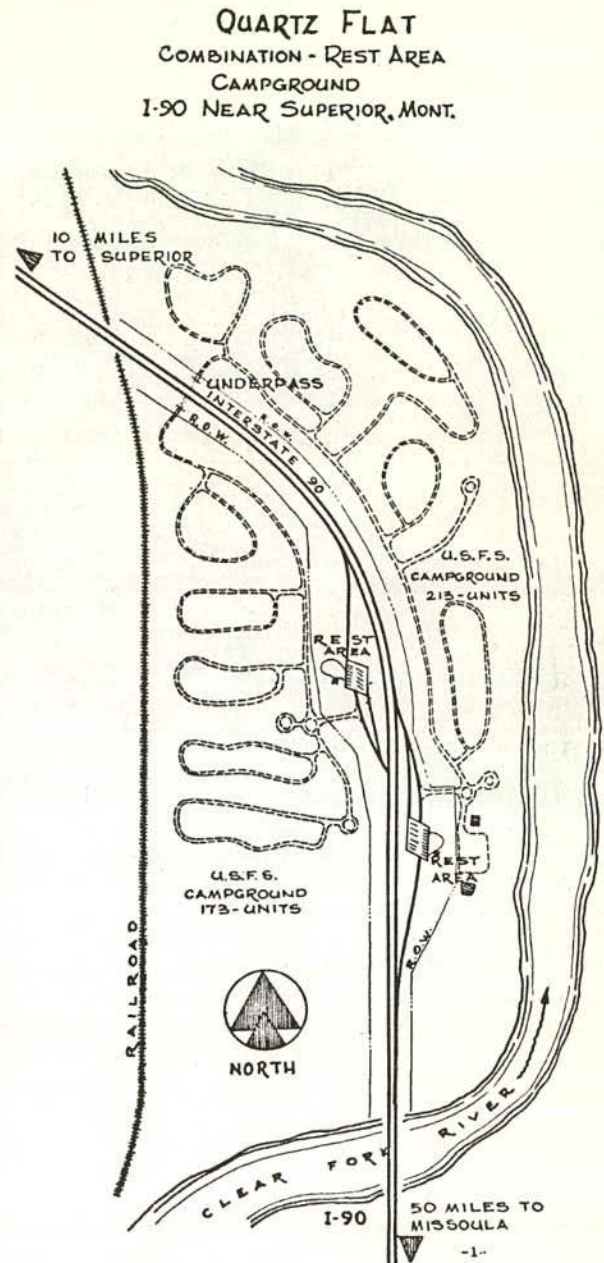






Figure 28. Rest area toilet building (partly roofed) and picnic shelter (Texas).

TABLE 1  
SUMMARY OF REST AREA COSTS (IOWA)

ITEM NO. NAME	NUMBER OF AREAS SAMPLED	COST (\$)		
		HIGH	LOW	AVG.
1. Land	16	56,538	4,970	16,539
2. Grading	6	93,128	23,960	29,127
3. Paving	5	221,719	20,474	120,936
4. Lagoons	5	76,058	26,352	48,580
5. Wells	15	50,998	3,038	11,331
6. Landscape	12	95,196	5,342	26,226
7. Buildings	16	213,597	73,192	139,181
8. Water system	9	6,280	3,512	5,427
9. Lighting	8	25,025	10,461	17,909
10. Utilities	3	715	218	533
11. Miscellaneous	9	35,630	2,403	17,178
Total				432,967
12. Addition <sup>a</sup>	6	2,272	2,026	2,159
13. Addition <sup>b</sup>	7	45,100	13,024	18,563

<sup>a</sup> Addition of ramps and special equipment to accommodate the physically handicapped.

<sup>b</sup> Addition of 10,000-gal water storage tanks and special pumping equipment to ensure water availability during breakdown and for low-producing wells.

buildings for rest areas. They may, for instance, prepare the architectural plans for highway structures such as bridges, grade separations, and retaining walls, and for buildings serving highway purposes (maintenance and equipment shops, division and district offices, etc.).

### Costs

Nationwide, rest area buildings vary considerably in the cost per square foot of construction. The variations in cost are not unexpected and are not necessarily unreasonable. They are brought about, in part, by such economic and marketing factors as kinds of materials, availability of materials, size of buildings, number of fixtures, variety of facilities required, cost of materials, cost of labor, isolation, and transportation.

Climate and geography also are factors affecting costs. In some warm, semi-arid or arid regions, rest area buildings may require neither air-conditioning nor heat and may be only partly roofed over (Fig. 28). In warm, wet, and humid regions, buildings may need air-conditioning and be fully roofed. In northern regions where cold, wind, and snow are factors, buildings may require heating and special construction against wind and snow loads.

Isolation is another factor affecting costs. Consideration is given to the cost of transporting labor, materials, and equipment over long distances and, possibly, to providing shelter, food, and other services to labor personnel for extended periods of time. Because all these factors vary so much (and sometimes change so often, as with local and national economies), a comparison of building costs is difficult. The range in six scattered states was \$15 to \$100 per sq ft (\$160 to \$1080/m<sup>2</sup>), with apparent median values of \$30 to \$60 per sq ft (\$325 to \$650/m<sup>2</sup>).

There are also variations in the cost of providing convenience equipment. The size, shape, materials, and appearance of picnic tables and benches, trash containers, shelters, drinking fountains, and bulletin stands are factors

TABLE 2  
COST OF TYPICAL REST AREA (TEXAS)

ITEM	COST (\$)
Grading	18,862
Paving	7,601
Sidewalks	4,232
Lighting	17,314
Electric power	5,022
Water system	24,179
Septic system	22,000
Sprinkler system	1,807
Drinking fountains	5,920
Picnic facilities	33,200
Toilet buildings	114,000
Total	253,147

that may cause higher costs in a fully design-integrated rest area.

Costs of constructing several rest areas in Iowa are summarized in Table 1. The cost of a typical rest area in Texas is presented in Table 2.

Early rest areas could and did contain gravel parking areas, pit toilets, hand-pumped well water, oil-drum trash cans, and the simplest of picnic tables and benches. Today, traffic and travelers' requirements call for more and better facilities. Environmental considerations are becoming increasingly important and the states generally wish to provide the very best for "state advertising." The great volume and high intensity of use in most rest areas call for facilities of great capacity, high quality, and considerable durability if they are to serve adequately over a reasonable span of time.

Most authorities believe that increased life and lower maintenance costs justify the installation of fixtures and fittings with a higher initial cost, but data documenting this view were not found.

## CHAPTER THREE

# OPERATION

### PUBLIC REQUIREMENTS

Because laws provide and the public expects that highways possess facilities for motorists' safety, comfort, and convenience, it follows that these facilities must be operated in a suitable manner for acceptable public service.

The movement of vehicles to and from the main travel ways and parking areas, and the movement of pedestrians

along walks and paths to and from the various facilities provided for their comfort and convenience, are important operational considerations that should be anticipated and resolved during the design of a rest area site.

In addition to the design of the roadways and parking areas, proper location and use of visual aids, such as advance signing (Fig. 29), internal signing (Fig. 30),





Figure 29. Advance signing for rest area.

pavement markings, and curbs, assist drivers and facilitate operation and management of vehicular traffic.

The same considerations hold true in the movement of pedestrian traffic. Functional design layouts, proper location of walks and paths, use of signs, and visual observation of structures enable pedestrians to move easily to and from toilet buildings, welcome centers, picnic areas, pet exercise areas, etc.

Safety in operation is an important consideration. All traffic, vehicular and pedestrian, is normally able to take care of itself safely and without supervision by rest area personnel. This means that (a) grades, sight distances, turning radii, and spaces for cars and trucks are adequate; (b) walks and paths have easy grades; (c) there are ramps rather than steps, if possible, and handrails if steps are required; (d) there is adequate drainage during storms; (e) shelters are provided for protection from the elements; (f) lighting is provided at night; (g) curb ramps are provided at parking areas for the use of the handicapped; (h) all buildings have doors that swing outward; (i) all buildings are adequately lighted inside and out; and (j) building ramps, rails, and signs are provided as needed. During peak periods, such as weekends, holidays, and special events, use of the rest area may be several times greater than normal. During these periods, special traffic control procedures may be required and operation of rest area buildings and grounds will require extra custodial help.

The information needed by travelers is usually provided on a self-service basis. The questions of where and how to park, how to find the toilets, picnic areas, and other facilities, as well as information about visitor services and facilities available off the highway, are taken care of by signs, bulletin stands, racks containing maps and folders, and public telephones. Bulletin stands and telephone booths are lighted for night use and self-service. A well-trained and informed custodian can assist most travelers.

Some states obtain information from visitors by means of a questionnaire card found on a registration desk in the vestibule of a toilet building or at a counter in a welcome center. The information obtained from the public is used to improve the design, operation, and maintenance of rest areas.

Under present federal law, the sale of food, drink, and vehicle services is not permitted in rest areas on Interstate highways. However, at welcome centers food and drink samples (usually local products) may be given to visitors gratis. A significant exception occurs on some limited-access highways that are operated by toll authorities but have been signed as a part of the Interstate system for the time being. Here, there are developments (rest areas?) containing gasoline service stations, parking areas, gift shops, information facilities, toilets, restaurants, snack bars, vending machines, and picnic areas. Some sources have insisted that the regulations be changed and that some form of food and drink service be permitted and provided at rest areas. There are indications that some states would favor the use of vending machines operated by some organization other than the state highway department, perhaps an agency operating in the interests of the handicapped.



## OPERATING POLICIES AND PROCEDURES

### Management

Most states use highway department personnel to manage rest areas. Usually, these personnel are part of the highway department's maintenance organization and are generally administratively responsible to an area or district office that may have several rest areas under its jurisdiction. A custodian may be responsible for the management of all operations in a rest area, or he may be advised to request the services of specialists or special units if needed. For instance, mowing operations in a rest area may be the responsibility of a highway department mowing crew assigned to a roadway section that includes the rest area.

In most states, rest areas on low-ADT highways are staffed on a one-man, one-shift day basis (say 8 AM to 5 PM). Additional personnel and equipment may be assigned on weekends or during special periods. In a few states, larger rest areas are being manned on overlapping shifts totaling 16 hr, or on a 24-hr basis. The 24-hr basis seems to be a growing tendency. Where rest areas are manned on less than a 24-hr basis, the toilet buildings usually are kept open all night.

Many states have developed and are using, or are preparing for use, guidelines, manuals, or handbooks relating to the operation and management of roadsides, including rest areas. These materials, of necessity, reflect a state's policies, procedures, and regulations and vary from state to state. HRB Committee A3D03 has drafted a section on rest areas for a maintenance manual that is expected to be published by AASHO in the near future.

### Buildings

Daily work requirements for rest area buildings include washing; cleaning; mopping; sanitizing; polishing; replacing light bulbs and tubes; and resupplying towels and toilet tissue, soap, maps, and other information materials. All or any of these operations may be performed more than one time daily.

Because most custodians are men, the cleaning of women's toilets can be a problem. This may be resolved by assigning a woman to a rest area work unit, by setting up a temporary toilet facility nearby, or by providing two sets of women's toilets (as one state is doing).

Vandalism is not considered to be a major problem. It is less frequent and extensive when a uniformed attendant is present and where vandal-resistant fixtures are used. Three states (California, Iowa, Texas) reported vandalism to be greater near metropolitan areas; three states (Florida, Illinois, North Carolina), greater in rural areas.

California reported that vandalism costs the state about \$300 per rest area per year.

### Grounds

Pickup and cleanup may be required frequently for reasons of sanitation, insect control, public health regulations, and heavy use. It may consist of picking up waste materials from picnic areas, walks and paths, parking areas, roadways, and pet exercise areas.



Figure 30. Internal signing.

Where irrigation systems are used in rest areas, they generally are automated and are operated at night. They also may be designed for manual operation by a custodian during his duty period at times when visitor use is low.

Operation of lighting for nighttime visibility and safety (Fig. 31) may be manual or automatic (light sensors). Alarm systems may be fully automated and connected to a custodian's office or residence or to a highway patrol system or local police agency.

It is desirable that the custodian or manager make frequent checks of the grounds to deter vandalism, ensure proper use of the facilities, and make sure that pets are on leashes.

### Utilities

Utility systems (water supply, sewage treatment, power supply) are designed to require little operational attention. Today, most utility systems are highly automated, with clocks or timers, thermostats, sensors, and other activating devices.

Most states now are using, or are preparing for use, manuals or handbooks relating to operation and maintenance of utilities. In many instances, the manufacturers





Figure 31. Rest area at night (Pennsylvania).

of products or systems have prepared and issued manuals relating to the use and care of their products or systems.

In some states, law requires that a wastewater treatment system be operated and maintained by a licensed operator, either under contract or as a state employee. Periodic training courses are conducted by state agencies to qualify operators. Because of the increasing concern and need for pollution control, other states may be required to regulate the operation and maintenance of utility systems, particularly sewage treatment plants.

#### Trash Collection and Disposal

Most states report that trash containers are positioned above ground. A few use a container with the lid placed at ground level, and report no special problems relative to spill, cleanup, or collection. In California, the trash container is made of reinforced concrete and is the same color and surface texture as the concrete used in toilet buildings and other structures. Nearly all states report the use of plastic liners for trash containers. Virginia rest area trash collection and handling equipment is shown in Figure 32.

Many states now use off-site landfill disposal areas for trash. Iowa at one time used on-site incinerators, but found them to be difficult to operate and expensive to maintain. Odor and ash pollution were problems on windy days. Others continue to use incinerators in some areas. In Illinois, the preference is for landfill on the basis of lower cost: \$1.50 per ton (\$1.65/1,000 kg) versus \$15.00 per ton (\$16.50/1,000 kg) for incineration.

Trash collections are managed under several methods. Pickup may be by state highway department personnel (custodian, unit, or special crew) or by contract with payment by cubic yard, truck load, mileage of haul, or lump sum per contract period. Weekend or special-period trash collections may be handled by using additional men and trucks, by giving overtime pay to regular crews, by overlapping weekend or special-period labor shifts, or by some combination of these.

#### Overnight Parking

In most states, rest area policy does not permit overnight parking and/or camping. Usually, parking is limited to a specified number of hours. This control has proven to be difficult to supervise and to enforce. Some states do permit overnight parking (drivers and others may sleep in cars, trailers, trucks) but do not permit tents or tent campers on rest area grounds. A few states, however, do permit overnight parking and camping. Surveillance of a rest area and the enforcement of regulations for its use in any given state may be the responsibility of the custodian while he is on duty and the state police at other times.

#### PERSONNEL

In most states, a custodian or a custodial crew is assigned to operate one rest area, or sometimes a pair of rest areas, depending on traffic volume, visitor use, and proximity of the pair to each other.

A custodian, as a state employee hired in accordance with a state's rules and regulations, is subject to the state's administrative controls for conduct, penalties, and benefits.

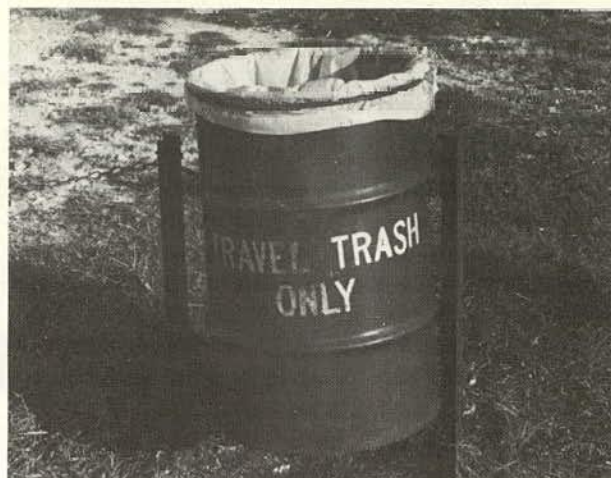
In most states, he is not required to have had previous training or experience for his job as custodian; however, in a few states special training and a license is required to operate a wastewater treatment system. For the most part, he receives his training on the job, although some states conduct classes offering instruction in his field. All costs for classes or special instruction are borne by the state. Usually, he is expected to administer all phases of rest area operations (grounds, buildings, utilities, public relations). Most states have prepared manuals or handbooks for the use of custodians.

Some states have special highway crews to handle such work items as mowing, snow removal, and storm damage repair on a routine basis. One eastern state has a special crew that handles only tree pruning, selective thinning and cutting, and brush disposal. Where special crews take care of some items of work, the custodian may spend most of

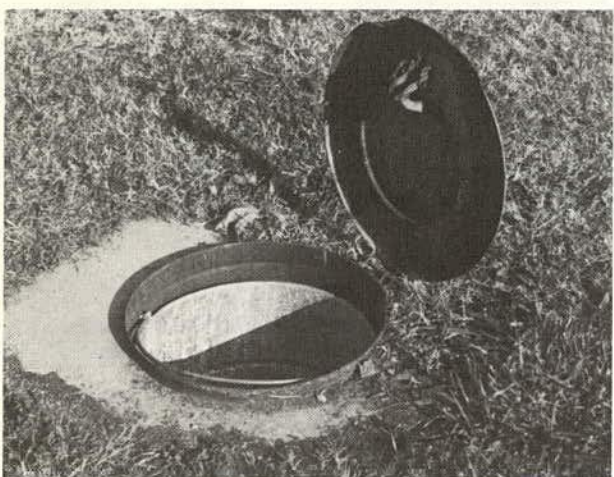




a. Pitch In Collection Can



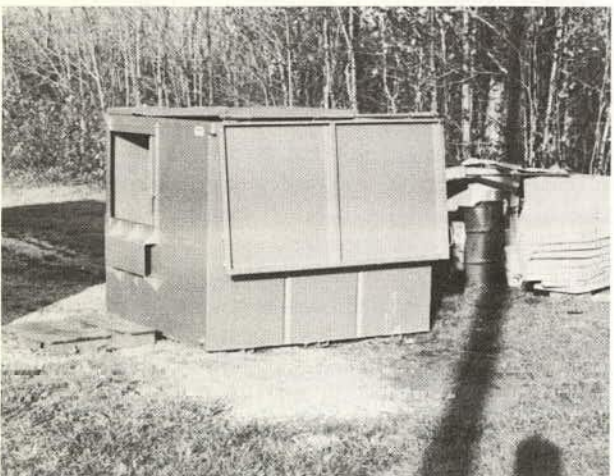
b. Trash Drum with Plastic Liner



c. Underground Collection Can



d. Pick-up Cart with Plastic-Lined Boxes



e. Trash Container



f. Holding and Incineration Area

Figure 32. Trash and litter collection and disposal devices (Virginia).

his time on routine housekeeping chores in the buildings and on the grounds.

In many states, the custodian wears a uniform that is consistent in style and color throughout the state. Most uniforms have shoulder patches that further identify the work unit. A few permit, or even require, the use of name tags to be worn on shirts or jackets. All custodians are expected to conform to a state's code for appearance, deportment, and performance.

The tendency in most states is to require uniforms for custodians. This identification provides secondary benefits by tending to direct a traveler to a recognizable rest area employee, who may be an information source, and by tending to reduce vandalism during the custodian's duty hours.

### **EQUIPMENT**

In most states, a rest area custodian or crew functions both for operation and maintenance. Equipment and material needed for normal operational purposes may serve for maintenance as well. If a vehicle is provided, usually it is a pickup truck. This may be used to carry mowers, snow-blowers, and other grounds maintenance tools and equipment in those cases where a pair of rest areas is under one custodian or crew; it may be used for trash collection; or it may be used to carry supplies and equipment for utilities and other operations.

Occasionally, special equipment may be required for trash collection and disposal operations. This could, for example, include truck-mounted hoists for lifting and dumping trash containers, or incinerators where these are used for trash disposal.

### **OPERATING COST**

Only limited data are available on the actual costs incurred in operation of rest areas. In one eastern state, traffic counts and other statistics have been kept on an Interstate rest area operating on a 24-hr basis. During five weeks of traffic counting, 37,600 cars stopped at the rest area. Using a basis of three persons per car, approximately 113,000 persons used the rest area during the five-week period. The total annual cost of operating and maintaining the rest area on a 24-hr basis was \$70,000. Projecting these statistics reveals that it costs about \$0.18 per vehicle or \$0.06 per person for the use of the rest area.

In a western state, the annual cost for operation and maintenance of rest areas in moderate-use is \$30,000 to \$40,000, and \$50,000 in high-use areas. These costs are for double rest areas, manned from 8 to 16 hr daily.

### **WELCOME CENTERS**

Welcome centers operate under a number of management systems. The facility may be designed by a consultant, built with private capital, and operated by a private concern under a lease agreement with the state. It may be designed by a consultant, built with state funds, and operated by a private concern, the highway department, or some other

state agency. Or, it may be designed and built by the state, and operated by a private concern, the state highway department, or some other state agency.

The strong preference is for the facility to be designed by a consultant, built with state funds, and operated by a state agency other than the state highway department. Operation by private concerns has had mixed success. In one midwestern state, a private concern went bankrupt. In a number of states in widely separated regions, one private concern of national scope is operating with some success. In most states where operations are conducted by a state highway agency or some other state department, only limited experience or knowledge has been acquired as yet relating to problems, costs, and the success of services rendered.

The primary and almost singular purpose of welcome center personnel is to provide information relating to services, accommodations, special events, travel routes, and destinations that may be local, regional, or national in nature. Most welcome center personnel wear identifying uniforms and patches, sometimes name tags. All personnel are expected to be presentable, attentive, courteous, and well informed. Because most welcome centers are located at or near state boundaries, a welcome center attendant often is a traveler's first contact with a state's personnel. It is important to a state that a good "image" and good public relations be established at this first meeting.

Welcome centers usually are operated on a one-shift basis (say 8 AM to 5 PM) by a staff that may number from one to six. Racks containing maps and informational folders may be placed outside the building for visitor use after closing hours.

### **MULTIPLE-USE PARTICIPATION**

In those states where multiple use of a rest area and adjoining public land is permitted and facilities are provided, definite agreements are reached relating to required operations. Generally, under multiple use, the rest area is operated by a custodian of the state highway department, a welcome center (if one is provided) by an agency other than the state highway department, and the adjacent land by personnel of the agency or agencies having jurisdiction of that land.

Occasionally, the operating responsibilities for a rest area in multiple use may be interrelated. In one eastern state, an Interstate combination welcome center-rest area has been developed with full facilities. The information counter of the welcome center is operated by a local historical association with salaries and maintenance costs shared by the historical association and the state natural resources department; the remainder of the operating and maintenance costs of the building and of all utilities is borne by the state highway department. Sometimes, surveillance of a multiple-use area for safety and protection purposes may be provided by agreement with local and/or state police units.

Where feasible and economical, an agreement may be made for a state highway department to operate a multiple-

use facility on adjacent public lands with its own rest area operations. The reverse may be true if work units other than those of the state highway department can provide some operational services to an adjacent rest area. There

are in use today many types of interagency agreements relating to the operation and management of multiple-use facilities between public agencies at all levels of government.

## CHAPTER FOUR

# MAINTENANCE

Operation and maintenance activities and requirements for rest areas are interrelated and interdependent. Most often, both functions are performed by the same person or crew. A successful operation depends on the satisfactory and continuous maintenance of all facilities. Most states are giving considerable attention to the problem and requirements of maintenance at the design stage of rest area development.

## MAINTENANCE POLICIES AND PROCEDURES

In most states, routine maintenance of all facilities in a rest area is the responsibility of a custodian or crew assigned to one or a pair of rest areas. Supervision usually is vested in the state highway department. At times, maintenance may be separated by facility groups (grounds, buildings, utilities) and be assigned to special crews on an area or district basis.

In some states, some phases of maintenance are performed by agreement with others or by contract with private businesses. Some states are trying a plan whereby all maintenance is performed under contract.

In some states, grounds maintenance is performed under an agreement with a nonprofit organization known as Green Thumb. This is an organization sponsoring employment of older, retired farmers, gardeners, nurserymen, or handymen who are looking for occasional employment to supplement low retirement incomes. They have proved that with very little training and supervision they can provide limited maintenance service in rest areas.

Most rest area maintenance is provided on a one-shift basis (say 8 AM to 5 PM). However, some personnel may be kept on a standby basis for quick availability in cases of emergency.

## PERSONNEL

In most states, the responsibilities of maintenance personnel are limited to a single rest area, or a pair of rest areas, as assigned. Personnel could consist of one person or a crew; in most instances, employees of the state highway department. Usually, they require little or no previous training or experience as a prerequisite for the job, and

are trained on the job or are given instruction in classes conducted by the state highway department. Their training and instruction may cover all general phases of rest area maintenance. For problems of a special nature, highway department special crews may be called upon. For example, a crew trained for drainage structure maintenance and repairs may be assigned to perform its services for a specific highway area or district, including those needed in rest areas. Another crew may take care of all roadside mowing in an area or district, including the mowing needed in rest areas.

In many states, maintenance personnel assigned to rest areas wear identifying uniforms, usually with shoulder patches, and sometimes with name tags.

## EQUIPMENT AND SUPPLIES

Some states provide certain items of equipment for use at each rest area or pair of rest areas and require that basic maintenance be performed by the custodian or crew for that rest area or areas. This equipment may consist of pickup trucks, mowing machines, snowblowers, backup units for utility systems (generators, motors, pumps, etc.), general and special tools and tool kits, chemicals, water treatment cells, instruments, spare parts, general supplies, etc. Care and maintenance of supplies and equipment are provided in a storage room or building on the rest area site.

## BUILDINGS

In most states, routine rest area toilet building maintenance is provided by the state highway department custodian or crew assigned to that rest area or pair of rest areas. Most routine maintenance consists of replacement of window glass and screens, painting, touch-up painting, and repairs or replacement of fixtures. This work is done as needed during daytime duty hours, or it may be scheduled for periods of low visitation or at night.

If a toilet building must be closed for repairs, reconstruction or expansion, temporary facilities may be set up on the rest area site or, as a last resort, the traveler may be directed to use the next nearest rest area ahead.

If problems are encountered that require the services

of electricians, plumbers, carpenters, or other skilled tradesmen, they may be requested as needed and provided by the state highway department or other agencies, or hired under contract. Major work items may be scheduled and budgeted for periodic routine maintenance (painting, cleaning, spraying for insect control, etc.) and performed by special state highway department units or crews, or by contract.

### UTILITIES

In most states, routine maintenance of rest area utility systems (water, sewage, electrical) may be performed by a custodian or a work crew. Special or major maintenance may be provided as needed or scheduled by state highway department units or crews operating on an area or district basis, or by specialists requested as needed or hired under contract.

The clean-out of septic tanks and recreational vehicle holding tanks may be considered as special or periodic maintenance and may be performed by special crews and equipment, either state-employed or by contract.

Although some damage to utilities may be due to natural causes (lightning strikes on buildings and power supplies), most is caused by vandalism or carelessness. The plugging of drains in toilets and lavatories is the greatest single problem. At times, maintenance is needed because the operation or care of a utility system has not been fully learned or understood by a custodian. Devices, fixtures, or systems that have been designed to be as simple, carefree, and vandal-resistant as possible can reduce maintenance and costs significantly.

Maintenance problems and costs can be reduced with a standardized water supply and treatment system. Where all of the rest areas in a state have identical water supply systems, operation and maintenance procedures will be identical, thus lowering costs.

### LANDSCAPE MAINTENANCE

In most rest areas, routine grounds maintenance is performed by state highway department personnel. It may include minor pruning, cultivating, and watering of small trees and shrubs; spot seeding, reseeding or sodding; planting and/or removal of small plants; or maintenance of an irrigation system for trees, shrubs, and lawns. A few states maintain their own nurseries; some have arrangements to use plant materials from other state-owned or state-managed nurseries. Some states contract for plants, planting, and maintenance, and get a guarantee for plant replacement and planting. One state contracts for plants and planting but does its own maintenance after planting, thus requesting no guarantee but reducing costs. Another state buys the plant materials but does its own planting and maintenance; no guarantee of plant survival is required from the nursery and costs are further reduced.

If the services of specialists (plant pathologists, horticulturists, agronomists, etc.) are required, they may be requested by the state highway department from other state

or public agencies or universities, or may be hired by contract.

Usually, no rest area is closed if major landscaping work is in progress. If necessary, temporary facilities may be provided for walks, paths, and picnicking.

### PAVEMENTS AND WALKS

The maintenance of pavements and walks is of primary importance in that the movement of vehicles and persons constitutes a rest area's greatest activity. Traffic lanes, ramps, roadways, shoulders, drainage systems, parking areas, walks, and paths require routine maintenance on a periodic and scheduled basis. Work items such as resurfacing, repairing, redressing, and cleaning are programmed and budgeted in advance of actual needs. Special maintenance may consist of repairs and cleanup following storms, accidents, etc.

In most states, major work items are performed by state highway department special units or crews that work on an area or district basis. They provide service for all roadways and associated facilities, including rest areas, within their assigned area or district. Work items that are relatively minor in extent and complexity may be given maintenance service by a custodian or crew assigned specifically to one rest area or a pair of rest areas.

### OTHER FACILITIES

Picnic tables and benches, shelters, drinking fountains, grills and fireplaces, trash collectors, incinerators, bulletin stands, and other facilities may be maintained by a rest area custodian if only routine service is required. If major repair or other work is needed, it may be performed as needed or scheduled by state highway department crews or by contract.

A considerable work load may result from damage caused by acts of vandalism or the carelessness of individuals. Damage also may result from natural causes.

### MULTIPLE-USE FACILITIES

Where all multiple-use facilities are within a rest area right-of-way or scenic strip administered by a state highway department, maintenance usually is performed by the state highway department. However, agreements may be reached whereby some maintenance may be performed by agencies other than the highway department. In one state, it has been agreed that all rest areas will be maintained by the counties in which they are located.

Where multiple-use facilities occupy adjacent public land areas and are accessible from a rest area, the jurisdictional agency usually operates and maintains its own facilities or makes arrangements for necessary services.

Where it may be feasible and economical, agreements have been reached whereby one agency provides maintenance service for the facilities of another agency. For example, an agency having a major system of roads, parking areas, walks, buildings, utilities, and other facilities (picnicking, boat launching, fishing, swimming, hiking,



etc.) and the necessary personnel and equipment for its needs may be able to provide a service to a nearby agency having a smaller system of facilities, where a separate maintenance organization would not be economical. Such

an arrangement yields a saving in costs to both agencies.

In all instances, carefully worked-out interagency agreements describe the degree and extent of participation and collaboration in maintenance services and costs.

## CHAPTER FIVE

# CONCLUSIONS AND RESEARCH RECOMMENDATIONS

## CONCLUSIONS

Rest areas on Interstate and other limited-access highways are serving highway traveler needs and are considered to be an integral element of a modern facility. This is supported by the responses to a questionnaire (Appendix B), by field interviews with highway officials and rest area users, and by the issuance of guidelines and directives by the states, AASHO, and FHWA.

### Planning and Funding

Nearly all states have a master plan for rest area development, and almost all have programs in progress. Most states are well advanced in the development of rest areas, although a few are just getting under way. In three states, the District of Columbia, and Puerto Rico, no Interstate rest areas will be constructed.

Federal participation for planning, designing, and constructing rest areas is available from Federal-Aid and Highway Beautification funds. Some states are having difficulty obtaining the required matching funds from their legislatures or are reluctant to use them for rest area purposes.

### Spacing and Site Selection

There is general acceptance of the 30- to 50-mile (48 to 80 km) spacing for rest areas. Most agencies attempt to locate rest areas in attractive surroundings, often with an eye-appealing view. There are sites where acquisition of additional land is desirable to provide buffer zones or insulation for recreational purposes, or for expansion. Rest areas usually are not objectionable to the adjoining communities and do not present any major adverse effect on the environment. Some agencies are scheduling every second or third rest area for construction now and will build the remaining ones as funds are available.

At each proposed site, an investigation should be made to determine if an acceptable water supply is available and a satisfactory sewage disposal system can be installed before final site selection is made and land is procured. This may require drilling of test wells in some locations.

## Design

It generally is desirable for the state to develop the rest area site plan and, whenever practical, to include the clearing, grading, drainage, and paving work in the roadway contract. There are several workable approaches that may be used in the design of the rest area buildings. They may be designed individually, or a standard design may be used. Even where the building exteriors are different, the interiors can follow a standard plan, thus facilitating operation and maintenance.

The following factors need to be considered during the design of rest areas (see also Appendix C):

- Total volume of traffic on the highway.
- Percent of traffic stopping at the rest area.
- Mix of cars, trucks, and recreational vehicles.
- Number of persons per vehicle.
- Average length of stop.
- Facilities used.
- Amount of water required for each user.

These factors affect the size of parking area, the size and allocation of spaces for various vehicles, the size and facilities in the toilet building, the need for picnic tables and shelters, the quantity of water required, and the capacity of the wastewater treatment system.

Limited experience indicates that each stopping vehicle will have about three people, stop from 20 to 30 min, and use from 3 to 5 gal (11 to 19 l) of water per person.

There is little if any cost saving obtained by using cheaper interior wall and floor construction. Ceramic tiles for walls and floors are preferable to paint and plain concrete.

Paper towels are not satisfactory for rest area use; electric (air) hand dryers or roll cloth towels are more satisfactory.

Modification of standard toilet stalls for use of the handicapped is not satisfactory. These stalls should be much larger and equipped with large doors.

Automatic cutoff faucets help to conserve water. Recessed fixtures (such as hand dryers and liquid soap dispensers) are less likely to suffer from vandalism.

Water supply and sewage treatment systems should be simple to operate, and have automatic signals to warn of malfunction or breakdown. The design should include adequate space for performing maintenance and replacement or repairs. Standardization of water treatment and sewage treatment systems simplifies operational and maintenance procedures and reduces costs.

A decision should be reached on whether to provide for the discharge of recreational vehicle holding tanks before designing the rest area sewage treatment system. Factors that should be considered are:

- Tendency for recreational vehicles to discharge holding tank contents directly into streams or on the right-of-way.
- Availability of alternate facilities.
- Anticipated demand for facilities.
- Increased capacity requirements for treatment system.

One of the advance guide signs for a rest area also should indicate the distance to the next rest area (Fig. 29).

It is desirable to have truck parking at the rear of the rest area to facilitate merging with other rest area traffic and to avoid blocking the view of the rest area from the roadway by police. Angle pull-through parking is usually more desirable for trucks and recreation vehicles.

The outer limits of a rest area should be fenced to prevent trespassing.

#### Operations and Maintenance

It is difficult to separate rest area functions into either operations or maintenance. This is especially true because it is usually highway agency maintenance employees that perform both functions. Generally, the day-to-day cleaning and resupply are considered operations; mowing, painting, and repair work are considered maintenance.

It is good practice for a state to publish policies, procedures, and specific requirements for rest area operations and maintenance in agency handbooks or manuals.

There are numerous advantages to having the custodians wear uniforms. Among these are increased assistance to the public, improved public relations, and a reduction in vandalism.

The highway patrol and local enforcement agencies can handle problem situations and should be encouraged to check the rest area frequently, particularly at night.

Clean rest areas and well-maintained grounds and buildings are what the public expects. The challenge to management is to provide this level of service at the lowest possible cost.

Most states note rest areas on their official highway maps. Standard symbols and also strip inserts as shown in Figure 33 would be helpful to the traveling public.

#### RESEARCH RECOMMENDATIONS

A few agencies currently are engaged in research into rest area design, operation, and maintenance. These are identified in Table 3. It is readily acknowledged that this is not a comprehensive list and that productive research may be in initial or continuing stages in highway agencies, universities, and other research-oriented agencies.

Much knowledge and technical information on the treatment of septic waste is available; however, it is apparent that the total impact of the 1972 Water Quality Act on the design and operation of rest area treatment systems is not known. Generally, it is believed that the present state of the art will enable the 1977 standards to be met at most rest areas in operation or under development. There is serious concern about meeting the standards proposed for 1983. If the 1983 standards are to be met, specific infor-

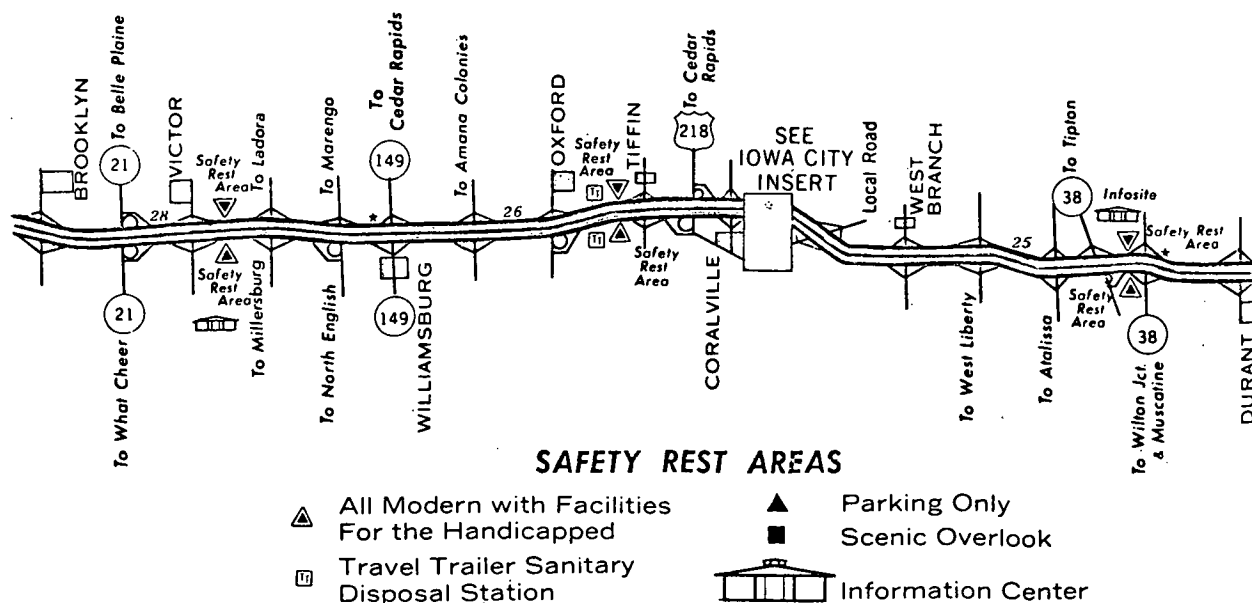


Figure 33. Interstate strip map showing rest areas.



TABLE 3  
SUMMARY OF KNOWN RESEARCH ACTIVITIES RELATED TO REST AREAS<sup>a</sup>

RESEARCH PROJECT TITLE	RESEARCH PROJECT	HRIP NO. <sup>b</sup>
Minimum Water Supply for Rest Areas	Alabama State Highway Department	24 086886
Treatment of Sanitary Wastes at Interstate Rest Areas	Purdue & Indiana State Highway Comm. JHRP	24 221365
Rest Area Waste Water Treatment and Disposal	University of Illinois	24 226012
Establishment of Roadside Rest Area Water Supply, Water Carriage, and Solid Waste Requirements	West Virginia University	24 228801

<sup>a</sup> As of July 1973. <sup>b</sup> Aquisition number assigned by the Highway Research Information Service of the Highway Research Board; HRIP = publication entitled *Highway Research in Progress* (current issue).

mation is needed immediately to identify the types of systems that will be satisfactory.

It is recommended that up-to-date manuals or handbooks be prepared on rest area design, operations, and maintenance. Examples of ongoing efforts are: the AASHO maintenance manual, which will include a section on rest areas; the "Water Supply and Waste Disposal Series" prepared by the FHWA Environmental Control Group in the Office of Research (only Vols. 1 and 6 have been issued; other volumes will be revised to reflect the 1977 and 1983 standard requirements); and "Guidelines" prepared by the Hydraulics Branch, Office of Engineering, FHWA. These handbooks and guides will require modification by the individual state to meet geographic, climatic, and other conditions.

Although there is a great deal of communication and coordination among the states, FHWA, AASHO, and HRB, improvement is needed in communication between these organizations and others, such as the Environmental Protection Agency, state and local public health and environmental agencies, etc., whose responsibilities affect the design and operation of rest areas. There also should be efforts to be aware of research being performed and information and equipment available relating to new principles and techniques in the field of water and sewage treatment for housing developments, commerce, and industry; for example, reverse osmosis, and the treatment of sewage by physio-chemical and thermo-chemical processes rather than biological processes.

There is a lack of data concerning the use of rest areas. It is recommended that the states take steps to gather data on the numbers and types of vehicles stopping at a rest area (including the number of persons per vehicle) in relation to:

- The total highway traffic.
- Types of traffic (recreation, tourist, commercial, etc.).
- Location of rest area (rural or urban).
- Distance to other services.

- Distance from major origin/destination points.
- Distance to major commercial or recreational attractions.
- Time of year, day of week, and time of day.
- Peak travel periods (e.g., holiday weekends).

Data also are needed on the percentage of people using the various facilities provided.

Research is needed on the maximum number of parking spaces that can be provided at a rest area before the facility becomes too large for efficient operation.

Another recommendation is to conduct research on the nighttime use of rest area facilities and on the effect this use could have on future rest area design, operation, and maintenance. At some rest areas near cities or centers of commerce and industry, truck drivers schedule overnight stops before delivering or picking up cargoes the next morning. Thus, the truck parking spaces at rest areas serve to some degree as a motel. In some states, overnight parking and camping either is permitted or condoned. If these are trends, some changes in operational policies may be necessary.

Research is recommended on the need to provide additional motorist services in rest areas on Interstate and other limited-access highways. These services might include fuel and other automotive supplies, food and drink, and limited facilities for recreation. Some of these services already are being provided on toll highways. If the need is found to be significant, some changes in state and federal legislation may be in order.

There are a variety of practices in regard to advance signing for a rest area. All states provide a one-mile advance notice and many also provide a sign two miles from the rest area. Additional advance signs are sometimes used and are desirable. In view of the current trend to symbolic signing, a standard symbol should be designed that would indicate a modern rest area as distinguished from the symbol presently used for a roadside picnic table.

## APPENDIX A

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# APPENDIX B

## SUMMARY TABULATION OF REST AREA DATA, BY STATE

		Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Minnesota	Mississippi	Missouri	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	N. Carolina	N. Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	S. Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming		
Design Criteria																																														
Arch'l Style Buildings	One Style-Statewide	x							x																		x							x												
	Individually Styled		x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Floor Plans	One Plan-Statewide	x						x	x						x			x			x	x		x	x				x							x	x	x	x	x	x	x	x	x	x	x
	Varied Plans		x	x	x	x				x	x	x	x		x	x		x	x		x	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	Expandible Plan	x		x	x			x	x		x	x		x	x	x		x						x	x		x	x	x	x	x	x	x	x		x	x		x	x		x	x	x	x	
Existing Guidelines (AASHO/FHWA) Adequate	Yes																				x		x	x				x	x							x	x			x			x			
	No	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x				x	x	x	x	x	x	x	x	x			x	x		x	x		x	x		
Need to Provide Food-Drink Services	Yes	x			x		x	x	x		x		x		x		x		x			x														x	x			x			x			
	No		x	x							x		x		x		x	x						x	x	x	x	x	x	x	x	x	x		x		x	x		x	x		x	x		
Site and Facilities	Should Be Larger			x	x	x		x		x	x	x		x	x	x		x			x				x	x		x								x			x			x	x	x		
	More Closely Spaced							x		x		x		x	x		x	x	x															x				x				x		x		
Acres in Smaller Site		15	10	4/5	3/5	2	20	5	10	3	6	7	12	15	3	2	2	10/12	12	1	6/8	8	7	4	5/7	10	8		4/5	3/5		5	10	9	8	4	6/12	5	2	10	8	10	10			
Acres in Larger Site		60	30	8/10	25	30	40	55/202	40	20	54	21	90	25	20	12	120	35/40	30/35	10	12/20	40	25	10/40	40	25	15	25/30	8/9	8/12	20/25	24	20	36	78	15	12/18	23	15	15	50	25	25			
Spacing (Miles apart)		25	36	50	30	55		30	35		30/70	50	42	25/35	33	30/35	30	30		42		50	35/40	30		30	25	25/35	30/40	35	30	25/35	35	30	39		35	50	30	30	30	30	45			
Parking																																														
Cars	Front of Building			x	x	x	x								x									x	x					x	x												x	x		
	Back of Building			x	x	x	x																																							
Trucks	Front of Building			x	x	x	x								x									x	x					x	x													x	x	
	Back of Building			x	x	x	x																																							
Cars/Trucks	No Fixed Location	x	x					x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Spaces (%)	Cars	75	67/80	65	60	65	75	80	k/	k/	65	67	65	75	90	70	n/			67	60	67	k/	80	k/	80	75	k/	66	75	65	60	80	80	70	80	70	80	k/	n/	73	80	75			
	Trucks	25	33/20	35	40	35	25	20	k/	k/	35	33	35	25	10	30				33	40	33	k/	20	k/	20	25	k/	34	25	35	40	20	20	30	20	30	20	k/	n/	27	20	25			
Overnight Parking Permitted			x	x			x			x	x		x	x							x		x		x	x	x		x	x	x												x	x		
Overnight Camping Permitted							x								x														x																	
Facilities for Recreational Vehicles																																														
Provided		x	x		x	x	x		x	x	x		x	x	x	x		x			x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Not Provided				x				x					x					x			x	x		x	x				x	x	x	x			x	x	x		x	x	x		x	x	x	

		Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Minnesota	Mississippi	Missouri	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	N. Carolina	N. Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	S. Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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	Telephones	x	x	x	x			x	x	x		x			x		x	x		x	x	x		x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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	Rest Area-Welcome Center Personnel	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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	Deep Wells	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
	Municipal Systems	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x		x	x		x	x	x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	Other Systems		e/		e/	e/	h/				j/						e/								h/																					j/		e/																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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	Package Plants		x	x	x	x		x	x					x		x	x	x		x		x	x		x							x		x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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	Septic Tank-Leach Field	x	x	x	x	x	x			x						x				x	x	x	x	x		x	x	x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						



		Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Minnesota	Mississippi	Missouri	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	N. Carolina	N. Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	S. Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming					
Operational Personnel																																																	
State Highway Department		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
Other State Agency					g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/		
Contract											x														g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/	g/		g/	g/	g/	g/	g/	g/	g/	g/	g/			
Uniforms Required		x	x						x	x		x	x	x	x		x	x		x		x			x							x					x	x						x	x				
Previous Qualifications Required			x				x				x		x	x											x		x	x										x			x				x	x	x		
On-job Training Provided		x		x			x		x	x		x	x	x		x		x				x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x			
Manuals in Use					x				x							x	x	x		x		x	x		x	x						x	x				x			x	x			x	x	x			
Manuals Being Prepared		x										x									x				x	x						x	x				x			x	x			x	x				
Need for AASHO-FHWA Manuals		x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x		x	x	x	x	x	x			x	x	x	x		x	x	x	x	x	x	x	x	x		
Contract vs. State Maintenance																																																	
Grounds	Contract							x				x	x	x							x	x	x						x	x				x		x	x	x	x				x	x	x		x		
	State Maintenance	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x		x	x		
Toilet Buildings	Contract		x	x				x		x		x	x		x	x		x	x	x	x	x					x	x	x		x						x	x	x				x		x	x	x		
	State Maintenance	x	x	x	x	x			x		x		x	x	x		x								x	x	x	x		x	x		x	x	x	x				x	x	x	x	x		x	x		
Utilities	Contract							x				x	x			x		x	x		x	x					x	x			x					x	x	x				x		x		x			
	State Maintenance	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x							x	x	x	x	x		x	x	x	x	x	x	x				x	x	x		x	x	x		
Welcome Centers	Contract			x				x	x							x		x			x	x	x					x		x	x						x	x	x				x	x		x	x	x	
	State Maintenance	x		x					x		x	x	x					x	x						x	x	x		x											x	x			x					
Vandalism																																																	
Major Problem			x	x		x					x		x				x													x						x			x				x		x	x			
Minor Problem		x			x			x	x	x		x		x	x					x	x			x	x	x	x		x									x			x	x				x	x		

# NOTES

- a/ Blank spaces indicate "No", "None", not applicable, or no response.
- b/ Alaska, Delaware, Hawaii and the District of Columbia do not have any rest areas nor are any planned.
- c/ Rhode Island has no rest areas in operation; however, two are under construction.
- d/ No response received from Michigan, Montana, South Carolina, or Puerto Rico.

- e/ Surface water collection.
- f/ Garbage packers.
- g/ State police.
- h/ Shallow wells.
- i/ Visitor information being collected and evaluated.
- j/ Springs.

- k/ Determined by percentage of ADT.
- l/ Taped and filmed events for official and public use.
- m/ Pit toilets.
- n/ Varies according to site.
- p/ Physical, chemical and combustion processes.
- q/ Pit toilets and trucking to municipal disposal areas.

## APPENDIX C

### REST AREA DESIGN GUIDE

#### OREGON STATE DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

#### DESIGN GUIDE FOR INTERSTATE SAFETY REST AREAS

NAME OF REST AREA \_\_\_\_\_

HIGHWAY \_\_\_\_\_ M.P. \_\_\_\_\_ COUNTY \_\_\_\_\_ DATE \_\_\_\_\_

#### I Traffic Data

A = 20 year ADT  
19 \_\_\_\_\_ = \_\_\_\_\_ x \_\_\_\_\_ (Seasonal factor) = \_\_\_\_\_

B = Peak hour directional traffic = A \_\_\_\_\_ x K \_\_\_\_\_ x D \_\_\_\_\_ = \_\_\_\_\_

Where K = Ratio of design hourly volume to ADT (0.135)

D = Directional distribution of design hourly volume (0.6)

C = Vehicles stopping peak hour = B \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_

The percentage of vehicle stopping in rest areas varies from about 5 percent to about 13 percent, depending upon location. For example,

1. Near commercial or recreational facilities,  $C = B \times 0.05$
2. Typical rural area,  $C = B \times 0.09$
3. In an isolated area, with no nearby commercial or recreational facilities,  $C = B \times 0.13$

#### II Parking Requirements

M = Total parking spaces =  $C \times 0.5 =$  \_\_\_\_\_

N = Car parking spaces =  $M \times 0.7 =$  \_\_\_\_\_

O = Truck parking spaces =  $M - N =$  \_\_\_\_\_

#### III Comfort Facilities

P = Persons/hour using facilities =  $C \times 2.25 =$  \_\_\_\_\_

The factor 2.25 is derived by multiplying the average vehicle occupancy (3.0) by the ratio of persons using comfort facilities (0.75)

Q = Number of persons using men's facility =  $P \times 0.5 =$  \_\_\_\_\_

R = Number of persons using women's facility =  $P \times 0.5 =$  \_\_\_\_\_

The required facilities may be determined by entering the value for persons/hour into the following table:

Persons/hour using rest room during design hours (Q)	Number of facilities - men's room				
	Urinals	Toilets	Wash basins	Hand dryers	
				Paper towels	Air or dryers
0-105	2	2	2	2	2
105-225	3	3	4	3	4
225-315	4	4	5	4	6
315-375	5	4	5	4	7
375-435	7	4	5	5	7
435-500	9	5	7	5	8
Persons/hour using rest room during design hours (R)	Number of facilities - women's room				
	Toilets	Wash basins	Hand dryers		
			Paper towels	Air or dryers	
0-105	4	3	2	2	
105-225	6	4	3	4	
225-315	9	6	4	6	
315-375	10	6	4	7	
375-435	12	8	5	7	
435-500	14	8	5	8	

#### IV Other Facilities

S = Picnic tables (includes shelters w/tables) =  $M \times 0.4 =$  \_\_\_\_\_

(Factor of 0.3 to 0.5 may be used where local conditions so dictate)

T = Litter receptacles =  $M \times 0.3 =$  \_\_\_\_\_

(Factor of 0.2 to 0.4 may be used where local conditions so dictate)

U = Drinking fountains =  $M \times 0.1 =$  \_\_\_\_\_



**NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM**

are available from:

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National Academy of Sciences  
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*Rep.*  
*No. Title*

- \* A Critical Review of Literature Treating Methods of Identifying Aggregates Subject to Destructive Volume Change When Frozen in Concrete and a Proposed Program of Research—Intermediate Report (Proj. 4-3(2)), 81 p., \$1.80
- 1 Evaluation of Methods of Replacement of Deteriorated Concrete in Structures (Proj. 6-8), 56 p., \$2.80
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