INTERIM REPORT

NEEDS AND FINANCE

FOR THE

NEW JERSEY STATE HIGHWAY SYSTEM

Wilbur Smith and Associates

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PREPARED FOR

New Jersey Department of Transportation
in cooperation with
U. S. Department of Commerce
Bureau of Public Roads

by

Wilbur Smith and Associates

December, 1966

Wilbur Smith and Associates, Inc.

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December 28, 1966

Mr. David J. Goldberg, Commissioner
New Jersey Department of Transportation
1035 Parkway Avenue
Trenton, New Jersey

Dear Mr. Goldberg:

We are pleased to submit our Interim Report, Needs and Finance for the New Jersey State Highway System, which has been prepared as an integral part of the New Jersey Highway Needs and Fiscal Study.

The report presents the findings of a preliminary analysis of highway needs and finance. The comprehensive study of classification, needs, finance, and economics is continuing. Results of this study will be available in the latter part of 1967.

This report deals primarily with the current status of highway finance and the need for additional revenue. The New Jersey Department of Transportation is critically short of funds to meet the present backlog of construction requirements and is facing the certainty of additional construction requirements in the future.

We hope that the data and findings presented will be helpful to the Department of Transportation in formulating plans for its improvement programs.

Respectfully submitted,

Wilbur S. Smith

Registered P.E.
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REPORT IN BRIEF

The rapid increase in New Jersey's population, and the continued trend toward urbanization, has resulted in unprecedented demands on the state's transportation network. Highways, the key element in the total transportation network, have experienced greatly increased motor vehicle travel, along with a demand for more and better service to the motoring public. These demands have far outstripped the rate at which highway improvements have been accomplished.

As a result, the New Jersey State Highway System is now faced with a heavy backlog of needed improvements. Estimates of the most critical needs have been developed in this report, based on an inventory and appraisal of the entire system. Included herein are the existing needs of the system for increased capacity and correction of structural failures. No attempt has been made in this report to include additional considerations related to the quality of service which should be provided, such as alignment improvements, surface and shoulder widening, improvements in traffic control, and provision of access control.

Of the total 1,957 miles of state highways, 695 miles, or 36 per cent, are presently deficient. Of this amount, 652 miles

are deficient in capacity and 26 miles have deficient pavement conditions. The remaining 17 miles is comprised of deficient bridges and other structures.

The estimated cost to correct these critical deficiencies is $811 million. This amount represents only the construction cost to overcome immediate traffic deficiencies and must be viewed only as a stopgap measure. Additional expenditures will be required to meet anticipated traffic increases in the near future and structural deterioration of presently adequate highways.

After deduction of committed expenditures for the Interstate System, maintenance, administration, state aid to local governments, operating costs of the Division of Railroad Transportation, and debt service on outstanding bonds, the total amount of funds available in 1967 for construction on state highways is $75 million. This includes $58 million in state funds and $17 million in federal funds.

The magnitude of the problem is self evident from a comparison of existing needs and available revenues. Critical backlog needs are more than ten times greater than the construction

funds available in 1967. From this comparison it is obvious that additional funds must be made available if the State Highway System is to properly serve the citizens of New Jersey and enhance the economic growth of the state.

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Chapter 1

INTRODUCTION

New Jersey, similar to many states, has experienced quite substantial growths in population, motor vehicle registration, and travel--all indicators of intensified highway use. The state is also faced with the phenomena of rapid urban growth and the accompanying concentration of commercial and industrial complexes.

Still another development, which adds materially to an already complex problem, is the public demand for not only an increase in the quantity of highway service but also in the quality of such service.

Not to be overlooked in evaluating highway needs is the increasing emphasis on highway safety and beautification.

The combination of changing and expanding economic factors, public demands, re-emphasis on current problems and evaluation of new programs culminates in a total of highway needs that substantially exceeds the funds made available.

New Jersey's highways, roads, and streets are being called upon to meet all of the pressures noted previously and, at the present time, are lagging badly in combating them.

The population of the state is steadily increasing despite the fact that population density is higher in New Jersey than in any other state. Motor vehicle ownership is growing rapidly and travel even more rapidly. Regardless of the statement, factual or otherwise, that the state is a bridge state, i.e., many trips on the state's highways are through trips as part of the huge movement of vehicles in the Megalopolis travel corridor, the problem of serving the citizens of the state plus the through travel bulks large in determining the future highway needs of the state.

It might also be noted that a state as highly urbanized as New Jersey is in need of a highly integrated transport system. Such a system must, by the sheer volume of the transport demand, incorporate every form of transport media. It is not only highly impossible but also inconceivable that even the most efficient highway transport system can adequately meet the transport demands the state must provide for.

Nevertheless, the highway systems of the state are the key elements of the transportation system, and if they are unable to meet the evergrowing pressures of travel demand then it necessarily follows that the economic growth of the state will be retarded and that the expenditure of economic resources in the form of public funds on an inadequate and outmoded system will be, to a degree, dissipated.

Purpose and Scope of Study

By agreement dated March 30, 1966, the state of New Jersey, acting through the State Highway Commissioner, engaged the consulting firm of Wilbur Smith and Associates to conduct a comprehensive study of highway needs and fiscal requirements. Detailed appraisal of physical needs will be made, and costs estimated for 10-, 15-, and 20-year stages of construction. Sources of revenue will be studied in relation to needs and cost responsibility allocated in proportion to costs incurred.

Interim Report- The agreement specifies that:

> "....The consultant shall concentrate efforts initially on the State Highway System and shall submit an interim report reflecting an evaluation of immediate needs on the State Highway System, within six (6) months following commencement of the work....."

The purpose of the Interim Report is to provide the Department of Transportation with an appraisal of the immediate or "backlog" needs on the State Highway System, as they now exist.

The scope of the Interim Report is limited to the State Highway System, its functional classification, its present backlog needs, and current financing. This report presents only a broad picture of the most urgent state highway needs and estimated costs, as indicated by current roadway and traffic conditions. Needs are appraised on the basis of surface and structural condition and traffic capacity.

Physical roadway conditions were determined by field appraisals made during the summer of 1966. Average unit costs of highway construction were established by analyzing the Department's more recent records of construction contracts.

Traffic information was taken from the Highway Department 1965 State Highway System Mileage Log.

Chapter 2

THE NEW JERSEY STATE HIGHWAY SYSTEM

The toll-free expressways, and major routes, designated as the State Highway System, are the main arteries of New Jersey's widespread network of roads and streets. These highways are under state control because of their importance in the intercity movement of persons and goods and their role in the general development of the state. The purpose of this chapter is to trace the development of New Jersey's state highways, discuss their function in the overall highway picture, and study the functional classification of the State Highway System.

Historical Development

The beginning of the modern era of highway construction can be traced back to 1891 when New Jersey was the first state in the country to appropriate funds to counties for road building. New Jersey's Secretary of Agriculture was authorized to grant $75,000 per year in state aid to counties to finance one-third of their cost in building public roads.

In 1894, the position of State Commissioner of Public Roads was created, and the duties of the Secretary of Agriculture

pertaining to public roads were transferred to him. During the same year, the Congress of the United States established an Office of Road Inquiry within the Department of Agriculture, the parent organization of the present Bureau of Public Roads.

The New Jersey State Legislature created a State Highway Commission in 1909 composed of the Governor, the President of the Senate, the Speaker of the House, and the Commissioner of Public Roads.

In 1912, the Legislature instructed the State Highway Commission to establish a comprehensive road network, not over 1,500 miles, as the State Highway System. This action, together with the demand for better highways caused by the increased use of motor vehicles, stimulated a new interest in road construction.

The New Jersey State Highway Department was established in 1917 to construct, maintain, and administer the State Highway System. The enabling Legislation specified that the Highway Department would come under the jurisdiction of an eight-member State Highway Commission and that the State Highway System would consist of fifteen specifically listed major routes.

The newly created State Highway Department faced the formidable task of constructing many miles of new roads, and laying down hard surfaces on existing unpaved roads. During the late 1920's and early 1930's, three-lane highways were built, and the first cloverleafs and traffic circles were constructed. During this period also, New Jersey was one of the first states to build divided highways.

In 1935, the Legislature abolished the State Highway Commission and created the post of State Highway Commissioner to act as executive head of the State Highway Department, reporting to the Governor. The Legislature in 1966 passed a bill which would establish a Department of Transportation, within which the Highway Department would function.

Since the State Highway System was created, its length has increased only 457 miles from 1,500 legislated miles in 1912, to 1,957 operating miles as of December 31, 1965. At present, it consists of 921 miles of rural and 1,036 miles of urban highways established by the urban delimitation based on the census of 1950. As shown in Table 1, the State Highway System, as of December 31, 1965, included 1,825 miles of state and federal aid highways, 113 miles of Interstate and Defense Highways, and 19 toll-free miles of the Garden State Parkway.

In addition to the State Highway System, New Jersey's major highway network includes approximately 375 miles of toll highways, of which almost 50 miles are part of the Interstate System.(1) The total highway network in New Jersey also includes 6,700 miles of county roads, 12,600 miles of town, township and borough roads, and 10,300 miles of local city streets. In addition, there are approximately 480 miles of forest, park, and institutional roads making a total statewide network of approximately 32,450 miles.

Function of State Highways

The State Highway System includes the major routes which connect New Jersey with its neighboring states and which link the important centers of population within the state. This system is a vital factor to the well being and economic progress of the state. The state highways function as main arteries over which the industrial, commercial, and agricultural products of the state move to the market. A substantial share of New Jersey's people use state highways daily in commuting, shopping, and for many other travel purposes. State highways are important to the

(1) SOURCES: 1965 State Highway System Mileage Log, 1966, TW2 Report, and 1965 Control Section Manual, New Jersey Highway Department.

movement of tourist traffic which brings millions of dollars into the state annually.

New Jersey's location in the heart of the Megalopolis corridor makes it imperative that its State Highway System keep pace with the economic growth of the region as well as its own development.

Functional Classification of Highways

The complex task of managing New Jersey's 32,452 miles of streets and highways is shared among state, county, and municipal governments and the three separate toll road authorities. Excepting the toll roads, levels of jurisdiction have evolved largely by reason of geographical location and extent of the road networks in relation to jurisdictional areas. The result has been classification of streets and highways by administrative systems which is frequently inconsistent with the service functions intended or performed.

Reclassification of streets and highways, according to the character of service they are expected to provide, would eliminate many of the management difficulties inherent in the administrative groupings. Functional classification simplifies at least the following areas of highway operation:

1. Planning of highway system development and future needs.

2. Assignment of jurisdiction.

3. Fiscal planning and cost accounting.

The functional classification of highway transportation facilities can be defined as the grouping into systems of those facilities which provide the same character or level of service, and the combining of all such systems into an integrated network to serve comprehensively the entire area under consideration. Since the basis for functional classification is the level of service provided by a road or street in its relationship to the total network, terms have been assigned to delineate the principal function served by each road or street. Those that principally provide "mobility" are referred to as arterials, those that principally serve as "access" facilities are called access roads and in the mid-range of the scale between the highest and lowest levels of service are those facilities which serve a compromise function between the extremes of service. These have been given the term collector.

In practice, classification of the components of the highway network establishes an array of functional levels. The three broad levels of service--arterial, collector, and land access--are usually subdivided for greater flexibility in the various applications such as determination of design criteria and cost allocation analyses. The determination of functional classification is based on extensive analyses of land use, traffic volumes, distribution of traffic generation, origin-destination studies, and the proportional distribution of trip lengths and trip purposes.

Table 2 generally outlines functional classification as it will be applied to New Jersey's streets and highways by this study. The three service levels are indicated, with the related divisions and subdivisions in each class. Both rural and urban designations are described.

Tentative classification of the State Highway System has been achieved although some minor modifications are anticipated before the final classification can be determined. Preliminary tabulations have been prepared which indicate that 79 miles of the State Highway System serve as Class I Major Highways. Together with the 113 miles of Interstate highways, these facilities

Table 2

OUTLINE OF FUNCTIONAL CLASSIFICATION

I. Arterial

A. Trunk Highways

1. National System of Interstate and Defense Highways

2. Class I Major Highways connecting major cities in the state and region and supplementing the Interstate Highway System at the same level of service. New Jersey's toll roads are part of this functional system.

B. Class II Major Highways--Interstate and Intercity at a lower level than Trunk Highways; partial control of access; accessible at not more than about 15 miles from any point in the state.

C. Area Service Highways--Routes having areawide scope; intercity within the state; medium speeds; no access control; accessible within ten miles.

D. Urban Thoroughfares

1. Urban extensions of Trunk, Major and Area Service Highways.

2. Class I Primary Thoroughfares--Streets carrying heavy traffic volumes, in which there is a high proportion of trips in excess of three miles.

3. Class II Primary Thoroughfares--Arterial streets serving the larger traffic generators and carrying through-City traffic. These streets together with the higher class facilities form a city network which is spaced about a mile apart.

Table 2 (Cont'd)

II. Collector

A. Collector Roads--Rural roads and their urban extensions at the intercounty level, they interconnect with the arterial highways and are accessible within one to three miles.

B. Secondary Urban Thoroughfares- Streets serving as collectors between access streets and the primary street system.

III. Access

A. Land Access Roads- Roads providing access to farms and other rural establishments from the collector system.

B. Urban Access Streets- Streets providing access to industrial, commercial, and residential sites.

constitute the Trunk Highway System of the state. Although comprising only 10 per cent of the State Highway System, these highways carry 18 per cent of all traffic on the system. The average daily traffic on these highways is in excess of 27,000.

Routes classified as Class II Major Highways total 504 miles or 26 per cent of the entire system. Thirty-two per cent of all travel on state highways occurs on these facilities, resulting in a daily average of about 18,000 vehicles. See Table 3.

Area Service Highways account for 40 per cent of the system mileage. The 786 miles in this classification carry 30 per cent of all state highway traffic and average 11,000 vehicles per day.

The remaining 475 miles are classified in other categories. This group comprises 24 per cent of the total state highway system, carry 20 per cent of the travel, and average almost 12,000 vehicles daily.

Table 3

FUNCTIONAL CLASSIFICATION OF STATE

HIGHWAYS - PRELIMINARY

FUNCTIONAL CLASSIFICATION	EXISTING MILES
Trunk Highways	-
Interstate	113
Class I Major Highways	79
Subtotal	192
Class II Major Highways	504
Area Service Highways	786
Other Classes	475
TOTAL	1,957

Chapter 3

IMPACT OF POPULATION GROWTH AND TRANSPORTATION TRENDS

The accelerated population growth in New Jersey and the substantial increase in motor vehicles registered have combined to intensify travel on the highways of the state. To fully understand their impact, the growth in population and the transportation trends must be studied both independently and jointly.

Population

The increase in population from 1910 through 1965 is depicted in Figure 1; the actual population data are listed in Table 4.

According to the 1960 Census, New Jersey ranked eighth among the states in population, and 46th in land area. In terms of population density, the state had 806 persons per square mile, second only to Rhode Island with 812 persons per square mile. Although New Jersey also ranked second in population density in 1950, with 643 persons, Rhode Island then had 749 persons per square mile. This indicates that New Jersey had a

Table 4

POPULATION OF NEW JERSEY

1910-1965

YEAR	POPULATION (in thousands)
1910	2,537
1920	3,156
1930	4,041
1940	4,160
1950	4,835
1960	6,067
1965(1)	6,800

(1) Research and Statistics Section, Division of Economic Development, New Jersey Department of Conservation and Economics.

SOURCE: 1910-1960 Data - Table No. 8, Statistical Abstract of the United States, 1965, 86th Edition, U. S. Bureau of the Census.

much more accelerated growth rate in population than Rhode Island during the decade ending in 1960.

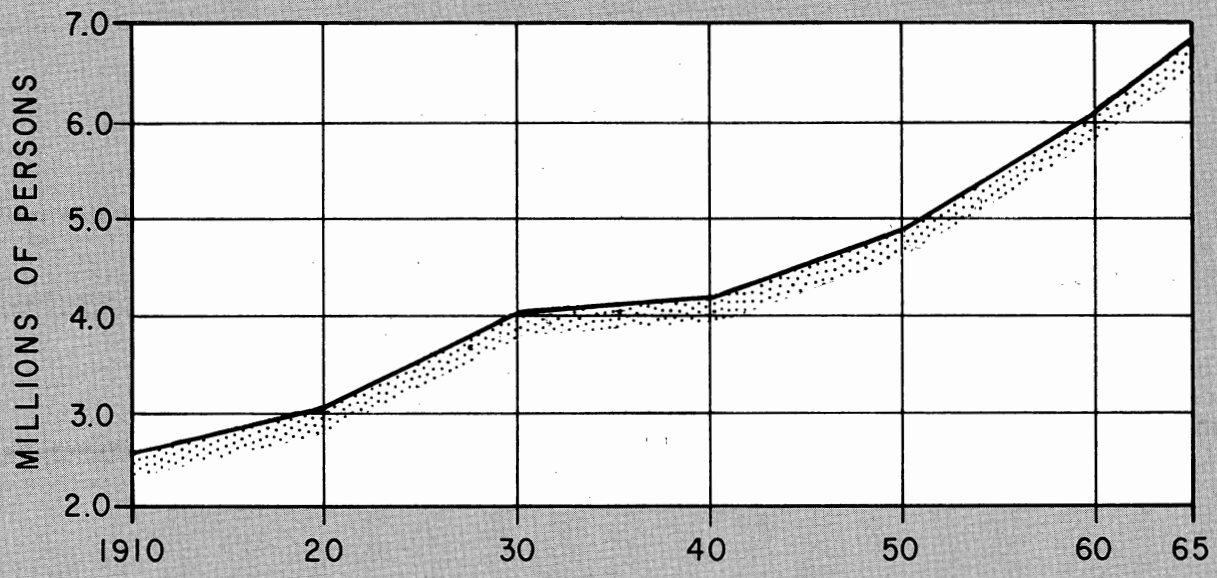
Based on preliminary estimates of the Bureau of the Census, (1965) the state has a density of 904 persons per square mile which indicates New Jersey is unquestionably the most heavily populated state, per square mile, of any in the Union. Should present trends continue it appears that by 1986 New Jersey will have almost ten million residents. This population projection indicates that there will be more than 1,300 persons per square mile in the state, which is double the population density in 1950.

Motor Vehicle Registrations

The sharp rise in motor vehicle registrations, as shown in Figure 2, is even more remarkable than the growth in population. The numbers of motor vehicles registered from 1910 through 1965 are shown in Table 5. In 1965, New Jersey registered slightly under three million motor vehicles.

Vehicle Ownership

The increase in motor vehicle registrations, being relatively more rapid than population growth, has increased the

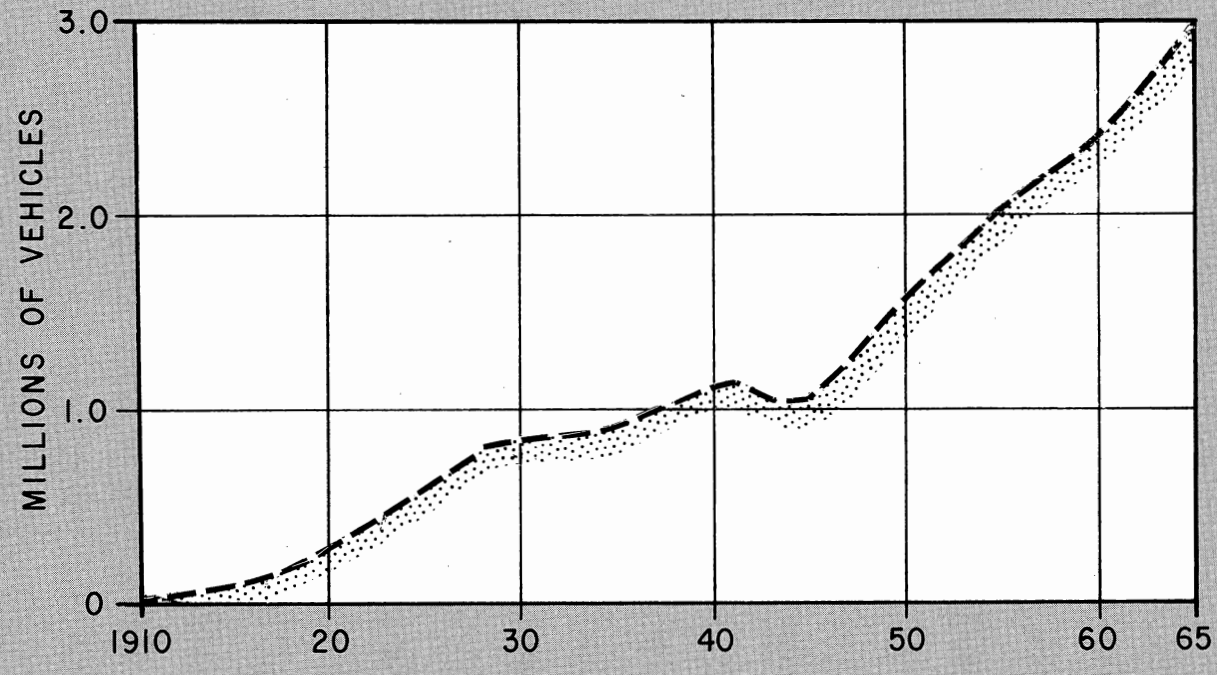


POPULATION GROWTH

NEW JERSEY

1910 - 1965

FIGURE 1



MOTOR VEHICLE REGISTRATIONS

NEW JERSEY

1910 - 1965

Wilbur Smith and Associates

FIGURE 2

Table 5

TRENDS IN MOTOR VEHICLE REGISTRATIONS IN NEW JERSEY[1]

1910-1965

YEAR	REGISTRATIONS	YEAR	REGISTRATIONS
1910	16,520	1940	1,100,319
1911	24,970	1941	1,178,438
1912	35,410	1942	1,123,786
1913	43,960	1943	1,022,017
1914	62,961	1944	1,022,838
1915	81,848	1945	1,031,495
1916	109,414	1946	1,137,693
1917	141,918	1947	1,233,946
1918	155,519	1948	1,331,916
1919	190,873	1949	1,440,773
1920	227,737	1950	1,579,181
1921	273,121	1951	1,685,304
1922	342,473	1952	1,746,068
1923	431,302	1953	1,836,914
1924	504,470	1954	1,928,077
1925	585,950	1955	2,060,963
1926	657,580	1956	2,113,560
1927	719,593	1957	2,166,453
1928	765,687	1958	2,240,597
1929	840,392	1959	2,306,871
1930	861,383	1960	2,401,062
1931	878,824	1961	2,533,768
1932	864,417	1962	2,608,610
1933	856,116	1963	2,741,493
1934	875,098	1964	2,861,104
1935	899,090	1965	2,979,631
1936	954,080		
1937	1,006,261		
1938	1,013,485		
1939	1,040,712		

(1) Excludes motorcycles.

SOURCE: Highway Statistics, (various editions), U. S. Bureau of Public Roads.

density of ownership considerably. These data are recorded in Table 6. In 1920, there were 21 motor vehicles per 100 persons, or one vehicle for every five persons. By 1950, there were 33 vehicles for every 100 New Jersey residents and by 1965, 44 vehicles.

Viewed in the light of population growth, the increase in per capita ownership of vehicles and the rising trend in motor vehicle registrations, it is estimated that by 1986, New Jersey will have over five million motor vehicles registered. In other words, there will be more than two thirds as many more vehicles registered in New Jersey in 1986 as there are now.

Motor Fuel Consumption

Motor fuel consumption has also risen rapidly in the state. Table 7 includes such data for New Jersey from 1935 to 1965. In 1960, more than twice the amount of motor fuel was consumed in highway use as in 1948. By 1965, fuel consumption had increased to 2.4 billion gallons annually.

The average annual gallons used per registered vehicle, 1935 through 1965, is also recorded in Table 7. Although this amount has fluctuated considerably over a period of thirty years,

Table 6

TRENDS IN NUMBER OF VEHICLES
PER 100 PERSONS
IN NEW JERSEY(1)

YEAR	VEHICLES PER 100 PERSONS
1910	1
1920	7
1930	21
1940	26
1950	33
1960	40
1965	44

(1) Excludes motorcycles.

Table 7

HIGHWAY USE OF MOTOR FUEL

New Jersey

1935-1965

YEAR	GALLONS (millions)	AVERAGE GALLONS PER VEHICLE
1935	634	705
1936	704	738
1937	774	770
1938	789	779
1939	820	788
1940	870	791
1941	922	783
1942	717	638
1943	533	522
1944	565	563
1945	636	617
1946	864	759
1947	947	768
1948	1,012	760
1949	1,091	757
1950	1,212	767
1951	1,306	775
1952	1,390	796
1953	1,470	800
1954	1,614	837
1955	1,726	837
1956	1,792	848
1957	1,802	832
1958	1,857	829
1959	1,984	860

Table 7 (Cont'd)

YEAR	GALLONS (millions)	AVERAGE GALLONS PER VEHICLE
1960	2,031	846
1961	2,063	814
1962	2,111	809
1963	2,219	810
1964	2,307	806
1965	2,439	818

SOURCE: Highway Statistics, (various editions), U. S. Bureau of Public Roads.

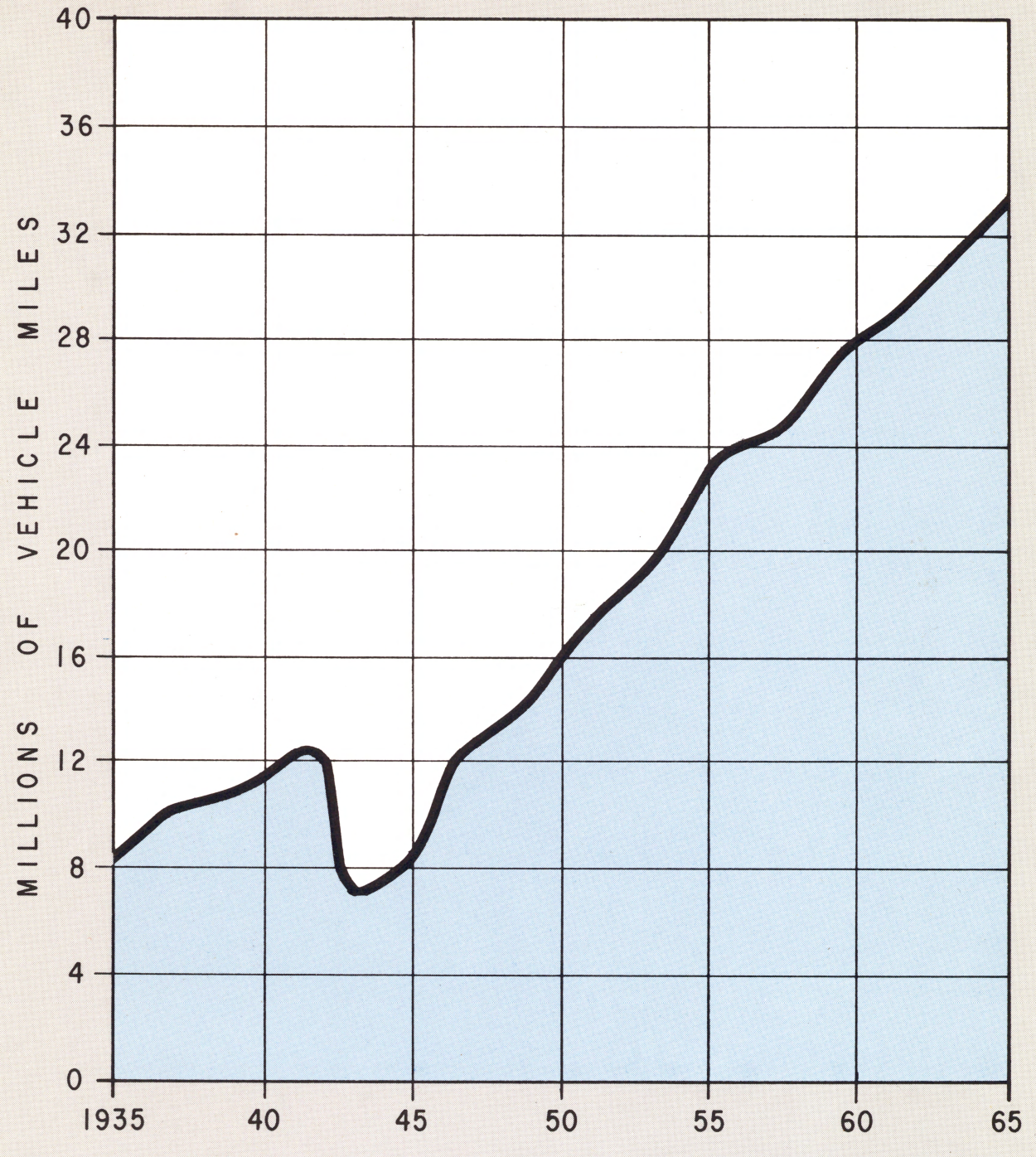
it has shown signs in recent years of stabilizing between 806 and 860 gallons per vehicle with a moderate downward trend.

Highway Travel

The single most important measure of highway use is the annual vehicle-miles of travel. These are shown in Figure 3 for 1935 through 1965 and listed in Table 8. In the past twenty years, the total travel on New Jersey's highways has tripled and currently exceeds 33 billion vehicle-miles every year. In other words, New Jersey's highways are used three times as much today as they were in 1946.

From 1935 to the present time, the average miles of travel per vehicle, also recorded in Table 8 have fluctuated annually. For over ten years, however, annual travel per vehicle has varied within three per cent, above or below, an annual average of 11,500 vehicle-miles.

When all factors are considered, it appears that there will be 60 billion vehicle-miles traveled on New Jersey's highways in 1986--almost 80 per cent more than the amount of travel in 1965. Projections of population and transportation trends to 1986 indicate that New Jersey is facing two decades of substantial



MOTOR VEHICLE TRAVEL

NEW JERSEY

1935-1965

Wilbur Smith and Associates

FIGURE 3

Table 8

MOTOR VEHICLE TRAVEL[1]

New Jersey

1935-1965

YEAR	VEHICLE MILES (millions)	AVERAGE MILES PER VEHICLE
1935	8,500	9,455
1936	9,440	9,895
1937	10,400	10,338
1938	10,550	10,415
1939	11,000	10,567
1940	11,660	10,600
1941	12,350	10,484
1942	12,300	10,943
1943	7,150	6,996
1944	7,580	7,557
1945	8,530	8,274
1946	11,600	10,193
1947	12,710	10,308
1948	13,580	10,195
1949	14,630	10,153
1950	16,270	10,304
1951	17,520	10,398
1952	18,630	10,670
1953	19,700	10,724
1954	21,600	11,203
1955	23,150	11,232
1956	24,190	11,443
1957	24,470	11,297
1958	25,850	11,535
1959	27,300	11,833

Table 8 (Cont'd)

YEAR	VEHICLE MILES (millions)	AVERAGE MILES PER VEHICLE
1960	28,130	11,716
1961	28,760	11,350
1962	30,002	11,499
1963	31,156	11,367
1964	32,351	11,308
1965	33,588	11,271

(1) Excludes motorcycles.

SOURCE: Division of Planning, New Jersey State Highway Department.

population expansion and that demands made by present and future highway users on the highways of the state, and particularly on the State Highway System will be tremendous.

Comparison of New Jersey With Other States in the Study Area

The high demand for travel on New Jersey's highways, in comparison with other states in the study area, is reflected in the data reported in Table 9. With 88 registered vehicles per mile of road in 1964, New Jersey showed a greater concentration than any other state in the study area. Only Connecticut and Rhode Island, both smaller states with fewer vehicles, even approached this density.

Table 9

NUMBER OF VEHICLES PER MILE OF ROAD[1]

New Jersey, Study Area, and the United States

1955-1964

YEAR	NEW JERSEY	CONNECTICUT	DELAWARE	MARYLAND	NEW YORK	PENNSYLVANIA	RHODE ISLAND	STUDY AREA	UNITED STATES
1955	70.9	59.0	34.8	46.5	44.5	35.2	74.3	45.0	18.4
1956	72.6	61.3	36.5	48.5	45.7	36.5	73.5	46.4	19.0
1957	73.8	63.5	37.7	49.1	45.3	37.0	76.9	46.7	19.4
1958	76.9	62.7	38.4	48.2	46.2	37.4	77.6	47.4	19.6
1959	74.4	63.5	39.8	50.0	47.3	38.4	79.3	48.3	20.3
1960	77.1	66.2	41.5	51.8	47.6	39.2	81.1	47.8	20.8
1961	78.4	67.6	42.8	52.5	48.6	40.0	79.7	50.5	21.2
1962	80.7	70.2	44.6	55.2	50.1	40.8	82.0	51.9	21.9
1963	84.7	73.8	46.8	57.6	54.7	42.0	82.9	54.9	22.8
1964	88.3	77.0	49.2	60.4	56.3	43.4	86.4	56.9	23.6

(1) Excludes motorcycles.

Chapter 4

STATE HIGHWAY FINANCES

The effectiveness of state highway financing depends on the adequacy of funds and the manner of their application. The purposes of this chapter are to examine the means used by the state of New Jersey in financing its highways and to analyze the annual amounts of revenues made available in recent years for state highways.

There are three principal sources of state highways funds. First are the moneys provided by appropriations by the State Legislature. The second source is federal grants for highways administered by the U.S. Bureau of Public Roads. Construction funds for a state highway, designated as part of a federal-aid highway system, are provided by both the state and federal government on a matching basis.

Bond financing is the third major source of funds. However, bond financing has not been very important in financing the State Highway System. Prior to 1956, New Jersey sold several relatively small issues of State Highway Construction Bonds. The principal payments that remain outstanding at the end of 1966 will be under $14 million. Because funds from bond sales have

been insignificant in providing money for New Jersey's state highways, the use of credit financing is not discussed in detail here.

Legislative Appropriations

New Jersey finances its State Highway System primarily through annual appropriations by the Legislature from the general funds of the state treasury, and through the moneys received from federal-aid highway grants. This is the state fiscal policy laid down in Article VIII, Section II, paragraph 2, of the Constitution of New Jersey, adopted in 1947, which states:

> "No money shall be drawn from the state treasury but for appropriations made by law. All moneys for the support of the state government and for all other state purposes as far as can be ascertained or reasonably foreseen, shall be provided for in one general appropriation law covering one and the same fiscal year; except that when a change in the fiscal year is made, necessary provisions may be made to effect the transition. No general appropriation law or other law appropriating money for any state purpose shall be enacted if the appropriation contained therein, together with all prior appropriations made for the same fiscal period, shall exceed the total amount of revenue on hand and anticipated which will be available to meet such appropriations during such fiscal period, as certified by the Governor."

New Jersey is one of five states that follow the policy of financing its highways from general fund appropriations. The other states are: Alaska, Delaware, New York, and Rhode Island.

Each of the forty-five remaining states has adopted a policy of earmarking all, or a substantial share, of the funds collected from motor fuel taxes, registration fees, drivers' licenses, and similar charges for highway purposes, based on the theory that revenues derived from levies against the highway users should be used to defray the costs of highways.

A study of the structure of the state's annual budget for highways provides the best means of understanding the categories for which funds are made available. Because categories vary from year to year, the following pattern is presented as representative of a typical budget rather than one for a specific year.

General State Operations (Executive)

a. Administration, General includes funds for the Division of Administration, the Office of Organization and Methods, the Budget Office and the Office of Personnel.

b. Division of Traffic Engineering

c. Division of Maintenance and Operations

d. Interest on Bonds refers to interest due annually on Highway Construction Bonds. The last issue of these bonds, Series G, was sold in 1955; the final interest payment is scheduled for 1990.

e. The Division of Railroad Transportation receives funds annually, as a component of the Highway Department's budget, to assist commuter and passenger railroads.

State Aid

a. The Division of Local Government Aid receives an appropriation for its own administrative costs in handling the state grants to counties and municipalities for highways.

b. Grants to Counties

(1) Total appropriation of $8,000,000 is distributed to counties based on a formula of one third for population, one third for area, and one third for county road mileage.

(2) Flat grant of $55,000 per county, for a total of $1,155,000.

c. Grants to Municipalities

(1) Total appropriation (currently $4,500,000) distributed to municipalities based on a formula of one half for population and one half for municipal road mileage.

(2) Flat grant of $100,000 per county, or a total of $2,100,000 for municipal roads.

d. County and Municipal Aid for Lighting Streets and Highways

Amounts vary every year; they range from a low of $210,000 for fiscal years 1958 and 1959, to a high of $411,000 for fiscal year 1964.

e. Special Grants of $200,000 per year have been made for the last two fiscal years to defray the costs of rebuilding county or municipal roads damaged by vehicles of 40,000 pounds or more that bear registration plates marked "constructor."

Capital Construction

a. Highway Department Installations include funds for new buildings, and for improvements and alterations to existing facilities.

b. Administration, Construction covers the costs of engineering, construction, right-of-way acquisition, planning, and the Division of Materials.

c. State Highway Projects constitute the largest general item in the budget. It includes the necessary state funds to match federal-aid highway grants, and also state appropriations for "non-federal-aid" highway construction.

d. Redemption of Bonds refers to the principal payments made annually on outstanding Highway Construction Bonds.

The following funds are not included above:

Secondary and Feeder Roads- Federal--The state matching funds are transferred to this account from the Capital Construction Budget.

Defense Access Roads - Federal is a fund covering the construction of access roads to federal installations. The current budget states: "Reimbursement of state costs is made under current procedures now in effect with the Federal Bureau of Public Roads. Funds cannot be anticipated..."

In the budget for the fiscal year ending June 30, 1967, two special grants for state aid were authorized:

> "Extraordinary state aid for county highways, with the share of each county to be calculated on the basis of the average of the following two percentages:
>
> (1) the percentage of population of such county to the total population of the state; and
>
> (2) the percentage of total county road mileage within such county to the total county road mileage in the state...$20,000,000."
>
> "Extraordinary state aid for municipal highways, with the share of each municipality to be calculated on the basis of the average of the following two percentages:
>
> (1) the percentage of population of such municipality to the total population of the state; and
>
> (2) the percentage of total municipal road mileage within such municipality to the total municipal road mileage in the state...$14,000,000."

These two appropriations more than doubled the total appropriation grant to counties and municipalities in any recent fiscal year.

At the end of a fiscal year, any highway funds that have not been obligated or disbursed automatically lapse. It is customary, however, for the State Legislature to insert a clause in the appropriation act directing that the unexpended balance at the end of the prior fiscal year "is hereby appropriated." Thus, a series of unexpended fund balances can be carried over from year to year.

State Funds Available for the New Jersey State Highway System

In the Governor's budget messages and in the appropriation acts of the New Jersey State Legislature, the funds for the State Highway Department are listed in three separate sections: General State Operations (Executive), State Aid, and Capital Construction. To determine the share of funds appropriated for state highway purposes, it is necessary to extract the component items from the budget and regroup them as follows:

State Highway Purposes

General Administration of State Highway Department

Capital Construction

Highway Department Installations

Construction and Right-of-Way Division--
Operating Costs

State Highway Projects

Debt Service on Highway Construction Bonds

Interest

Principal

Division of Railroad Transportation

State Aid to Counties and Municipalities

Administrative Costs

Aid to Counties

Aid to Municipalities

Grants for Lighting

Special Grants

The amounts appropriated to the State Highway Department, regrouped in accordance with the four general purposes listed above, are reported in Table 10 for fiscal years 1957 through 1967. (Certain adjustments were made to reflect funds transferred to and from the Department of Railroad Transportation.) A brief explanation should clarify the nature of each of these four groups.

State Highway Purposes - Funds appropriated for state highway purposes cover all maintenance, administrative, and general costs of the Department of Transportation (exclusive of the Divisions of Local Government Aid and Railroad Transportation)

Table 10

TOTAL APPROPRIATIONS BY THE NEW JERSEY STATE LEGISLATURE
TO THE
NEW JERSEY STATE HIGHWAY DEPARTMENT[1] [2]

FOR THE FISCAL YEAR ENDING JUNE 30	STATE HIGHWAY PURPOSES	DEBT SERVICE	STATE AID TO COUNTIES AND MUNICIPALITIES	DIVISION OF RAILROAD TRANSPORTATION	TOTAL
			(thousands of dollars)		
1957	$42,254	$2,889	$17,033	$ -	$62,176
1958	39,641	2,870	16,883	-	59,394
1959	58,949	2,864	16,747	50	78,610
1960	61,633	2,872	17,068	200	81,773
1961	58,871	2,886	17,089	7,200[3]	86,046
1962	60,281	2,872	17,095	5,750	85,998
1963	59,852	2,881	16,616	9,000	88,349
1964	63,307	2,886	16,810	9,600	92,603
1965	67,894	2,864	16,944	6,000	93,702
1966	76,603[4]	2,874	17,073	7,950	104,500
1967	90,555	1,830	50,964	15,050	158,399

(1) Adjusted to reflect funds transferred to the Division of Railroad Transportation from appropriations for "State Highway Purposes" as follows: 1961, $6,500,000; 1963, $3,000,000; 1964, $1,000,000; and 1966, $750,000.

(2) Excludes any federal funds.

(3) Includes $500,000 transferred from the Department of Public Utilities for grade crossing elimination on Camden-Kirkwood Line.

(4) Includes $3,300,000 representing highway work involved in the Aldene Plan administered by the Division of Railroad Transportation.

SOURCE: 1957-1965 Annual Budget Messages of the Governor;
1966: Chapter 112, Laws of 1965;
1967: Assembly Bill No. 550 (1966 Legislative Session)

plus the capital outlay for construction of the State Highway System, right-of-way, and highway department installations. Since fiscal year 1957, these amounts have fluctuated between a low of $40 million in 1958 and a high of $91 million in 1967. From 1959 through 1964, however, the annual appropriations were fairly stable ($59 to $63 million), rising to $68 million in 1965, then increasing more substantially in the next two fiscal years. In 1967, these funds total $90,555,000.

Debt Service- Debt service, in the form of principal and interest, on outstanding Highway Construction Bonds must be paid annually under the terms of bond indentures. The annual debt service obligations were relatively constant (about $2.9 million) from 1957 through 1966. In 1966, the final payment was made on one of the issues, so in 1967 debt service requirements total only $1.8 million. Further reductions will occur in 1968 when debt service costs will be about $1 million. After 1968, the amounts needed to meet principal and interest payments will be less than $1 million per year until 1990 when the last bonds are scheduled to be redeemed.

State Aid- State-aid grants to counties and municipalities administered by the Division of Local Government Aid, averaged

about $17 million per year from 1957 through 1966. For 1967, the Legislature supplemented the annual appropriation of $17 million with special fund grants of $20 million to counties and $14 million to municipalities, for a total of $51 million.

Division of Railroad Transportation- Recognizing the need for maintaining and improving rail commuter service as a vital component in mass transportation, the state established a Division of Railroad Transportation in 1959 as an operating unit within the State Highway Department. After the Division became fully operational, annual appropriations increased from $7.2 million in 1961 to $8.0 million in 1966. The 1967 appropriation of $15 million is about double the amount appropriated to the Division in 1966.

Trends in Annual Appropriations- Table 10 shows that the total appropriation to the State Highway Department has increased each year since 1958, with the 1967 appropriation of $158 million more than double the 1958 amount of $59 million. While the total appropriation has steadily increased, the amounts available for the four major groups have varied from year to year.

From 1957 through 1966, the amounts for debt service and state aid remained fairly stable. However, in 1967, the amount

for state aid was increased by $34 million, for a total amount three times the average 1957-1966 appropriation.

Appropriations to the Division of Railroad Transportation were not of significance until 1961. Between 1961 and 1966, the amounts for this Division fluctuated between a low of $5.8 million and a high of $9.6 million. The appropriation of $15 million for 1967 is twice the average amount for the period 1961-1966.

The amounts available for state highway purposes advanced sporadically during the period with declines noted in 1958, 1961, and again in 1963. In 1966, the appropriation for state highways was 26 per cent higher than in 1959. The $90.6 million appropriation in 1967 is slightly more than 1.5 times the 1959 appropriation.

The most significant changes in the breakdown of the Legislative appropriations have been the relationship between the four major categories. In 1959 and 1960, the amount for state highway purposes constituted 75 per cent of the total appropriation. In 1961, the first year in which the Division of Railroad Transportation assumed significance, the state highway share was 68 per cent. By 1967 the state highway proportion had dropped to 57 per cent of the total.

In 1961, the Division of Railroad Transportation received 8.4 per cent of the total appropriation. The Division's proportion of the 1967 appropriation was only slightly greater at 9.5 per cent.

The greatest relative change has been in the amount made available for state aid. In 1961, state aid accounted for 20 per cent of the total. In 1967, the amount for state aid constituted 32 per cent of the total, or more than 1.5 times the proportion for 1961.

Federal Aid for Highways

Since 1916, the federal government has distributed substantial sums among the states for highways. These amounts have increased considerably during the past ten years because of the accelerated rate of construction caused by the Federal-aid Highway Act of 1956.

The apportionment of Federal-aid Highway Funds to New Jersey is shown in Table 11. For the Interstate System, the apportionment is determined by the need for funds to complete the system in each state. The amount of Interstate funds apportioned to New Jersey for the fiscal year ending June 30, 1967, was $78,100,650. The apportionment for primary, secondary, and urban

Table 11

APPORTIONMENTS OF FEDERAL-AID HIGHWAY FUNDS
TO NEW JERSEY BY THE BUREAU OF PUBLIC ROADS

FEDERAL FUNDS APPORTIONED During Calendar Year	For Fiscal Year	PRIMARY	SECONDARY	URBAN	SUBTOTAL	INTERSTATE	TOTAL
				(dollars)			
1955	1957	$4,081,077	$1,369,283	$ 7,592,209	$13,042,569	$ 3,759,671	$16,802,240
1956(1)	1957	746,588	252,837	1,375,976	2,375,401	21,903,382	24,278,783
1956(2)	1958	6,076,929	1,719,295	8,356,506	16,152,730	37,235,749	53,388,479
1957(3)	1959	6,198,993	1,747,245	8,563,453	16,509,691	43,533,500	60,043,191
1958(1)	1959	-	-	-	(4)	4,375,226	4,375,226
1958	1960	5,488,333	1,904,658	9,857,490	17,250,481	80,495,500	97,745,981
1959	1961	4,628,033	1,889,329	9,824,877	16,342,239	57,665,520	74,007,759
1960	1962	4,904,496	2,006,565	9,668,607	16,579,668	70,079,625	86,659,293
1961	1963	6,127,534	2,180,663	9,959,813	18,268,010	62,402,100	80,670,110
1962	1964	5,962,020	2,044,966	10,190,574	18,197,560	67,602,275	85,799,835
1963	1965	6,166,540	2,140,434	10,405,791	18,712,765	69,846,907	88,559,672
1964	1966	6,016,770	1,981,060	10,769,268	18,767,098	72,802,450	91,569,548
1965	1967	6,023,416	1,989,893	10,742,004	18,755,313	78,100,650	96,855,963
1966	1968	6,086,295	2,023,886	10,785,627	18,895,808	88,873,518	107,769,326

(1) Additional funds apportioned.
(2) Includes transfer of $1,000,129 from Urban to Primary Funds.
(3) Includes transfer of $1,020,218 from Urban to Primary Funds.
(4) This table does not include special ("D") funds of $7.5 million authorized for fiscal year 1959 and loans of $3.0 million in ("L") funds made to match the special funds. These loans were, in effect, repaid by reductions from subsequent appropriations.

SOURCE: Highway Statistics, 1955 through 1964, Table FA-4; 1965 and 1966 data from Press Release.

highways (the ABC program) is based on formulas weighted as follows: one third, population; one third, area; and one third, post road mileage. The total apportionment to New Jersey in the current fiscal year is $18,755,313 for its federal-aid primary, secondary, and urban highways.

Recently, the Bureau of Public Roads announced that New Jersey's apportionment for the next fiscal year (ending June 30, 1968) will be $88,873,518 for the Interstate System and $18,895,808 for the ABC program.

The federal-aid secondary program in New Jersey is administered by the Division of Local Government Aid within the State Highway Department. Of the 2,246 miles of federal-aid secondary roads in New Jersey, over 90 per cent are under county jurisdiction. This system is financed 50 per cent from federal funds and 50 per cent from matching funds provided by the state or counties. (The major share of matching funds comes from the counties.)

FAS funds are distributed to each county on the basis of a formula in those cases where the counties have made application for FAS grants. In the cases of counties that have, in the past, failed to request FAS grants equal to their allocation

under the formula, the forfeited funds have been reallocated to those counties applying for funds in excess of their formula allocation.

Toll Facilities

New Jersey is served by three toll road facilities: the New Jersey Turnpike, Garden State Parkway, and Atlantic City Expressway.

In 1948, due to demanding north-south traffic needs, the New Jersey legislature created the New Jersey Turnpike Authority to "construct, maintain, repair, and operate" specific toll road projects. The Turnpike Authority through the issuance of $235 million in bonds constructed the 118-mile New Jersey Turnpike which has been in operation since 1952. At later dates additional bonds were issued by the Turnpike Authority for additions and improvements and more are programmed for the future.

The quick acceptance by motorists and the financial success of the New Jersey Turnpike encouraged the State Legislature to authorize construction of the Garden State Parkway. This 173 mile toll facility was financed by the issuance of $285 million in bonds and fully completed in 1956. Like the New Jersey Turnpike,there

have been additions and improvements to the Parkway, with the total debt as of December 13, 1965, being $355.3 million.

The newest toll facility was created in 1962 when the New Jersey Expressway Authority was created to build the 44 mile Atlantic City Expressway. This toll facility was completely opened to traffic in 1965, being financed by a $53 million bond issue.

All bonds issued by the various toll road authorities are secured by the tolls and receipts of the respective facilities, except for the original issue of the Garden State Parkway which is further secured by the "full faith and credit" of the state.

In addition to the three toll roads that cross the state, there are numerous toll crossing facilities circling the state. These facilities are under the jurisdiction of the following authorities and commissions: The Port of New York Authority, Delaware River Port Authority, Delaware River Joint Toll Bridge Commission, Delaware River and Bay Authority, Burlington County Bridge Commission, and Cape May Bridge Commission.

Although all toll facilities are important to the movement of traffic and goods within and across New Jersey, they have

not been included in this study. Financing from public funds is not required since toll revenues are presumed adequate for debt service, maintenance, and operation costs.

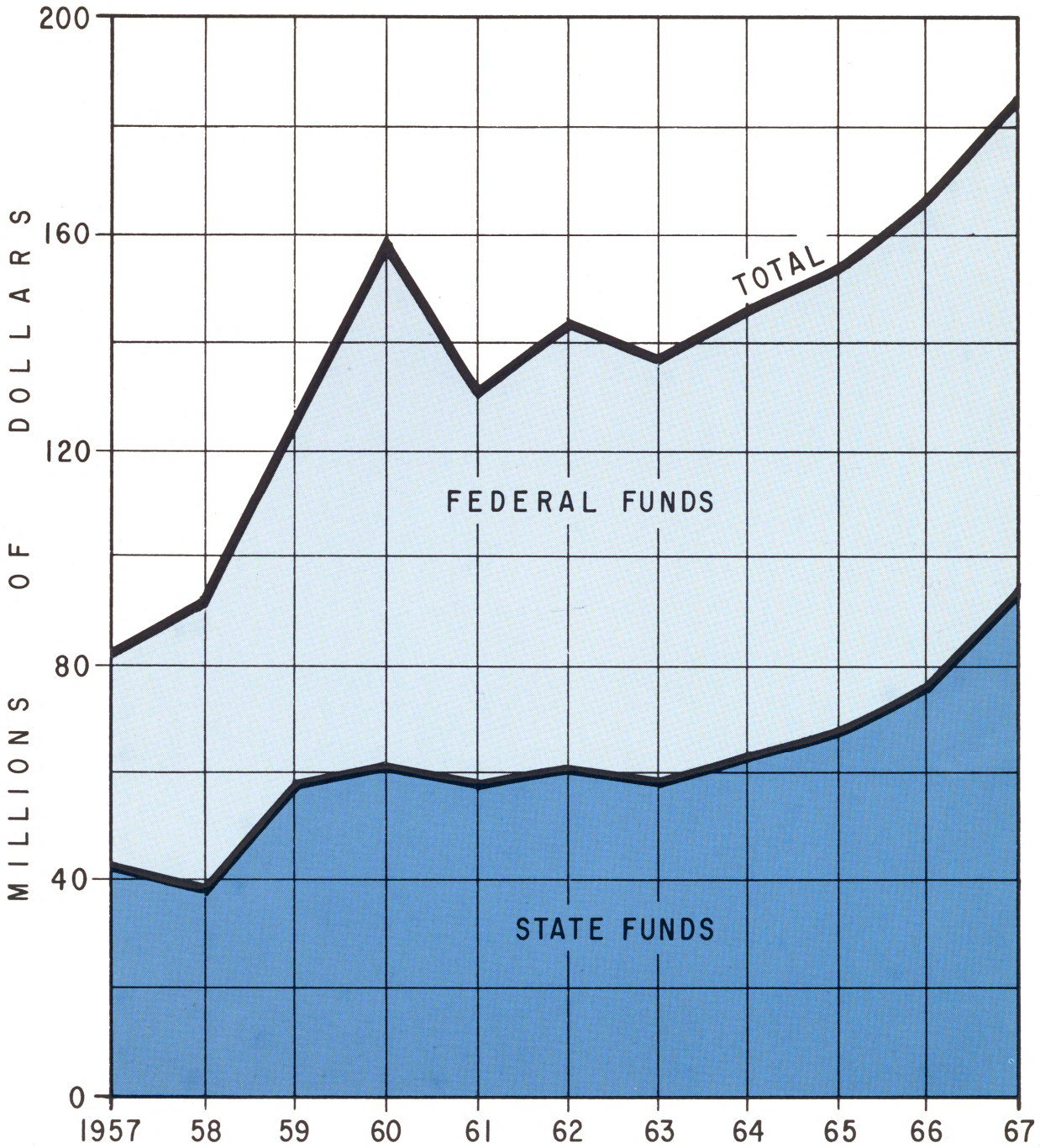
Palisades Interstate Parkway

This facility was originally constructed by the New Jersey State Highway Department but is operated by and completely under the jurisdiction of the Palisades Interstate Parkway Commission. The total length of the Parkway is approximately 11 miles.

Combined State and Federal Funds for State Highways

Federal-aid apportionments and New Jersey's appropriations for state highways for fiscal years 1957 to 1967, are combined in Table 12 and illustrated in Figure 4. The amounts shown for federal funds do not include federal-aid secondary apportionments since these are distributed to the counties. As can be seen, federal-aid funds have been greater than state appropriated funds in every year since 1958. For 1967, state funds amount to $90.6 million and federal funds, $94.9 million, for a total of $185.4 million.

Of these amounts, federal aid for the Interstate System totals $78.1 million. Based on the 90-10 financing ratio, state



STATE AND FEDERAL FUNDS

FOR STATE HIGHWAYS

NEW JERSEY

1957-1967

Wilbur Smith and Associates

FIGURE 4

Table 12

COMBINED STATE AND FEDERAL FUNDS FOR

STATE HIGHWAYS IN NEW JERSEY

FOR THE FISCAL YEAR ENDING JUNE 30	STATE APPROPRIATIONS	FEDERAL-AID[1] APPROPRIATIONS	TOTAL
	(thousands of dollars)		
1957	$42,254	$39,459	$ 81,713
1958	39,641	51,669	91,310
1959	58,949	62,671	121,620
1960	61,633	95,841	157,474
1961	58,871	72,118	130,989
1962	60,281	84,653	144,934
1963	59,852	78,489	138,341
1964	63,307	83,755	147,062
1965	67,894	86,419	154,313
1966	76,603	89,588	166,191
1967	90,555	94,866	185,421

(1) Excludes Federal-aid Secondary Funds.

funds amounting to $8.7 million are required for matching the federal apportionment. If all of these funds were to be obligated from the 1967 appropriation, a total of $86.8 million would be expended on the Interstate System, leaving a balance of $98.6 million for construction maintenance, and administration of the remainder of the State Highway System.

Chapter 5

STATE HIGHWAY NEEDS

The principal objective of this report is to indicate the magnitude of immediate needs on the State Highway System. The state highway needs, as reported herein, have been developed in two categories. The first category includes Interstate Highways while the second category is comprised of all other state highways. For the Interstate System, estimates of the funds necessary to complete the initial construction of the system are included. For other state highways, estimates of the financial requirements for construction needs necessary to meet present day traffic demands have been developed. In addition to these needs, the State Highway Department is faced with financial needs for the maintenance, operation, and preservation of highway investments. Also, total needs of the Department of Transportation include administrative costs for highway management, research, and planning activities.

Interstate Highways

The National System of Interstate and Defense Highways is scheduled for completion during 1972. With the exception of those portions of the 375 miles in the proposed system which are

toll facilities with no federal-aid funds, the system will be financed, insofar as initial construction is concerned, by 90 per cent federal-aid funds, with the remaining 10 per cent coming from state sources. Because of the statutory limitations placed on the completion date for the Interstate System, the state's share of these programs represents a fixed commitment of Highway Department funds.

The present status of the Interstate System in New Jersey is compared in Table 13 with the other states in the study area and with the United States as of June 30, 1966. The states in the study area had completed an average of 64.9 per cent of their Interstate mileage compared with 52.6 per cent for the United States and only 40.6 per cent completed in New Jersey.

A comparison of the status of the Interstate System in New Jersey with other states, based solely on Table 13, would not be a fair evaluation of New Jersey's progress, for certain other factors must be considered. In New Jersey, 55 per cent of the toll-free mileage on the Interstate System has been designated as urban compared with 36 per cent in New York and 20 per cent in Pennsylvania. Highway construction in urban areas is much more costly per mile and requires more detailed planning than in

Table 13

STATUS OF INTERSTATE SYSTEM
New Jersey, Study Area, and the United States
as of June 30, 1966

		WORK IN PROGRESS					OPEN TO TRAFFIC			
STATE		PRELIMINARY STATUS OR NOT YET IN PROGRESS	Engineering or Right-of-Way	Under Construction	Total Underway	TOLL FACILITIES	Improved to Standards Adequate for Present Traffic	Completed To Full or Acceptable Standards	Total Open To Traffic	TOTAL DESIGNATED SYSTEM
N.J.:	Miles	69.5	105.7	46.5	152.2	46.3	49.3	56.0	151.6	373.3
	Per Cent	18.6	28.3	12.5	40.8	12.4	13.2	15.0	40.6	100.0
Conn:	Miles	3.6	29.7	9.4	39.1	13.8	47.0	192.1	252.9	295.6
	Per Cent	1.2	10.0	3.2	13.2	4.7	15.9	65.0	85.6	100.0
Del.:	Miles	-	9.7	14.0	23.7	14.3	0.9	1.7	16.9	40.6
	Per Cent	-	23.9	34.5	58.4	35.2	2.2	4.2	41.6	100.0
Md. :	Miles	19.2	53.4	30.2	83.6	53.0	93.8	104.6	251.4	354.2
	Per Cent	5.4	15.1	8.5	23.6	15.0	26.5	29.5	71.0	100.0
N.Y :	Miles	24.6	101.9	170.8	272.7	492.5	70.4	365.2	928.1	1,225.4
	Per Cent	2.0	8.3	14.0	22.3	40.2	5.7	29.8	75.7	100.0
Pa. :	Miles	40.3	342.4	272.7	615.1	360.2	2.2	562.0	924.4	1,579.8
	Per Cent	2.6	21.7	17.2	38.9	22.8	0.1	35.6	58.5	100.0
R.I.:	Miles	-	28.6	10.7	39.3	-	8.7	22.8	31.5	70.8
	Per Cent	-	40.4	15.1	55.5	-	12.3	32.2	44.5	100.0
Study Area:	Miles	157.2	671.4	554.3	1,225.7	980.1	272.3	1,304.4	2,556.8	3,939.7
	Per Cent	4.0	17.0	14.1	31.1	24.9	6.9	33.1	64.9	100.0
U.S.:	Miles	2,055.0	11,064.3	6,310.7	17,375.0	2,304.4	3,171.6	16,094.0	21,570.0	41,000.0
	Per Cent	5.0	27.0	15.4	42.4	5.6	7.7	39.3	52.6	100.0

rural sections. Then, too, the table must be qualified by pointing out that New Jersey has expended much effort in preliminary engineering, holding hearings on the best route locations, etc. before right-of-way can be purchased and construction can proceed. Table 13 does, however, indicate the task facing the state in constructing its Interstate mileage.

Interstate highway construction needs have been estimated by the New Jersey Department of Transportation in compliance with federal requirements for periodical submission of revised cost estimates for completing the Interstate System. These cost estimates form the basis for apportionment of Interstate funds to the states. The most recent estimate covers the cost of initial construction of the Interstate System from January 1, 1964, to completion. Funds required to complete the Interstate System in New Jersey were estimated as $540 million exclusive of such construction items for which no federal-aid funds will be available. Such excluded items normally are those for which the design criteria are in excess of that required by the Bureau of Public Roads. Of the total amount, $486 million represents the 90 per cent federal share and $54 million is the ten per cent state matching share. Since the time of this estimate, the federal government has apportioned $167 million in Interstate

funds to New Jersey leaving a balance of $319 million due from federal-aid funds. The State Legislature has appropriated $19 million with an outstanding balance of $35 million.

The $35 million comprises only New Jersey's outstanding obligations for initial constructing of the system. The state must also assume all costs of administration and maintenance in perpetuity.

Procedures for Determining Immediate Needs on Other State Highways

The analysis of existing conditions on the highways and streets which form the present State Highway System is the basis for the estimate of the monetary requirements to bring that system to tolerable standards adequate for today's traffic demands.

In the scope of the total study many factors will be considered in the final analysis of highway needs, including the projection of traffic demands on all highway and street facilities in New Jersey for several periods of time into the future. However, the purpose of this Interim Report is to determine the locations, types, extent, and fiscal magnitude of only the most urgent present-day needs on state highways.

Every mile of every highway and street in active service on the State Highway System has been examined, and the physical characteristics of the roadways and structures have been inventoried and recorded. The present condition of the base and surfacing on roadways and structural adequacy of all bridges and other structures on the system have been examined and rated.

The primary basis for identifying existing needs which require corrective action in the immediate future was the relationship between the effective capacity of each highway facility and the actual volume of motor vehicles that each highway facility presently carries. Any identified section of highways serving a volume of traffic in excess of its effective capacity has been termed intolerable for capacity reasons.

In addition to capacity deficiencies, in the interim analysis of the State Highway System surface conditions and subsurface structural conditions were analyzed on all routes. Any route section found to have an intolerable pavement condition was included in the tabulation of backlog needs. Those facilities which indicated some deterioration of pavement

or base but which were rated as having an effective life of one year or more were not included as immediate needs.

In the analysis of the adequacy of bridges and other structures, several items were considered in addition to those effecting roadway tolerability. In all cases where bridges operated with fewer lanes than the approach roadways, and the approach roadways required their total existing lanes for capacity requirements, such bridges were declared inadequate for capacity reasons. Further, any structure with a load rating of less than 20 tons or a vertical clearance of less than 14 feet was tabulated as inadequate. Finally all structures were inspected to determine the extent, if any, of substructure, deck, or superstructure failure. Any serious deficiencies of this type were included as backlog needs.

It should be understood that the analysis of backlog needs for this Interim Report has been limited by a number of factors. Primary among these was the deliberate limitation of the possible deficient item. of roadway conditions to those of capacity, and pavement condition. This limitation was imposed as a result of the limited time available between the inception of New Jersey Highway Needs Study in May, 1966, and the publishing

of this Interim Report, The basic factors considered are expected to identify the most critical of the current deficient highway sections. However, further analyses which will be in greater detail and which will consider supplemental factors associated with level of service can be expected to identify additional backlog highway segments and structures.

Therefore, while the tabulations of current urgent needs on the State Highway System contained in this report are intended to stratify the magnitude of such needs, they should not be considered as all-inclusive.

Recognition has been given to the variations in capacities and improvement costs found in rural and urban areas, and the procedures utilized in developing the data for the Interim Report were intended to permit the most accurate cost estimates commensurate with the objectives of this report. However, such cost estimates have been based only upon the needs of current traffic volumes. Acceptable design policy is to make all improvements adequate for traffic anticipated 20 years from the time of improvement in order to avoid immediate obsolescence of highway improvements.

Therefore, the backlog needs indicated in this Interim Report reflect only the most critical deficiencies observed in the State Highway System. The cost of improvement of such backlog needs reflects only the cost to overcome immediate traffic deficiencies and can be viewed as stopgap measures which will require additional expenditures in the near future if they are to serve anticipated traffic volumes.

Mileage and Cost of Backlog Needs - Other State Highways

The analysis of backlog needs has developed a total of 695 miles on the State Highway System deficient by reason of capacity limitations or pavement conditions of which 17 miles were bridges and other structures, and 678 miles were roadway sections. This mileage represents approximately 36 per cent of the total 1,957 miles on the State Highway System. A total of 611 structures were determined to be in need of immediate improvement. The cost of corrective action for immediate needs which will be accounted for by the 1967 Construction Program have not been included in the tabulation of the backlog needs.

Table 14 lists the mileages of backlog needs by type of deficiency and estimated costs for corrective action.

Table 14

MILEAGES AND ESTIMATED CORRECTIVE COSTS FOR BACKLOG NEEDS

BY DEFICIENCY TYPES[1]

DEFICIENCY TYPE	MILEAGE	COSTS
Pavement Condition	26	$ 80,690,000
Capacity Limitation	652	685,410,000
Bridges and Other Structures[2]	17	44,514,000
TOTAL	695	$810,614,000

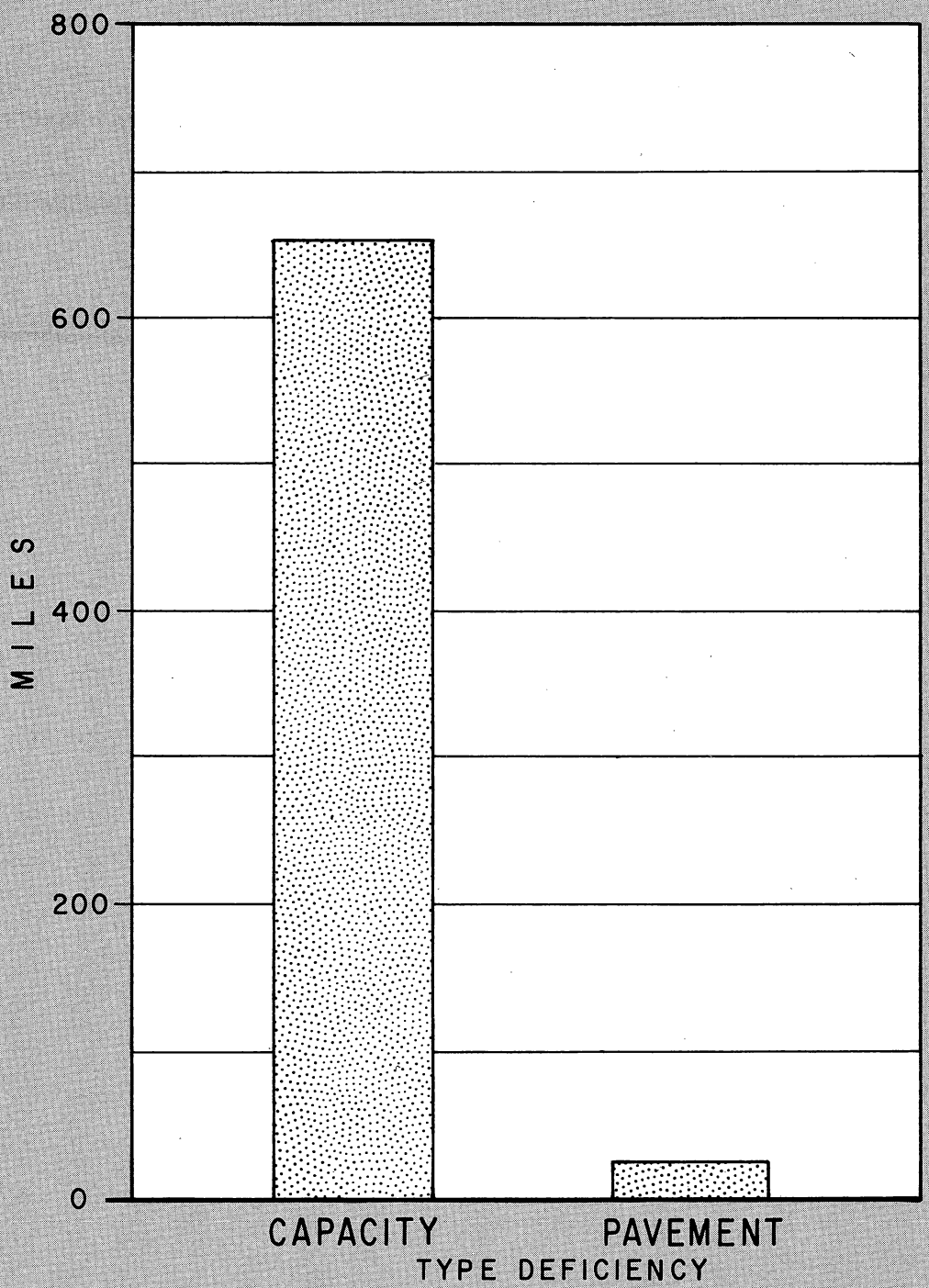
(1) Exclusive of deficiencies to be corrected by the 1967 Construction Program and by previous Construction Programs not yet implemented but for which funds have been appropriated and committed.

(2) The lengths of all deficient structures were deducted from the mileages of all deficient roadway sections, and the costs for structure needs were computed separately.

Illustrated in Figure 5 are the miles of roadway backlog needs by type of deficiency. A total of 678 miles of roadways were determined to be in urgent need of improvement. Of the total deficient roadway miles, only 26 miles were deficient because of deteriorated pavement condition while 652 miles were deficient in capacity.

Characteristically, it is to be expected that, wherever a high percentage of a system's total mileage is found to be deficient by reason of extended operation at greater than effective capacity, this deficiency normally will be accompanied by a significant mileage of inadequate paving conditions. It is therefore, noteworthy that the inspection of the New Jersey State Highways has indicated only a relatively minor mileage with pavement deficiencies. This condition reflects a commendable highway policy which insists upon high design standards for pavements and an effective maintenance program.

Total cost of the most critical backlog needs amounts to $810.6 million. Of this amount, $80.7 million is required to correct pavement deficiencies, $685.4 million for capacity deficiencies, and $44.5 million for structures.



BACKLOG MILES BY TYPE DEFICIENCY

STATE HIGHWAYS

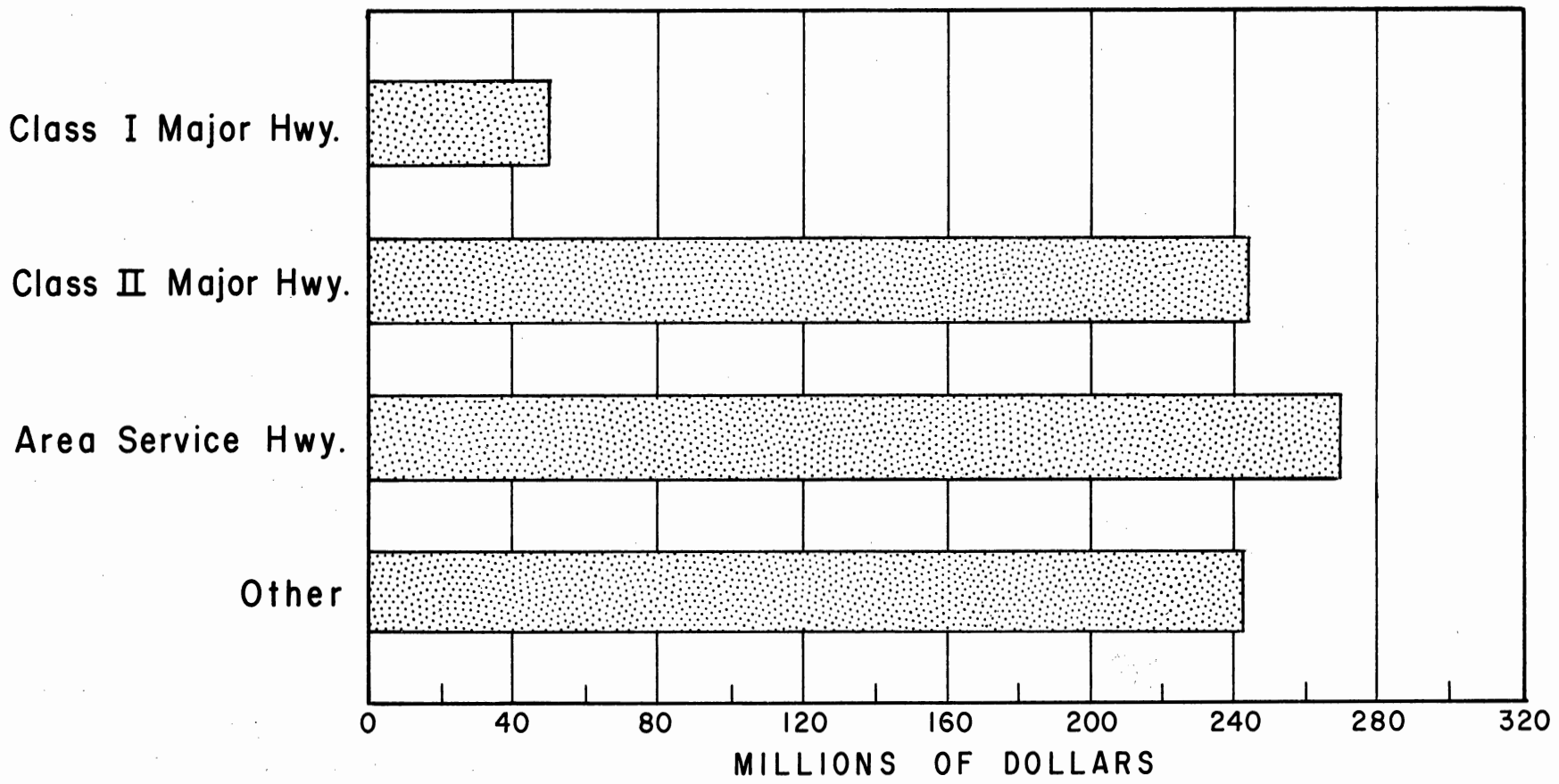
NEW JERSEY

Wilbur Smith and Associates

FIGURE 5

Table 15 lists the types of deficiencies identified by functional classification of the State Highway System. Estimated costs of backlog needs are also included and are illustrated in Figure 6. Twenty miles of Class I Major Highways are critically deficient, requiring $52.7 million in improvements, or 7 per cent of the cost of all backlog needs. A total of 146 miles of Class II Major Highways were estimated to need improvement of $245.5 million, or 30 per cent of all current needs on state highways, not including the Interstate Systems. The cost of correcting deficiencies on 307 miles of deficient Area Service Highways totals $270.1 million, or 33 per cent of the total. Deficiencies of other functional classes of state highways amount to 222 miles, with associated costs of $242.3 million, or 30 per cent of the total.

In the Appendix are listed the mileages and estimated costs of all deficiencies identified in each county, separated according to functional classification of highway. Figure 7 is a map of the State Highway System on which are indicated the approximate locations of the identified deficient route sections.



BACKLOG NEEDS BY FUNCTIONAL CLASSIFICATION

NEW JERSEY

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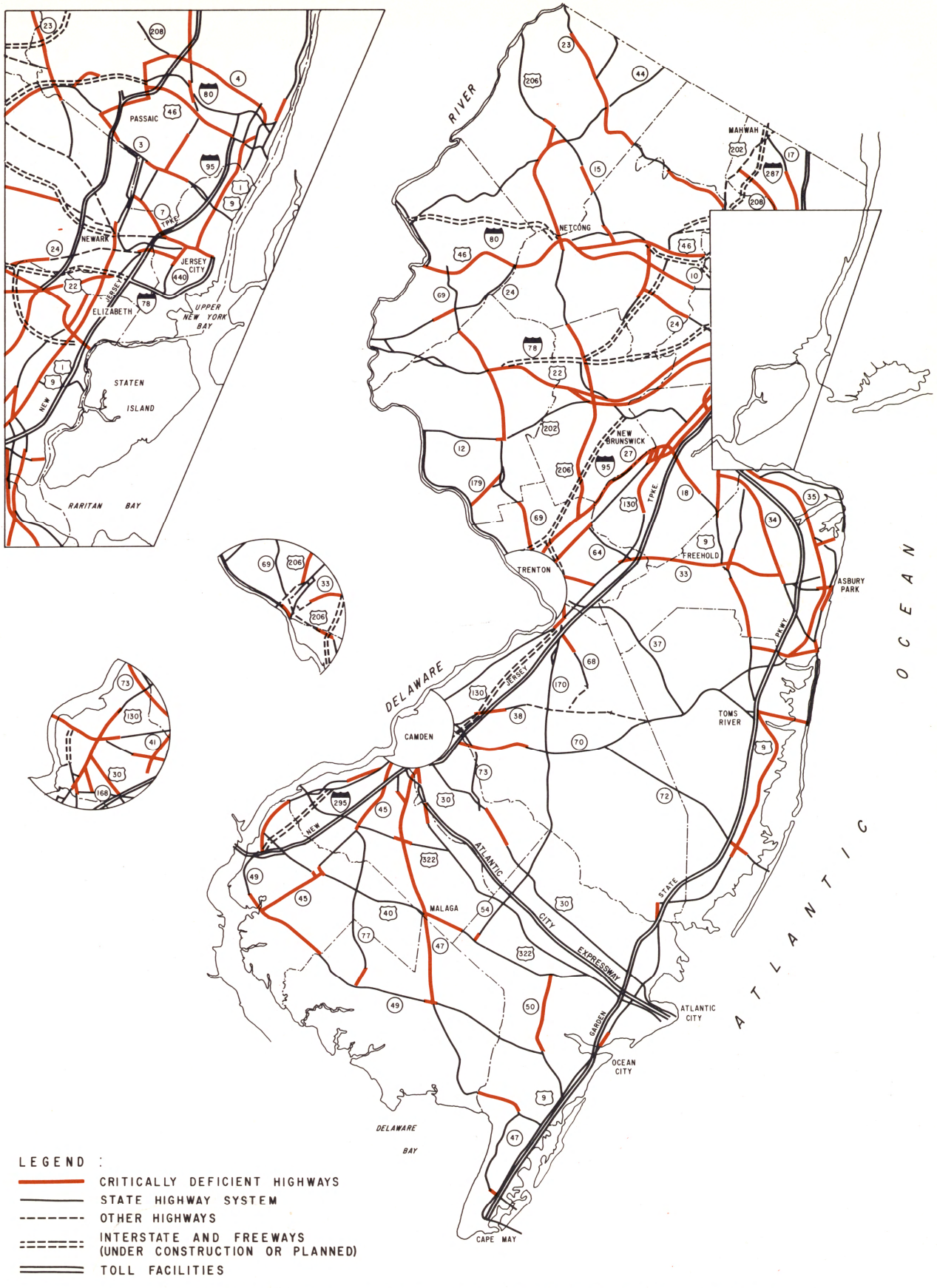
FIGURE 6



EXISTING CRITICAL CONSTRUCTION NEEDS

NEW JERSEY

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FIGURE 7

Table 15

BACKLOG NEEDS BY FUNCTIONAL CLASSIFICATION(1)

FUNCTIONAL CLASSIFICATION	MILEAGE	NEEDS
Class I Major Highways:		
Capacity	18	$ 38,301,000
Pavement	-	-
Bridges and Other Structures	2	14,378,000
Subtotal	20	$ 52,679,000
Class II Major Highways:		
Capacity	142	$219,094,000
Pavement	-	-
Bridges and Other Structures	4	26,439,000
Subtotal	146	$245,533,000
Area Service Highways:		
Capacity	289	$223,598,000
Pavement	12	2,544,000
Bridges and Other Structures	6	43,947,000
Subtotal	307	$270,089,000
Other Classifications:		
Capacity	203	$205,584,000
Pavement	14	1,087,000
Bridges and Other Structures	5	35,642,000
Subtotal	222	$242,313,000
TOTAL	695	$810,614,000

(1) Exclusive of backlog needs to be corrected by the 1967 Construction Program and by previous Construction Programs not yet implemented but for which funds have been appropriated and committed.

Maintenance and Administration

Progress on overcoming the backlog of urgently needed construction can only be made after the fixed commitments of the New Jersey Department of Transportation have been met. These commitments include maintenance and administrative overhead in addition to providing the state's share of matching money necessary to qualify for Federal-aid Interstate funds.

In the annual appropriation for state highway purposes, the general administration of the Department of Transportation and the construction of Department of Transportation installations are individually itemized. The item "general administration" includes appropriations for maintenance.

As shown in Table 16, maintenance and administration totaled $23.5 million for 1967. An additional $0.7 million was appropriated for highway department installations for a total of $24.2 million. This is a 51 per cent increase over the $16.0 million for these purposes in 1957.

Table 16

MAINTENANCE AND ADMINISTRATION APPROPRIATIONS

TO THE

NEW JERSEY STATE HIGHWAY DEPARTMENT

FISCAL YEAR	MAINTENANCE AND ADMINISTRATION	HIGHWAY DEPT. INSTALLATIONS	TOTAL
1957	$15,769,434	$265,000	$16,034,434
1958	16,414,132	233,000	16,647,132
1959	17,872,464	375,000	18,247,464
1960	19,413,577	300,000	19,713,577
1961	20,172,992	-	20,172,992
1962	20,389,298	121,000	20,510,298
1963	21,618,758	745,000	22,363,758
1964	22,360,489	267,000	22,627,489
1965	24,392,504	455,000	24,847,504
1966	21,294,793	479,400	21,774,193
1967	23,507,899	710,000	24,217,899

SOURCE: 1957-1965 Annual Budget Messages of the Governor; 1966: Chapter 112, Laws of 1965; 1967: Assembly Bill No. 550 (1966 Legislative Session).

Chapter 6

SUMMARY

From the preceding sections of this report, the tremendous problems facing the New Jersey Department of Transportation are evident. Tremendous growth in population and associated increases in vehicle registration have created additional travel demands far in excess of the Department's ability to improve its highway system under present financing policies. A 45 per cent growth in statewide travel in the ten years ending 1965, is expected to be accelerated in the forthcoming decade. This will further accentuate an already critical situation. The need for additional revenues to overcome existing backlog needs and to keep pace with future needs which will arise can not be over emphasized.

The 1967 legislative appropriation to the New Jersey Department of Transportation totals $158.4 million. Of this amount, however, only $90.6 million is available for state highway purposes. The remaining $67.8 million is for state aid to local governments, the Division of Railroad Transportation, and debt service on outstanding bonds.

Of the amount for state highway purposes, $24.2 million is for maintenance and administration. This deduction leaves $66.4 million for matching of federal-aid funds and for projects requiring 100 per cent state funds.

Assuming that the federal Interstate apportionment for 1968 would be matched by state funds appropriated in 1967, a total of $8.7 million would be required from state funds. This would provide for a total expenditure of $86.8 million on the Interstate System in fiscal year 1968.

The assumed deduction of Interstate matching funds would leave a balance of $57.7 million in state funds for highway construction needs on other state highways.

Federal-aid apportionments for the primary, secondary, and urban systems total $18.9 million for 1967. Of this amount, $2.0 million is for the secondary system and is allocated to the counties, leaving $16.9 million for state highways.

Therefore, the total amount of funds available in 1967 for construction on state highways, exclusive of the Interstate System, totals $74.6 million. This includes $57.7 million in state funds and $16.9 million in federal funds.

With $811 million in critically deficient highways, exclusive of the improvements already scheduled in the 1967 construction program of the New Jersey Department of Transportation the magnitude of the problem becomes self-evident. Additional needs, over 10 times the funds available in 1967, will tend to restrict the potential growth and economic prosperity of the state.

The seriousness of the situation is magnified by the fact that the $811 million in critical needs is not a static value which can be slowly eliminated in the ensuing years. Additional needs will continue to develop as more and more travel results from the growing numbers of people and vehicles expected in the future. Other demands will also effect the ability of the state to overcome the present deficiencies. An acceleration of the Interstate program will be required if the system is to be completed by 1972. In addition, the maintenance budget will steadily increase as Interstate freeways are constructed, further depleting the funds which may be used for construction improvements.

The facts presented herein have been intended to illustrate the magnitude of critical backlog needs on the State Highway System and to indicate the level of current financing.

At this time, no specific recommendations can be made as to the proper courses of future improvement and financial programs. However, the present status of the State Highway System indicates that additional revenues will be required if New Jersey is to meet the demands of highway travel and achieve the potential economic growth that a good highway system can foster.

A P P E N D I X

Appendix Table

MILEAGES AND COSTS OF DEFICIENCIES BY TYPE ACCORDING TO FUNCTIONAL CLASSIFICATION OF DEFICIENT FACILITIES

COUNTY	CAPACITY LENGTH (miles)	DEFICIENCY COST (thousands)	PAVEMENT LENGTH (miles)	DEFICIENCY COST (thousands)	STRUCTURE DEFICIENCY ALL TYPES Number	STRUCTURE DEFICIENCY ALL TYPES Cost (thousands)	TOTAL COSTS (thousands)
Atlantic							
Class I Major	-	-	-	-	-	-	-
Class II Major	1.0	$ 362	-	-	-	-	$ 362
Area Service	-	-	4.9	$ 1,841	3	$ 67	1,908
Other	1.7	831	7.9	566	1	1,296	2,693
Bergen							
Class I Major	-	-	-	-	-	-	-
Class II Major	27.9	46,433	-	-	60	9,570	56,003
Area Service	5.7	6,202	-	-	9	2,974	9,176
Other	8.7	14,593	-	-	16	11,107	25,700
Burlington							
Class I Major	-	-	-	-	-	-	-
Class II Major	14.3	6,300	-	-	8	766	7,066
Area Service	10.4	6,533	-	-	5	134	6,667
Other	5.0	2,120	2.7	360	5	227	2,707
Camden							
Class I Major	-	-	-	-	-	-	-
Class II Major	7.2	12,840	-	-	11	1,129	13,969
Area Service	9.9	11,131	-	-	5	916	12,047
Other	8.2	8,519	-	-	28	2,522	11,041

Appendix Table (Cont'd)

COUNTY	CAPACITY LENGTH (miles)	DEFICIENCY COST (thousands)	PAVEMENT LENGTH (miles)	DEFICIENCY COSTS (thousands)	STRUCTURE DEFICIENCY ALL TYPES Number	STRUCTURE DEFICIENCY ALL TYPES Cost (thousands)	TOTAL COSTS (thousands)
Cape May							
Class I Major	-	-	-	-	-	-	-
Class II Major	-	-	-	-	-	-	-
Area Service	-	-	-	-	-	-	-
Other	7.4	2,977	-	-	3	381	3,358
Cumberland							
Class I Major	-	-	-	-	-	-	-
Class II Major	-	-	-	-	-	-	-
Area Service	3.2	2,358	-	-	2	124	2,482
Other	9.1	3,465	-	-	2	19	3,484
Essex							
Class I Major	4.0	6,220	-	-	12	8,274	14,494
Class II Major	3.7	2,882	-	-	7	738	3,620
Area Service	3.4	9,076	-	-	10	10,644	19,720
Other	5.9	11,982	-	-	5	495	12,477
Gloucester							
Class I Major	-	-	-	-	-	-	-
Class II Major	-	-	-	-	-	-	-
Area Service	14.2	5,543	-	-	6	360	5,903
Other	25.1	11,435	-	-	9	108	11,543
Hudson							
Class I Major	-	-	-	-	-	-	-
Class II Major	1.9	3,538	-	-	6	2,419	5,957
Area Service	10.9	18,362	-	-	11	3,090	21,452
Other	1.0	975	-	-	2	12	987

Appendix Table (Cont'd)

COUNTY	CAPACITY DEFICIENCY LENGTH (miles)	DEFICIENCY COST (thousands)	PAVEMENT DEFICIENCY LENGTH (miles)	DEFICIENCY COSTS (thousands)	STRUCTURE DEFICIENCY ALL TYPES Number	Cost (thousands)	TOTAL COSTS (thousands)
Hunterdon							
Class I Major	-	-	-	-	-	-	-
Class II Major	20.2	11,210	-	-	20	1,121	12,331
Area Service	9.5	5,042	-	-	1	23	5,065
Other	0.2	226	-	-	2	186	412
Mercer							
Class I Major	0.3	954	-	-	3	457	1,411
Class II Major	5.2	6,446	-	-	2	46	6,492
Area Service	19.8	12,595	-	-	8	419	13,014
Other	5.2	3,717	-	-	9	1,110	4,827
Middlesex							
Class I Major	7.3	6,289	-	-	6	1,656	7,945
Class II Major	9.6	4,223	-	-	9	4,375	8,598
Area Service	14.6	26,148	7.6	703	24	13,029	39,880
Other	24.7	41,152	2.4	134	29	3,602	44,888
Monmouth							
Class I Major	-	-	-	-	-	-	-
Class II Major	9.7	4,951	-	-	4	186	5,137
Area Service	28.7	14,503	-	-	8	1,399	15,902
Other	16.9	10,611	-	-	5	290	10,901

Appendix Table (Cont'd)

COUNTY	CAPACITY DEFICIENCY LENGTH (miles)	DEFICIENCY COST (thousands)	PAVEMENT DEFICIENCY LENGTH (miles)	DEFICIENCY COSTS (thousands)	STRUCTURE DEFICIENCY ALL TYPES Number	Cost (thousands)	TOTAL COSTS (thousands)
Morris							
Class I Major	-	-	-	-	-	-	-
Class II Major	1.4	935	-	-	1	23	958
Area Service	15.3	14,545	-	-	7	267	14,812
Other	32.1	38,449	-	-	28	2,741	41,190
Ocean							
Class I Major	-	-	-	-	-	-	-
Class II Major	2.0	88	-	-	-	-	88
Area Service	30.7	10,323	-	-	6	4,027	14,350
Other	11.0	5,905	-	-	7	910	6,815
Passaic							
Class I Major	-	-	-	-	-	-	-
Class II Major	10.1	29,535	-	-	31	4,113	33,648
Area Service	9.5	13,643	-	-	8	1,267	14,910
Other	3.7	6,887	0.6	27	15	2,313	9,227
Salem							
Class I Major	-	-	-	-	-	-	-
Class II Major	-	-	-	-	-	-	-
Area Service	25.6	11,120	-	-	6	255	11,375
Other	-	-	-	-	-	-	-
Somerset							
Class I Major	-	-	-	-	-	-	-
Class II Major	9.6	29,859	-	-	8	801	30,660
Area Service	41.7	24,921	-	-	41	2,542	27,463
Other	5.5	3,403	-	-	7	116	3,519

Appendix Table (Cont'd)

COUNTY	CAPACITY LENGTH (miles)	DEFICIENCY COST (thousands)	PAVEMENT LENGTH (miles)	DEFICIENCY COSTS (thousands)	STRUCTURE DEFICIENCY ALL TYPES Number	STRUCTURE DEFICIENCY ALL TYPES Cost (thousands)	TOTAL COSTS (thousands)
Sussex							
Class I Major	-	-	-	-	-	-	-
Class II Major	5.0	2,943	-	-	2	25	2,968
Area Service	13.7	7,891	-	-	9	179	8,070
Other	15.1	6,997	-	-	10	436	7,433
Union							
Class I Major	6.4	24,838	-	-	18	3,991	28,829
Class II Major	12.9	56,549	-	-	11	1,127	57,676
Area Service	7.4	15,690	-	-	11	1,883	17,573
Other	14.2	29,907	-	-	11	7,258	37,165
Warren							
Class I Major	-	-	-	-	-	-	-
Class II Major	-	-	-	-	-	-	-
Area Service	14.7	7,972	-	-	11	348	8,320
Other	2.9	1,433	-	-	7	513	1,946
TOTAL							810,614


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