



**DELAWARE
HIGHWAY
NEEDS TO
1985**

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SUMMARY

The present highway network has spurred the economic growth of Delaware and the development of its industrial, agricultural, and recreational opportunities. It has also created problems that demand courageous action and confidence in our future if practical and effective solutions are to be achieved.

HIGHWAY IMPROVEMENTS COSTING \$125 MILLION ARE NEEDED TO CORRECT THE EXISTING DEFICIENCIES IN THE STATE HIGHWAY SYSTEM.

\$628 MILLION WILL BE NEEDED FOR HIGHWAY IMPROVEMENTS FROM NOW UNTIL 1985.

ANNUAL CONSTRUCTION PROGRAMS OF \$37 MILLION PER YEAR WILL BE NEEDED TO PROVIDE A COMPLETELY ADEQUATE HIGHWAY SYSTEM BY 1985.

ASSUMING THAT THE TOTAL AMOUNT OF FEDERAL AID FUNDS WILL CONTINUE AT THE PRESENT LEVEL UNTIL 1985, STATE FUNDS NEED TO BE PROVIDED AT A LEVEL OF \$26.9 MILLION PER YEAR.

RECOMMENDATIONS

TO PROVIDE FOR THE LONG RANGE HIGHWAY NEEDS, IT IS IMPORTANT THAT DELAWARE'S CAPITAL IMPROVEMENT BUDGET AUTHORIZE \$26.9 MILLION A YEAR FOR HIGHWAY IMPROVEMENTS BEGINNING WITH FISCAL YEAR 1968.

TO PERMIT THE ADVANCE PLANNING NECESSARY TO ACCOMPLISH THE IMPROVEMENTS NEEDED AFTER COMPLETION OF THE INTERSTATE SYSTEM (AND PRIOR TO 1985), IT IS EQUALLY IMPORTANT THAT AN ADEQUATE CONTINUING FEDERAL AID HIGHWAY PROGRAM BE AUTHORIZED.

TO PROTECT PAST AND FUTURE HIGHWAY INVESTMENTS, IT IS NECESSARY TO PLACE INCREASED EMPHASIS ON THE USE OF ACCESS CONTROL AS WELL AS PLANNING AND ZONING CONTROLS.

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STATE HIGHWAY DEPARTMENT

P. O. BOX 778 DOVER, DELAWARE 19901

February 1, 1967

Mr. Henry T. Price
Chairman
Delaware State Highway Department
Dover, Delaware

Dear Mr. Price:

This report entitled "Delaware Highway Needs" presents the nature and magnitude of highway improvements from today until 1985.

The adequacy of the existing highway system is reviewed, the improvements needed by 1985 are outlined, and the inadequacies of existing incomes are illustrated.

The problem of financing an adequate system of roads and streets is presented for review by the people of Delaware. The cost of transportation cannot be avoided. Either the government will provide an efficient highway system, or the highway users will pay in terms of inefficient, inconvenient and unsafe travel.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Ernest A. Davidson".

Ernest A. Davidson
Director

IMPROVED HIGHWAYS WILL BENEFIT EVERY DELAWAREAN

Properly planned and timely constructed highways can make the total environment more pleasing, widen the range of employment opportunities, assist in guiding and stabilizing land utilization patterns, and improve the accessibility of the entire state for the movement of people and goods.

Highway improvements will offer definite benefits to every Delaware citizen.

- **AS MOTORISTS**, they will receive direct savings from less expensive vehicle operation, time savings and fewer accidents.
- **AS TAXPAYERS**, their past investments in highways will be protected, maintenance costs will be reduced and the accompanying improvements in the economy will broaden the tax base.
- **AS PROPERTY OWNERS**, highways will increase the value of adjacent land, provide better access to remote areas, and improve the environment by relieving congestion on presently overcrowded routes.
- **AS DELAWAREANS**, their increased mobility will enhance the over-all economic, social and recreational climate of the state.

Delaware citizens should realize that they pay for good highways even if those highways never materialize. Road users pay sales and motor fuel taxes to the Federal Government (and will continue to pay) whether or not a fair share of these dollars is returned to Delaware for highway construction. They are paying for the cost of accidents which could be eliminated by improved highways. They are paying through inefficient operation of vehicles on congested highways.

BACKGROUND

The Director of Operations is charged with the responsibility for reporting to the State Highway Department concerning the condition of Delaware highways and their needed improvements. Previous Highway Needs reports were submitted in 1948, 1955 and 1961. It is satisfying to note that some of the recommendations of these previous reports have become or are becoming a fact. Earlier recommendations have included:

A CONTINUING ADEQUATE SOURCE OF INCOME

STATEWIDE CONTROL OF ACCESS LEGISLATION

ADEQUATE ZONING AT ALL LEVELS

AN OVERALL PLAN FOR FUTURE HIGHWAYS

THE DEVELOPMENT OF THE "INTERSTATE SYSTEM"

LEGISLATION TO EARMARK HIGHWAY USER TAXES FOR HIGHWAY IMPROVEMENTS

OBJECTIVE

The objective of this Report is to present in general terms the adequacy of the existing highway system, the future demands placed on it, and the total amount of improvements needed by the year 1985.

Answers to the following questions are presented:

ARE DELAWARE HIGHWAYS ADEQUATE?

WHAT KIND OF HIGHWAY SYSTEM WILL BE NEEDED BY 1985?

HOW MUCH WILL IT COST TO DEVELOP A SAFE, CONVENIENT AND EFFICIENT HIGHWAY SYSTEM BY 1985?

ARE PRESENT SOURCES OF FUNDS ADEQUATE?

This is not a compilation of grandiose highway route proposals, nor is it based upon the wishful thinking that the need for automobile transportation will disappear. Instead, it is the Department's best estimate of what will be needed to provide the level of service that is commensurate with the desires of the citizens of Delaware.

By knowing in advance the extent of the highway improvements and the need for funds, the decision makers can accomplish the most intelligent budgeting of improvements. At the same time, the homeowner, farmer, merchant, developer and industrialist can invest in our State with the knowledge that good highway transportation will continue to be provided within a known budget.

SCOPE

This report presents the needs of all roads and streets for which the State Highway Department is responsible. The 4316 miles of State maintained roads and streets include:

Interstate System	40.5 miles
Federal-Aid Primary System	578.4 miles
Federal-Aid Secondary System	1475.9 miles
Tertiary System	2221.3 miles
Total	4316.1 miles

The Interstate, Primary and Secondary Systems are classified according to type of federal-aid designation. The Tertiary System consists of all state maintained roads for which federal-aid funds are not eligible for improvements, and includes 1723 miles of minor roads and 498 miles of residential

streets in suburban unincorporated communities.

This report does not include the needs of the Delaware Memorial Bridge, the John F. Kennedy Turnpike or the Lewes-Cape May Ferry. Nor, does the report cover the needs of the 490 miles of local municipal streets for which \$2,000,000 is apportioned each year directly to the municipalities for the purpose of maintaining and improving these streets. Also, not included is the cost of the original construction of streets in suburban communities, provided by the developer at his own expense.

HIGHWAY GOALS

The objective of the highway network is to aid State and National goals in creating a better total living and working environment. The highway system, being a part of the overall transportation system, is a basic force in shaping Delaware's future development.

An efficient transportation system, of which the highway network is an integral part, can provide the mobility and convenience necessary for all individuals to exercise their freedom of choice of jobs, residences, goods, services, and other amenities.

The highway network should provide for the movement of people and goods with maximum safety, economy, efficiency, convenience and dispatch, and result in the minimum disruptive influences on adjacent land utilization, existing neighborhoods, and scenic and historic sites. It should do this at the least total expense to the Government and highway users.

Also, the highway network should improve the general welfare by promoting a desirable pattern of land utilization and by serving that pattern.

EXISTING CONDITIONS

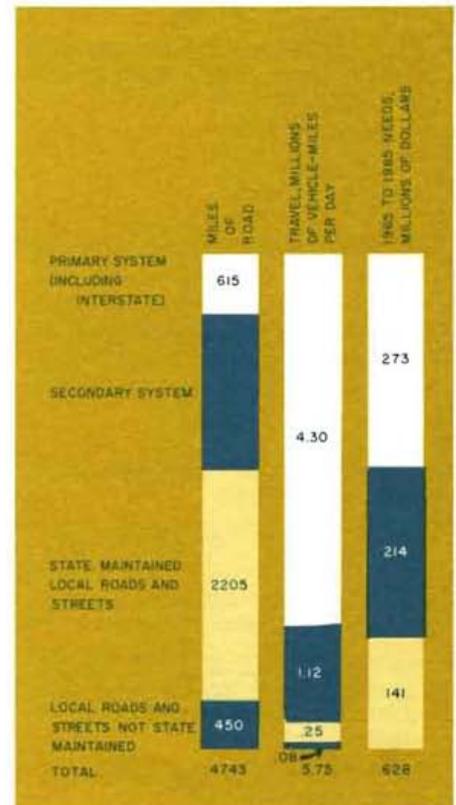
The Delaware State Highway Department is responsible for many types of highways. Design characteristics vary from the most primitive to modern interstate standards. Traffic volumes vary from just a few vehicles per day on some roads to more than 40,000 vehicles per day on U.S. 13 south of Farnhurst and on I-95 east of Farnhurst. The variety is endless, but all these roads combine to form the State Highway System.

Until 1935, the three County Levy Courts were responsible for public roads. The lack of adequate coordination resulted in poor continuity in the total system. In 1917, with experience gained from the Coleman DuPont Road and with grants established by the Federal Road Act of 1916, the Delaware State Highway Department was formed. In 1935, all roads maintained by the counties were made the responsibility of the State Highway Department.

Even today, Delaware is one of just three states whose State Highway Department is responsible for all roads. Although Delaware's system places a heavy financial and administrative burden on the State, it does result in more efficient operation and maintenance, more equitable priorities in highway development, and more consistent design standards and levels of maintenance.

Since 1916, Federal Aid programs have continued to increase

in magnitude and scope. Highway systems in Delaware are now classified according to the source of Federal reimbursement for new construction and reconstruction. The newest and most dramatic Federal expenditure for highways is the Interstate Highway System which connects the major cities and regions of the country. The Federal-Aid Primary system (FAP) connects principal communities within Delaware and in adjoining states. The Federal-Aid Secondary system (FAS) complements the primary system by providing roads connecting smaller communities and serving less important lines of travel. Tertiary roads are roads of a strictly local nature and receive no Federal assistance. They include both local rural roads and suburban development streets.



Divided, controlled-access highways of the Interstate System provide convenient, safe and economical transportation.

I-95 construction completed in South Wilmington.

THE INTERSTATE SYSTEM

The National System of Interstate Highways, now moving toward completion, is shrinking travel distances and times across the nation, improving the safety of highway travel, and providing new impetus to local and regional development of all types. The system first gained recognition in the Federal Aid Highway Act of 1944, which provided for 40,000 miles of interstate routes connecting 90% of the cities with populations over 50,000. Although the total mileage of the Interstate System is only 1.2% of the entire national road mileage, it will carry 20% of all travel.

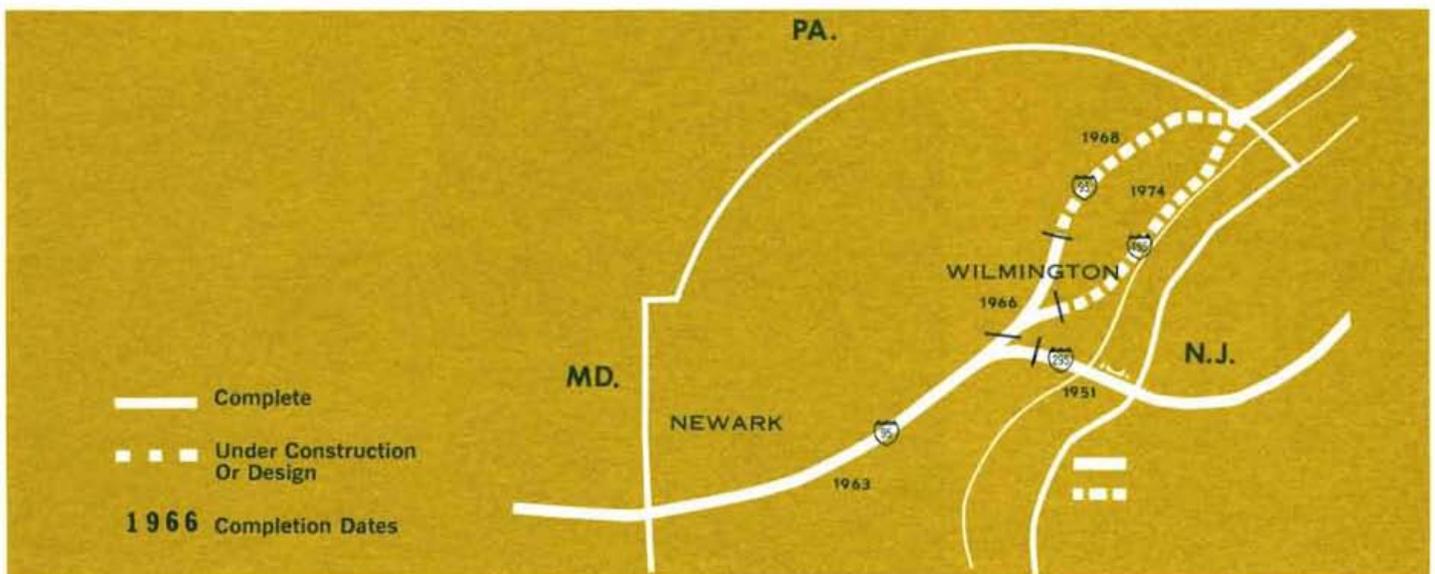
The specifications for the Interstate System are uniform throughout the country. They include control of access, complete grade separations, no stops or traffic signals, and uniform design standards.

Even though Delaware's share of the Interstate Routes account for less than 0.1% of the total national mileage, it is important because of its strategic location within the



New York to Washington travel corridor.

The original target date for completion of the Interstate System was 1972. Some delay in that date now seems probable. It is presently planned that I-95 will be completed to the Pennsylvania state line by 1968, with I-495 scheduled for completion as Federal funds are made available.



Delaware's primary routes accommodate 75% of all traffic.

THE PRIMARY SYSTEM

The Federal Highway Act of 1921 strengthened the act of 1916 by requiring states to designate up to 7% of their rural road mileage as a connected road system. This system has since become known as the Federal Aid Primary system.

In Delaware, the Primary system has experienced steady growth. In 1921, it totaled only 351 miles. Now, the 615 miles of Primary highways and their urban extensions comprise 13% of the State highway mileage, and carry 75% of all vehicle miles of travel in the State. The Delaware Primary routes are shown on the opposite page.

The needed improvements to the Primary system were last determined by a sufficiency survey

conducted during 1965.

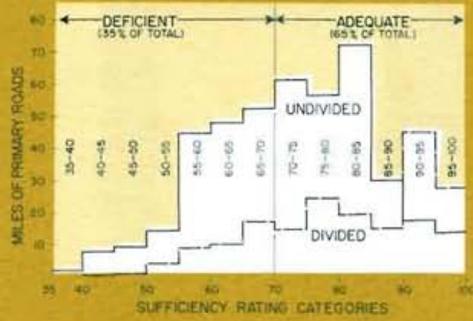
A sufficiency survey is a highway planning procedure which measures the adequacy of each section of road. A perfect road section is assigned 100 points. Points are then deducted for conditions which are not desirable; the more serious the inadequacy, the greater the amount of the deduction. The total rating includes three elements: condition, safety, and service. Each element is further divided into measurable items and points assigned to each according to its relative importance.

On the Primary system a rating of 70 is considered adequate. All roads with ratings below 70 are considered for improvement and are indicated by the heavy line on the map.



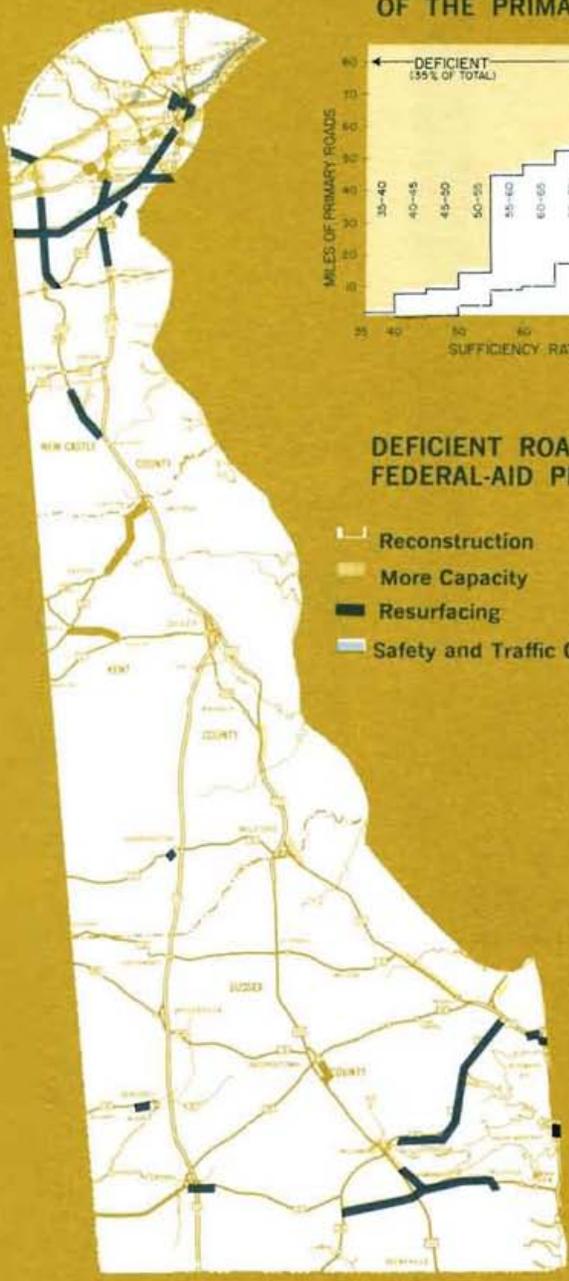
Fast, long-distance travel between various regions of the State is carried on the Primary system.

SUFFICIENCY RATINGS OF THE PRIMARY SYSTEM



DEFICIENT ROAD SECTIONS FEDERAL-AID PRIMARY SYSTEM

-  Reconstruction
-  More Capacity
-  Resurfacing
-  Safety and Traffic Capacity Improvements



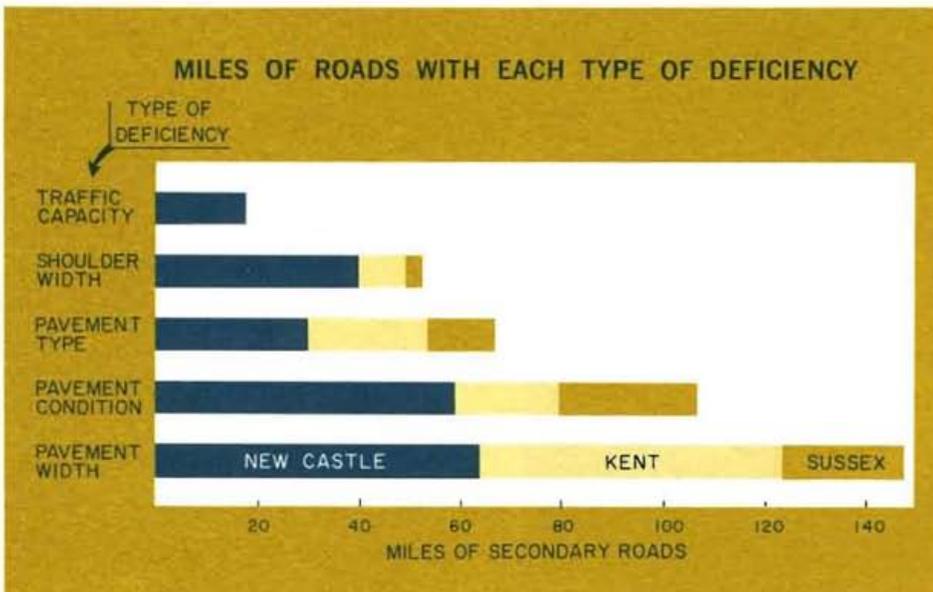
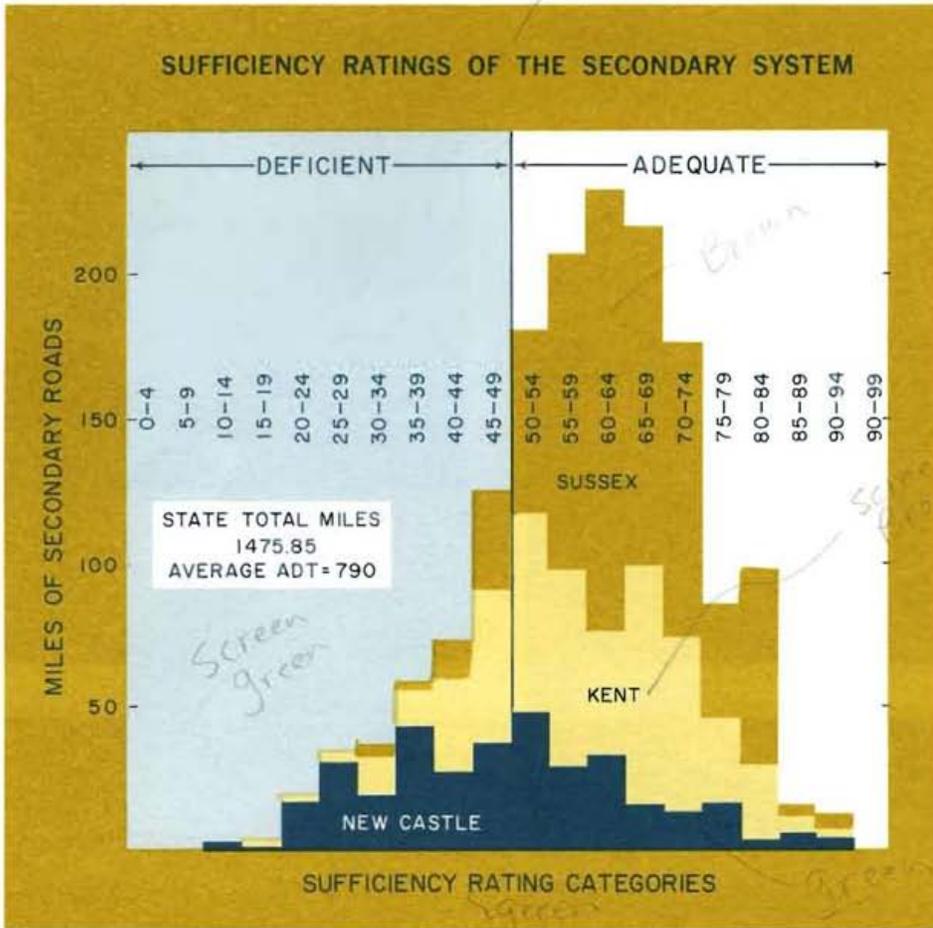
Delaware's Secondary system is designed to serve rural transportation and connect small communities with the Primary system.

THE SECONDARY SYSTEM

The Federal Aid Highway Act of 1944 required the designation of a system of secondary highways. This system includes such uses as farm to market roads, rural mail routes, public school bus routes, feeder roads to the primary routes, links between small communities, and access routes to recreational or industrial traffic generators.

The 1475.9 miles of Secondary roadways in Delaware are 34% of the total highway mileage in the State, and carry 20% of the vehicle miles traveled.

The Secondary system was rated by a sufficiency survey similar to the procedure used on the Primary system. However, lower standards



Local streets and roads serving rural and suburban residences comprise the Tertiary system. Included are streets built by developers which are accepted into the system upon Department inspection and approval.

of design are expected of the secondary roads and a rating of 50 points is considered adequate.

The secondary road problem is so severe in that fully two-thirds of this system or about 1000 miles have inadequate pavement width, type or condition.

THE TERTIARY SYSTEM

The Tertiary system, nearly 52% of total State highway mileage, has the greatest mileage of any system in the State.

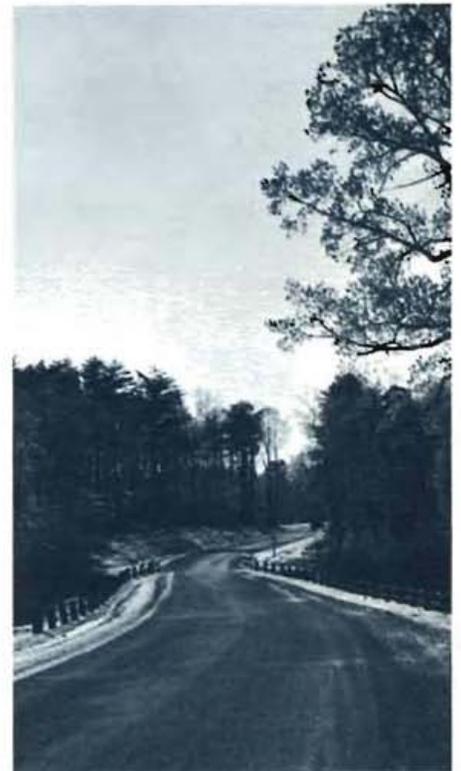
Tertiary roads are purely local in nature, serving rural and suburban residences. They generally comprise the road system maintained by the Levy Courts before 1935 and the streets in suburban developments.

Being so vast, the Tertiary system requires large expenditures in relation to the amount of traffic it carries. Not only must the great mileage of the system be maintained in good condition, but the obsolete roadway must be maintained and improved to modern standards.

Narrow lanes must be widened. More than 1300 miles have surfaces less than 20 feet wide. Many curves, poor grades, intersections, and sight distances must be improved. It is not surprising that the Tertiary system has the highest accident rate.

Furthermore, there are about 700 bridge structures on the system which are over 30 years old and are narrow, on unsafe alignments and are incapable of carrying legal vehicle loads.

Streets in suburban developments which are accepted into the State highway system require little expenditure initially. There are, however, many miles of streets that were constructed long ago and now need reconstructing.



Grade separation utilizing reinforced concrete trestles as I-95 continues to grow.

TYPES OF HIGHWAY IMPROVEMENTS

In the pursuit of the goal of a desirable highway network, the Department's construction program includes several categories of improvements. Each is characterized by its own particular problems, urgency and total cost. Separately, each fulfills a specific purpose; together they constitute the total highway program.

COMPLETION OF THE INTERSTATE SYSTEM is desired at the earliest practical date. In 1963, the farsighted Delaware Legislature authorized the State funds necessary for the completion of this system. The amount of Federal-Aid Interstate funds apportioned to Delaware varies from year to year. The current Federal rate of allocation provides for I-95 to be opened to travel by 1968. I-495 will be completed as Federal funds are made available.



PRIMARY ROUTE IMPROVEMENTS provide for the new construction, up-grading and reconstruction of the main arterial routes carrying traffic in the high volume corridors throughout the State.

Another high-volume roadway takes shape in the Primary system.

A hot-mix roller puts the finishing touches on a resurfacing project on a Secondary road.

Many suburban streets require reconstruction or resurfacing.



SECONDARY AND TERTIARY ROUTE IMPROVEMENTS provide for the widening, resurfacing and reconstruction of roads and streets not on the Primary system.



SUBURBAN DEVELOPMENT STREETS — The Highway Department is responsible for maintaining certain streets within unincorporated suburban communities. Many of these streets are in very poor condition and require reconstruction or resurfacing.



Safety is a major factor in the replacement of narrow bridges.

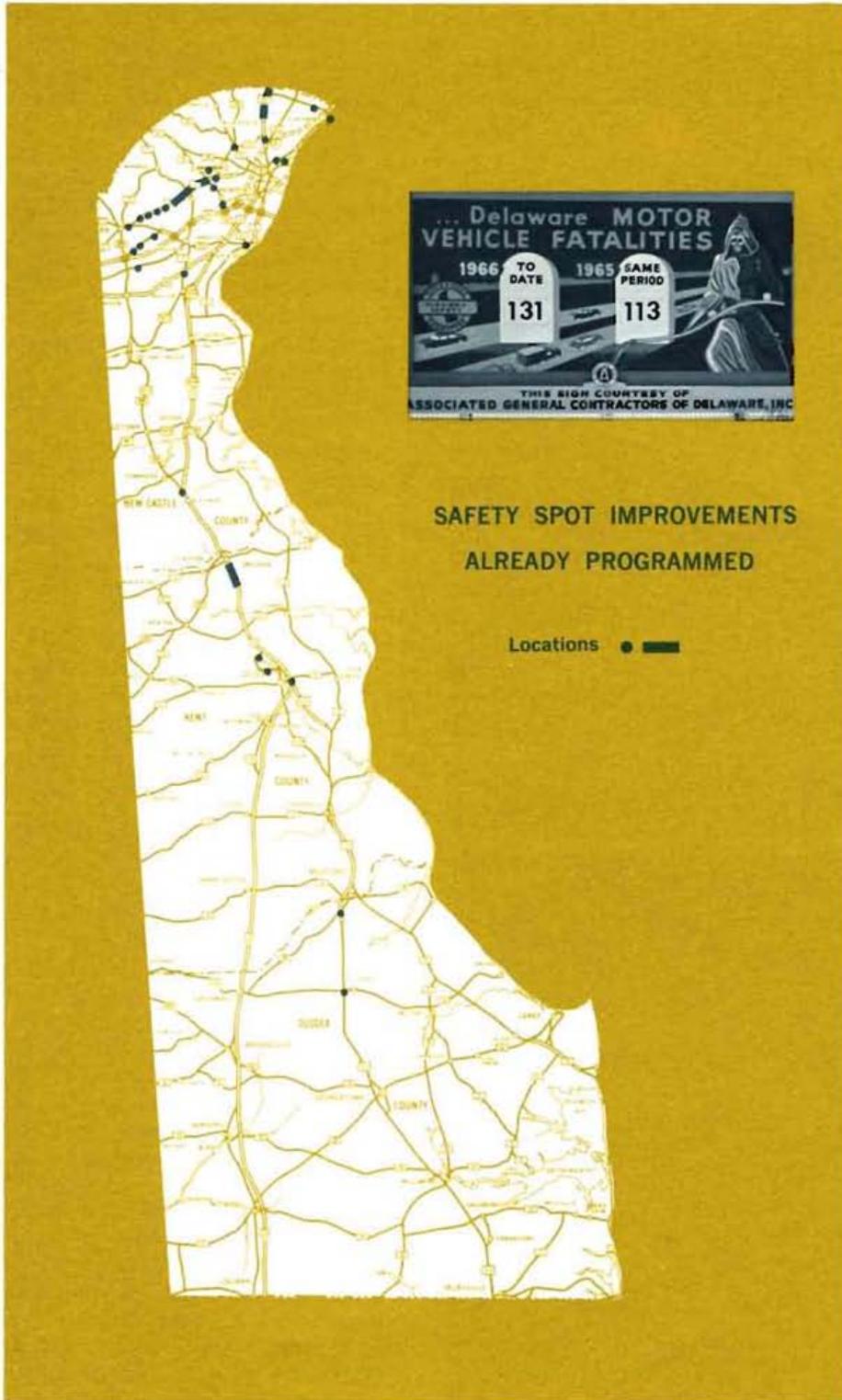
SMALL BRIDGE REPLACEMENT PROGRAM — There are approximately 1400 bridges, box culverts, and minor drainage structures on the State highway system. Many are functionally inadequate, present severe maintenance problems and have questionable life expectancy. There are 250 structures on the State system which are incapable of carrying legal loads. Another 130 are inadequate to safely serve two-lane traffic.



SAFETY SPOT IMPROVEMENT PROGRAM — In response to the growing national concern about the dangers and hazards of highway travel, the State Highway Department is conducting a program of improvements at locations with poor accident records and apparent hazards. Eventually, these improvements would have been made along with the upgrading or reconstruction of the entire route. This program means that the spot locations are being improved ahead of schedule so that the maximum benefit can be realized.

Fortunately, accidents and fatalities have not increased as rapidly as travel. In the past decade, the total number of accidents increased 76% and fatalities 45% while travel was increasing

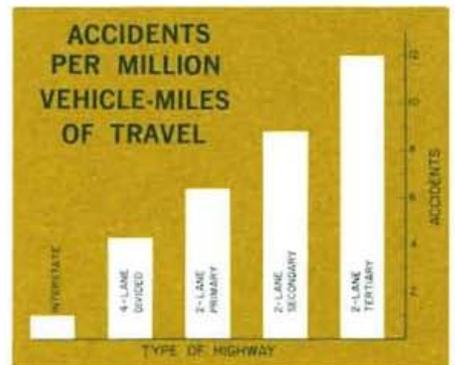
Safety spot improvement program aims to give the driver the largest possible margin for error.

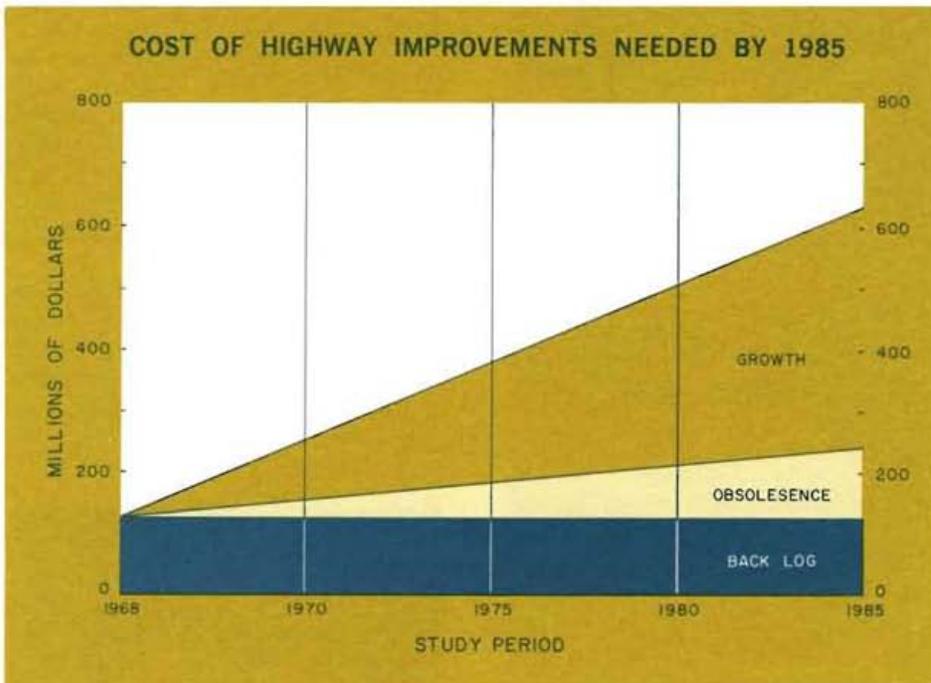


80%. Simply knowing that the accident rate per million vehicle miles of travel is continually being reduced is not the goal of the Department. The objective of the safety spot improvement program is to make as great an impact as possible on reducing the total number of accidents.

Projects accomplished or about to be completed by this program are indicated on the map of Delaware. They have been relatively minor in expense, but they are improvements that hopefully can save the experience of a tragic accident.

A total of 98 locations are scheduled for improvements by the end of 1970. Although these improvements represent less than 2% of the road mileage within the State, they are the location of nearly 1/3 of all accidents.





HIGHWAY IMPROVEMENTS NEEDED IMMEDIATELY

HIGHWAY SYSTEM	TYPE OF IMPROVEMENT	COST
PRIMARY	Construct on New Alignment	\$ 39,000,000
	Upgrade to Higher Type Route	38,000,000
	Reconstruct	4,000,000
	Widen and/or Resurface	7,000,000
	All Primary	\$ 88,000,000
SECONDARY	Upgrade to Higher Type Route	\$ 1,000,000
	Reconstruct	17,000,000
	Widen and/or Resurface	5,000,000
	All secondary	\$ 23,000,000
TERTIARY	Reconstruct	\$ 4,000,000
	Widen and/or Resurface	10,000,000
	All Tertiary	\$ 14,000,000
TOTAL		\$125,000,000

This backlog of immediate needs does not include any projects for which funds have, as yet, been authorized.

HIGHWAY NEEDS

Recently, a careful and comprehensive examination and evaluation was made of the highway and traffic conditions that affect motor vehicle travel on all roads and streets in Delaware. This engineering appraisal identified the type, extent and cost of needed improvements for the period from the present until 1985.

The total needs for the twenty year period consists of three components:

1. Backlog of previously needed but deferred improvements.
2. Replacement of pavements and structures that will become obsolete during the study period.
3. New roads and streets to provide for the economic growth predicted by 1985.

BACKLOG OF IMMEDIATE NEEDS

The backlog of immediate needs are improvements that should have been made prior to today, but had to be deferred because of insufficient funds in the past.

This large backlog causes inefficient, unsafe and uneconomical traffic operation and will result in more expensive rehabilitation through excessive deterioration while awaiting improvement.

This backlog should be eliminated in the shortest possible time. However, future restoration of needed pavements and critical new construction to provide for future growth should not be neglected.

Recent sufficiency surveys determined that the size of the backlog is \$125 million. This does not include any projects for which funds have, as yet, been authorized.

Timely resurfacing prevents loss of original investment and represents efficient use of improvement funds.

Highway planning must consider projected land use.



STRUCTURAL OBSOLESCENCE

Structural obsolescence begins soon after completion of a new facility. The nature of roadway pavement requires that it be resurfaced after a certain number of years. This length of time before required resurfacing is called "pavement life." It varies from a few years for intermediate-type pavements to 25 years for high-type pavements. Truck loads and soil conditions have a great affect on the length of "pavement life".

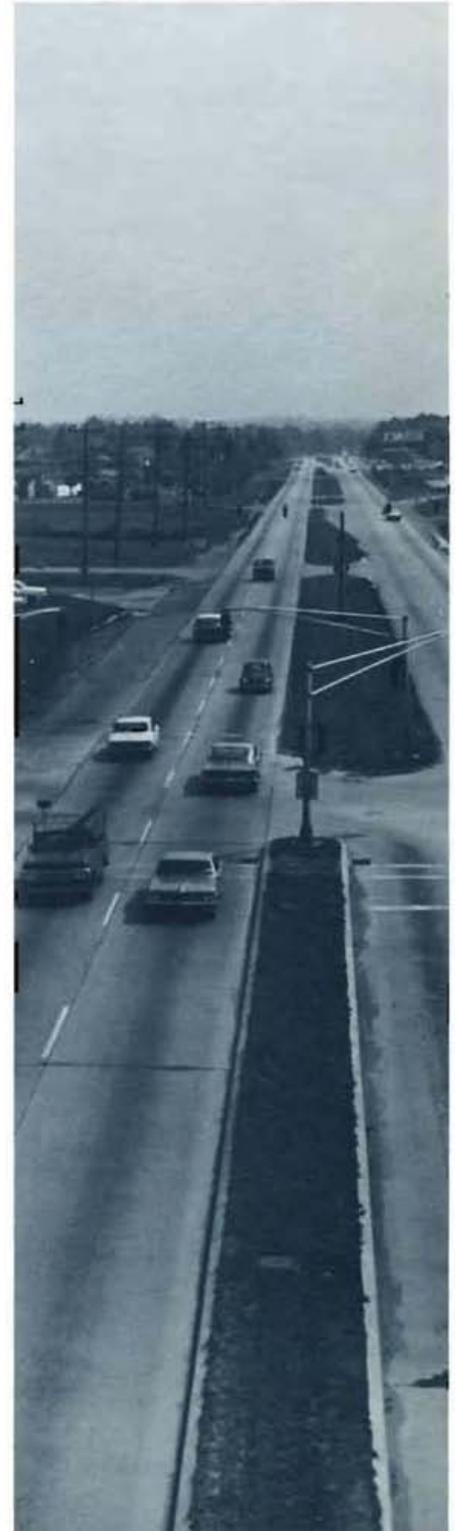
Timely resurfacing when the surface has deteriorated to a certain level restores life to the pavement, salvages the previous investment, and results in efficient use of improvement funds. On the other hand, failure to provide a new wearing surface when needed results in further and more rapid deterioration, possibly to the extent that the existing pavement cannot be salvaged.

The cost of structural obsolescence is estimated to be about \$6 million per year for the complete highway system.

FUNCTIONAL OBSOLESCENCE

Although structural obsolescence cannot be prevented, the ability of a road to serve its intended function can be preserved by the proper use of the planning and zoning program.

The planning and zoning program balances land uses and the transportation facilities that serve them. Land should not be put to more intense utilization than there are transportation facilities available to serve it. A sound program can protect, preserve and enhance the value, efficiency, utility, and traffic-carrying capability of the highway facilities and can aid in the elimination of traffic hazards produced by adjacent land-use practices.



Streets and highways must provide the framework for Delaware's growing urbanization.



FUTURE HIGHWAY TRAVEL

The determination of highway needs is predicated on a knowledge of economic trends, growth and distribution of population, motor vehicle ownership and travel. These factors not only affect the amount and type of highway facilities needed to adequately meet anticipated traffic demands, but give indications of Delaware's ability to finance needed improvements.

Delaware's highways should be planned and constructed to serve the 750,000 residents expected by 1985. The development of additional areas in which to live, work, and enjoy other non-work activities will require a considerable growth in the street and highway network. The types of need will vary from constructing new arterial routes, to up-grading of existing routes, to providing new and improved connecting streets. In this segment of the total highway improvements lies the greatest opportunity to influence or be influenced by future land utilization changes.

Lack of provision for this growth could have the effect of retarding the economic growth of the State or areas within the State.

Estimates of future automobile and truck travel depend upon estimates of future population and where these people will live and work. Basic to any projection of population size or geographic allocation is the determination of future employment by type and extent.

Within Delaware, the basic types of employment have been industrial activities in northern New Castle County and agricultural activities in the remainder of the State. This picture is changing. Mechanization and changes in types of crops have reduced the amount of farm labor needed. Fortunately, employers of large numbers of workers have located in southern Delaware to offset the reduction in farm employment.

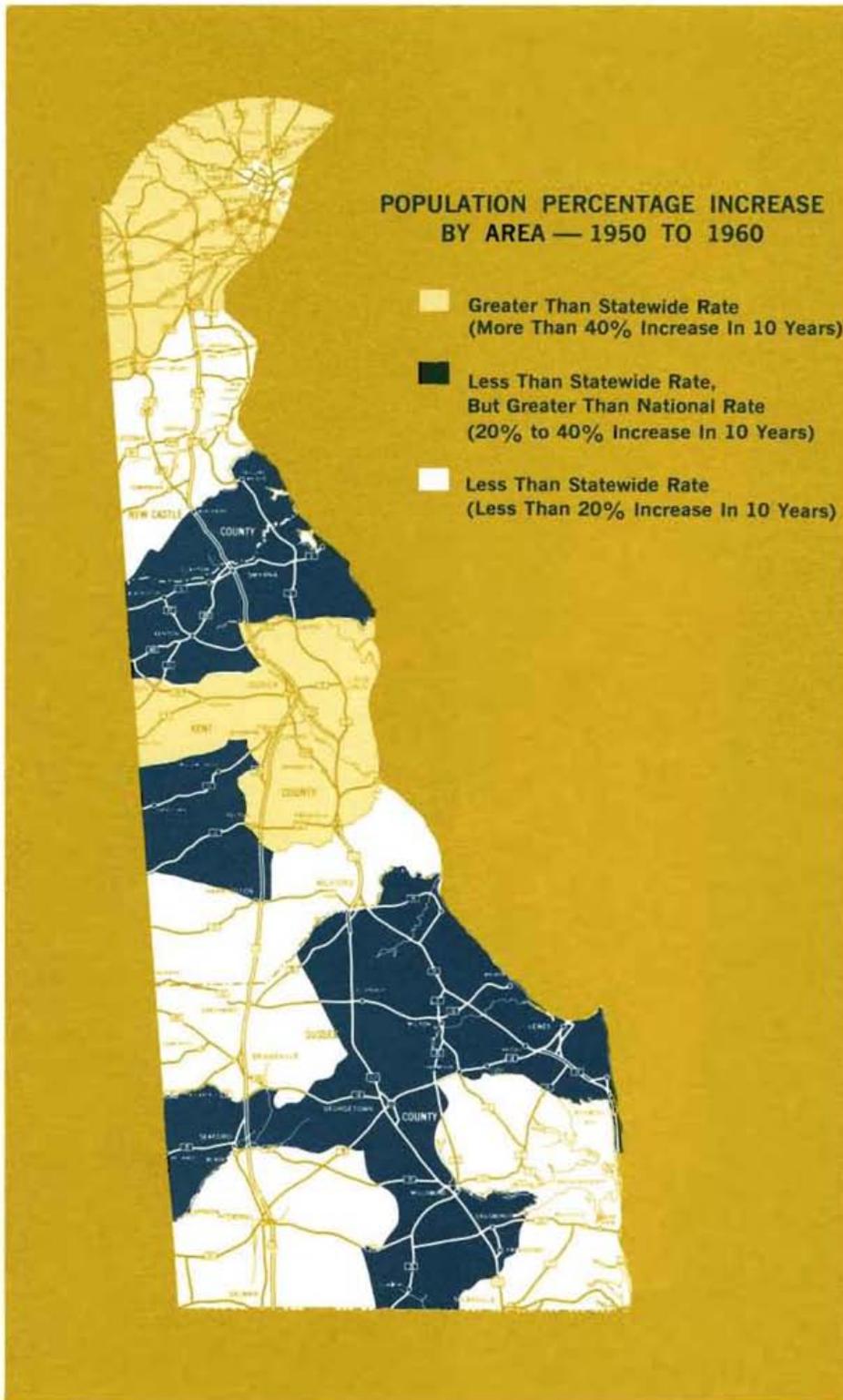
Geography has been responsible primarily for the past economic development of the State. New Castle is centrally located within

the north-south travel corridor of the metropolitan growth pattern extending from Boston to Richmond. Until recently, Kent and Sussex Counties have been relatively isolated to transportation by water barriers. Consequently, the area was largely overlooked by industry seeking new plant locations.

The fact that southern Delaware was overlooked in the past is one of the prime reasons that rapid economic growth in the coming years can be expected which will match the continued development



Source: Robert W. Cook, "The Delaware Economy Volume I" Newark, Delaware 1965



Source: U.S. Department of Commerce, Bureau of Census

of northern New Castle County. Industry will realize that there is a reservoir of centrally located labor and available land near the very heart of megalopolis.

The total population of the United States increased 18.5% from 1950 to 1960. This growth was not uniformly distributed. Some states, including Delaware, received more than their share of the population increase. Delaware's 10-year increase of 40.3% was exceeded only by five other states — Alaska, Arizona, California, Florida and Nevada.

10-YEAR POPULATION INCREASES

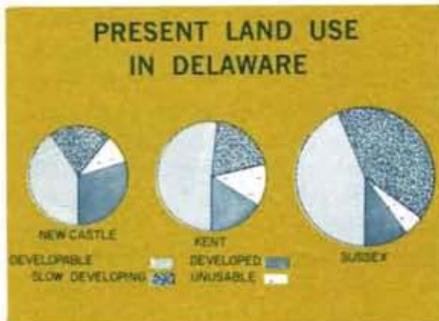
	<i>Actual</i>		<i>Pro-</i>
	1940	1950	jected
	to	to	to
	1950	1960	1985
Delaware	19%	40%	68%
New Castle	22%	41%	68%
Kent	10%	73%	80%
Sussex	19%	16%	60%
United States	14%	18%	43%
Maryland	29%	32%	65%
New Jersey	16%	26%	55%
Pennsylvania	6%	8%	23%

Although the recent population growth of Delaware has exceeded the surrounding states, Delaware is still less urbanized than Maryland, Pennsylvania and New Jersey. In fact, the percentage of Delaware's population living in urban areas is less than the national average. Only 65.6% of all Delawar- eans live in areas defined as urban; i.e., municipalities with more than 5000 population or unincorporated areas with more than 1000 people per square mile. Nearly 70% of the total U.S. population live in urban areas. Future economic and population increases will tend to bring the population density and degree of urbanization of Delaware in line with the characteristics of the surrounding states.

The prediction of a rapidly expanding Delaware population emphasizes the need for careful consideration of additional land development for a variety of purposes

Land presently in use as residential, commercial or industrial areas — combined with government land used for institutions and parks — total over 16% of the State. Almost 39% of Delaware consists of marsh and slowly growing wooded lands.

The remaining 45% of Delaware land is feasible for immediate development. Homebuilders as well as industrial, commercial and institutional development groups tend to use this cleared, well-drained agricultural land for obviously practical reasons. Thus, it becomes increasingly vital that land use consideration for future residences, schools, factories, stores, highways and other functions be in the forefront of all current planning.



Source: Division of Urban Affairs and Agricultural Experimental Station, University of Delaware "Land Use in Delaware", 1962.

DELAWARE LAND

The population projected for 1985 will require that the land developed as residential, commercial and industrial be increased from 16.4% to 21% of the Delaware area. In other words, about 10% of the total Delaware land area capable of development will be required for that purpose.

The map on this page shows the developed land, the land unsuitable for development and the approximate amount of land needed for development by 1985. The development of the additional area will require the planning and construction of many miles of residential streets and collector roads, and the reconstruction and upgrading of many miles of arterial and collector routes.

AREA REQUIRED FOR DEVELOPMENT BY 1985

NEW CASTLE COUNTY



KENT COUNTY



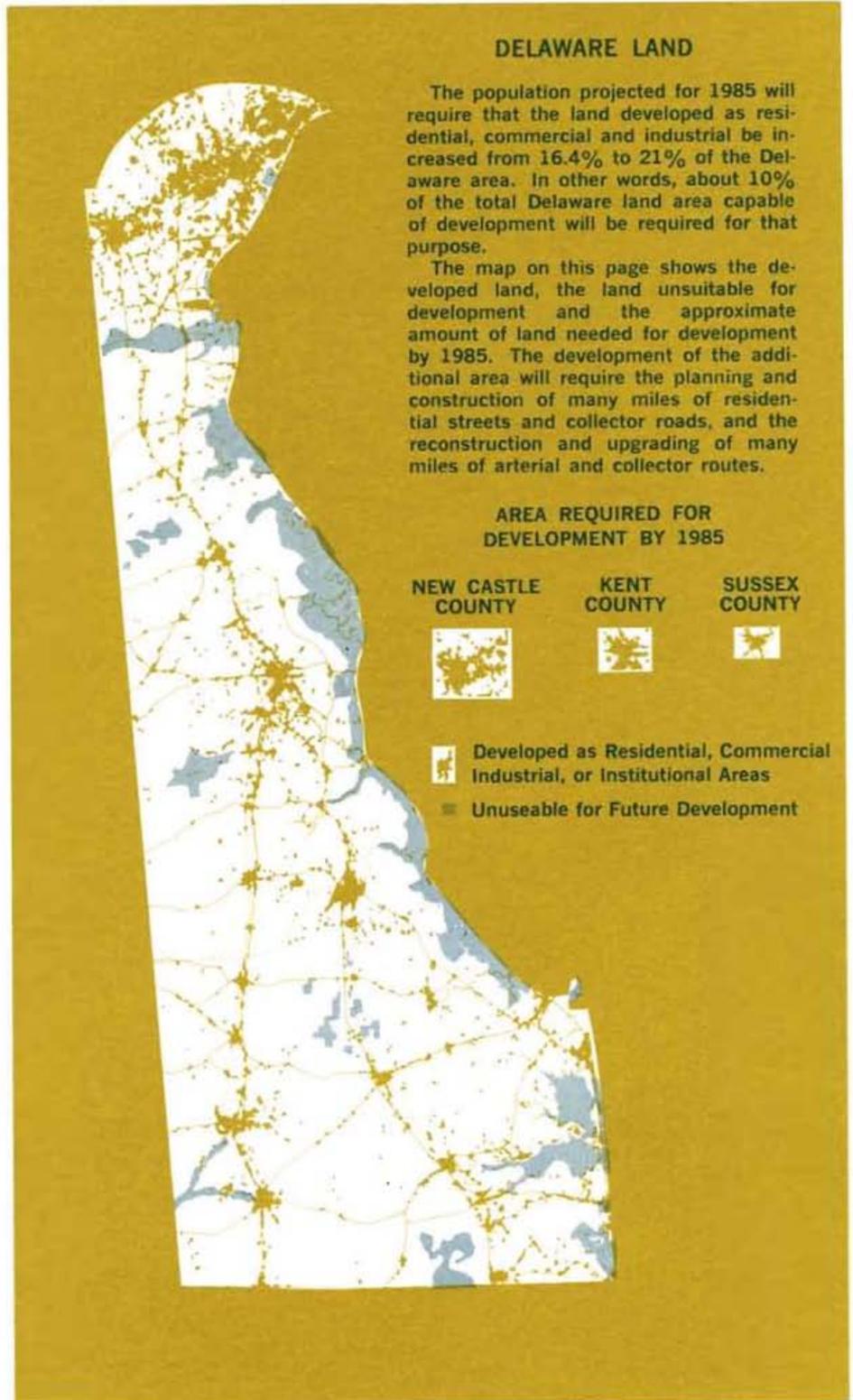
SUSSEX COUNTY



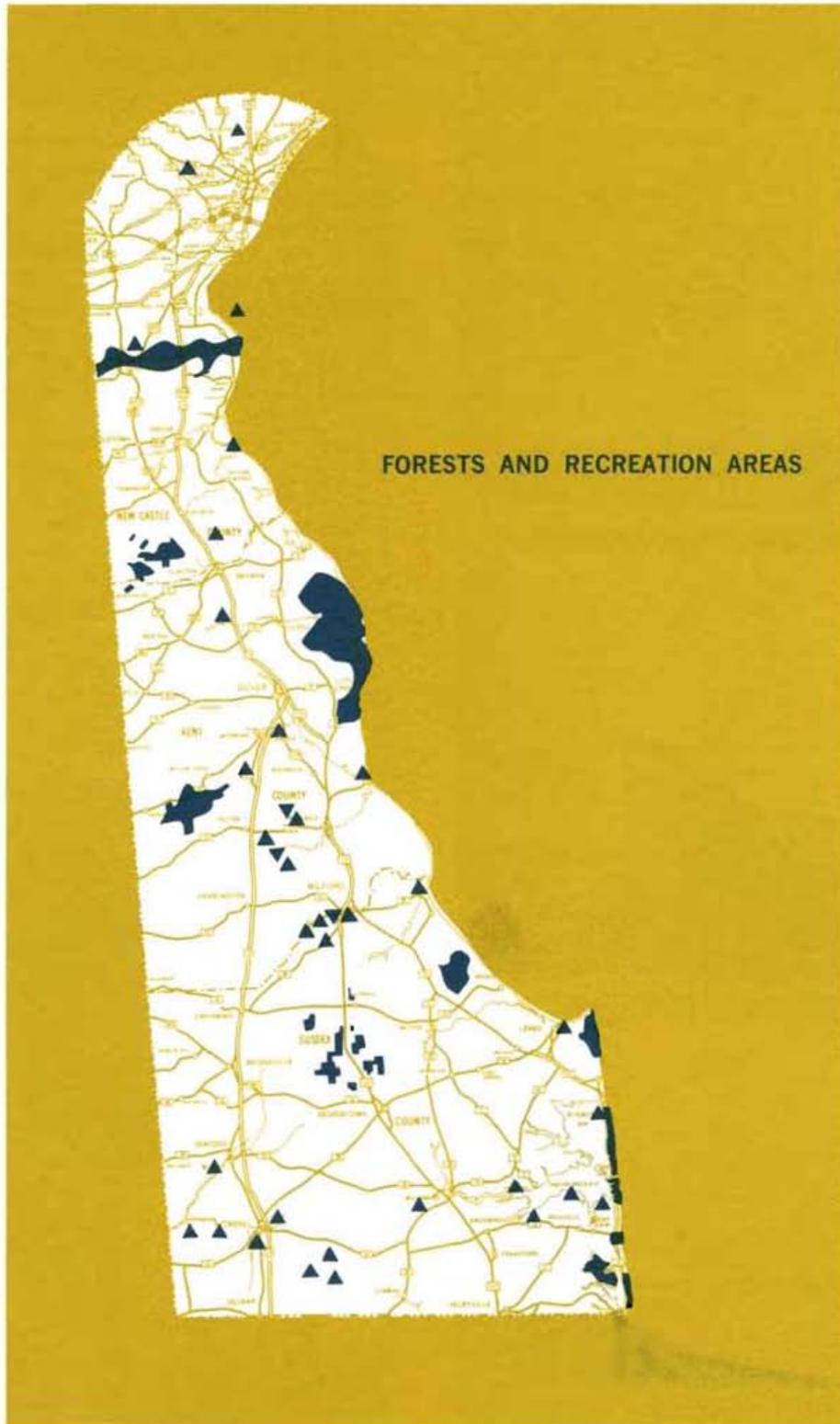
Developed as Residential, Commercial, Industrial, or Institutional Areas



Unuseable for Future Development



Serving recreational needs is part of a highway's function.

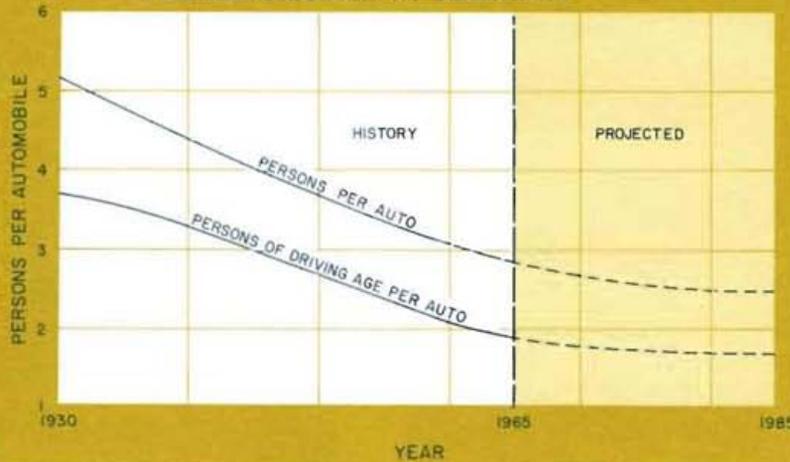


Tourism and recreational travel exhibits a significant influence on Delaware highways. The State has many areas available for water based recreational activities. These parks, beaches and hunting areas, as well as the many historic sites, are visited by persons throughout the State, and by many out-of-state visitors.

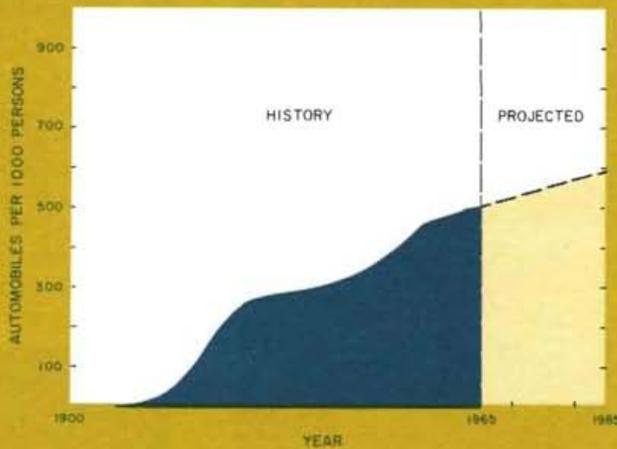


Source: Delaware State Planning Office, "Profile and Plan: Outdoor Recreation in Delaware" Dover, 1966

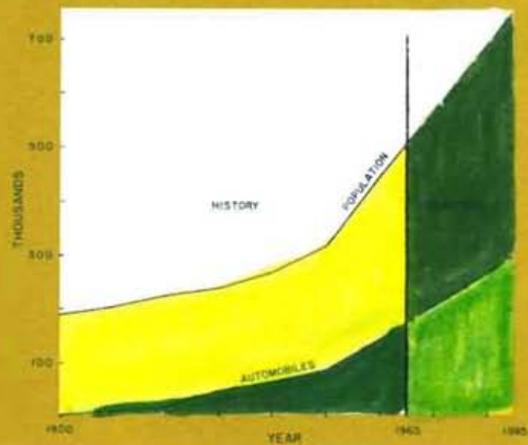
PERSONS AND DRIVING AGE PERSONS PER AUTOMOBILE IN DELAWARE



AUTOMOBILES PER 1000 PERSONS OF DRIVING AGE IN DELAWARE



DELAWARE POPULATION AND REGISTERED AUTOMOBILES

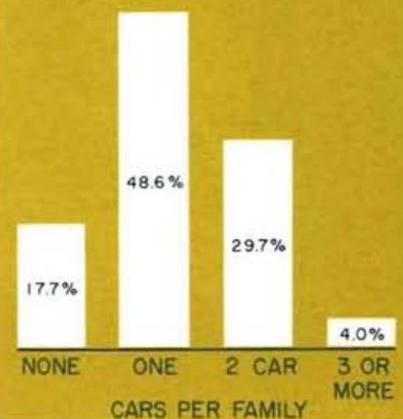


The amount of total travel is affected not only by increases in population and changes in land utilization patterns, but also by the extent of automobile ownership within the population. Improved economic conditions have resulted in more households having automobiles, many households having second automobiles and in some cases, a third.

More and more Delawareans are driving. About 80% of the persons over 16 are licensed to drive. This is much higher than the national average of 72% and is the second highest percentage found in any state east of the Mississippi River.

The ratio of persons per automobile has been continually lowered until today where there is one automobile for every three Delawareans. For every 1000 persons

AUTOMOBILE OWNERSHIP IN NEW CASTLE COUNTY



of driving age, there are 490 registered automobiles.

Between 1950 and 1960, while population was increasing by 40%, automobile registration increased by 65%. Since 1960, the number of automobiles has increased another 40%. The actual increase during the past 5 years is equal to the increase during the preceding 10 years.

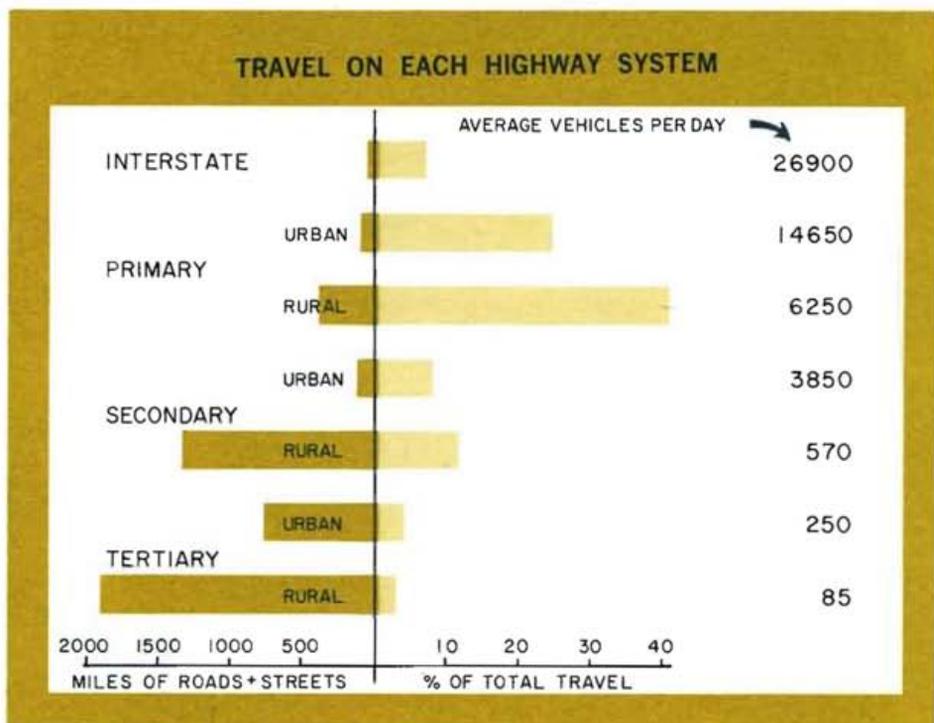
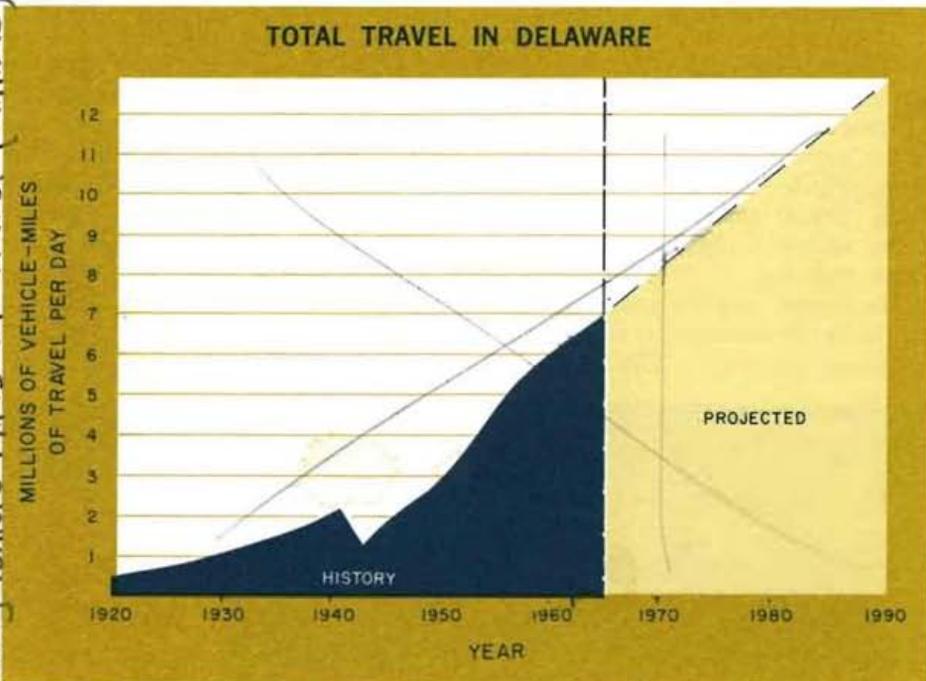
The amount of total travel on Delaware highways has greatly exceeded the most liberal predictions envisioned only a decade ago. Total travel increased 80% in the past decade. Today, an average automobile travels 10,000 miles per year.

The tremendous increases in traffic on Delaware roads has not been entirely due to the characteristics of the increased Delaware population. On some corridors, much of the traffic, in fact almost all traffic on I-95 between Farnhurst and the Maryland Line, has both ends of the trip outside of Delaware.

Total daily travel in Delaware now stands at more than 7 million vehicle-miles of travel per day. In more familiar terms, this averages to about 30 miles per registered vehicle per day.

Not surprisingly, the Interstate and Federal Primary systems serve most of the vehicle-miles of highway travel. Totaling, but 619 miles out of the 4,316 miles of state-maintained roads, they carry 75% of all travel in Delaware. And, of course, within the Primary system the travel is not uniformly distributed. Traffic volumes on Primary roads varies from 324 to 45,000 vehicles per day.

Daily Vehicle Miles of Travel (Millions)

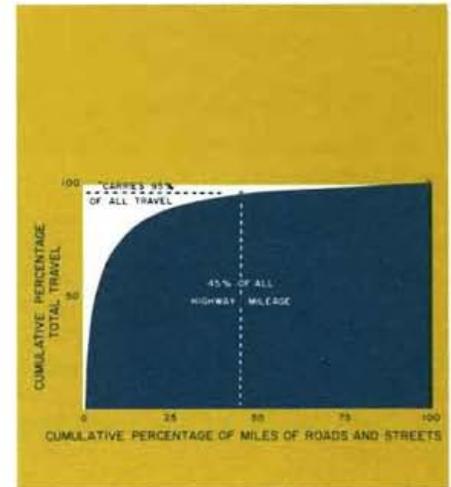


The mixture of roads and streets having different functions within the 4,316 mile State highway system is revealed by the wide range of traffic use. Although traffic use, by itself, is not sufficient ground to define the functional importance of a road or street, it does suggest the relative significance of a particular road or street to the State as a whole. Large volumes of traffic occur where the road or street serves a high level of economic activity.

The major corridor traffic movements in Delaware are shown on the maps (page 21). The chart on

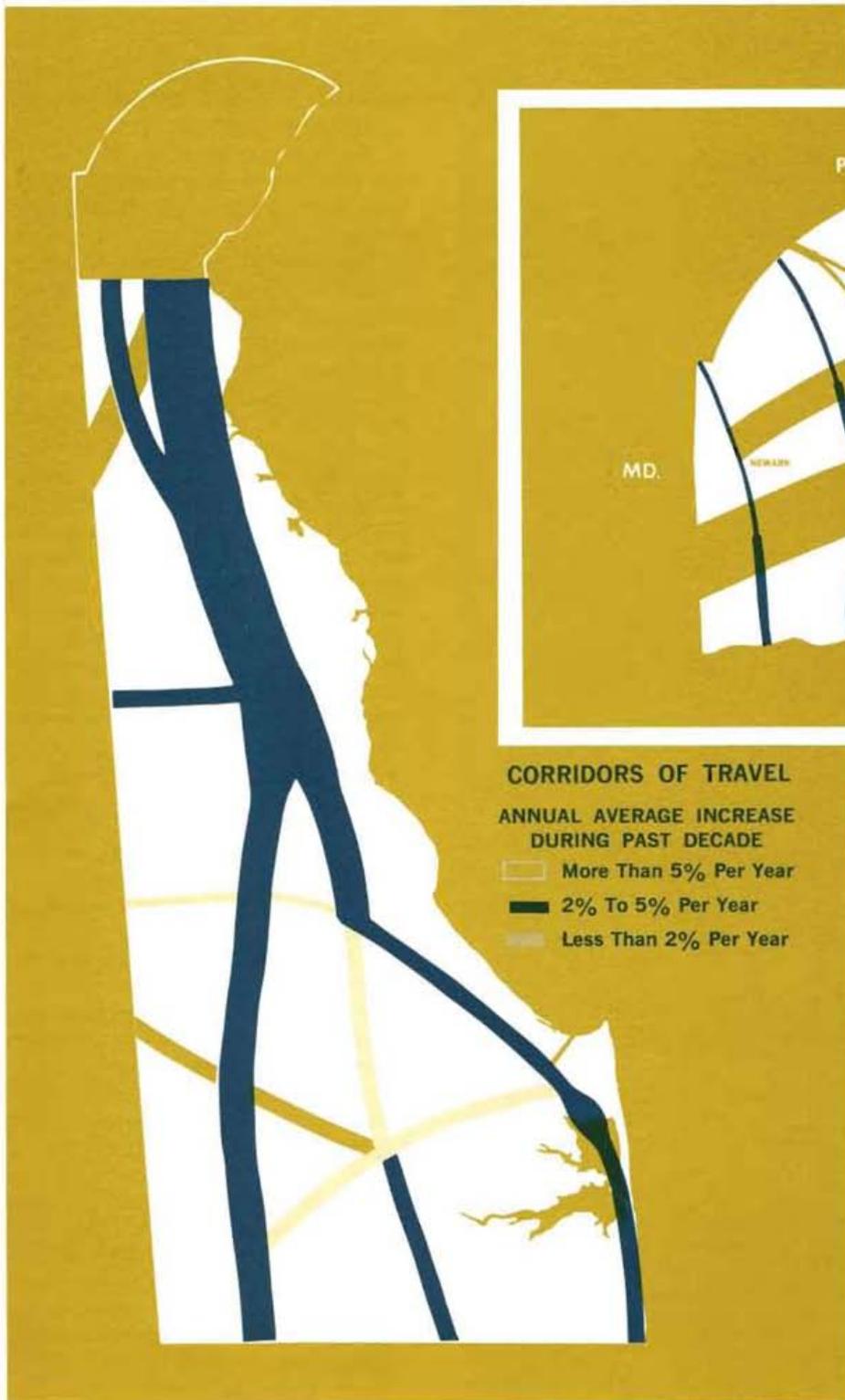
this page shows that most of the vehicle travel is concentrated on a few miles of roads and streets. For example, 95% of all vehicle-miles of travel actually occurs on only 45% of the total mileage.

Upon the completion of the Interstate System, 18.5% of all travel in Delaware will be on the 40.5 miles of I-95 and I-495. This will greatly improve traffic conditions on the parallel corridor routes. On the other hand, the total Primary system within the urban area will, in fact, carry a slightly greater proportion of the total traffic than it is now carrying.



TRAVEL BY HIGHWAY SYSTEM

HIGHWAY SYSTEM	DAILY VEHICLE-MILES (MILLIONS)		% OF ALL TRAVEL		AVERAGE VEHICLES PER DAY	
	1965	1985	1965	1985	1965	1985
INTERSTATE	0.44	2.16	6.2	18.5	26900	58000
PRIMARY - URBAN	2.10	3.64	29.6	31.2	15400	16000
PRIMARY - RURAL	2.90	3.22	41.0	27.6	6250	8200
SECONDARY - URBAN	0.53	0.96	7.4	8.2	3850	2850
SECONDARY - RURAL	0.76	1.11	10.8	9.5	570	950
TERTIARY - URBAN	0.19	0.34	2.7	2.9	250	180
TERTIARY - RURAL	0.16	0.25	2.3	2.1	85	130
ALL SYSTEMS	7.08	11.68	100.0	100.0	1222	2000



CORRIDORS OF TRAVEL
ANNUAL AVERAGE INCREASE
DURING PAST DECADE

- More Than 5% Per Year
- 2% To 5% Per Year
- Less Than 2% Per Year

Most travel is funneled into corridors and onto a relatively few miles of roads. This enables the highway system to provide the optimum traffic service on a few selected corridor routes.

In addition to more travel being concentrated into some corridors than others, the increase in the past decade has not been uniformly distributed. Uneven population and economic growth and major route improvements or lack of improvements have caused unevenness of the traffic increases.

Arterial highways must occur at necessary intervals to collect traffic from roads of lesser importance and form logical connections with routes of equal importance.



THE 1985 HIGHWAY SYSTEM

With the completion of the Interstate System and other major corridors in progress, the attention of highway planners is turning to the problem of determining the future long-range highway requirements.

The population increase to occur by 1985 will require more residential areas and more streets and roads to carry the increased traffic. Additional roads and streets will not improve the total traffic problem unless they are logically classified by purpose and designed, constructed and operated to fulfill their specified function. Without question, certain roads and streets are more important than others. Some carry large numbers of cars and trucks while others mainly provide access to land. Some collect and distribute traffic between the main routes and the access roads. Each highway should be designed and constructed to perform specific functions and to provide a particular type of service. Roads are classified as Arterial, Collectors or Local for the purposes of developing an integrated network.

Generally, long trips should be served by the *Arterial* system, which has the primary function of moving traffic. Arterial routes connect centers of population and economic activity, carry the corridor type of movements, occur at necessary intervals to collect traffic from roads of lesser importance, form logical connections with routes of equal importance, tie in with the major urban street systems, and form a truly integrated network. The proposed arterial system will account for 6% of all road and street mileage, and serve about 70% of all vehicle-miles of travel. The actual roadway design varies from a controlled access, multi-lane

The Collector system, in addition to providing access to land uses adjacent to main highways, collects traffic from local roads and channels it into the Arterial system.

The terminal ends of travel are served by the Local system which provides access to land without provisions for high speed or heavy traffic.

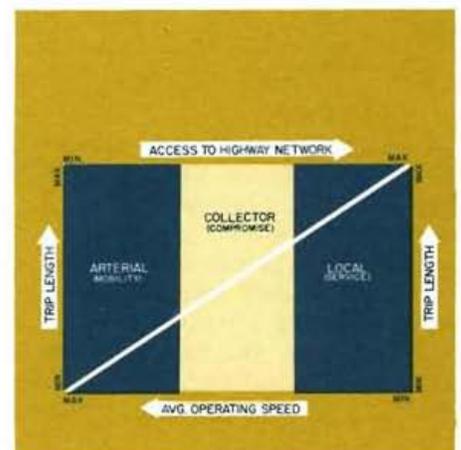
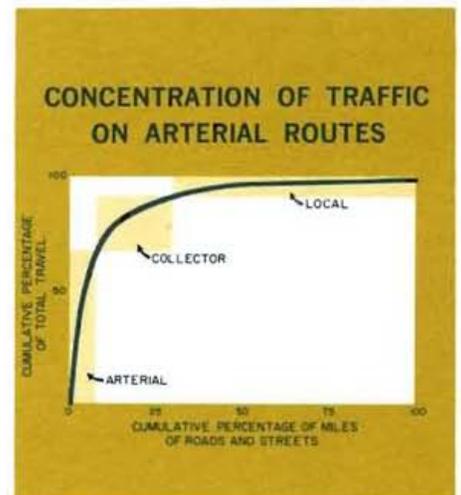


freeway to a 2-lane rural road, depending upon the traffic to be served.

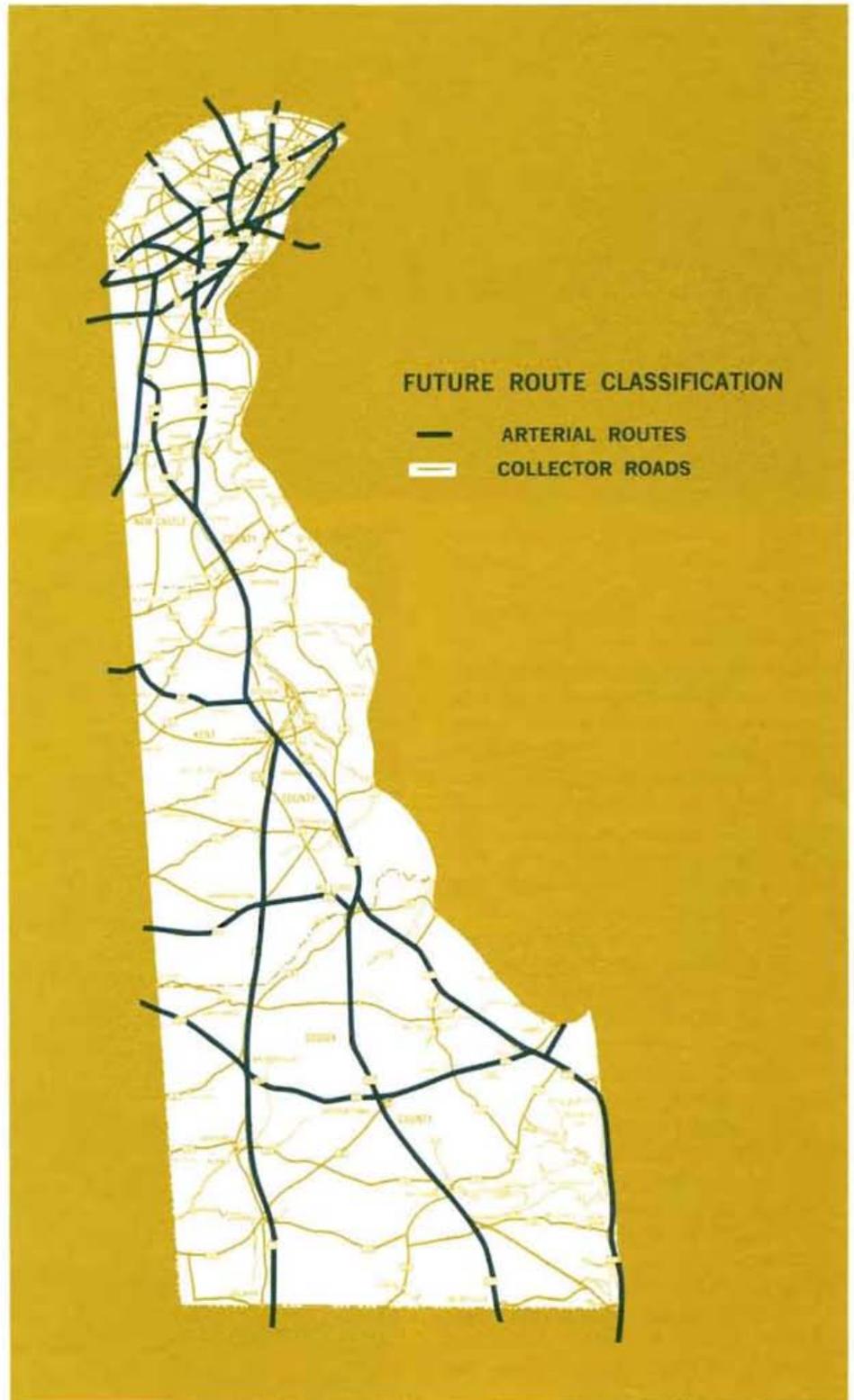
The *Collector* system serves a dual function of providing a medium level of service for the transition between arterial and local systems, and for offering access to adjacent land uses. Collector routes occur at reasonably regular intervals. They collect traffic from local roads and channel it into the arterial road system, and serve centers of population not feasibly served by the arterial routes.

Local roads and streets provide direct access to abutting properties. The terminal ends of the majority of trips should be served by the *Local* system which has the primary function of providing access to adjacent land uses.

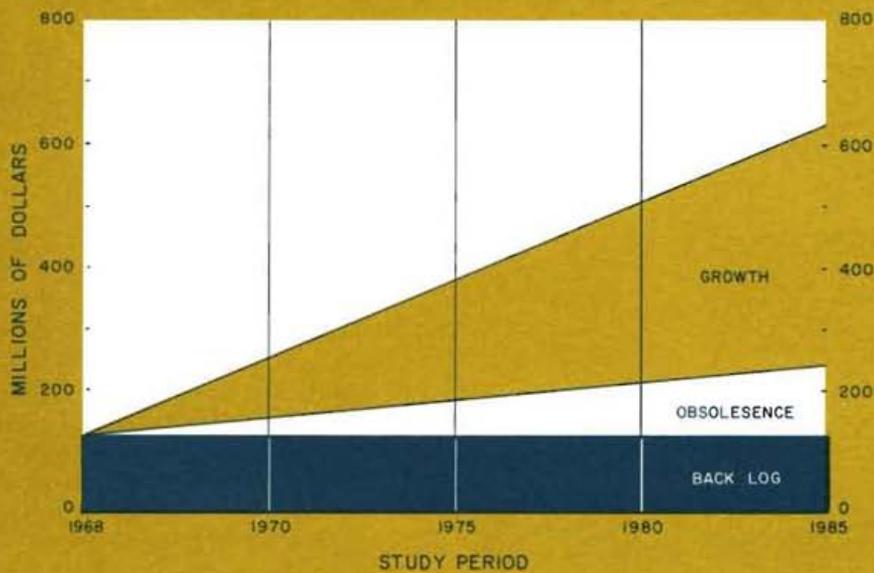
The graphs on this page illustrate the classification of roads as Arterial, Collector, or Local. Arterial routes carry most of the vehicle miles of travel on a few high-speed, high-capacity highways. Local routes provide access to adjacent land without provisions for high speeds or heavy traffic. Collector routes distribute traffic from the Arterials to the Locals.



Arterial and Collector Routes needed by 1985 for Delaware are shown on right. Naturally, some of the designations may be debatable and the exact future land utilization patterns may increase or decrease the need for certain collectors. However, the extent of the arterial and collector system is consistent for the population predicted for 1985.



COST OF HIGHWAY IMPROVEMENTS NEEDED BY 1985



TOTAL COST OF IMPROVEMENTS NEEDED BY 1985

SYSTEM	COST
Interstate — Urban (After Presently Authorized System is completed)	\$ 13,000,000
Primary — Urban	\$127,000,000
Rural	\$133,000,000
All Primary	\$260,000,000
Secondary — Urban	\$140,000,000
Rural	74,000,000
All Secondary	\$214,000,000
All Other Roads and Streets — Urban	\$ 72,000,000
Rural	69,000,000
All Other Roads and Streets	\$141,000,000
All Roads and Streets — Urban	\$352,000,000
Rural	276,000,000
Total Needs by 1985	\$628,000,000

HOW TO MEET THE NEED

HIGHWAY PLANNING HAS BEEN CARRIED OUT IN 2 STAGES; FROM PRESENT TO 1975, AND 1975 TO 1985.

PRESENT SOURCE AND AMOUNT OF HIGHWAY IMPROVEMENT FUND

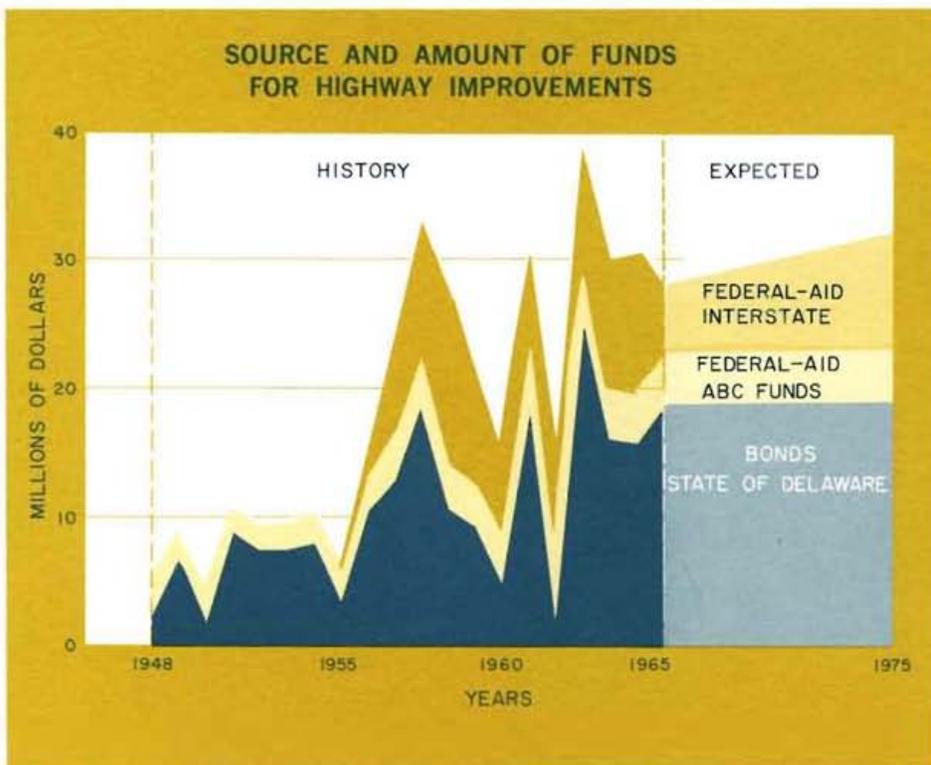
Funds for constructing and re-constructing highways in Delaware are obtained from two sources:

1. **Highway Improvement Bonds** authorized by the General Assembly as part of the State's Capital Improvement program. The Department's recommendation is given consideration each year along with the needs of other State agencies and within the limitations of the total program approved by the administration. Recent annual authorizations for highways have averaged \$15.4 million.

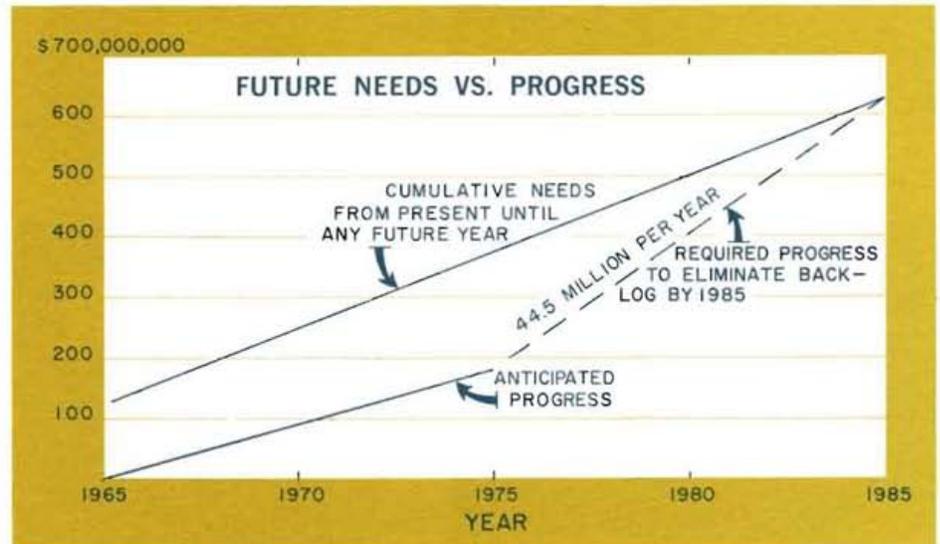
2. **Federal Aid Funds**
These funds are of two types: *ABC Funds* for use on Primary, Secondary, and Urban highways, presently authorized at level of \$4.3 million per year.

Interstate Funds presently authorized at about \$5.2 million per year but scheduled to terminate on completion of construction of Interstate System.

The present annual level of total highway funds is \$23.9 million.



"An adequate program will close the gap between needs and accomplishments . . ."



ANTICIPATED PROGRESS BY 1975

Interstate System:

Interstate Routes 95, 295 and 495, totaling 40.5 miles of controlled access freeway, are scheduled for completion in the period 1972-1975 depending on the level of continuing Federal-Aid financing. (Necessary State matching funds have already been authorized).

Primary, Secondary & Tertiary Systems:

Present programming anticipates improvements to these systems, affecting 1530 miles of roads, either completed or in some stage of design or construction by 1975 and requires \$183 million. It should be pointed out, however, that this requirement exceeds the present level of financing.

As extensive as this program may seem, an additional \$190 million will be required to eliminate the backlog of needed improvements by 1975.

1975 TO 1985 NEEDS

Having determined the total needs for the period from now until 1985, and having measured the anticipated progress by 1975, the difference is the needs for the period from 1975 until 1985.

Total needs by 1985	\$628 million
Anticipated financing by 1975	183 million
Needs 1975 - 1985	\$445 million

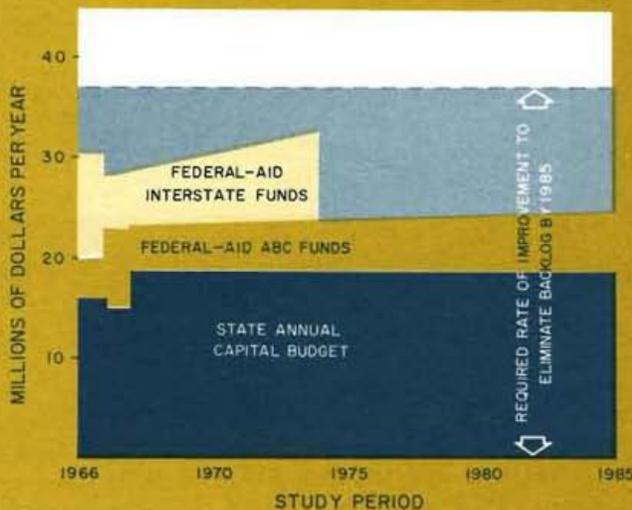
Assuming that 1985 is the target date for the achievement of a completely adequate system of highways and assuming that the extent of improvements to be completed prior to 1975 cannot be substantially increased, then annual expenditures averaging \$44.5 million per year will be needed for the period from 1975 to 1985.

The graph above illustrates the problem of meeting the requirements of the needs up to 1975 and those required for the period 1975 to 1985. An adequate program is one which will close the gap between needs and accomplishments.

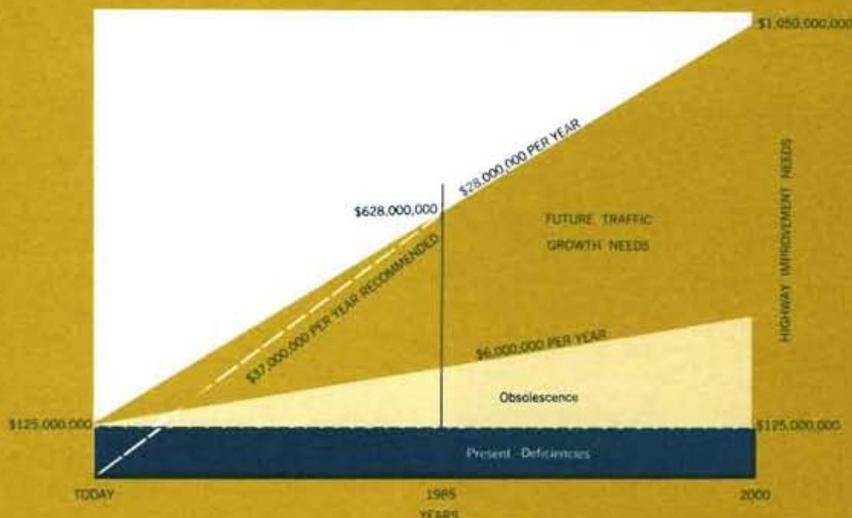
PROGRAMMED (BUT NOT FINANCED) PROGRESS FROM 1967-1975

HIGHWAY SYSTEM	MILES OF IMPROVEMENT	COST
INTERSTATE	State Funds for Completion have already been authorized and needs are not included in this Report	
PRIMARY — Urban	90	\$ 47,000,000
— Rural	120	55,000,000
SECONDARY — Urban	75	30,000,000
— Rural	265	16,000,000
TERTIARY — Urban	500	18,000,000
— Rural	480	17,000,000
ALL SYSTEMS	1530	\$183,000,000

REQUIRED ANNUAL EXPENDITURES AND ANTICIPATED FUNDS



TOTAL HIGHWAY NEEDS



RECOMMENDED SCHEDULING OF HIGHWAY IMPROVEMENT FUNDS

A start on the elimination of the huge backlog of needed highway improvements should be undertaken now to meet the needs of current traffic demands. It is in the interest of safety, overall economy and the orderly development of our state that an effective program not be delayed.

To undertake a meaningful program will require an increase in annual highway expenditures to \$37 million a year. The present level of income for highway improvement, both State and Federal, is \$28.7 million per year. This is \$8.3 million a year less than is required to achieve an adequate highway system by our established goal of 1985. Any delay in initiating an effective program will require a higher rate of expenditure if the goal is to be reached.

STATE PROGRAM

Because Federal-Aid funds are allocated several years in advance, the indicated deficiency in highway financing would have to be provided initially by increased State expenditures. To achieve the goal, it would be necessary to provide Highway Improvement funds in the amount of approximately \$27 million per year.

FEDERAL PROGRAM

Present law provides for a reduction in Federal Aid Highway funds with the completion of the Interstate System. It is essential that a new program be authorized in time to insure continuity of operation and that it be designed to provide for the adequate financing of changing traffic demands.

SUMMARY AND CONCLUSION

IF PRESENT INADEQUATE ROADS ARE TO BE MADE ADEQUATE. . .

IF PAVEMENTS AND STRUCTURES ARE TO BE RESTORED AS THEY DETERIORATE. . .

IF A HIGHWAY SYSTEM IS TO BE PROVIDED TO MEET THE REQUIREMENTS OF FUTURE POPULATION AND ECONOMIC GROWTH. . .

AND ASSUMING:

FEDERAL AID HIGHWAY FUNDS WILL CONTINUE AT ABOUT THE PRESENT LEVEL — EVEN AFTER THE SCHEDULED COMPLETION OF THE INTERSTATE SYSTEM.

THEN IT FOLLOWS THAT:

DELAWARE MUST EXPAND ITS HIGHWAY PROGRAM TO AN ANNUAL AVERAGE EXPENDITURE OF \$37 MILLION PER YEAR DURING THE PERIOD 1968 TO 1985 IF THE ESTABLISHED GOALS ARE TO BE ACHIEVED