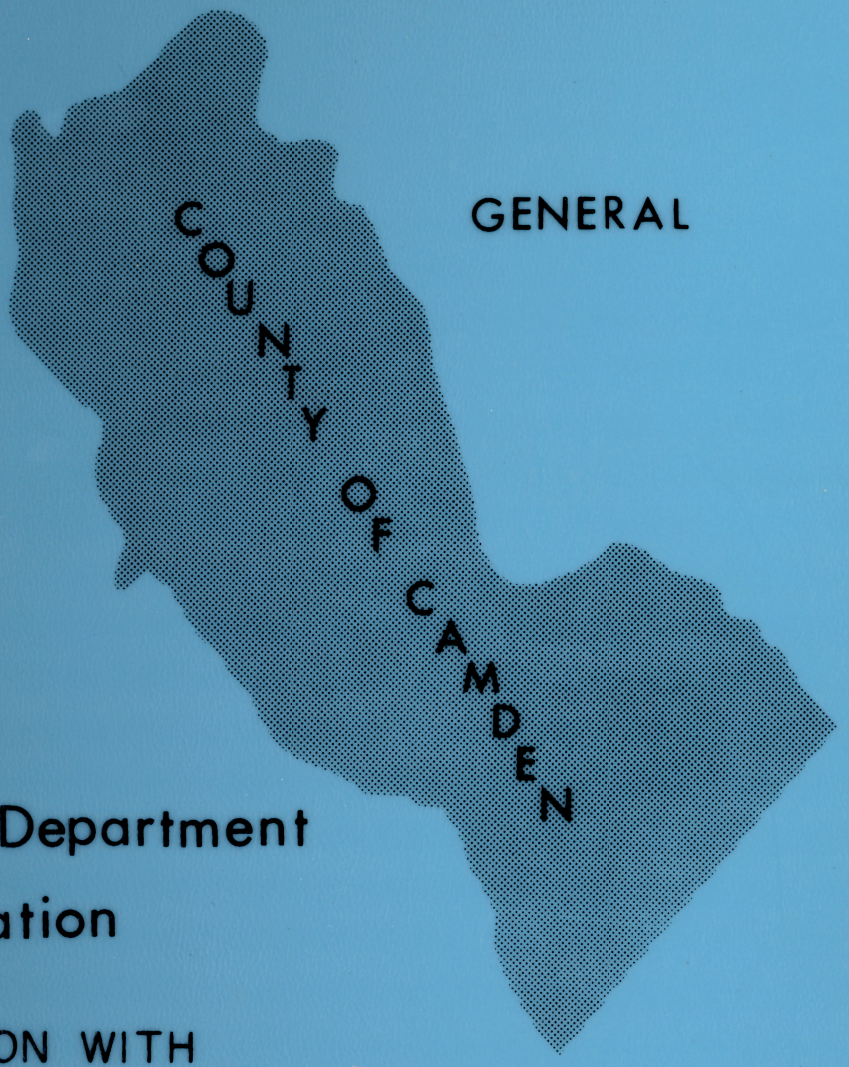
TOPICS • COUNTY OF CAMDEN • GENERAL
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v.1 (Gen.)

TOPICS STUDY



GENERAL

T-4002 (6)

PREPARED FOR

New Jersey Department of Transportation

IN COOPERATION WITH

U.S. Department of Transportation
Federal Highway Administration

New Jersey State Library

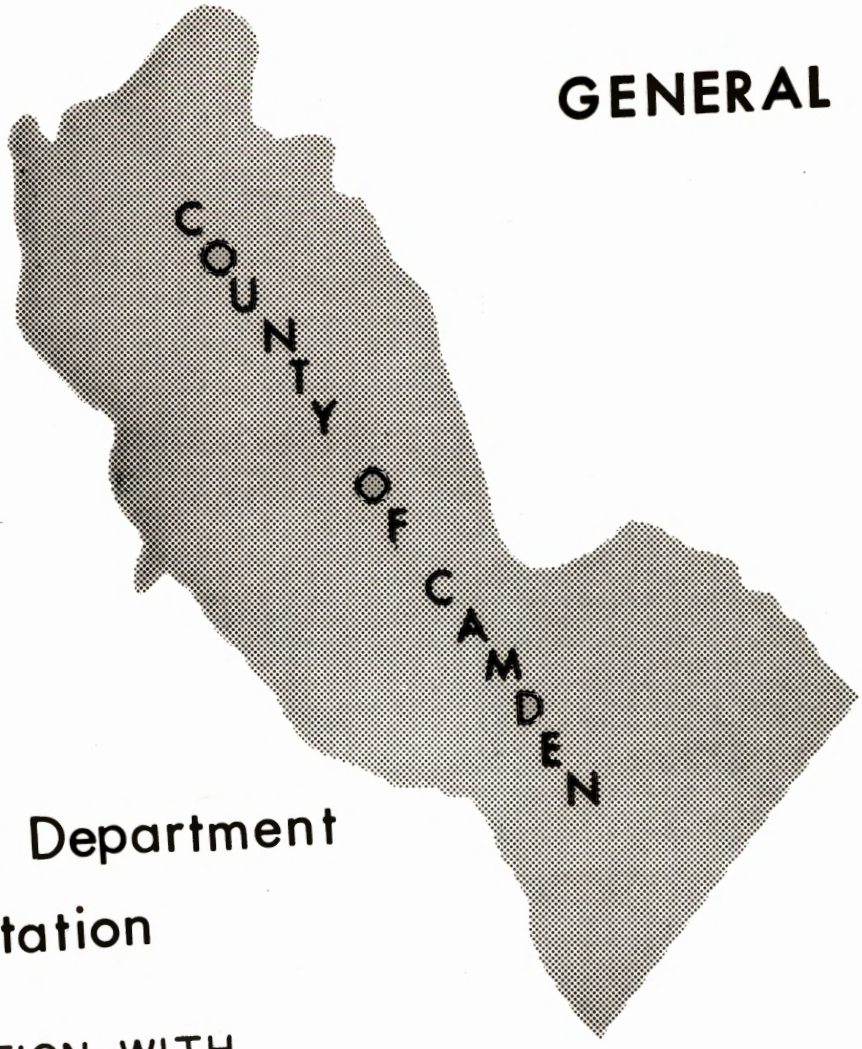
KAMMERER, SYMES & ASSOCIATES INC.
CONSULTING ENGINEERS
CHERRY HILL, NEW JERSEY

January 1974

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TOPICS STUDY

GENERAL



T-4002 (6)

PREPARED
FOR

New Jersey Department
of Transportation

IN COOPERATION WITH

U.S. Department of Transportation
Federal Highway Administration

KAMMERER, SYMES AND ASSOCIATES INC.
CONSULTING ENGINEERS
CHERRY HILL, NEW JERSEY

January 1974

Kammerer, Symes & Associates, Inc.
CONSULTING ENGINEERS
P. O. BOX 151 · ROCKHILL ROAD, CHERRY HILL, N. J. 08002
PHONE 609-424-2615
55 MOSSHILL LANE, WILLINGBORO, N. J. 08046
PHONE 609-877-2390

January 31, 1974

Mr. John C. Kohl
Commissioner of Transportation
N.J. Department of Transportation
1035 Parkway Avenue
Trenton, New Jersey 08625

Director of the Board of
Chosen Freeholders
Camden County Freeholders Office
Court House
Camden, New Jersey

Re: TOPICS Study

Gentlemen:

We are pleased to submit our TOPICS (Traffic Operations Program to Increase Capacity and Safety) Study for the County of Camden. The recommendations included are designed to improve the flow and safety for major roadways within the County.

The report summarizes the studies conducted for the purpose of analyzing the conditions on the existing arterial and collector roadways, identifying major problem areas and recommending short and long range solutions to major problem areas.

We are most appreciative of the opportunity to have been of service to the Department of Transportation and the County of Camden on this assignment.

Respectfully submitted,

KAMMERER, SYMES & ASSOCIATES, INC.

Allan M Kammerer

Allan M. Kammerer, P.E., P.P.
Vice-President

AMK:hes

ACKNOWLEDGEMENTS

We are most appreciative to the following organizations and agencies for their assistance and cooperation during the course of this study:

FEDERAL HIGHWAY ADMINISTRATION

NEW JERSEY DEPARTMENT OF TRANSPORTATION

NEW JERSEY DIVISION OF MOTOR VEHICLES

COUNTY OF CAMDEN

BOROUGH OF AUDUBON

BOROUGH OF AUDUBON PARK

BOROUGH OF BARRINGTON

BOROUGH OF BELLMAWR

BOROUGH OF BERLIN

TOWNSHIP OF BERLIN

BOROUGH OF BROOKLAWN

TOWNSHIP OF CHERRY HILL

BOROUGH OF CLEMENTON

BOROUGH OF COLLINGSWOOD

BOROUGH OF GIBBSBORO

CITY OF GLOUCESTER

TOWNSHIP OF GLOUCESTER

TOWNSHIP OF HADDON

BOROUGH OF HADDONFIELD

BOROUGH OF HADDON HEIGHTS

BOROUGH OF HI-NELLA

ACKNOWLEDGEMENTS, CONTINUED

BOROUGH OF LAUREL SPRINGS

BOROUGH OF LAWNSIDE

BOROUGH OF LINDENWOLD

BOROUGH OF MAGNOLIA

BOROUGH OF MERCHANTVILLE

BOROUGH OF MOUNT EPHRAIM

BOROUGH OF OAKLYN

TOWNSHIP OF PENNSAUKEN

BOROUGH OF PINE HILL

BOROUGH OF PINE VALLEY

BOROUGH OF RUNNEMEDE

BOROUGH OF SOMERDALE

BOROUGH OF STRATFORD

BOROUGH OF TAVISTOCK

TOWNSHIP OF VOORHEES

TOWNSHIP OF WATERFORD

BOROUGH OF WOODLYNNE

DELAWARE RIVER PORT AUTHORITY

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

HERBERT H. SMITH ASSOCIATES

TRANSPORT OF NEW JERSEY

URBAN ENGINEERS

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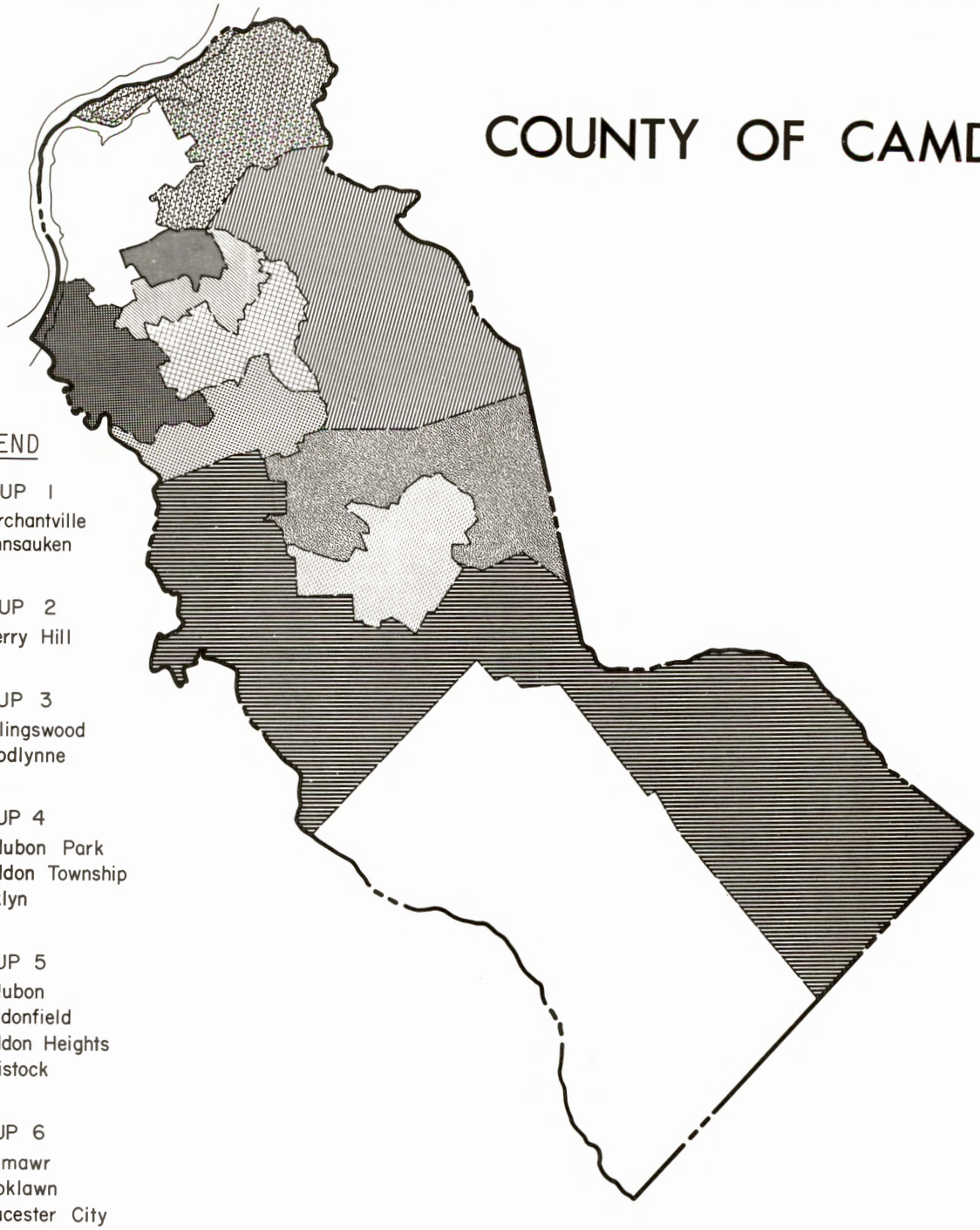
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COUNTY OF CAMDEN



LEGEND

GROUP 1
- Merchantville
- Pennsauken

GROUP 2
- Cherry Hill

GROUP 3
- Collingswood
- Woodlynne

GROUP 4
- Audubon Park
- Haddon Township
- Oaklyn

GROUP 5
- Audubon
- Haddonfield
- Haddon Heights
- Tavistock

GROUP 6
- Bellmawr
- Brooklawn
- Gloucester City
- Mt. Ephraim

GROUP 7
- Barrington
- Lawnside
- Magnolia
- Runnemede

GROUP 8
- Hi Nella
- Laurel Springs
- Somerdale
- Stratford
- Voorhees Township

GROUP 9
- Clementon
- Gibbsboro
- Lindenwold

GROUP 10
- Berlin
- Berlin Township
- Gloucester Township
- Pine Hill
- Pine Valley
- Waterford Township

AREA MAP

EXHIBIT NO. 1

Kammerer, Symes & Assoc.
Consulting Engineers

CHAPTER 1

THE TOPICS PROGRAM

The authorization, scope and objectives of the TOPICS Program and its ultimate aims are set forth in the following:

> "Policy and Procedure Memorandum 21-18", of May 12, 1972, Federal Highway Administration, United States Department of Transportation, refers to "-- the development of a TOPICS plan based on a systematic traffic engineering analysis --". TOPICS means Traffic Operations Program to Increase Capacity and Safety. The objective of the Program is not to supplant long range planning but to complement it.
>
> The Program is administered under the authority provided by Section 10 of the Federal-Aid Highway Act of 1968, approved August 23, 1968, which amended Chapter 1 of Title 23, United States Code, by adding a new Section 135, "Urban Area Traffic Operations Improvement Programs".

This report provides traffic improvement recommendations under the TOPICS Program for the County of Camden, based on the type of systematic traffic engineering analyses called for by the Act of 1968, as amended.

The objective of TOPICS is to obtain better use of existing streets and roadways by improvements which will fit into and become part of a general long range highway plan. In brief, it will be a series of short range improvements which will mesh with those for the long range.

Among the more important considerations are adequate traffic engineering, up-dated pavement marking systems, more efficient channeling of intersecting traffic, more responsive signals, improved street lighting, and construction or reconstruction of short sections of highway where traffic problems exist.

The following is a list of the types of improvements which may be eligible for financing under the TOPICS Program.

a. Channelization of intersections.

b. Widening traffic lanes.

c. Provide additional traffic lanes on approaches to signalized intersections.

d. Install traffic control systems to make traffic signal operation responsive to traffic conditions.

e. Install traffic surveillance systems.

f. Upgrade traffic control signs and pavement markings.

g. Provide improved areas for loading and unloading bus passengers including separate bus lanes and shelters.

h. Upgrade highway and or street lighting.

i. Modifications associated with restricting curb parking.

j. Construction of pedestrian grade separations or highway grade separations at complex intersections.

k. Limited construction or reconstruction where such an improvement is essential for route continuity along a street of otherwise adequate width.

The report which follows describes the study findings and sets forth recommended solutions to existing problem areas.

CHAPTER 2

STUDY DESCRIPTION

STUDY AREA - COUNTY OF CAMDEN

There are thirty-seven (37) municipalities in Camden County, three (3) of which were excluded from this study. A separate study was conducted in the City of Camden while the Borough of Chesilhurst and the Township of Winslow did not qualify for the TOPICS Program because they fell outside of the Urban Delimit Line. For the purpose of this study the remaining thirty-four (34) municipalities were broken down into ten (10) groups and were studied both individually and integrally as part of the County. The ten (10) groups are listed below and consist of:

GROUP 1

a. Borough of Merchantville

b. Township of Pennsauken

GROUP 2

a. Township of Cherry Hill

GROUP 3

a. Borough of Collingswood

b. Borough of Woodlynne

GROUP 4

a. Borough of Audubon Park

b. Township of Haddon

c. Borough of Oaklyn

GROUP 5

a. Borough of Audubon

b. Borough of Haddonfield

c. Borough of Haddon Heights

d. Borough of Tavistock

GROUP 6

a. Borough of Bellmawr

b. Borough of Brooklawn

c. City of Gloucester

d. Borough of Mount Ephraim

GROUP 7

a. Borough of Barrington

b. Borough of Lawnside

c. Borough of Magnolia

d. Borough of Runnemede

GROUP 8

a. Borough of Hi-Nella

b. Borough of Laurel Springs

c. Borough of Somerdale

d. Borough of Stratford

e. Township of Voorhees

GROUP 9

a. Borough of Clementon

b. Borough of Gibbsboro

c. Borough of Lindenwold

GROUP 10

a. Borough of Berlin

b. Township of Berlin

c. Township of Gloucester

d. Borough of Pine Hill

e. Borough of Pine Valley

f. Township of Waterford

Camden County is a complex industrial, commercial, agricultural, residential and historical area located in southern New Jersey with its western border on the Delaware River. Its bordering counties are: Burlington on the northeast, Atlantic to the southeast and Gloucester and Cumberland to the southwest. The 1970 population of four hundred fifty-six thousand, three hundred (456,300) is an increase of sixty-four thousand (64,000) people or sixteen point four (16.4) percent over the 1960 population of three hundred ninety-two thousand (392,000) people.

There are two (2) Interstate Highways, Route 295 and Route 76, one (1) freeway, Route 42 and one (1) toll road, the New Jersey Turnpike, traveling through Camden County. There are seven (7) very heavily traveled main access highways and a network of one hundred seventy-five (175) county collector roads. The collector roads and the main access highways handle the traffic from the local streets in the thirty-seven (37) municipalities within the County in addition to the commuter and industrial traffic. Summer traffic is particularly heavy due to the heavy volumes of traffic using Camden County roads in order to reach the Atlantic County, Cape May County and Ocean County resort areas. (See *Exhibit Nos. 2A through 2J and 3A through 3J).*

Camden County covers an area of two hundred twenty-five (225) square miles of which two hundred twenty point eight (220.8) are land. Camden County is the seventeenth (17th) in land area of the twenty-one (21) counties within the State of New Jersey.

There are twelve (12) major industrial parks and several smaller ones in the county, all of which contribute heavily to the traffic volumes. There are many major shopping malls containing large suburban branches of department store complexes from Philadelphia and New York. These shopping areas have local branches of many New Jersey chains of all kinds so that traffic congestion on normal shopping days is the rule rather than the exception. Normal traffic is augmented on weekends due to the many fine restaurants and golf courses in the County. There are some areas of historical interest particularly in the City of Camden but none have a significant effect on traffic.

There are a few areas in Camden County where the terrain causes some effect on the flow of traffic but generally the flat to rolling configuration has no adverse effect on traffic patterns. Traffic within the County is usually very heavy due to the Interstate Highways and the main arterials which carry a heavy volume of commuter truck traffic and commuter passenger car traffic. The truck traffic is increased by the large industrial complexes located in the County. The New Jersey Turnpike collects and distributes a large volume of mixed traffic onto the County's main arterials, particularly Route 295. During the summer months shore traffic is increased several fold by cars from neighboring states.

GENERAL

STUDY ROADWAY SYSTEM

The roadways and intersections included in the initial study system were developed through field inspections by the Consultant and meetings with Municipal, County and State Officials.

The study system was composed of existing Federal-Aid Urban, Federal-Aid Primary and Secondary routes and major connector and collector streets within the County. *(See Exhibit Nos. 3A through 3J).*

Through the initial investigation of traffic volumes and accident data, the study system was reduced to that shown also on *Exhibit Nos. 3A through 3J* and consists of the Federal-Aid Urban System, Federal-Aid Primary Type I, Federal-Aid Secondary and Federal-Aid Primary Type II roads. The Federal-Aid Primary Type II System is composed of major connector and collector streets located within the County. Road mileage for each system is included on *Exhibit Nos. 3A through 3J.*

THE ANALYTICAL APPROACH

A sequence was developed by which those locations exhibiting poor traffic operation characteristics were identified, corrective measures formulated, relative importance of each location compared and an improvement schedule developed. The roadways were analyzed in terms of their accident history, or safety, their ability to handle traffic volume, or capacity, and their ability to move traffic, or travel quality.

The first step in the study was the collection of data. The following is the data which was collected relative to the roadways within the study network.

1. Traffic data from Municipal, County and State Officials including ordinances relating to traffic, accident records and traffic volumes.

2. Traffic operation data from extensive ground surveys including rights of way, signs, pavement markings, inventories of intersections, public transportation and traffic signals.

3. Peak and off-peak traffic volumes and intersection turning movements.

4. Classification of traffic as to passenger cars, buses, trucks and tractor-trailers.

5. Spot speed checks and time delay studies for peak and off-peak hours.

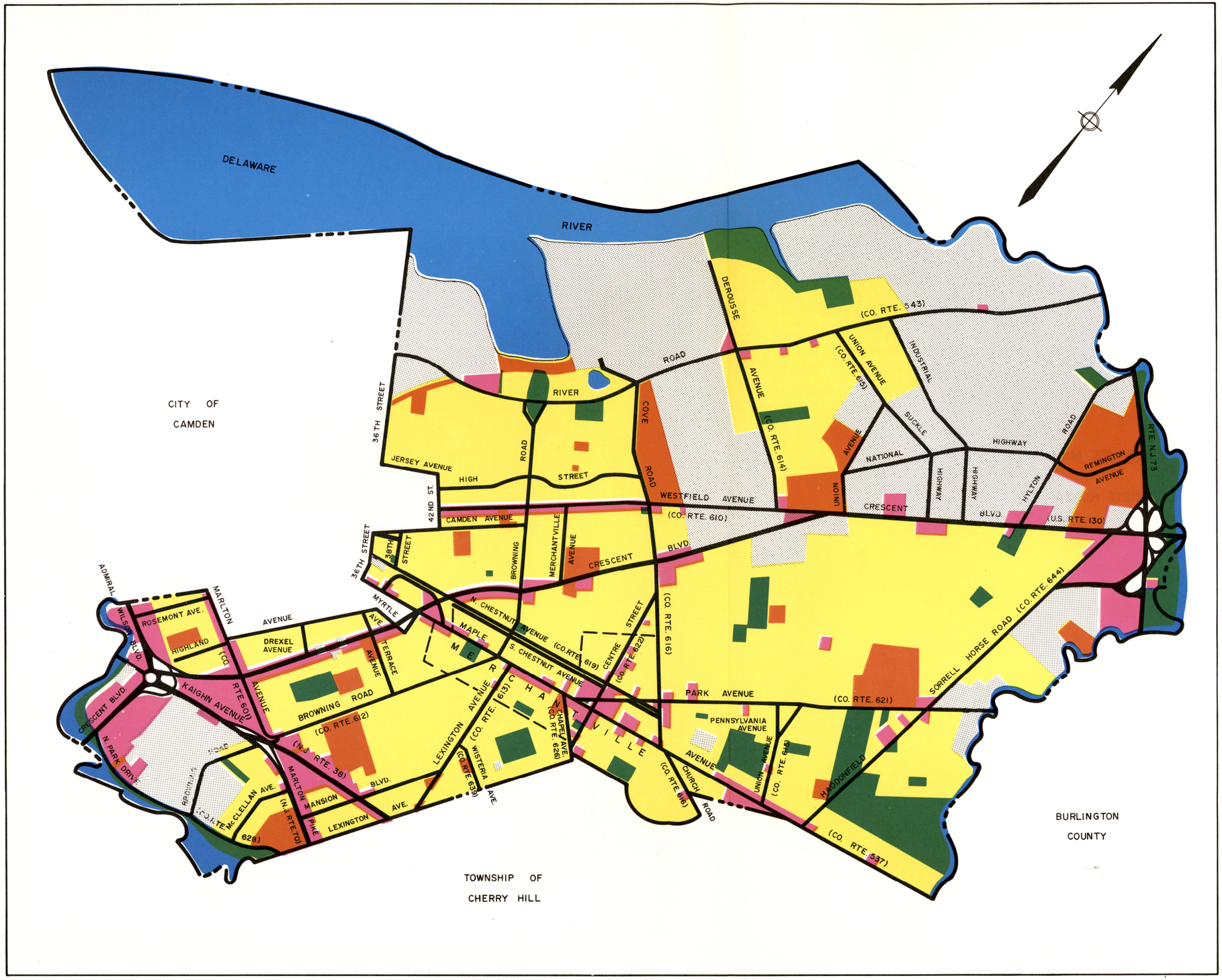
OPERATIONAL REVIEW

During the operational review, data was gathered at various locations. This review included the analysis of the data collected with the purpose of identifying operational problems and developing workable solutions.

PROJECT PRIORITY

Following the development of solutions to problem areas, a project list was developed based on the accident history, volume-capacity ratio and quality of flow established from the time delay studies. Project priorities developed were reviewed with Municipal and County Officials and the final list of priorities, as presented in this report, reflects the results of those meetings.

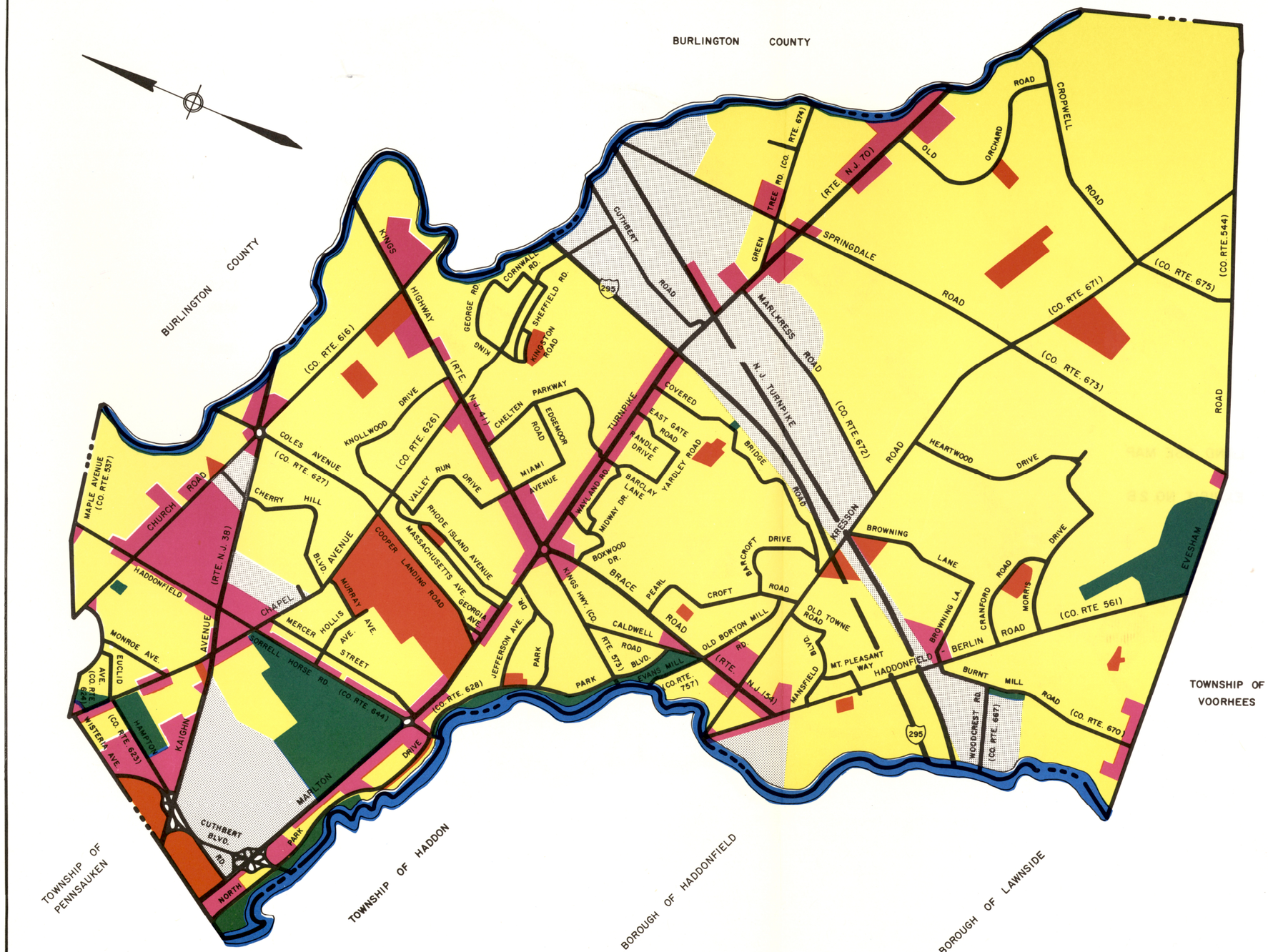
Upon completion of the preparation of preliminary design and cost estimates, a schedule for the implementation of the projects was developed.



LAND USE MAP

EXHIBIT NO. 2A

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

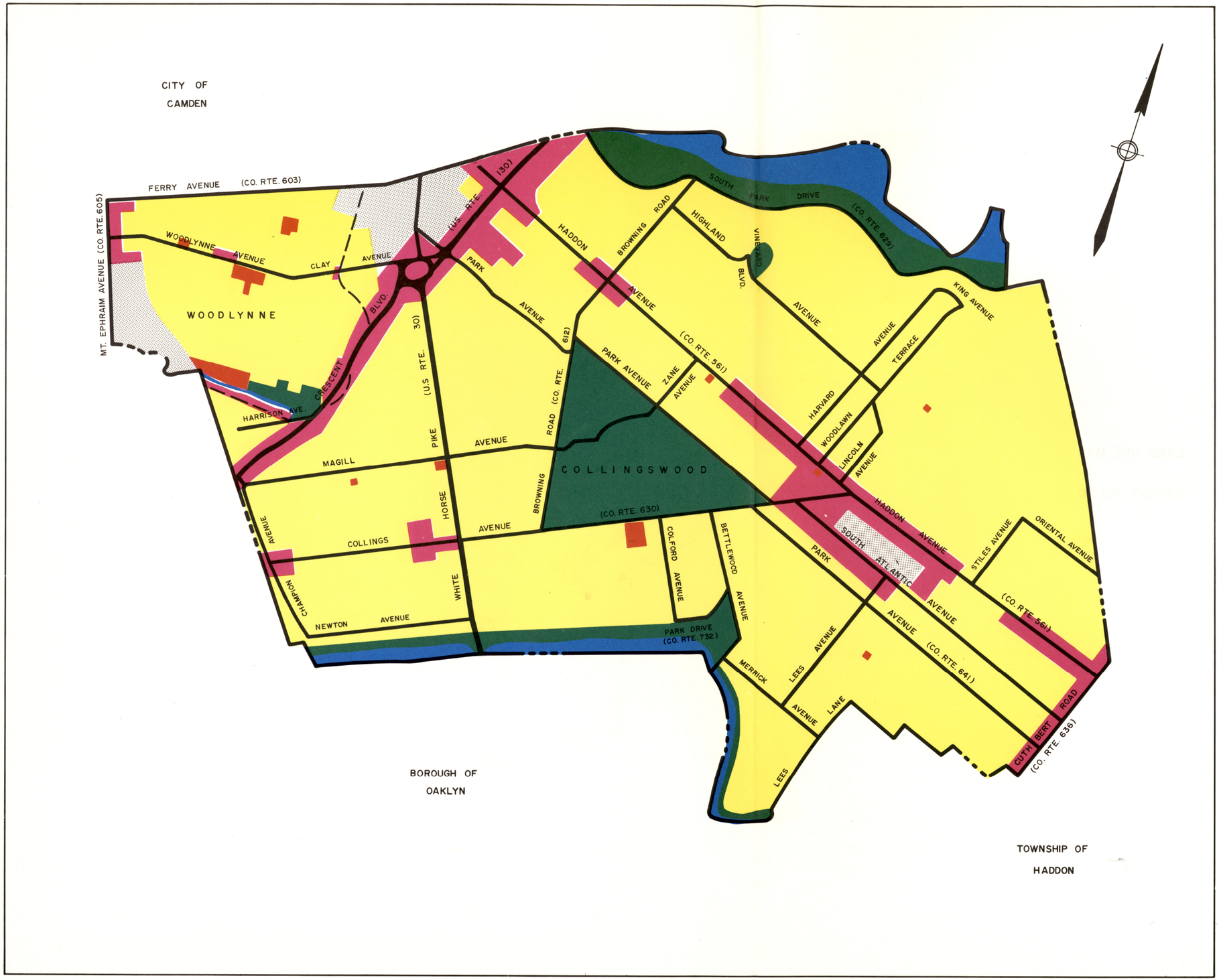
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- Business & Professional
- Residential
- Governmental , Educational & Civic
- Parks & Recreation
- Industrial
- Lakes & Streams
- Undeveloped Land

LAND USE MAP

EXHIBIT NO. 2 B

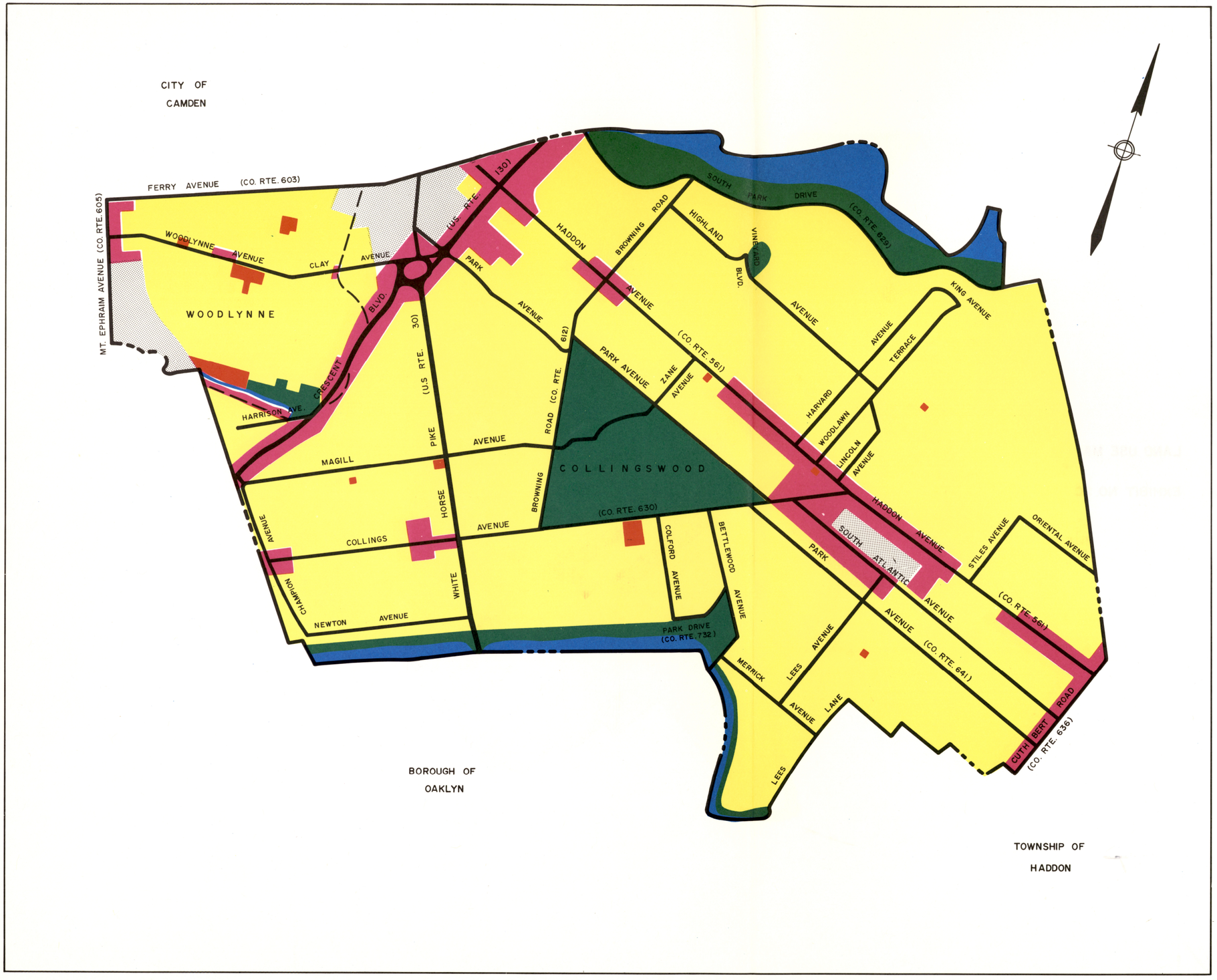
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LAND USE MAP

EXHIBIT NO. 2C

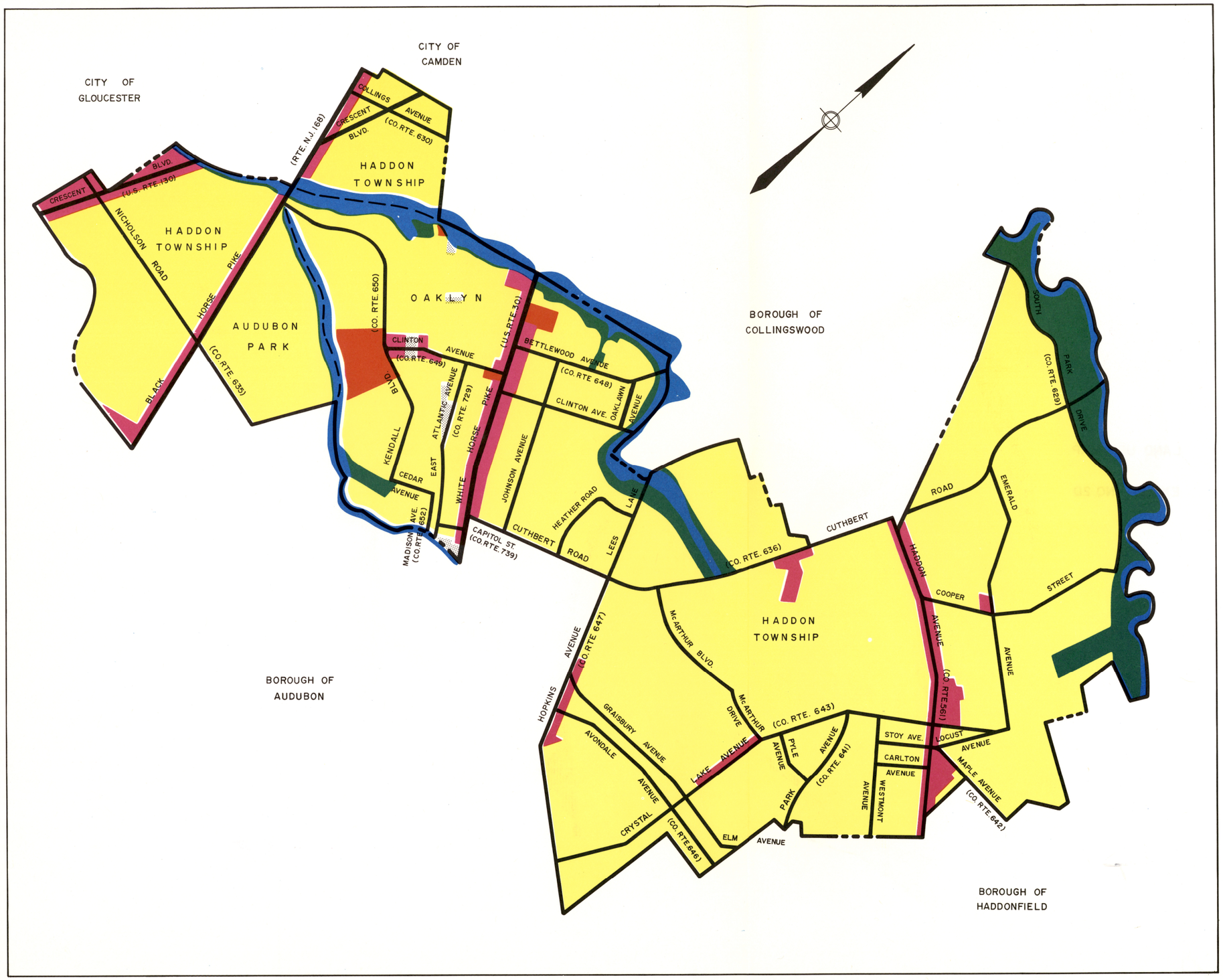
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LAND USE MAP

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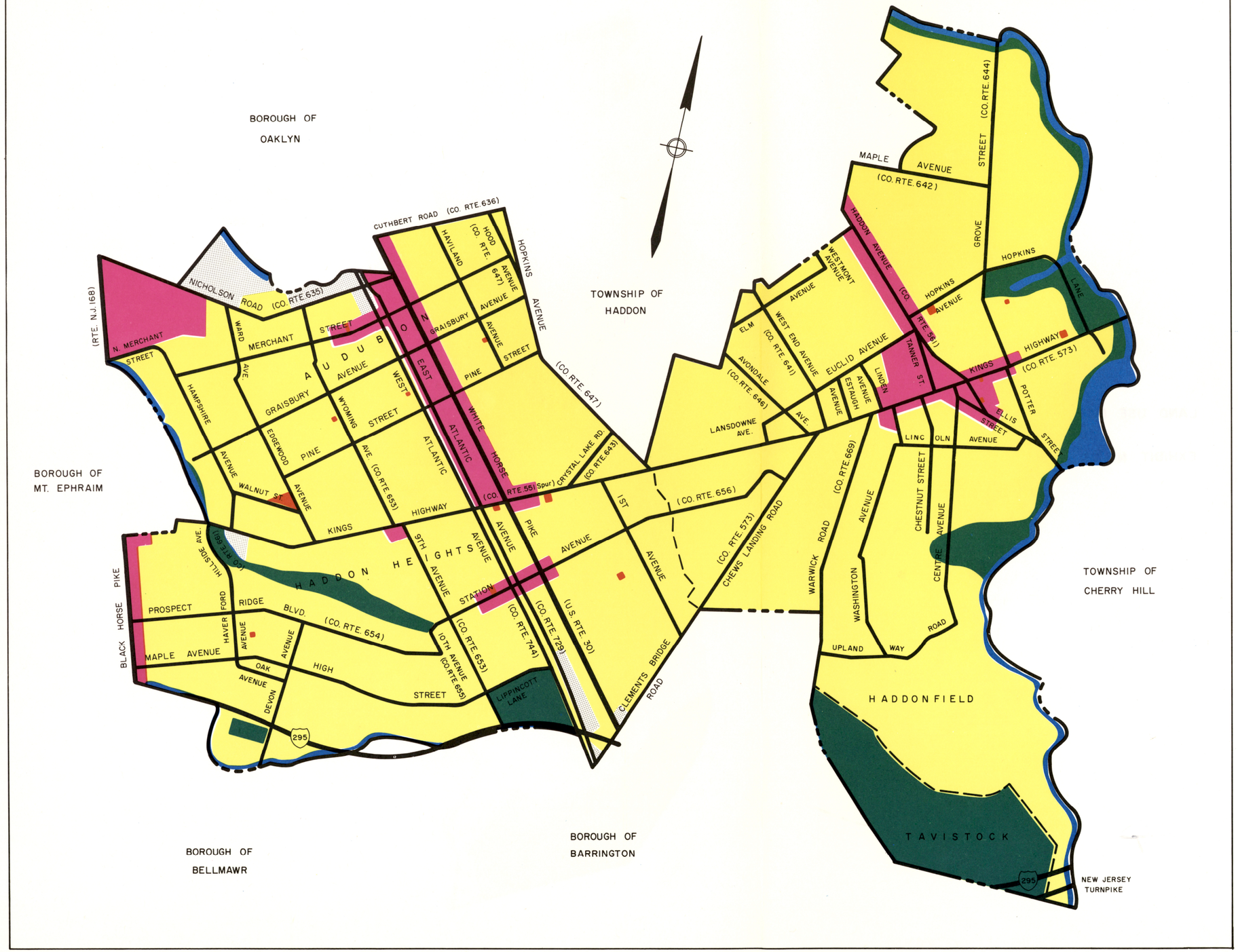
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LAND USE MAP

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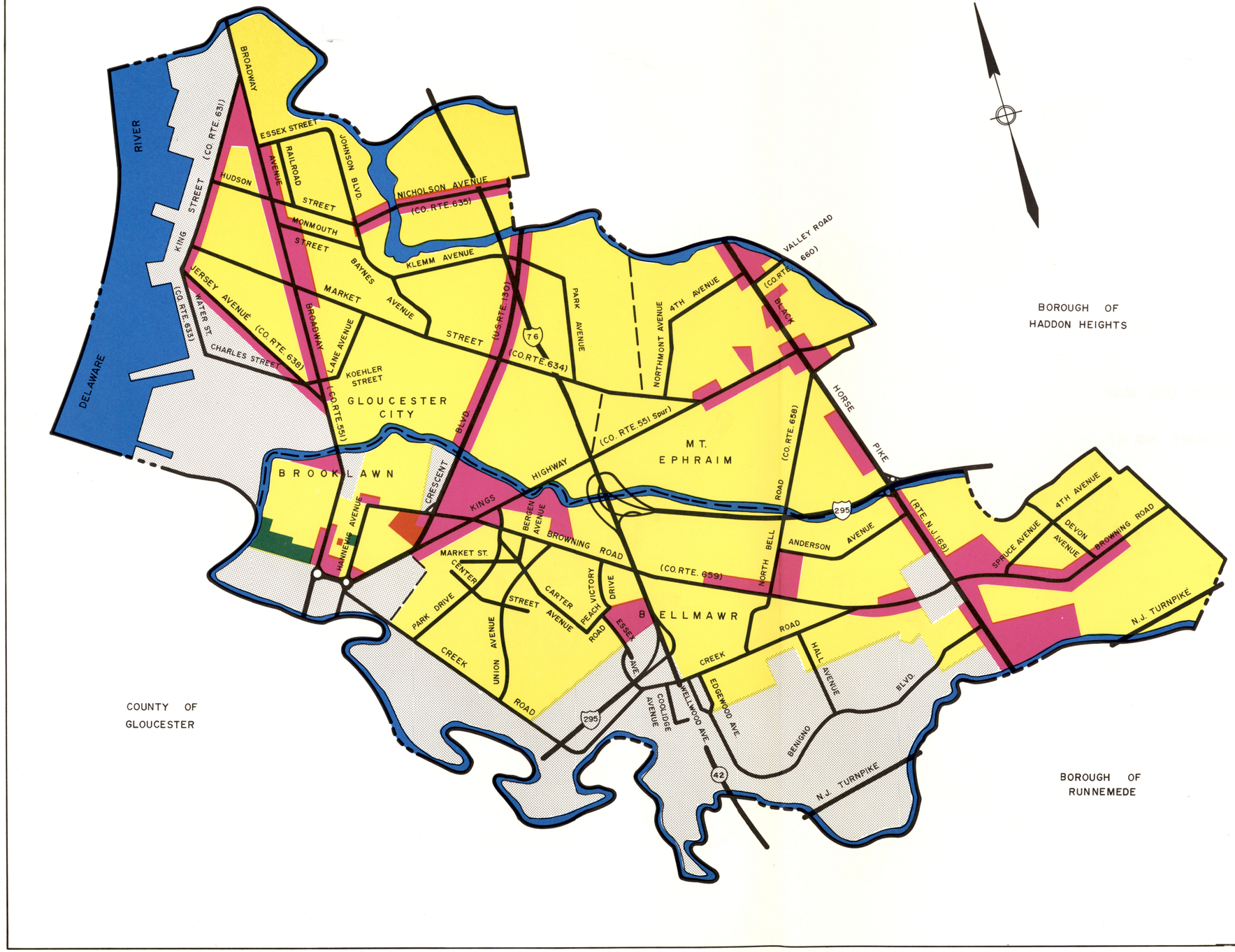
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Consulting Engineers



Business & Professional
Residential
Governmental, Educational & Civic
Parks & Recreation
Industrial
Lakes & Streams

LAND USE MAP

EXHIBIT NO. 2E



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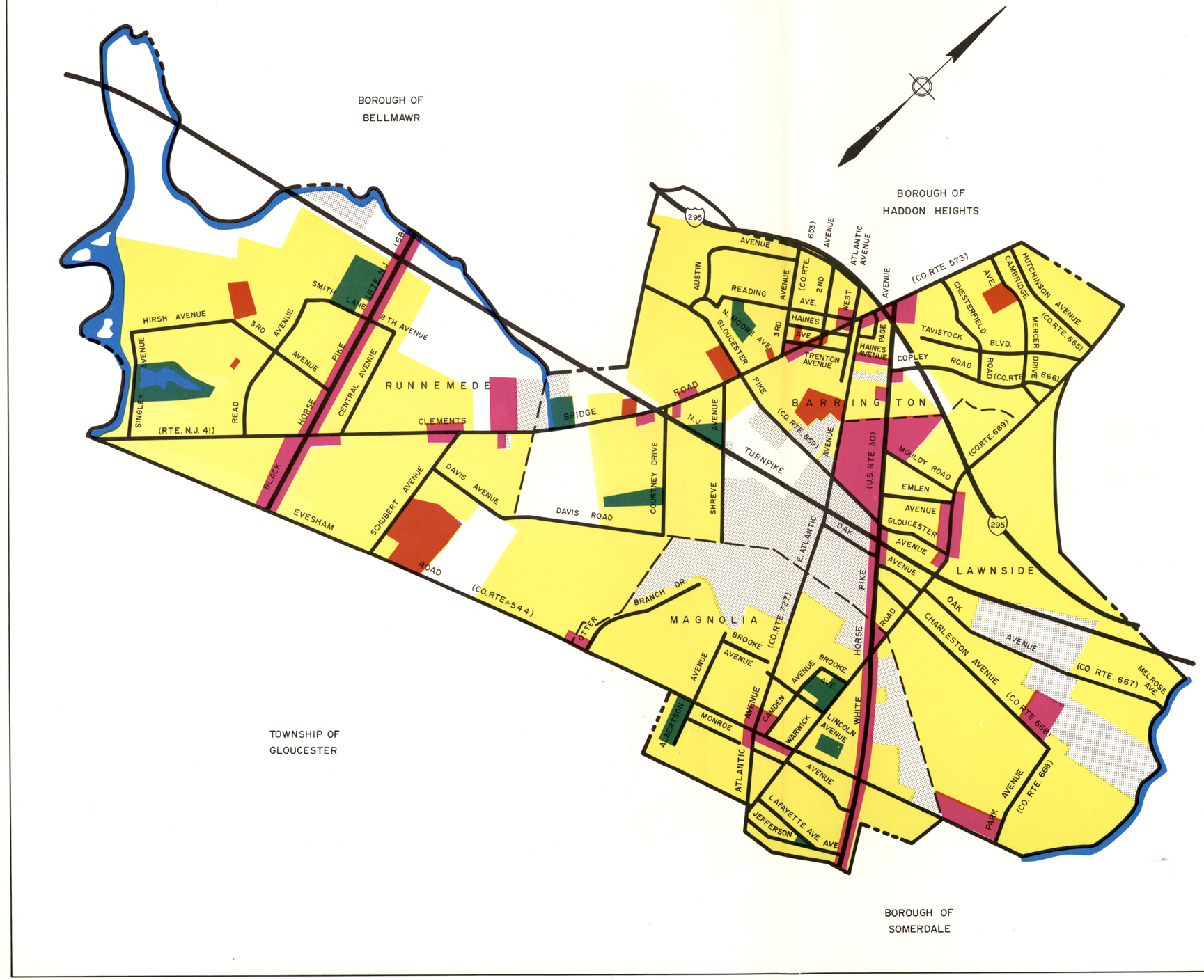
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- Business & Professional
- Residential
- Governmental, Educational & Civic
- Parks & Recreation
- Industrial
- Lakes & Streams

LAND USE MAP

EXHIBIT NO. 2F

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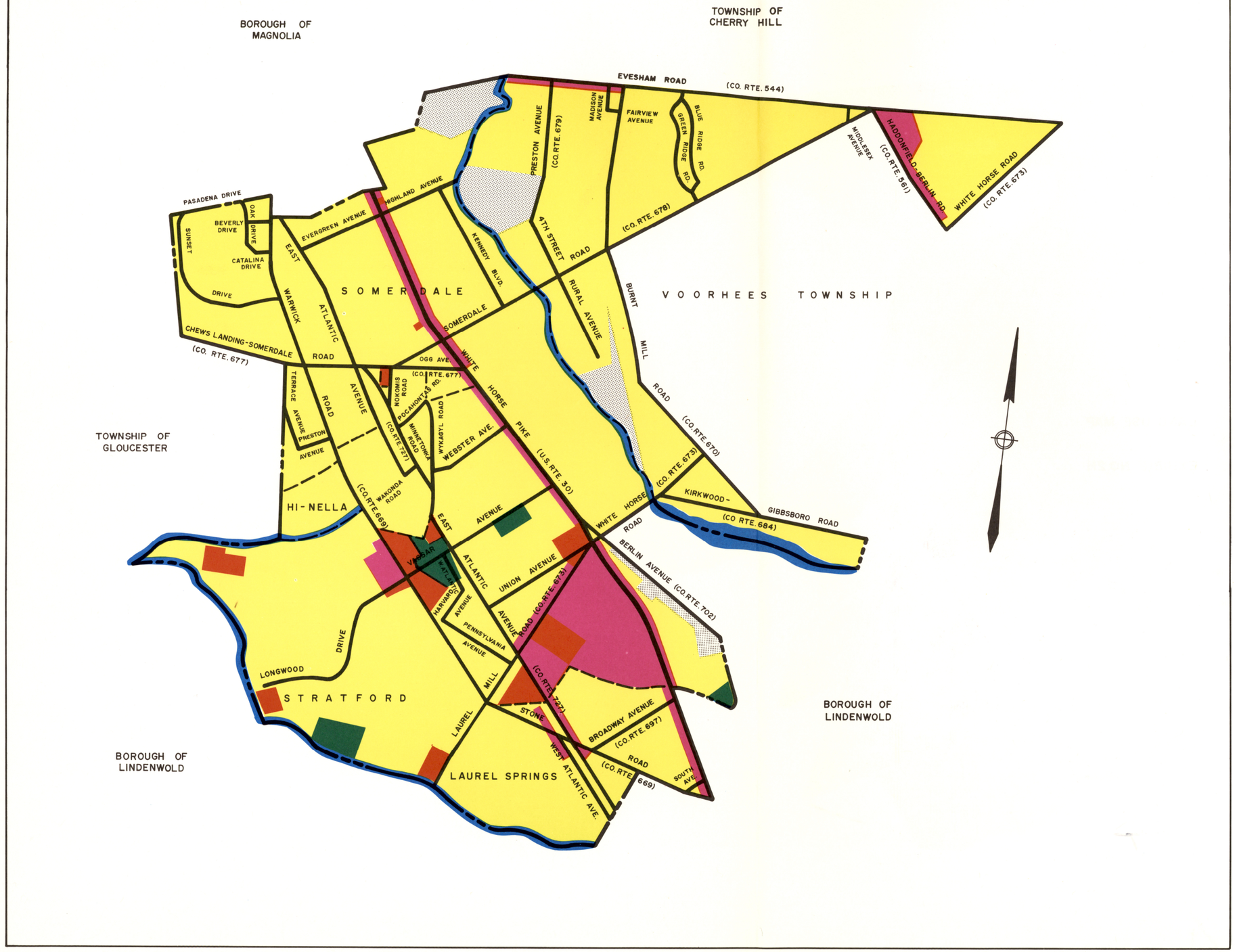
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- Business & Professional
- Residential
- Governmental, Educational & Civic
- Parks & Recreation
- Industrial
- Lakes & Streams
- Undeveloped Land

LAND USE MAP

EXHIBIT NO. 2G

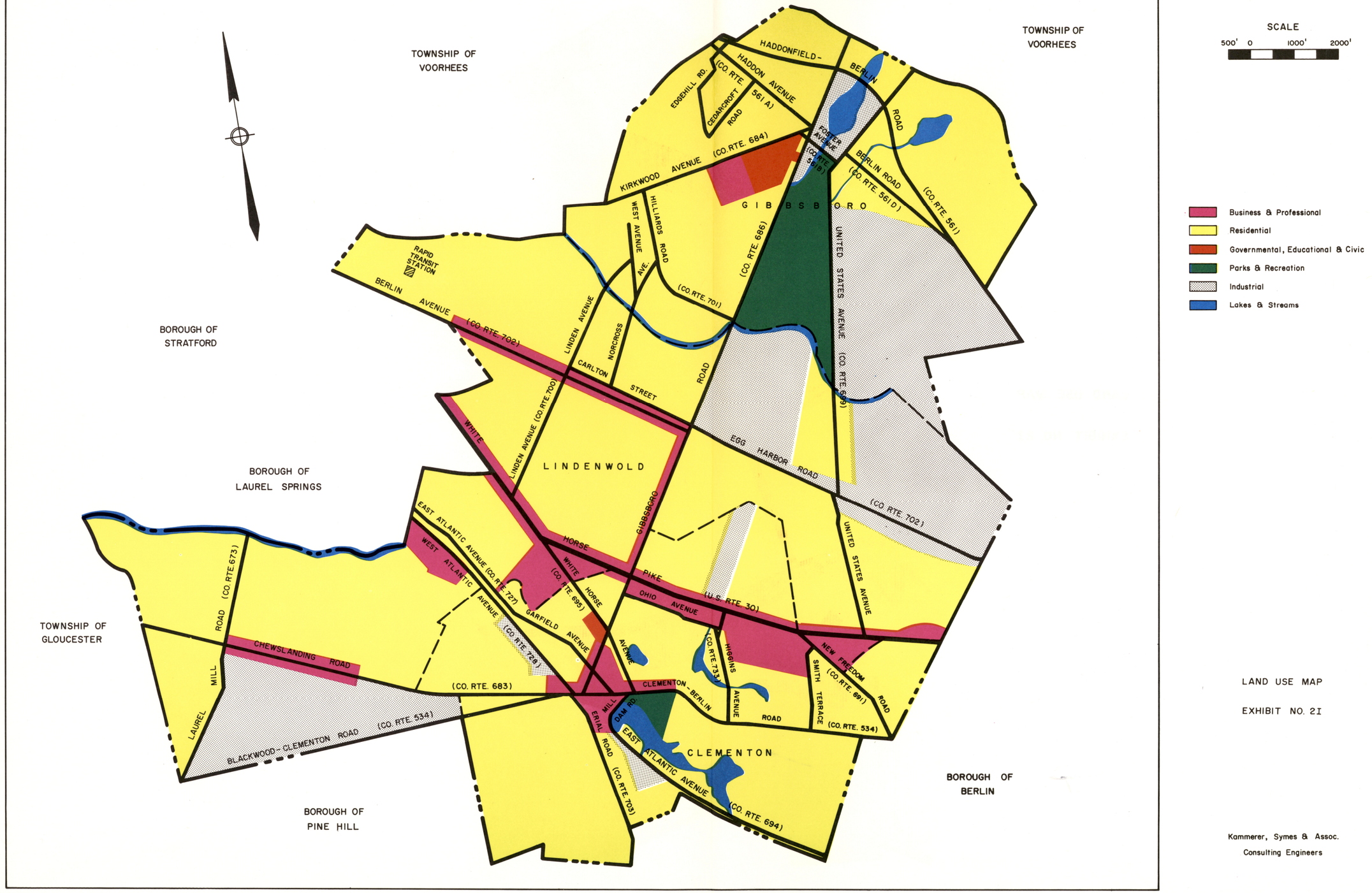
Kammerer, Symes & Assoc.
Consulting Engineers



LAND USE MAP

EXHIBIT NO.2H

Kammerer, Symes & Assoc.
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LAND USE MAP

EXHIBIT NO. 21

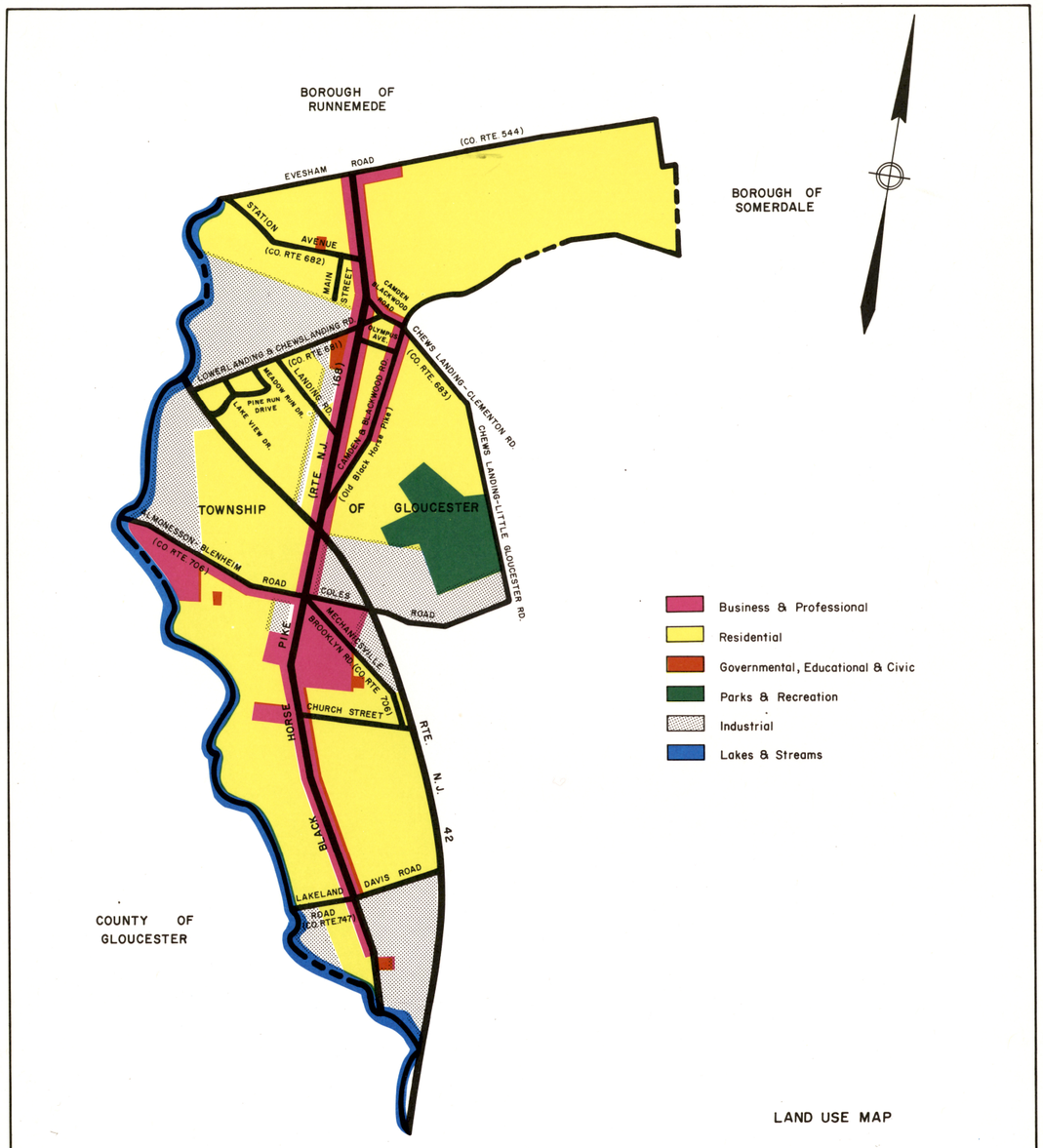
Kammerer, Symes & Assoc.
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LAND USE MAP

EXHIBIT NO. 2J

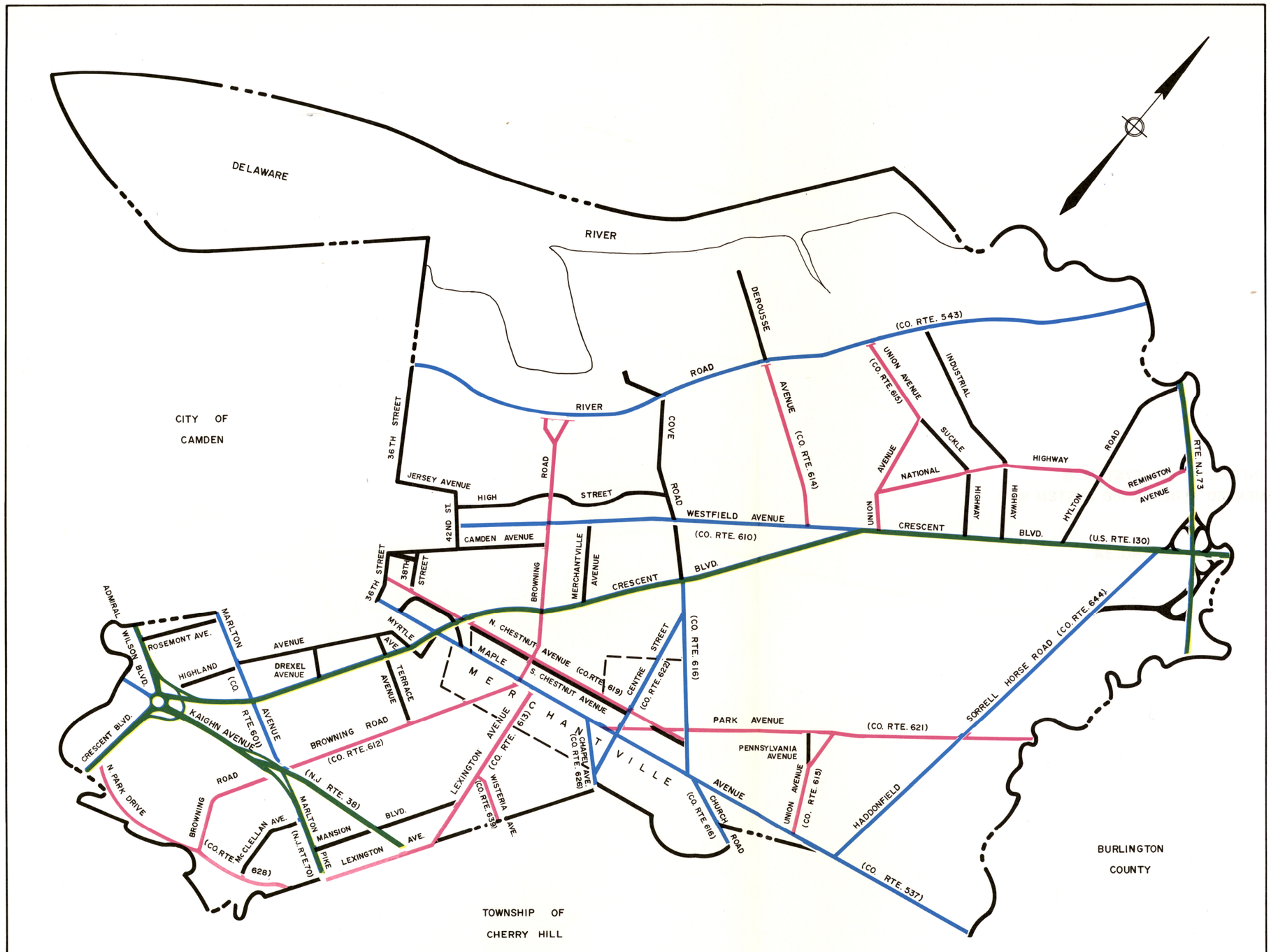
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LAND USE MAP

EXHIBIT NO. 2J

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

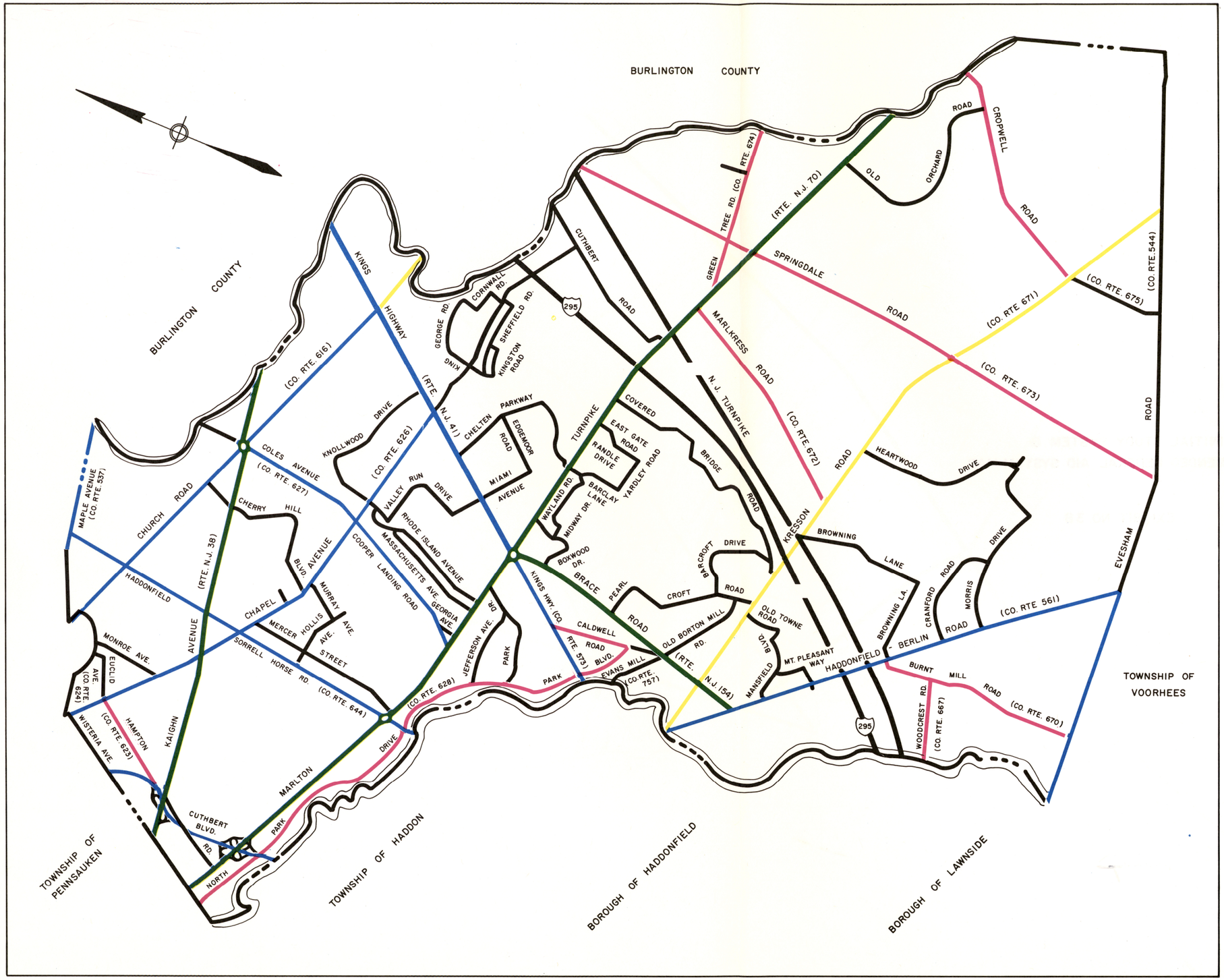
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Streets in the Initial Study System		
Primary Type I (State Highways)	9.31	miles
Secondary - F.A.S. (County Roads)	0.00	miles
Primary Type II (Proposed)	16.25	miles
Federal Aid Urban System	14.94	miles

INITIAL STUDY SYSTEM & RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3A

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

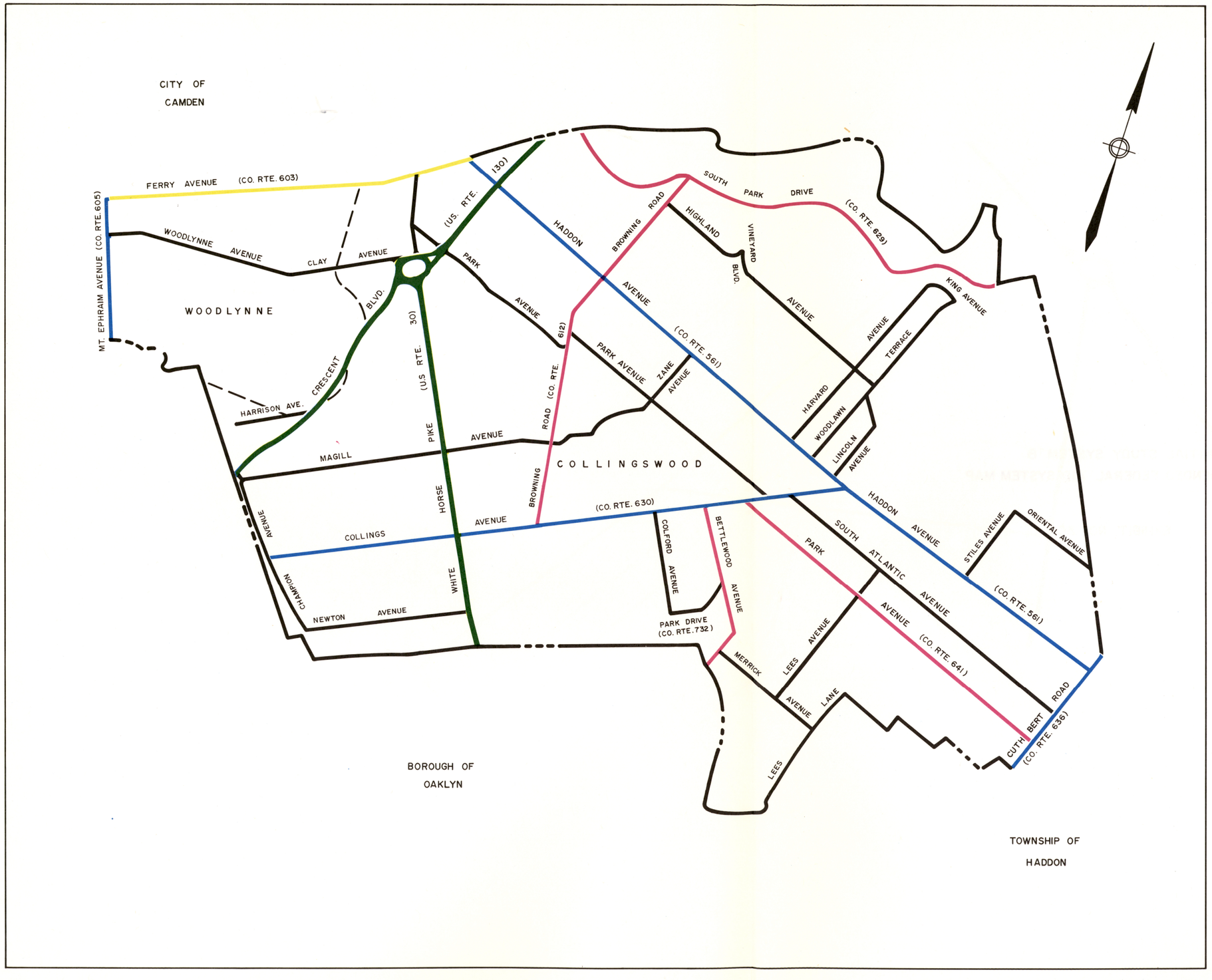
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Streets in the Initial Study System	
Primary Type I (State Highways)	10.91 miles
Secondary - F.A.S. (County Roads)	5.60 miles
Primary Type II (Proposed)	14.62 miles
Federal Aid Urban System	19.23 miles

INITIAL STUDY SYSTEM &
RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3B

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

200' 0 600' 1200'

Streets in the Initial Study System		
Primary Type I (State Highways)	1.77	miles
Secondary - F.A.S. (County Roads)	0.79	miles
Primary Type II (Proposed)	3.09	miles
Federal Aid Urban System	3.64	miles

INITIAL STUDY SYSTEM &
RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3C

Kammerer, Symes & Assoc.
Consulting Engineers

CITY OF CAMDEN

CITY OF GLOUCESTER

COLLINGS CRESCENT BLVD.

AVENUE (CO. RTE. 630)

(RTE. N.J. 168)

CRESCENT BLVD. (U.S. RTE. 130)

HADDON TOWNSHIP

NICHOLSON ROAD

HADDON TOWNSHIP

BLACK HORSE PIKE

(CO. RTE. 635)

AUDUBON PARK

(CO. RTE. 650)

OAKLYN

CLINTON AVENUE (CO. RTE. 649)

BLVD.

KENDALL

ATLANTIC AVENUE (CO. RTE. 729)

EAST

CEDAR AVENUE

MADISON AVE. (CO. RTE. 652)

WHITE HORSE PIKE

(U.S. RTE. 30)

BETTLEWOOD AVENUE (CO. RTE 648)

CLINTON AVE. OAKLAWN AVENUE

JOHNSON AVENUE

HEATHER ROAD

LANE

CUTHBERT ROAD

LEES

CAPITOL ST. (CO. RTE. 739)

BOROUGH OF COLLINGSWOOD

CUTHBERT (CO. RTE. 636)

SOUTH PARK (CO. RTE. 629) DRIVE

ROAD

EMERALD

HADDON AVENUE (CO. RTE. 561)

COOPER STREET

AVENUE

HADDON TOWNSHIP

McARTHUR BLVD.

McARTHUR DRIVE

(CO. RTE. 643)

HOPKINS AVENUE (CO. RTE. 647)

GRAISBURY AVENUE

AVONDALE AVENUE

LAKE AVENUE

PYLE AVENUE

AVENUE (CO. RTE. 641)

STOY AVE.

CARLTON AVENUE

LOCUST AVENUE

MAPLE AVENUE (CO. RTE. 642)

WESTMONT AVENUE

PARK

CRYSTAL AVENUE (CO. RTE. 646)

ELM AVENUE

BOROUGH OF AUDUBON

BOROUGH OF HADDONFIELD

SCALE

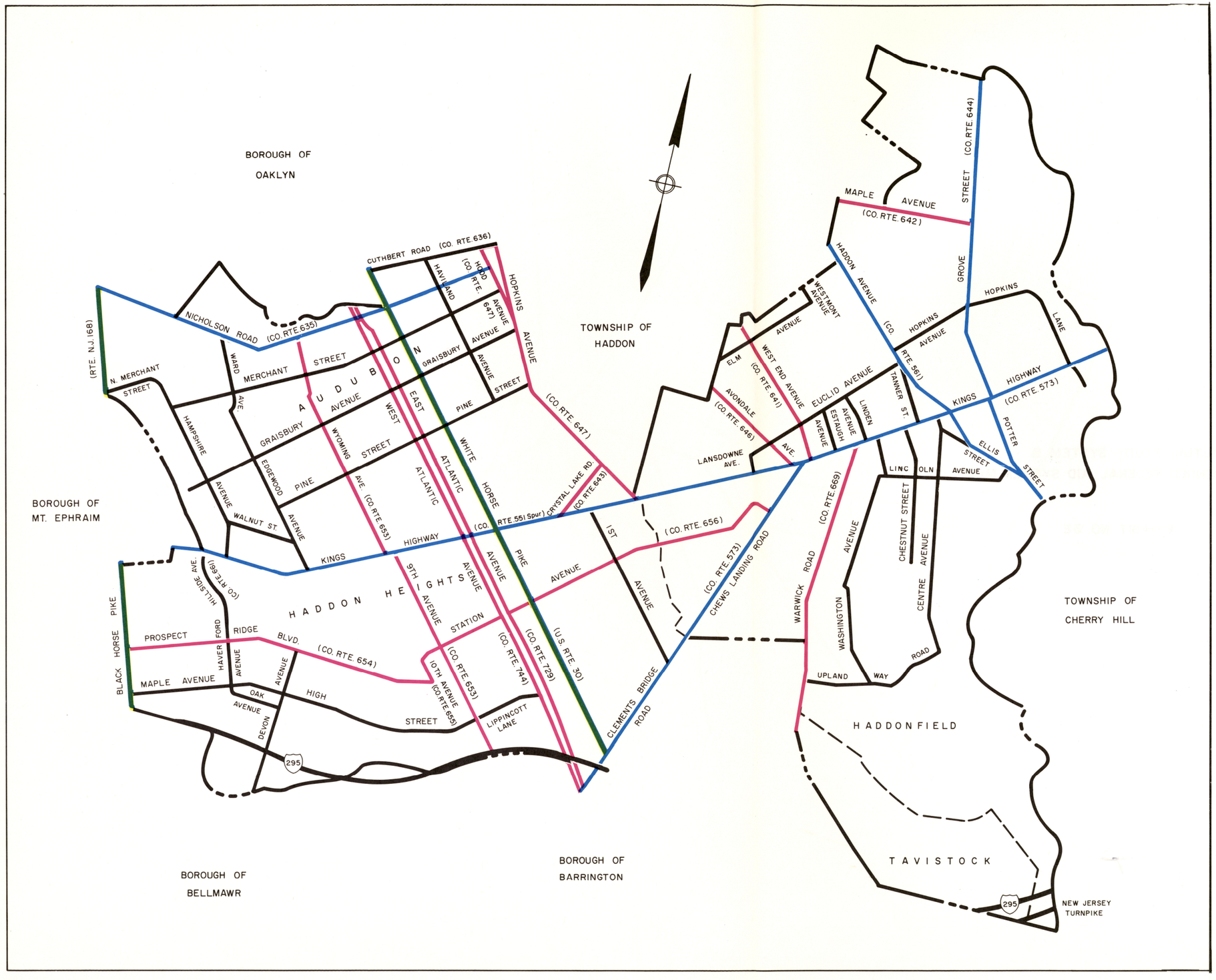
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Streets in the Initial Study System		
Primary Type I (State Highways)	2.73	miles
Secondary - F.A.S. (County Roads)	0.56	miles
Primary Type II (Proposed)	6.98	miles
Federal Aid Urban System	3.47	miles

INITIAL STUDY SYSTEM &
RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3D

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

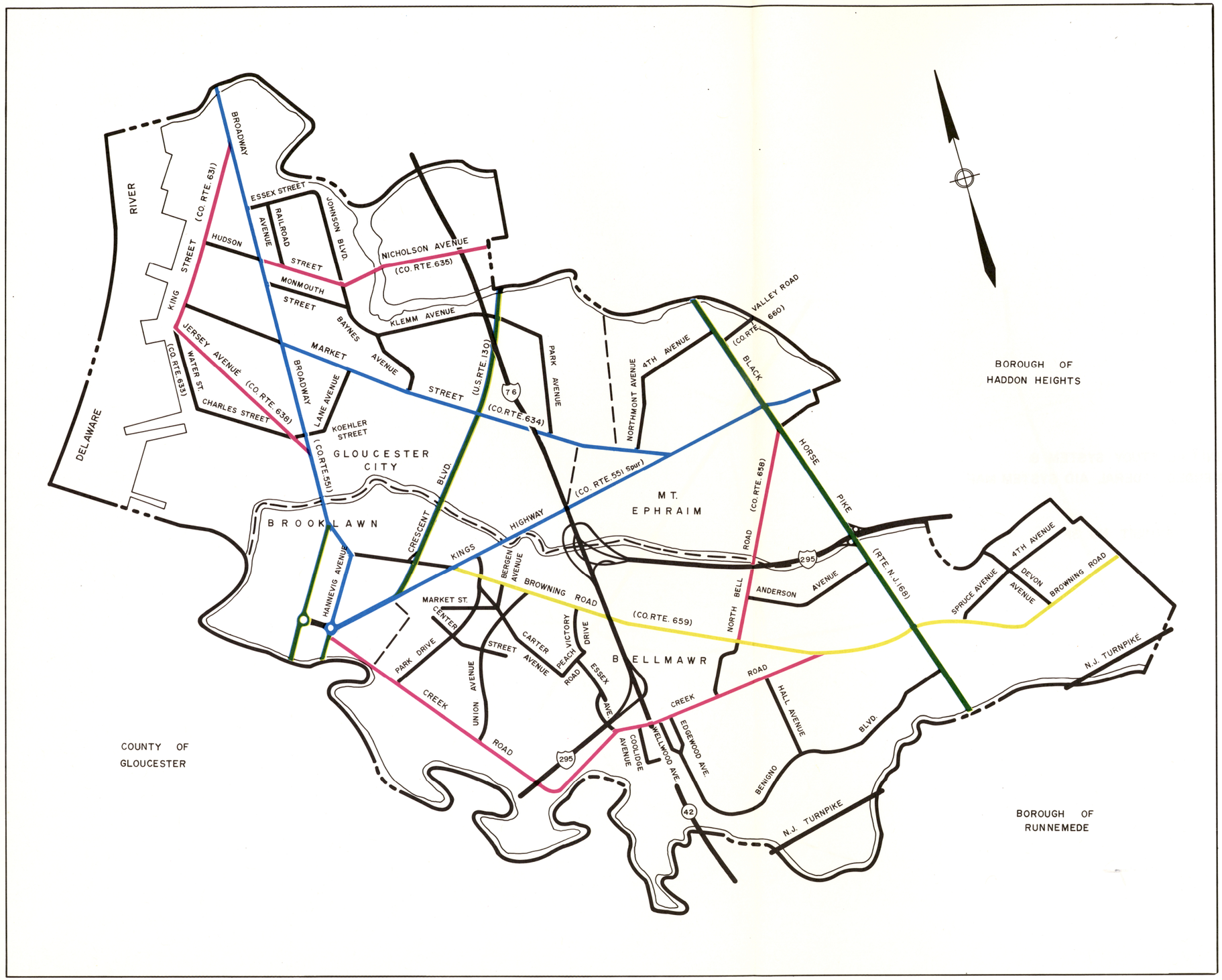
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Streets in the Initial Study System	
Primary Type I (State Highways)	2.89 miles
Secondary – F.A.S. (County Roads)	0.00 miles
Primary Type II (Proposed)	12.69 miles
Federal Aid Urban System	9.29 miles

INITIAL STUDY SYSTEM &
RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3E

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

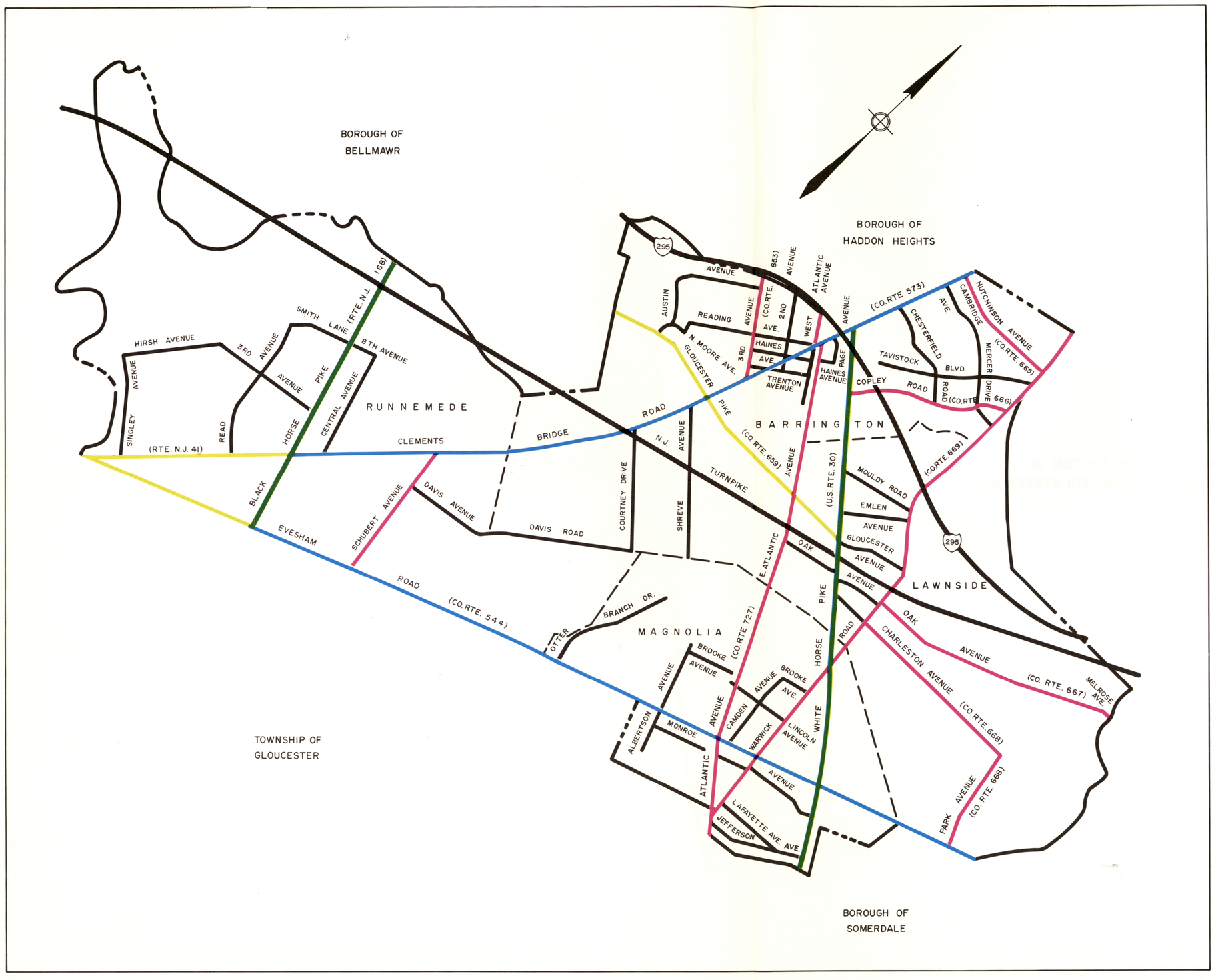
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Streets in the Initial Study System	
Primary Type I (State Highways)	3.67 miles
Secondary – F.A.S. (County Roads)	2.71 miles
Primary Type II (Proposed)	5.54 miles
Federal Aid Urban System	5.92 miles

INITIAL STUDY SYSTEM &
RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3F

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

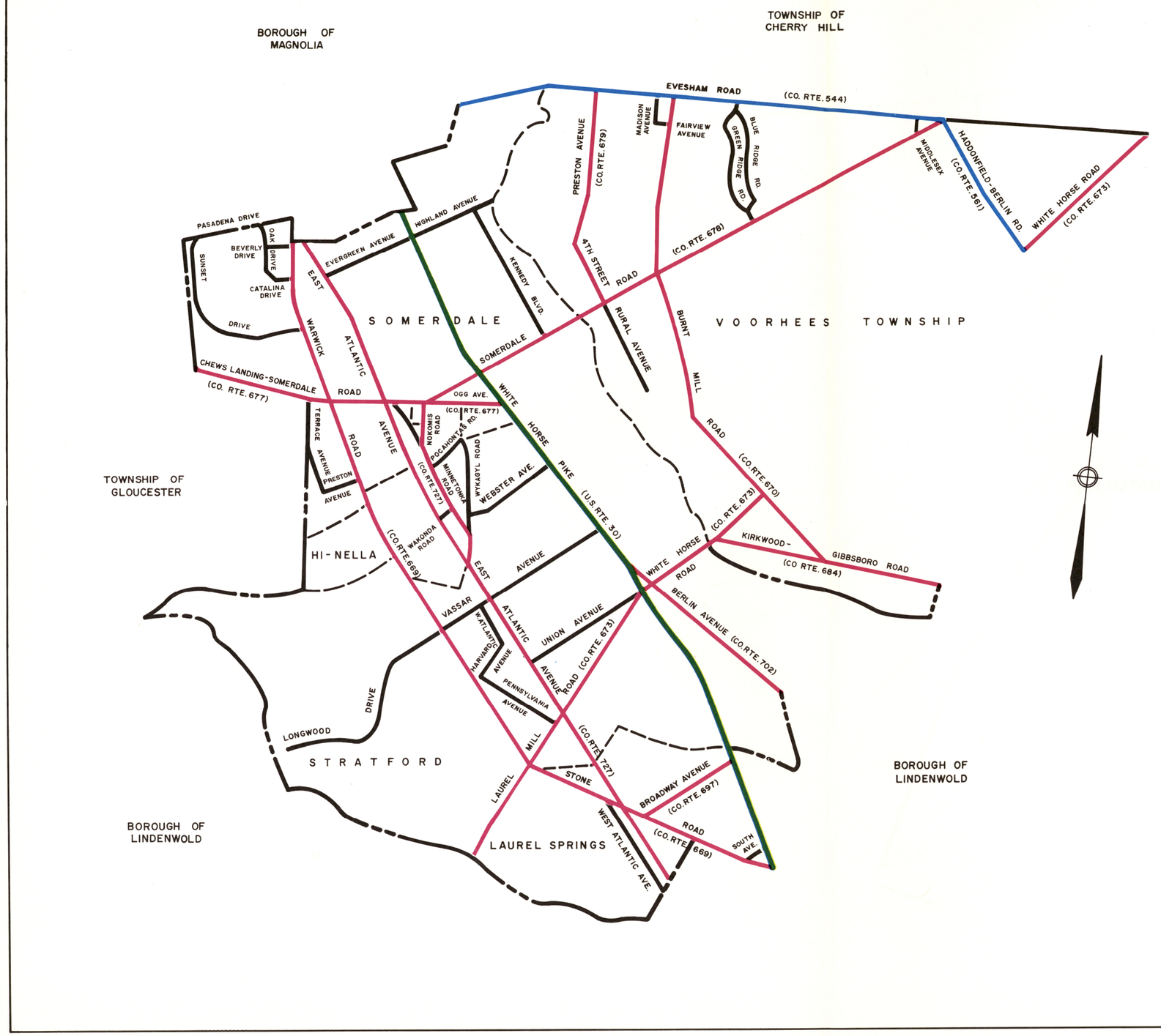
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Streets in the Initial Study System	
Primary Type I (State Highways)	3.30 miles
Secondary - F.A.S. (County Roads)	2.78 miles
Primary Type II (Proposed)	8.50 miles
Federal Aid Urban System	5.92 miles

INITIAL STUDY SYSTEM & RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3G

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

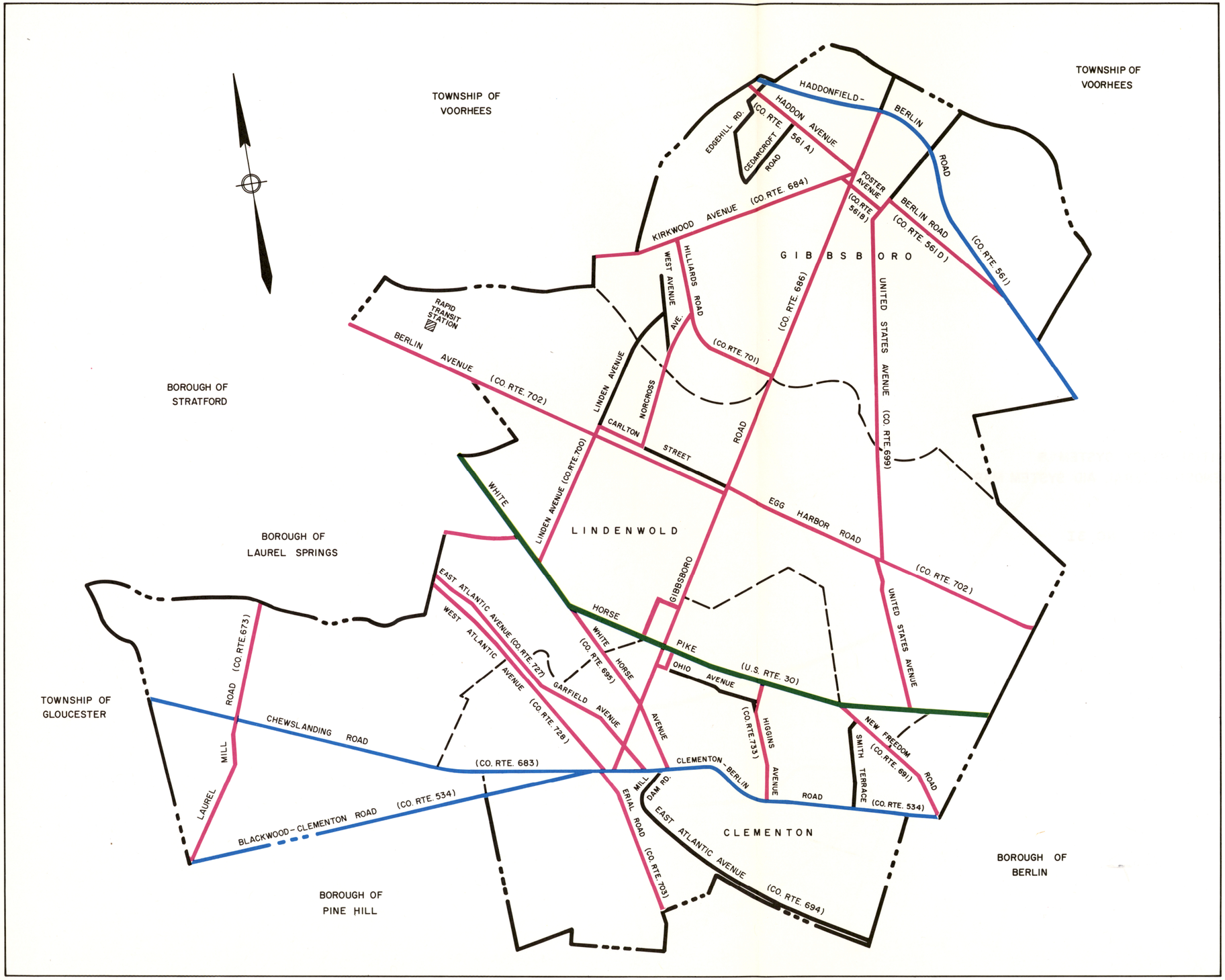
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Streets in the Initial Study System	
Primary Type I (State Highways)	2.75 miles
Secondary - F.A.S. (County Roads)	0.00 miles
Primary Type II (Proposed)	16.48 miles
Federal Aid Urban System	2.28 miles

INITIAL STUDY SYSTEM &
RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3H

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

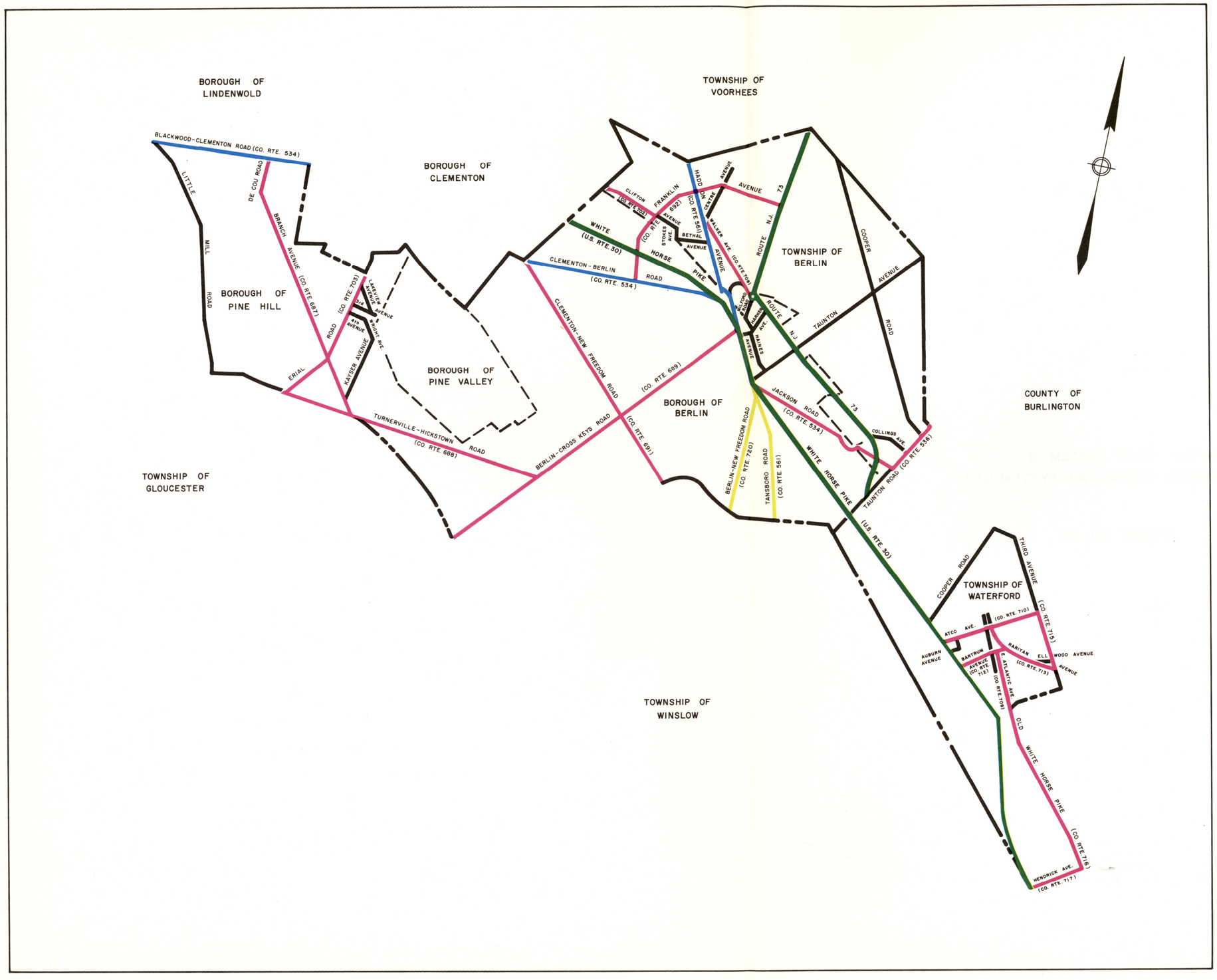
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Streets in the Initial Study System	
Primary Type I (State Highways)	2.41 miles
Secondary – F.A.S. (County Roads)	0.00 miles
Primary Type II (Proposed)	16.10 miles
Federal Aid Urban System	6.58 miles

INITIAL STUDY SYSTEM &
RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3I

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

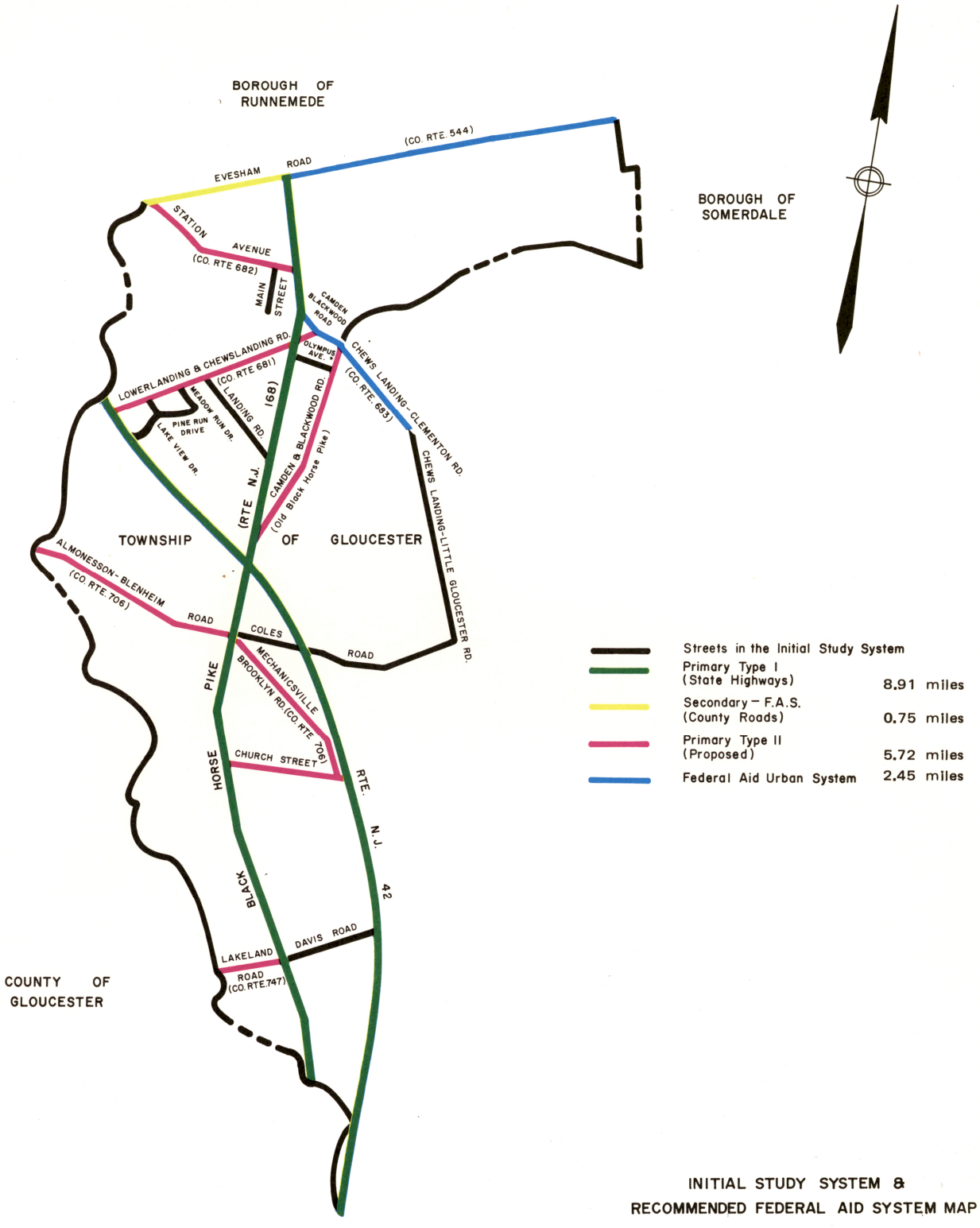
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Streets in the Initial Study System	
Primary Type I (State Highways)	9.84 miles
Secondary – F.A.S. (County Roads)	1.78 miles
Primary Type II (Proposed)	19.31 miles
Federal Aid Urban System	3.94 miles

INITIAL STUDY SYSTEM &
RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3J

Kammerer, Symes & Assoc.
Consulting Engineers



INITIAL STUDY SYSTEM &
RECOMMENDED FEDERAL AID SYSTEM MAP

EXHIBIT NO. 3J

Kammerer, Symes & Assoc.
Consulting Engineers

CHAPTER 3

DATA COLLECTION

Data for the TOPICS study was collected during the period March 1971 through September 1972 by the Consultant and included the following:

a. Traffic Volumes - traffic volumes and turning movements were determined at specific locations for various durations.

b. Roadway Inventory - right of way and roadway widths, type and condition of pavement, location of curbs, shoulders, sidewalks, poles and trees, etc.

c. Traffic Control Devices - location of and condition of traffic control devices such as traffic signals, signs and pavement markings.

d. Accident History - records of all reported accidents were reviewed, but only locations where five (5) or more accidents occurred per year for the years 1968, 1969 and 1970, were studied extensively and included in this report.

e. Time and Delay - travel speeds on roads within the study area were graphically recorded, using electronic equipment, for peak and off-peak periods.

f. General Observations - during the study period, observations were made by both the Consultant and local officials of traffic operations, pedestrian problem areas, roadway lighting and the enforcement of existing traffic regulations.

At the outset of the project, meetings were held with Municipal and County Officials, members of the Police Departments and the Consultant to introduce personnel, to develop lines of communication and to explain the various procedures to be used.

At the completion of the field inventory phase of the work, the Consultant contacted Municipal and County Officials to review the data collected, familiarize them with the TOPICS Program and to obtain their views on problems within the study area.

CHAPTER 4

ACCIDENT RECORDS

Accident records for locations reporting five (5) or more accidents per year for any one year from 1968 through 1970, enabled comparisons to be made for several different factors. An analysis was made of the data collected for the purpose of developing accident patterns which might be based on day or night, weather conditions, roadway conditions, traffic control and traffic density.

Following is a Table of High Accident Locations within Camden County. The locations are listed in the order of their frequency of occurrence and include the total number of accidents occurring during the three (3) year period, the most significant type of accident and the percentage of the most significant type when compared to the total number of occurrences at a particular location. The types of accidents noted were:

1. Fixed Object - F.O.
2. Head On - H.O.
3. Left Turn - L.T.
4. Pedestrian - Ped.
5. Right Angle - R.A.
6. Same Direction - S.D.

TABLE NO. 4

HIGH ACCIDENT LOCATIONS

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Pennsauken	Airport Circle	620	SD	57%
Cherry Hill	Grove Street Circle	200	SD	69%
Cherry Hill	Church Road Circle	153	SD	72%
Clementon	Route 30 and Gibbsboro Road	121	LT	48%
Collingswood	Collingswood Circle	105	LT	41%
Magnolia	Route 30 and Evesham Road	102	SD	40%
Cherry Hill	Haddonfield-Sorrell Horse Road and Chapel Avenue	88	SD	55%
Mount Ephraim	Route 168 and Kings Highway	84	SD	50%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Barrington	Route 30 and Copley Road	75	LT	67%
Stratford	Route 30 and Laurel Mill Road	73	SD	42%
Magnolia	Route 30 and Warwick Road	73	SD	63%
Cherry Hill	Haddonfield-Sorrell Horse Road and Church Road	72	LT	49%
Haddon Heights	Route 30 and Kings Highway	69	LT	54%
Cherry Hill	Cuthbert Boulevard and North Park Drive	63	RA	52%
Pennsauken	Route 130 and Marlton Pike Jughandle	61	RA	67%
Gloucester City	Route 130 South and Market Street	61	LT	67%
Brooklawn	Route 130 and East Traffic Circle	59	SD	47%
Stratford	Laurel Mill Road and Warwick Road	55	RA	65%
Somerdale	Route 30 and Somerdale Road	52	SD	46%
Cherry Hill	Haddonfield-Sorrell Horse Road and Maple Avenue	52	SD	42%
Collingswood	Route 30 and Collings Avenue	51	LT	51%
Pennsauken	Route 130 and Marlton Pike	50	SD	52%
Haddon Heights	Route 30 and Clements Bridge Road	50	SD	40%
Haddonfield	Kings Highway, Potter Street and Grove Street	50	LT	42%
Cherry Hill	Route 38 and Chapel Avenue	50	SD	56%
Pennsauken	Route 130 and Hylton Road	49	SD	49%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Cherry Hill	Route 70 and Cornell Avenue	49	SD	61%
Pennsauken	Route 130 and Browning Road	48	RA	44%
Pennsauken	Route 38 and Mansion Avenue	48	SD	48%
Pennsauken	Route 38 and Route 70	46	SD	80%
Pennsauken	Route 130 and Cove Road	46	RA	57%
Merchantville	Maple Avenue and Browning Road	45	SD	49%
Lawnside	Route 30 and Gloucester Avenue	44	SD	50%
Pennsauken	Route 130 and Union Avenue	43	RA	42%
Cherry Hill	Route 70 and Springdale Road	42	SD	48%
Pennsauken	Route 73, Route 130 N. and Haddonfield-Sorrell Horse Road Overpass	41	FO	61%
Collingswood	Route 130 and Haddon Avenue	41	LT	44%
Haddon Township	Route 130 and Wilson Avenue	41	SD	54%
Brooklawn	Route 130 and Browning Lane	41	SD	39%
Collingswood	Haddon Avenue and Cuthbert Road	40	SD	38%
Haddon Township	Haddon Avenue and Cuthbert Road	40	SD	38%
Haddon Township	Route 130 and Collings Avenue	39	SD	64%
Lawnside	Route 30, Mouldy Road and Entrance to Two Guys Shopping Center	39	SD	54%
Audubon	Route 168 and Nicholson Road	37	RA	70%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Stratford	Route 30 and DRPA Access Road	37	SD	38%
Berlin Borough	Route 30 and Berlin-Cross Keys Road	37	LT	35%
Pennsauken	Route 73 and Hylton Road	35	SD	89%
Cherry Hill	Route 38 and Longwood Avenue	35	SD	74%
Gloucester City	Route 130 and Klemm Avenue	35	LT	34%
Cherry Hill	Burnt Mill Road and Evesham Road	35	RA	54%
Pennsauken	Park Avenue and Haddonfield-Sorrell Horse Road	35	RA	66%
Pennsauken	Westfield Avenue and Route 130	34	SD	44%
Gloucester City	Route 130 North and Market Street	34	SD	47%
Cherry Hill	Route 70 and Cuthbert Road	33	Ped.	73%
Stratford	Route 30 and Hunt Avenue	33	SD	48%
Pennsauken	Route 130 and Suckle Highway	33	SD	52%
Cherry Hill	Route 154 and Haddonfield-Berlin Road	33	SD	45%
Brooklawn	Route 130 and West Traffic Circle	32	SD	53%
Berlin Borough	Route 30, Clementon Road and Park Drive	32	SD	41%
Pennsauken	Route 73 and Remington Avenue	31	SD	81%
Pennsauken	Route 70 and McClellan Avenue	31	SD	48%
Haddon Heights	Route 30 and Station Avenue	31	SD	42%
Berlin Borough	Route 30 and Franklin Avenue	31	LT	45%
Cherry Hill	Route 70 and Fulton Avenue	30	SD	43%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Cherry Hill	Chapel Avenue and Coles Avenue	30	SD	70%
Magnolia	Evesham Road and Atlantic Avenue	30	RA	53%
Cherry Hill	Route 41 and Chapel Avenue	29	SD	45%
Gloucester Township	Route 168 and Church Street	29	SD	62%
Gloucester Township	Route 168 and Old Black Horse Pike	29	SD	52%
Cherry Hill	Route 70 and Kingston Road	28	SD	54%
Haddon Township	Route 130 and Route 168	28	SD	64%
Brooklawn	Route 130 and Kings Highway	28	SD	39%
Cherry Hill	Route 38 and Mill Road	28	SD	50%
Voorhees Township	Haddonfield-Berlin Road and White Horse Road	28	RA	64%
Lindenwold	Laurel Mill Road and Chews Landing Road	28	RA	61%
Haddonfield	Kings Highway and Haddon Avenue	28	SD	57%
Cherry Hill	Route 70, Georgia Avenue and Edison Avenue	28	SD	61%
Merchantville	Chapel Avenue and Centre Street Circle Complex	28	RA	79%
Bellmawr	Route 168 and Browning Road	28	SD	58%
Lindenwold	Route 30 and Linden Avenue	27	SD	48%
Cherry Hill	Route 70 and Green Tree Road	27	SD	59%
Haddon Township	Haddon Avenue and Crystal Lake Avenue	26	RA	46%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Stratford	Berlin Avenue and DRPA Access Road	26	RA	81%
Gloucester Township	Route 168 and Almonesson-Blenheim Road	26	SD	62%
Gloucester City	Broadway and Market Street	26	SD	35%
Magnolia	Warwick Road and Evesham Road	26	RA	38%
Magnolia	Route 30 and Washington Avenue	25	SD	52%
Cherry Hill	Church Road and Route 41	25	SD	48%
Clementon	Route 30 and Reed Avenue	25	SD	48%
Bellmawr	Browning Road and Kings Highway	25	RA	56%
Runnemede	Route 168 and Evesham Road	25	SD	56%
Voorhees Township	Haddonfield-Berlin Road and Evesham Road	25	SD	40%
Haddonfield	Kings Highway, West End Avenue and Chews Landing Road	25	LT	44%
Pennsauken	Route 130 and Drexel Avenue	24	SD	79%
Lindenwold	Route 30 and United States Avenue	24	LT	46%
Cherry Hill	Burnt Mill Road and Haddonfield-Berlin Road	24	SD	58%
Berlin Borough	Route 30 and Broad Street	24	SD	46%
Cherry Hill	Burnt Mill Road and Haddonfield-Berlin Road	24	SD	58%
Cherry Hill	Cuthbert Boulevard and Hampton Road	24	RA	88%
Clementon	White Horse Avenue and Gibbsboro Road	24	RA	38%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Pennsauken	Route 130 and Merchantville Avenue	23	SD	52%
Merchantville	Maple Avenue and Lexington Avenue	23	SD	39%
Pennsauken	Route 130 and Terrace Avenue	23	SD	57%
Laurel Springs	Route 30 and South Avenue	23	SD	35%
Lindenwold	Route 30 and White Horse Avenue	23	RA	48%
Pennsauken	Park Avenue and Union Avenue	23	RA	70%
Berlin Borough	Route 30 and Harker Avenue	22	SD	41%
Cherry Hill	Route 38 and Cuthbert Boulevard	22	SD	45%
Cherry Hill	Haddonfield-Sorrell Horse Road and Haddonfield-Sorrell Horse Road Extension	22	SD	27%
Merchantville	Maple Avenue and Centre Street	22	SD	50%
Cherry Hill	Lenape Road, Church Road and Cherry Hill Mall Drive	22	SD	59%
Cherry Hill	Route 154 and Kresson Road	22	SD	32%
Woodlynne	Mount Ephraim Avenue and Woodlynne Avenue	22	LT	73%
Runnemede	Route 168 and Eighth Avenue	22	SD	55%
Pennsauken	Route 70 and Lexington Avenue	21	SD	57%
Merchantville	Centre Street and Park Avenue	21	FO	48%
Lawnside	Route 30, Emlen Avenue and Entrance to Pathmark Store	21	SD	71%
Cherry Hill	Route 70 and Cooper Landing Road	21	SD	52%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Stratford	Route 30 and Vassar Avenue	21	SD	48%
Stratford	Route 30 and Columbia Avenue	21	SD	48%
Gloucester City	Broadway and Koehler Street	21	FO	52%
Stratford	Atlantic Avenue and Vassar Avenue	21	RA	95%
Audubon	Route 30 and Pine Street	20	RA	50%
Berlin Borough	Route 30 and Haddon Avenue	20	LT	25%
Clementon	Clementon-Berlin Road and Gibbsboro Road	20	RA	40%
Runnemede	Clements Bridge Road and Evesham Road	20	LT	40%
Runnemede	Route 168 and Clements Bridge Road	20	SD	50%
Barrington	Clements Bridge Road and Gloucester Pike	20	SD	40%
Voorhees Township	White Horse Road and Burnt Mill Road	20	RA	85%
Gloucester Township	Route 168 and Station Avenue	20	SD	35%
Gloucester Township	Route 168 and Lakeland Road	20	RA	65%
Magnolia	Route 30 and Jefferson Avenue	19	SD	53%
Berlin Township	Haddon Avenue and Franklin Avenue	19	RA	68%
Berlin Borough	Route 30 and Taunton Avenue	19	SD	53%
Audubon	Route 30 and Nicholson Road	19	LT	47%
Oaklyn	Route 30, West Clinton Avenue and Haddon Avenue	19	SD	58%
Berlin Borough	Route 73 and Harker Avenue	19	RA	68%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Gloucester Township	Route 168 and Lower Landing Road	19	RA	53%
Mount Ephraim	Route 168 and 2nd Avenue	18	SD	67%
Stratford	Route 30 and Bishop Terrace	18	SD	39%
Stratford	Route 30 and Berlin Avenue	18	SD	56%
Clementon	Route 30, Brand Avenue and Trout Avenue	18	LT	56%
Pennsauken	Union Avenue and River Road	18	RA	44%
Somerdale	Somerdale Road and Warwick Road	18	FO	39%
Audubon	Entrance to Black Horse Pike Shopping Center	17	RA	71%
Cherry Hill	Route 295 and Haddonfield-Berlin Road	17	SD	47%
Audubon	Route 30 and Merchant Street	17	LT	47%
Lindenwold	Route 30 and Fairmont Avenue	17	RA	41%
Clementon	Route 30 and New Freedom Road	17	RA	53%
Laurel Springs	Route 30 and Madison Avenue	17	SD	59%
Stratford	Warwick Road and Vassar Avenue	17	SD	59%
Lindenwold	Berlin Road, Gibbsboro Road and Egg Harbor Road	17	RA	29%
Gloucester City	Market Street and Hughes Avenue	17	FO	35%
Gloucester City	Broadway and Monmouth Street	17	FO	35%
Gloucester Township	Laurel Mill Road and Blackwood-Clementon Road	17	SD	35%
Collingswood	Park Avenue and Collings Avenue	17	RA	76%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Haddon Township	Route 130 and Nicholson Road	16	RA	38%
Haddon Township	Cuthbert Road and Lindisfarne Avenue	16	LT	50%
Stratford	Route 30 and Arlington Avenue	16	SD	69%
Somerdale	Route 30 and Crestwood Avenue	16	SD	69%
Cherry Hill	Route 70 and Marlkress Road	16	RA	75%
Collingswood	Park Avenue and Cuthbert Road	16	RA	50%
Haddon Township	Park Avenue and Cuthbert Road	16	RA	50%
Haddon Township	Route 30 and Cuthbert Road	16	SD	56%
Berlin Borough	Berlin-Cross Keys Road and Clementon-New Freedom Road	16	RA	88%
Audubon	East Atlantic Avenue and Pine Street	16	RA	88%
Gloucester City	Broadway and Jersey Avenue	16	SD	50%
Cherry Hill	Route 70 and Covered Bridge Road	15	SD	67%
Clementon	Blackwood-Clementon Road and Clementon-Berlin Road	15	FO	53%
Lindenwold	Route 30 and Stone Road	15	SD	47%
Somerdale	Route 30 and Ogg Avenue	15	SD	60%
Stratford	Berlin Avenue and Laurel Mill Road	15	RA	73%
Bellmawr	Route 168 and New Jersey Turnpike Exit	15	SD	53%
Mount Ephraim	Route 168 and 5th Avenue	15	SD	53%
Stratford	Laurel Mill Road and Atlantic Avenue	15	RA	33%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Haddon Township	Route 130 and Grant Avenue	15	SD	60%
Haddon Township	Emerald Avenue and Cuthbert Road	15	SD	67%
Cherry Hill	Route 70 and Delaware Avenue	15	SD	47%
Haddonfield	Potter Street and Ellis Street	15	FO	40%
Gloucester Township	Somerdale Road and Chews Landing-Clementon Road	15	RA	47%
Mount Ephraim	Route 168, Bell Road Gloucester Avenue and New Jersey Avenue	15	HO	67%
Haddon Township	Haddon Avenue and Maple Avenue	14	RA	57%
Audubon Park	Route 168 and Kennedy Drive	14	RA	50%
Stratford	Route 30 and Stratford Avenue	14	SD	64%
Clementon	Garfield Avenue and Gibbsboro Avenue	14	RA	36%
Somerdale	Warwick Road and Preston Avenue	14	RA	29%
Haddon Heights	Route 30 and Haddon Street	14	SD	43%
Cherry Hill	Route 154 and Borton Mill Road	14	SD	43%
Somerdale	Route 30 and Evergreen Avenue	14	SD	50%
Cherry Hill	Route 70 and Old Orchard Road	14	RA	86%
Runnemede	Route 168 and 5th Avenue	14	SD	71%
Pennsauken	Union Avenue and Maple Avenue	14	SD	43%
Pennsauken	River Road and Cove Road	14	RA	43%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Laurel Springs	East Atlantic Avenue West Atlantic Avenue and Stone Road	14	RA	50%
Cherry Hill	Kresson Road and Pearl Croft Road	14	RA	43%
Haddon Township	Crystal Lake Avenue and Park Avenue	14	SD	29%
Merchantville	Maple Avenue and Chapel Avenue	14	RA	36%
Haddonfield	Kings Highway and Chestnut Street	14	SD	64%
Lawnside	Warwick Road and Charleston Avenue	14	RA	50%
Voorhees Township	Springdale Road and Evesham Road	14	RA	50%
Collingswood	600 Block of Collings Avenue	13	FO	38%
Somerdale	Route 30 and Maiden Lane	13	SD	54%
Stratford	Route 30 and J.M. Fields Entrance	13	RA	38%
Oaklyn	Newton Avenue and West Clinton Avenue	13	RA	38%
Gloucester City	Jersey Avenue and Fifth Street	13	RA	46%
Gloucester City	Broadway and Essex Avenue	13	RA	38%
Collingswood	Route 30 and Grant Avenue	13	RA	77%
Lindenwold	Route 30 and Rosemont Avenue	13	LT	46%
Merchantville	Maple Avenue and Park Avenue	13	SD	69%
Cherry Hill	Kresson Road and Springdale Road	13	RA	69%
Gloucester City	Broadway and Cumberland Street	13	FO	31%
Magnolia	Warwick Road, East Atlantic Avenue and Jefferson Avenue	13	RA	62%
Runnemede	Route 168 and Third Avenue	13	SD	77%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Voorhees Township	Somerdale Road and Burnt Mill Road	13	RA	54%
Pennsauken	Hylton Road, National Highway and Remington Avenue	13	RA	77%
Somerdale	Route 30 and Dartmouth Avenue	12	LT	33%
Haddon Township	Cuthbert Road and South Park Drive	12	SD	50%
Gloucester Township	Church Street and Pennsylvania Avenue	12	LT	33%
Gloucester Township	Church Street and Mechanicsville - Brooklyn Road	12	SD	50%
Gloucester City	Market Street and 3rd Street	12	RA	58%
Bellmawr	Route 168 and Route 295	12	SD	42%
Lindenwold	Route 30 and Elm Avenue	12	SD	75%
Haddonfield	Kings Highway and Washington Avenue	12	RA	50%
Lawnside	Atlantic Avenue, Oak Avenue and Fiberglass Road	12	RA	75%
Magnolia	Route 30 and Ashland Avenue	12	SD	42%
Runnemede	Route 168 and 6th Avenue	12	SD	33%
Clementon	Berlin Road, Erial Road and West Atlantic Avenue	12	SD	50%
Clementon	Chews Landing Road and Blackwood Road	12	FO	67%
Haddonfield	Kings Highway and Hinchman Avenue	12	RA	42%
Haddonfield	Maple Avenue and Grove Street	12	SD	50%
Merchantville	Park Avenue and Cove Road	12	RA	50%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Berlin Borough	Clementon-Berlin Road and Franklin Avenue	12	RA	50%
Barrington	Route 30 and Bell Avenue	11	RA	36%
Haddonfield	Haddon Avenue and Hopkins Street	11	LT	36%
Haddon Heights	Route 30 and Garden Street	11	RA	36%
Collingswood	Route 130 and Richey Avenue	11	SD	91%
Collingswood	Route 30 and Ferry Avenue	11	RA	82%
Berlin Township	Route 73 and Franklin Avenue	11	SD	45%
Berlin Township	Berlin Circle	11	FO	64%
Berlin Borough	Route 30 and Washington Avenue	11	RA	36%
Berlin Borough	Berlin-Cross Keys Road and Park Drive	11	SD	36%
Oaklyn	Route 30 and East Bettlewood Avenue	11	RA	36%
Voorhees Township	Route 73 and Kresson Road	11	SD	73%
Somerdale	Route 30 and Cedar Avenue	11	FO	45%
Stratford	Route 30 and Yorkshire Drive	11	LT	55%
Stratford	Route 30 and Wellington Avenue	11	RA	27%
Haddonfield	Kings Highway and Tanner Street	11	SD	73%
Haddonfield	Kings Highway and Warwick Road	11	SD	64%
Audubon	Crystal Lake Avenue and Hopkins Avenue	11	RA	91%
Merchantville	Centre Street and Chestnut Street	11	RA	36%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Merchantville	Centre Street and Walnut Street	11	RA	45%
Pennsauken	Westfield Avenue and 47th Street	11	RA	64%
Haddon Heights	East Atlantic Avenue and Station Avenue	11	RA	73%
Haddon Heights	Ninth Avenue and Station Avenue	10	RA	80%
Cherry Hill	Cooper Landing Road and Georgia Avenue	10	RA	60%
Runnemede	Route 168 and Plaza Place	10	SD	70%
Haddon Township	Cuthbert Road and Oriental Avenue	10	RA	70%
Oaklyn	Route 168 and Kendall Boulevard	10	SD	50%
Gloucester Township	Route 168 and Lake Avenue	10	SD	50%
Pine Hill	Erial Road and 8th Avenue	10	LT	30%
Collingswood	Route 30 and Dwight Avenue	10	SD	70%
Haddon Heights	Route 168 and Prospect Ridge Avenue	10	SD	50%
Cherry Hill	Cuthbert Boulevard and Wisteria Avenue	10	SD	90%
Pennsauken	Merchantville Avenue and Westfield Avenue	10	RA	100%
Pennsauken	Derousse Avenue and Westfield Avenue	10	RA	50%
Audubon	Entrances to the Black Horse Pike Shopping Center from Nicholson Road	10	SD	50%
Clementon	Route 30 and Sutton Avenue	9	SD	33%
Clementon	Route 30 and Higgins Avenue	9	SD	56%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Haddon Township	Haddon Avenue and Strawbridge Avenue	9	SD	44%
Haddon Township	Cuthbert Road and Atlantic Avenue	9	SD	44%
Oaklyn	Route 30 and West Bettlewood Avenue	9	SD	33%
Somerdale	Route 30 and Olden Avenue	9	SD	56%
Somerdale	Somerdale Road and Atlantic Avenue	9	RA	78%
Runnemede	Route 168 and 2nd Avenue	9	SD	56%
Magnolia	Route 30 and Madison Avenue	9	SD	56%
Haddonfield	Haddon Avenue, Euclid Avenue and Tanner Street	9	FO	56%
Pennsauken	River Road and Derousse Avenue	9	RA	66%
Haddon Township	Route 130 and Eldridge Avenue	9	RA	44%
Pennsauken	National Highway and Suckle Highway	8	RA	88%
Magnolia	Evesham Road and Walnut Avenue	8	RA	38%
Somerdale	Somerdale Road and Browning Road	8	RA	38%
Haddon Township	Route 168 and Berwick Avenue	8	SD	63%
Oaklyn	Route 30 and East Beechwood Avenue	8	SD	63%
Lindenwold	Gibbsboro Road and Coachman Manor Apartments	8	SD	63%
Haddonfield	Haddon Avenue and Hawthorne Street	8	RA	38%
Haddonfield	Warwick Road and Hickory Avenue	8	RA	38%
Haddon Heights	Route 168 and Maple Avenue	8	LT	50%

MUNICIPALITY	LOCATION	ACCIDENT NUMBER	MOST SIGNIFICANT TYPE	% OF TOTAL
Barrington	Clements Bridge Road and Shreve Avenue	7	SD	71%
Pennsauken	Park Avenue and Cooper Avenue	7	RA	29%
Pennsauken	Admiral Wilson Boulevard and Waldorf Avenue	7	FO	57%
Cherry Hill	Haddonfield-Sorrell Horse Road and Dudley Avenue	7	SD	43%
Cherry Hill	Route 70 and Saw Mill Road	7	SD	57%
Hi-Nella	East Atlantic Avenue and Wakonda Road	7	FO	86%
Barrington	Clements Bridge Road and Third Avenue	7	SD	86%
Runnemede	Route 168 and New Jersey Avenue	6	SD	50%
Runnemede	Route 168 and Ardmore Avenue	6	FO	50%
Haddon Heights	Route 168 and Sycamore Street	6	LT	50%

SUMMARY

In order to make effective recommendations, it is necessary to detail the number of each accident type at the reporting locations. From the accident reports filed for these locations, collision diagrams were prepared and a detailed analysis based on the circumstances and conditions surrounding each accident was made. The number and severity of the occurrences at any given location became an integral part of the decision making processs required to select the locations needing improvement. The nature of the individual accidents at a specific location became a decisive factor in the design of the appropriate improvement.

CHAPTER 5

TRAFFIC VOLUMES

Data for projection of traffic volumes and the conversion of traffic counts to Annual Average Daily Traffic (A.A.D.T.) was furnished by the New Jersey Department of Transportation. This data was supplemented by traffic counts taken at specific locations for various durations.

TRAFFIC VOLUMES

The New Jersey Department of Transportation employs a system for classifying roadways as to the type of traffic a particular roadway experiences throughout the year. This classification consists of Pattern Numbers which are defined below:

a. Pattern No. 1 - basically consistent traffic volumes with a slight reduction of traffic on weekends.

b. Pattern No. 2 - basically consistent traffic volumes with weekend traffic about the same as weekday traffic.

c. Pattern No. 3 - somewhat inconsistent traffic volumes with some recreational and seasonal traffic.

d. Pattern No. 4 - basically recreational and seasonal traffic volumes.

Monthly factors are assigned to each Pattern Number and must be utilized in order to convert a weekday traffic count to an A.A.D.T. count. *Chart No. 5* indicates Pattern No. 1 traffic variations by months for Route 130 in Pennsauken Township, *Chart No. 6* indicates Pattern No. 2 traffic variations by months for Route 30 in Lawnside Borough and *Chart No. 7* indicates Pattern No. 4 traffic variations by months for Route 30 in Waterford Township. There are no roadways with Pattern No. 3 traffic variations in the study area.

In general the average daily traffic exhibits a morning peak between 7:30 a.m. and 8:30 a.m., declines slightly, then increases again between 12:30 p.m. and 1:30 p.m., declines once again and reaches an afternoon peak at 5:30 p.m. before tapering off in the evening hours. 1970 A.A.D.T. volumes on the study roadways are illustrated on *Exhibit Nos. 8A through 8J*.

SYSTEM CAPACITY

The relationship of traffic volume to roadway capacity is an accepted method of measuring the ability of a street to carry existing and projected traffic. The nature of the street system in this study area is such that intersection capacities are the controlling factors in determining the overall capacities of the roadways to handle traffic.

The capacity of the major intersection approaches was calculated and compared to the peak hour traffic volume. The peak hour traffic volume was used in computing levels of service.

CHART NO. 5

MONTHLY TRAFFIC VARIATION OF A TYPICAL WEEKDAY ON ROUTE 130 AS % OF AADT

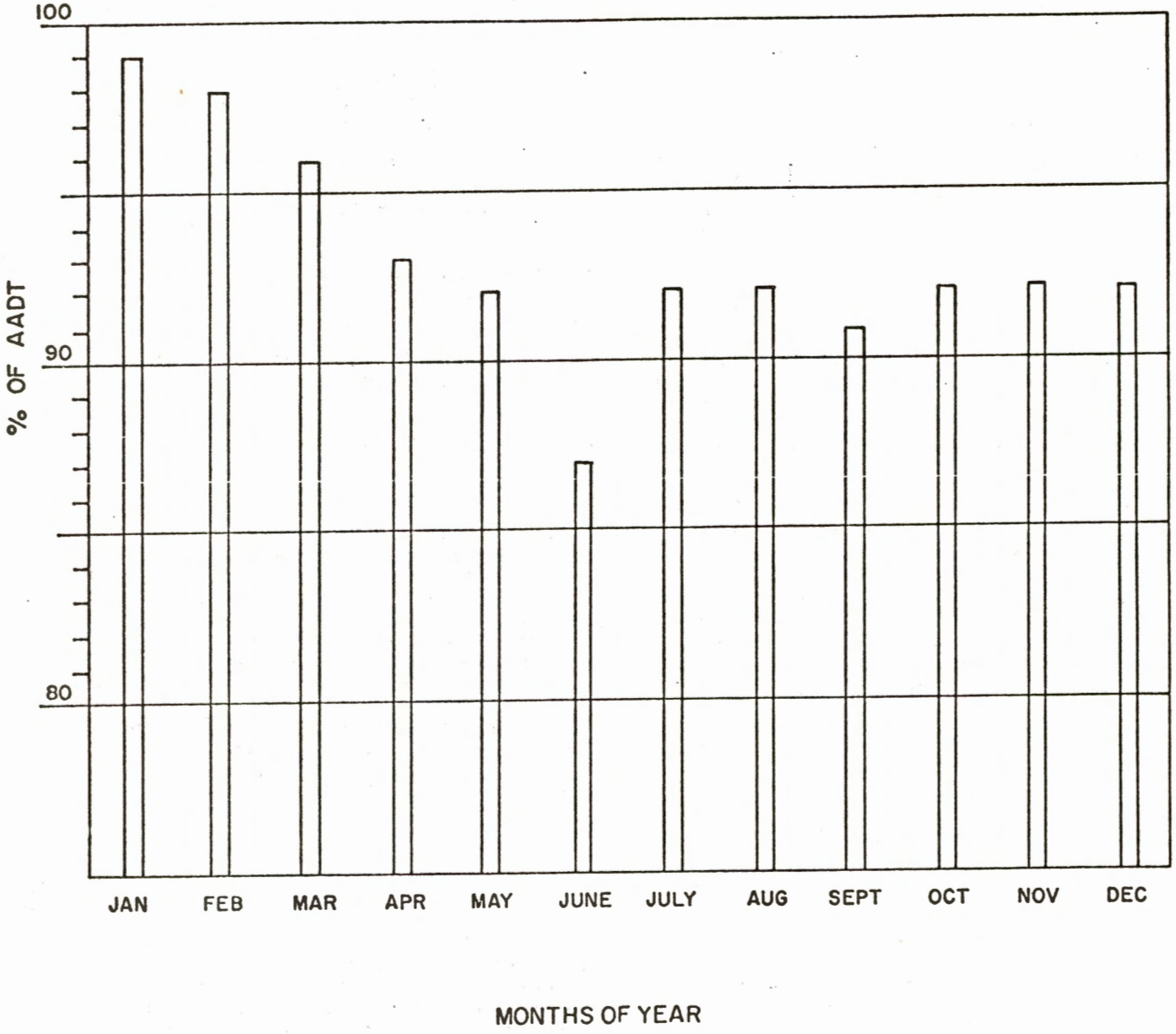


CHART NO. 6

MONTHLY TRAFFIC VARIATION OF A TYPICAL WEEKDAY ON ROUTE 30 AS % OF AADT

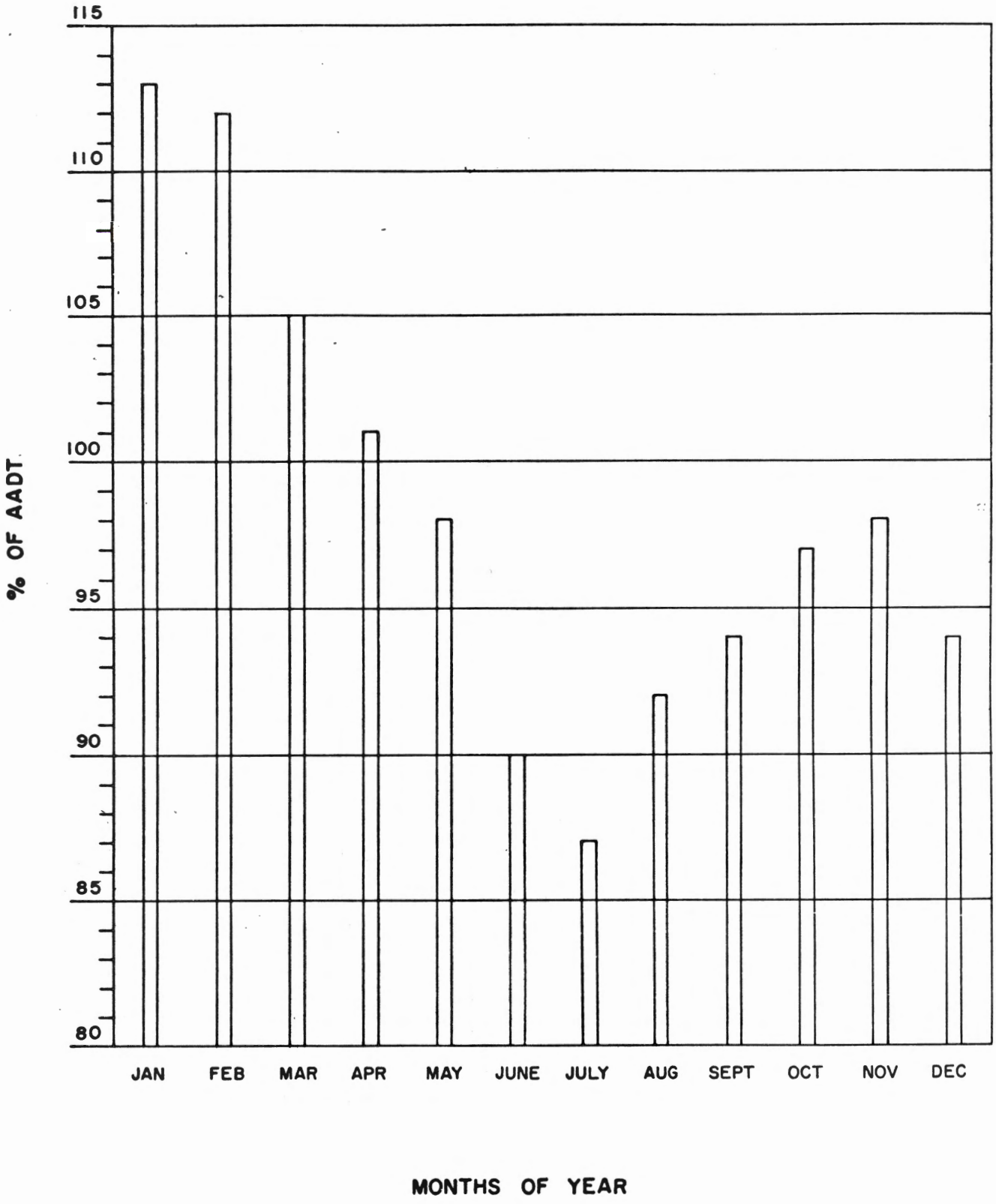
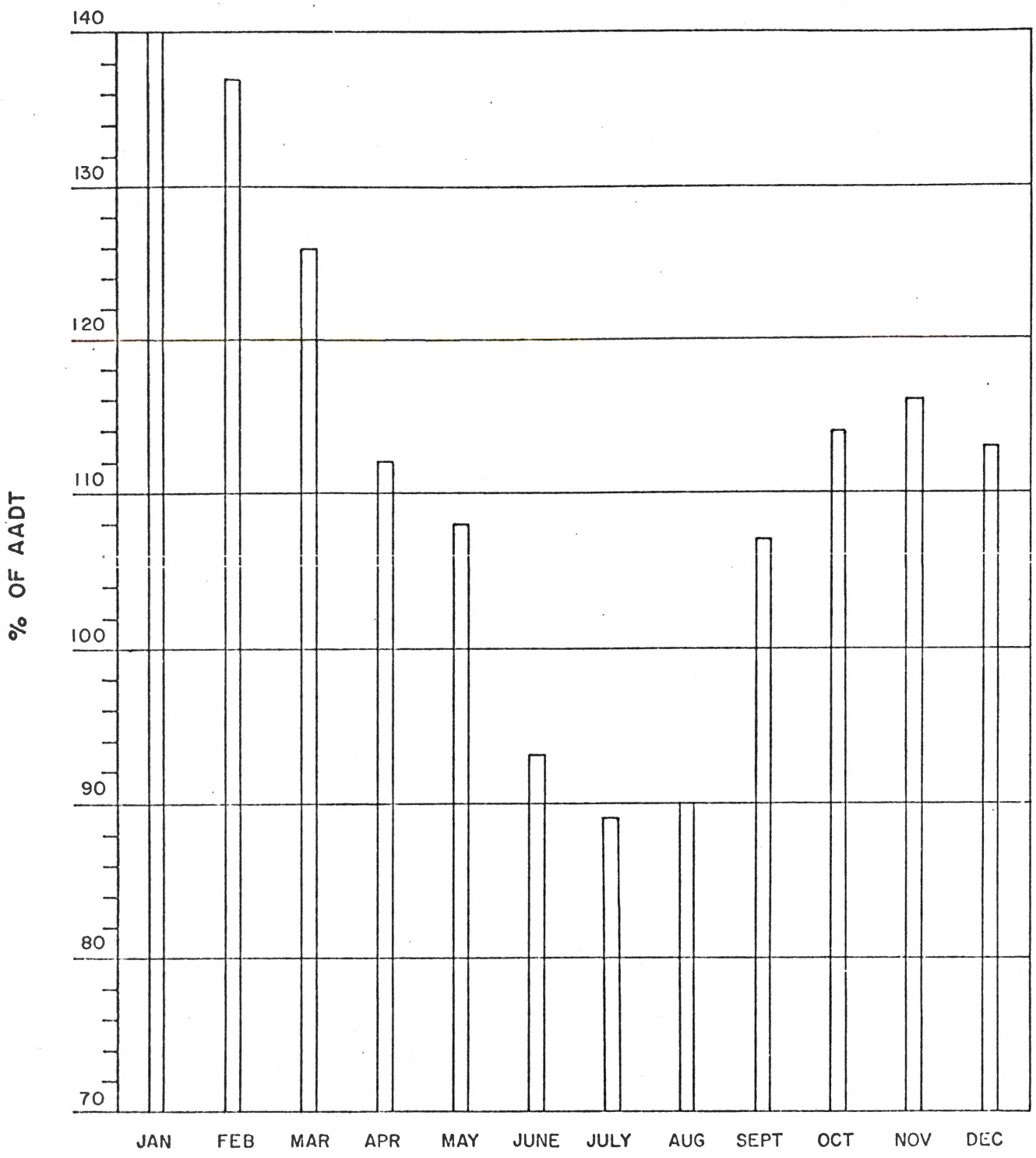
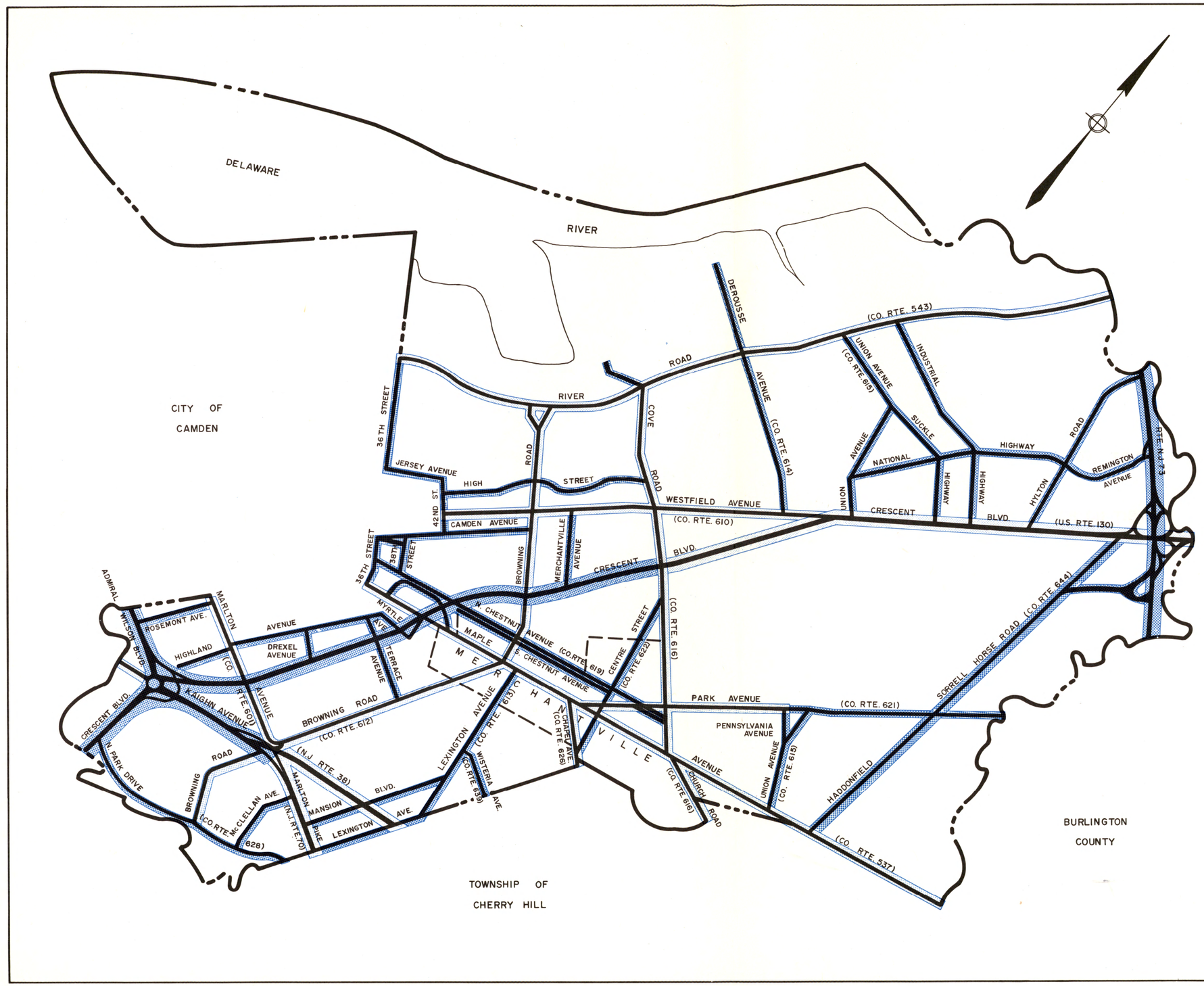


CHART NO. 7

MONTHLY TRAFFIC VARIATION OF A
TYPICAL WEEKDAY ON ROUTE 30 AS % OF AADT





1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8A

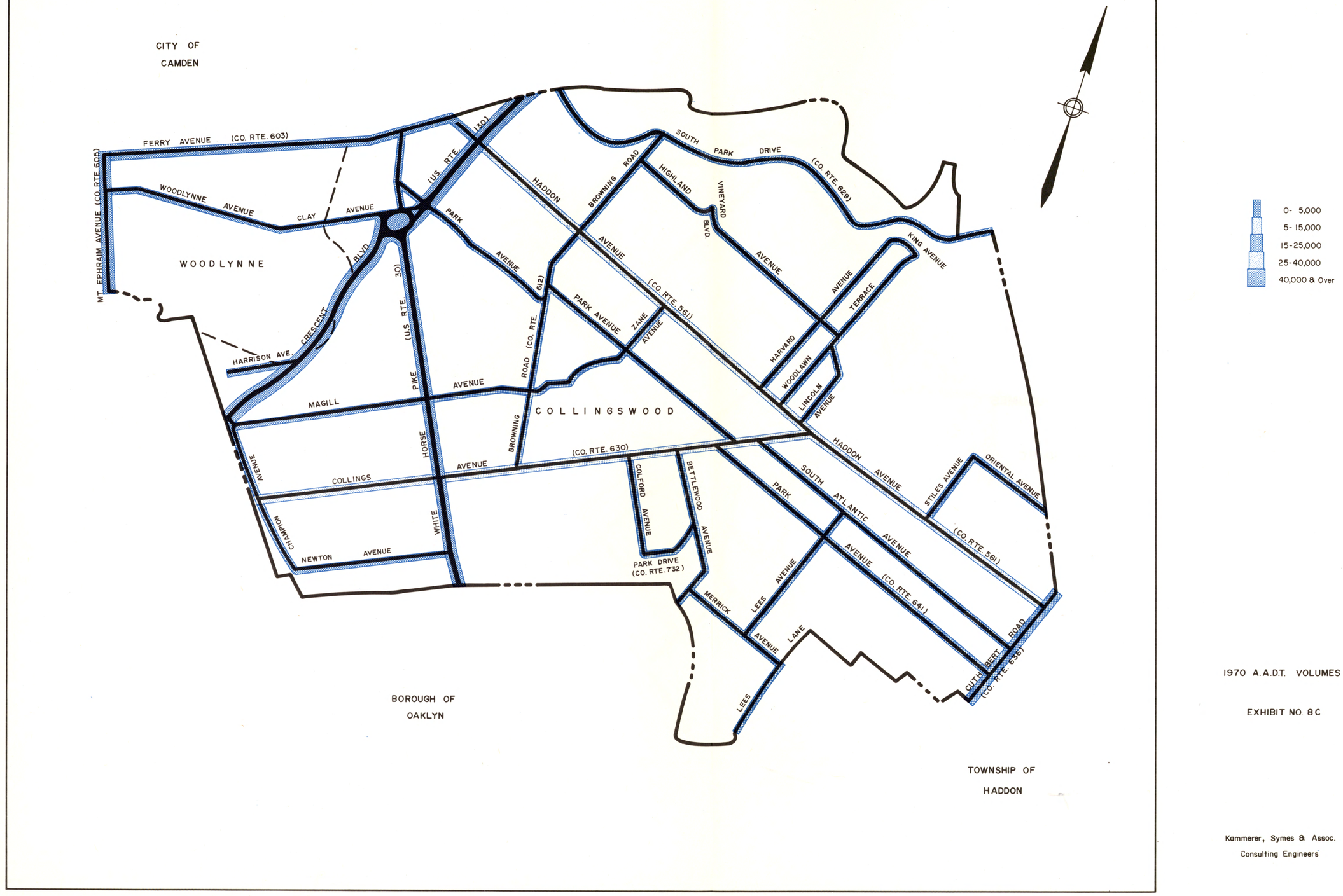
Kammerer, Symes & Assoc.
Consulting Engineers



1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8B

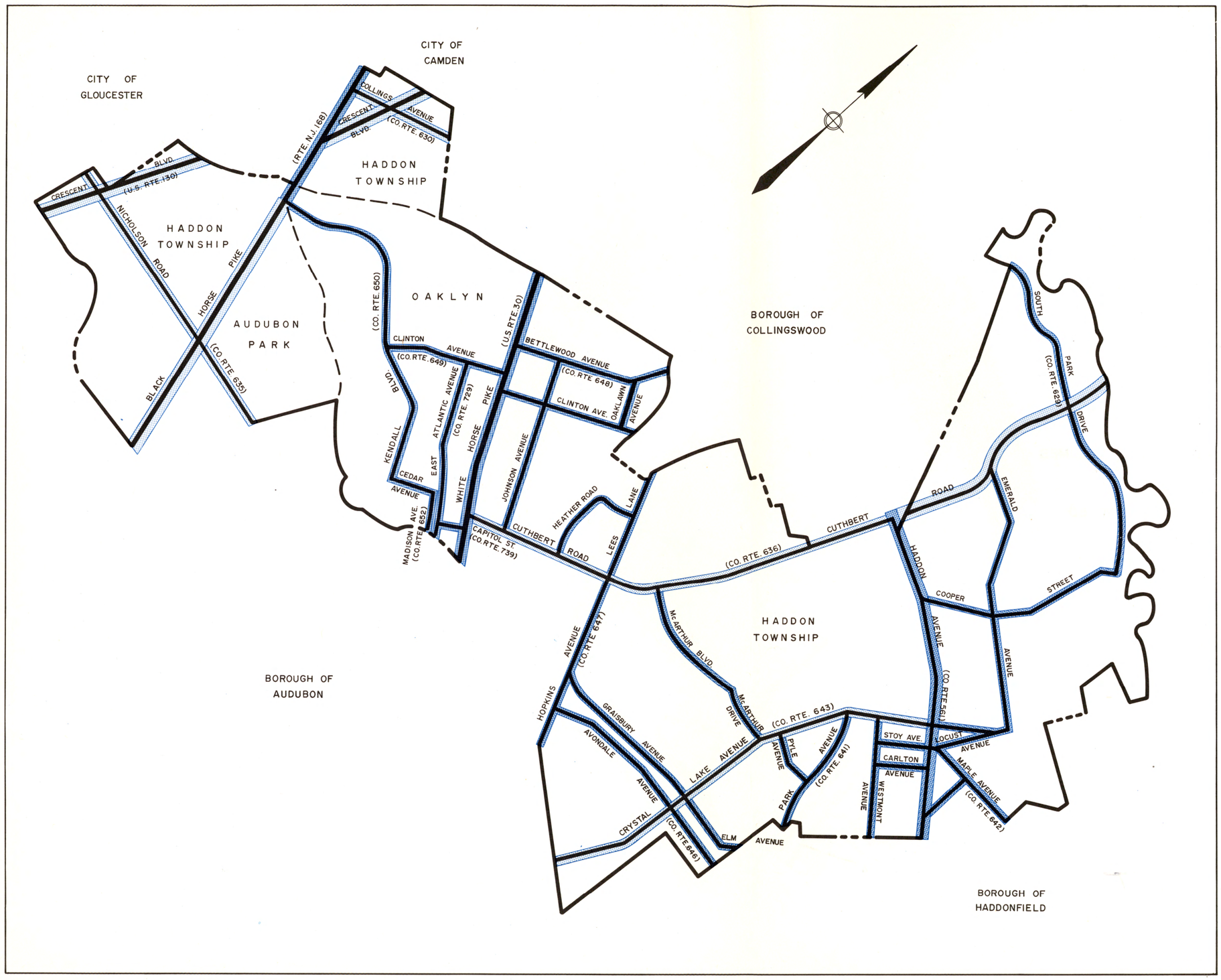
Kammerer, Symes & Assoc.
Consulting Engineers



1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8C

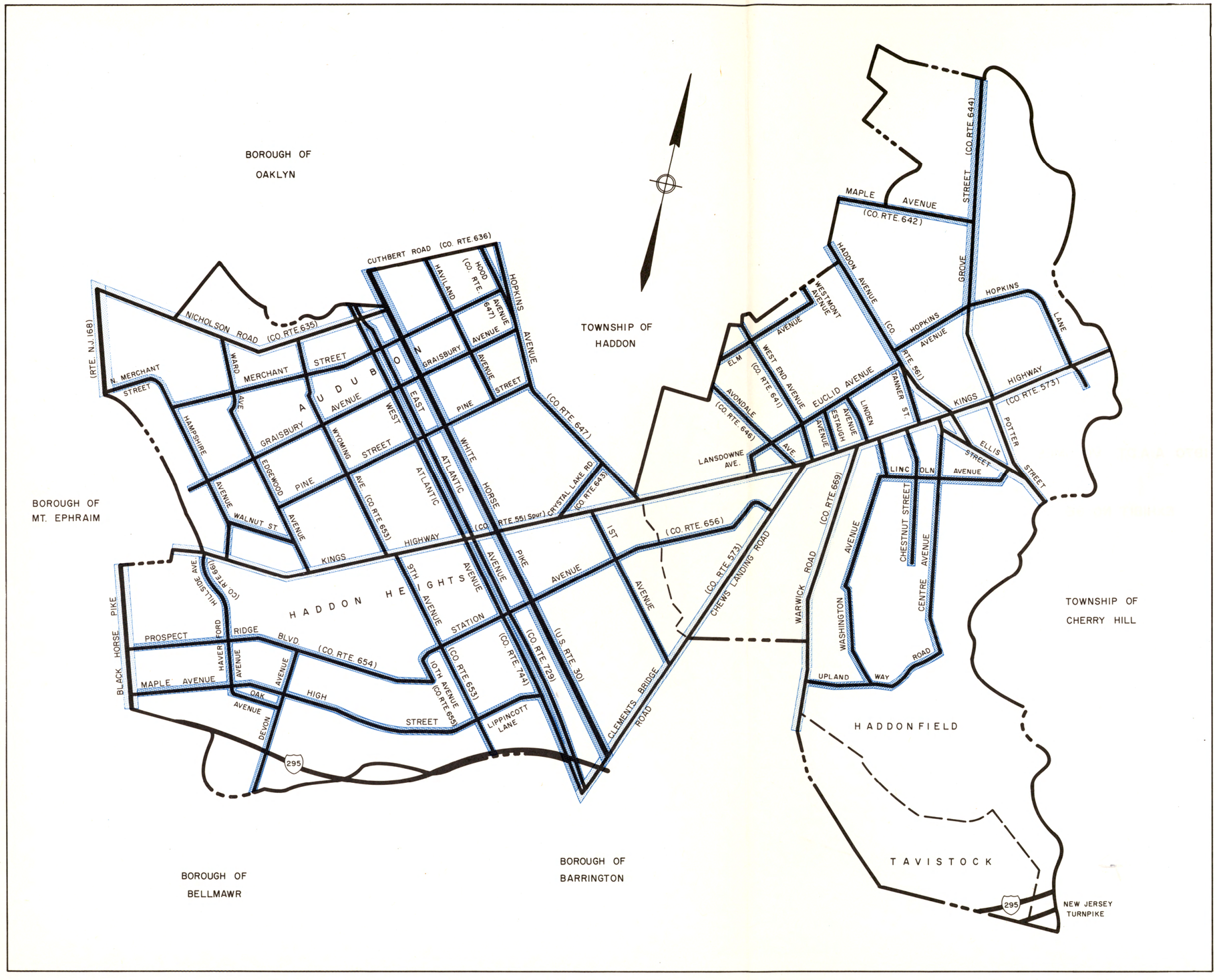
Kammerer, Symes & Assoc.
Consulting Engineers



1970 A.A.D.T. VOLUMES

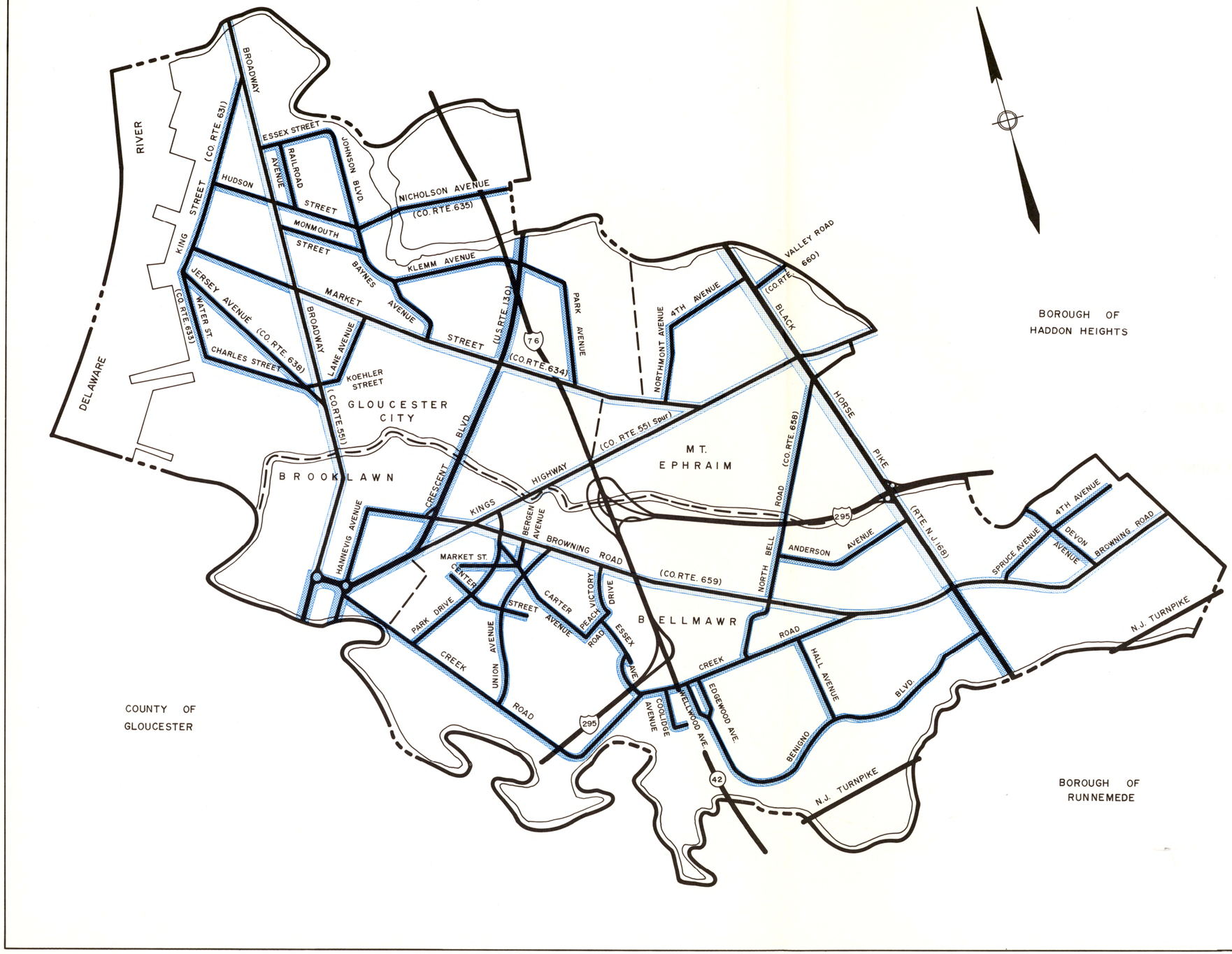
EXHIBIT NO. 8D

Kammerer, Symes & Assoc.
Consulting Engineers



1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8E



SCALE

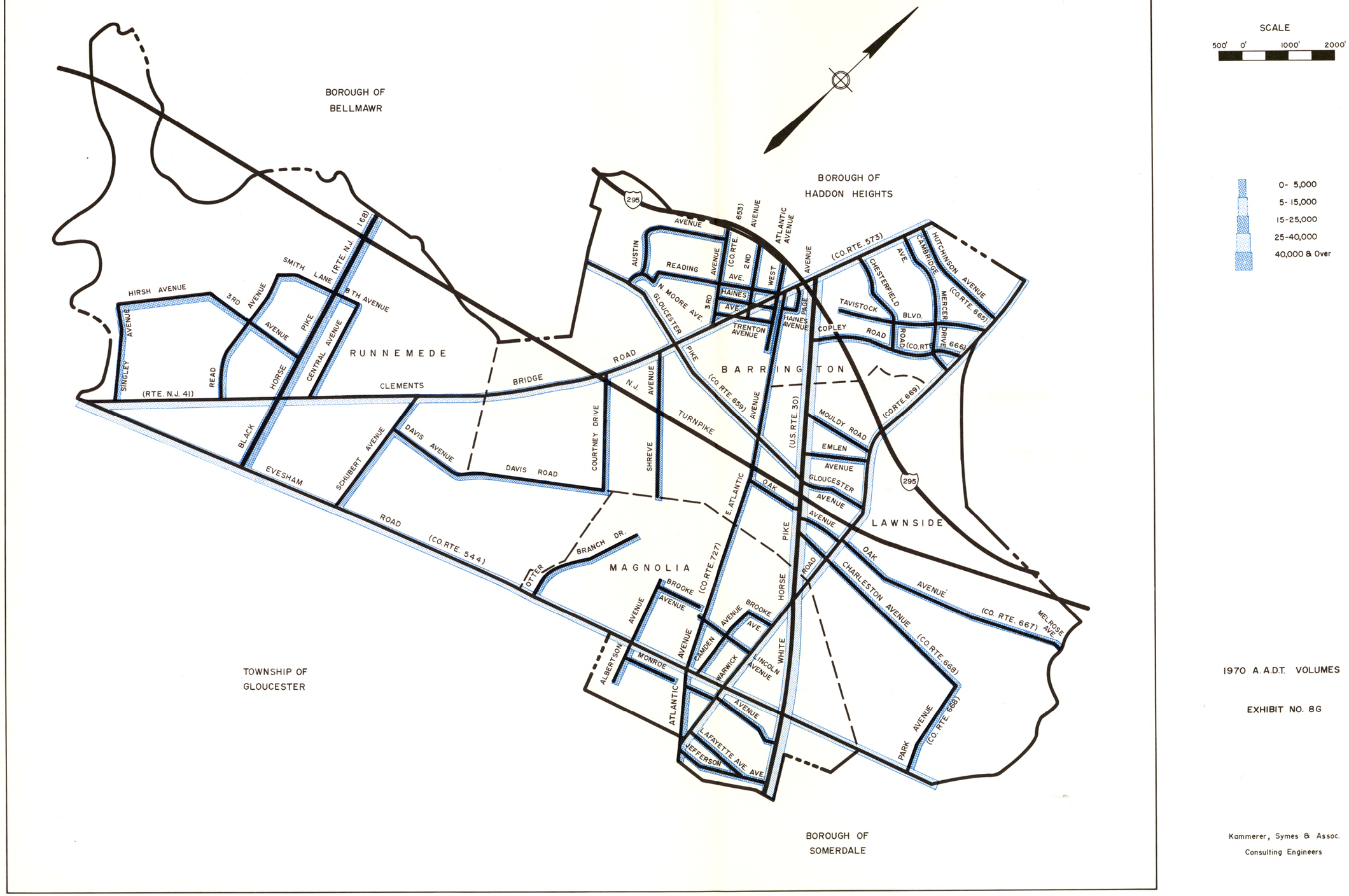
500' 0 1000' 2000'

- 0- 5,000
- 5- 15,000
- 15-25,000
- 25-40,000
- 40,000 & Over

1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8F

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

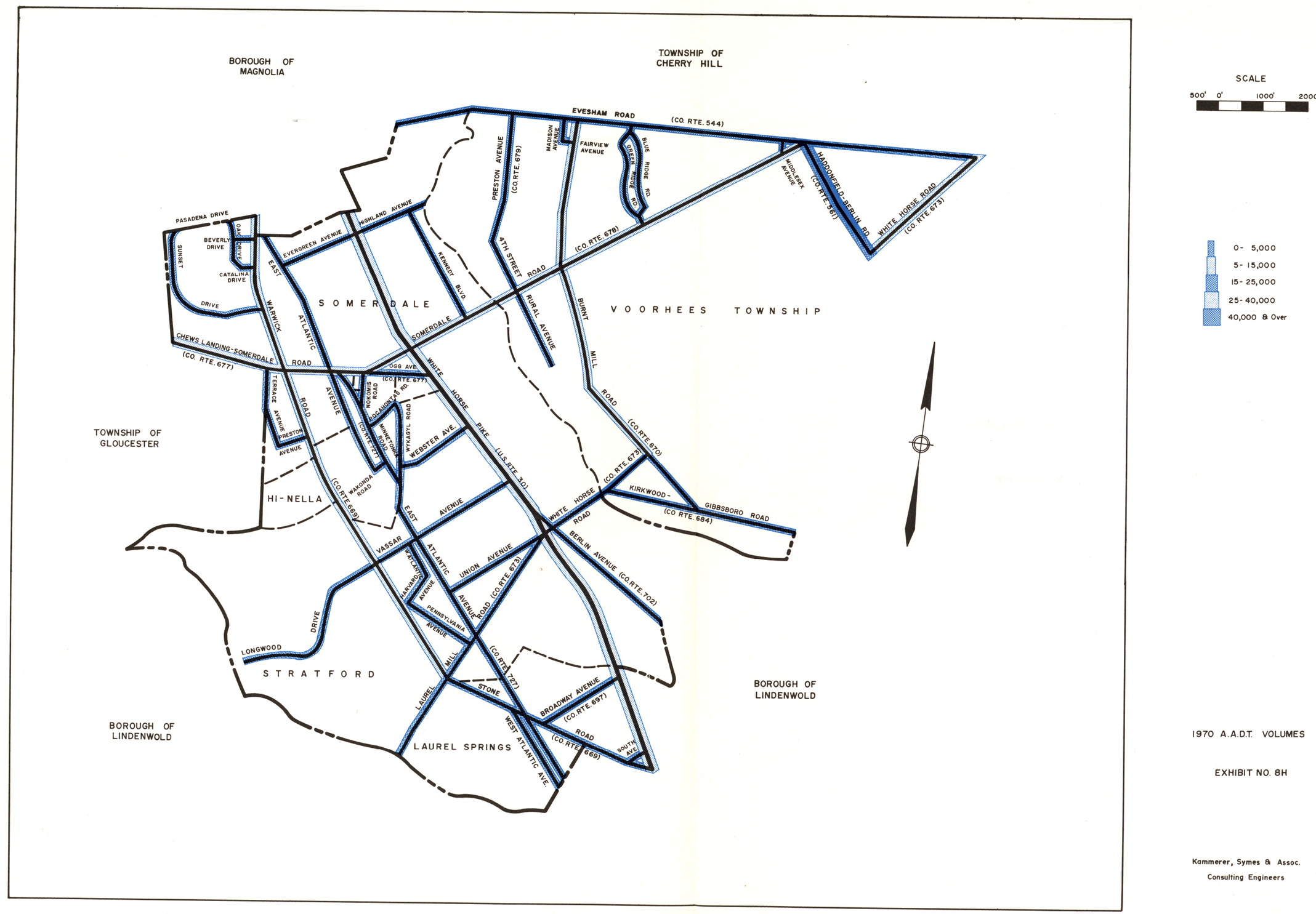
500' 0' 1000' 2000'

- 0- 5,000
- 5- 15,000
- 15-25,000
- 25-40,000
- 40,000 & Over

1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8G

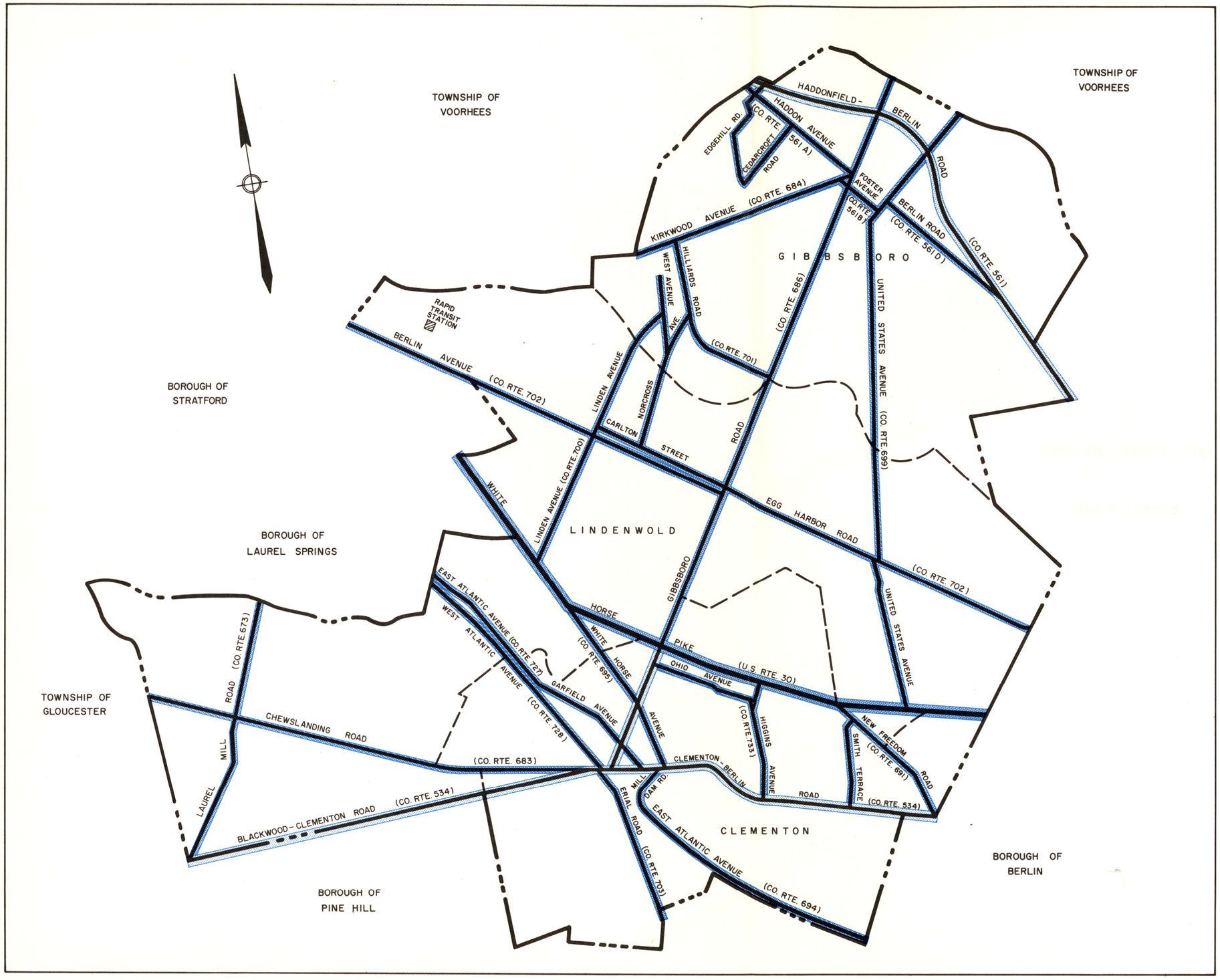
Kammerer, Symes & Assoc.
Consulting Engineers



1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8H

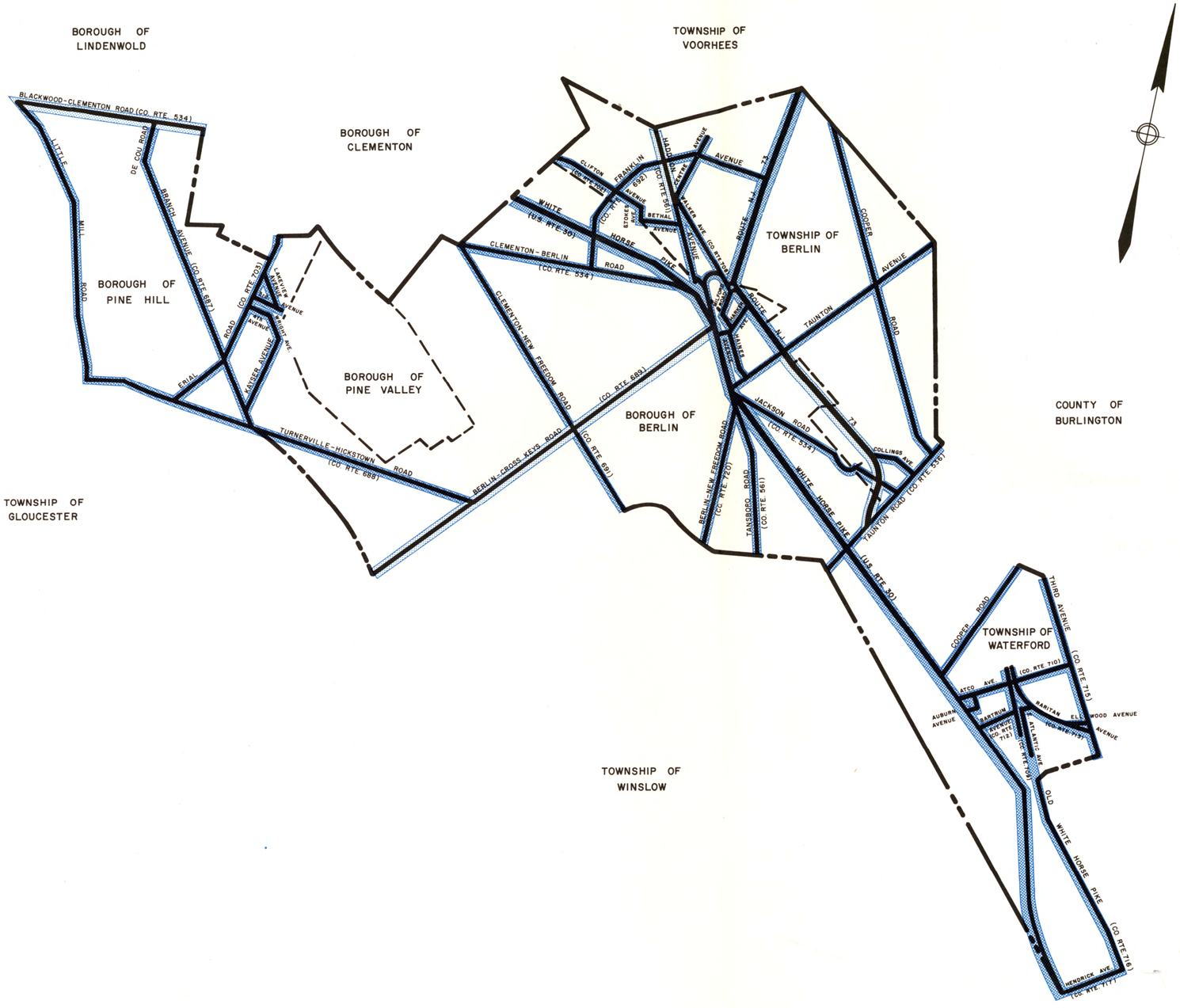
Kammerer, Symes & Assoc.
Consulting Engineers



1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8I

Kammerer, Symes & Assoc.
Consulting Engineers



SCALE

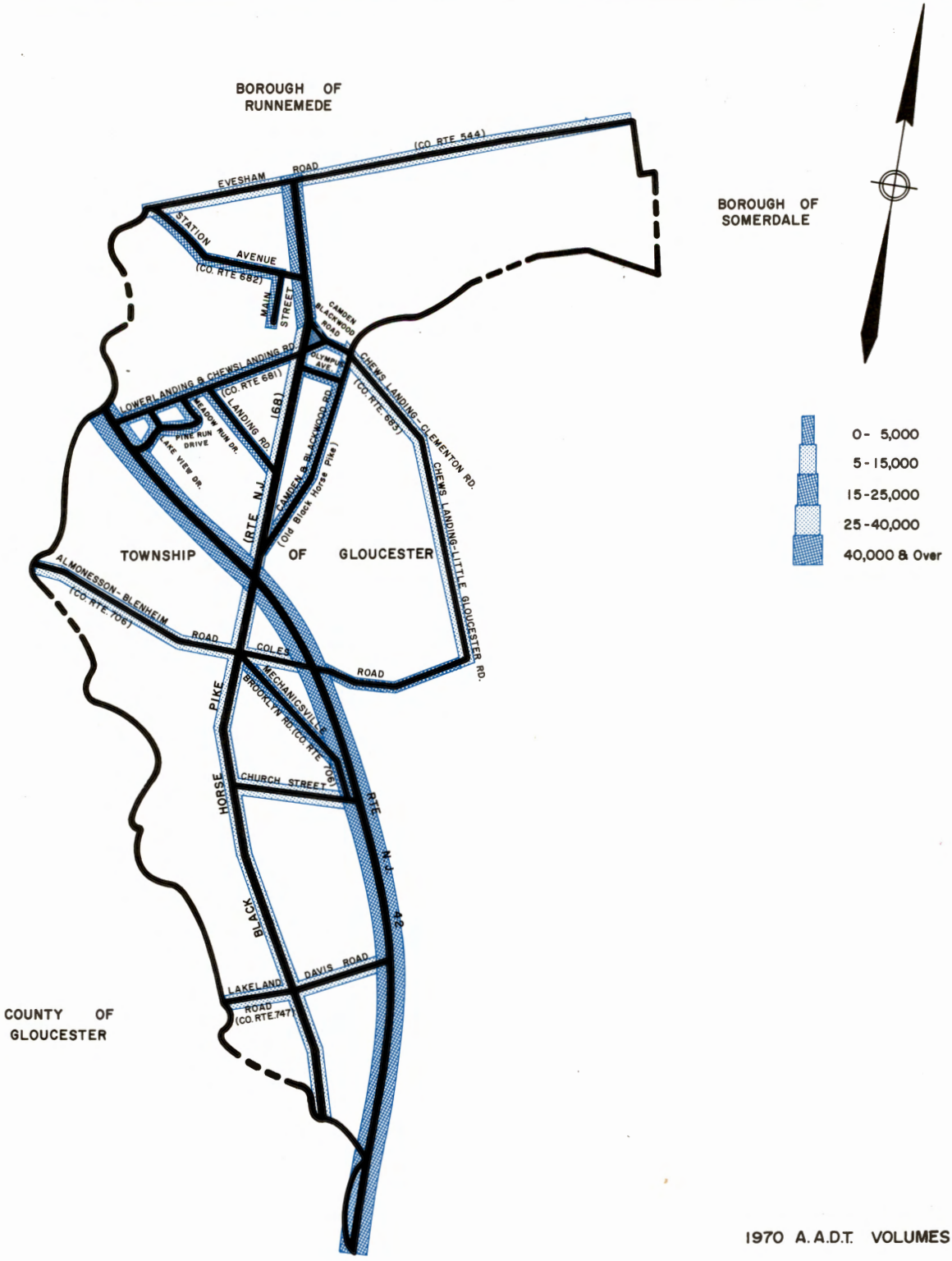
1000 0 2000 4000

- 0- 5,000
- 5- 15,000
- 15-25,000
- 25-40,000
- 40,000 & Over

1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8 J

Kammerer, Symes & Assoc.
Consulting Engineers



1970 A.A.D.T. VOLUMES

EXHIBIT NO. 8 J

Kammerer, Symes & Assoc.
Consulting Engineers

The capacity (as defined in the 1965 Highway Capacity Manual) was computed for critical segments of the roadways in the study area for use in making a comparison with the demand hourly volumes. The resulting quotient, termed volume-capacity ratio (i.e., the V/C ratio), is a useful index for identifying locations deficient in capacity. As the value of the ratio approaches one (1), the intersection approach volume converges to the maximum number of vehicles possible under prevailing roadway and traffic conditions, regardless of delay or restricted maneuverability.

CHAPTER 6

GENERAL INFORMATION ON IMPROVEMENTS

IMPROVEMENTS

This report covers four (4) basic areas of recommended improvements for the municipalities studied under the Camden County TOPICS Program. They are:

a. Traffic Control Devices

b. Physical Roadway System

c. Traffic Flow

d. Parking

TRAFFIC CONTROL DEVICES

This area covers proposed traffic signals, reconstruction of existing signals, pavement markings, signing and channelization.

Some traffic signal installations have been in operation for many years, and should be reconstructed to conform to the current Manual on Uniform Traffic Control Devices for Streets and Highways. Other signals need reconstruction to efficiently control the increased traffic demands.

Traffic signal installations reach maximum efficiency when they are set up to be responsive to traffic demands with provisions for fluctuations by means of semi and fully actuated controllers in order to optimize the distribution of green time. Existing and proposed signals can be timed to provide progressive movement of traffic for various volumes which are encountered during the day.

Through the use of pavement markings and/or signs, more efficient use of existing traffic lanes can be achieved. Recommendations include revision of non-standard devices and the placement of traffic control devices on the study network with the objective that increased safety, capacity and desirable quality of flow will be achieved.

PHYSICAL ROADWAY SYSTEM

Recommendations will be made covering renovations to the geometry of the roadway system within the municipalities studied in this report to provide additional capacity and smoother traffic flow. Areas of consideration include widening of roadways, restricted turning lanes, channelization and improved riding quality. In areas where geometric improvements have been considered, specific recommendations have been made in an effort to stay within existing rights of way. The area of additional right of way which may be required to construct proposed improvements has been kept to a minimum.

TRAFFIC FLOW

The major roadways of the municipalities studied in this report are presently overloaded with traffic, during peak and off peak hours. All indications of growth in Camden County denote a continued increase in the volumes of traffic. With the existing restrictions on right of way, it will be necessary to reduce the rate of growth of traffic by encouraging traffic to use alternate routes.

PARKING

Most of the municipalities in Camden County have some parking problems. With the exception of three (3) or four (4) communities some study is needed to correct certain of those problems which do exist. In general, those communities of the older type, with narrow streets, buildings and houses built close together, and houses with no driveways are the areas needing particular attention.

There is no uniform method of dealing with the parking situation on a countywide basis. There are only five (5) communities having metered parking. Parking on both sides of narrow collector streets seems commonplace. There are numerous locations where parking is permitted too close to intersections for safety. In many communities, even though there are restrictions against parking, especially in the Central Business Districts, it is usual practice to find little attention paid to enforcement. In the newer municipalities where large shopping centers are located the problem of parking is relatively minor. In most of these communities the houses are apt to have driveways or at least space needed to install a driveway is available.

Parking problems exist in the older sections of the county, along the business areas of the arterial highways and on the collector streets where there are no restrictions against both side parking or lack of enforcement in those communities having such restrictions.

CHAPTER 7

AREA WIDE CONSIDERATIONS

LAND USE

Traffic flow on the road network studied in this report is heavily influenced by the land use patterns of not only the municipalities in Camden County but also the surrounding communities. In this study, consideration has been given to the changing land use patterns of the entire area.

GROWTH FACTORS

Development of realistic growth factors for use in projecting 1971 traffic volumes to the volumes expected in 1976 and 1981 took into consideration the land use, area, population growth and data on growth of traffic volumes on surrounding roadways.

IMPROVED CRITERIA

Improvements recommended in this report are based on the TOPICS concept of improving the safety, capacity and quality of traffic flow on a selected street system.

A detailed analysis has been made of locations on the study system that are deficient in capacity, have a poor quality of travel, and a high accident incidence to determine those traffic engineering improvements which would be best suited to solving specific problems.

PROJECT PRIORITIES

In the interest of comparing the needs of each location found deficient in the TOPICS Study with that of the other locations, a priority has been developed for each project. The method used considered accident experiences, the volume to capacity ratios and the travel time delays. Through the use of these parameters a tentative priority number was assigned to each deficient area to develop a tentative project list. The priority listing was then reviewed with local and County officials. The final project priorities were established following the review with these officials.

Following is a list of the improvement locations and the estimated costs for improvements for problem areas in Camden County.

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	BOROUGH OF MERCHANTVILLE	
MH-1	Maple Avenue and Browning Road	$105,300.00
MH-2	Chapel Avenue and Centre Street Circle Complex	184,600.00
MH-3	Maple Avenue and Chapel Avenue Maple Avenue and Park Avenue	63,000.00

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	BOROUGH OF MERCHANTVILLE	
MH-4	Maple Avenue, Church Road and Cove Road	$ 96,200.00
MH-5	Maple Avenue and Centre Street Park Avenue and Centre Street	112,600.00
MH-6	Park Avenue and Cove Road	1,000.00
MH-7	Maple Avenue and Poplar Street	2,000.00
MH-8	Centre Street and Chestnut Street	6,100.00
MH-9	Centre Street and Walnut Street	7,500.00
	TOWNSHIP OF PENNSAUKEN	
PE-1	River Road and Derousse Avenue	$102,600.00
PE-2	Park Avenue and Union Avenue	194,800.00
PE-3	Derousse Avenue and Westfield Avenue	52,300.00
PE-4	Union Avenue and River Road	13,200.00
PE-5	National Highway and Suckle Highway	3,900.00
PE-6	Haddonfield-Sorrell Horse Road and Maple Avenue	18,500.00
PE-7	Hylton Road, National Highway and Remington Avenue	3,000.00
PE-8	Park Avenue and Haddonfield-Sorrell Horse Road	405,400.00
PE-9	Merchantville Avenue and Westfield Avenue	10,700.00
PE-10	Westfield Avenue and 47th Street	9,400.00
	TOWNSHIP OF CHERRY HILL	
CH-1	Haddonfield-Sorrell Horse Road and Church Road	$209,000.00
CH-2	Burnt Mill Road and Haddonfield-Berlin Road	103,650.00
CH-3	Haddonfield-Sorrell Horse Road and Chapel Avenue	450,800.00
CH-4	Church Road, Lenape Road and Cherry Hill Mall Drive	75,200.00
CH-5	Route N.J. 38 and Chapel Avenue	203,300.00
CH-6	Cuthbert Boulevard and North Park Drive	42,625.00

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	TOWNSHIP OF CHERRY HILL	
CH-7	Kresson Road and Springdale Road	$ 8,700.00
CH-8	Route N.J. 70 - Between Marlkress Road and Covered Bridge Road	202,900.00
CH-9	Route N.J. 70 and Green Tree Road	6,400.00
CH-10	Chapel Avenue and Coles Avenue	124,000.00
CH-11	Route N.J. 70, Georgia Avenue, Edison Avenue Cooper Landing Road and Pennsylvania Avenue	151,400.00
CH-12	Burnt Mill Road and Evesham Road	95,700.00
CH-13	Route N.J. 154 and Haddonfield-Berlin Road	56,000.00
CH-14	Haddonfield-Sorrell Horse Road and Maple Avenue	18,500.00
CH-15	Route N.J. 70 and Delaware Avenue	2,100.00
CH-16	Route N.J. 154 and Kresson Road	69,200.00
CH-17	Cuthbert Boulevard and Hampton Road	2,300.00
CH-18	Kresson Road and Pearl Croft Road	1,050.00
CH-19	Cuthbert Boulevard and Wisteria Avenue	9,100.00
CH-20	North Park Drive at Penn Central Reading Seashore Lines Railroad Crossing	744,000.00
	BOROUGH OF COLLINGSWOOD	
CO-1	Haddon Avenue and Cuthbert Road	$249,500.00
CO-2	Park Avenue and Collings Avenue	26,000.00
CO-3	600 Block of Collings Avenue	9,000.00
CO-4	Cuthbert Road and Park Avenue	128,000.00
	BOROUGH OF WOODLYNNE	
WO-1	Mount Ephraim Avenue and Woodlynne Avenue	$ 43,800.00
WO-2	U.S. Route 130 and Dwight Avenue	7,200.00

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	TOWNSHIP OF HADDON	
HT-1	Haddon Avenue and Cuthbert Road	$ 249,500.00
HT-2	Haddon Avenue and Crystal Lake Avenue Haddon Avenue, Maple Avenue and Stoy Avenue	93,300.00
HT-3	U.S. Route 30 and Cuthbert Road	40,900.00
HT-4	Cuthbert Road and Park Avenue	128,000.00
HT-5	Crystal Lake Avenue and Park Avenue	50,400.00
HT-6	Emerald Avenue and Cuthbert Road	152,000.00
HT-7	U.S. Route 130 and Eldridge Avenue	6,100.00
HT-8	U.S. Route 130 and Grant Avenue	32,500.00
HT-9	Crystal Lake Avenue and Hopkins Avenue	6,800.00
	BOROUGH OF OAKLYN	
OA-1	U.S. Route 30, West Clinton Avenue and East Haddon Avenue	$ 34,230.00
OA-2	Improvement to the Flow of Traffic Along East and West Atlantic Avenues	6,000.00
	BOROUGH OF AUDUBON	
AU-1	Nicholson Road and East and West Atlantic Avenues U.S. Route 30 and Nicholson Road	$2,162,400.00
AU-2	Hopkins Avenue, Barrett Avenue and Pine Street	4,300.00
AU-3	Kings Highway and Crystal Lake Avenue	800.00
AU-4	Improvement to the Flow of Traffic Along East and West Atlantic Avenues	6,000.00
AU-5	Kings Highway and West Atlantic Avenue	42,000.00
AU-6	Kings Highway, Ninth Avenue and Wyoming Avenue	13,300.00
AU-7	Entrances to the Black Horse Pike Shopping Center From Nicholson Road	9,150.00
AU-8	East Atlantic Avenue and Pine Street	3,000.00
AU-9	Crystal Lake Avenue and Hopkins Avenue	6,800.00

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	BOROUGH OF HADDONFIELD	
HA-1	Kings Highway and Haddon Avenue	$ 27,500.00
HA-2	Haddon Avenue, Euclid Avenue and Tanner Street	33,900.00
HA-3	Haddon Avenue, Ellis Street and Snowden Avenue	43,800.00
HA-4	Kings Highway, Potter Street and Grove Street	44,000.00
HA-5	Kings Highway, West End Avenue and Chews Landing Road	152,000.00
HA-6	Maple Avenue and Grove Street	47,500.00
HA-7	Interconnection of Traffic Signals Along Kings Highway	27,000.00
HA-8	Potter Street and Ellis Street	18,350.00
HA-9	Improvement to the Flow of Traffic Along Haddon Avenue	2,100.00
HA-10	Kings Highway and Warwick Road	2,400.00
HA-11	Kings Highway and Tanner Street	15,350.00
HA-12	Kings Highway and Hinchman Avenue	3,900.00
HA-13	Kings Highway and Chestnut Street	200.00
	BOROUGH OF HADDON HEIGHTS	
HH-1	East and West Atlantic Avenues and Station Avenue	$ 28,200.00
HH-2	U.S. Route 30 and Station Avenue	3,840.00
HH-3	Ninth Avenue and Station Avenue	5,300.00
HH-4	Clements Bridge Road, East Atlantic Avenue and Barrington Avenue	51,000.00
	BOROUGH OF BELLMAWR	
BE-1	Route N.J. 168 and Browning Road	$ 72,900.00
BE-2	Route N.J. 168 and Benigno Boulevard	34,500.00
BE-3	Essex Avenue and Creek Road	9,050.00
BE-4	Browning Road and Bell Road	4,800.00
BE-5	Improvement to the Flow of Traffic Along Browning Road	3,600.00

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	BOROUGH OF BELLMAWR	
BE-6	Improvement to the Flow of Traffic Along Creek Road	$ 2,100.00
	BOROUGH OF BROOKLAWN	
BR-1	Route N.J. 47 and Creek Road	$ 69,200.00
	CITY OF GLOUCESTER	
GC-1	Broadway and Market Street	$ 46,550.00
GC-2	Broadway and Jersey Avenue	7,150.00
GC-3	U.S. Route 130 and Klemm Avenue	16,500.00
GC-4	Broadway and Cumberland Street Broadway and Monmouth Street	46,100.00
GC-5	U.S. Route 130 North and Market Street	10,400.00
GC-6	U.S. Route 130 South and Market Street	350.00
GC-7	Interconnection of Traffic Signals Along Broadway	114,200.00
GC-8	Market Street and Hughes Avenue	600.00
	BOROUGH OF MOUNT EPHRAIM	
ME-1	Kings Highway and Market Street	$ 57,100.00
ME-2	Route N.J. 168, Bell Road, Gloucester Avenue and New Jersey Avenue	3,000.00
	BOROUGH OF BARRINGTON	
BA-1	Clements Bridge Road, East Atlantic Avenue and Barrington Avenue	$ 51,000.00
BA-2	Clements Bridge Road and Gloucester Pike	152,500.00
BA-3	Clements Bridge Road and Third Avenue	28,000.00
	BOROUGH OF LAWNSIDE	
LA-1	Gloucester Avenue and East Atlantic Avenue	$ 97,050.00
LA-2	U.S. Route 30 and Gloucester Avenue	121,700.00
LA-3	Gloucester Avenue and Warwick Road	83,000.00
LA-4	Warwick Road and Charleston Avenue	5,400.00

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	BOROUGH OF LAWNSIDE	
LA-5	East Atlantic Avenue, Oak Avenue and Fiberglass Road	$ 10,800.00
LA-6	Improvement to the Flow of Traffic Along Warwick Road	3,800.00
	BOROUGH OF MAGNOLIA	
MA-1	U.S. Route 30 and Warwick Road	$ 55,800.00
MA-2	U.S. Route 30 and Evesham Road	87,900.00
MA-3	Evesham Road and East Atlantic Avenue	109,100.00
MA-4	Warwick Road and Evesham Road	123,400.00
MA-5	Warwick Road, East Atlantic Avenue and Jefferson Avenue	153,000.00
MA-6	Improvement to the Flow of Traffic Along East Atlantic Avenue	1,500.00
	BOROUGH OF RUNNEMEDE	
RU-1	Evesham Road and Schubert Avenue	$ 16,950.00
RU-2	Clements Bridge Road and Schubert Avenue	54,000.00
RU-3	Improvement to the Flow of Traffic in the Central Business District	17,300.00
RU-4	Route N.J. 168, Clements Bridge Road and Route N.J. 41	52,400.00
RU-5	Route N.J. 168 and Evesham Road	47,400.00
RU-6	Route N.J. 168 and Third Avenue	4,800.00
RU-7	Improvement to the Flow of Traffic Along Clements Bridge Road	500.00
RU-8	Route N.J. 168, Eighth Avenue and Smith Lane	8,400.00
RU-9	Schubert Avenue and Davis Avenue	1,650.00
	BOROUGH OF HI-NELLA	
HN-1	East Atlantic Avenue, Minnetonka Road and Somerdale Road	$ 36,000.00
HN-2	East Atlantic Avenue, Minnetonka Road and Columbia Avenue	3,900.00
HN-3	Construction of East Atlantic Avenue from Wakonda Road to Minnetonka Road	79,200.00
HN-4	Somerdale Road, Ogg Avenue and Nokomis Road	2,000.00

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	BOROUGH OF LAUREL SPRINGS	
LS-1	East Atlantic Avenue, West Atlantic Avenue and Stone Road	$ 17,400.00
	BOROUGH OF SOMERDALE	
SO-1	Somerdale Road and Warwick Road	$110,000.00
SO-2	Warwick Road, East Atlantic Avenue and Jefferson Avenue	153,000.00
	BOROUGH OF STRATFORD	
ST-1	U.S. Route 30, Berlin Avenue and Laurel Mill Road	$149,000.00
ST-2	Laurel Mill Road and East Atlantic Avenue	91,300.00
ST-3	Laurel Mill Road and Warwick Road	61,700.00
ST-4	Warwick Road, Vassar Avenue and Longwood Drive	7,000.00
ST-5	East Atlantic Avenue and Vassar Avenue	7,500.00
	TOWNSHIP OF VOORHEES	
VT-1	Kirkwood-Gibbsboro Road and White Horse Road	$ 14,100.00
VT-2	Haddonfield-Berlin Road, Evesham Road and Somerdale Road	155,500.00
VT-3	Burnt Mill Road and Somerdale Road	42,800.00
VT-4	Springdale-White Horse Road and Evesham Road	222,700.00
VT-5	Burnt Mill Road and Evesham Road	95,700.00
VT-6	Haddonfield-Berlin Road and White Horse Road	47,600.00
VT-7	White Horse Road and Burnt Mill Road	6,000.00
	BOROUGH OF CLEMENTON	
CL-1	Chews Landing Road and Blackwood Road	$ 24,000.00
CL-2	White Horse Avenue and Gibbsboro Road	39,000.00
CL-3	U.S. Route 30 and Gibbsboro Road	83,800.00
CL-4	Berlin Road, Erial Road and West Atlantic Avenue	102,200.00

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	BOROUGH OF LINDENWOLD	
LI-1	Laurel Mill Road and Chews Landing Road	$138,400.00
LI-2	U.S. Route 30 and White Horse Avenue	105,400.00
LI-3	Berlin Road, Gibbsboro Road, Carlton Street and Egg Harbor Road	17,800.00
	BOROUGH OF BERLIN	
BB-1	U.S. Route 30, Jackson Road, New Freedom Road, Tansboro Road, Taunton Avenue and Washington Avenue	$123,700.00
BB-2	U.S. Route 30, Berlin-Cross Keys Road and Haddon Avenue	293,500.00
BB-3	U.S. Route 30, Clementon-Berlin Road and Park Drive	188,000.00
BB-4	U.S. Route 30 and Broad Street	6,550.00
BB-5	U.S. Route 30 and Franklin Avenue	2,200.00
BB-6	U.S. Route 30 and Townsend Avenue	2,650.00
BB-7	Berlin-Cross Keys Road and Clementon-New Freedom Road	33,000.00
BB-8	Clementon-Berlin Road and Franklin Avenue	2,000.00
BB-9	Route N.J. 73 and Harker Avenue	300.00
	TOWNSHIP OF GLOUCESTER	
GT-1	Somerdale Road and Chews Landing-Clementon Road	$132,300.00
GT-2	Route N.J. 168 and Lakeland Road	40,000.00
GT-3	Route N.J. 168 and Lower Landing Road	6,200.00
GT-4	Route N.J. 168 and Church Street	60,600.00
GT-5	Laurel Mill Road and Blackwood-Clementon Road	44,800.00
GT-6	Route N.J. 168 and Almonesson-Blenheim Road	1,700.00
GT-7	Route N.J. 168, Station Avenue and Fifth Avenue	14,000.00
GT-8	Route N.J. 168 and Old Black Horse Pike	1,800.00

IMPROVEMENT LOCATIONS

PROJECT NUMBER	LOCATION	ESTIMATED COST
	BOROUGH OF PINE HILL	
PH-1	Turnersville Road and Berlin-Cross Keys Road	$ 43,800.00
PH-2	Erial Road and Branch Avenue	46,400.00

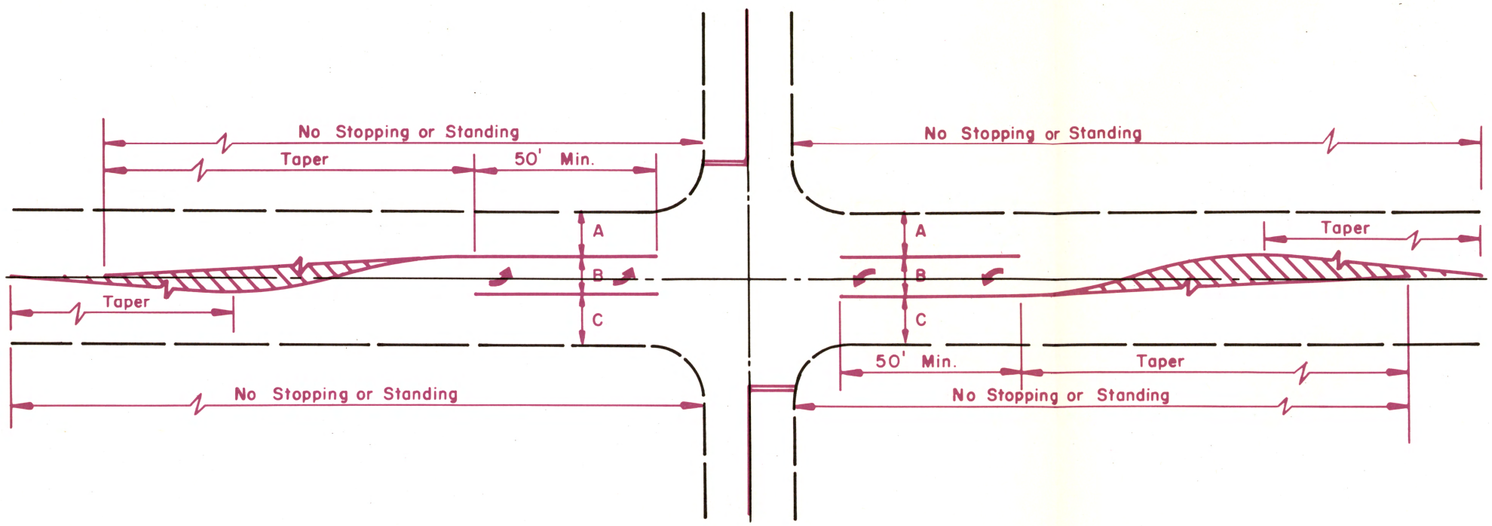
CHAPTER 8

GENERAL RECOMMENDATIONS

The recommendations presented in this chapter are general in nature and deal primarily with turning movements and speed limits; however, a project has been included for the interconnection of traffic signals along U.S. Route 130 within Camden County.

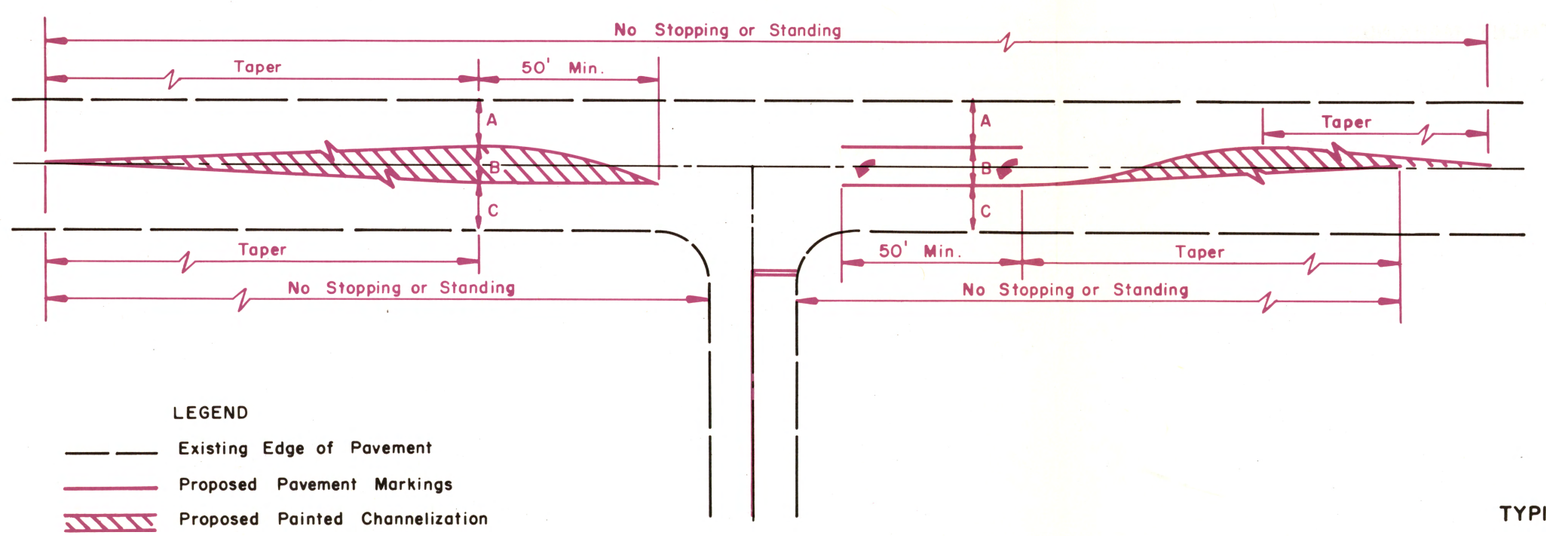
Specific recommendations which pertain to individual municipalities within the County are detailed in Volumes 1 through 10 of the individual Group Reports. The project regarding the interconnection of traffic signals has been detailed in this report as it somewhat applies to the entire County.

The recommended improvements which follow have been reviewed with County Officials.



TYPICAL FOUR WAY INTERSECTION

TRAFFIC LANE	CARTWAY WIDTH		
	36'	38'	40'
A	13'	13'	14'
B	10'	12'	12'
C	13'	13'	14'
TAPER	200'	240'	240'



TYPICAL THREE WAY INTERSECTION

TRAFFIC LANE	CARTWAY WIDTH		
	36'	38'	40'
A	13'	13'	14'
B	10'	12'	12'
C	13'	13'	14'
TAPER	200'	240'	240'

PROJECT NO. G-1

TYPICAL LEFT TURN LANE PAVEMENT MARKINGS

EXHIBIT NO. G-1

Kammerer, Symes & Assoc.
Consulting Engineers

PROJECT NO. G-1 TYPICAL LEFT TURN LANE PAVEMENT MARKINGS

Several of the arterial and collector roads in the study area do not have sufficient width to be marked for two (2) lanes of traffic in each direction. Provisions for left turn lanes are desirable at many of the major intersections with connector streets. *(Exhibit No. G-1).*

a. PROBLEMS

(1) Roads on the study system with cartway widths between thirty-six (36) and forty (40) feet are marked for one lane of travel in each direction.

(2) Vehicles desiring to turn into the main connector streets within a residential area must straddle the centerline while waiting to turn.

(3) On-coming traffic receives no pre-warning that a vehicle is straddling the centerline.

b. RECOMMENDATIONS

(1) Construct painted channelization to provide one (1) lane of through traffic in each direction plus a center lane for turning vehicles at locations in the study system which have cartway widths between thirty-six (36) and forty (40) feet and are marked for one lane of travel in each direction.

c. BENEFITS

(1) Will provide a protected area for vehicles to wait for clearance to make left turn movements, thereby reducing exposure to head-on, rear-end and same direction accidents.

(2) Driver confusion will be eliminated.

d. ESTIMATED COSTS

(1) Engineering	$150.00
(2) Signs and Markings	750.00
*Total Estimated Cost	*$900.00

*Denotes cost of typical intersection

PROJECT NO. G-2 GENERAL SPEED LIMITS

Project No. G-2 covers general speed limits within the study area.

a. PROBLEMS

(1) Unrealistically low speed limits are in force on many roads within the study area.

(2) Unrealistic speed limits result in driver disrespect for speed limit signs.

(3) Drivers who obey these speed limits actually create a hazardous condition.

b. RECOMMENDATIONS

(1) Arterial roadways should be speed zoned in accordance with the Manual on Uniform Traffic Control Devices.

c. BENEFITS

(1) A safer and smoother flow of traffic will be achieved.

(2) Greater respect for traffic control measures will be gained.

PROJECT NO. G-3 INTERCONNECTION OF TRAFFIC SIGNALS ALONG U.S. ROUTE 130

COUNTY OF CAMDEN

Project No. G-3 covers the interconnection of traffic signals to provide progressive timing along U.S. Route 130.

a. PROBLEMS

(1) Existing fixed time and semi-actuated traffic signals along Route 130 are not physically interconnected to provide progressive movement of traffic.

(2) Traffic is required to make many more stops than would be required by a system timed to provide progressive movement of traffic at the posted speed limit.

(3) Accident records indicate a total of five hundred thirty-six (536) accidents occurred during the three (3) year period from 1968 through 1970 at the following locations:

a. Route 130 and Cove Road

b. Route 130 and Merchantville Avenue

c. Route 130 and Browning Road

d. Route 130 and Terrace Avenue

e. Route 130 and Drexel Avenue

f. Route 130 and Marlton Pike

g. Route 130 and Collings Avenue

h. Route 130 and Route 168

i. Route 130 and Nicholson Road

j. Route 130 and Wilson Avenue

k. Route 130 and Klemm Avenue

l. Route 130 (S.B.) and Market Street

m. Route 130 (N.B.) and Market Street

n. Route 130 and Browning Lane

o. Route 130 and Kings Highway

Of the total number of accidents during this period, two hundred thirty-six (236) were classified as same direction accidents, one hundred seventy one (171) were classified as right angle accidents, eighty-five (85) were classified as left turn accidents, thirty-five (35) were collisions with fixed objects, six (6) involved pedestrians and three (3) were classified as head on collisions.

PROJECT NO. G-3 INTERCONNECTION OF TRAFFIC SIGNALS ALONG U.S. ROUTE 130

COUNTY OF CAMDEN

b. RECOMMENDATIONS

(1) Construct an analog computer system of traffic signals along Route 130 which will measure speed, volume and density and also adjust the cycle, offset and split to the demands of traffic in the system. The offset change will be accomplished gradually, thereby causing a smoother transition of the traffic along Route 130 at the following intersections:

a. Route 130 and Hylton Road

b. Route 130 and Suckle Highway

c. Route 130 and Union Avenue

d. Route 130 and Westfield Avenue

e. Route 130 and Cove Road

f. Route 130 and Merchantville Avenue

g. Route 130 and Browning Road

h. Route 130 and Terrace Avenue

i. Route 130 and Drexel Avenue

j. Route 130 and Marlton Pike

k. Route 130 and Collings Avenue

l. Route 130 and Nicholson Road

m. Route 130 and Wilson Avenue

n. Route 130 and Klemm Avenue

o. Route 130 (S.B.) and Market Street

p. Route 130 (N.B.) and Market Street

q. Route 130 and Browning Lane

r. Route 130 and Kings Highway

c. BENEFITS

(1) The operating level of service along Route 130 will be improved by providing a more continuous flow of traffic.

(2) The number of same direction accidents will be reduced by decreasing the number of stops made at traffic signals.

(3) Obtain better observance of signal commands and, in general, gain greater respect for traffic control measures.

PROJECT NO. G-3 INTERCONNECTION OF TRAFFIC SIGNALS ALONG U.S. ROUTE 130

COUNTY OF CAMDEN

d. ESTIMATED COSTS

1. Engineering	$13,500.00
2. Traffic Signals	67,500.00
Total Estimated Cost	$81,000.00

CHAPTER 9

IMPLEMENTATION

The basis for the selection of Projects for proposed improvements as stated previously was the increase of intersection and roadway capacities, improvement of the quality of travel and the reduction of accident potential.

The requirements of the TOPICS Program for the Study Area referred to in this report states that a feasible schedule of time and costs be established to implement the projects within a five (5) year period, 1973 - 1978. This Chapter presents a summary of the parameters used for implementation.

RIGHT OF WAY

Several of the Projects will require the acquisition of additional right of way. While these projects may not be scheduled for construction in the early phases, the acquisition of right of way should proceed as scheduled to restrict development of vacant land and take advantage of the lowest possible price. The acquisition of right of way by a governmental agency is a complex process which involves many functions from the time the right of way plans are completed by the engineers until the right of way personnel can begin their job of acquisition. Right of way estimates given in this report have been escalated at an annual rate of six (6) percent per year. It should be noted that acquisition for rights-of-way on all highway projects must comply with the following statutes:

a. STATE - Chapter 361, Laws of New Jersey 1971.
Assembly Bill No. 504, approved December 21, 1971.
"Eminent Domain Act of 1971".

b. STATE - Chapter 47, Laws of New Jersey 1972.
Senate Bill No. 987, approved June 1, 1972.
"Uniform Transportation Replacement Housing and Relocation Act".

c. FEDERAL- Public Law 91-646, 91st Congress.
Senate Bill No. 1, approved January 2, 1971.
"Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970".

CONSTRUCTION COSTS

The estimated costs for recommended projects are based on the experience of the Consultant and the cost of similar work.

In recent years, the "Engineering News Record" Construction Cost Index has increased an average of five (5) percent per year; however, in 1968, the increase in the index was ten (10) percent. The costs shown in the schedules in this Chapter have been escalated at the rate of eight (8) percent per year.

ENGINEERING

In addition to the early acquisition of right of way, early preparation of plans and specifications is essential to the orderly completion of the projected schedule.

A minimum period of one (1) year should be scheduled to obtain project approvals, obtain right of way and prepare engineering drawings for each project. On more complex and expensive projects, the period will be considerably longer.

Estimated engineering fees include the preparation of right of way plans, preliminary design, final design, construction layout and construction inspection. A factor of twenty (20) percent of the estimated construction cost was used to estimate the engineering fees. The fees estimated in this schedule have been escalated at the rate of six (6) percent per year.

CHAPTER 10

SYSTEMS MAINTENANCE AND EVALUATION

The projects recommended in this report do not significantly increase the road mileage within the municipalities studied. Thirty-four (34) new signals have been added to the system in the County of Camden as a result of this study.

Signals, signs and pavement markings on State Highways are maintained by the State. The changes recommended with the exception of initial cost would have somewhat of a change in the maintenance budget. The estimated maintenance cost for the recommended changes will be approximately twenty (20) percent of the current maintenance budgets for the municipalities studied in this report.

TRAFFIC SIGNALS

At present the County of Camden does not have a Traffic Department or a Traffic Coordinator. Consequently, traffic signals on municipal and county roads are maintained by the municipalities. It is the recommendation of this report that the County of Camden establish a Traffic Department in addition to a qualified Traffic Coordinator which will enable the County to take a more active part in the design and installation of traffic signals on County Roads. More specifically, it is felt that the County should review and approve the design, participate financially in the construction cost and take the responsibility for maintaining the signal after installation.

Since thirty-four (34) new signals have been recommended in this report, estimates for maintenance of signals within the County should be increased.

SIGNS AND PAVEMENT MARKINGS

Provisions should be made in the Municipal Budgets for annual repainting of pavement markings on a pre-determined schedule. The schedule should be based on past experience of traffic volumes. Additional monies should be budgeted for signs to cover the cost of painting, cleaning, replacement, vandalism and placement of new signs as changes in traffic volumes and experience require.

EVALUATION

The improvements recommended should be evaluated by a qualified traffic engineer as to their effectiveness. Through such a study, the effectiveness of each project can be evaluated in eliminating the problem areas outlined in the report.

APPENDIX

DEFINITIONS

ACTUATED SIGNALS: A type of traffic control signal in which the intervals are varied in accordance with the demands of traffic as registered by the actuation of detectors.

AVERAGE ANNUAL DAILY TRAFFIC: The total yearly volume divided by the number of days in the year, commonly abbreviated as A.A.D.T.

CAPACITY: The maximum number of vehicles which has a reasonable expectation of passing over a given section of a lane or a roadway in one direction (or in both directions for a two-lane or a three-lane highway) during a given time period under prevailing roadway and traffic conditions.

CARTWAY WIDTHS: Widths of roadways between curbs or travel way including shoulders.

CENTRAL BUSINESS DISTRICT (C.B.D.): That portion of a municipality in which the dominant land use is for intense business activity.

CHANNELIZATION OF TRAFFIC: The separation or regulation of conflicting traffic movements into definite paths of travel by use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movement of traffic, both vehicular and pedestrian.

COLLECTOR STREETS: Streets providing through movements between major arterials and local streets and having direct access to abutting property.

CORNER RADII: The radius, in feet, for curb or edge of paving joining intersecting roadways.

DESIGN HOUR VOLUME (D.H.V.): The future hourly volume used for design (two-way unless otherwise specified), usually the thirtieth (30th) highest hourly volume of the design year.

FIXED TIME SIGNALS: A type of traffic control signal which directs traffic to stop and permits it to proceed in accordance with predetermined time schedules.

GEOMETRY: Engineering data, which defines the alinement of roadways and intersections, consisting of curve radii, angles and distances.

GREEN TIME: The actual time that a green traffic light is on for a given approach during one cycle.

INTERSECTION CAPACITY: The computed maximum number of vehicles per hour that can be handled by an intersection.

JUGHANDLE: A separate lane turning off of a roadway expressly for accommodating turning movements, frequently used to eliminate left turn movements from the main roadway.

LEVEL OF SERVICE: A qualitative measure of the effect of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience and operating costs.

PEAK-HOUR TRAFFIC: The highest number of vehicles found to be passing over a section of a lane or a roadway during sixty (60) consecutive minutes.

PROGRESSIVE TIMING SYSTEM: A signal system in which the successive signal faces controlling a given street give "go" indications in accordance with a time schedule to permit (as nearly as possible) continuous operation of groups of vehicles along the street at a planned rate of speed, which may vary in different parts of the system.

RIGHT OF WAY: An easement giving the right to pass across land; as that portion of land dedicated for use as a travel way and within which roadways are constructed.

SPOT SPEED CHECKS: A method used to measure the instantaneous speed of a vehicle at a specified location.

THE THIRTIETH (30TH) HIGHEST HOUR VOLUME: The hourly volume on a given roadway that is exceeded by twenty-nine (29) hourly volumes during a designated year.

TIME DELAY STUDIES: Studies to determine the average travel time on an arterial or highway and the points of, duration and cause of delays.

TOPICS: Traffic Operations Program to Increase Capacity and Safety.

TRAFFIC VOLUME: The number of vehicles that pass over a given section of a lane or a roadway during a time period of one hour or more. Volume can be expressed in terms of daily traffic or annual traffic, as well as on an hourly basis.

VOLUME/CAPACITY RATIO: Ratio of actual vehicular volume or demand to the computed possible capacity for a given section of roadway.

WARRANTS FOR TRAFFIC SIGNAL INSTALLATION

Traffic control signals should not be installed unless one or more of the signal warrants in the Manual on Uniform Traffic Control Devices are met. Information should be obtained by means of engineering studies and compared with the requirements set forth in the warrants. If these requirements are not met, a traffic signal should neither be put into operation nor continued in operation (if already installed).

The warrants are as follows:

a. WARRANT NO. 1 - MINIMUM VEHICULAR VOLUME

b. WARRANT NO. 2 - INTERRUPTION OF CONTINUOUS TRAFFIC

c. WARRANT NO. 3 - MINIMUM PEDESTRIAN VOLUME

d. WARRANT NO. 4 - SCHOOL CROSSING

e. WARRANT NO. 5 - PROGRESSIVE MOVEMENT

f. WARRANT NO. 6 - ACCIDENT EXPERIENCE

g. WARRANT NO. 7 - SYSTEMS WARRANT

h. WARRANT NO. 8 - COMBINATION OF WARRANTS