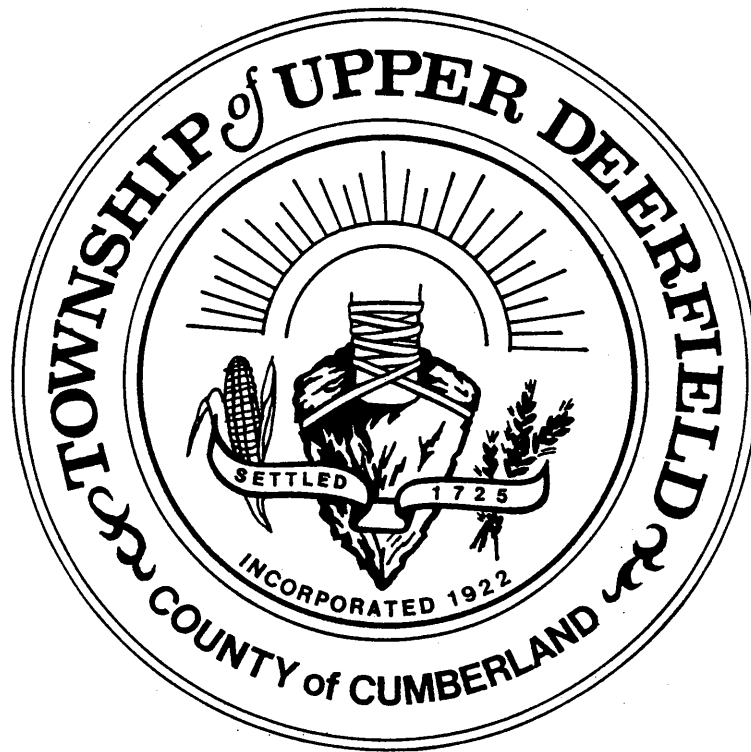


# MASTER TRAFFIC PLAN

prepared for

Upper Deerfield Township



prepared by



ORTH-RODGERS & ASSOCIATES, INC.

October, 1992

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## INTRODUCTION

Upper Deerfield Township, home to about 7,000 residents within its approximate 32-square mile area, is located in the northwest corner of Cumberland County in the southern section of New Jersey. As shown in Figure 1, the Township is bisected by a number of state highways, including N.J. Route 77 and N.J. Route 56 (Landis Avenue), which link it with other parts of the County and the region.

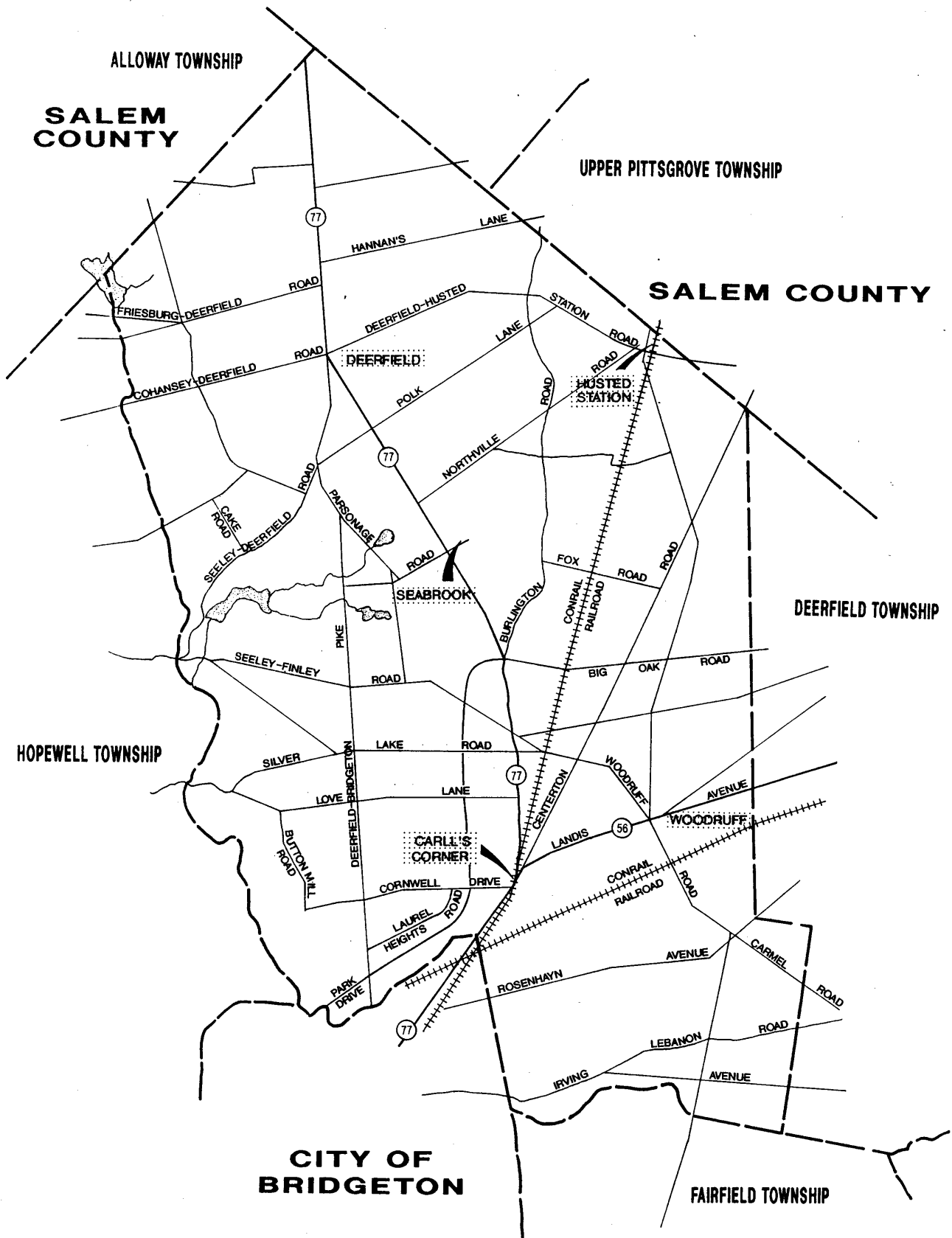
The 1988 "Master Plan of the Township of Upper Deerfield" prepared by the Township Planning Board, indicated that the Township was "on the brink" of major development activity due to improved public sanitary sewer systems and the completion of nearby N.J. Route 55. The potential growth of population and labor will put pressure on Township services and facilities including its roadway network.

To meet the challenge this growth will place upon the roadway system, the Township has retained Orth-Rodgers and Associates, Inc. (ORA) to prepare a Master Traffic Plan for Upper Deerfield Township. The Master Traffic Plan is intended to provide guidance to the Township as it moves toward implementation of necessary road and highway improvements in concert with the New Jersey Department of Transportation and Cumberland County.

In developing a Master Traffic Plan, a set of goals, objectives and standards must be established. Key transportation related goals must be developed based on the "vision" of the community beginning with the 1988 Comprehensive Plan. Next, focusing on the key transportation related goals, objectives to meet these goals must be determined. Finally, standards to measure achievement of the goals must be developed.

# Site Location Map

UPPER DEERFIELD TOWNSHIP  
CUMBERLAND COUNTY, NEW JERSEY



A discussion follows of the 1988 Township Comprehensive Plan, a list of concerns provided by the Planning Board and the goals, objectives and standards.

## TOWNSHIP COMPREHENSIVE PLAN

In 1979, the Township completed a Comprehensive Master Plan which set out three major goals. The first goal was the preservation of the Township's character and physical features. The Township has identified areas which they believe should be preserved for agriculture to keep the Township's open, rural environment.

The second goal was to enhance the quality of life for community residents through the improvement of the Township's ability to deal with development. Progress in this area includes the sanitary sewage system which is now available to much of the proposed development areas. The Township is also establishing property maintenance codes and a development regulations office.

The third goal was innovation in the methods used for resolving the conflicts, problems and pressures in the community's evolution. This effort, as it engenders public discussion, in part addresses this goal.

The 1988 Comprehensive Plan update determined these goals were still worthy of being sought. This plan also set two major goals for the Township Circulation Plan. The first goal is the safe and efficient movement of traffic throughout the community. Second is to encourage good street design while preserving the integrity of the Township's street and roadway system. The specific objectives to meet these goals and help provide a transportation system which is safe and efficient include:

1. Establishment of specific standards for street and road improvements which can be adjusted to meet need and conditions.

2. Encourage developers to use innovative design techniques when laying out new projects.
3. Set minimum standards for access to properties adjacent to arterial and major collector roads.
4. Promote and preserve both rail and air service to the township as a vital inducement to economic development.
5. Require the provision of pedestrian and bike traffic in development design and construction.
6. Evaluate new development in terms of transportation on the basis of its effect on the existing system and how it can be accommodated with the least detriment or ill effects.
7. Address all issues of roadway design including signs, lighting and furniture in both regulation and development review with aim of economics and maintenance by the municipality.

These goals have been reaffirmed by the Planning Board and as applicable will be incorporated into the Master Traffic Plan effort.

#### UPPER DEERFIELD TOWNSHIP MASTER TRAFFIC PLAN

As indicated previously, the Township Master Traffic Plan is to provide a vehicle to meet the goals set by the Township and its "vision" of the community. The Township Planning Board also indicated many concerns throughout the community regarding traffic circulation. Some of the concerns are listed below.

- safety at intersections
- through traffic in residential areas
- traffic flow in and around Carll's Corner
- traffic from western Cumberland County travelling through the Township to Route 55 and the Cumberland Mall
- traffic circulation between neighborhoods
- potential congestion along N.J. Route 77, N.J. Route 56 and Deerfield Pike

Based on these concerns as well as the goals and standards for the Comprehensive Plan, a set of goals for the master traffic plan were developed by the Planning Board. The goals of this study are:

- To improve traffic safety in the Township.
- To improve traffic flow to and through Carll's Corner.
- To provide local circulation between residential neighborhoods without allowing and/or encouraging through traffic.
- To provide an east-west route through the Township from western Cumberland County to N.J. Route 55.
- To manage congestion along all major routes (including but not limited to, N.J. Route 77, N.J. Route 56 and Deerfield Pike) so that traffic does not divert onto residential streets.
- To properly classify Township roadways.
- To develop access guidelines for County and Township streets.

To accomplish these goals, a work program has been developed which incorporates the following objectives:

- To document the present traffic volumes and conditions.
- To develop solutions to existing traffic problems -- an immediate action plan.
- To project future development potential and its traffic impact.
- To develop improvement recommendations that address future increases in traffic volumes and identified safety problems.
- To identify possible funding sources for highway improvements.

The Township Planning Board also specified Level of Service 'C' as a standard for all intersections in the Township. This standard is based on the "vision" of the community described in the Comprehensive Plan and the goal to retain an open, rural environment.

## THE EXISTING SITUATION

A review of existing roadway and traffic conditions in Upper Deerfield Township was conducted to identify existing traffic problems and address potential 'pressure points' -- intersections and roadway segments which would be most affected by growth within (and outside) the Township.

The key roadway corridors and intersections that were the focus of the study effort are described below.

- N. J. Route 77 - This north-south route passes through the heart of Upper Deerfield Township and provides access to a mix of land uses. For the most part, the roadway is one lane per direction with shoulders. This road passes through major sections of the Township such as Deerfield, Seabrook and Carll's Corner. The major intersection of N. J. Route 77, N. J. Route 56 and Cornwell Drive in Carll's Corner is characterized by large traffic volumes and some congestion. This location provides access to the majority of commercial uses within the Township. It is also the hub of major routes to and from Bridgeton to the south and, Vineland and Millville to the east.
- Deerfield Pike (County Route 606) - This is another north-south roadway from N. J. Route 77 in the north to Bridgeton in the south. The road provides one travel lane per direction with shoulders. Deerfield Pike is generally straight with some rolling terrain which provides direct access to residential and commercial land uses within the Township, and extends to Bridgeton in the south.

- N. J. Route 56 (Landis Avenue) - This east-west roadway connects N. J. Route 77 at Carll's Corner with areas to the east in Cumberland County and also N. J. Route 55. The route provides one lane per direction with shoulders. As noted earlier, high traffic volume and some congestion was noted at the intersection of N. J. Route 77, N. J. Route 56 and Cornwell Drive in Carll's Corner.

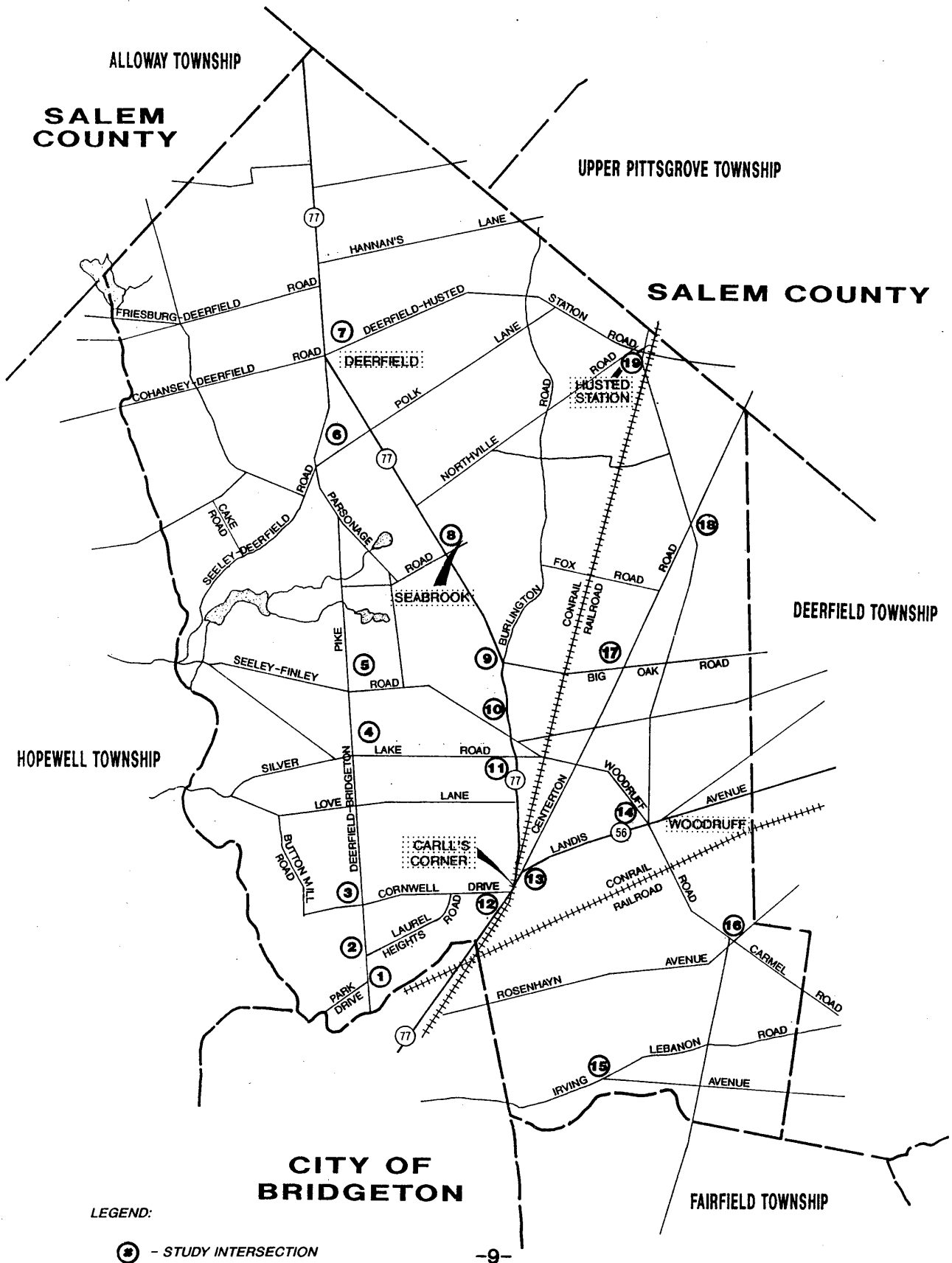
Figure 2 illustrates the key intersections along the roadway corridors discussed, as well as intersections in other areas of the Township, which were identified for detailed analysis. The 19 intersections are:

<u>Intersection</u>	<u>Intersection Control</u>	<u>Intersection Number</u>
A. <u>Deerfield Pike (C.R. 606) and</u>		
- Park Drive (C.R. 621)	signalized	1
- Laurel Heights Drive (C.R. 662)	unsignalized	2
- Cornwell Drive (C.R. 622)	unsignalized	3
- Silver Lake Road (C.R. 704)	unsignalized	4
- Seeley - Finley Road (C.R. 617)	unsignalized	5
B. <u>N. J. Route 77 and</u>		
- Cohansey-Deerfield Road (C.R. 540)	unsignalized	7
- Parsonage Road (C.R. 630)	signalized	8
- Big Oak Road (C.R. 658)	unsignalized	9
- Seeley-Finley Road (C.R. 617)	unsignalized	10
- Silver Lake Road (C.R. 704)	unsignalized	11
- N. J. Route 56 (Landis Avenue) and Cornwell Drive	signalized	12



# Study Locations

UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



C. N. J. Route 56 (Landis Avenue) and

- Centerton Road (C.R. 611)	unsignalized	13
- Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R. 687)	signalized	14

D. Other Locations

- Seeley-Deerfield Road (C.R. 612) and Parsonage Road (C.R. 630)	unsignalized	6
- Irving Avenue (C.R. 552) and Lebanon Road (C.R. 654)	unsignalized	15
- Woodruff Road (C.R. 553), Rosenhayn Avenue (C.R. 659) and Carmel Road (C.R. 705)	unsignalized	16
- Centerton Road (C.R. 553) and Big Oak Road (C.R. 658)	unsignalized	17
- Center Road (C.R. 553) and Woodruff-Husted Station Road (C.R. 687)	unsignalized	18
- Deerfield-Husted Station Road (C.R. 540), Husted Station Road (C.R. 687) and Northville Road (C.R. 711)	unsignalized	19

Existing Traffic Volumes

Existing turning movement traffic volumes at the study intersections were determined through the conduct of turning movement traffic counts. All of the turning movement counts were collected in the period beginning November 29, 1990 and ending January 4, 1991. No counts were conducted between December 21, 1990 and January 2, 1991 due to the holidays. The counts were conducted from 7:00 A.M. to 9:00 A.M. and 4:00 P.M. to 6:00 P.M. at the 19 study intersections. Afternoon counts at the intersections of Silver Lake Road at both N.J. Route 77 and Deerfield Pike, were conducted from 2:00 P.M. to 6:00 P.M. to observe traffic from the Cumberland Regional High School.

Review of the traffic count data indicates that the morning and afternoon peak traffic hours typically occur between 7:15 A.M. and 8:15 A.M. and 4:00 P.M. and 5:00 P.M., respectively. To provide for a detailed accounting of all the study locations, Upper Deerfield Township was divided into three sectors:

- Northern Area -- generally the area north of a parallel line to Fox Road.
- Central Area -- generally the area south of the Northern Area but north of Love Lane.
- Southern Area -- generally the area south of the Central Area, below Love Lane.

Figures 3 through 8 illustrate the existing peak hour volumes at study area intersections within each 'area' of the Township. The existing total intersection volumes are illustrated in Table I.

It is interesting to note that the afternoon peak hour volumes are significantly higher than the morning peak hour volumes at most of the study intersections.

### Volume/Capacity Analysis -- Existing Conditions

While traffic volumes provide an important measure of activity on the area road system, evaluating how well that system accommodates those volumes is also important -- i.e., a comparison of peak traffic volumes with available roadway capacity. By definition, capacity represents the maximum number of vehicles which can be accommodated given the constraints of roadway geometry, environment, traffic characteristics and controls.

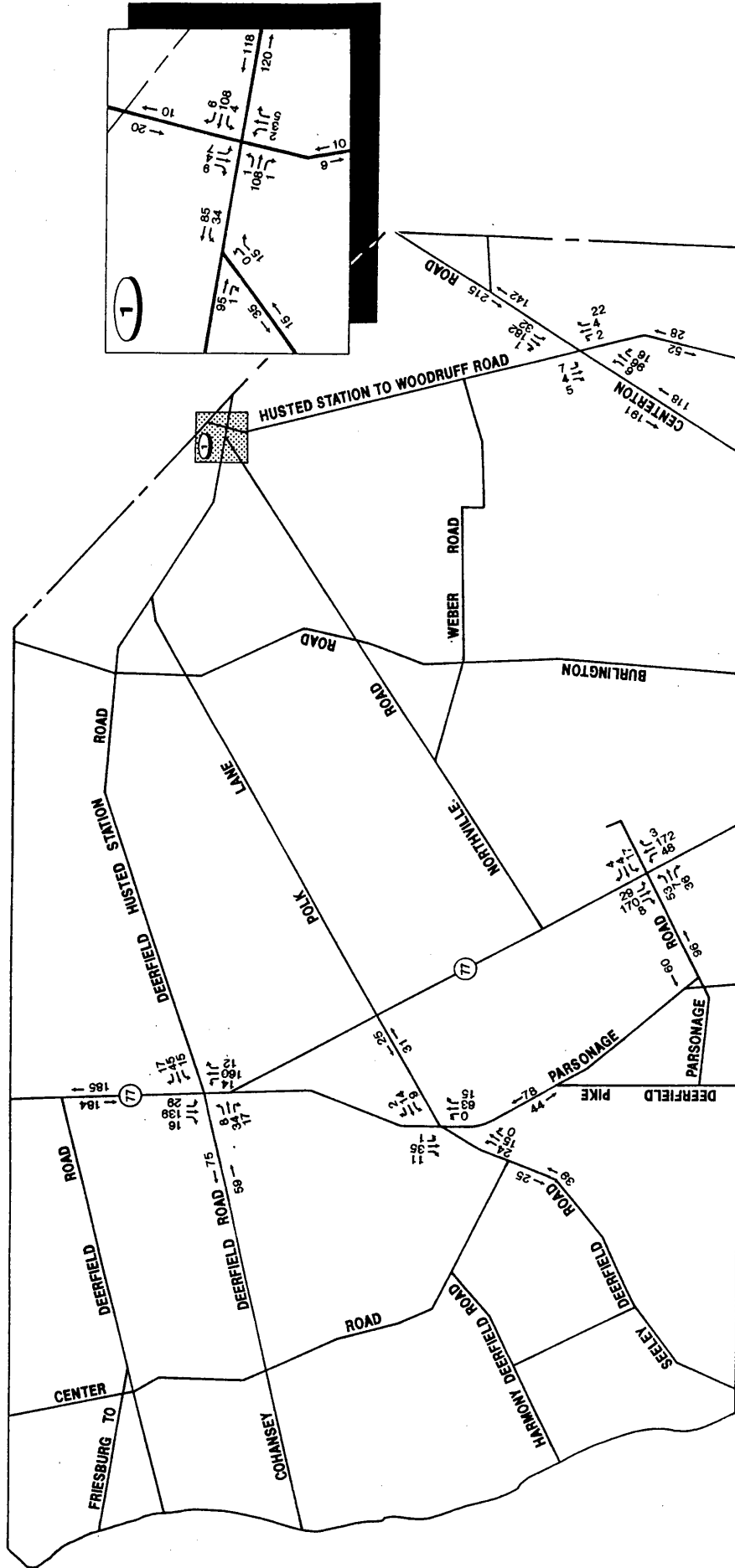
**Existing Morning Peak Hour Traffic Volumes**

7:15 AM - 8:15 AM

Northern Area

UPPER DEERFIELD TOWNSHIP

CUMBERLAND COUNTY, NEW JERSEY

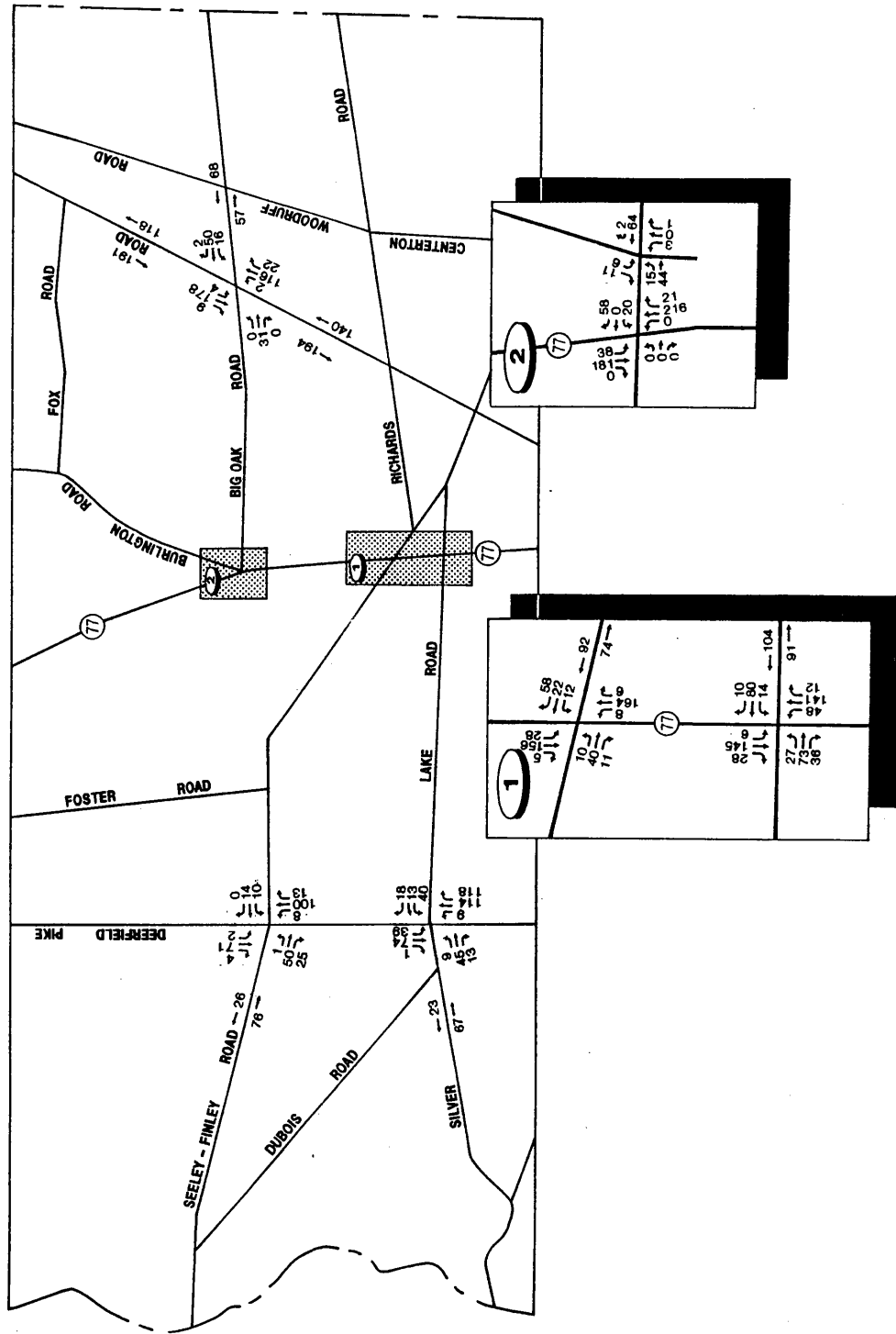


**Existing Morning Peak Hour Traffic Volumes**

7:15 AM - 8:15 AM

Central Area

UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



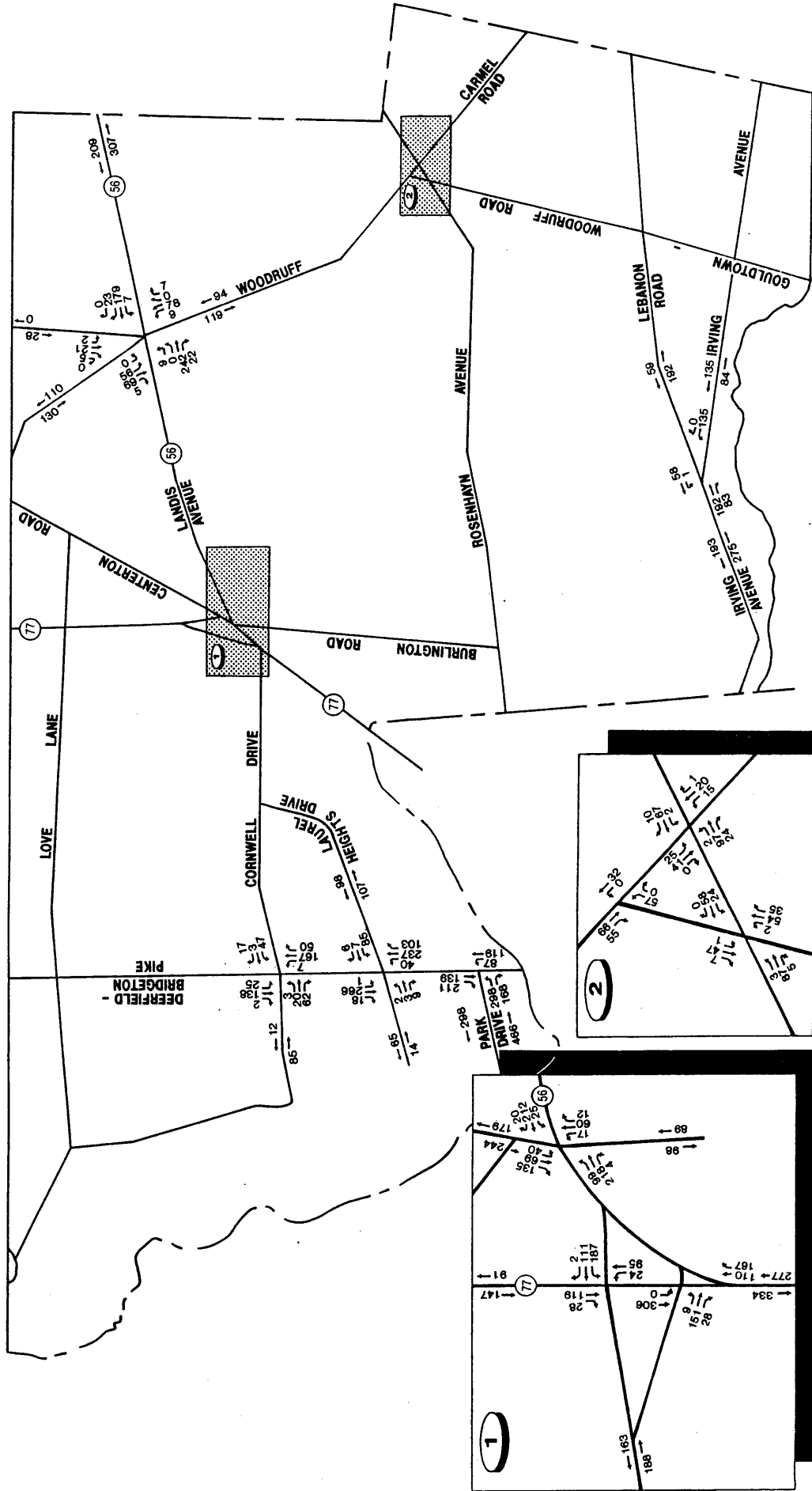
**Existing Morning Peak Hour Traffic Volumes**

7:15 AM - 8:15 AM

Southern Area

UPPER DEERFIELD TOWNSHIP

CUMBERLAND COUNTY, NEW JERSEY



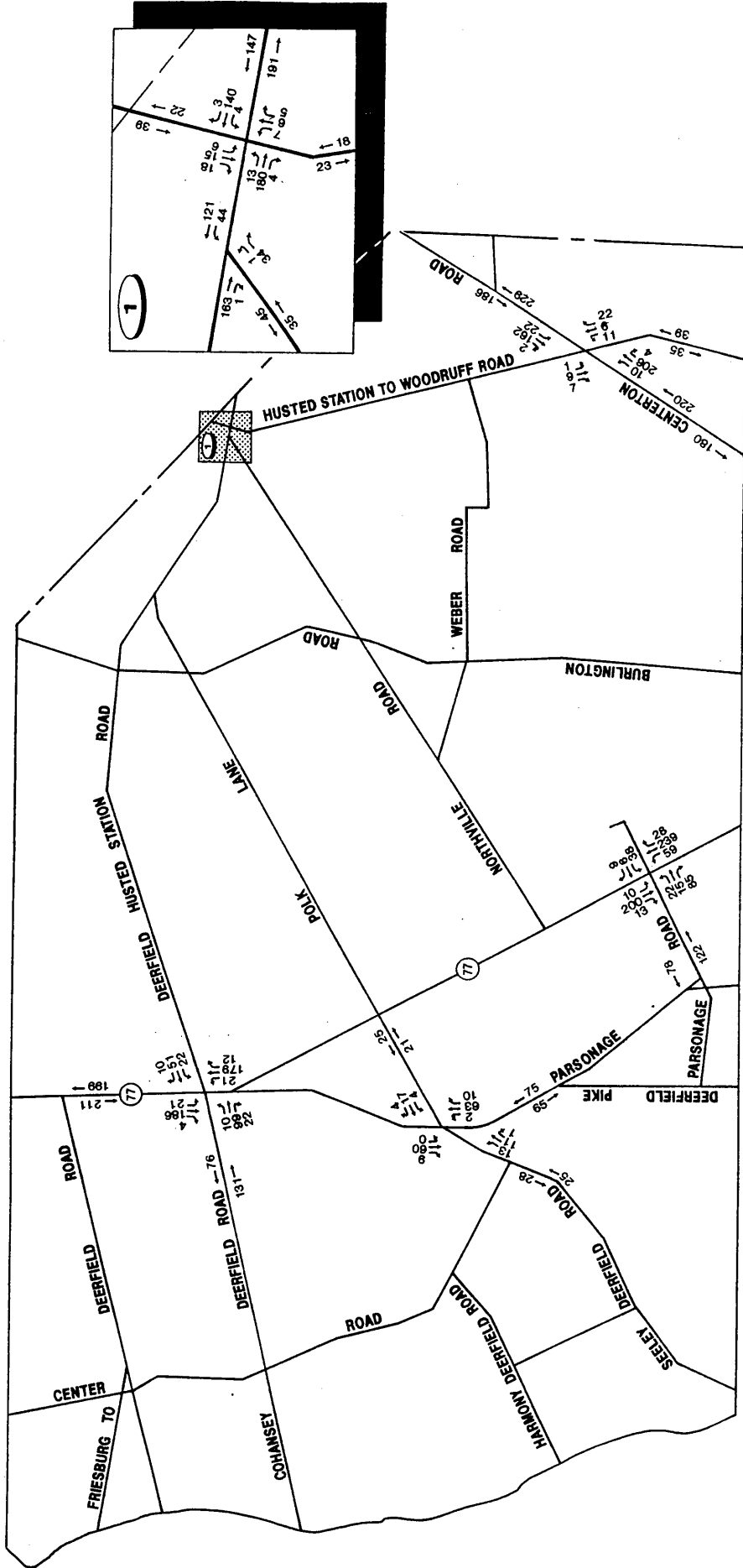
### Existing Afternoon Peak Hour Traffic Volumes

4:00 PM - 5:00 PM

Northern Area

UPPER DEERFIELD TOWNSHIP  
CUMBERLAND COUNTY, NEW JERSEY

FIGURE 6



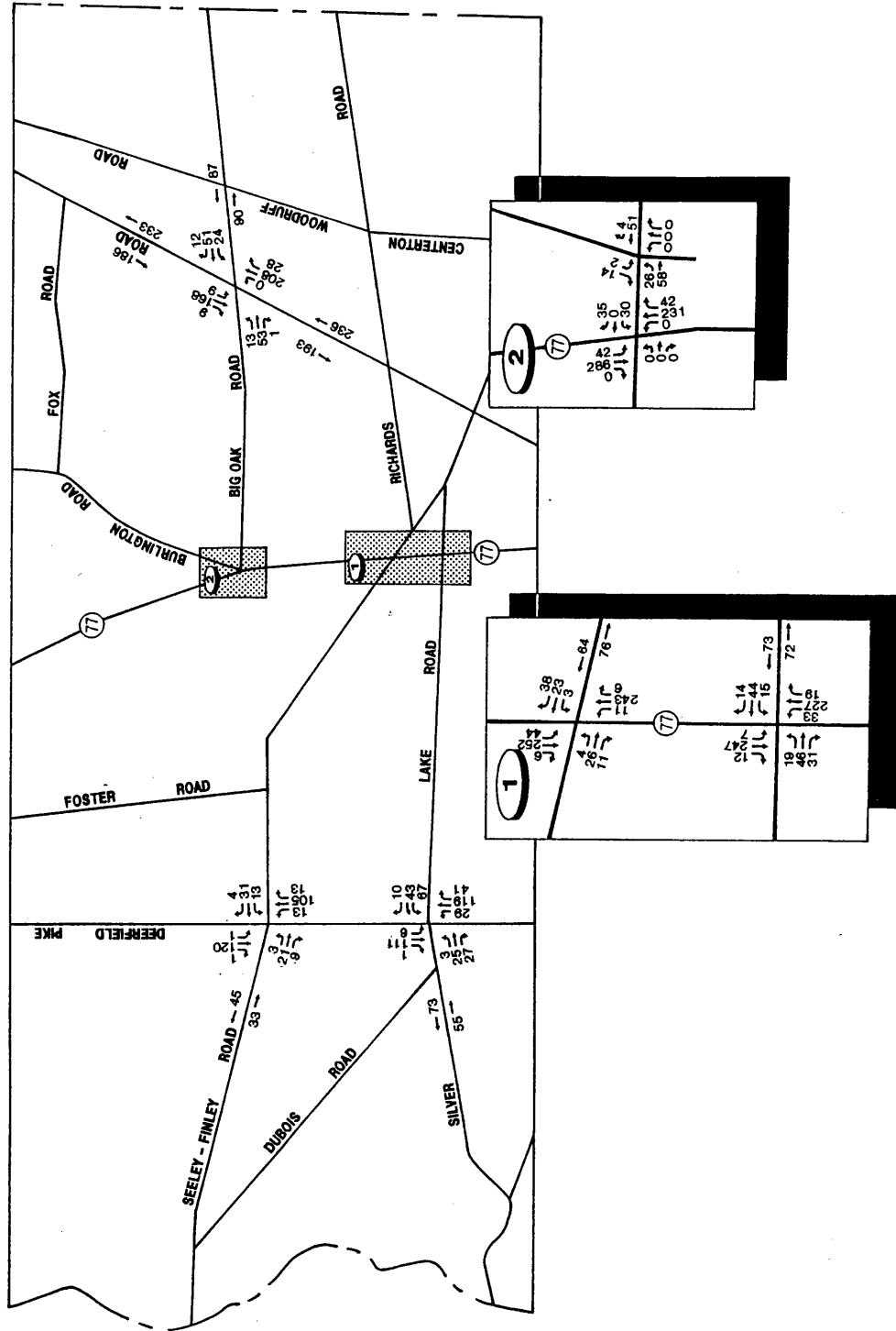
**Existing Afternoon Peak Hour Traffic Volumes**

4:00 PM - 5:00 PM

Central Area

UPPER DEERFIELD TOWNSHIP

CUMBERLAND COUNTY, NEW JERSEY





**Existing Afternoon Peak Hour Traffic Volumes**

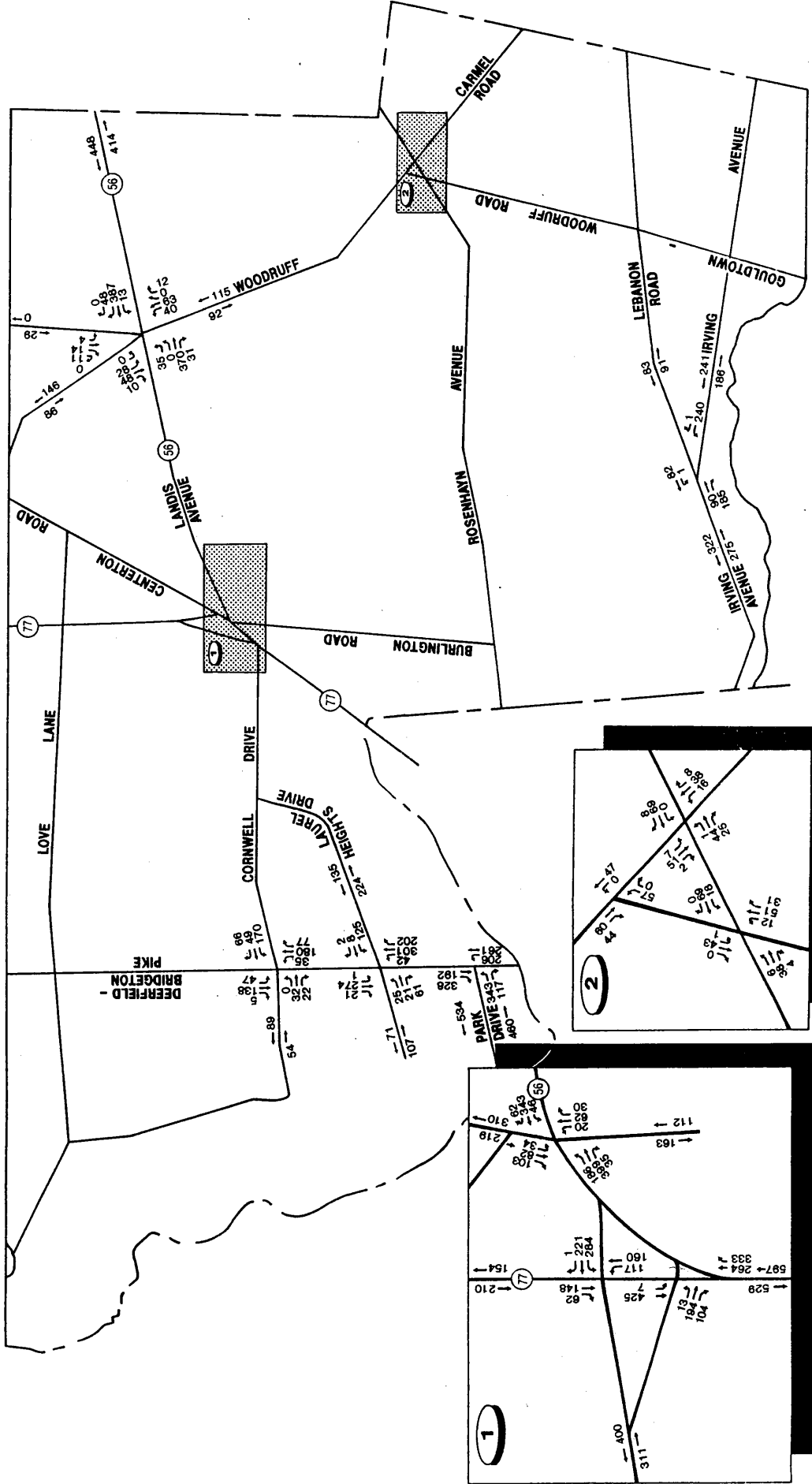
4:00 PM - 5:00 PM

Southern Area

UPPER DEERFIELD TOWNSHIP

CUMBERLAND COUNTY, NEW JERSEY

FIGURE 8



**TABLE I  
TOTAL INTERSECTION VOLUMES**

<u>Intersection</u>	<u>Total Volume</u>	
	<u>A.M. Peak</u>	<u>P.M. Peak</u>
Deerfield Pike (C.R. 606) and Park Drive (C.R. 621)	1022	1447
Deerfield Pike (C.R. 606) and Laurel Heights (C.R. 662)	777	1083
Deerfield Pike (C.R. 606) and Cornwell Drive (C.R. 622)	541	821
Deerfield Pike (C.R. 606) and Silver Lake Road (C.R. 704)	593	482
Deerfield Pike (C.R. 606) and Seeley-Finley Road (C.R. 617)	298	334
N. J. Route 77 and Cohansey-Deerfield Road (C.R. 540)	506	637
N. J. Route 77 and Parsonage Road (C.R. 743)	551	724
N. J. Route 77 and Big Oak Road (C.R. 658)	543	672
N. J. Route 77 and Seeley-Finley Road (C.R. 617)	520	667
N. J. Route 77 and Silver Lake Road (C.R. 704)	620	714
N. J. Route 77 and N. J. Route 56 (Landis Avenue)	912	1624
N. J. Route 56 (Landis Avenue) and Centerton Road (C.R. 611)	911	1402
N. J. Route 56 (Landis Avenue), Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R.687)	734	1114
Seeley-Deerfield Road (C.R.612) and Parsonage Road (C.R.630)	189	194
Irving Avenue (C.R. 552) and Lebanon Road (C.R. 654)	469	599
Woodruff Road (C.R. 553), Rosenhayn Avenue (C.R. 659) and Carmel Road (C.R. 705)	422	385
Centerton Road (C.R. 553) and Big Oak Road (C.R. 658)	430	576
Centerton Road (C.R. 553) and Woodruff Road/Husted Station (C.R. 687)	377	462
Deerfield-Husted Station Road (C.R. 540), Husted Station (C.R. 687) and Northville Road (C.R. 711)	259	403

Primarily, intersections control capacity in road networks, since conflicts exist at these points between through, crossing and turning traffic. Because of these conflicts, congestion is most likely to occur at intersections. Therefore, intersections are studied most often when determining the quality of traffic flow.

Although an unsignalized intersection on a through route is seldom critical to the overall capacity of the through route, it may significantly affect the capacity of the minor cross-route and it may influence the quality of traffic flow on both. When analyzing unsignalized intersections, major street through movements and right-turns are unimpeded and have the right-of-way over all side street traffic and left-turns from the major street. All other turning movements in the intersection cross, merge with, or are otherwise impeded by major street movements.

Traffic delays at unsignalized intersections are determined by sequentially processing these impeded movements. For each impeded movement in turn, all conflicting flows are summed, and the minimum necessary critical 'gap' in traffic is determined. Based upon the number of available gaps, the potential capacity of that movement can be calculated.

Since operation at capacity is usually unsatisfactory to most drivers, a descriptive concept has been developed for unsignalized intersections called level of service. Level of service relates expected traffic delay to remaining, or reserve capacity (the number of unused 'gaps'). Unsignalized levels of service range from Level of Service 'a' (little or no delay) to Level of Service 'f' (extreme delay). Table II summarizes the relationship between reserve capacity and level of service for unsignalized intersections as defined by the 1985 Transportation Research Board Highway Capacity Manual.

At signalized intersections, factors that affect the various approach capacities include width of approach, number of lanes, signal "green time", turning percentages, truck volumes, etc. However, operation at capacity is far from

**TABLE II**  
**LEVEL OF SERVICE AND EXPECTED DELAY**  
**FOR UNSIGNALIZED INTERSECTIONS<sup>1)</sup>**

<u>LEVEL OF SERVICE</u>	<u>EXPECTED TRAFFIC DELAY</u>	<u>RESERVE CAPACITY</u>
a	Little or no delay	400 or more
b	Short traffic delays	300 to 399
c	Average traffic delays	200 to 299
d	Long traffic delays	100 to 199
e	Long traffic delays	0 to 99
f	Very long traffic delays	Less than 0

---

1) *Transportation Research Board, 1985 Highway Capacity Manual, published by the National Academy of Sciences, Washington, D. C., 1985.*

satisfactory since substantial delays or reduced operating speeds are likely. Therefore, a descriptive mechanism (Table III) has been developed (Level of Service) which will indicate average delay at the intersection on a scale from 'A' (indicating little or no delay) to 'F' (indicating average delay of more than 60 seconds).

Delays cannot be related to capacity in a simple one-to-one fashion. It is possible to have delays in the Level of Service 'F' range, without exceeding roadway capacity. High delays can exist without exceeding roadway capacity if one or more of the following conditions exist:

- long signal cycle lengths;
- the particular traffic movement experiences a long red time; or,
- progressive movement for a particular lane group is poor.

While the previous discussion describes the level of service concept in general, it is important to relate the concept to Upper Deerfield Township in particular. Levels of Service 'A' and 'B' indicate typically congestion free operation and are clearly acceptable in Upper Deerfield Township. Level of Service 'C', on the other hand, represents the start of congestion, and, while still acceptable, indicate that further increases in traffic could result in congestion and consequently, conditions should be monitored over time. Levels of Service 'D', 'E', and 'F' are not acceptable and indicate short term improvements must be considered.

A detailed volume/capacity analysis was completed at the study area intersections during the morning and afternoon peak hours, respectively. Figures 9 through 14 illustrate the results of the volume/capacity analyses. Review of the figures indicate most intersections operate at Level of Service 'A' or 'B'. No intersections were found to operate at overall Level of Service 'F' conditions. Of the remaining intersections, the following five operate at Level of Service 'D' or 'E':

TABLE III  
LEVEL OF SERVICE  
FOR SIGNALIZED INTERSECTIONS<sup>1)</sup>

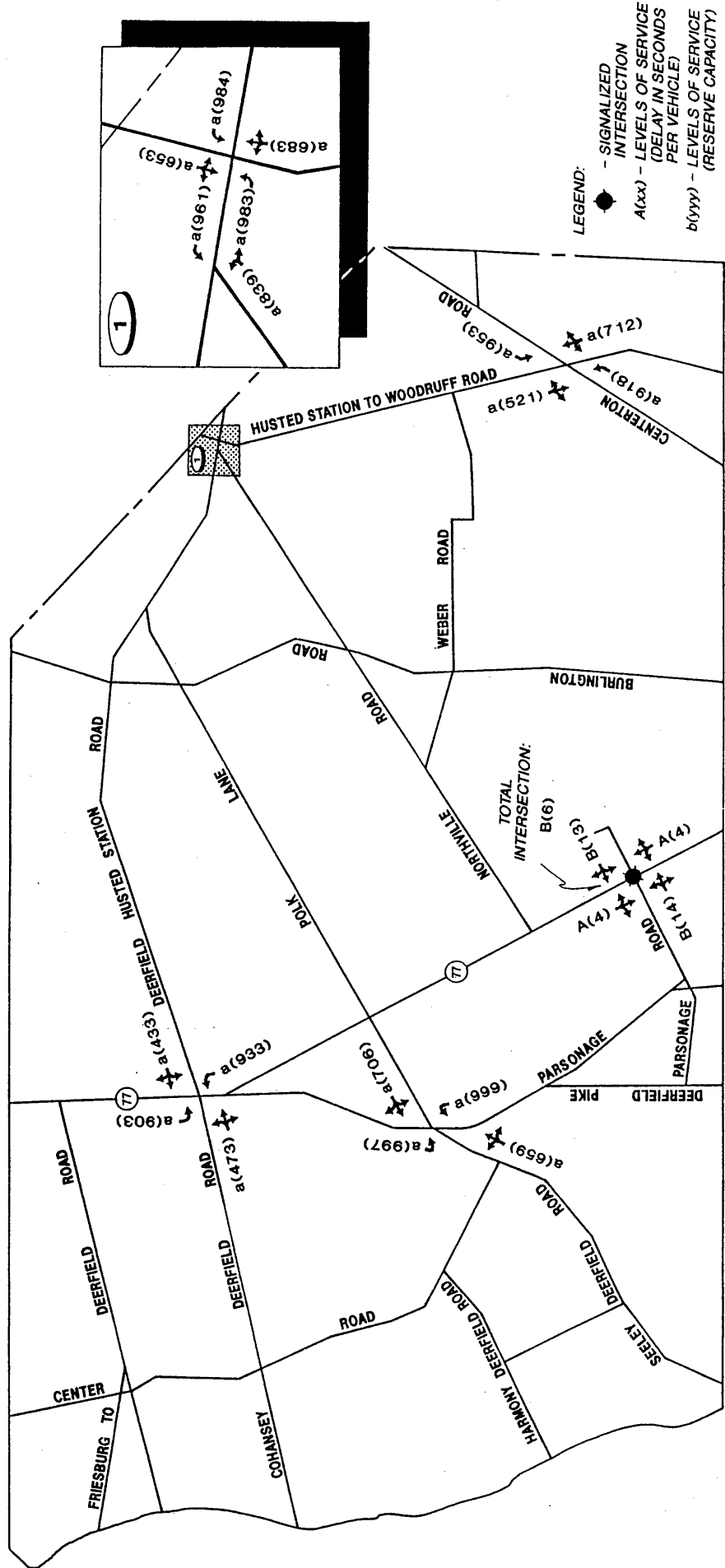
<u>LEVEL OF SERVICE</u>	<u>DESCRIPTION</u>	<u>AVERAGE STOPPED DELAY PER VEHICLE (SECONDS)</u>
A	Very low delay, good progression; most vehicles do not stop at intersection.	≤ 5.0
B	Generally good signal progression and/or short cycle length; more vehicles stop at intersection than level of service A.	5.1 to 15.0
C	Fair progression and/or longer cycle length; significant number of vehicles stop at intersection.	15.1 to 25.0
D	Congestion becomes noticeable; individual cycle failures; longer delays from unfavorable progression, long cycle length, or high volume/capacity ratios; most vehicles stop at intersection.	25.1 to 40.0
E	Usually considered <u>limit of acceptable delay</u> indicative of poor progression, long cycle length, or high volume/capacity ratio; frequent individual cycle failures.	40.1 to 60.0
F	Could be considered excessive delay in some areas, frequently an indication of oversaturation (i.e., arrival flow exceeds capacity), or very long cycle lengths with minimal side street green time. Capacity is not necessarily exceeded under this level of service.	> 60.0

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<sup>1)</sup> *Transportation Research Board, Special Report 209, Highway Capacity Manual, 1985, published by the Transportation Research Board, Washington, D.C. 1985.*

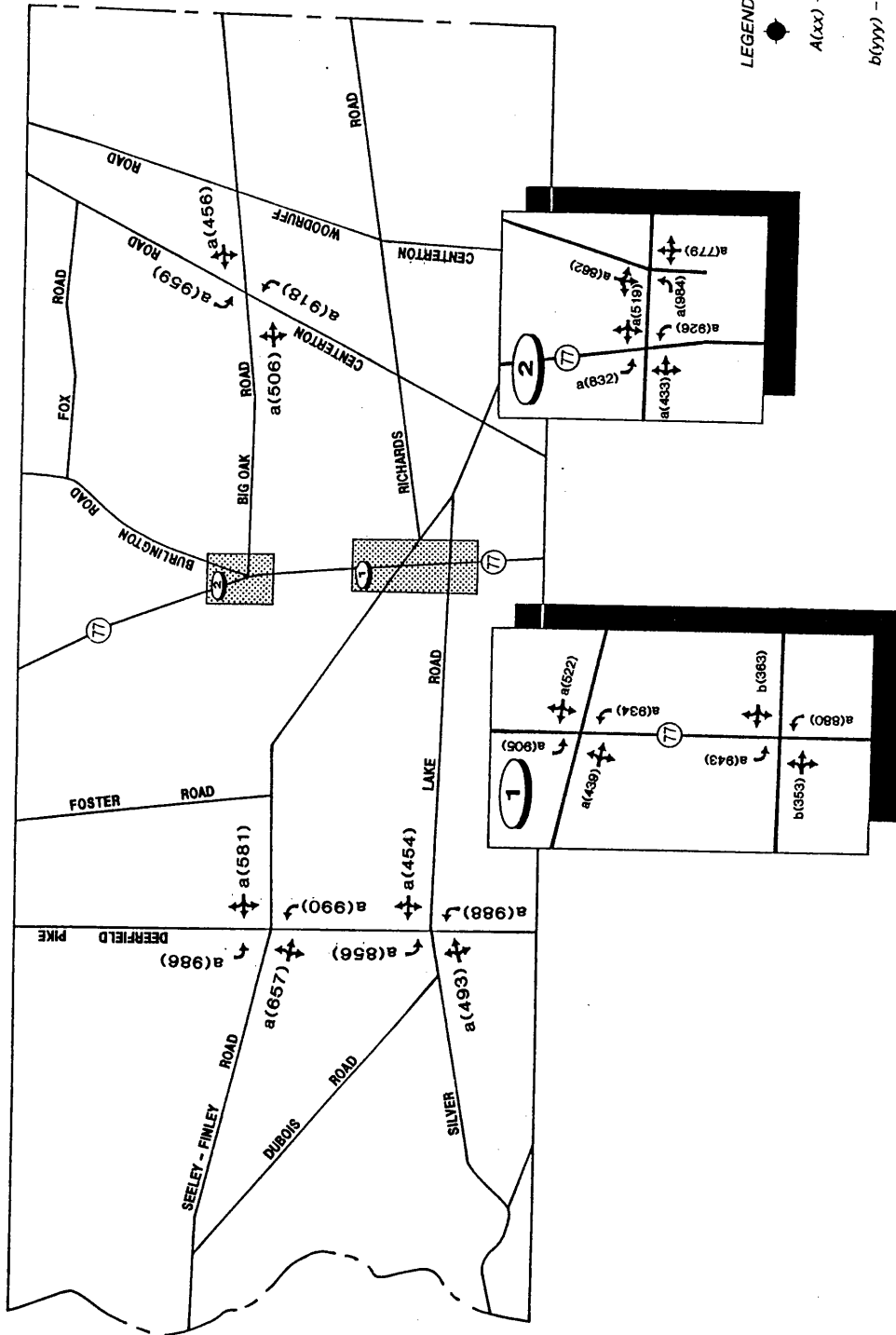
# Existing Morning Peak Hour Levels of Service

Northern Area  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



# Existing Morning Peak Hour Levels of Service

Central Area  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY

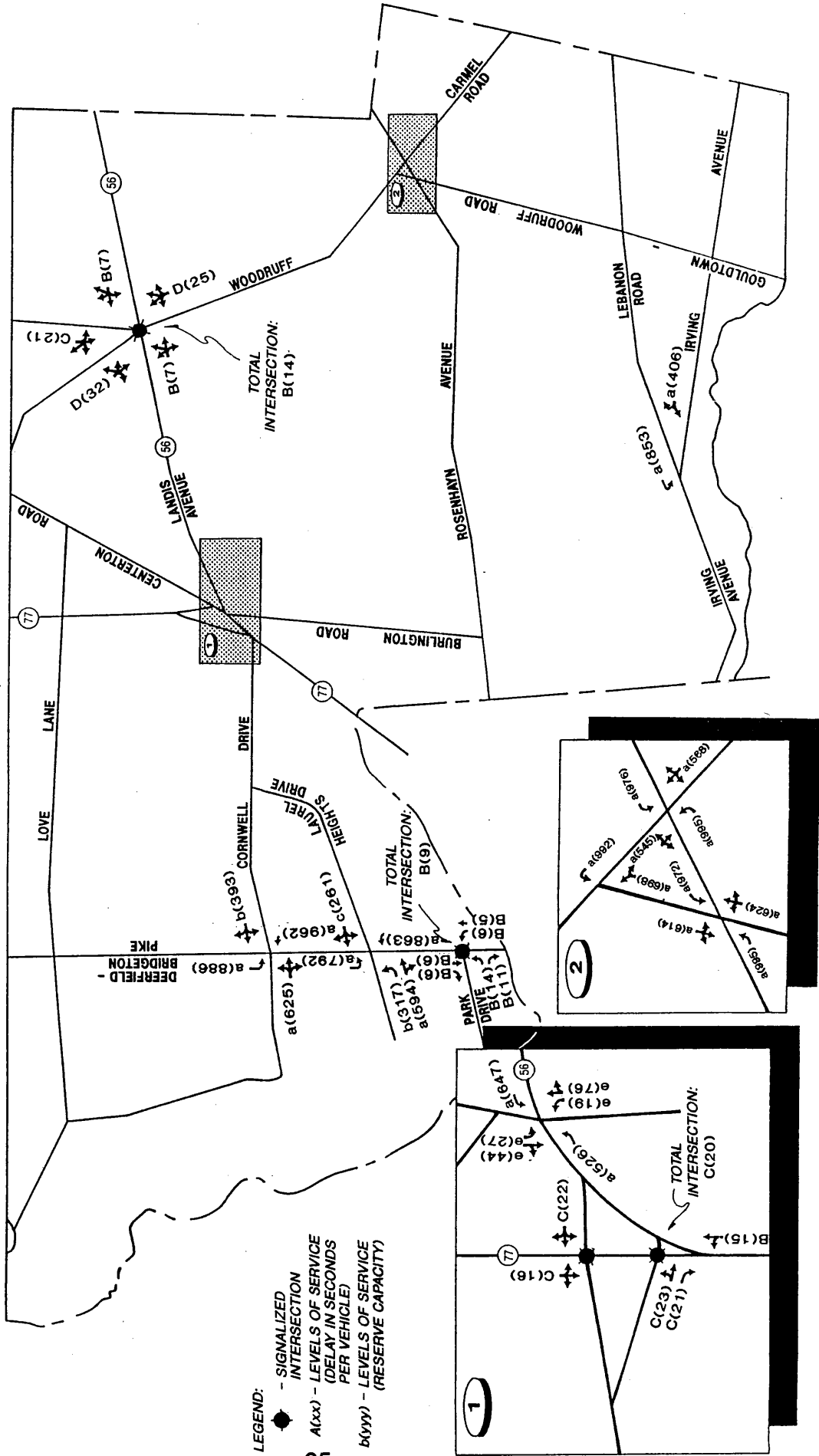


- LEGEND:
- - SIGNALIZED INTERSECTION
  - A(xx) - LEVELS OF SERVICE (DELAY IN SECONDS PER VEHICLE)
  - b(yyy) - LEVELS OF SERVICE (RESERVE CAPACITY)



# Existing Morning Peak Hour Levels of Service

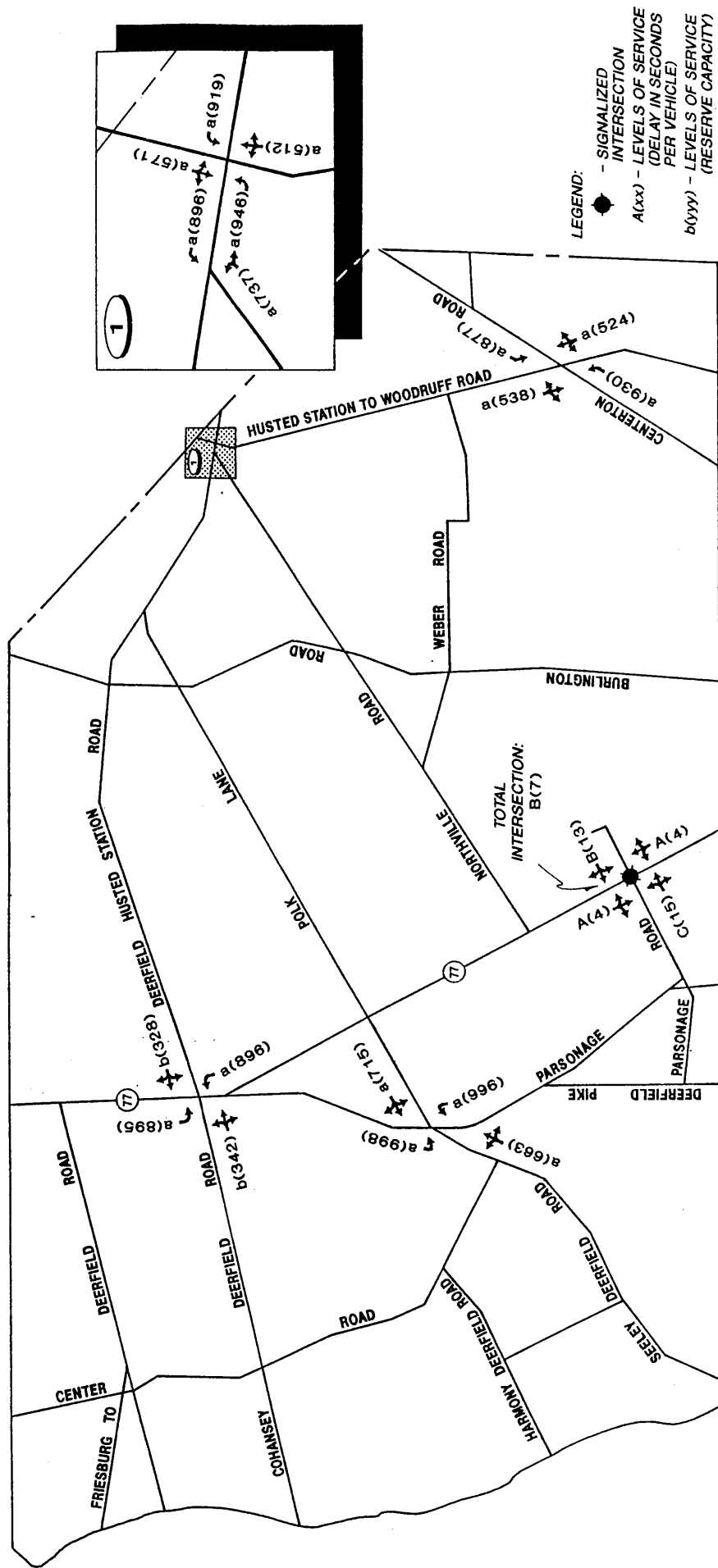
Southern Area  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



# Existing Afternoon Peak Hour Levels of Service

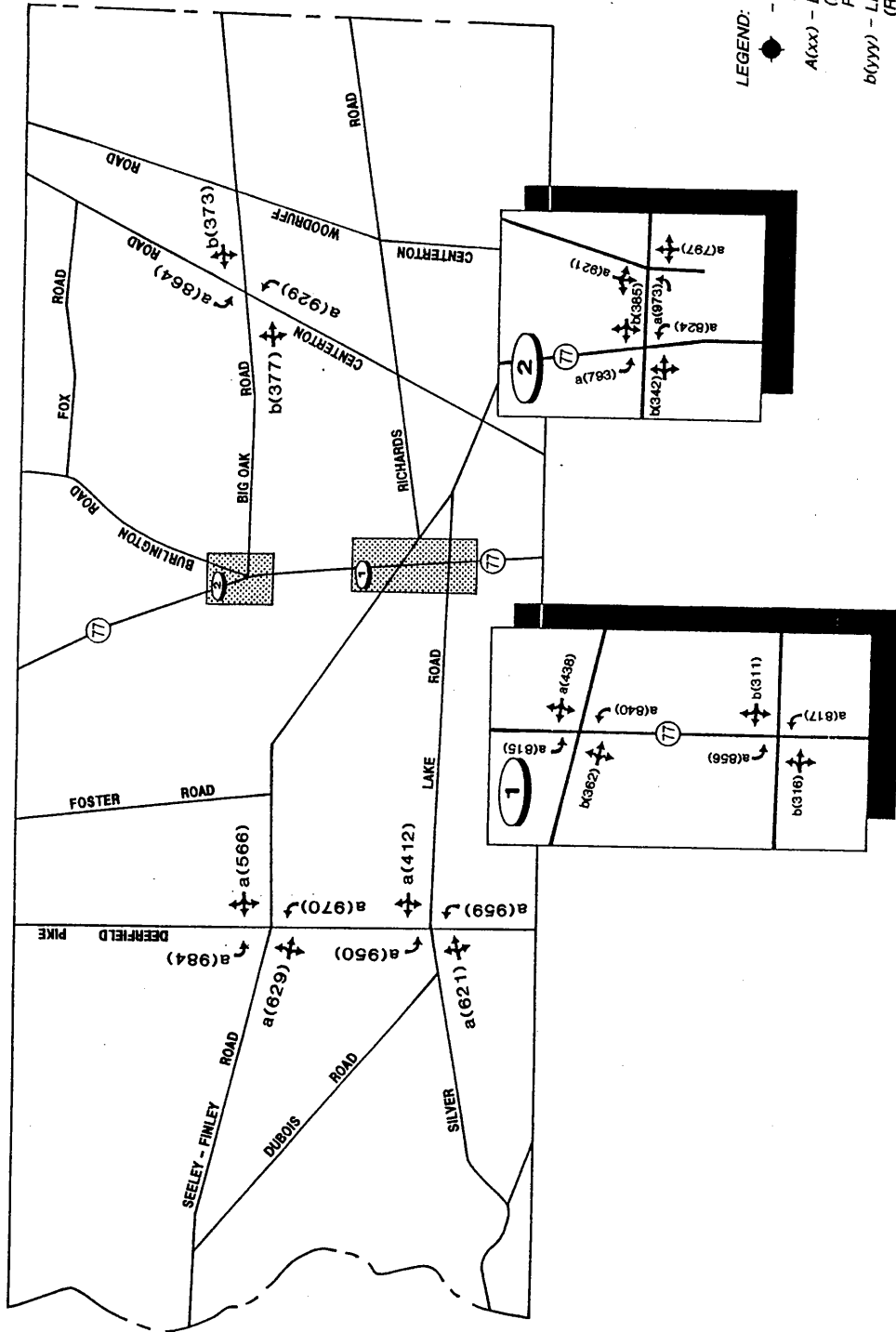


Northern Area  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



# Existing Afternoon Peak Hour Levels of Service

Central Area  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY

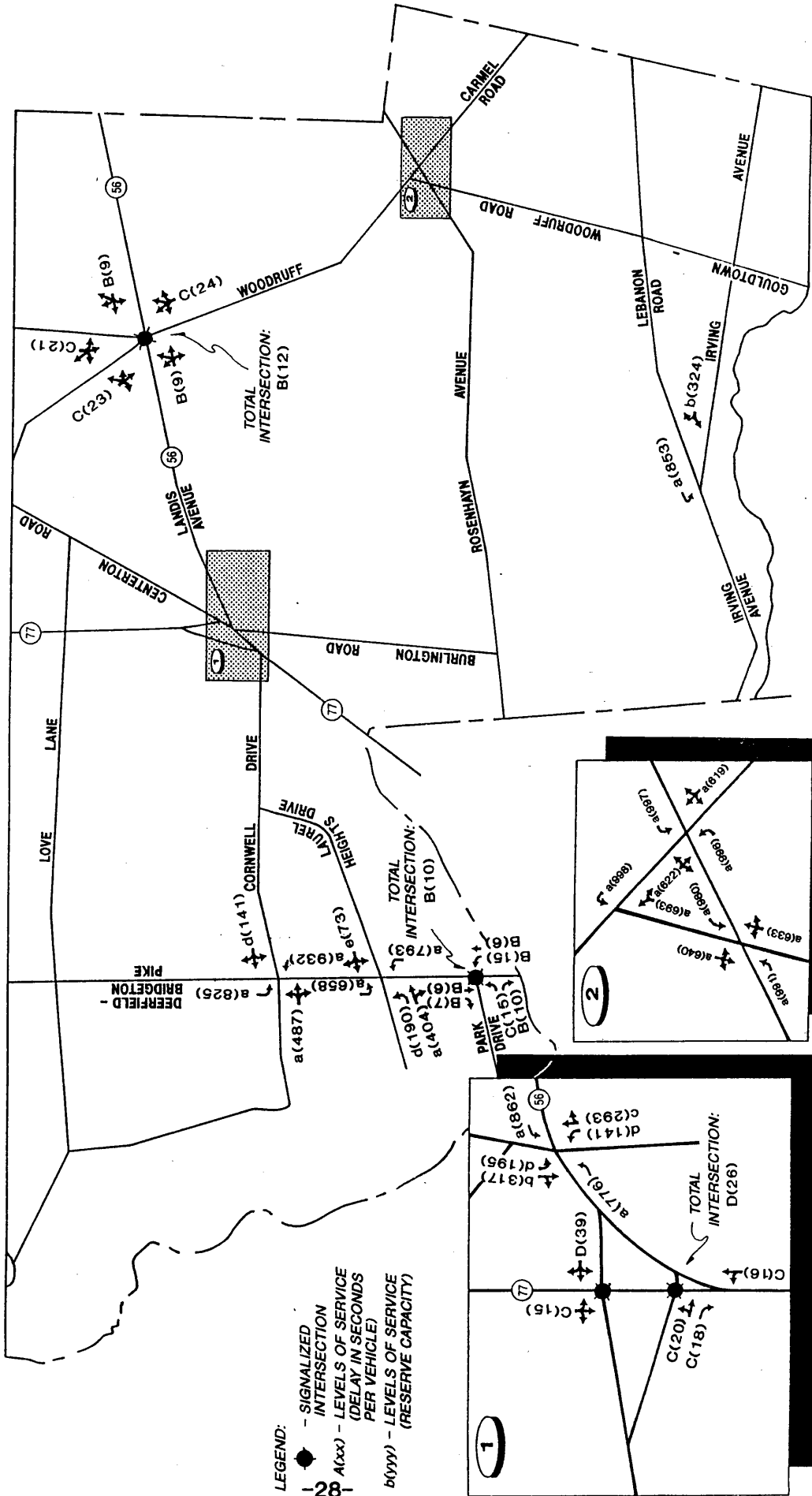


LEGEND:  
 ◆ - SIGNALIZED INTERSECTION  
 A(xx) - LEVELS OF SERVICE (DELAY IN SECONDS PER VEHICLE)  
 b(yyy) - LEVELS OF SERVICE (RESERVE CAPACITY)

# Existing Afternoon Peak Hour Levels of Service



Southern Area  
UPPER DEERFIELD TOWNSHIP  
CUMBERLAND COUNTY, NEW JERSEY



LEGEND:  
 - SIGNALIZED INTERSECTION  
 - UN-SIGNALIZED INTERSECTION  
 A(xx) - LEVELS OF SERVICE (DELAY IN SECONDS PER VEHICLE)  
 b(yyy) - LEVELS OF SERVICE (RESERVE CAPACITY)

- Deerfield Pike and Laurel Heights Drive (LOS 'e')
- Deerfield Pike and Cornwell Drive (LOS 'd')
- N. J. Route 77, N. J. Route 56 and Cornwell Drive (LOS 'D')
- N. J. Route 56 and Centerton Road (LOS 'e')
- N. J. Route 56, Woodruff Road and Centerton-Woodruff Road ('D' for northbound and southbound approaches of Woodruff Road)

These intersections require further study to identify immediate action improvements.

Finally, no intersections operated at overall Level of Service 'C'.

## IMMEDIATE ACTION PROGRAM

The following locations within Upper Deerfield Township represent existing traffic problems that require immediate attention and can be improved by actions that can be implemented in the short or near term. These locations are listed below:

- Deerfield Pike corridor from Park Avenue to Cornwell Drive
- N. J. Route 56 and Centerton Road
- N. J. Route 56, Woodruff Road (C.R. 553), and Centerton-Woodruff Road (C.R. 687)
- N. J. Route 77 and N. J. Route 56

This section will address the specific problems uncovered in the analysis and recommend immediate action solutions.

### Deerfield Pike Corridor from Park Avenue to Cornwell Drive

As previously noted in the afternoon peak period, the westbound Laurel Heights Drive approach to Deerfield Pike operates at Level of Service 'e' and the eastbound approach from the office complex operates at Level of Service 'd'. Field observations indicate significant conflicts occur between Laurel Heights Drive traffic and southbound Deerfield Pike traffic.

In the afternoon peak period, the westbound Cornwell Drive approach to Deerfield Pike operates at Level of Service 'd'. Field observations indicate significant backups on this approach, as many as 12 vehicles at a time.

Analysis of the afternoon peak hour traffic volumes indicate a traffic signal is warranted at both locations. This analysis involved the use of the Manual on Uniform Traffic Control Devices (MUTCD) Warrant #11, Peak Hour Volume.

Volume/capacity analyses at these locations indicate all movements would operate at Level of Service 'C' or better assuming traffic signals are installed at the two intersections. Average individual delays would not exceed 18 seconds per vehicle for any movement at either location.

The timing plan at both locations is a two-phase signal with a 60-second cycle length.

Since both intersections warrant traffic signals in the peak hour, we recommend these locations be monitored periodically for signal warrants. We also recommend the first signal be located at Cornwell Drive. A signal at this location may divert traffic from the westbound approach of Laurel Heights Drive to the Cornwell Drive and Deerfield Pike intersection and potentially eliminate the need for a signal at Laurel Heights Drive.

#### **N. J. Route 56, Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R. 687)**

The northbound and southbound approaches of Woodruff Road (C.R. 553) operate at Level of Service 'D' (with delays of 32 and 25 seconds for each approach) during the morning peak period. Signal optimizing can decrease these delays below 25 seconds to a Level of Service 'C'. The signal change would involve taking three seconds of green time from N. J. Route 56 and giving it to Woodruff Road. However, field observations indicate no significant delays or backups at this intersection. It is also unlikely that N.J.DOT would approve this change in timing. The intersection operates at an overall Level of Service 'B' without these signal timing changes. This location should be monitored as development occurs.

### **N. J. Route 56 and Centerton Road**

The northbound and southbound approaches of Centerton Road at N. J. Route 56 operate at Level of Service 'e' and 'd' during the morning and afternoon peak hours, respectively. Field observations indicate congestion and delays for the minor approaches as well as N. J. Route 56 traffic.

Analysis of the morning and evening traffic volumes indicate a traffic signal is warranted at this intersection. This analysis involved the use of both Warrant #11, Peak Hour Volume, and Warrant #9, Four Hour Volume, from the MUTCD.

Volume/capacity analyses assuming a traffic signal at this location, indicate all movements would operate at Level of Service 'B' or better. Average individual delays would not exceed 15 seconds per vehicle for any movement.

### **N. J. Route 77, N.J. Route 56 and Cornwell Drive**

This intersection operates at Level of Service 'D' during the afternoon peak hour. Field observations indicate this intersection is characterized by large traffic volumes and some congestion. Significant congestion and back-ups occur on the westbound N.J. Route 56 approach.

Potential immediate action improvements at this location include restriping the westbound N.J. Route 56 approach to provide for two lanes -- a separate left-turn lane and a shared through and right-turn lane. Volume/capacity analyses, assuming this improvement, indicate all movements would operate at Level of Service 'C' or better. Average individual delays would not exceed 23 seconds per vehicle for any movement.



## POTENTIAL N.J.DOT IMPROVEMENTS

The N.J.DOT is currently in the Final Design phase for improvements to the N. J. Route 77 and 56 corridors. The improvement plan includes the following:

- N. J. Route 77, N. J. Route 56 and Cornwell Drive
  - realign eastbound and westbound approaches
  - provide four lanes for northbound and southbound N. J. Route 77 approaches including separate left- and right-turn lanes and two through travel lanes per direction.
  - provide three lanes for eastbound Cornwell Drive approach including separate left-, through- and right-turn lanes.
  - provide three lanes for westbound N. J. Route 56 approach including dual left-turn lanes and a shared through and right-turn lane.
  
- N. J. Route 56 and Centerton Road
  - provide two lanes for northbound and southbound Centerton Road approaches including a separate left-turn lane and a shared through and right-turn lane
  - provide two through travel lanes for eastbound N. J. Route 56 with a channelized right-turn (left-turns restricted)
  - provide three lanes for westbound N. J. Route 56 including separate left, through and right-turn lanes.

This plan also includes a connector road between Centerton Road and N. J. Route 77. The connector would form a four-leg intersection at N. J. Route 77 opposite Northwest Avenue and a 'T'-intersection at Centerton Road. Both new intersections are proposed to be signalized. Old Burlington Road is to be realigned further north on Centerton Road and provide a cul-de-sac near N. J. Route 77.

The connector road would divert volumes from the N. J. Route 56 and Centerton Road intersection. The eastbound left-turns to northbound Centerton Road (proposed restriction) will use the connector. The southbound right-turn to westbound N. J. Route 56 may also decrease in volume due to the connector road.

As presently mentioned, the plans are currently in the Final Design phase. Construction will not begin prior to 1993 due to funding. If the construction is delayed significantly beyond 1993, the immediate action improvements discussed at N. J. Route 77, N. J. Route 56 and Cornwell Drive and at N. J. Route 56 and Centerton Road should be implemented. The improvements include signalizing N. J. Route 56 and Centerton Road and restriping the westbound N. J. Route 56 approach at N. J. Route 77. These improvements would require N.J.DOT approval.

The N.J.DOT and Cumberland County have approved plans to install a traffic signal at the N.J. Route 77 and Silver Lake Road intersection. The improvements will include loop detectors for the Silver Lake approaches. No widening or lane configuration changes are proposed.

## ACCIDENT ANALYSIS

Accident histories for key study area roadways were provided by Cumberland County for analysis as part of the Master Traffic Plan. The histories provided cover a three-year period from January 1, 1985 to December 31, 1987.

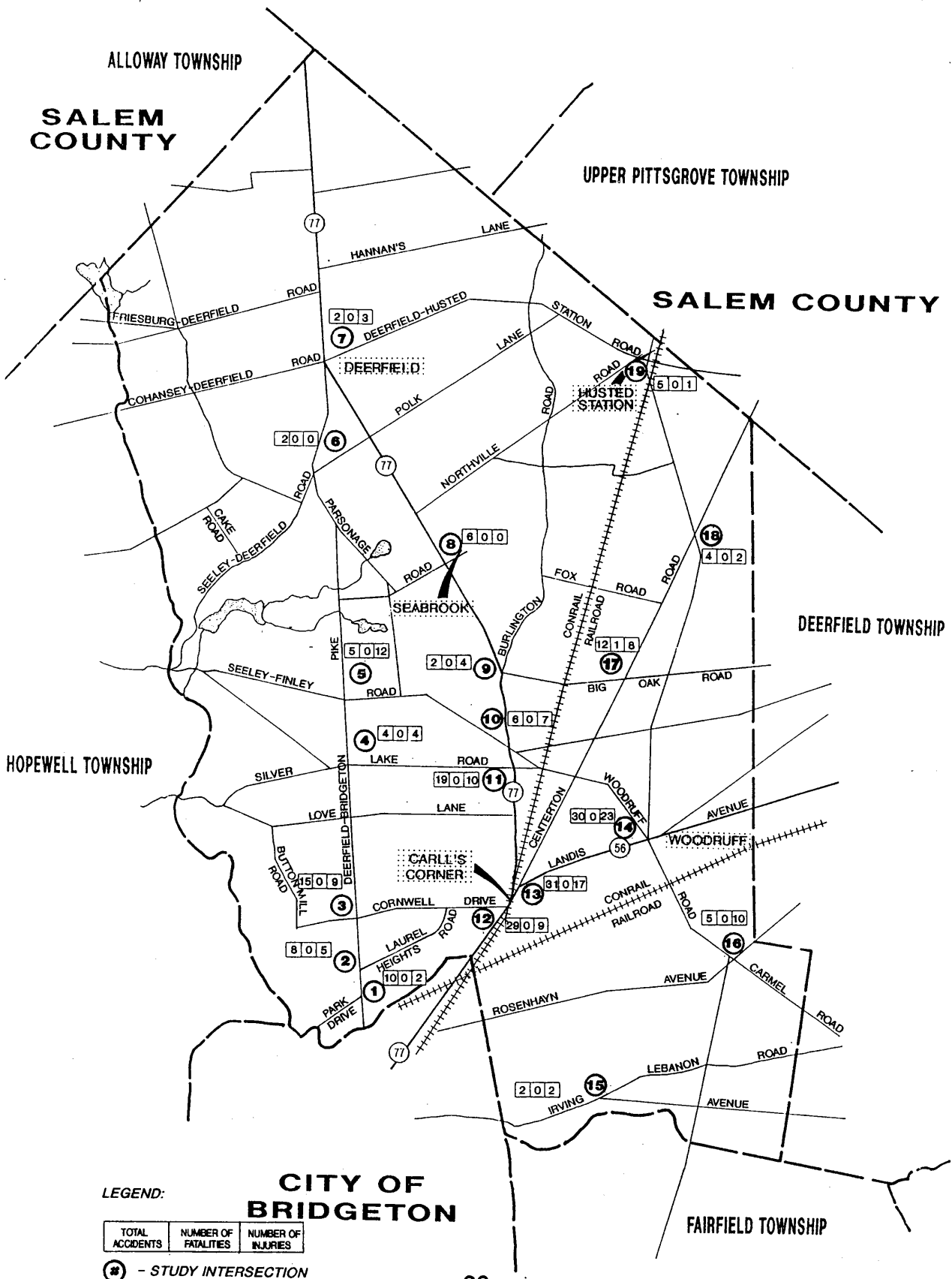
The accidents are classified by number of injuries and fatalities only. No information on type, time of day, day of week, vehicle type or causation factor for each accident was provided. For each of the 19 study area intersections, the number of accidents and number of injuries or fatalities has been recorded. Figure 15 and Table IV illustrate this data by intersection. The five highest total accident intersections are:

1. N. J. Route 56 (Landis Avenue) and Centerton Road (C.R. 611) with 31 accidents;
2. N. J. Route 56 (Landis Avenue), Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R.687) with 30 accidents;
3. N. J. Route 77 and N. J. Route 56 (Landis Avenue) with 29 accidents;
4. N. J. Route 77 and Silver Lake Road (C.R. 704) with 19 accidents; and
5. Deerfield Pike (C.R. 606) and Cornwell Drive (C.R. 622) with 15 accidents.

A total of 197 accidents occurred at the study area intersections which included 128 injuries and one fatality. The fatality occurred at Centerton Road (C.R. 553) and Big Oak Road (C.R. 658).

# Study Intersection Accidents -- 1985 to 1987

UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



LEGEND:

TOTAL ACCIDENTS	NUMBER OF FATALITIES	NUMBER OF INJURIES
203	7	200
3	0	5
15	0	9
4	0	4
5	0	12
2	0	3
8	0	0
2	0	4
8	0	7
19	0	10
29	0	9
31	0	17
30	0	23
2	0	2
5	0	10
12	1	8
4	0	2
5	0	1

# - STUDY INTERSECTION

**TABLE IV**  
**STUDY INTERSECTION ACCIDENT TABULATION**  
**UPPER DEERFIELD TOWNSHIP, N. J.**

<u>Intersection Number</u>	<u>Intersection</u>	<u>Total Number of Accidents</u>	<u>Number of Fatalities</u>	<u>Number of Injuries</u>
1	Deerfield Pike (C.R. 606) and Park Drive (C.R. 621)	10	0	2
2	Deerfield Pike (C.R. 606) and Laurel Heights (C.R. 662)	8	0	5
3	Deerfield Pike (C.R. 606) and Cornwell Drive (C.R. 622)	15	0	9
4	Deerfield Pike (C.R. 606) and Silver Lake Road (C.R. 704)	4	0	4
5	Deerfield Pike (C.R. 606) and Seeley-Finley Road (C.R. 617)	5	0	12
6	Seeley-Deerfield Road (C.R.612) and Parsonage Road (C.R.630)	2	0	0
7	N. J. Route 77 and Cohansey-Deerfield Road (C.R. 540)	2	0	3
8	N. J. Route 77 and Parsonage Road (C.R. 743)	6	0	0
9	N. J. Route 77 and Big Oak Road (C.R. 658)	2	0	4
10	N. J. Route 77 and Seeley-Finley Road (C.R. 617)	6	0	7
11	N. J. Route 77 and Silver Lake Road (C.R. 704)	19	0	10
12	N. J. Route 77 and N. J. Route 56 (Landis Avenue)	29	0	9
13	N. J. Route 56 (Landis Avenue) and Centerton Road (C.R. 611)	31	0	17
14	N. J. Route 56 (Landis Avenue), Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R.687)	30	0	23
15	Irving Avenue (C.R. 552) and Lebanon Road (C.R. 654)	2	0	2
16	Woodruff Road (C.R. 553), Rosenhayn Avenue (C.R. 659) and Carmel Road (C.R. 705)	5	0	10
17	Centerton Road (C.R. 553) and Big Oak Road (C.R. 658)	12	1	8
18	Centerton Road (C.R. 553) and Woodruff Road/Husted Station (C.R. 687)	4	0	2
19	Deerfield-Husted Station Road (C.R. 540), Husted Station (C.R. 687) and Northville Road (C.R. 711)	<u>5</u>	<u>0</u>	<u>1</u>
		197	1	128

It is not possible to discern which accidents are correctable and which are due to driver error. However, several of the five highest total accident locations have proposed improvements planned by the New Jersey Department of Transportation (N.J.DOT) and Cumberland County. The N.J.DOT is currently in the Final Design phase for improvements to the N. J. Route 77 and 56 corridors from Cornwell Drive to Centerton Road. The County also has approved a traffic signal for the N. J. Route 77 and Silver Lake Road (C.R. 704) intersection. The Immediate Action Program recommends a traffic signal at the Deerfield Pike (C.R. 606) and Cornwell Drive (C.R. 622) intersection. The N. J. Route 56 (Landis Avenue), Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R. 687) intersection has been signalized since this data was collected. There is no accident data available after the traffic signal was installed. These proposed and recommended improvements may decrease accidents at these locations and would address 63 percent of the accidents surveyed.

## SCHOOL BUS TRAFFIC

School bus route information has been provided by the Upper Deerfield Township School District (grades K-8) and the Cumberland Regional High School (grades 9-12). The school bus route information provided is for the 1990-1991 school year. The following is a short summary of the elementary school and high school bus routing.

### Township School District

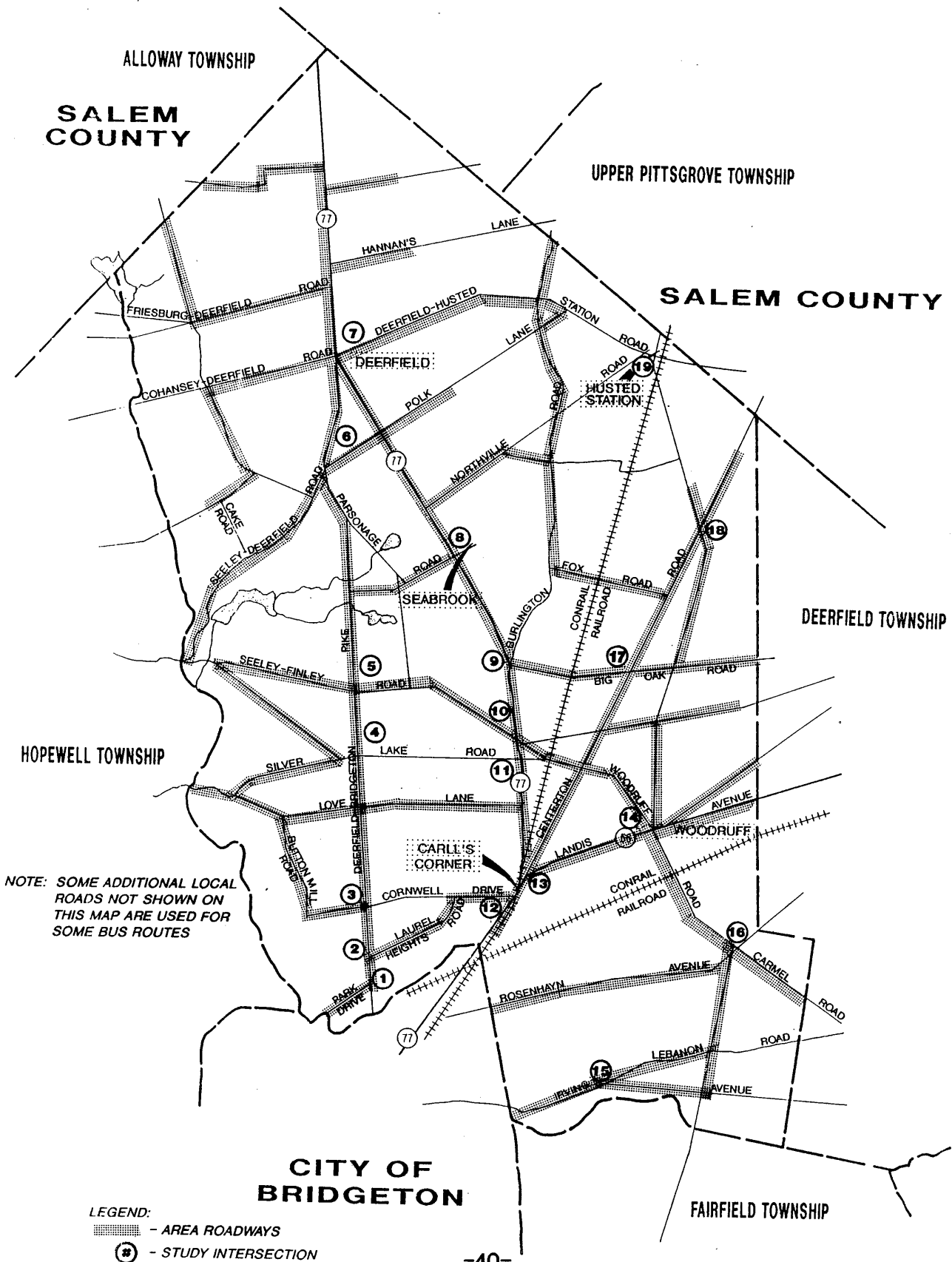
There are a total of 22 school bus routes for the Township School District. Of these 22 routes, 19 are for grades 1-8. The three other routes are for the kindergarten with one being a route to the school (P.M.) and two being routes home from school (A.M.).

Area roadways used for the school bus routes are illustrated in Figure 16. The figure indicates the majority of major roads in the Township and 18 of the 19 study intersections are used by the school buses.

### Cumberland Regional High School

There are a total of 33 school bus routes for the Cumberland Regional High School. Eight of these school bus routes are entirely within Upper Deerfield Township and two of the eight routes have only one stop. Ten school bus routes have stops in other townships as well as Upper Deerfield Township. The other 15 school bus routes have stops only in other townships. The earliest pickup within Upper Deerfield Township occurs at 6:45 A.M. while all arrivals to the school occur at about 7:35 A.M.

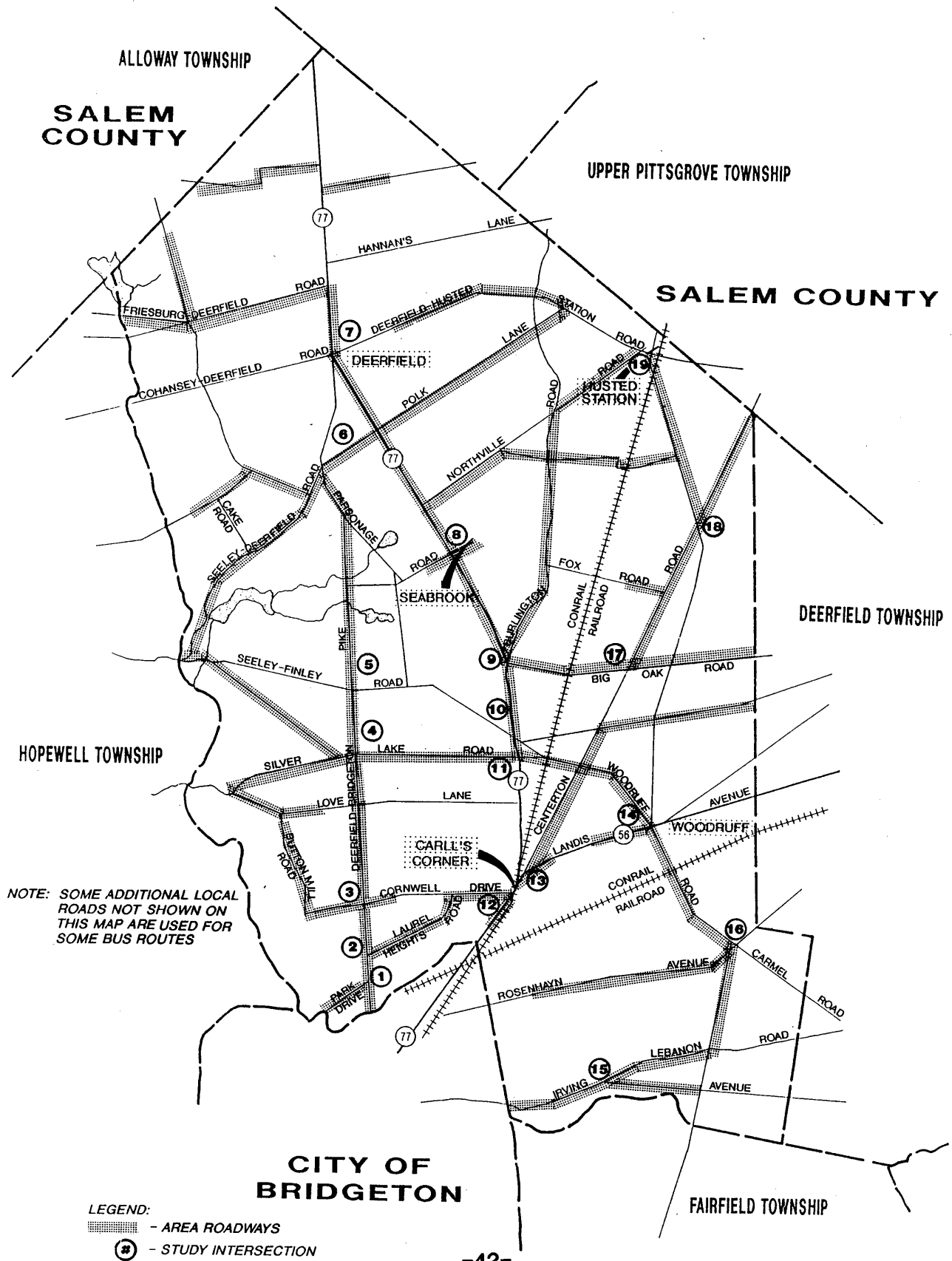
**Area Roadways Used By Township School District Bus Routes -- Year 1990 - 1991**  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY





Area roadways used for the high school bus routes are illustrated in Figure 17. The figure indicates the majority of major roads in the Township and all 19 study intersections are used by the school buses.

**Area Roadways Used By Cumberland Regional School District Bus Routes -- Year 1990 - 1991**  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



NOTE: SOME ADDITIONAL LOCAL ROADS NOT SHOWN ON THIS MAP ARE USED FOR SOME BUS ROUTES

LEGEND:  
 [Hatched Line] - AREA ROADWAYS  
 [Circled Number] - STUDY INTERSECTION

## TRAFFIC CONDITIONS AT CUMBERLAND REGIONAL HIGH SCHOOL

To better understand traffic conditions at Cumberland Regional High School, traffic count data was collected over a longer duration at the intersection of N. J. Route 77 and Silver Lake Road and Deerfield Pike and Silver Lake Road. At both intersections, the afternoon traffic count period was extended for an additional two hours encompassing the school exiting peak period from 2:00 P.M. to 6:00 P.M.

Figures 18 and 19 illustrate traffic volumes (total) and school bus volumes at the intersections of N. J. Route 77 and Silver Lake Road and Deerfield Pike and Silver Lake Road, respectively. As shown, total intersection traffic volumes remain relatively constant at N. J. Route 77 and Silver Lake Road between 2:30 P.M. and 5:15 P.M., ranging from 155 vehicles to 180 vehicles per each 15 minute period. There are three distinct 15 minute periods where sharp increases to over 200 vehicles occur -- 2:45 P.M. to 3:00 P.M. which is a school peak and during the evening commuter peak, from 4:30 P.M. to 4:45 P.M. and from 5:30 P.M. to 5:45 P.M. A detailed volume capacity analysis was conducted for the school peak which extends from 2:30 P.M. to 3:30 P.M. and the results revealed Level of Service 'b' conditions as in the commuter peak periods.

At the intersection of Deerfield Pike and Silver Lake Road, total intersection traffic volumes ranged from about 100 vehicles to 147 vehicles for each 15 minute period between 2:30 P.M. and 5:45 P.M. The highest 15 minute period at this intersection occurs between 2:45 P.M. and 3:00 P.M. -- the school peak. The evening commuter peak 15 minute period of 131 vehicles occurs at 4:30 P.M. However, at this intersection the traffic volumes between the school peak and the evening commuter peak are relatively constant, averaging around 130 vehicles. A volume/capacity analysis was completed for the school peak which extends from 2:30 P.M. to 3:30 P.M. and the results revealed Level of Service 'a' conditions.

Regarding the school buses at the intersections, the peak 15-minute period occurs at 2:45 P.M. with 22 buses at the N. J. Route 77 and Silver Lake Road intersection and 18 school buses at the Deerfield Pike and Silver Lake Road intersection.

FIGURE 18

# AFTERNOON TRAFFIC VOLUMES

## NJ Route 77 and Silver Lake Road

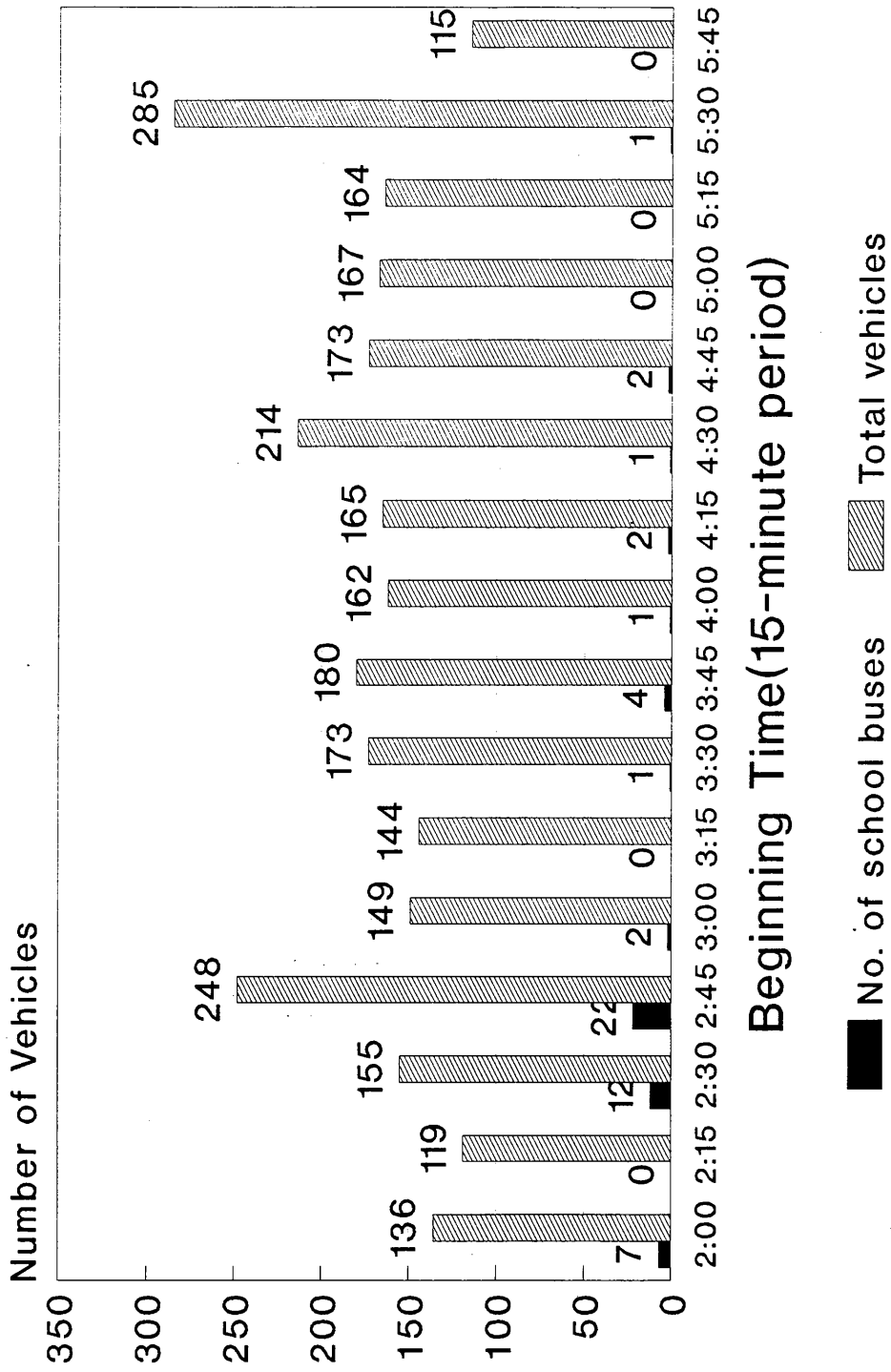
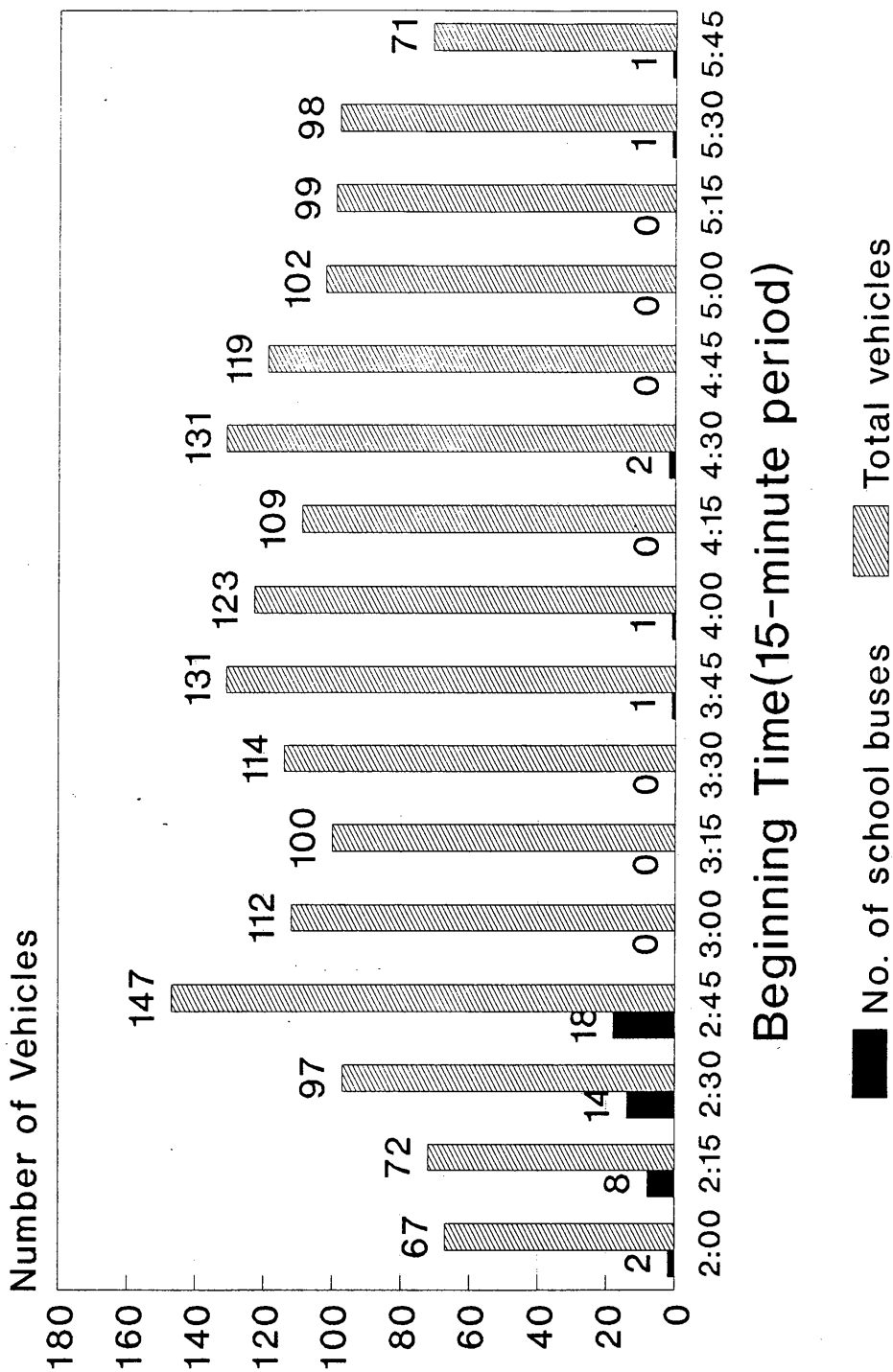


FIGURE 19

# AFTERNOON TRAFFIC VOLUMES

## Deerfield Pike and Silver Lake Road



## FUTURE GROWTH AND DEVELOPMENT

It is clear that the roadway network serving Upper Deerfield Township and other adjacent and nearby communities will be subjected to increasing traffic loads as the area continues to grow and develop. It is also evident that N. J. Route 77, N. J. Route 56 and Deerfield Pike as arterial roadways serving Upper Deerfield Township will have to serve a major portion of this increased traffic demand.

In order to develop a traffic plan that will not only alleviate existing capacity within the area but will also address future conditions, it was necessary to select a future target year. In this instance, the year 2000, which represents a 10-year horizon period, was chosen.

Such a date provides some reasonable lead time for implementation of a recommended improvement program and it is also a date by which much of the projected development within the study area could be expected to occur. However, even if certain projected developments should not be completed until beyond the 2000 target year, it is clear that sooner or later the existing roadway system in Upper Deerfield Township will have to carry the bulk of the generated traffic burden, and the traffic plan needs to provide enough flexibility to accommodate the increased volumes.

### Background Growth

Traffic demand along the roads and highways in Upper Deerfield Township will increase over the next ten years even if there were no substantial new developments in the Township itself. Traffic from new homes, offices, commercial and

industrial activities in adjacent and nearby communities will pass through Upper Deerfield -- particularly along such major routes as N. J. Route 77, N.J. Route 56 and Deerfield Pike.

Review of historical data obtained from Cumberland County indicates that a 'background growth' of 10% represents a reasonable estimate for the future 10-year target period -- i.e., an annual rate of about one percent. Again, this rate does not account for major new development within the Township. That traffic impact has been estimated separately and is discussed in more detail below.

### **Future Development**

In addition to 'background' or regional growth, substantial new development is projected to occur within Upper Deerfield Township and adjacent townships over the next several years.

The Township identified land for potential development in Upper Deerfield Township which could occur over the next several years. Information on land usage and potential development was provided by Upper Deerfield Township based on the number of dwelling units for residential and agricultural zoned areas and acreage for business and industrial zoned area. The business and industrial areas also provided more specific details on the actual land use such as banks, offices, retail, warehouse, industrial plant/factory, recreation, medical/hospital, planned unit development, etc.

A trip generation analysis was performed to determine the volume of traffic that might be generated by various future developments in the course of a typical weekday -- during the morning peak traffic hour (usually occurring between 7:00 A.M. and 9:00 A.M.) and the evening peak hour (usually occurring between 4:00 P.M. and 6:00 P.M.).



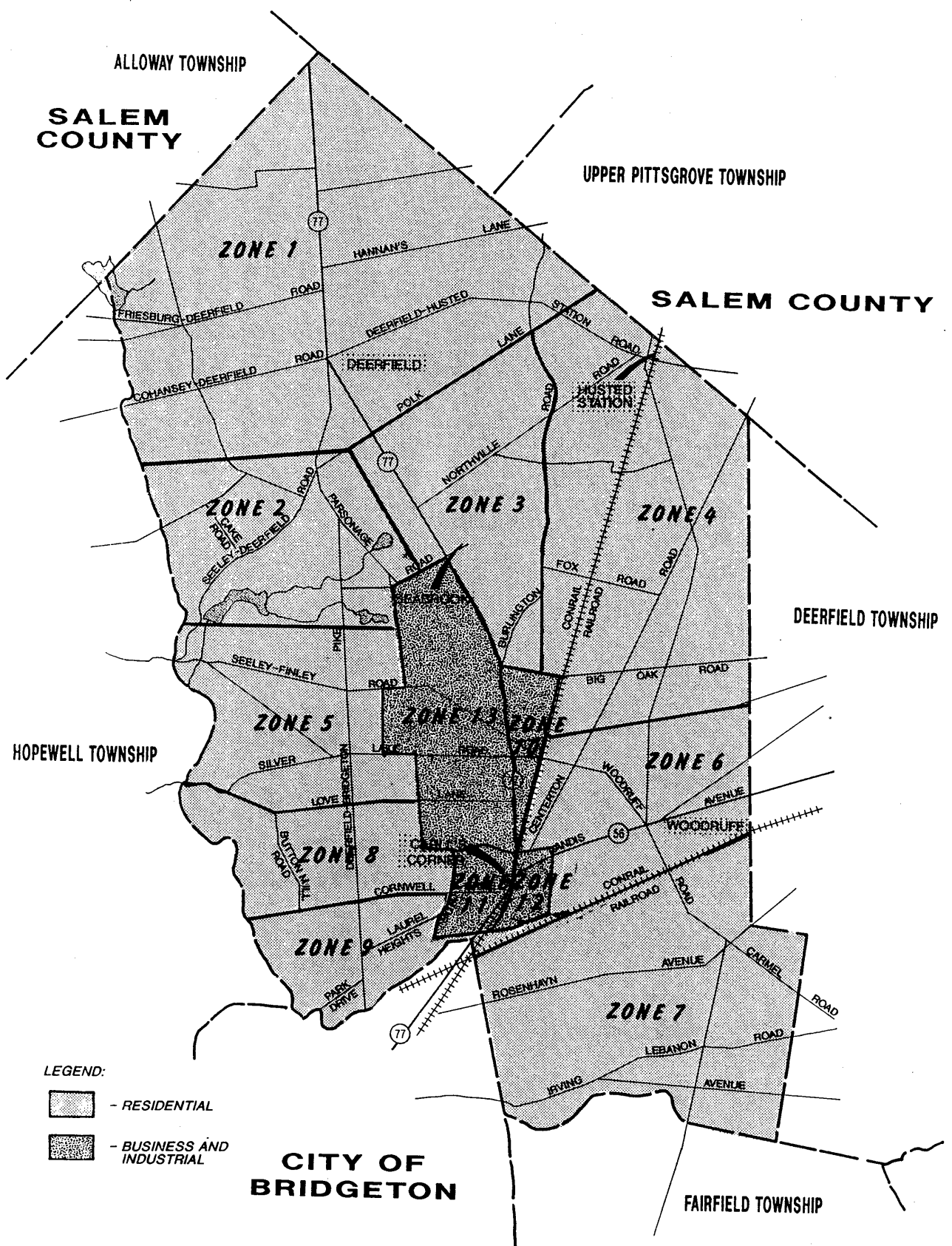
Trip generation typically relates anticipated traffic demand (vehicles in and out) to dwelling units, floor space (square footage) or acreage. The publication, Trip Generation, An Institute of Transportation Engineers (ITE) Informational Report (Fifth Edition, Revised 1991), summarizes the results from a compilation and statistical analysis of numerous traffic studies conducted at various locations throughout the country and presents suggested trip generation rates for various types of land uses. The suggested trip generation rates from the ITE publication were applied to various future land developments in Upper Deerfield Township including all of the residential and agricultural zoned areas (dwelling units) and the business and industrial zoned areas (acreage) where available. The trip generation manual does not suggest trip rates using acres for several of the specific uses projected for business and industrial zoned areas.

For these uses, trip rates were applied using information provided in the publication, Transportation and Land Development, published by ITE (1988). Applying the suggested rates from these two publications for the future land developments results in estimates of daily morning peak hour and evening peak hour traffic.

For analysis purposes, the future land developments were clustered into 13 development zones as illustrated in Figure 20. Table V lists the residential projections for zones 1 to 9 and provides estimates of traffic to be generated in each zone. Table VI lists the business and industrial projections for zones 10 to 13 and provides estimates of traffic to be generated in each zone. Table VII summarizes the trip generation for residential and business/industrial uses. As indicated, it is estimated that the possible new developments could generate a total of almost 88,600 trips on a typical weekday -- 44,300 trips 'in' and 44,300 trips 'out'. During the morning peak hour a total of about 7,550 trips are expected to be generated while the evening peak hour is expected to generate about 10,200 trips (35% more trips than expected in the morning peak). The residential use represents about 28 percent and the business/industrial use represents about 72 percent of the peak hour and daily trips.

# Land Development Zones

UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



**LEGEND:**



-  - RESIDENTIAL
-  - BUSINESS AND INDUSTRIAL

TABLE V  
TRIP GENERATION BY ZONE  
RESIDENTIAL PROJECTIONS

	A.M. PEAK HOUR			P.M. PEAK HOUR			DAILY
	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL	
ZONE 1 319 SFU	55	165	220	200	105	305	3005
ZONE 2 47 SFU	10	30	40	35	20	55	515
ZONE 3 154 SFU	30	85	115	105	55	160	1535
ZONE 4 261 SFU	50	135	185	165	90	255	2500
ZONE 5 323 SFU	60	165	225	200	110	310	3040
ZONE 6 543 SFU	90	260	350	320	175	495	4900
ZONE 7 230 SFU	45	120	165	150	80	230	2225
57 SFU	5	30	35	25	15	40	405
	50	150	200	175	95	270	2630
ZONE 8 702 SFU	115	320	435	405	220	625	6210
	5	30	35	25	15	40	400
	30	15	45	35	20	55	525
	150	365	515	465	255	720	7135
ZONE 9 172 SFU	35	95	130	115	60	175	1700
61 THU	5	30	35	25	15	40	430
147 AU	50	25	75	60	30	90	915
	90	150	240	200	105	305	3045
TOTAL TRIPS	585	1505	2090	1865	1010	2875	28305

TABLE VI  
TRIP GENERATION BY ZONE  
BUSINESS AND INDUSTRY PROJECTIONS

	A.M. PEAK HOUR			P.M. PEAK HOUR			DAILY
	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL	
B-1 ZONE (ZONE 10)							
GROUP I 22.5 Acres	20	5	25	5	15	20	190
GROUP II 22.5 Acres	75	15	90	15	75	90	640
B-2 ZONE (ZONE 11)							
GROUP I 10.0 Acres	25	20	45	75	80	155	1300
GROUP II 30.0 Acres	105	15	120	15	90	105	500
G-1 ZONE (ZONE 12 (13%) & ZONE 13 (87%))							
GROUP I 229.0 Acres	1475	945	2420	1075	1770	2845	26550
GROUP II 174.0 Acres	955	140	1095	110	935	1045	5910
GROUP III 55.0 Acres	330	240	570	745	875	1620	13140
<hr/>							
B-1 Subtotal	95	20	115	20	90	110	830
B-2 Subtotal	130	35	165	90	170	260	1800
G-1 Subtotal							
Zone 12	360	175	535	250	465	715	5930
Zone 13	2400	1150	3550	1680	3115	4795	39670
TOTAL TRIPS	2985	1380	4365	2040	3840	5880	48230

NOTE: 20% reduction of trips due to pass-by and internalization

TABLE VII  
TRIP GENERATION BY ZONE  
PROJECTIONS  
FOR  
UPPER DEERFIELD TOWNSHIP

	A.M. PEAK HOUR			P.M. PEAK HOUR			DAILY
	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL	
<b>RESIDENTIAL</b>							
2751 SFU	490	1375	1865	1695	915	2610	25630
174 THU	15	90	105	75	45	120	1235
232 AU	80	40	120	95	50	145	1440
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3157 UNITS	585	1505	2090	1865	1010	2875	28305
<b>BUSINESS AND INDUSTRIAL</b>							
<b>B-1 ZONE</b>							
45.0 Acres	95	20	115	20	90	110	830
<b>B-2 ZONE</b>							
40.0 Acres	130	35	165	90	170	260	1800
<b>G-1 ZONE</b>							
458.0 Acres	2760	1325	4085	1930	3580	5510	45600
-----	-----	-----	-----	-----	-----	-----	-----
543.0 Acres	2985	1380	4365	2040	3840	5880	48230
<b>TOTAL TRIPS</b> (3157 Units, 543 Acres)	3570	2885	6455	3905	4850	8755	76535

NOTE: Business and Industrial trips include 20% reduction to account for pass-by and internalization. Internalization of trips represent trips that originate in but do not leave the Township.

Traffic generated by the various new developments will, of course, use different routes in travelling to and from each particular site depending upon several factors including:

- the location of the specific developments within the Township;
- the configuration of the area roadway network; and,
- the general traffic conditions.

Consideration of these factors has resulted in the trip distribution pattern as illustrated in Figure 21 and summarized below:

<u>Direction</u>	<u>Distribution of Traffic (%)</u>
To/from east	36%
To/from west	15%
To/from north	15%
To/from south	<u>34%</u>
	100%

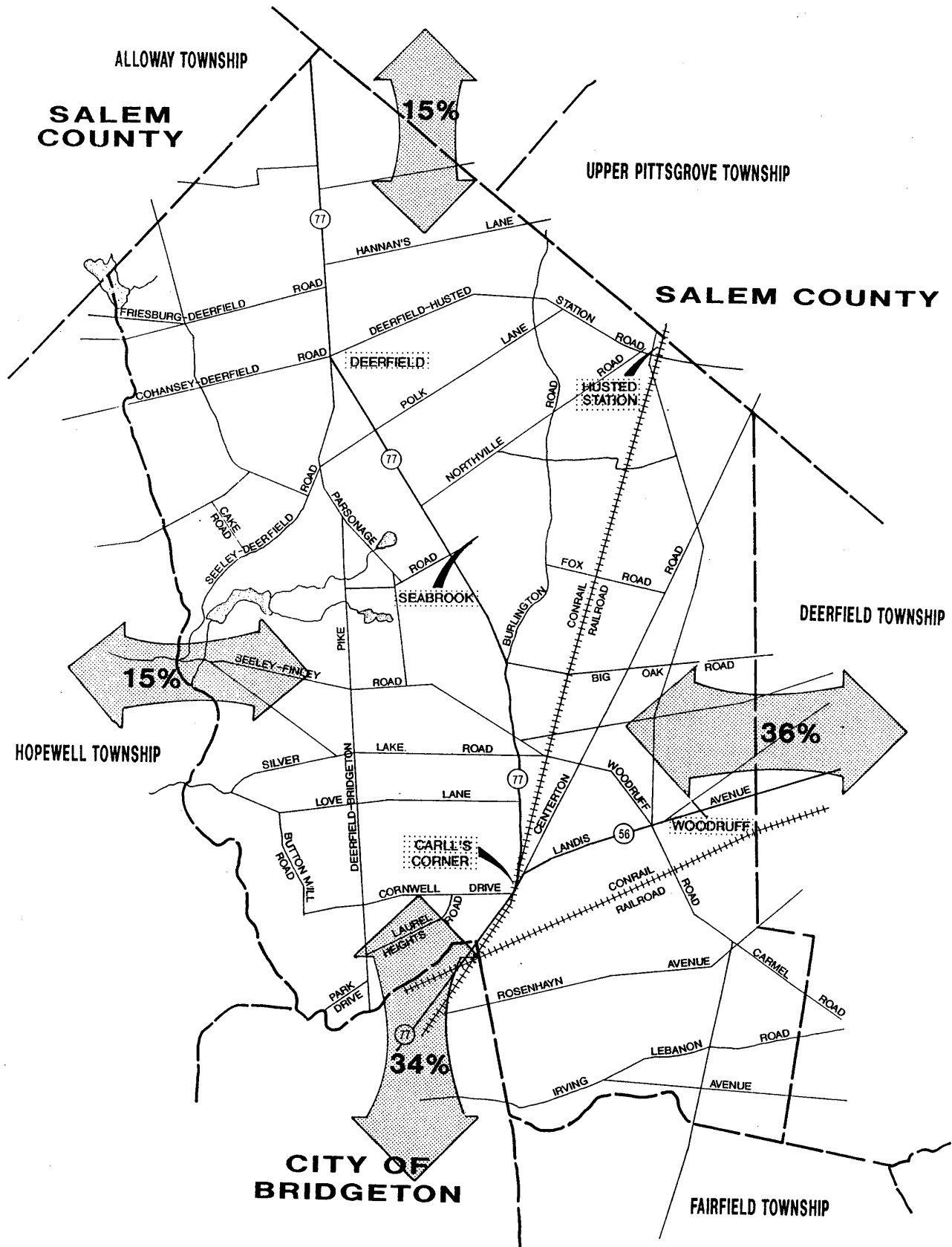
### Future Traffic Volumes

Projected morning and evening peak hour traffic volumes (i.e., present traffic plus 10% background growth plus development-generated traffic) on the Township's roadway network are illustrated in Figures 22 through 27. As might be expected, traffic volumes in the Township are projected to increase significantly over present levels. Tables VIII and IX illustrate a comparison of the existing and future total intersection volumes for the morning and evening peak hours, respectively, for all study intersections. Also included in the table is a percentage change in volumes over the ten-year analysis period. On the average, morning peak hour volumes are expected to increase by 173% throughout the Township -- with about 163% being strictly new development traffic, while the evening peak hour volumes are expected to increase by 154% -- with about 144% being new development traffic.

# Township Wide Distribution

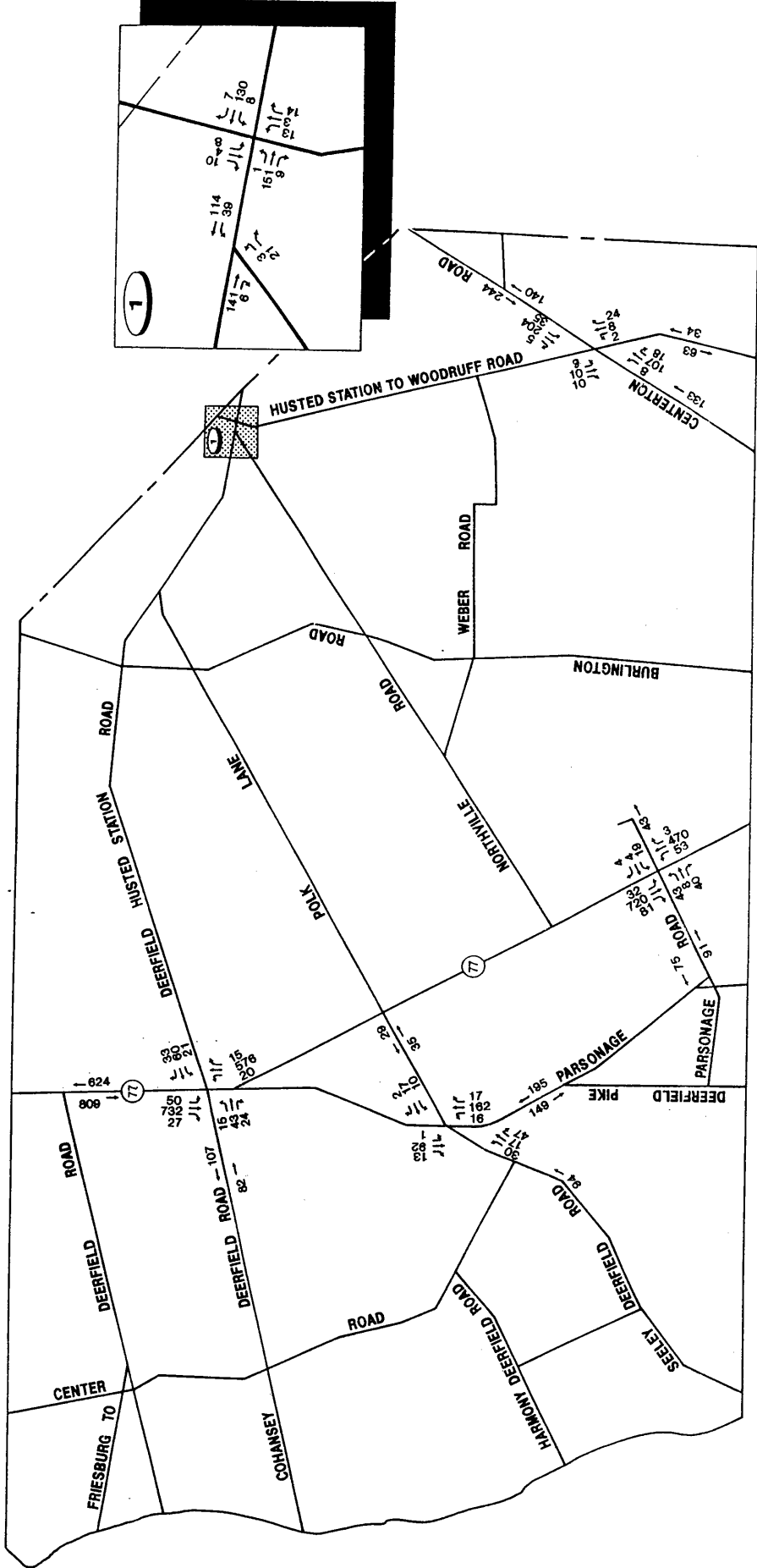
## Estimated Distribution of Development Generated Traffic

UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



# Future 2000 Morning Peak Hour Traffic Volumes

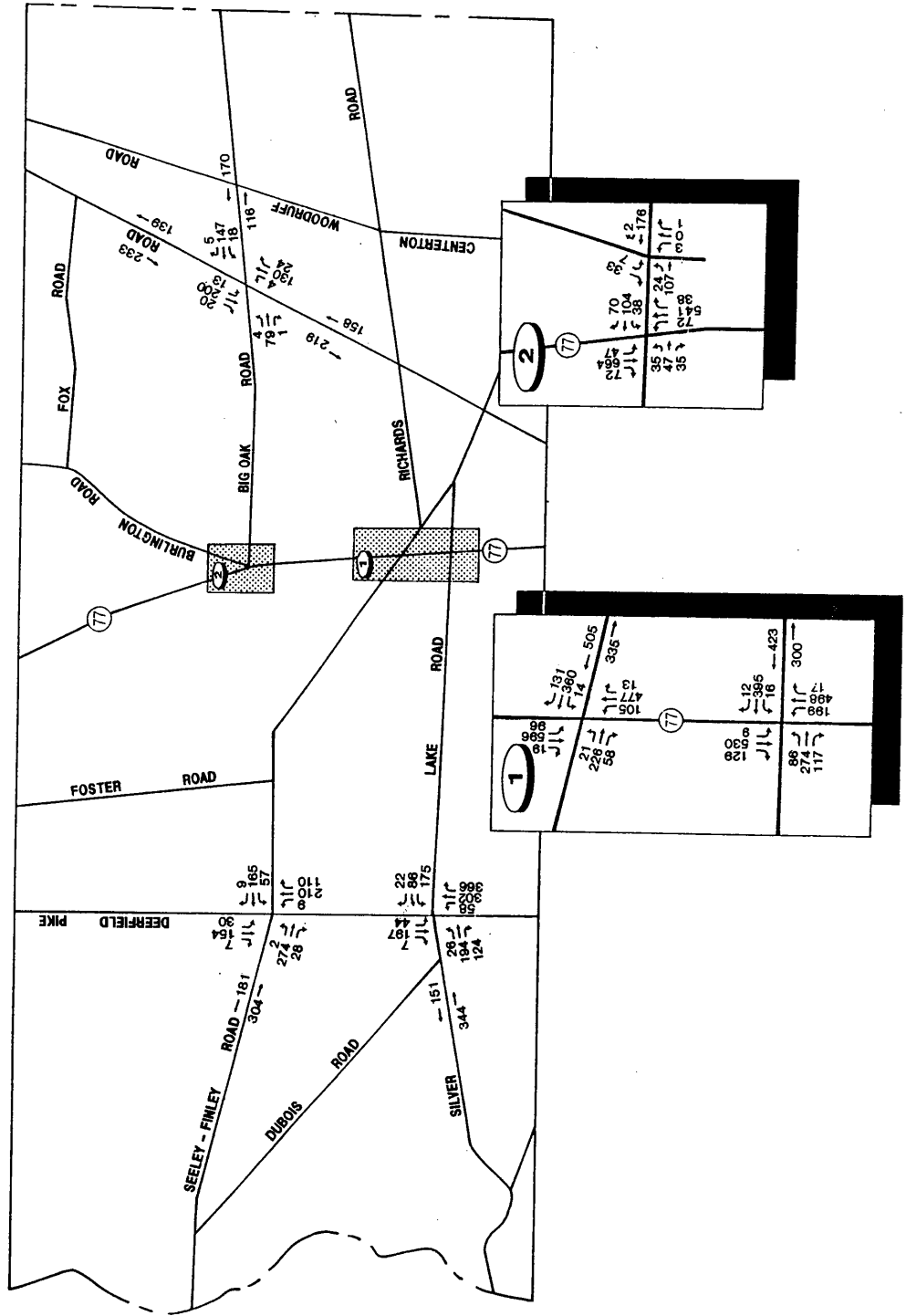
Northern Area  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY





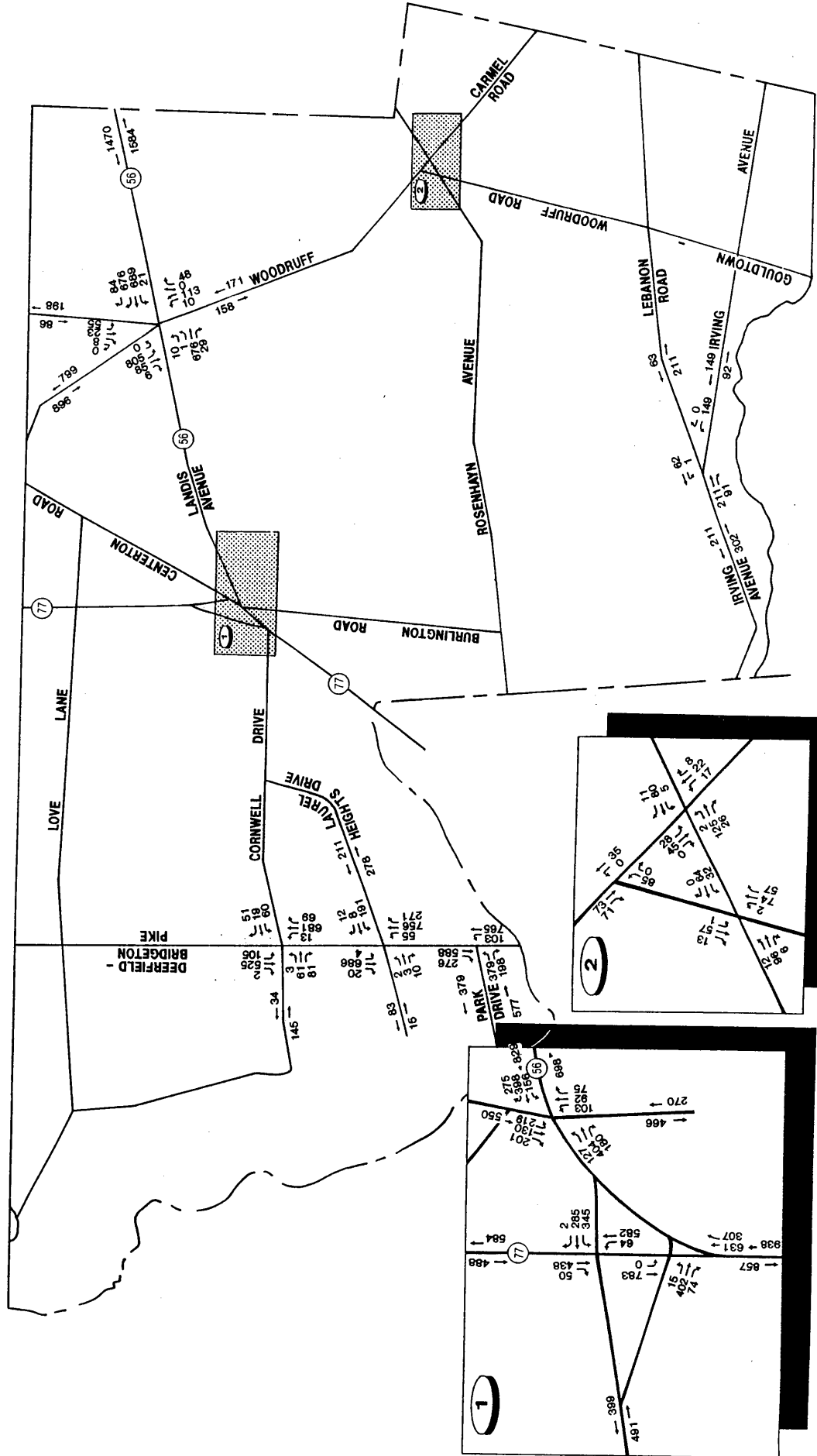
# Future 2000 Morning Peak Hour Traffic Volumes

Central Area  
UPPER DEERFIELD TOWNSHIP  
CUMBERLAND COUNTY, NEW JERSEY



# Future 2000 Morning Peak Hour Traffic Volumes

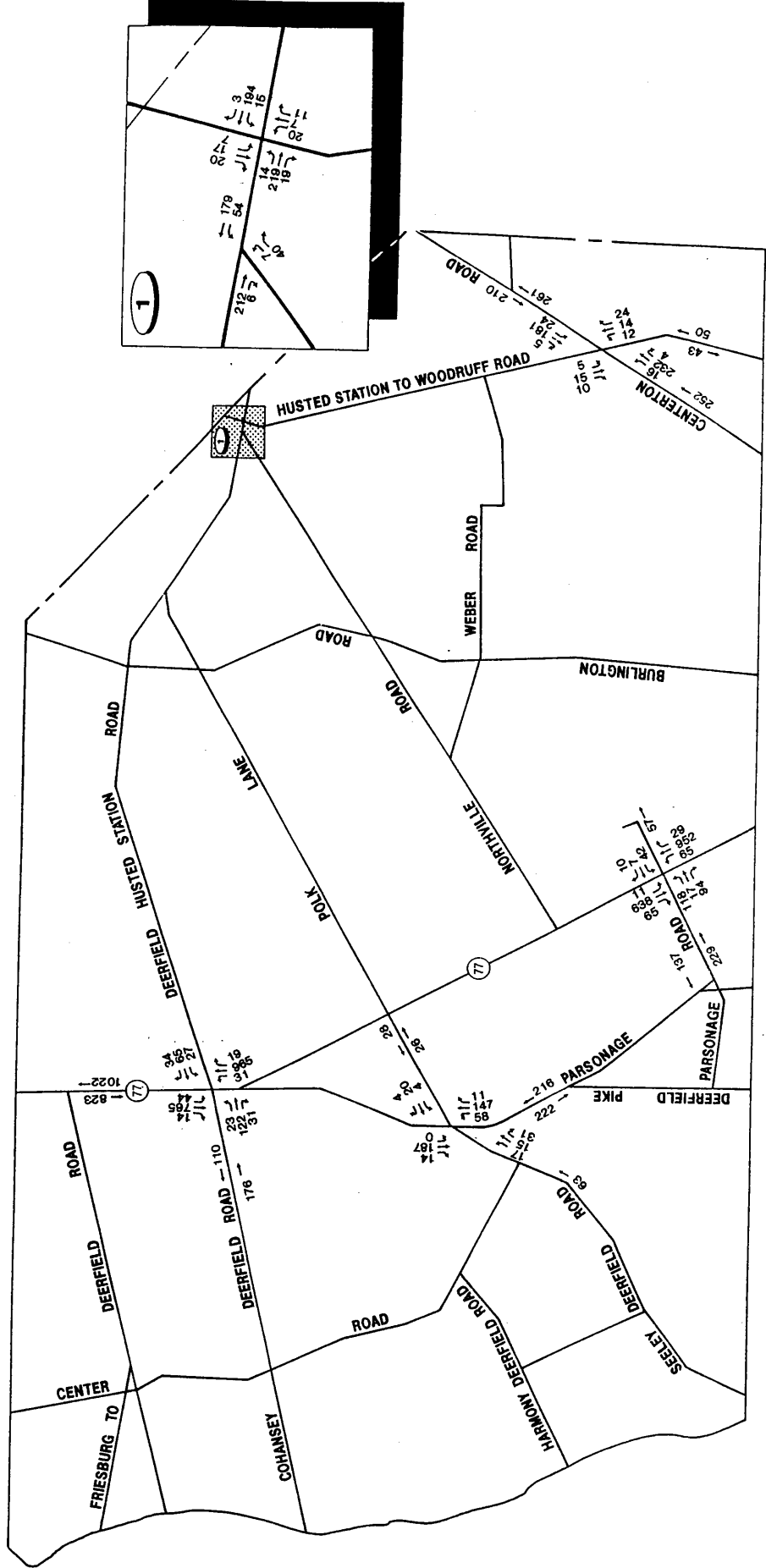
Southern Area  
UPPER DEERFIELD TOWNSHIP  
CUMBERLAND COUNTY, NEW JERSEY



# Future 2000 Evening Peak Hour Traffic Volumes

Northern Area  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY

FIGURE 25



# Future 2000 Evening Peak Hour Traffic Volumes

Central Area  
 UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY

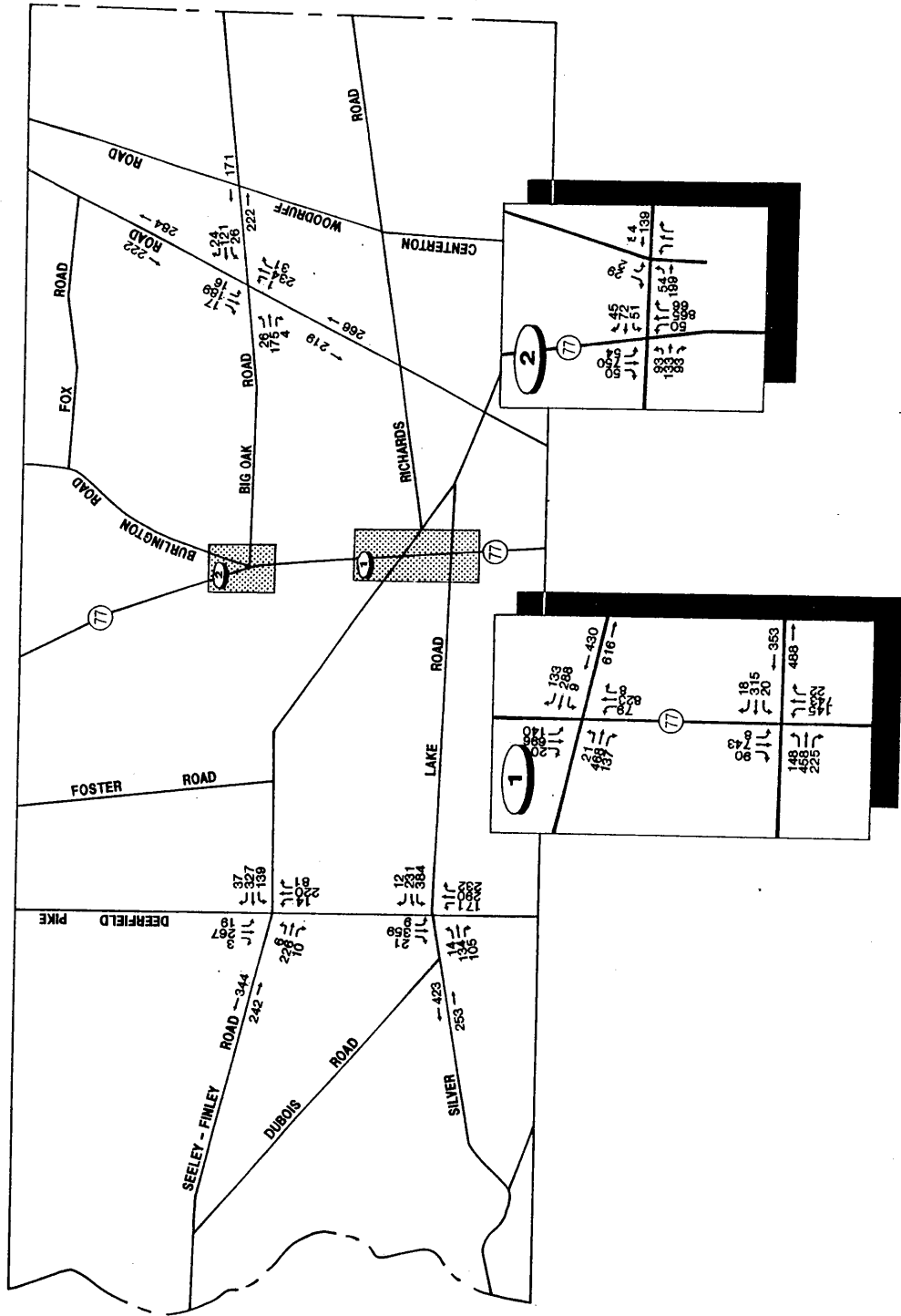




TABLE VIII  
TOTAL INTERSECTION VOLUMES  
MORNING PEAK HOUR

Intersection	1990 Existing A.M. Peak	2002 Projected A.M. Peak	Percent Increase
1. Deerfield Pike (C.R. 606) and Park Drive (C.R. 621)	1022	2309	126 %
2. Deerfield Pike (C.R. 606) and Laurel Heights (C.R. 662)	777	2018	160 %
3. Deerfield Pike (C.R. 606) and Cornwell Drive (C.R. 622)	541	1670	209 %
4. Deerfield Pike (C.R. 606) and Silver Lake Road (C.R. 704)	593	1601	170 %
5. Deerfield Pike (C.R. 606) and Seeley-Finley Road (C.R. 617)	298	1055	254 %
6. N.J. Route 77 and Cohansey-Deerfield Road (C.R. 540)	506	1616	219 %
7. N.J. Route 77 and Parsonage Road (C.R. 743)	551	1477	168 %
8. N.J. Route 77 and Big Oak Road (C.R. 658)	543	1773	227 %
9. N.J. Route 77 and Seeley-Finley Road (C.R. 617)	520	2116	307 %
10. N.J. Route 77 and Silver Lake Road (C.R. 704)	620	2292	270 %
11. N.J. Route 77 and N.J. Route 56 (Landis Avenue)	912	2549	179 %
12. N.J. Route 56 (Landis Avenue) and Centerton Road (C.R. 611)	911	2360	159 %
13. N.J. Route 56 (Landis Avenue), Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R. 687)	734	3339	355 %
14. Seeley-Deerfield Road (C.R. 612) and Parsonage Road (C.R. 630)	189	424	124 %
15. Irving Avenue (C.R. 553) and Lebanon Road (C.R. 654)	469	514	10 %
16. Woodruff Road (C.R. 553), Rosenhayn Avenue (C.R. 659) and Carmel Road (C.R. 705)	422	534	27 %
17. Centerton Road (C.R. 553) and Big Oak Road (C.R. 658)	430	645	50 %
18. Centerton Road (C.R. 553) and Woodruff Road/Husted Station (C.R. 687)	377	440	17 %
19. Deerfield-Husted Station Road (C.R. 540), Husted Station (C.R. 687) and Northville Road (C.R. 711)	259	368	42 %

TABLE IX  
TOTAL INTERSECTION VOLUMES  
EVENING PEAK HOUR

Intersection	1990 Existing P.M. Peak	2002 Projected P.M. Peak	Percent Increase
1. Deerfield Pike (C.R. 606) and Park Drive (C.R. 621)	1447	3194	121 %
2. Deerfield Pike (C.R. 606) and Laurel Heights (C.R. 662)	1083	2774	156 %
3. Deerfield Pike (C.R. 606) and Cornwell Drive (C.R. 622)	821	2356	187 %
4. Deerfield Pike (C.R. 606) and Silver Lake Road (C.R. 704)	482	1962	307 %
5. Deerfield Pike (C.R. 606) and Seeley-Finley Road (C.R. 617)	334	1349	304 %
6. N.J. Route 77 and Cohansey-Deerfield Road (C.R. 540)	637	2140	236 %
7. N.J. Route 77 and Parsonage Road (C.R. 743)	724	2048	183 %
8. N.J. Route 77 and Big Oak Road (C.R. 658)	672	2322	246 %
9. N.J. Route 77 and Seeley-Finley Road (C.R. 617)	667	2822	323 %
10. N.J. Route 77 and Silver Lake Road (C.R. 704)	714	2935	311 %
11. N.J. Route 77 and N.J. Route 56 (Landis Avenue)	1624	3302	103 %
12. N.J. Route 56 (Landis Avenue) and Centerton Road (C.R. 611)	1402	3383	141 %
13. N.J. Route 56 (Landis Avenue), Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R. 687)	1114	2141	92 %
14. Seeley-Deerfield Road (C.R. 612) and Parsonage Road (C.R. 630)	194	508	162 %
15. Irving Avenue (C.R. 553) and Lebanon Road (C.R. 654)	599	660	10 %
16. Woodruff Road (C.R. 553), Rosenhayn Avenue (C.R. 659) and Carmel Road (C.R. 705)	385	514	34 %
17. Centerton Road (C.R. 553) and Big Oak Road (C.R. 658)	576	864	50 %
18. Centerton Road (C.R. 553) and Woodruff Road/Husted Station (C.R. 687)	462	542	17 %
19. Deerfield-Husted Station Road (C.R. 540), Husted Station (C.R. 687) and Northville Road (C.R. 711)	403	559	39 %

This provides an indication of the impact that possible future developments could have on the Township roadways. All intersections will have a significant increase in volume with the percentage change ranging from 10% to 355%.

It should be noted that the assignment of new development-generated traffic does not reflect any capacity restrictions on the area highway network which already exist or may exist in the future (i.e., the assignment is "unrestrained"). If no intersection or roadway improvements are implemented, the projected volumes will not be accommodated and motorists will choose alternate routes and/or vary their travel times as much as possible. It is also possible that some anticipated development may not occur (or may not occur to the scale presently anticipated) -- either because of the developer's decision and/or a determination on the part of the Township through its planning and/or zoning process that the level (density) and/or type of development permitted will have to be modified because of traffic (or other) considerations.

#### Volume/Capacity and Level of Service

A detailed volume/capacity analysis was completed for future conditions at the study area intersections during the morning and evening peak hours assuming no improvements. The analysis reveals that the intersections along the major corridors of N. J. Route 77, N. J. Route 56 and Deerfield Pike (Seeley-Finley and south) will operate deficiently with most of the corridor operating at Level of Service 'F' conditions. The majority of the approaches along these three corridors will be oversaturated (i.e., volume/capacity ratio greater than 1.2 for signal locations and negative reserve capacity for unsignalized locations) and motorists will experience long delays and backups. The following intersections will operate with deficiencies in 2002 if no other improvements are made:

- Deerfield Pike (C.R.606) and Park Drive (C.R.621)
- Deerfield Pike (C.R.606) and Laurel Heights Drive (C.R.662)
- Deerfield Pike (C.R.606) and Cornwell Drive (C.R.622)



- Deerfield Pike (C.R.606) and Silver Lake Road (C.R.704)
- Deerfield Pike (C.R.606) and Seeley-Finley Road (C.R.617)
- N.J. Route 77 (C.R.606) and Cohansey-Deerfield Road (C.R.540)
- N.J. Route 77 and Parsonage Road (C.R.743)
- N.J. Route 77 and Big Oak Road (C.R.658)
- N.J. Route 77 and Seeley-Finley Road (C.R.617)
- N.J. Route 77 and Silver Lake Road (C.R.704)
- N.J. Route 77 and N.J. Route 56 (Landis Avenue)
- N.J. Route 56 (Landis Avenue) and Centerton Road (C.R.611)
- N.J. Route 56 (Landis Avenue), Woodruff Road (C.R.553) and Centerton-Woodruff Road (C.R.687)

## UPPER DEERFIELD TOWNSHIP ROADWAY IMPROVEMENT PROGRAM

As indicated in the previous chapters, there are existing traffic problems - from both a capacity and a safety viewpoint -- in Upper Deerfield Township. With traffic demands expected to increase significantly over the next ten years, it is clear that problems will only increase and worsen if no actions are taken to improve their situation. This study has identified both existing and future traffic deficiencies in the Township. Further examination of these deficiencies has, in turn, led to the development of a comprehensive traffic improvement program. Implementation of this plan would result in acceptable traffic conditions in Upper Deerfield Township.

### Functional Roadway Classification System

Generally, roadways and streets serve one of two functions -- providing access to abutting properties or providing for efficient passage of through traffic. The most efficient mover of through traffic is the freeway or expressway -- N.J.Route 55 for example. Freeways have no local access function. At the other end of the spectrum are streets solely designed for local access -- cul de sacs and loop streets. However, most streets in Upper Deerfield Township serve some combination of functions -- i.e., providing local access and moving through traffic. A hierarchy functional classification system can be established that reflects the relative importance in the roadway network of a given roadway in terms of its function. Specifically:

- **Arterials** are higher order streets and highways in the hierarchy which serve to move traffic between municipalities and other activity centers and provide connections with major state and interstate facilities. Significant community facilities and retail, commercial, and industrial

facilities may also be located on arterials. Arterials generally carry relatively high traffic volume and their inclusion is not appropriate in the residential street hierarchy. The Cumberland County Transportation Plan divides the Arterial Classification into Primary and Minor Arterial. The Upper Deerfield Plan is consistent in this classification with Deerfield Pike as a Minor Arterial. It is recommended that it be upgraded to a Primary Arterial in the County's Plan for consistency due to the substantial future traffic volumes projected for this roadway.

- o Collector roadways carry and distribute traffic between low-order streets (local or minor streets) and higher-order streets (arterials). Because their function is to promote free traffic flow, collectors should not provide parking, deliveries and trash pickup, or access frontage to residential lots. The Collector Road System has been subdivided into Level 1 and Level 2 Collectors based upon traffic volume and the level of regional traffic served. This is consistent with the County system and a new feature for the Township system.

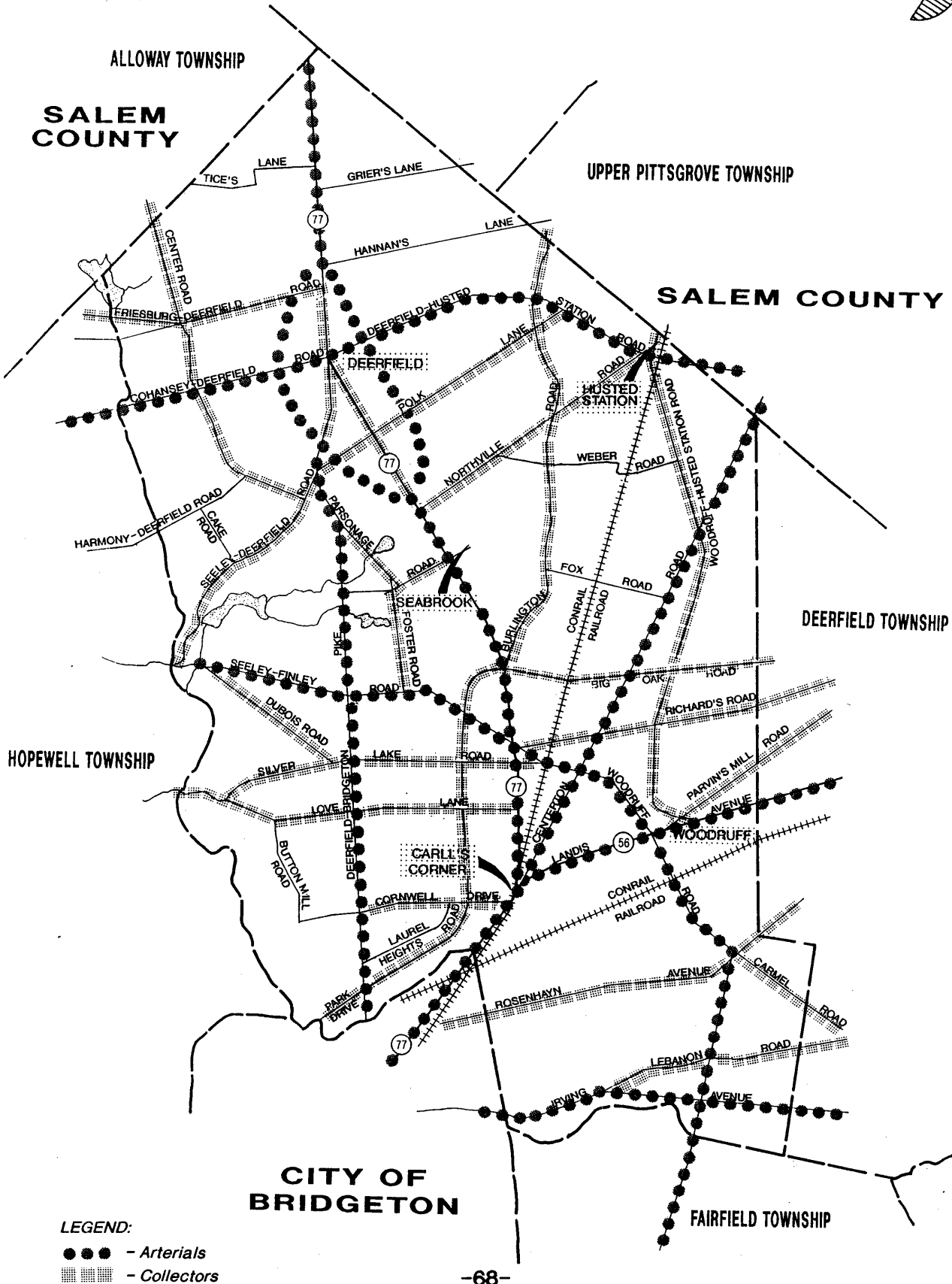
Figure 28 illustrates the proposed Functional Classification for the Roadways of Upper Deerfield Township. All roadways not shown on the future are considered local roadways which are designed to serve as a means of access to local properties.

As shown in Figure 28, arterial roadways recommended in Upper Deerfield Township include:

- N. J. Route 77
- N. J. Route 56
- Deerfield Pike (C.R.606)
- Cohansey-Deerfield Road (C.R.540)
- Irving Avenue (C.R.552)
- Seeley-Finley Road (C.R.617) and Finley-Woodruff Road (C.R.553)
- Centerton Road (C.R.611 and C.R.553)

# Proposed Future Functional Classification System

UPPER DEERFIELD TOWNSHIP  
 CUMBERLAND COUNTY, NEW JERSEY



LEGEND:  
 ●●●● - Arterials  
 □□□□ - Collectors

Routes classified as collectors include:

- Big Oak Road (C.R.658)
- Burlington Road (C.R.677)
- Silver Lake Road (C.R.704)
- Love Lane
- Dubois Road
- Richards Road
- Rosenhayn Avenue (C.R.659)
- Carmel Road (C.R.705)
- Lebanon Road (C.R.654)
- Cornwell Drive (C.R.622)
- Parvins Mill Road (C.R.645)
- Centerton-Woodruff Road (C.R.687)
- New Connector and Park Drive (C.R.621)
- Polk Lane (C.R.612)
- Friesburg-Deerfield Road (C.R.640)
- Center Road (C.R.663)
- Seeley-Deerfield Road (C.R.612)
- Parsonage Road (C.R.630)
- Northville Road (C.R.711)

Other roadways not listed are considered local roadways.

### **Roadway Cross Section Standards**

Roadways should be wide enough to accommodate present and future traffic volumes. This would involve consideration of the required number of travel lanes, the needs of abutting land uses and the requirements of given roadway intersections. Local roadways are functions of the needs of a given residential development and involve consideration of the density of the development, the need for on-street parking and the need to accommodate non-motorized vehicles such as bicycles.

Table X illustrates the recommended cartway widths for the types of roadways in Upper Deerfield Township.

**TABLE X**  
**UPPER DEERFIELD TOWNSHIP**  
**"MINIMUM ROADWAY STANDARDS FOR NEW ROADS AND**  
**EXISTING ROADS SLATED FOR MAJOR IMPROVEMENTS"**

<u>Classification</u>	<u>Lane Widths</u>	<u>No. of Travel Lanes</u>	<u>Shoulder Widths</u>	<u>Total Width*</u>	
				<u>Curbed</u>	<u>Uncurbed</u>
Arterial	12	2 minimum	12	50	48
Collector	12	2 minimum	8	44	40

\*Add 12 feet of paving for each additional travel lane. If curbs are required, add two feet of width to the right lane for a gutter area.

**Local Roadways**

Low Intensity (serving no more than 50 lots)

20' without parking

28' with parking

Residential Subcollector (serving 50 to 100 lots)

20' without parking

28' parking one side

36' parking both sides

The recommended right-of-way for each classification is as follows:

Arterials -- State Highway system -- minimum 80 feet

-- County Road System -- minimum 66 feet

Collectors -- minimum 60 feet

Local Roadways -- 50 feet

## RECOMMENDED ROADWAY IMPROVEMENTS

With the roadway classifications established, a series of field investigations were collected concentrating on the locations within Upper Deerfield Township where deficiencies were noted previously.

The proposed traffic improvement program (illustrated in Figure 29, see insert) has three major components:

- upgrading of selected road segments;
- new roadway links; and,
- improvements of selected intersections.

Figure 29 summarizes the roadway improvement locations with each improvement discussed in further detail below.

### Roadway Segments

The following roadway segments are recommended for widening and/or shoulder improvements:

- N. J. Route 77
  - Widen to a five-lane cross-section north of N.J. Route 56/Cornwell Drive to 700 feet north of Big Oak Road (N.J.DOT to improve south of this area).

- N. J. Route 56
  - Widen to five-lane cross-section from east of Centeron Road to 700 feet east of Woodruff Road (C.R.553). N.J.DOT to improve west of this section to N.J. Route 77.

### New Roadway Links

The following new roadway links should be added to the system:

- Provide bypass of Deerfield area via a two-lane road to the east or west of N. J. Route 77 from Friesburg-Deerfield Road to approximately 1100 feet south of Polk Lane (Figure 30).
- Provide connector road from Big Oak Road west through the Bench property and continuing south to Cornwell Pike where it will connect opposite the extension of Park Drive. The road should follow the Deerfield Running Track on its east side.

### Specific Intersection Improvements

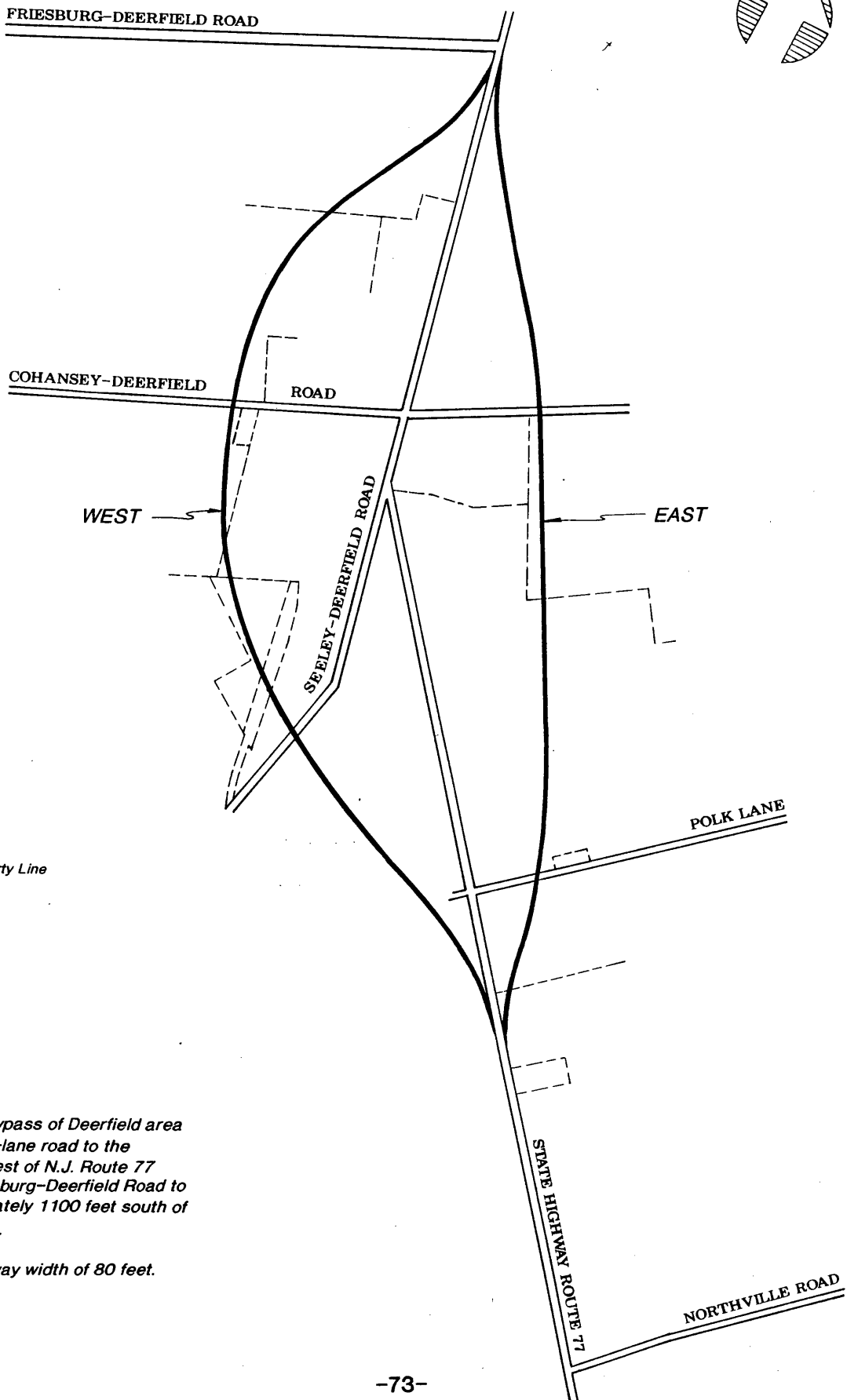
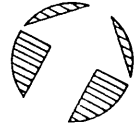
There is a significant number of intersections in Upper Deerfield Township where major improvements will be necessary to relieve congestion and improve traffic operations in the future. In fact, 10 of the 19 intersections analyzed will require major improvements and three others will require traffic signals only. Table XI lists the recommended improvements at each of the locations. The table also lists corresponding figures for each location which illustrate a concept sketch for recommended improvements.



# Deerfield Bypass

## IMPROVEMENT SKETCH

not to scale



**LEGEND:**

----- Property Line

**NOTE:**

- 1) Provide bypass of Deerfield area via a two-lane road to the east or west of N.J. Route 77 from Friesburg-Deerfield Road to approximately 1100 feet south of Polk Lane.
- 2) Right-of-way width of 80 feet.

**TABLE XI**  
**INTERSECTION IMPROVEMENTS**

**ALL INTERSECTIONS WILL OPERATE AT LEVEL OF SERVICE 'C' OR BETTER WITH IMPROVEMENTS, EXCEPT WHERE NOTED**

	<u>Figure Number</u> (see for Concept Sketch)
1. Deerfield Pike (C.R.606) and Park Drive (C.R.621)	31
- Extend Park Drive east to Cornwell Drive near Motor Vehicle Building	
- Provide two lanes on new WB approach -- a separate left-turn lane and shared through right lane	
- Provide separate right-turn lane for NB Deerfield Pike	
2. Deerfield Pike (C.R.606) and Laurel Heights (C.R.662)	N/A
- Monitor for signal.	
3. Deerfield Pike (C.R.606) and Cornwell Drive (C.R.622)	32
- Provide immediate action improvements, i.e., traffic signal.	
- Provide separate left-turn lanes for NB and SB Deerfield Pike and WB Cornwell Drive.	
4. Deerfield Pike (C.R.606) and Silver Lake Road (C.R.704)	33
- Provide traffic signal.	
- Provide separate left-turn lanes for NB and SB Deerfield Pike.	
5. Deerfield Pike (C.R.606) and Seeley-Finley Road (C.R.617)	34
- Provide traffic signal.	
- Provide separate left-turn lanes for NB and SB Deerfield Pike and WB Seeley-Finley Road.	

**TABLE XI (Continued)**  
**INTERSECTION IMPROVEMENTS**

6.	Seeley-Deerfield Road (C.R.612) and Parsonage Road (C.R.630)	N/A
	- No improvements needed.	
7.	N. J. Route 77 and Cohansey-Deerfield Road (C.R.540)	N/A
	- Provide traffic signal.	
8.	N. J. Route 77 and Parsonage Road (C.R. 743)	35
	- Provide separate NB left-turn lane.	
	- Increase curb radii to accommodate truck turning movements.	
9.	N. J. Route 77 and Big Oak Road (C.R. 658)	36
	- Provide traffic signal.	
	- Separate NB and SB left-turns along N.J. Route 77.	
	- Separate EB left-turn lane.	
	- Restripe WB approach to provide separate right-turn lane.	
10.	N. J. Route 77 and Seeley-Finley Road (C.R. 617)	37
	- Provide two through travel lanes on N. J. Route 77 with separate left-turn lanes.	
	- Provide three EB lanes -- separate left-turn, through and right-turn lanes.	
	- Provide two WB lanes -- a shared left-through lane and a shared through-right lane.	
11.	N. J. Route 77 and Silver Lake Road (C.R. 704)	37
	- Provide two through travel lanes on N. J. Route 77 with separate left turn lanes.	
	- Provide separate EB right-turn lane and WB left-turn lane on Silver Lake Road.	

**TABLE XI (Continued)**  
**INTERSECTION IMPROVEMENTS**

12. N. J. Route 77 and N. J. Route 56 (Landis Avenue) N/A

- Realign EB and WB approaches of NJ Route 56 and Cornwell Drive.
- Provide four lanes for NB and SB N.J. Route 77 approaches including separate left and right-turn lanes and two through travel lanes.
- Provide three lanes for EB Cornwell Drive approach including separate left, through and right-turn lanes.
- Provide three lanes for WB NJ Route 56 approach including double left-turn lanes and a shared through right-turn lane.

13. N. J. Route 56 (Landis Avenue) and Centerton Road (C.R.611) N/A

- Provide two lanes for NB and SB Centerton Road approaches including a separate left-turn lane and a shared through and right-turn lane.
- Provide two through travel lanes for EB N.J. Route 56 with a channelized right-turn. Left-turns restricted.
- Provide three lanes for WB N. J. Route 56 including separate left, through and right-turn lanes.

NOTE: This N.J.DOT plan includes a connector road between Centerton Road and N.J. Route 77 which would form a four-leg intersection at N.J. Route 77 opposite Northwest Avenue and a 'T' intersection at Centerton Road. Both new intersections are proposed to be signalized. Old Burlington Road is to be realigned further north on Centerton Road and provide a cul-de-sac near NJ Route 77.

14. N. J. Route 56 (Landis Avenue), Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R.687) 38

- Provide two through travel lanes on N. J. Route 56 with separate left turn lanes.
- Relocate C.R.687 approach about 600 feet east of its current location. It is also recommended that Parvins Mill Road provide a cul-de-sac and form a 'T' intersection with relocated C.R.687.

**TABLE XI (Continued)**  
**INTERSECTION IMPROVEMENTS**

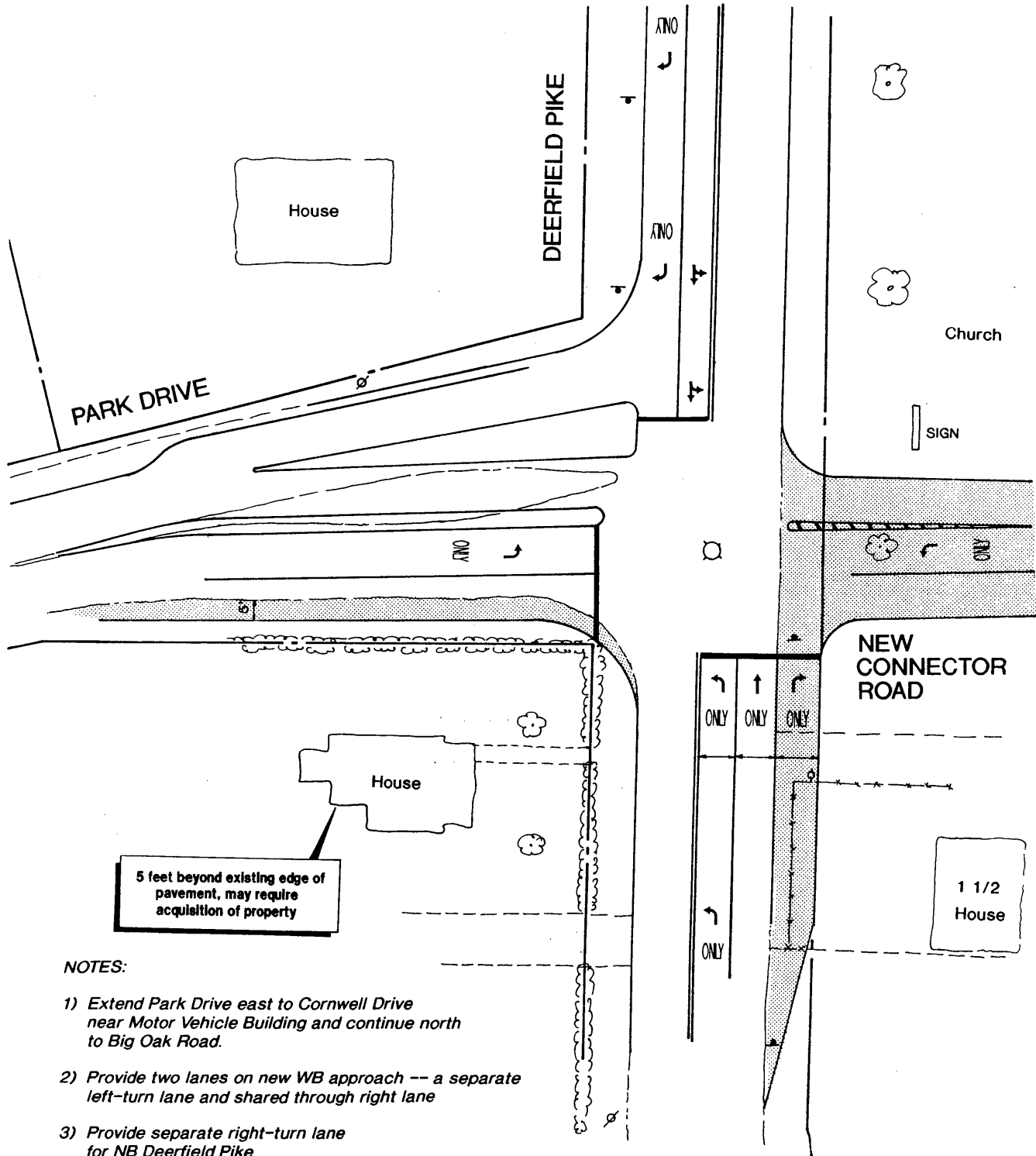
- Provide separate NB left turn lane on C.R. 553.
  - Provide two lanes on SB C.R. 553, a separate left-turn lane and a shared left, through and right turn lane.
15. Irving Avenue (C.R.552) and Lebanon Road (C.R. 654) N/A
- No improvements needed.
16. Woodruff Road (C.R. 553), Rosenhayn Avenue (C.R. 659) and Carmel Road (C.R.705) N/A
- No improvements needed.
17. Centerton Road (C.R.553) and Big Oak Road (C.R. 658) N/A
- Provide traffic signal.
18. Centerton Road (C.R. 553) and Woodruff Road/Husted Station (C.R. 687) N/A
- No improvements needed.
19. Deerfield-Husted Station Road (C.R. 540), Husted Station (C.R. 687) and Northville Road (C.R. 711) N/A
- No improvements needed.

**NOTE:** Traffic signal recommendations are based upon projected traffic volumes and should be considered where and when warranted.

# Deerfield Pike and Park Drive/New Connector Road

## Improvement Sketch

not to scale



5 feet beyond existing edge of pavement, may require acquisition of property

**NOTES:**

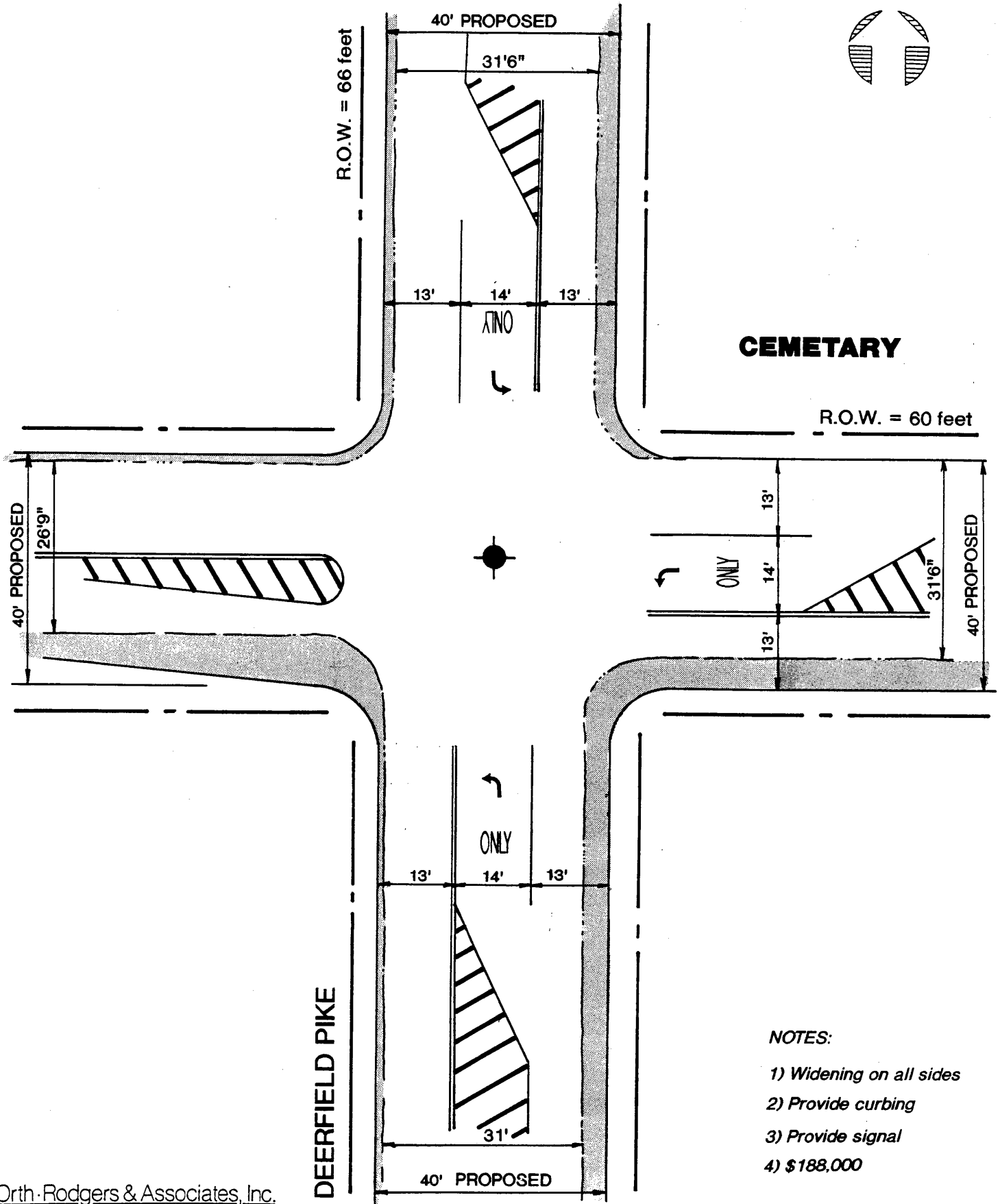
- 1) Extend Park Drive east to Cornwell Drive near Motor Vehicle Building and continue north to Big Oak Road.
- 2) Provide two lanes on new WB approach -- a separate left-turn lane and shared through right lane
- 3) Provide separate right-turn lane for NB Deerfield Pike
- 4) Right-of-way acquisition may be required on southwest corner.
- 5) R.O.W. for Deerfield is 66 feet and for Park Drive is 60 feet.

# DEERFIELD PIKE AND CORNWELL DRIVE

## Roadway Improvement Sketch

FIGURE 32

not to scale



**NOTES:**

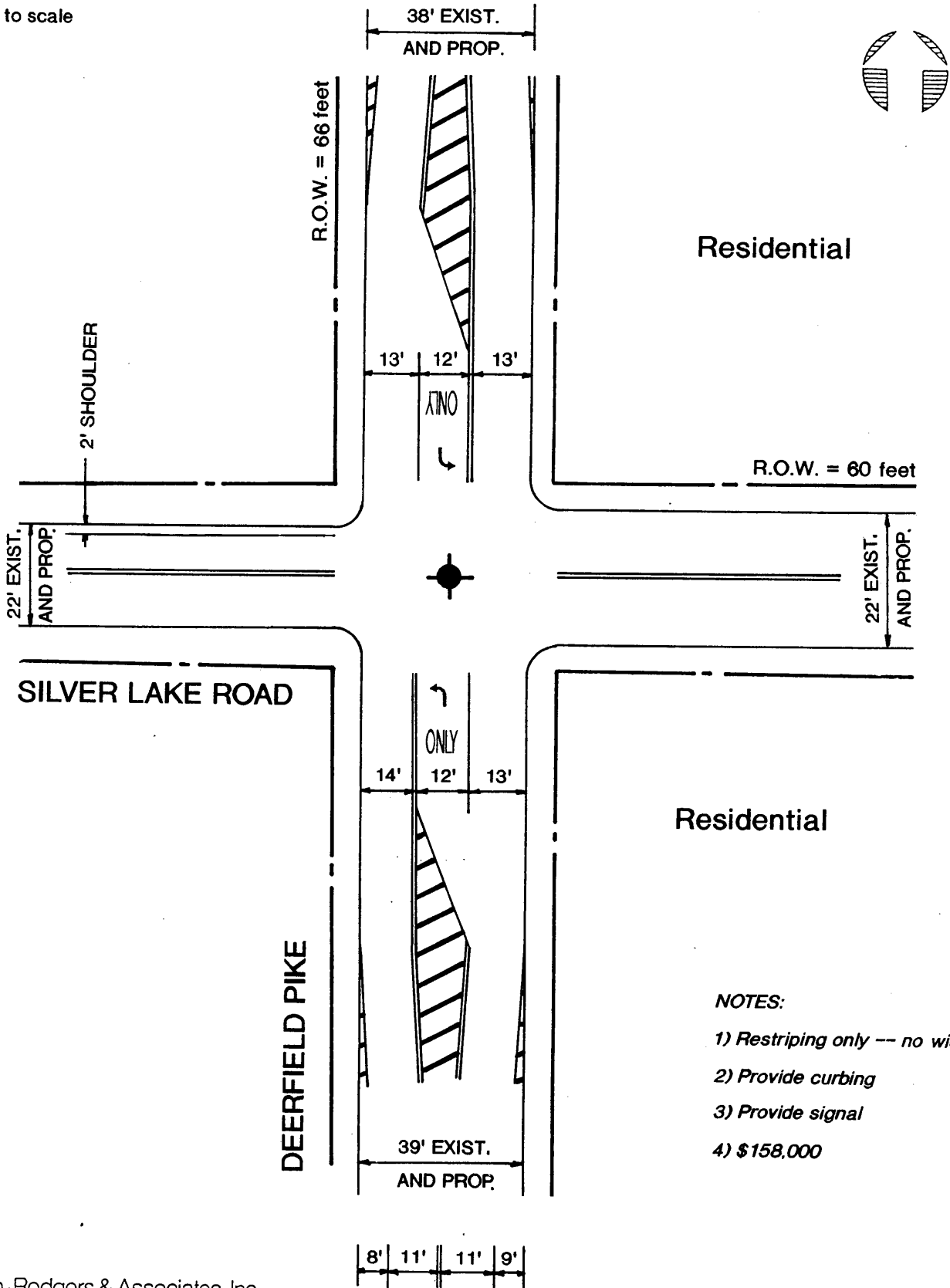
- 1) Widening on all sides
- 2) Provide curbing
- 3) Provide signal
- 4) \$188,000

# DEERFIELD PIKE AND SILVER LAKE ROAD

FIGURE 33

## Roadway Improvement Sketch

not to scale



**NOTES:**

- 1) Restriping only -- no widening
- 2) Provide curbing
- 3) Provide signal
- 4) \$158,000

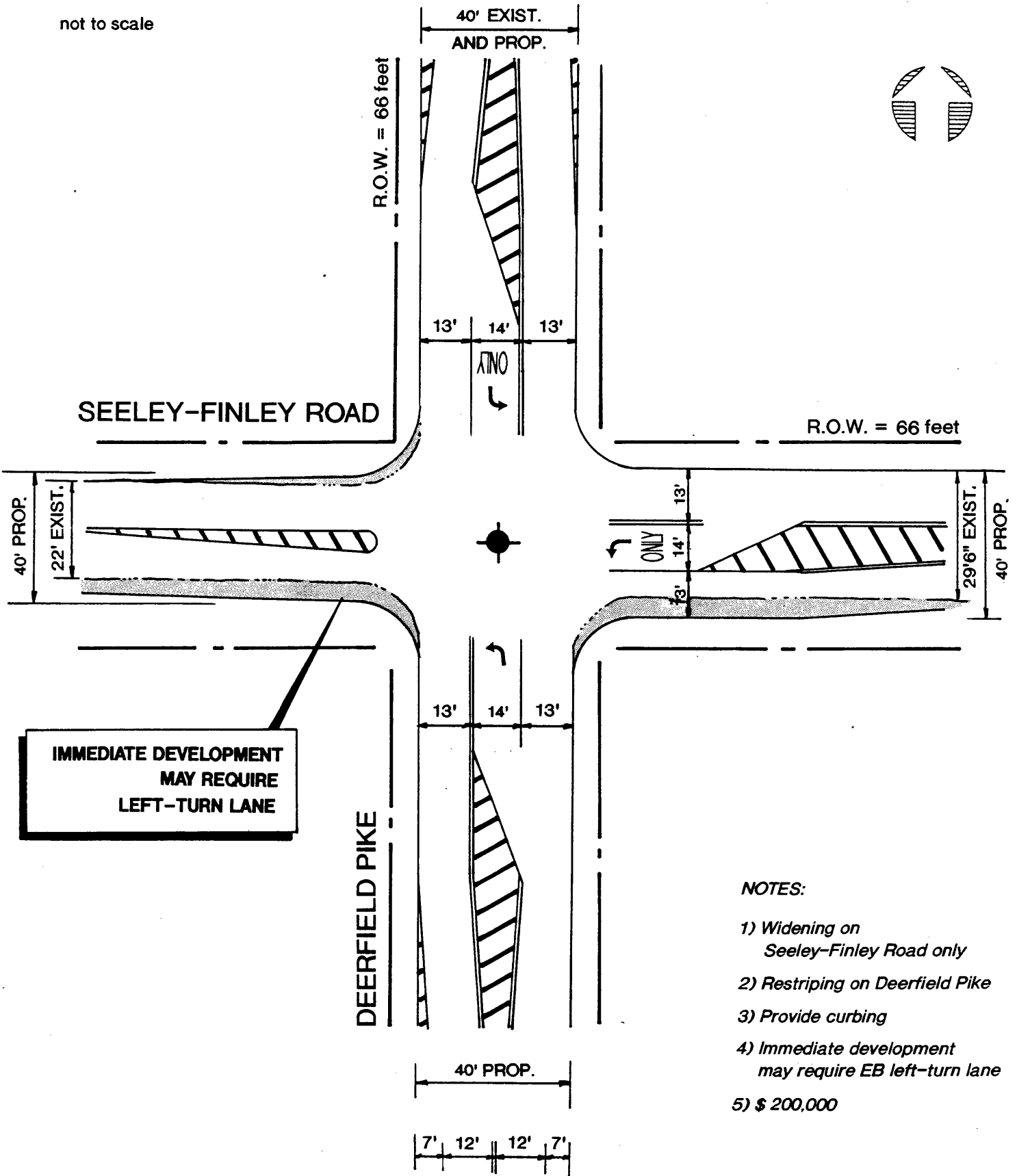


# DEERFIELD PIKE AND SEELEY - FINLEY ROAD

FIGURE 34

## Improvement Sketch

not to scale



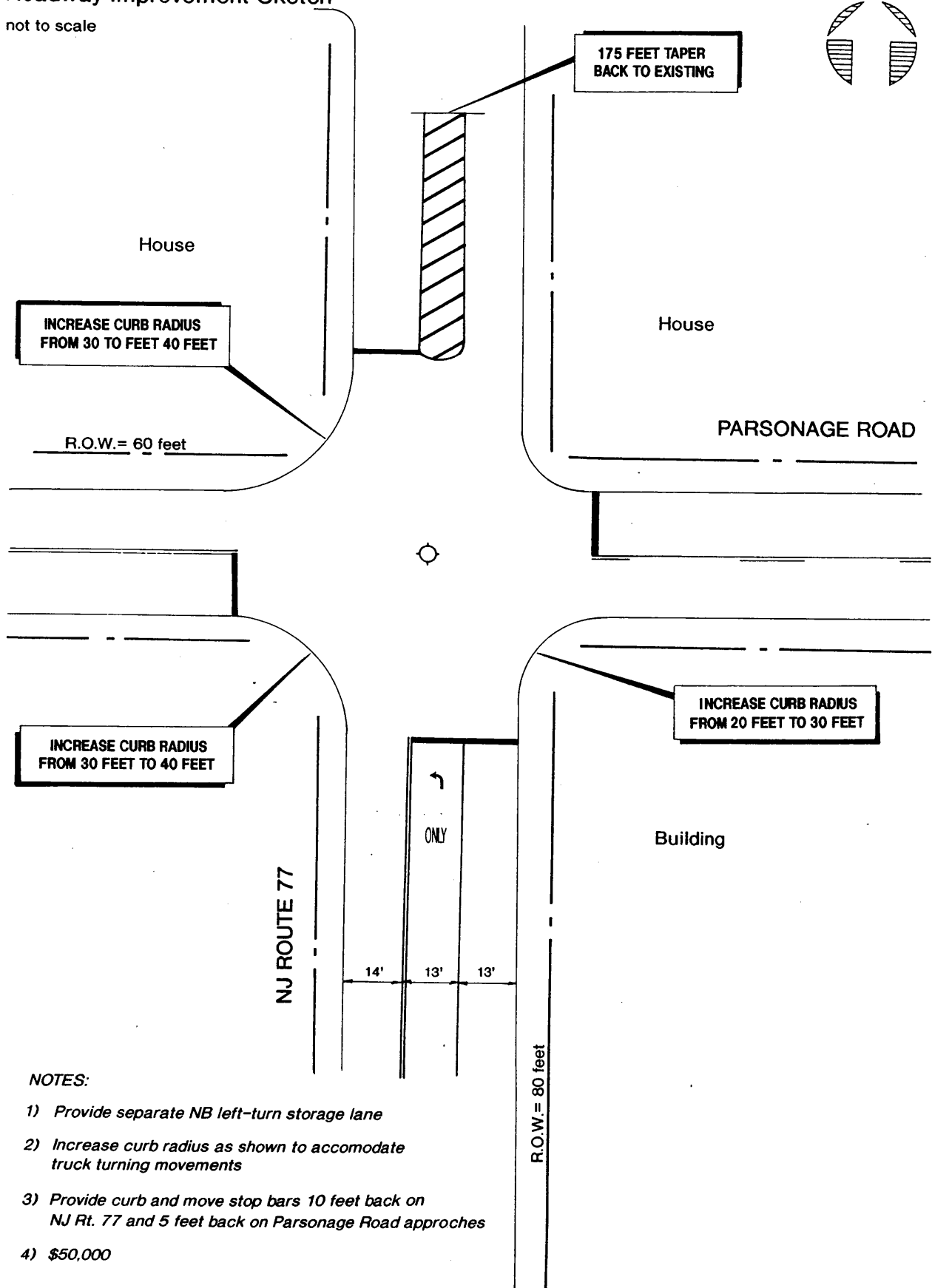
**NOTES:**

- 1) Widening on Seeley-Finley Road only
- 2) Restriping on Deerfield Pike
- 3) Provide curbing
- 4) Immediate development may require EB left-turn lane
- 5) \$ 200,000

# NJ ROUTE 77 and PARSONAGE ROAD

## Roadway Improvement Sketch

not to scale



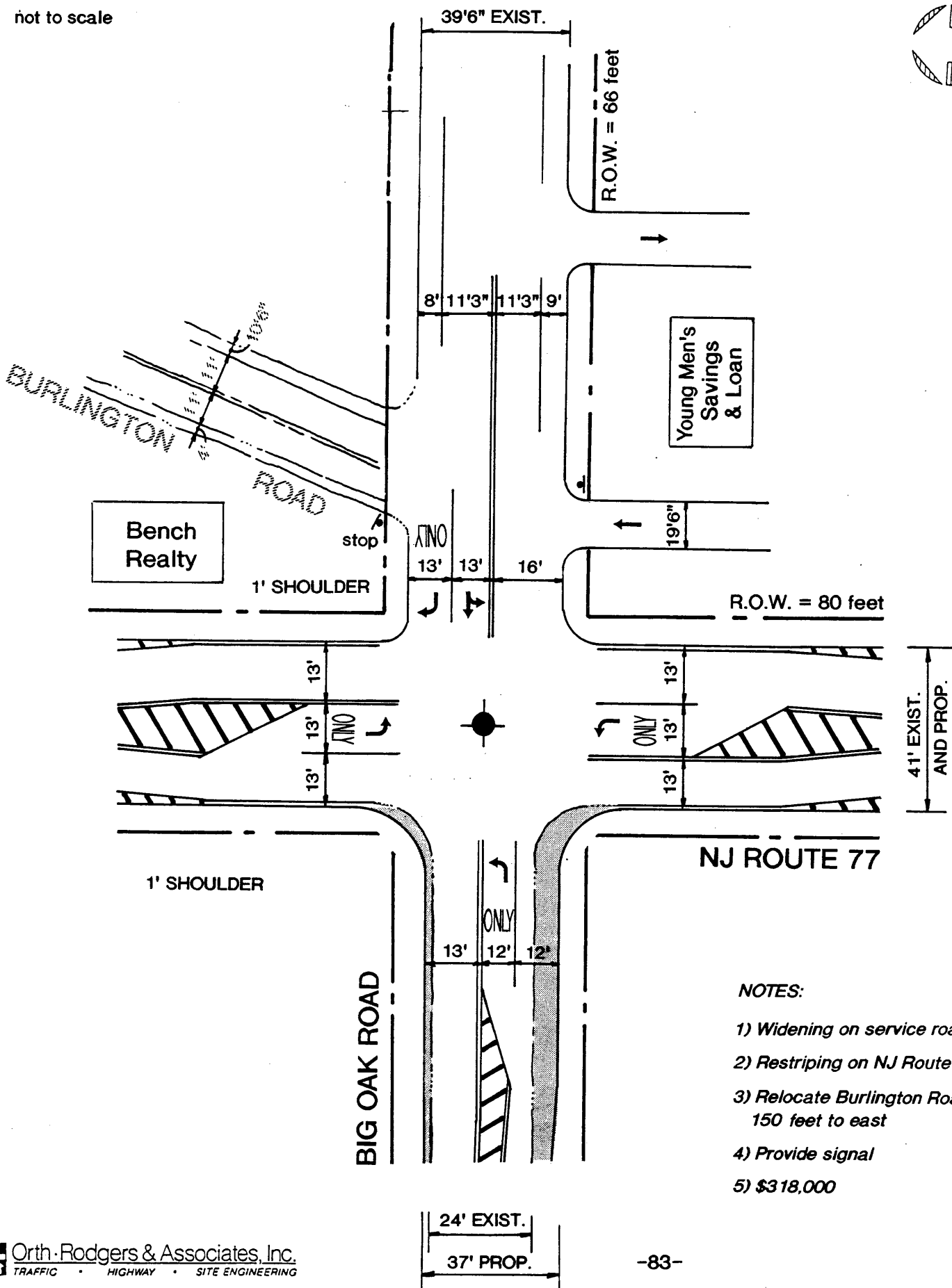
**NOTES:**

- 1) Provide separate NB left-turn storage lane
- 2) Increase curb radius as shown to accommodate truck turning movements
- 3) Provide curb and move stop bars 10 feet back on NJ Rt. 77 and 5 feet back on Parsonage Road approaches
- 4) \$50,000

# NJ ROUTE 77 and BIG OAK ROAD Improvement Sketch

FIGURE 36

not to scale

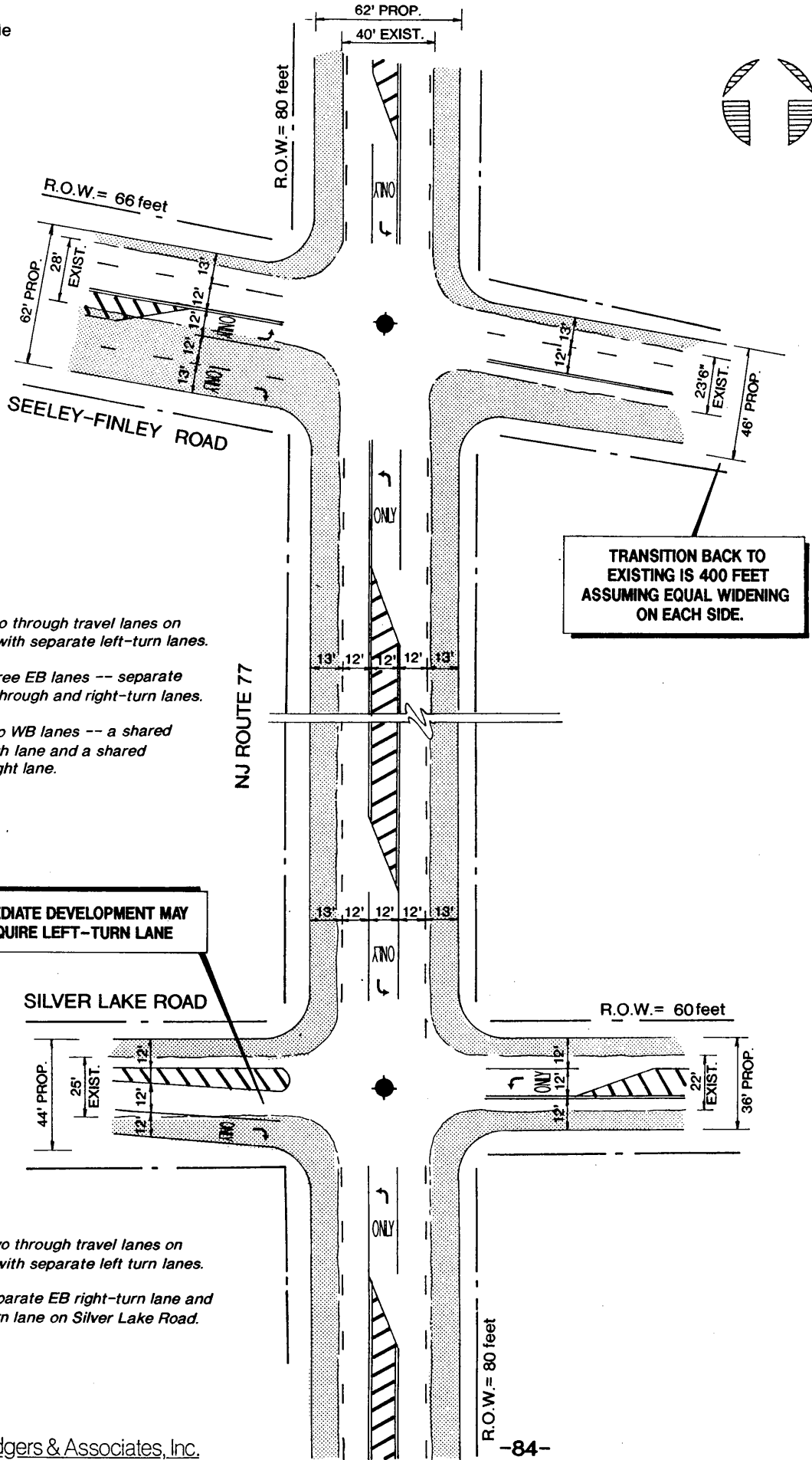


- NOTES:**
- 1) Widening on service road only
  - 2) Restriping on NJ Route 77
  - 3) Relocate Burlington Road 150 feet to east
  - 4) Provide signal
  - 5) \$318,000

# NJ ROUTE 77 and SEELEY-FINLEY ROAD NJ ROUTE 77 and SILVER LAKE ROAD IMPROVEMENTS

FIGURE 37

not to scale



**NOTES:**

- 1) Provide two through travel lanes on NJ Rt. 77 with separate left-turn lanes.
- 2) Provide three EB lanes -- separate left-turn, through and right-turn lanes.
- 3) Provide two WB lanes -- a shared left-through lane and a shared through-right lane.

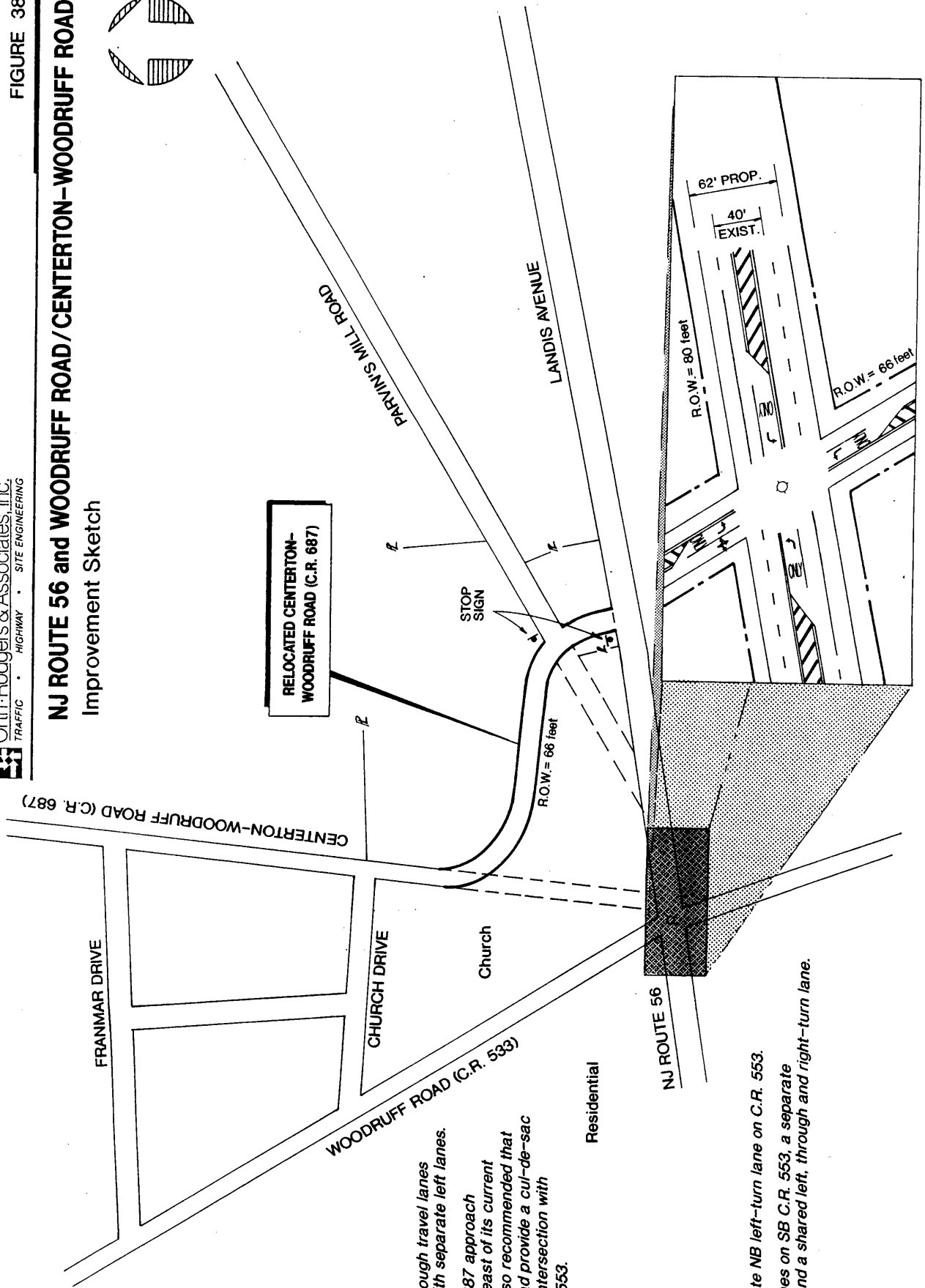
**IMMEDIATE DEVELOPMENT MAY REQUIRE LEFT-TURN LANE**

**TRANSITION BACK TO EXISTING IS 400 FEET ASSUMING EQUAL WIDENING ON EACH SIDE.**

**NOTES:**

- 1) Provide two through travel lanes on NJ Rt. 77 with separate left turn lanes.
- 2) Provide separate EB right-turn lane and WB left-turn lane on Silver Lake Road.

**NJ ROUTE 56 and WOODRUFF ROAD/CENTERTON-WOODRUFF ROAD**  
Improvement Sketch



**NOTES:**

- 1) Provide two through travel lanes on NJ Rt. 56 with separate left lanes.
- 2) Relocate C.R. 687 approach about 600 feet east of its current location. It is also recommended that Parvins Mill Road provide a cul-de-sac and form a 'T' intersection with relocated C.R. 553.
- 3) Provide separate NB left-turn lane on C.R. 553.
- 4) Provide two lanes on SB C.R. 553, a separate left-turn lane and a shared left, through and right-turn lane.
- 5) \$560,000

Implementation of these improvements will result in overall Level of Service 'C' or better conditions except as follows:

- N.J. Route 77 and Cornwell/N. J. Route 56 which is projected to operate at overall Level of Service 'D'.
- N. J. Route 56 and Woodruff Road (C.R.553) which is projected to operate at overall Level of Service 'E'.
- Deerfield Pike (C.R.606) and Park Drive (C.R.621) which is projected to operate at overall Level of Service 'E'.

## ROADWAY IMPROVEMENT PROGRAM COST

Implementation of the recommended traffic improvement program will not be accomplished overnight. The Township should continue to seek the cooperation of the New Jersey Department of Transportation to ensure access to federal and state funding and implementation assistance. Without question, the task will be substantial. The total cost of the improvement program is estimated at 15 to 16 million 1992 dollars (exclusive of right-of-way acquisition and demolition but including utilities and contingencies at 10% and engineering costs at 10%). Costs of the individual projects are listed in Table XII.

It should also be recognized that individual improvement proposals may have to be modified somewhat as final design proceeds. It is also possible that alternate schemes may be developed in the course of detailed engineering studies.

### Program Implementation

With a comprehensive traffic improvement program in hand, the Township can now begin addressing the closely related questions of phasing and funding. Key questions to be addressed are:

- which projects should be implemented first?
- what level of funding assistance can be expected from the state and federal government?
- how and to what level can (or will) the Township fund some 'local share' of the improvement package?

**TABLE XII  
UPPER DEERFIELD TOWNSHIP  
ROADWAY IMPROVEMENT PROGRAM  
COST ESTIMATE**

<u>IMPR. NO.</u>	<u>IMPROVEMENT</u>	<u>COST</u>
1.	Deerfield Pike (C.R.606) and Park Drive (C.R.621)	Cost Included in New Collector Rd.
	- Extend Park Drive east to Cornwell Drive near Motor Vehicle Building	
	- Provide two lanes on new WB approach -- a separate left-turn lane and shared through right lane	
	- Provide separate right-turn lane for NB Deerfield Pike	
2.	Deerfield Pike (C.R.606) and Laurel Heights (C.R.662)	\$100,000
	- Monitor for signal.	
3.	Deerfield Pike (C.R.606) and Cornwell Drive (C.R.622)	\$188,000
	- Provide immediate action improvements, i.e., traffic signal.	
	- Provide separate left-turn lanes for NB and SB Deerfield Pike and WB Cornwell Drive.	
4.	Deerfield Pike (C.R.606) and Silver Lake Road (C.R.704)	\$158,000
	- Provide traffic signal.	
	- Provide separate left-turn lanes for NB and SB Deerfield Pike.	
5.	Deerfield Pike (C.R.606) and Seeley-Finley Road (C.R.617)	\$200,000
	- Provide traffic signal.	
	- Provide separate left-turn lanes for NB and SB Deerfield Pike and WB Seeley-Finley Road.	



**TABLE XII (Continued)**  
**UPPER DEERFIELD TOWNSHIP**  
**ROADWAY IMPROVEMENT PROGRAM**  
**COST ESTIMATE**

7.	N. J. Route 77 and Cohansey-Deerfield Road (C.R. 540)	\$100,000
	- Provide traffic signal.	
8.	N. J. Route 77 and Parsonage Road (C.R. 743)	\$50,000
	- Provide separate NB left-turn lane.	
	- Increase curb radii to accommodate truck turning movements	
9.	N. J. Route 77 and Big Oak Road (C.R. 658)	\$318,000
	- Provide traffic signal.	
	- Separate NB and SB left-turns along N.J. Route 77.	
	- Separate EB left-turn lane.	
	- Restripe WB approach to provide separate right-turn lane.	
10/ 11	Widening of N. J. Route 77 from Carll's Corner to north of Big Oak Road (includes widening of Seeley-Finley Road and Silver Lake Road)	\$ 5,200,000
12	N. J. Route 77 and N. J. Route 56 (Landis Avenue)	
	- Realign EB and WB approaches of NJ Route 56 and Cornwell Drive.	

**TABLE XII (Continued)**  
**UPPER DEERFIELD TOWNSHIP**  
**ROADWAY IMPROVEMENT PROGRAM**  
**COST ESTIMATE**

<ul style="list-style-type: none"> <li>- Provide four lanes for NB and SB N.J. Route 77 approaches including separate left and right-turn lanes and two through travel lanes.</li> <li>- Provide three lanes for EB Cornwell Drive approach including separate left, through and right-turn lanes.</li> <li>- Provide three lanes for WB NJ Route 56 approach including double left-turn lanes and a shared through right-turn lane.</li> </ul>	Cost of these improvements to be done by N.J.DOT
<b>13. N. J. Route 56 (Landis Avenue) and Centerton Road (C.R. 611)</b>	
<ul style="list-style-type: none"> <li>- Provide two lanes for NB and SB Centerton Road approaches including a separate left-turn lane and a shared through and right turn lane.</li> <li>- Provide two through travel lanes for EB N.J. Route 56 with a channelized right-turn. Left-turns restricted.</li> <li>- Provide three lanes for WB N. J. Route 56 including separate left, through and right-turn lanes.</li> </ul>	Cost of these improvements to be done by N.J.DOT
<p>This N.J.DOT plan includes a connector road between Centerton Road and N.J. Route 77 which would form a four-leg intersection at N.J. Route 77 opposite Northwest Avenue and a 'T' intersection at Centerton Road, Both new intersections are proposed to be signalized. Old Burlington Road is to be realigned further north on Centerton Road and provide a cul-de-sac near NJ Route 77.</p>	
<b>14. N. J. Route 56 (Landis Avenue), Woodruff Road (C.R. 553) and Centerton-Woodruff Road (C.R.687)</b>	
<ul style="list-style-type: none"> <li>- Provide two through travel lanes on N. J. Route 56 with separate left turn lanes.</li> <li>- Relocate C.R.687 approach about 600 feet east of its current location. It is also recommended that Parvins Mill Road provide a cul-de-sac and form a 'T' intersection with relocated C.R.687.</li> </ul>	<b>\$560,000</b>

**TABLE XII (Continued)**  
**UPPER DEERFIELD TOWNSHIP**  
**ROADWAY IMPROVEMENT PROGRAM**  
**COST ESTIMATE**

-	Provide separate NB left-turn lane on CR 553.	
-	Provide two lanes on SB C.R.553, a separate left-turn lane and a shared left, through and right turn lane.	
17.	Centerton Road (C.R.553) and Big Oak Road (C.R. 658)	\$100,000
-	Provide traffic signal.	
A.	New Collector Road from N. J. Route 77 and Big Oak to Park Drive	\$ 5,000,000
B.	Deerfield Bypass	
	East Side - Alternate I	\$ 3,000,000
	West Side - Alternate II	\$ 4,000,000
	<b>TOTAL COST -- Alternate I</b>	<b>\$14,974,000</b>
	<b>TOTAL COST -- Alternate II</b>	<b>\$15,974,000</b>

- how will the 'local share' be raised?

Clearly, the pace of the program will be dictated by the availability of funding. As a first step, Upper Deerfield Township should establish a "Committee" to develop a funding strategy. The "Committee" should have the following membership:

- Upper Deerfield Township Supervisors
- Cumberland County Planning Commission
- New Jersey Department of Transportation
- Citizen/Business Representation
  - Civic Associations
  - Developers and Large Land Owners
  - Chamber of Commerce

The "Committee" would require staff assistance including engineering and financial experts. Once established, the "Committee" would develop a funding plan and a phasing plan for the improvement program. This plan would form the basis of actions taken by the County, N.J.DOT, the Township and private developers towards implementation. In particular, implementation responsibilities would be assigned.

With the funding plan in place and the phasing plan established, the projects can proceed towards implementation. The first step in this phase of the process is a "preliminary engineering study" which further refines the design for each project so that the environmental issues can be addressed through an environmental analysis, the second step.

### Allocation of Project Costs

This section suggests a procedure to allocate the costs of the improvement program to developers in a manner that respects the need to demonstrate a "rational nexus" between a given development and a given improvement. Specifically, each development zone generates a given volume of new trips to the roadways of the highway network. This volume represents a portion of the total future traffic volume on that highway. The remaining volumes are allocated to other development zones and to the public. The public share consists of all traffic not attributed to a proposed development. The cost to improve the highway or intersection, or construct the new highway link is then apportioned to each development zone based upon its proportional contribution of traffic to the improvement. Table XIII illustrates the improvement cost and the share of that cost allocated to each development zone based upon 1992 cost estimates and anticipated levels of development. Allocation of project costs should be updated using current cost estimates and levels of development when:

- a) deemed advisable as a result of the statutorily required review of the Master Plan; or,
- b) sooner than statutes require if deemed necessary by the Planning Board.

Each development zone could be made up of several individual developments. Each developer within the development zone is responsible to share costs based upon the proportion of new trips added to the roadway network as a percentage of the total estimated trips for the development zone. Should a proposed development exceed the trip rate established for the development zone such that later developments that generate trips within allowable trip rate would exceed the total allowable trips with developable land remaining, the proposed development that is expected to exceed the allowable trip rate must determine if any additional improvements are required and fund the additional improvements.

**TABLE XIII**  
**COST ALLOCATION SUMMARY**  
**Upper Deerfield Township**  
**Roadway Improvement Program**

LOCATION	TOTAL COST	EXISTING + BACKGROUND	ZONES										TOTAL ZONES + EXISTING + BACKGROUND			
			ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6	ZONE 7	ZONE 8	ZONE 9	ZONE 10		ZONE 11	ZONE 12	ZONE 13
HAJ RT 77 & CORNWELL-DEERFIELD RD	\$100,000.00	\$17,156.00	\$371.00	\$1,121.00	\$2,617.00	\$2,198.00	\$3,458.00	\$1,889.00	\$2,150.00	\$5,047.00	\$5,047.00	\$1,889.00	\$1,889.00	\$5,047.00	\$23,556.00	\$100,000.00
ANDRUSVILLE ROAD/DEERFIELD HUSTED STATION	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
STATION TO WOODRUFF RD	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
PARSONAGE RD & PULK LN & SEELEY-BEER-FIELD RD	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
HAJ RT 77 & PARSONAGE RD	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
CENTERION ROAD/HUSTED STATION TO WOODRUFF	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
DEERFIELD PIKE & SEELEY-FINLEY RD	\$200,000.00	\$65,009.00	\$7,815.00	\$4,283.00	\$1,954.00	\$6,927.00	\$9,947.00	\$2,487.00	\$15,453.00	\$8,171.00	\$1,776.00	\$0.00	\$0.00	\$61,812.00	\$200,001.00	
HAJ RT 77 & BIG DAK RD	\$318,000.00	\$100,385.00	\$0.00	\$18,625.00	\$13,284.00	\$1,076.00	\$10,134.00	\$5,478.00	\$3,013.00	\$0.00	\$3,698.00	\$5,478.00	\$14,791.00	\$131,062.00	\$318,000.00	
BURLINGTON RD & BIG DAK RD	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
CENTERION RD & BIG DAK RD	\$100,000.00	\$73,032.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
DEERFIELD PIKE & SILVER LAKE RD	\$158,000.00	\$51,345.00	\$1,837.00	\$0.00	\$5,222.00	\$19,629.00	\$0.00	\$8,412.00	\$4,448.00	\$1,741.00	\$0.00	\$0.00	\$0.00	\$60,331.00	\$158,000.00	
HAJ RT 77 & SEELEY-FINLEY RD	COMBINED															
HAJ RT 77 & SILVER LAKE RD	\$5,200,000.00	\$1,372,034.00	\$18,085.00	\$173,424.00	\$46,989.00	\$104,777.00	\$125,552.00	\$63,227.00	\$39,743.00	\$0.00	\$77,679.00	\$72,260.00	\$195,102.00	\$2,762,133.00	\$5,200,001.00	
DEERFIELD PIKE & CORNWELL DR	\$188,000.00	\$82,895.00	\$1,741.00	\$0.00	\$3,986.00	\$8,158.00	\$0.00	\$0.00	\$32,431.00	\$6,767.00	\$1,391.00	\$0.00	\$0.00	\$44,775.00	\$187,999.00	
DEERFIELD PIKE & LAUREL HEIGHTS	\$100,000.00	\$48,692.00	\$491.00	\$0.00	\$1,258.00	\$3,598.00	\$777.00	\$0.00	\$4,988.00	\$6,787.00	\$813.00	\$3,434.00	\$7,032.00	\$19,787.00	\$100,001.00	
DEERFIELD PIKE & PARK DR	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
HAJ RT 77 & CORNWELL DR (N)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
HAJ RT 77 & CORNWELL BRIS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
HAJ RT 56 & CENTERION RD	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
HAJ RT 56, WOODRUFF RD & CENTERION-WOODRUFF	\$550,000.00	\$176,214.00	\$2,877.00	\$9,343.00	\$576.00	\$16,111.00	\$25,317.00	\$13,254.00	\$18,823.00	\$5,754.00	\$13,522.00	\$26,969.00	\$198,510.00	\$550,000.00		
WOODRUFF RD & ROSEMARY AVE	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
CORNWELL RD & ROSEMARY AVE	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
WOODRUFF RD & CARREL RD	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
HAJ RT 77 & PARSONAGE ROAD/EN 743	\$50,000.00	\$19,434.00	\$0.00	\$3,326.00	\$342.00	\$195.00	\$1,807.00	\$777.00	\$37.00	\$0.00	\$391.00	\$577.00	\$2,637.00	\$17,575.00	\$50,001.00	
DRIVING AVE & CEDRON RD	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
NEW COLLECTOR ROAD FROM NJ RT 77 TO PARK DRIVE	\$5,000,000.00	\$2,201,835.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
DEERFIELD BYPASS	\$3,000,000.00	\$612,435.00	\$1,324.00	\$24,870.00	\$27,479.00	\$95,264.00	\$80,829.00	\$43,523.00	\$118,135.00	\$49,741.00	\$40,415.00	\$80,829.00	\$217,617.00	\$1,451,813.00	\$2,999,999.00	
ALTERNATE 1/ENST	\$4,000,000.00	\$1,071,895.00	\$26,144.00	\$83,640.00	\$83,640.00	\$65,889.00	\$436,980.00	\$135,948.00	\$366,013.00	\$156,863.00	\$15,688.00	\$73,203.00	\$19,693.00	\$1,307,190.00	\$4,000,000.00	
ALTERNATE 2/ENST	\$4,837,000.00	\$4,837,000.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
ALTERNATE 2-	\$5,276,480.00	\$5,276,480.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
ALTERNATE 2-	\$5,276,480.00	\$5,276,480.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	

**CHAPTER**  
**ACCESS MANAGEMENT FOR**  
**STREETS AND ROADWAYS IN**  
**UPPER DEERFIELD TOWNSHIP**

The control of access to the public highway system is critical to the safe and efficient movement of people and goods. Recognizing that once an area is developed, the opportunity to control access has been lost and recognizing that areas that have yet to develop, such as Upper Deerfield Township, have a unique opportunity to manage access, this chapter will suggest a series of guidelines to be followed in the design and review of development and development access proposals.

Access management is a design technique created to further the following key principles:

- Separate the conflict areas. By reducing the number of driveways or increasing the spacing between driveways or between driveways and intersections, the number of conflict areas at driveways and intersections can be reduced.
- Limit the types of conflicts. By reducing the frequency of conflicts and reducing the area of conflicts by limiting or relocating the vehicular movements allowed, remaining conflict areas can be made safer.
- Remove turning vehicles from the through lanes. By providing separate pathways for turning and through vehicles, the severity and frequency of conflicts can be reduced.

- Managing backups or queues. By providing proper storage areas for waiting vehicles and keeping waiting vehicles out of conflict areas, the frequency and severity of conflicts can be reduced.

To address these four principles, recommended guidelines have been developed for Upper Deerfield Township streets. For Cumberland County roads, it should be noted that official access management guidelines do not exist, however, within Upper Deerfield Township, it is recommended that the guidelines contained herein be considered for County roadways. Since the New Jersey Department of Transportation has already developed Access Management Standards for State Highways, those standards supercede the guidelines in this chapter.

It should be noted that the guidelines to follow are not a substitute for good engineering judgement and proper design practices. Further, the standards of the American Association of State Highway and Transportation Officials as published in their publication entitled "A Policy on Geometric Design of Highways and Streets" dated 1990 (and as updated) must be followed.

The key access management techniques are divided into the following categories:

- A. Limit the Number of Conflict Points
- B. Separate Basic Conflict Areas
- C. Limit the Impact of Deceleration of Turning Vehicles
- D. Remove Turning Vehicles from the Through Lanes

The access management techniques to follow should be applied, as applicable, as access is considered.



A. Limit the Number of Conflict Points

1. Encourage subdivision design with "T" intersections and not 4-way intersections. This reduces the number of conflict points from 24 to nine at each intersection.
2. Space traffic signals to achieve smooth traffic flow. Access to the collector road system should be consolidated to minimize the number of conflicts and to create signalized intersections spaced for the smooth flow of traffic along the collector route. The spacing of signals is governed by the speed of traffic and the level of traffic on both the main street and the cross streets. An applicant proposing a new traffic signal must demonstrate that the proposed traffic signal does not degrade the ability of traffic to flow through the existing traffic signals by increasing delays to through traffic and that the proposed signal location is compatible with all future planned roadways.
3. Limit left turns to/from driveways by channelization and/or signing. This technique is used to reduce conflicts due to left turning vehicles and is especially effective when the left-turns can be made at a nearby, convenient location.
4. Offset opposing major driveways by separating them by 300 feet and minor driveways by 125 feet. Separating driveways that face or oppose each other can reduce the conflict points of a four way intersection to those of two "T" intersections. Caution must be exercised to insure the separation is sufficient to prevent left turning vehicles from overlapping each other.
5. Locate driveways opposite existing signalized three way or "T" intersections.
6. Install two one way driveways in lieu of two two-way driveways. This also minimizes the number of conflict points at each intersection.

**B. Separate the Basic Conflict Areas**

1. Space unsignalized driveways in accordance with the following criteria:

<u>Posted Speed (MPH)</u>	<u>Minimum Spacing (feet)</u>
20	85
25	105
30	125
35	150
40	185
45	230
50	275

Judgement may be required where existing driveways are not sufficiently spaced. In those instances, cross easements between developments, auxiliary lanes, consolidation of driveways and prohibition of turning movements should be considered as noted in the techniques to follow.

2. Regulate minimum corner clearance from the signalized intersection to the nearest unsignalized driveway (and vice versa). The Traffic Institute, Northwestern University suggests the following:

Distance Between a Driveway and a <u>Cross Street</u>	<u>30 MPH or less</u>		Rural or <u>Higher Speeds</u>	
	Upstream <u>Driveway</u>	Downstream <u>Driveway</u>	Upstream <u>Driveway</u>	Downstream <u>Driveway</u>
Arterial	115	230	230	460
Collector	85	175	170	350
Local	50	50	100	100

It should be noted that other factors such as backups or queuing from the intersection, the presence of turning lanes and/or the number of lanes may indicate other standards should be considered. Consult the publication Transportation and Land Development, pages 138 to 145, by V. G. Stover and F. J. Koepke for these instances.

3. Regulate the number of driveways on any given frontage. Three design recommendations are suggested to achieve this technique along a given frontage:
  - a. allow only one driveway for each residential usage and two for each non-residential usage
  - b. for properties with frontages over 600 feet, a second driveway may be permitted
  - c. properties with an adequate internal collector road may need only one driveway.
4. Consolidate access points for adjacent properties.
5. Designate through access covenants, the maximum number of driveways allowed regardless of future subdivision of the property.

C. **Limit the Impact of Deceleration of Turning Vehicles**

1. Restrict parking in advance and downstream of driveways to improve sight distance and ease the turning movement into and out of driveways. Corner clearances of 20 feet are recommended. Turning radii into and out of a driveway must be sufficient to accommodate the vehicles expected to use the driveway.

2. Insure Required Sight Distance is Available. All driveways must meet sight distance standards. The standards of the American Association of State Highway and Transportation Officials are applicable in Upper Deerfield Township.
3. Provide proper driveway design to meet the projected traffic demands. Consult Chapter 6 of Transportation and Land Development by V. G. Stover and F. J. Koepke for detailed information regarding driveway design.

D. Remove Turning Vehicles from the Through Lanes

1. Install left turn lanes when the projected peak hour traffic expected to turn left is greater than 100 vehicles per hour or when indicated through a volume/capacity analysis. The required length of a left turn lane should be calculated through a queuing analysis based upon a Poisson-based estimate of a 90th percentile queue. The minimum length of a left turn lane is 75 feet. Where the calculated left turn lane length exceeds 300 feet, consider a double left turn lane.
2. Install right turn deceleration lanes for all driveways when the right turning vehicles exceed 120 vehicles in the peak hour on a two lane road and 90 vehicles per hour on a four lane road. Below those thresholds, if the right turning peak hour volume is 10% of the approach volume, a deceleration lane is required. Deceleration lanes are not required on local and minor collector roads. The length of the lanes should be in accordance with AASHTO criteria.
3. Encourage cross easement connections between adjacent properties.