Pinebush Transportation Study Update

September 2004

SUMMARY

The Albany County Department of Public Works submitted a proposal under CDTC's 2000-01 Community and Transportation Linkage Planning Program requesting that CDTC staff update the 1985 Pinebush Area Transportation Study to "address all of the changes which have occurred since the completion of the Pinebush Area Transportation Study in 1990." The county's proposal indicated that the study would be used to develop a consensus and gain support of all the municipalities and interested parties in the area. The county's proposal was approved and $20,000 was programmed for the study.

To accomplish the goals of the linkage study, CDTC staff looked at the transportation system in the Pinebush Study area and identified physical changes that took place over the fifteen-year period, such as intersection configuration, bicycle/pedestrian accommodation, physical condition, etc. To evaluate how the current transportation system is performing, CDTC staff first compared current traffic counts with the 1985 counts and determined where growth, if any occurred. Next, CDTC staff identified the locations where traffic growth exceeded the background growth rate for Albany County and identified any attendant development that occurred that could explain the increase in traffic growth. CDTC staff looked at capacity and level-of-service (LOS) issues at all the locations where current counts were taken. Threshold analysis was conducted at all the intersections and links where current counts were available. Intersection level of service analysis using HCM was conducted at those intersections where current traffic counts and signal timing plans are available. Speed-delay runs were conducted along three major corridors in the study area--New Karner Road, Washington Avenue Extension and Western Avenue. Hourly variation in traffic was compared with 1985 variation to discern where peak hour spreading (if any) occurred.

Trips resulting from future probable development, as identified by the city of Albany and town of Guilderland planning departments, were estimated using the 1997 ITE Trip Generation Manual, Sixth Edition, and added to the system. Level of Service and capacity analysis was performed for all locations where analysis was considered necessary.

Briefly, this process resulted in some surprising findings. First, while quite a bit of office, retail and residential development occurred in the study area over the fifteen year period, traffic did not grow in the pm peak as expected. Second, average travel speeds along the three major corridors in the area (Washington Avenue Extension, New Karner Road and Western Avenue) did not deteriorate much, and in some cases improved since 1985. Third, AADT's in the study area increased at rates closer to what was expected for peak hour traffic, and there were significant increases in the percentage of traffic in the off peak hours.

People have altered both their travel schedules and their travel route in the Pinebush area to avoid peak hour traffic congestion.

Peak hour traffic on the Thruway, which runs along the middle of the study area (but has no direct access) more than doubled. The Crossgates ramps to and from Fuller Road Alternate carry almost 1200

vehicles each in the pm peak hour. The ramp from Fuller Road Alternate to Crossgates carried 500 vehicles in the pm peak hour in 1985. The ramp from Crossgates to Fuller Road Alternate was non-existent in 1985.

These facts strongly suggest that although there was traffic growth attendant to development in the Pinebush area, people have altered their travel schedule and route to avoid the periods of heavy congestion. Furthermore, it appears that the NYS Thruway has attracted some of the trips produced and attracted in the study area, because of E-ZPass, high speed limits and relatively no congestion.

The signalized intersections in the Pinebush Study area are not processing the traffic flow in the PM peak hour well. Consequently, the challenge is "how can trips added to the highway system in the PM peak be accommodated in an efficient manner?"

Although peak hour traffic growth in the Pinebush Study area was not quite what was expected, with a few notable exceptions, intersection LOS at most of the twelve intersections deteriorated or remained the same over the fifteen-year horizon. Five of the twelve intersections operated at LOS F or worse (over-saturated) in 1985. Ten of these twelve intersections currently operate at LOS F in the pm peak hour. Thirteen out of the 16 signalized and unsignalized intersections analyzed have less than 20% reserve capacity. In fact, peak entering volumes exceed LOS D capacity at half of the signalized intersections. Only three intersections have reserve capacity of 20 percent or more, one is signalized and two are unsignalized.

Given the theory that peak spreading occurs naturally in response to traffic congestion problems that are not addressed by highway projects and that users of the transportation system make adjustments in travel in a congested area until an acceptable equilibrium is reached, the recommendations for transportation improvements set forth in the 1985 study were reevaluated.

Basically, all of the low cost transportation system improvements recommended in the 1985 study remain valid. For example, plans to consolidate driveways along Western Avenue and New Karner Road, where feasible should be developed. Signal coordination along Western Avenue and New Karner Road should be pursued. Low cost intersection improvements, such as adding turn lanes and approach lanes, within existing alignments should also be performed. The recently completed linkage study for the McKownville Corridor outlines potential low cost intersection, driveway consolidation and bicycle/pedestrian improvements for much of the Western Avenue corridor. Transportation Demand Management actions such as encouraging carpooling, bus use, staggered work hours flexible work weeks have been identified as having a positive effect on the transportation system in the Pinebush. More participation by employers and employees can only help improve traffic flow and delay or negate the need for major capital improvements to the transportation system in the area. All improvements should have an eye toward bicycle and

The recommendations for transportation improvements set forth in the 1985 study were reevaluated. Basically, all of the low cost transportation system improvements recommended in the 1985 study remain valid.

pedestrian accommodation given renewed emphasis on bicycle and pedestrian accommodation in recent federal legislation.

Several of the major capital improvements recommended in the 1985 study have been constructed or are nearing construction. The remaining recommendations from 1985 were reevaluated as part of this study. Clearly, the recommendation to widen Washington Avenue Extension from New Karner Road to Fuller Road is not warranted given that peak hour traffic has not grown, and is not expected to increase to the levels identified in the 1985 report. Widening New Karner Road, to four lanes can be avoided with some innovative improvements to the corridor. Traffic conditions on this road have not significantly worsened over the past fifteen years, which suggests that the widening may not be the answer to the transportation problems. Albany County is exploring a "Safe Track" project for New Karner Road from Western Avenue to Watervliet Shaker Road. This project would make minor repairs to the existing concrete roadway, repair the shoulders, pave the existing lanes with several inches of asphalt and if possible construct turning lanes at Charles Park/Corporate Circle. The estimated cost of this project is $5 million with the potential of completing the project with county funds. This project is contingent upon the approval of jurisdictional transfer of highways between Albany County and New York State. Once the pavement conditions are stabilized on New Karner Road, it would be appropriate to continue the exploration of the funding for and details of longer range strategies for the corridor. Longer-range strategies include conversion of the facility into a "parkway" with advanced design treatment for wildlife crossing (as suggested in the Pine Bush Commission's design exercise) and advanced design treatment at intersections (such as roundabouts). Funding for the longer-range strategies cannot be expected to include the degree of private financing that had been anticipated when the widening project was added to the TIP in 1993. CDTC will need to explore the ability of routine sources of highway funding (TIP funding) to support some or all of the longer-range concepts; any linear work such as parkway creation would not be scheduled to occur prior to the end of the life of the upcoming pavement repairs. Intersection work such as roundabout consideration could be pulled out and advanced sooner, as funding and TIP priorities permit.

Widening New Karner Road, to four lanes can be avoided with some innovative improvements to the corridor.

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TRANSPORTATION STUDY UPDATE
PINEBUSH STUDY AREA

Background:

In the spring of 1985, in response to concern with traffic in the Pinebush, the Capital District Transportation Committee initiated a study of the Pinebush area transportation system and transportation needs. The primary objective of the study was to examine transportation issues in the Pinebush area and provide information to the communities involved regarding possible future traffic deficiencies and options available to provide acceptable traffic levels of service in the future. The geographic limits of the Pinebush study area were roughly bounded by Fuller Road to the east, The City of Albany jurisdictional line to the west, Central Avenue to the north and Western Avenue to the south.

The technical activities of the 1985 study were carried out through the cooperative participation of the CDTC staff, NYSDOT and other concerned and affected government agencies. The CDTC staff assumed the responsibility for the entire study under the direction of the CDTC Planning Committee and a technical advisory Committee (TAC). The TAC membership consisted of Planning Committee members and other governmental, business and community representatives for the Pinebush area communities.

The major work elements progressed under the 1985 study included formulation of goals, objectives and standards; collection of land use, demographic and travel characteristics; the identification of existing transportation problems; the identification and evaluation of expected short-range (5-year) land development; the identification of a range of long-range (25-year) future development patterns; the preparation and evaluation of long-range transportation actions and the selection of an alternative transportation plan. These components were completed in 1990 and were summarized in Chapters I-VI of the Pinebush Transportation Study Technical report.

Current Study Objectives:

The Albany County Department of Public Works submitted a proposal under CDTC's 2000-01 Community and Transportation Linkage Planning Program requesting that CDTC staff update the Pinebush Area Transportation Study to "address all of the changes which have occurred since the completion of the Pinebush Area Transportation Study in 1990." The county's proposal indicated that the study would be used to develop a consensus and gain support of all the municipalities and interested parties in the area. The county's proposal was approved and $20,000 was programmed for the study.

Study Approach:

For the 1985 study, CDTC staff created a micro-simulation model using CARS software, which was state-of-the art modeling software at the time. This model incorporated a detailed land use

inventory of the study area, and was calibrated to the 1985 traffic count data. Once calibrated, the model was run using several land use growth scenarios-- one depicting short-term (five-year) growth in the area, one depicting long-term (2010) target growth in the area, and one depicting more aggressive (high) long-term growth projections. Using the output from these growth scenarios, CDTC staff analyzed the potential impact that growth in this magnitude would have on the area's transportation system. Recommendations for improvements were then drafted based on the output of this process.

The process described above was not repeated for the current Pinebush Linkage project because the CARS software that the 1985 study was based on is defunct and no longer usable on CDTC's computers. It would be difficult to recreate the assumptions and network from that effort using CDTC's T-model software. Consequently, CDTC staff determined that an analysis of existing conditions overlaid on the work that was performed between 1985 and 1990 would be sufficient to reevaluate potential transportation problems in the Pinebush Study area and reevaluate the 1985 Study recommendations. As a means toward this end, CDTC staff collected recent traffic count data for the area and requested that the county conduct traffic counts at the locations where recent counts were unavailable.

CDTC staff looked at the transportation system in the Pinebush Study area and identified physical changes that took place over the fifteen-year period, such as intersection configurations, bicycle/pedestrian accommodation, physical condition, etc. These differences are noted in various sections of this report. To evaluate how the current transportation system is performing, CDTC staff first compared current traffic counts with the 1985 counts and determined where growth, if any occurred. Next, CDTC staff identified the locations where traffic growth exceeded the background growth rate for Albany County and identified any attendant development that occurred that could explain the increase in traffic growth. CDTC staff looked at capacity and level-of-service (LOS) issues at all the locations where current counts were taken. Threshold analysis was conducted at all the intersections and links where current counts were available. Intersection level of service analysis using HCM was conducted at those intersections where current traffic counts and signal timing plans are available. Speed-delay runs were conducted along three major corridors in the study area--New Karner Road, Washington Avenue Extension and Western Avenue. Hourly variation in traffic volume was also analyzed to determine if peak spreading occurred over the 15 year time period.

Trips resulting from future probable development, as identified by the city of Albany and Town of Guilderland planning departments, were estimated using the 1997 ITE Trip Generation Manual, Sixth Edition, and added to the system. Level-of-Service and capacity analysis was performed for all locations where analysis was considered necessary.

The recommendations for transportation improvements in the Pinebush Study Area outlined in the 1985/1990 reports were reevaluated given the results of the various analyses described above. It should be noted that the timing of this examination fits well with the fact that many of the major roads in the Pinebush Transportation Study Area need improvement or repair based on their current condition rating (MAP 1). Most major roads within the study area have a current condition rating of 6 or less. Repaving, shoulder repair, etc. will be initiated on these roads within the next few years. Now is the time to determine where bicycle/pedestrian

accommodations, extra turn lanes, wider shoulders are required, so that some of these "fixes" can be integrated with the rehabilitation project.

Growth in Traffic--1985 to 2000/01

Tables 1 contains pm peak hour traffic count information for 1985 and 2000/01 counts. Maps 2 through 8 also depict traffic volume information for 1985 and 2000/01 respectively. As shown in Table 1, many locations experienced an actual decline in peak hour traffic, and with a few notable exceptions, growth at the remaining locations was smaller than or equal to the "background" traffic growth in the region. "Background" traffic growth can be defined as traffic growth resulting from general demographic changes (for example, an increase in vehicles per household, increase in income, increase in driving age population, etc), from general improvement in mobility and from changes in travel behavior.

The New York State Department of Transportation (NYSDOT) collects and analyzes traffic growth data from a variety of sources. Daily VMT data from the State Touring Route System for Albany county indicate that the county has experienced a 37.0% increase in VMT during the period 1985-1999. This translates to an average growth rate of 2.3 percent per year.

The sections of Table 1 highlighted in yellow identify the locations where traffic growth in the corridor exceeded the average growth rate of 2.3% per year. The sections highlighted in blue identify locations where growth has occurred at a rate of 1% per year or more (but less than 2.3% per year). Traffic at the remaining locations of the study area grew very little (less than 1% per year) or declined from 1985 levels.

Table 1 also indicates that the peak direction on several segments of Washington Avenue Extension (WAE) changed direction during the fifteen-year period. These segments are highlighted in green. For example, during 1985, the westbound flow between Crossgates and Crossgates Commons was the peak direction, with volumes of 2065. In 2000, volumes in this direction decreased to 1495, while volumes in the eastbound direction increased from 1365 in 1985 to 2060 in 2000, a 33.7 percent increase. Peak direction changes were also observed between Crossgates Commons and Rapp Road and Rapp Road and Pine West. All switched from a westbound peak direction to an eastbound peak flow. A major portion of the peak direction change can probably be attributed to the ramp that was constructed at Crossgates, which allows vehicles to exit the Ring Road and access the Fuller Road Alternate in the northbound direction. In 1985, vehicles destined north on Fuller Road Alternate had to access Fuller Road Alternate from Western Avenue or from ramps off Fuller Road. PM peak hour volumes on the ramp from Crossgates to Fuller Road Alternate were nearly 1200 vehicles per hour in 2000.

As for significant traffic growth, Table 1 shows that both peak direction and two-way volumes on Columbia Circle West (road by Corporate Plaza) between the office complex and South Frontage Road and between South Frontage Road and Washington Avenue Extension increased

Map 1 here

TABLE 1

Summary of Growth in PM Peak Hour Traffic Volumes 1985-2000

	1985 PM Peak Direction	2000 PM Peak Direction	Absolute Change	Percent Change Peak Direction	Annualized Change Peak Direction	1985 PM Two-Way	2000 PM Two-Way	Absolute Change	Percent Change Two-Way
NEW KARNER ROAD									
NY 5 - Albany Street*	880 (SB)	855 (SB)	-25	-2.8%	-0.2%	1740	1820	80	4.6%
	860 (NB)	965 (NB)	105	12.2%	0.8%				
Albany Street - Rifle Range Road	1150 (NB)	1335 (NB)	185	16.1%	1.0%	2200	2530	330	15.0%
Rifle Range Road - Old State Road	1120 (NB)	1225 (NB)	105	9.4%	0.6%	2200	2445	245	11.1%
Old State Road - Washington Ave Ext	1710 (NB)	1780 (NB)	70	4.1%	0.3%	2820	2950	130	4.6%
Washington Ave Ext - Pinehurst Blvd	1275 (SB)	1235 (SB)	-40	-3.1%	-0.2%	2160	2460	300	13.9%
Pinehurst Blvd - Charles Blvd	NC	1115 (SB)	NA	NC	NC	NC	2205	NA	NA
Charles Blvd - Western Avenue	1250 (SB)	1325 (SB)	75	6.0%	0.4%	1920	2160	240	12.5%
WASHINGTON AVENUE EXTENSION									
Fuller Road - Crossgates ('85 & '99)	1720 (WB)	1600 (WB)	-120	-7.0%	-0.5%	2840	2810	-30	-1.1%
Crossgates - Crossgates Commons ('88 & '01)*	2065 (WB)	1495 (WB)	-570	-27.6%	-2.5%	3430	3555	125	3.6%
	1365 (EB)	2060 (EB)	695	33.7%	3.2%				
Crossgates Commons - Rapp Rd ('85 & '98)*	2000 (WB)	1320 (WB)	-680	-34.0%	-3.1%	2925	3160	235	8.0%
	930 (EB)	1730 (EB)	800	86.0%	4.9%				
Rapp Road - Pine West ('85 & '98)*	1875 (WB)	1410 (WB)	-465	-24.8%	-2.2%	2695	2950	255	9.5%
	820 (EB)	1540 (EB)	720	87.8%	4.3%				
Pine West - Karner Road	2090 (WB)	2030 (WB)	-60	-2.9%	-0.2%	3060	3280	220	7.2%
WESTERN AVENUE									
Fuller Rd - Schoolhouse Road	1665 (WB)	1615 (WB)	-50	-3.0%	-0.2%	2715	2700	-15	-0.6%
Schoolhouse Road - Fuller Road Alternate	1340 (WB)	1585 (WB)	245	18.3%	1.1%	2790	3100	310	11.1%
Fuller Road Alternate - Church Road ('01)	1965 (WB)	2440 (WB)	475	24.2%	1.4%	3370	4310	940	27.9%
Church Road - Crossgates Entrance ('01)	1950 (WB)	2115 (WB)	165	8.5%	0.5%	3350	3775	425	12.7%
Crossgates Entrance - Rapp Road/Johnston Rd ('01)	1745 (WB)	1720 (WB)	-25	-1.4%	-0.1%	2770	3035	265	9.6%
Rapp/Johnston Road - NY 155 ('01)	1485 (WB)	1680 (WB)	195	13.1%	0.8%	2455	2935	480	19.6%
NY 155 - Star Plaza (1985 & 1997)	1590 (WB)	1645 (WB)	55	3.5%	0.3%	2490	2810	320	12.9%
FULLER ROAD									
I-90 Ramp - Washington Avenue Extension ('99)	1685 (SB)	1565 (SB)	-120	-7.1%	-0.5%	2695	2620	-75	-2.8%
Washington Avenue Extension - City Line*	750 (NB)	601 (NB)	-149	-19.9%	-1.5%	1275	1245	-30	-2.4%
	530 (SB)	645 (SB)	115	21.7%	1.2%				
City Line - Western Avenue	1070 (SB)	855 (SB)	-215	-20.1%	-1.5%	1610	1360	-250	-15.5%
FULLER ROAD ALTERNATE									
Western Avenue to Crossgates Flyover	1530 (NB)	1900 (NB)	370	24.2%	1.5%	2920	3660	740	25.3%
CROSSGATES RAMP TO I-87									
I-87 SB to Crossgates Ring Road ('01)	500 (WB)	1120 (WB)	620	124.0%	5.2%	NA	NA	NA	NA
Crossgates Ring Road to I-87 NB ('01)	NA	1190 (EB)	NA	NA	NA	NA	NA	NA	NA
NYS THRUWAY (I-90)									
Exit 24 to Exit 25 ('81 & '01)	1890 (WB)	3980 (WB)	2090	110.6%	4.8%	2890	6275	3385	117.1%

TABLE 1

(Continued)

	1985 PM Peak Direction	2000 PM Peak Direction	Absolute Change	Percent Change Peak Direction	Annualized Change Peak Direction	1985 PM Two-Way	2000 PM Two-Way	Absolute Change	Percent Change Two-Way
COLUMBIA CIRCLE WEST									
Office Buildings - South Frontage Road ('89 & '01)	120 (NB)	535 (NB)	415	345.8%	14.6%	140	600	460	328.6%
South Frontage Road - Wash Ave Ext ('89 & '01)	300 (NB)	810 (NB)	510	170.0%	9.5%	410	955	545	132.9%
SOUTH FRONTAGE ROAD									
Pitch Pine Road - Columbia Circle West ('89 & '01)	95 (EB)	100 (EB)	5	5.3%	0.3%	165	165	0	0
Columbia Circle West - Rapp Rd ('89 & '01)	135 (WB)	190 (WB)	55	40.7%	2.3%	230	290	60	26.1%
RAPP ROAD									
Crossgates Access - Western Ave ('01)	90 (SB)	680 (SB)	590	655.6%	13.5%	140	990	850	607.1%
Albany Landfill - Washington Ave Extension ('01)	380 (NB)	370 (NB)	-10	-2.6%	-0.2%	602	534	-68	-11.3%
CHURCH ROAD									
Great Oaks Blvd- Western Avenue ('01)*	185 (NB)	320 (NB)	280	155.6%	6.0%	515	915	400	77.7%
	330 (SB)	265 (SB)	130	38.8%	2.1%				
JOHNSTON ROAD									
Chanyk Drive- Western Avenue ('01)*	180 (NB)	460 (NB)	135	73.0%	3.5%	515	575	60	11.7%
	335 (SB)	455 (SB)	-65	-19.7%	-1.4%				
OLD STATE ROAD									
New Karner Road - City Line	715 (WB)	915 (WB)	200	28.0%	1.6%	935	1220	285	30.5%
ALBANY STREET									
Karner Road - New Karner Road	285 (WB)	535 (WB)	250	87.7%	4.3%	465	815	350	75.3%
New Karner Road - Cavanaugh Drive	405 (WB)	460 (WB)	55	13.6%	0.9%	590	665	75	12.7%

*** The Peak Direction Changed between the 1980's and 2000**

Change in Peak Direction
≥1% & <2.3% Annual Growth
≥ 2.3% Annual Growth

Map 2 here

Map 3 here

Map 4 here

Map 5 here

Map 6 here

Map 7 here

Map 8 here

by more than 2.3% per year. This growth, beyond background growth, can be attributed to the construction of nearly 500,000 square feet of office space in the office parks south of Washington Avenue Extension. The high growth rate is also attributable to the fact that the rate is calculated from a relatively small base. Columbia Circle West carried only 120 vehicles in 1989 in the peak direction between the office complex and South Frontage Road and only 300 vehicles in the peak hour between South Frontage Road and WAE. Year 2000 peak direction volumes are in the vicinity of 500 and 800 vehicles per hour.

Church Road experienced a large increase in traffic between 1985 and 2001 and also a change in peak direction. According to Table 1, traffic volumes in the northbound direction increased by 6.0% per year and traffic in the southbound direction increased by 2.1 percent per year. The peak direction switched from southbound to northbound during the sixteen-year period. More than a one percent annual growth rate in traffic was also observed on Western Avenue between Fuller Road Alternate and Church Road. This link experienced an increase of almost 500 vehicles in the peak direction (westbound) in the peak hour. Peak direction and two-way volumes on this link increased by 1.5 percent per year over the sixteen-year period. The expansion of Crossgates not only drives these increases, but so does the extensive residential development that occurred in Guilderland, south of Western Avenue, along Veeder and Doc Shaw Road. Many of these residents use Church Road and Veeder Road to travel to and from their homes. In addition, the Great Oaks office complex, at the southeast corner of Western Avenue and Church Road, was built in the late 1980's and contributes to the traffic on this link. This office complex, is approximately 175,000 square feet and produces/attracts over 250 vehicles in the pm peak hour.

During the early 1990's, Rapp Road was aligned with Johnston Road at the intersection with Western Avenue. During 1985, when the Pinebush Transportation Study was undertaken, Rapp Road and Johnston Road were offset, with Rapp Road to the east of the intersection of Johnston Road and Western Avenue. When the Rapp Road/Johnston Road/Western Avenue intersection was realigned, access to Crossgates from Rapp Road was also provided. Consequently, traffic on Rapp Road at its approach to Western Avenue increased dramatically--from 90 vehicles in the southbound direction to 680 vehicles and from 50 vehicles in the northbound direction to 315 vehicles. Traffic on Johnston Road just south of Western Avenue remained relatively constant (515 vehicles in 1985 to 575 vehicles in 2000), but the peak direction changed here as well. During 1985, the peak direction was in the southbound direction, in 2001, the peak direction became northbound.

One of the largest annual traffic growth figures shown in Table 1 occurred on the New York State Thruway between Exit 24 and 25. Traffic on this section of the Thruway increased from around 1900 vehicles per hour in the westbound direction in 1981 to almost 4000 vehicles per hour in 2001. The E-ZPass toll collection system was installed during this time frame, which made it much more convenient to travel on the Thruway because much of the delay at the tollbooths was eliminated. The speed limit was also increased from 55 mph to 65 mph during the early 1990's. This, coupled with the ever-present congestion on alternative routes, such as Central Avenue, Western Avenue and Washington Avenue Extension/Old State Road/Kings Road, made the Thruway option more attractive. Two-way pm peak hour travel on the Thruway increased by 117 percent over the 20-year time span as well.

Two final increases in traffic worth noting occurred on Fuller Road Alternate between Western Avenue and the Crossgates ramps and on the ramp from Fuller Road Alternate Southbound to Crossgates. Traffic increased on Fuller Road Alternate by about 25 percent in each direction over the fifteen-year period, or about 1.5 percent per year. Traffic on the ramp from Fuller Road Alternate to Crossgates increased from 500 vehicles per hour to over 1100 vehicles per hour, a 124.0 percent increase (5.2 percent per year). Much of these increases (on both Fuller Road Alternate and the Crossgates Ramp) can be attributed to traffic that Crossgates generates and attracts. During 1985, when the first Pinebush Transportation Study was underway, Crossgates had recently been built and was not yet fully occupied. Since 1985, Crossgates underwent several expansions, and increased in retail space from 875,000 square feet to 1,590,000 square feet. The increase alone, according to ITE data, should account for a maximum of 1000 additional trips in the pm peak hour (this figure is a "worst case figure and does not account for pass-by trips). In fact, traffic on portions of Western Avenue near Crossgates also increased by over one percent per year during the fifteen-year period, which provides further evidence regarding the impact that the expansion of Crossgates has on area traffic patterns.

Finally, it should be noted that while growth in the peak direction on many segments declined over the fifteen-year period, two-way traffic on these same segments increased slightly. Furthermore, as shown in Table 2 and Map 8, AADTs (Average Annual Daily Traffic) at nearly all roads within the study area increased significantly over the fifteen-year period. Average Annual Daily Traffic increased from a low of 2.4 percent to a high of 41.2 percent on roads within the Pinebush Study area over the fifteen-year period, which translates into 0.5 percent to 2.3 percent per year. AADT's on the Thruway between exits 24 and 25 increased by 98 percent over a sixteen year time period.

These data strongly suggest that although there was traffic growth attendant to development in the Pinebush area, people have altered their travel schedule to avoid the periods of heavy congestion. Furthermore, Table 2 provides information regarding growth in pm peak hour vehicle miles traveled (VMT) and in daily VMT. These measures are provided because they are more comparable to the background traffic growth numbers that were calculated using NYS data depicting VMT growth in Albany County. While the VMT and average AADT data for the Pinebush Study Area are estimates, these figures clearly demonstrate the effect that the Thruway has had on diverting trips in the Pinebush Study area. The average pm peak hour VMT on the major roads in the study area (excluding the Thruway) increased by only 0.8 percent per year while average AADT increased by 1.3 percent per year. Comparable figures, including Thruway data, show the growth at 1.7 and 1.9 percent per year, respectively. Average daily VMT increased by more than countywide VMT growth (2.5 percent per year), yet the percent of daily VMT that occurs in the peak hour declined from just over 11 percent in 1985 to 10 percent in 2000. Again, these data imply that people have altered both their travel schedules and their travel route in the Pinebush area to avoid peak hour traffic congestion.

Traffic Attendant to Development in the Study Area--1985 to 2000/01

The City of Albany Planning Office and Town of Guilderland Planning Staff reviewed tables that were created during the 1980's that identified known and probable future development in the

TABLE 2
Summary of Growth in Average Annual Daily Traffic Volumes

Location	1985 AADT	2000 AADT	Absolute Change	Percent Change	Annualized Change	Average Chg in AADT
Washington Avenue Extension						
Between Fuller Rd and Fuller Rd Alternate ('98)	25250	31380	6130	24.3%	1.7%	***5695***
Between Rapp Road and New Karner Road ('98)	18925	24184	5259	27.8%	1.9%	***25.8%***
Western Avenue						
Between Fuller Rd and the Northway ('99)	24833	28034	3201	12.9%	0.9%	***6007***
Between Fuller Rd Alternate and Crossgates	29867	38500	8633	28.9%	1.7%	***23.1%***
Between Rapp Road and NY 155 ('98)	29061	32990	3929	13.5%	1.0%	
Between NY 155 and Willow Street ('99)	20074	28337	8263	41.2%	2.5%	
New Karner Road						
Between Western Ave and Charles Blvd	15357	16500	1143	7.4%	0.5%	***2726***
Between Charles Blvd and Old State Road ('86)	22700	26370	3670	16.2%	1.1%	***13.4%***
Between Old State Road and Albany Street	22741	26105	3364	14.8%	0.9%	
Fuller Road						
Between Western Ave and City Boundary ('99)	12598	12900	302	2.4%	0.2%	
NYS Thruway						
Between Exit 25 and Exit 24 ('01)	37000	73285	36285	98.1%	4.4%	
Average AADT (excluding Thruway)	**22141**	**26530**	**4389**	**19.8%**	**1.3%**	
Average PM Peak Hour VMT (excluding Thruway)	**24995**	**28110**	**3115**	**12.5%**	**0.8%**	
Average AADT (including Thruway)	**23491**	**30780**	**7289**	**31.0%**	**1.9%**	
Average PM Peak Hour VMT (including Thruway)	**32838**	**41913**	**9075**	**27.6%**	**1.7%**	
Average Daily VMT	**290979**	**411888**	**120909**	**41.6%**	**2.5%**	
Percent of Daily VMT that Occurs in the PM Peak Hour	**11.3%**	**10.2%**				

> 1.0 and <2.3% per year Growth
≥ 2.3 % per year growth

Source: NYSDOT and Albany County DPW

Pinebush Transportation Study Area. Much of the expected residential development in the Town of Guilderland was constructed, totaling 2800 units.

Commercial development identified under the "target" development scenario in the mid-1980's severely underestimated what actually occurred, particularly in the retail sector (see Table 3). Most of this commercial development occurred along the Washington Avenue Extension Corridor. For instance, the target growth scenario identified expansion at Crossgates at 400,000 square feet. Crossgates expanded by 715,000 square feet. Crossgates Commons was not identified as a potential development, under any of the growth scenarios. This development is over 600,000 square feet in size. The SUNY Center for Environmental Sciences and Technical Management Center (CESTM) located on the southwest corner of Fuller Road and WAE also was not identified as a potential development in 1985. Expected office development was not as severely underestimated. The target growth scenario identified a potential of an additional 500,000 square feet of office space along Washington Avenue Extension; close to 750,000 square feet was added between 1985 and 2000, with an additional 600,000 square feet pending.

The table below displays a comparison of specific development that was identified in the mid-1980's under the target growth scenario and development that actually occurred by 2000:

TABLE 3

Comparison of Expected and Actual Growth 1985--2000

Land Use	Expected (1985)	Actual (2000)	Difference('00-'85)
Commercial			
Office	770,000	1, 052,600	282,600
Retail/Service	550,000	1,430,000	880,000
Industrial	0	21,000	21,000
Residential (DU's)	2,100	2,800	700

As shown in Table 3, development occurred more intensively than anticipated in the Pinebush Transportation Study Area. Yet actual traffic growth was not at the levels anticipated under the target growth scenario, or even the low growth scenario. As evidenced in Table 1 and Maps 2 through 5, pm peak hour traffic growth in the Pinebush Study Area was relatively flat, which is counter-intuitive to what is expected given the intensity of development that occurred. Theoretically, the number of pm peak vehicle trips that should have been added to the Pinebush Transportation System due to the development that occurred during the late 1980's and 1990's is in the vicinity of 7000 trips. This figure was estimated using ITE trip generation figures. The ITE trip generation rates used compare well to data collected for these types of commercial and residential properties in the Pinebush study area. Eighty percent of these trips (5700+) originated or were destined to properties along Washington Avenue Extension. Therefore, it was expected that the Washington Avenue Extension corridor would experience measurable growth in traffic.

Nevertheless, AADT's in the area *did* increase during the 15-year time frame. The average change in AADT on WAE between 1985 and 1998 was almost 5700 vehicles, which accounts

for the anticipated growth from development, and some additional background traffic growth. According to Map 8, the AADT on Washington Avenue Extension between Fuller Road and Fuller Road Alternate increased by 6130 by 1998 and by 7080 in 2000. There was a 5260 increase in AADT along WAE from Rapp Road and New Karner Road between 1985 and 1998. The AADT data suggest that the trips attendant to development in the Pinebush Study area have been added to the transportation system, but not entirely during the PM peak as was anticipated.

These findings strongly suggest that peak spreading occurs naturally in response to traffic congestion problems that are not addressed by highway projects. It is theorized that users of the transportation system make adjustments in travel in a congested area until an acceptable equilibrium is reached.

Analysis of Hourly Variation in Traffic--1985 vs. 2000

Data portraying two-way hourly variation in traffic (measured as a percent of daily traffic) were compared with similar 2000 traffic data to verify the notion that peak spreading has occurred in the Pinebush Study Area. The hourly variation data were compared for five locations—two on New Karner Road, two on Washington Avenue Extension and one on Western Avenue. Graphs depicting these comparisons are found in Figures 1 through 5.

Figure 1 illustrates the two-way hourly variation of traffic on New Karner Road between Old State Road and Albany Street. Figure 2 shows the hourly variation on the southern end of New Karner Road, between Charles Blvd and Western Avenue. Figure 1 clearly demonstrates the peak-spreading concept. The proportion of traffic that occurs in the AM peak two hours is significantly lower in 2000 than in 1985, while the percentage of daily traffic occurring during the traditional "non-peak hours" (9 am to 4 pm) was significantly higher in 2000 than in 1985. PM peak hour traffic shares were lower in 2000 compared to 1985 while the percentage of post pm peak traffic remained relatively constant.

Data in Figure 2 (New Karner Road between Charles Blvd and Western Avenue) are similar to those shown in Figure 1, although not as dramatic. There was little difference in the AM peak period shares between 1985 and 2000, but the mid-day shares in 2000 were significantly larger than 1985. Interestingly, there was little difference in the pm peak period shares between the two years, but the year 2000 post pm peak shares were all lower than those found in the 1985 data. From Figures 1 and 2 it can be concluded that peak spreading definitely occurred on New Karner Road during the 15-year period, with a larger proportion of trips occurring during the hours of 9 am and 4 pm than previously noted. The percentage of peak period traffic along the northern portion of New Karner Road definitely dipped, and spread to other travel periods, while the percentage of peak period traffic between Charles Blvd and Western Avenue basically remained unchanged, but additional trips were accommodated in the off peak mid-day hours.

Figures 3 and 4 provide similar analyses for travel along WAE, between Crossgates and Fuller Road (Figure 3) and New Karner Road and Rapp Road (Figure 4). Peak hour traffic in both these locations represented a lower proportion of daily traffic in 2000 than in 1985. Mid-day and post pm traffic shares in both locations were higher in 2000 than in 1985, again supporting the

Figure 1
Hourly Variation in Daily Traffic 1985 vs 2000
New Karner Road between Old State Road and Albany Street

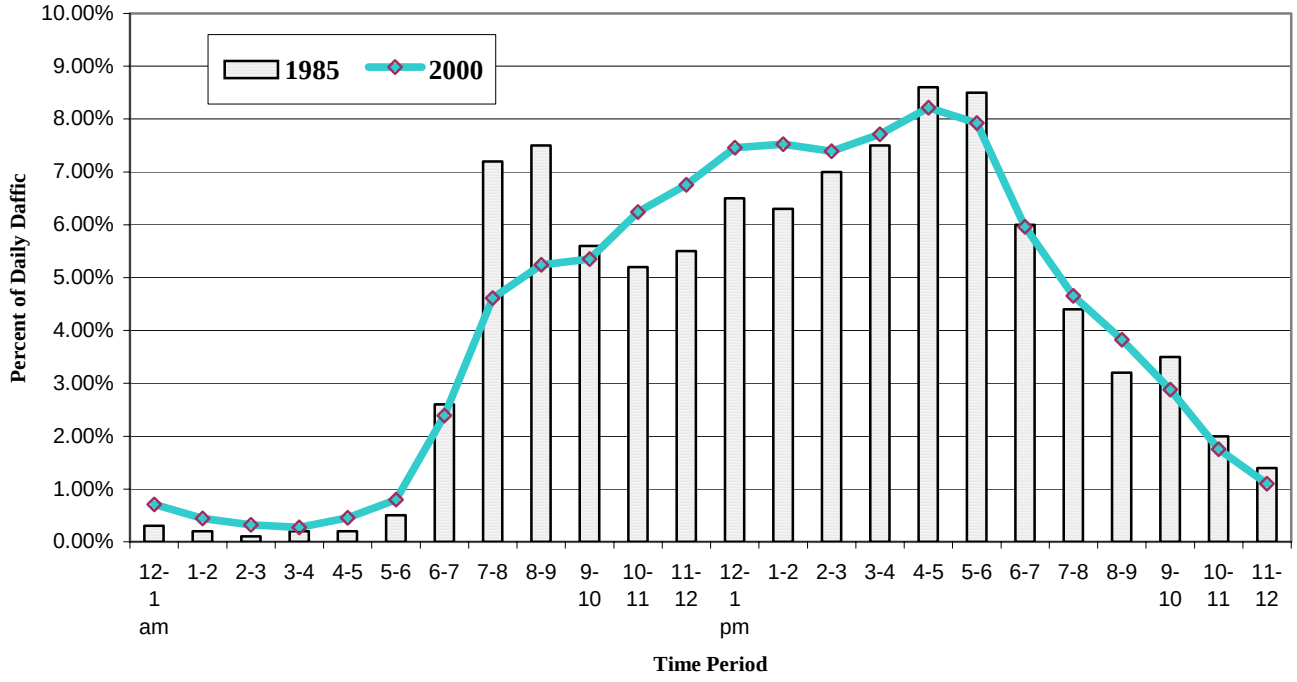


Figure 2
Hourly Variation in Traffic 1985 vs. 2000
New Karner Road Between Charles Blvd and Western Avenue

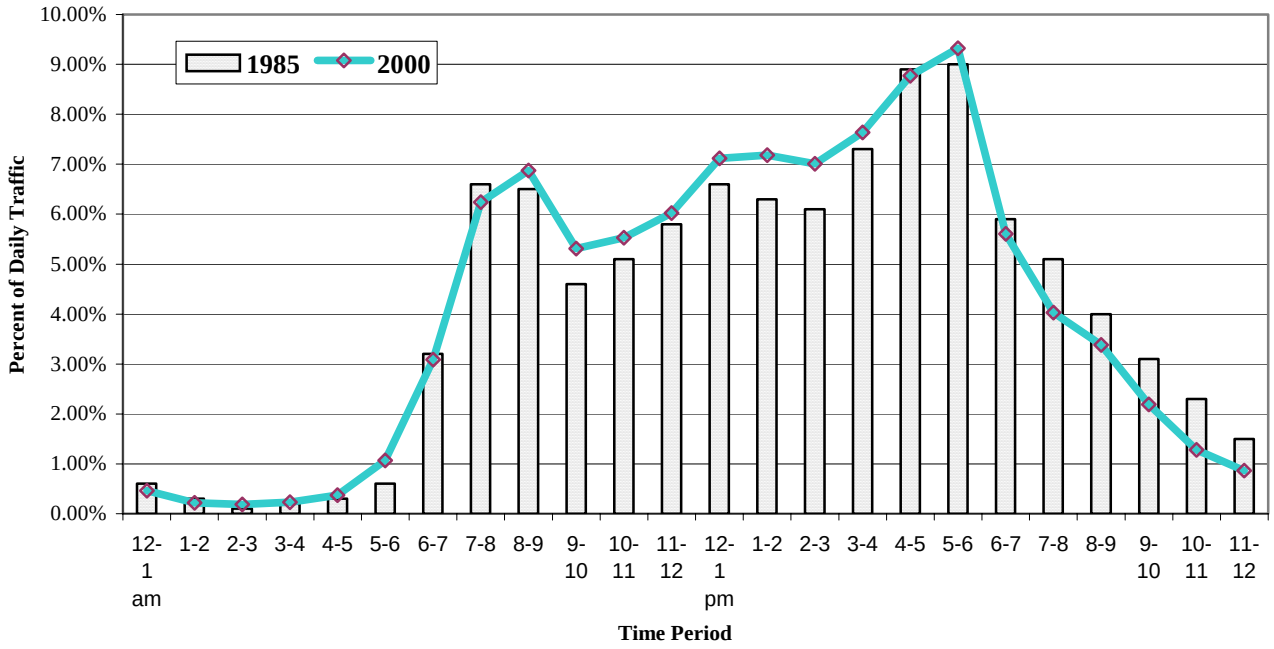


Figure 3
Hourly Variation in Daily Traffic 1985 vs 2000
Washington Avenue Extension between Crossgates and Fuller Road

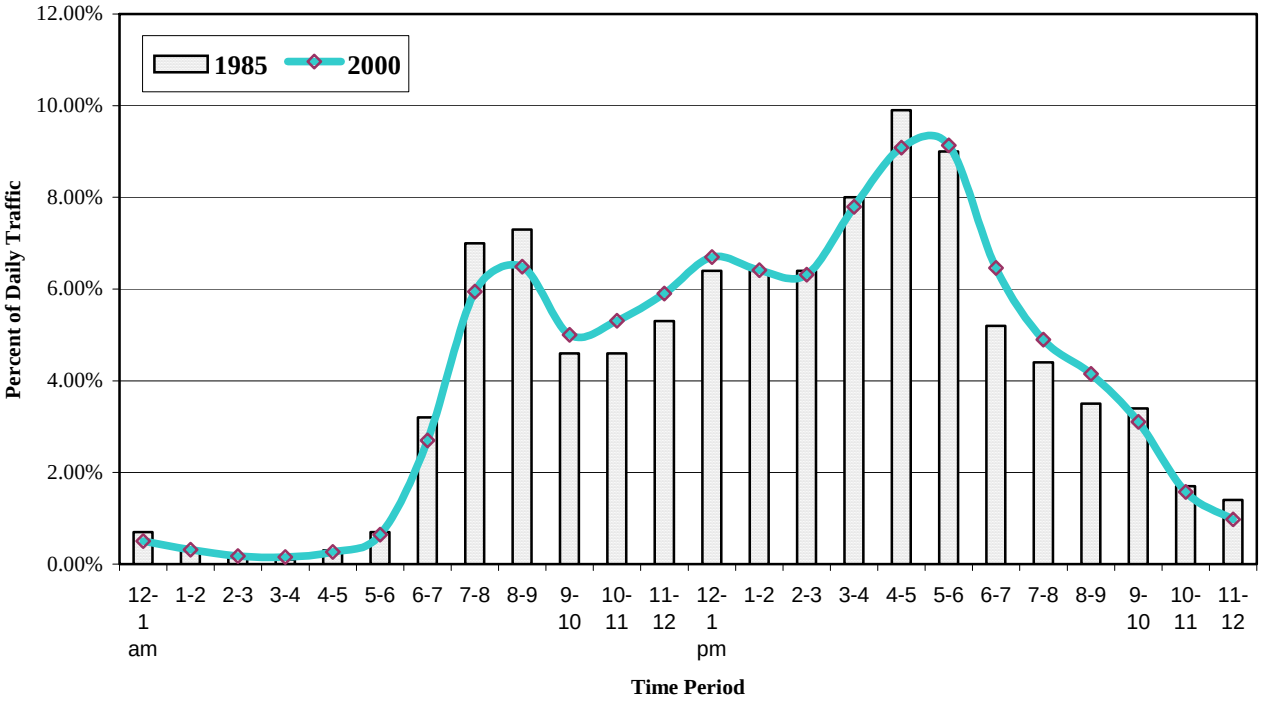


Figure 4
Hourly Variation in Daily Traffic 1985 vs 2000
Washington Avenue Extension between NKR and Rapp Road

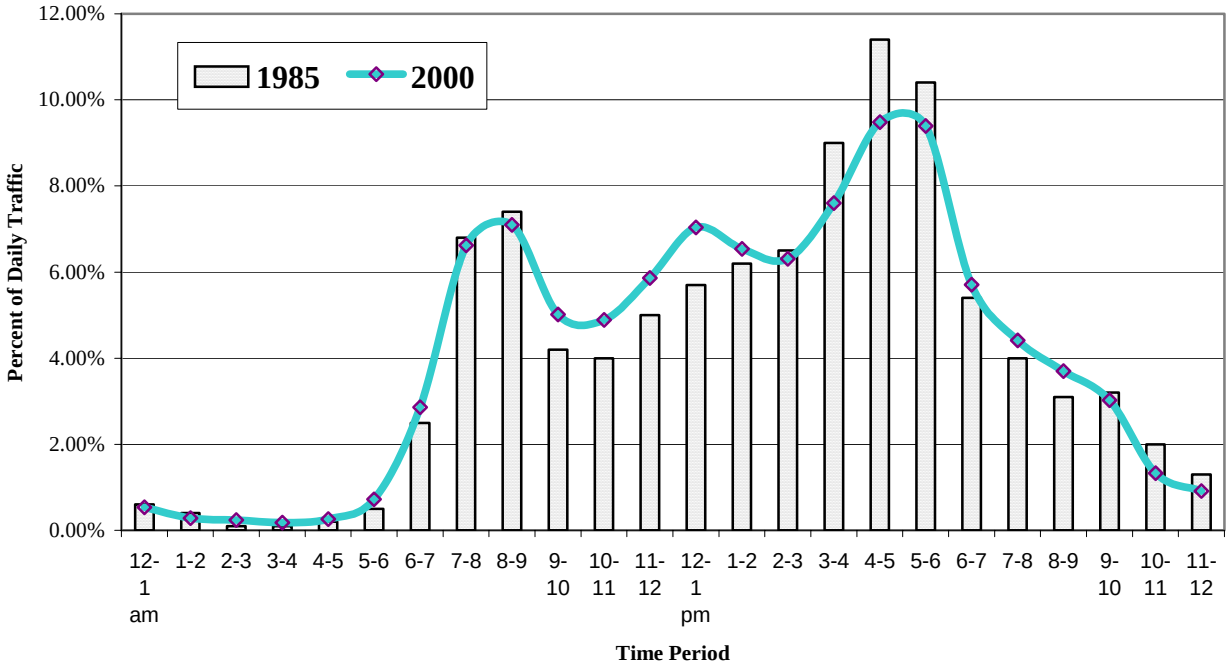
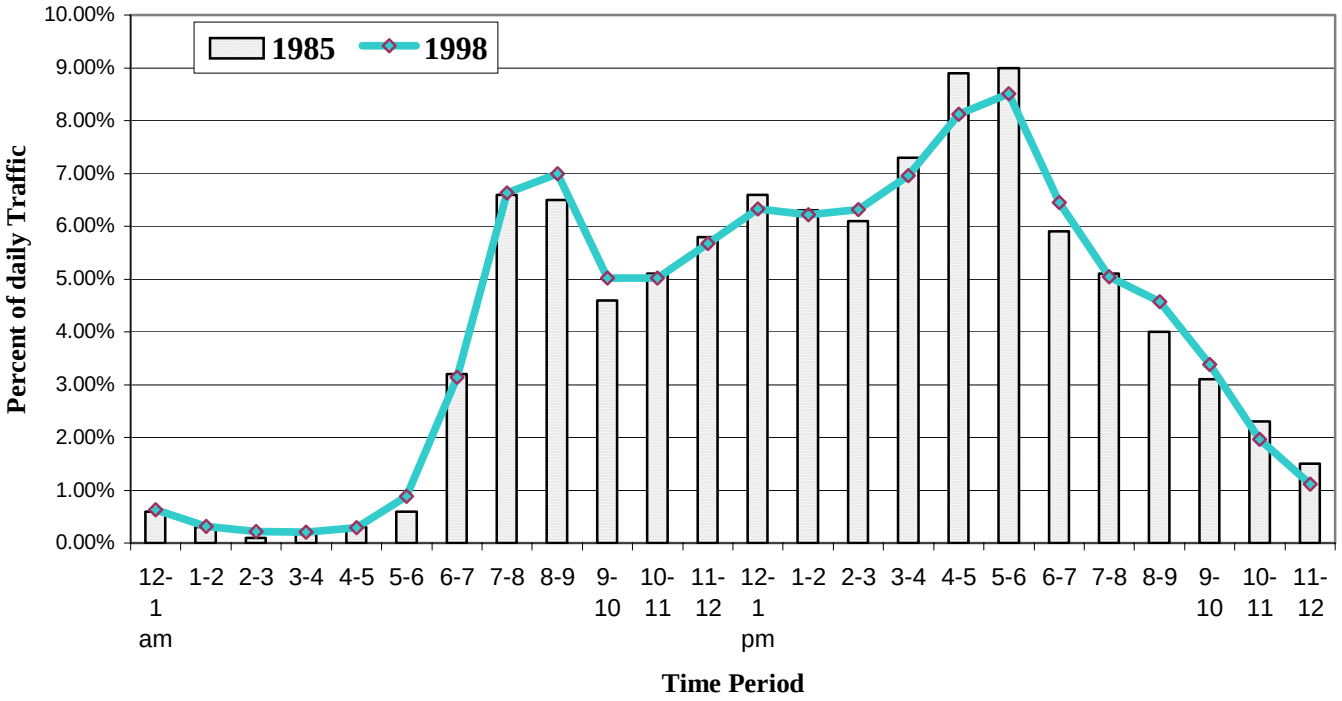


Figure 5
Hourly Variation in Daily Traffic 1985 vs 1998
Western Avenue between NKR and Rapp Road



theory that trips were added to the highway system, but not necessarily during peak travel periods.

Peak spreading on Western Avenue between New Karner Road and Rapp Road is not as evident as it was on New Karner Road and Washington Avenue Extension. Basically, 1985 and 2000 AM period shares remained unchanged, as did most mid-day shares. PM peak period shares declined in 2000, where post pm peak period (post 6 pm) shares increased slightly until 10 pm. Much of the post 1985 development in the Pinebush Study area, however, was not along Western Avenue. Consequently, the difference in the data depicted in Figure 5, as compared to Figures 1 through 4 is not unexpected.

Intersection Level-of-Service Analysis--1985 vs. 2000/01

During 2000/2001, Albany County staff and CDTC staff conducted traffic counts at many of the intersections in the Pinebush Study Area. CDTC staff collected recent counts from NYSDOT and consultant studies. Intersection count information for eleven intersections was summarized, analyzed and compared to data collected in 1985. The results of these analyses are presented in Table 4. Table 4 identifies the level-of-service (LOS) of each signalized intersection as well as the LOS for each movement. In addition, LOS changes from acceptable (LOS A/B/C) to unacceptable levels (LOS E and LOS F) are highlighted in yellow, orange and red. Improvements in LOS are also noted, using the same color scheme.

Although traffic growth in the Pinebush Study area was not quite what was expected, with a few notable exceptions, intersection LOS at most of the eleven intersections deteriorated or remained the same over the fifteen-year horizon. Five of the eleven intersections operated at LOS F or

TABLE 4
Comparison of 1985 and 2000 PM Peak Hour Capacity and Level-of-Service Analyses for Signalized Intersections

Intersection	Movement	1985 Stopped Delay			2000 Stopped Delay		
		V/C	Seconds	LOS	V/C	Seconds	LOS
Western Ave/Fuller Road	EB NY 20-Left Turns	0.27	17.0	C	0.90	90.6	F
(1985 vs. 1999)	EB NY20-Thru Movement (& Right--1999)	0.74	25.5	C	0.43	19.6	B
	WB NY 20-All Movements--1985	1.84	oversaturated	oversaturated	--	28.8	C
	WB NY 20-Left and Thru--1999	--	--	--	0.84	30.7	C
Note: Burger King at the south end of this	WB NY 20-Right Turns--1999	--	--	--	0.38	19.8	B
intersection was not constructed in 1985.	SB Fuller Rd-Left Turns	1.02	81.9	F	1.09	245	F
	SB Fuller Rd-Right Turns	0.61	9.9	B	0.68	26.9	C
	SB Fuller Rd-LTR (1999 only)	--	--	--	0.05	28.7	C
	Average for Entire Intersection	--	oversaturated	oversaturated	--	56.0	E
Western Ave/	EB Western Avenue-Thru Movement	0.71	14.8	B	0.78	25.4	C
Schoolhouse Road	WB Western Ave-Left Turns	1.24	oversaturated	oversaturated	0.73	51	D
(1985 vs. 2001)	WB Western Ave-Thru Movement	1.60	oversaturated	oversaturated	0.59	9.3	A
	NB Schoolhouse Road-All Movements	0.95	46.8	E	--	30.4	C
	NB Schoolhouse Road-Left Turns--1999				0.31	30.3	C
	NB Schoolhouse Road-Right Turns--1999				0.25	30.5	C
	Average for Entire Intersection	0.53	oversaturated	oversaturated	--	20.6	C
Western Avenue/	EB Western Ave--All Movements	0.79	9.3	B	--	19.5	B
Church Road	EB Western Ave--Thru Movement--2001				0.60	19.7	B
(1985 vs. 2001)	EB Western Ave--Right Movement--2001				0.08	13.5	B
	WB Western Ave--Left Turns	1.34	oversaturated	oversaturated	1.34	oversaturated	F
	WB Western Ave--Thru Movement	0.71	5.4	B	0.73	22.7	C
	NB Church Road-Left Turns	0.49	30.0	D	0.33	46.5	D
	NB Church Road-Right Turns	0.22	23.4	C	1.41	oversaturated	F
	Average for Entire Intersection	--	oversaturated	oversaturated	--	144.3	F
Western Avenue/	EB Western Ave-Left Turns	0.21	8.6	B	0.23	36.6	D
Crossgates	EB Western Ave-Thru Movement	0.52	6.1	B	0.85	25.6	C
(1985 vs. 2001)	WB Western Ave-Thru Movement	0.87	10.9	B	1.13	oversaturated	F
	WB Western Ave-Right Turns				0.32	3.8	A
	SB Crossgates-Right Turns				0.05	15.1	B
	SB Crossgates-Left Turns	0.52	16.4	C	0.39	38.8	C
	Average for Entire Intersection	--	10.2	B	--	131.6	F

TABLE 4
(continued)

Intersection	Movement	1985 Stopped Delay V/C	1985 Stopped Delay Seconds	1985 Stopped Delay LOS	2000 Stopped Delay V/C	2000 Stopped Delay Seconds	2000 Stopped Delay LOS
Western Avenue/ Crossgates (1985 vs. 2001)	EB Western Ave-Left Turns	0.21	8.6	B	0.23	36.6	D
	EB Western Ave-Thru Movement	0.52	6.1	B	0.85	25.6	C
	WB Western Ave-Thru Movement	0.87	10.9	B	1.13	oversaturated	F
	WB Western Ave-Right Turns				0.32	3.8	A
	SB Crossgates-Right Turns				0.05	15.1	B
	SB Crossgates-Left Turns	0.52	16.4	C	0.39	38.8	C
	Average for Entire Intersection	--	10.2	B	--	131.6	F
Western Avenue/ Johnston Rd/Rapp Road (1985 vs. 2001) Note: this intersection was offset in 1985 and analyzed as two separate intersections. The intersection of Rapp Road and Western Avenue was unsignalized in 1985. There was one SB lane in 1985, from which vehicles turned left or right on to Western Avenue. There was no excess capacity on this SB leg, and long delays, (driven by the left turn movement) which made this intersection operate at LOS E.	EB Western Ave-All Movements	0.62	10.5	B	--	55.3	E
	EB Western Ave-Left Turns--2001				0.83	102.5	F
	EB Western Ave-Thru & Right--2001				0.89	49.1	D
	WB Western Ave-Left Turns	0.55	12.9	B	0.69	80.7	F
	WB Western Ave-Thru (& Right 2001)	0.63	4.7	A	1.13	oversaturated	F
	NB Johnston-Right Turns (& Thru 2001)	0.21	13.1	B	0.21	42.1	D
	NB Johnston-Left Turns	0.25	23.8	C	0.85	106.6	F
	SB Rapp-All Movements	1.00		E	--	oversaturated	F
	SB Rapp- Thru & Right Turns--2001				1.26	oversaturated	F
	SB Rapp-Left Turns--2001				0.62	74.4	E
	Average for Entire Intersection	--	8.8	B	--	219.3	F
Western Avenue/ New Karner Road/ State Farm Road (1985 vs. 1997)	EB Western Ave-Left Turns	0.95	52.6	E	0.67	70.2	E
	EB Western Ave-Thru & Right	0.71	15.6	C	0.78	55.8	E
	WB Western Ave-Left Turns	--	oversaturated	oversaturated	0.39	54.9	D
	WB Western Ave-Thru Movement	0.88	19.3	C	0.89	64.6	E
	WB Western Ave-Right Turns	0.41	10.0	B	0.42	46.0	D
	NB State Farm Road-Left Turns	0.28	26.1	D	0.51	68.6	E
	NB State Farm Rd-Thru and Right Turns	0.61	19.7	C	0.78	71.6	E
	SB New Karner Road-Left Turns	1.08	106.0	F	0.94	129.7	F
	SB New Karner Road- Thru Movement	0.60	19.4	C	0.59	63.1	E
	SB New Karner Road-Right Turns	2.00	oversaturated	oversaturated	1.92	oversaturated	F
	Average for Entire Intersection	--	oversaturated	oversaturated	--	oversaturated	F

TABLE 4
(continued)

Intersection	Movement	1985 Stopped Delay			2000 Stopped Delay		
		V/C	Seconds	LOS	V/C	Seconds	LOS
New Karner Road/Charles Blvd/Corporate Circle	EB Charles Park--All Movements				0.41	35.6	D
	WB Corporate Circle-Left and Thru Mvm't				1.06	oversaturated	F
	WB Corporate Circle-Right Turns				1.02	150.8	C
Note: This intersection was not signalized in 1985. No counts were available from 1985.	NB New Karner Road-All Movements				0.72	13.3	B
	SB New Karner Road-All Movements				1.09	186.7	F
	Average for Entire Intersection	--			--	126.4	F
New Karner Road/ Old State Road	EB Old State Rd-Left Turns (& Thru 2001)	0.35	29.4	D	0.51	34.9	C
	EB Old State Rd- Right Turns	0.28	13.7	B	0.26	15.9	B
	WB SEFCU-Left and Thru Mvm't	--	--	--	0.41	33.2	C
Note: This intersection was a three-legged intersection in 1985 and analyzed as such. SEFCU was constructed during the late 1980's and the driveway to SEFCU comprises the fourth leg of this intersection.	WB SEFCU-Right Turns	--	--	--	0.12	30.0	C
	NB New Karner Road-Left Turns	1.30	oversaturated	oversaturated	1.23	oversaturated	F
	NB New Karner Road-Thru (& Right Turns 2001)	0.94	14.6	B	1.10	oversaturated	F
	SB New Karner Road-All Movements	0.71	13.4	B	--	113.1	F
	SB New Karner Road-Left Turns--2001	--	--	--	0.68	68.1	E
	SB New Karner Road- Thru Movement--2001	--	--	--	1.05	151.7	F
	SB New Karner Road-Right Turns--2001	--	--	--	0.49	22.7	C
	Average for Entire Intersection	--	oversaturated	oversaturated	--	193.1	F
Washington Ave Extension/ Italian Community Center/ Columbia Circle West	EB Washington Ave Ext-Left Turns	0.01	6.3	B	0.05	32.6	C
	EB Washington Ave Ext- Thru (& Right '01)	0.40	6.8	B	0.67	27.2	C
	EB Washington Ave Ext-Right Turns	0.05	5.40	B	--	--	--
	WB Washington Ave Ext-Left Turns	0.12	6.60	B	0.22	34.8	C
	WB Washington Ave Ext- Thru (& Right '01)	0.94	16.5	C	0.98	61.4	E
	WB Washington Ave Ext-Right Turns	0.05	5.4	B	--	--	--
	NB Columbia Circle West-All Movements	0.39	12.6	B	1.92	--	F
	SB Italian Community Center-All Movements	0.44	12.9	B	1.38	oversaturated	F
	Average for Entire Intersection	--	13.2	B	--	oversaturated	F

TABLE 4
(continued)

Intersection	Movement	1985 Stopped Delay V/C	1985 Stopped Delay Seconds	1985 Stopped Delay LOS	2000 Stopped Delay V/C	2000 Stopped Delay Seconds	2000 Stopped Delay LOS
Washington Ave Extension/ Rapp Road	EB Washington Ave Ext-Left Turns	0.42	31.9	D	0.40	46.7	C
	EB Washington Ave Ext- Thru & Right	0.45	8.5	B	0.81	32.1	C
	WB Washington Ave Ext-Left Turns	0.17	30.10	D	0.21	43.1	D
	WB Washington Ave Ext- Thru & Right	1.01	30.80	D	0.91	40.4	D
	NB Rapp Road-All Movements ('85)	0.60	26.1	D	--	oversaturated	F
	NB Rapp Road-Left Turns ('01)	--	--	--	0.42	50.3	D
	NB Rapp Road-Thru and Right Turns ('01)	--	--	--	1.21	oversaturated	F
	SB Rapp Road-Left and Thru Movements ('85)	0.63	29.3	D	--	--	--
	SB Rapp Road-Right Turns ('85)	0.24	23.40	D	--	--	--
	SB Rapp Road-Left Turns ('01)	--	--	--	0.23	43.4	D
	SB Rapp Road-Thru & Right Turns ('01)	--	--	--	0.48	48.9	D
	Average for Entire Intersection	--	24.6	C	--	81.9	F
Washington Ave Extension/ Fuller Road (1985 vs. 1999)	EB Washington Ave Ext-Left Turns	1.02	113.5	F	1.09	312.1	F
	EB Washington Ave Ext- Thru Movement	0.70	35.1	D	0.65	55.9	E
	EB Washington Ave Ext-Right Turns	0.18	27.10	D	0.16	43.5	D
	WB Washington Ave Ext-Left Turns	0.21	56.70	E	0.41	86.7	F
	WB Washington Ave Ext- Thru Movement	0.94	58.6	E	0.95	110.1	F
	NB Fuller Road-Left Turns	0.92	89.20	F	0.57	93.3	F
	NB Fuller Road-Thru Movement ('85)	0.83	59.50	E	--	--	--
	NB Fuller Road-Right Turns ('85)	0.70	57.4	E	--	--	--
	NB Fuller Road-Thru & Right Turns ('01)	--	--	--	0.99	165.8	F
	SB Fuller Road-Left Turns	0.76	55.90	E	1.07	245.7	F
	SB Fuller Road- Thru Movement ('85)	1.26	oversaturated	oversaturated	--	--	--
	SB Fuller Road-Left and Thru Movements ('01)	--	--	--	0.55	72.7	E
	Average for Entire Intersection	--	oversaturated	oversaturated	--	128.2	F

KEY: **LOS A-D**
LOS E
LOS F

25

worse (over-saturated) in 1985. Nine of these eleven intersections currently operate at LOS F in the pm peak hour. Declines in LOS were experienced at the intersections of Washington Avenue Extension and New Karner Road (LOS C to LOS F), Washington Avenue Extension and Columbia Circle West (LOS B to LOS F), Western Avenue and Crossgates (LOS B to LOS F), and Western Avenue and Rapp Road/Johnston Road (LOS B to LOS F). Deterioration in LOS at the intersections along Western Avenue can be attributed to the expansion of Crossgates Mall. Office development along Washington Avenue Extension and the expansion of Crossgates Mall both contribute to the decline in LOS that occurred at the Washington Avenue Extension intersections. The intersection of New Karner Road and Charles Blvd/Corporate Circle was not signalized in 1985. Intersection LOS information was not collected and analyzed for this location in 1985. However, LOS analysis was performed using 2000 count data. This intersection operates at LOS F during the pm peak hour.

The intersection of New Karner Road and Pinehurst Blvd is an unsignalized intersection that was not analyzed in either 1985. This intersection was analyzed for this update because it has been noted that the residents of Pinehurst Estates have a difficult time accessing and egressing Pinehurst Blvd due to the high traffic volumes that exist on New Karner Road near this intersection. Not surprisingly, left turns out of Pinehurst Blvd onto New Karner Road northbound causes this intersection to operate at LOS F. Currently, only 15 vehicles turn left from New Karner Road onto Pinehurst Blvd in the pm peak hour. Consequently this movement operates at LOS C.

One intersection, Western Avenue and Fuller Road, improved from an over-saturated situation in 1985 to LOS E in 1999. Burger King was not at the southern end of this intersection in 1985, the re-phasing of the signal to accommodate this property could very well have improved its operation to LOS E. Operation of the intersection of Western Avenue and Schoolhouse Road improved from LOS F to LOS C between 1985 and 2001. This is not surprising, since this intersection was reconfigured in the mid-1990's (a left turn lane was added, and additional improvements were made on Schoolhouse Road on the approach to Western Avenue).

With regard to the intersection performance data, however, it should be noted that the assumptions inherent in the 2000 Highway Capacity Manual (HCM) software were significantly different from those built in the 1985 version of the software. Nonetheless, the difference between the two versions does not negate the finding that eleven of the twelve signalized intersections studied in the Pinebush Study area currently operate at unacceptable levels of service.

Threshold Analysis for Intersections-2000/01

Although Table 4 shows that most intersections in the Pinebush Study area operate at LOS F, a threshold analysis was also performed to identify where reserve capacity (if any) exists. This analysis was performed, because the poor LOS was mostly driven by delay, and not by high V/C ratios. Table 5 contains the results of the threshold analysis that was performed for intersections where current traffic counts were available. The data that appear in Table 5 clearly indicate that most (12 out of 16) of the intersections have very little reserve capacity. In fact, peak entering volumes exceed LOS D capacity at over one-third of the signalized intersections. Only three intersections have reserve capacity of 20 percent or more, one is signalized and two are unsignalized. These intersections are Western Avenue and New Karner Road, and the intersections of South Frontage Road and Pitch Pine Road and Columbia Circle. It should be

TABLE 5
Threshold Analysis for Signalized and Unsignalized Intersections Located Within the Pinebush Study Area

Intersection	2000 PM Peak Hour Entering Volume	Critical Capacity Thresholds		
		LOS D Capacity	Reserve Capacity (%)	Reserve Capacity Volume
Western Ave/Fuller Rd ('99)	3280	3810	14%	530
Western Ave/Schoolhouse Rd ('01)	3425	3810	10%	385
Western Ave/Church Rd ('01)	4440	4270	-4%	-170
Western Ave/Crossgates ('01)	3980	3760	-6%	-220
Western Ave/Johnston Rd/Rapp Rd ('01)	3975	4275	7%	300
Western Avenue/New Karner Rd ('97)	4390	6060	28%	1670
New Karner Rd/Charles Blvd ('98)	2660	2030	-31%	-630
New Karner Rd/Washington Ave Extension	4640	5145	10%	505
New Karner Rd/Old State Road/SEFCU	3365	2720	-24%	-645
New Karner Rd/Albany Street	2927	3065	5%	138
Washington Ave Extension/Italian Community Center	3320	3180	-4%	-140
Washington Ave Extension/Rapp Rd ('98)	3715	4220	12%	505
Washington Ave Extension/ Crossgates Commons	4000	4450	10%	450
Washington Ave Extension/ Fuller Road ('99)	4745	5655	16%	910
South Frontage Road/Pitch Pine Rd ('01) (unsignalized)	135	1350	90%	1215
South Frontage Road/Columbia Circle ('01) (unsignalized)	1010	1350	25%	340

noted that the intersection of New Karner Road and Charles Blvd was not signalized in 1985. A signal was added at this location during the 1990's. This intersection operates at LOS F, with entering volumes exceeding threshold capacity by over 600 vehicles during the pm peak hour.

These data coupled with the HCM analysis indicate that the signalized intersections in the Pinebush Study area are not processing the traffic flow in the PM peak hour well. Consequently, the challenge is "how can trips added to the highway system in the PM peak be accommodated in an efficient manner?"

Midblock Threshold Analysis--2000

Midblock traffic conditions were evaluated using guidelines established for CDTC's regional planning work. The working guidelines for arterial and collector and local roads are summarized below.

Highway Type	Maximum Desirable Capacity (LOS C)	Maximum Acceptable Capacity (LOS D)	Maximum Capacity (LOS E/F)
Single Lane (each Direction)	800 vphpl	1000 vph	1300 vph
Two Lane (each direction)	2000 vphpl	2800 vph	3500 vph
Two Lane Expressway (Divided)	3000 vph	3400 vph	3700 vph
Local	500 vph	625 vph	800 vph

Table 6 provides information regarding mid-block traffic levels, LOS E/F capacity constraints, reserve capacity and attendant annual growth that can be accommodated given year 2000/01 traffic counts. From Table 6 it can be seen that seven links are currently at or near LOS E capacity and therefore will be unable to accommodate large increases in traffic due to development pressure. Not surprisingly, four of the eight links are located on NY 155 between Albany Street and Western Avenue. Peak direction pm peak hour volumes on this portion of New Karner Road range from a high of 1780 to a low of 1175. Theoretically, these links can accommodate 1300 vehicles per hour, under LOS E conditions. Volumes in the "non-peak" direction are near LOS E capacity as well. For example, northbound link on New Karner Road between WAE and Old State Road carries 1780 vehicles in the pm peak hour, while the southbound link carries 1170 vehicles. In general, the southbound direction is the non-peak direction between Central Avenue and Charles Blvd. New Karner Road carries over 1100 vehicles in this direction in the pm peak along the entire length between Albany Street and Charles Blvd. Some sections carry over 1200 vehicles.

As mentioned, the northbound direction in the pm peak hour is the peak direction on New Karner Road between WAE and Albany Street. The southbound direction is the peak direction between WAE and Western Avenue. According to Table 6, traffic on the northbound section of New Karner Road between Old State Road and Albany Street can not accommodate any additional

TABLE 6
Midblock Capacity Threshold Analysis for Selected Highways Located in the Pinebush Study Area—Year 2000

Highway/Segment	2000 Peak Directional Volume (vph)	Maximum Acceptable Capacity (vph) (LOS E/F)	Reserve Capacity	Reserve Capacity %	Maximum Annual Growth Rate Without Exceeding Capacity 10 Years	Maximum Annual Growth Rate Without Exceeding Capacity 20 Years
NY 910D--Washington Avenue Ext						
Fuller Road - Crossgates Commons	1830	3500	1670	48%	6.7%	3.3%
Crossgates Commons - Rapp Rd	1730	3500	1770	51%	7.3%	3.6%
Rapp Road - Columbia Circle West	1540	3500	1960	56%	8.6%	4.2%
Columbia Circle West - NY 155	2030	3500	1470	42%	5.6%	2.8%
NY 155 - New Karner Road						
Central Avenue - Albany Street	965	3500	2535	72%	13.8%	6.7%
Albany Street - Old State Road	1280	1300	20	2%	0.2%	0.1%
Old State Road - Washington Ave Ext	1780	1300	-480	-37%	-3.1%	-1.6%
Washington Ave Ext - Charles Blvd	1175	1300	125	10%	1.0%	0.5%
Charles Blvd - Western Avenue	1325	1300	-25	-2%	-0.2%	-0.1%
US 20 - Western Avenue						
Fuller Road - Schoolhouse Road	1615	3500	1885	54%	8.0%	3.9%
Schoolhouse Road - Fuller Rd Alt	1585	3500	1915	55%	8.2%	4.0%
Fuller Road Alt - Church Road	2440	4800	2360	49%	7.0%	3.4%
Church Road - Crossgates	2115	4800	2685	56%	8.5%	4.2%
Crossgates - Rapp/Johnston Road	1720	3500	1780	51%	7.4%	3.6%
Rapp/Johnston Road - NY 155	1830	3500	1670	48%	6.7%	3.3%
Fuller Road						
I-90 Ramp - Washington Ave Ext	1565	3500	1935	55%	8.4%	4.1%
Washington Ave Ext - City Line	645	1300	655	50%	7.3%	3.6%
City Line - Western Avenue	855	1300	445	34%	4.3%	2.1%
NYS Thruway						
Exit 24 to Exit 25	3980	5550	1570	28%	3.4%	1.7%
South Frontage Road						
Pitch Pine Road - Columbia Circle West	100	800	700	88%	23.1%	11.0%
Columbia Circle West - Rapp Rd	190	800	610	76%	15.5%	7.5%
Columbia Circle West						
Office Complex - South Frontage Rd	535	800	265	33%	4.1%	2.0%
South Frontage Rd - Wash Ave Ext	810	800	-10	-1%	-0.1%	-0.1%

Cannot accommodate historical peak hour growth rate of 2.3% per year

traffic that will occur due to general background growth and/or development in the area. The southbound link between Washington Avenue Extension and Charles Blvd has a reserve capacity of 125 vehicles, which means that traffic can grow at one percent per year for 10 years or at one-half percent per year for 20 years before LOS E capacity will be experienced. These rates are far below the average annual traffic growth the County as a whole has experienced over the past fifteen years. The southbound link between Charles Blvd and Western Avenue currently carries 1325 vehicles in the pm peak, which exceeds LOS E capacity thresholds.

Maps 9 and 10 provide a graphic comparison of mid block level of service between 1985 and 2000/01. From these maps, it can be seen that mid-block LOS worsened on several segments of New Karner Road in both directions. Most other mid-block LOS indices remained at or below LOS C over the fifteen-year period. The westbound portion of the NYS Thruway between exits 24 and 25 is one notable exception, with volumes increasing from 2300 in 1985 to almost 4000 vehicles per hour in 2001. These data clearly suggest that a plan is needed to address capacity concerns on the New Karner Road corridor.

Speed-Delay Analysis

Maps 11-14 and Table 7 provide information regarding the speed delay runs that were conducted in both 1985 and 2000/2001. The results of these in traffic runs are summarized below:

Washington Avenue Extension (WAE): AM peak hour and PM peak hour speed delay runs were conducted for the WAE corridor. During the AM peak hour, average overall speed on WAE westbound from Fuller Road to New Karner Road declined from almost 40 mph in 1985 to just above 27 mph in 2001. Stopped delay increased from 53 seconds in 1985 to 99 seconds in 2001. Morning travel speeds from Columbia Circle to New Karner Road in the westbound direction were at LOS E in 2001, at close to 16 mph. The travel speed from Rapp Road to Columbia Circle dipped from over 50 mph to just over 27 mph. The speed-delay data suggest that the office space added along WAE during the 80's and 90's negatively impacted average travel speeds. Average overall speeds in the eastbound direction declined as well, from 36.4 mph to 32.7 mph in the AM peak and from 33.5mph to 28.3 mph in the PM peak.

Changes in PM Peak hour overall travel speeds in this corridor were not as dramatic. Again, the theory that peak spreading occurred during the evening commute over the fifteen-year period (as a traffic handling technique) is evidenced by the lack of significant changes in the speed delay data. WAE currently operates at LOS C in both directions, down from LOS B in 1985. Travel speed on Washington Avenue Extension in the westbound direction between Columbia Circle and new Karner road, however, did decline from LOS D (23.5 mph) to LOS E (19.3 mph). This is not surprising given that the intersection of WAE and New Karner Road operates at LOS F, with the westbound approaches to New Karner Road greatly contributing to this poor function. One segment on WAE, in the eastbound direction (Rapp Road to Crossgates Commons), however, declined from an average overall speed of 57 mph to 20 mph. This segment experienced 0 seconds of stopped delay in 1985 and an average of 33 seconds of delay (at the intersection) in 2001. This change can be attributed to the fact that Crossgates Commons produces and attracts over 2000 trips in the pm peak hour.

New Karner Road (NKR): AM speed delay runs were conducted on New Karner Road in 2001. During the AM peak hour, average overall travel speed along the entire corridor between Central

Map 9 here

Map 10 here

Map 11 here

Map 12 here

Map 13 here

Map 14 here

TABLE 7
Average Peak Hour Weekday Travel Times and Operating Speeds
1985 vs. 2000

Facility	Link	Posted Speed	Length (miles)	AM Peak Time (min)		AM Peak Speed (mph) LOS		AM Peak Stopped Delay (seconds)		PM Peak Time (min)		PM Peak Speed (mph) LOS		PM Peak Stopped Delay (seconds)	
				1985	2000	1985	2000	1985	2000	1985	2000	1985	2000	1985	2000
Washington Avenue Extension *Westbound*	Fuller Road to Crossgates Commons	55	1.1	1.27	1.78	51.8 **A**	39.0 **B**	0	0	1.39	1.74	47.4 **A**	38.0 **B**	0	6
Class I	Crossgates Commons to Rapp Road	55	0.4	.48	.60	50.4 **A**	30.7 **C**	5	7	.68	.67	35.5 **B**	36.0 **B**	15	5
	Rapp Road to Columbia Circle	55	0.5	.59	1.05	51.1 **A**	27.1 **C**	3	11	.90	1.00	33.5 **C**	30.1 **C**	10	8
	Columbia Circle to New Karner Road	55	0.6	1.58	2.72	22.8 **D**	16.3 **E**	45	81	1.53	1.86	23.5 **D**	19.3 **E**	34	39
	Total for Entire Length		**2.6**	**3.92**	**6.15**	**39.8 B**	**26.9 D**	**53**	**99**	**4.50**	**5.26**	**34.7 B**	**29.6 C**	**59**	**58**
Washington Avenue Extension *Eastbound*	New Karner Road to Columbia Circle	55	0.6	.90	1.02	40.0 **B**	3606 **B**	0	2	1.12	1.15	32.1 **C**	31.4 **C**	5	12
Class I	Columbia Circle to Rapp Road	55	0.5	.83	1.05	36.3 **B**	23.7 **D**	19	28	.78	.85	38.6 **B**	35.2 **B**	13	5
	Rapp Road to Crossgates Commons	55	0.4	.43	.53	55.8 **A**	39.5 **B**	0	0	.40	1.21	57.1 **A**	19.8 **E**	0	33
	Crossgates Commons to Fuller Road	55	1.1	2.12	2.17	31.0 **C**	30.0 **C**	32	39	2.35	1.91	28.0 **C**	34.6 **B**	44	13
	Total for Entire Length		**2.6**	**4.28**	**4.77**	**36.4 B**	**30.8 C**	**51**	**69**	**4.65**	**5.52**	**33.5 C**	**30.5 C**	**62**	**63**

TABLE 7 (continued)

Facility	Link	Posted Speed	Length (miles)	AM Peak Time (min)		AM Peak Speed (mph) LOS		AM Peak Stopped Delay (seconds)		PM Peak Time (min)		PM Peak Speed (mph) LOS		PM Peak Stopped Delay (seconds)	
				1985	2000	1985	2000	1985	2000	1985	2000	1985	2000	1985	2000
Western Avenue *Westbound*	Fuller Road to Schoolhouse Road	40	0.2							.91	.84	13.2 **E**	14.3 **E**	24	10
Class II	Schoolhouse Road to Church Road	40	0.2							1.03	.71	11.7 **F**	16.7 **E**	32	2
	Church Road to Rapp Road	40	0.7							1.23	2.25	34.2 **B**	18.7 **D**	4	42
	Rapp Road to Gipp Road	40	0.5							1.69	1.04	17.8 **D**	28.8 **B**	26	7
	Gipp Road to New Karner Road	40	1.1							2.68	3.10	24.6 **C**	21.3 **D**	53	63
	Total for Entire Length		**2.7**							**7.54**	**7.95**	**21.5 D**	**20.4 D**	**139**	**122**
Western Avenue *Eastbound*	New Karner Road to Gipp Road	40	1.1							2.05	1.86	32.2 **B**	35.5 **A**	15	2
Class II	Gipp Road to Rapp Road	40	0.5							1.17	1.63	25.6 **C**	18.4 **D**	10	38
	Rapp Road to Church Road	40	0.7							1.12	1.58	37.5 **A**	26.5 **C**	3	14
	Church Road to Schoolhouse Road	40	0.2							.92	1.73	13.0 **F**	6.9 **F**	21	70
	Schoolhouse Road to Fuller Road	40	0.2							1.15	.57	10.4 **F**	21.2 **D**	47	6
	Total for Entire Length		**2.7**							**6.41**	**7.38**	**25.3 C**	**22.0 D**	**96**	**129**

38

TABLE 7 (continued)

Facility	Link	Posted Speed	Length (miles)	AM Peak Time (min)		AM Peak Speed (mph) LOS		AM Peak Stopped Delay (seconds)		PM Peak Time (min)		PM Peak Speed (mph) LOS		PM Peak Stopped Delay (seconds)	
				1985	2000	1985	2000	1985	2000	1985	2000	1985	2000	1985	2000
New Karner Road	Western Avenue to Charles Blvd	30	0.5	.85	1.70	35.3 **A**	17.6 **D**	8	12	.86	.91	34.9 **B**	30.0 **C**	2	21
Northbound	Charles Blvd to Washington Ave	50	0.9	1.96	2.22	27.6 **C**	24.3 **D**	44	65	2.95	2.28	18.3 **E**	24.4 **D**	90	13
Class I	Extension														
	Washington Ave Extension to SEFCU	50	0.5	1.19	.95	25.2 **D**	31.6 **C**	9	0	1.15	1.21	26.1 **D**	25.8 **D**	4	23
	SEFCU to Albany St	50	0.8	1.73	1.41	27.7 **C**	34.0 **C**	14	12	2.49	1.38	19.3 **E**	33.7 **C**	47	16
	Albany Street to Central Avenue	50	0.4	1.93	2.83	12.4 **F**	8.5 **F**	97	100	2.03	2.07	11.8 **F**	13.0 **F**	66	54
	Total for Entire Length		**3.1**	**7.66**	**9.12**	**24.3 D**	**20.4 E**	**172**	**189**	**9.48**	**7.61**	**19.6 E**	**24.4 D**	**209**	**126**

TABLE 7 (continued)

Facility	Link	Posted Speed	Length (miles)	AM Peak Time (min)		AM Peak Speed (mph) LOS		AM Peak Stopped Delay (seconds)		PM Peak Time (min)		PM Peak Speed (mph) LOS		PM Peak Stopped Delay (seconds)	
				1985	2000	1985	2000	1985	2000	1985	2000	1985	2000	1985	2000
New Karner Road	Central Avenue to Albany Street	30	0.4	1.03	.98	23.3 **D**	24.4 **D**	9	0	.84	1.21	28.6 **C**	19.9 **E**	1	21
Southbound	Albany Street to SEFCU	50	0.8	3.09	2.27	15.5 **F**	21.2 **D**	156	34	1.67	1.62	28.7 **C**	29.6 **C**	18	13
Class I	SEFCU to Washington Ave Extension	50	0.5	2.77	1.12	10.8 **F**	26.7 **D**	73	0	1.75	1.28	17.1 **E**	23.5 **D**	44	23
	Washington Ave Extension to Charles Blvd	50	0.9	1.50	1.26	36.0 **B**	43.0 **A**	13	0	1.58	1.82	34.2 **B**	29.7 **C**	9	16
	Charles Blvd to Western Avenue	50	0.5	1.35	1.60	22.2 **D**	18.8 **E**	34	29	1.23	1.69	24.4 **D**	17.7 **E**	26	53
	Total for Entire Length		**3.1**	**9.74**	**7.23**	**19.1 E**	**25.7 D**	**285**	**63**	**7.07**	**7.61**	**26.3 D**	**24.4 D**	**98**	**126**

CLASS I

LOS A > 42 mph
LOS B >34-42 mph
LOS C > 27-34 mph
LOS D >21-27 mph
LOS E > 16-21 mph
LOS F ≤16 mph

CLASS II

LOS A > 35 mph
LOS B >28-35 mph
LOS C > 22-28 mph
LOS D >17-22 mph
LOS E > 13-17 mph
LOS F ≤13 mph

Avenue and Western Avenue improved slightly in the southbound direction and decreased slightly in the northbound direction between 1985 and 2001. Southbound speeds increased by 7 mph while northbound speeds decreased by about 4 mph. Notable speed declines in the northbound direction occurred on the link between Charles Blvd and Western Avenue. The speed on this link dipped from over 35 mph in 1985 to less than 18 mph in 2001. Signalization of the New Karner Road/Charles Blvd intersection is likely the cause of the halving of the average speed on this link. Southbound travel speeds in the AM peak improved on all but one link over the 16-year period. The travel speed LOS improved from LOS F to LOS D between Albany Street and WAE. Both the intersections of Albany Street and NKR and SEFCU/Old State Road and New Karner Road were reconfigure/re-timed during this time frame. Conceivably, the changes made at these two intersections improved flow on this section of the New Karner Road corridor.

For the PM peak hour, average overall travel speed along the entire corridor between Central Avenue and Western Avenue improved slightly in both directions between 1985 and 2001. Northbound speeds increased by 4 mph while southbound speeds decreased by just over 1 mph. Overall speed in the northbound direction increased noticeably on two links--the first between Charles Blvd and WAE and the second between WAE and Old State Road/SEFCU. The New Karner Road/Charles Blvd intersection was not signalized in 1985, and has since become a signalized intersection. The improved speed may well be the result of aggressive driver behavior and their use of the shoulders to by-pass left turning vehicles.. With regard to NKR/Old State Road/SEFCU, two things occurred over the 15-year period. First, SEFCU was constructed in the late 1980's and second, the signal-timing plan was altered to accommodate SEFCU and the new geometry at the intersection. The left turn phase that was added to signal plan in the northbound direction probably impacted flow on New Karner Road most. Consequently, it is understandable that average travel speed has remained relatively constant even though New Karner Road carries an average of 200 vehicles per hour more now than in 1985.

Western Avenue: Overall travel speed along Western Avenue between Fuller Road and New Karner Road decreased between 1985 and 2000. Travel speed negligibly declined in the westbound direction (from 21.5 mph to 20.4 mph, while speed more noticeably declined in the eastbound direction (25.3 mph to 22.0 mph). LOS, with respect to travel speed remained D in the westbound direction, and deteriorated from C to D in the eastbound direction. The section between Schoolhouse Road and Church Road was LOS E/F in both directions in both 1985 and 2000.

Few improvements in travel speed and LOS occurred on Western Avenue between 1985 and 2000. Two noteworthy exceptions are identified. Travel speed on Western Avenue between Schoolhouse Road and Fuller Road doubled (from 10mph to 21 mph) in the eastbound direction. This improvement can be attributed to the improvements that were made to the Schoolhouse Road and Western Avenue intersection in 1997. The average travel speed on Western Avenue between Rapp Road and Gipp Road in the westbound direction increased from 17.8 mph in 1985 to 28.8 mph in 2001. This increase in travel speed is likely the result of aligning the Rapp Road Johnston Road intersections.

Probable Additional Development

There is very little new development that is expected to occur over the next few years within the confines of the Pinebush Study Area boundaries. It was recently announced that SEFCU was moving from New Karner Road to the State Office Campus. A Pinebush Visitor Center will take the existing building over, and is expected to produce and attract fewer trips than the credit union. The second phase of the SUNY CESTM complex is currently under construction. The analysis of the traffic impact of this expansion is documented in the *Northwest Campus Capacity/Constrains Study* completed by the Saratoga Associates in January 2001. This study also identifies potential development scenarios and attendant impacts for 40 acres of land owned by the University between WAE and Western Avenue on the western side of Fuller Road. Much of the proposed development on this 40-acre parcel will be for student and retirement housing and is not expected to significantly impact the operation of the sections of Western Avenue, WAE and New Karner Road that are within the Pinebush Transportation Study area. Consequently, CDTC staff did not reanalyze the impact of this potential development for this update. Recently, it was announced that "Sematech North" (a semiconductor industry) will locate a research facility in Albany as part of the CESTM research complex at Fuller Road and Washington Ave. Extension. This decision is viewed by many as signaling a potential employment boost to the region. The Sematech facility itself is expected to employ only between 200 and 300 employees -- a relatively small number for the sub-area. Its impact on Fuller Road traffic, relative to the prior Pinebush study, is offset to some degree by the considerable loss of employment at Sysco and other sites on Fuller Road to the north. If additional research activity is anticipated at or near the site, it will be important for the University and other players in the public-private partnership to coordinate development with the Town of Guilderland and Albany County to ensure the continued functioning of Fuller Road, in particular.

An additional development proposal to develop a 31-acre parcel adjacent to Teresian House (WAE/Rapp Road vicinity) has been approved. This parcel will be developed into a senior campus, with 150 retirement units, a 100-person adult day care facility and an administration center. This development is not expected to be a large contributor to pm peak hour traffic, given that congregate care facilities produce/attract .17 trips per unit in the pm peak hour. Assisted Living units are currently under construction on the Daughters of Sarah Campus. Again, this development is not expected to significantly add to the traffic on the transportation network surrounding the development.

There is little developable land along Western Avenue within the confines of the Study Area. What has occurred over the decade, and what will continue to occur, is the reassignment of land use at existing parcels. As one business vacates, another typically will take its place over time. It is assumed that this constant flux in land use will not significantly change the character and flow of the travel in the area.

Beyond this development, future specific development in the area will most likely be limited to the following:

TABLE 8

Expected Development in the Pinebush Transportation Study Area

Development	Size of Development or Expansion	Potential Number of PM Peak Hour Trips
Washington Plaza	120,000 square feet of additional office space	180
Columbia Circle	60,000 Square feet of additional office space	90
Touhey Offices	75,000 square feet of additional office space	165
Mckenzie Property	300,000 square feet of additional office space	450
Crossgates Commons	130,000 square feet of additional retail space	415
Pine Lane	100 dwelling units	101
Karner Road Industrial Park	80,000 square feet of additional space	70
Gas/Convenience Store	Assumed 10 gas pumps	80

*The figures appearing in the column heading "Potential Number of PM Peak Hour Trips" do not account for pass-by trips. Therefore, these figures represent *maximum* trips, and actual trips could be up to 25% less due to pass-by.

Impact of Future Development on the Traffic Operation on the Major Roads in the Pinebush Study Area

Columbia Circle and McKenzie Property: These developments are located on the south side of Washington Avenue Extension, east of NKR. Together, these two developments could add 540 vehicle trips in the pm peak hour. Approximately 50 percent of trips originating from existing offices head west on WAE and the remaining 50 percent head east. Table 9 identifies the probable traffic impacts of these two developments. Given past history, it is likely that a major portion of these trips will be taken outside the peak hour. However, Table 9 shows the "worst case" scenario which assumes no pass-by trips and all trips occurring in the pm peak hour.

Washington Plaza: This development is located north of WAE between Washington Square and the Pine West Office Development. This development has the potential to produce and attract 180 vehicle trips in the pm peak hour. Using trip distribution patterns from the Pine West development, approximately 14 percent of trips produced will travel westbound on Washington Avenue Extension through the WAE/NKR intersection and the remaining 86 percent will travel eastbound. Approximately 21 percent of the entering traffic come from Washington Avenue Extension west of the development, and the remaining 79 percent from the east. It follows that a maximum 14 percent of the traffic resulting from the expansion could travel through the intersection of WAE and New Karner Road. Table 9 depicts the potential maximum (no local

TABLE 9
Potential Impact of Future Developments on the Pinebush Transportation System

Highway	Segment	2000 Volume		Maximum Acceptable Capacity		Development	Projected Increase in Volume		Projected Total Volume		2000 Reserve Capacity (no additional development)				Projected Reserve Capacity (with additional development)			
		EB	WB	EB	WB		EB	WB	EB	WB	EB	%	WB	%	EB	%	WB	%
WASHINGTON AVENUE EXTENSION (WAE)	Crossgates to Crossgates Commons	2060	1495	3500	3500	Columbia Circle/ McKenzie	235	50	2295	1545	1440	41%	2005	57%	1205	34%	1955	56%
						Washington Plaza	133	20	2193	1515	1440	41%	2005	57%	1307	37%	1985	57%
						Crossgates Commons	140	123	2200	1618	1440	41%	2005	57%	1300	37%	1882	54%
						Touhey	72	15	2132	1510	1440	41%	2005	57%	1368	39%	1990	57%
						Pine Lane	25	9	2085	1504	1440	41%	2005	57%	1415	40%	1996	57%
						Karner Road Industrial Park	13	3	2073	1498	1440	41%	2005	57%	1427	41%	2002	57%
						Gas/Convenience Store	17	13	2077	1508	1440	41%	2005	57%	1423	41%	1992	57%
						Total All Developments	***635***	***233***	***2695***	***1728***	***1440***	***41%***	***2005***	***57%***	***805***	***23%***	***1772***	***51%***
WAE	Crossgates Commons to Rapp Road	1730	1320	3500	3500	Columbia Circle/ McKenzie	235	50	1965	1370	1770	51%	2180	62%	1535	44%	2130	61%
						Washington Plaza	133	20	1863	1340	1770	51%	2180	62%	1637	47%	2160	62%
						Crossgates Commons	76	76	1806	1396	1770	51%	2180	62%	1694	48%	2104	60%
						Touhey	72	15	1802	1335	1770	51%	2180	62%	1698	49%	2165	62%
						Pine Lane	16	24	1746	1344	1770	51%	2180	62%	1754	50%	2156	62%
						Karner Road Industrial Park	13	3	1743	1323	1770	51%	2180	62%	1757	50%	2177	62%
						Gas/Convenience Store	17	13	1747	1333	1770	51%	2180	62%	1753	50%	2167	62%
						Total All Developments	***327***	***201***	***2057***	***1521***	***1770***	***51%***	***2180***	***62%***	***1443***	***41%***	***1979***	***57%***

Table 9
(continued)

Highway	Segment	2000 Volume		Maximum Acceptable Capacity		Development	Projected Increase in Volume		Projected Total Volume		2000 Reserve Capacity (no additional development)				Projected Reserve Capacity (with additional development)			
		EB	WB	EB	WB		EB	WB	EB	WB	EB	%	WB	%	EB	%	WB	%
WAE	Rapp Road to Columbia Circle West	1540	1410	3500	3500	Columbia Circle/ McKenzie	27	230	1567	1640	1960	56%	2090	60%	1933	55%	1860	53%
						Washington Plaza	133	20	1673	1430	1960	56%	2090	60%	1827	52%	2070	59%
						Crossgates Commons	76	76	1616	1486	1960	56%	2090	60%	1884	54%	2014	58%
						Touhey	72	15	1612	1425	1960	56%	2090	60%	1888	54%	2075	59%
						Pine Lane	16	24	1556	1434	1960	56%	2090	60%	1944	56%	2066	59%
						Karner Road Industrial Park	13	3	1553	1413	1960	56%	2090	60%	1947	56%	2087	60%
						Gas/Convenience Store	17	13	1557	1423	1960	56%	2090	60%	1943	56%	2077	59%
						Total All Developments	***354***	***381***	***1894***	***1791***	***1960***	***56%***	***2090***	***60%***	***1606***	***46%***	***1709***	***49%***
WAE	Columbia Circle West to New Karner Road (NKR)	1250	2030	3500	3500	Columbia Circle/ McKenzie	27	230	1277	2260	2250	64%	1470	42%	2223	64%	1240	35%
						Washington Plaza	5	22	1255	2052	2250	64%	1470	42%	2245	64%	1448	41%
						Crossgates Commons	76	76	1326	2106	2250	64%	1470	42%	2174	62%	1394	40%
						Touhey	72	70	1322	2100	2250	64%	1470	42%	2178	62%	1400	40%
						Pine Lane	16	24	1266	2054	2250	64%	1470	42%	2234	64%	1446	41%
						Karner Road Industrial Park	13	3	1263	2033	2250	64%	1470	42%	2237	64%	1467	42%
						Gas/Convenience Store	17	13	1267	2043	2250	64%	1470	42%	2233	64%	1457	42%
						Total All Developments	***226***	***438***	1476	2468	2250	64%	1470	42%	2024	58%	1032	29%

Table 9
(continued)

Highway	Segment	2000 Volume		Maximum Acceptable Capacity		Development	Projected Increase in Volume		Projected Total Volume		2000 Reserve Capacity (no additional development)				Projected Reserve Capacity (with additional development)			
		EB	WB	EB	WB		EB	WB	EB	WB	EB	%	WB	%	EB	%	WB	%
NEW KARNER ROAD	WAE to Old State Road	1780	1170	1300	1300	Columbia Circle/ McKenzie	140	14	1920	1184	-480	-37%	130	10%	-620	-48%	116	9%
						Washington Plaza	13	3	1793	1173	-480	-37%	130	10%	-493	-38%	127	10%
						Crossgates Commons	140	13	1920	1183	-480	-37%	130	10%	-620	-48%	117	9%
						Touhey	43	4	1823	1174	-480	-37%	130	10%	-523	-40%	126	10%
						Pine Lane	14	8	1794	1178	-480	-37%	130	10%	-494	-38%	122	9%
						Karner Road Industrial Park	16	3	1796	1173	-480	-37%	130	10%	-496	-38%	127	10%
						Gas/Convenience Store	20	15	1800	1185	-480	-37%	130	10%	-500	-38%	115	9%
						Total All Developments	***386***	***60***	***2166***	***1230***	***-480***	***-37%***	***130***	***10%***	***-866***	***-67%***	***70***	***5%***
NEW KARNER ROAD	Old State Rd to Albany St	1280	1210	1300	1300	Columbia Circle/ McKenzie	90	11	1370	1221	20	2%	90	7%	-70	-5%	79	6%
						Washington Plaza	9	2	1289	1212	20	2%	90	7%	11	1%	88	7%
						Crossgates Commons	61	15	1341	1225	20	2%	90	7%	-41	-3%	75	6%
						Touhey	27	3	1307	1213	20	2%	90	7%	-7	-1%	87	7%
						Pine Lane	10	6	1290	1216	20	2%	90	7%	10	1%	84	6%
						Karner Road Industrial Park	11	5	1291	1215	20	2%	90	7%	9	1%	85	7%
						Gas/Convenience Store	13	22	1293	1232	20	2%	90	7%	7	1%	68	5%
						Total All Developments	***221***	***53***	***1501***	***1263***	***20***	***2%***	***90***	***7%***	***-201***	***-15%***	***37***	***3%***

Table 9
(continued)

Highway	Segment	2000 Volume		Maximum Acceptable Capacity		Development	Projected Increase in Volume		Projected Total Volume		2000 Reserve Capacity (no additional development)				Projected Reserve Capacity (with additional development)			
		EB	WB	EB	WB		EB	WB	EB	WB	EB	%	WB	%	EB	%	WB	%
NEW KARNER ROAD	Albany St to Central Ave	965	855	1300	1300	McKenzie	56	7	1021	862	335	26%	445	34%	279	21%	438	34%
						Washington Plaza	6	2	971	857	335	26%	445	34%	329	25%	443	34%
						Crossgates Commons	38	20	1003	875	335	26%	445	34%	297	23%	425	33%
						Touhey	17	2	982	857	335	26%	445	34%	318	24%	443	34%
						Pine Lane	6	4	971	859	335	26%	445	34%	329	25%	441	34%
						Karner Road Industrial Park	7	4	972	859	335	26%	445	34%	328	25%	441	34%
						Gas/Convenience Store	8	18	973	873	335	26%	445	34%	327	25%	427	33%
						Total All Developments	***138***	***50***	***1103***	***905***	***335***	***26%***	***445***	***34%***	***197***	***15%***	***395***	***30%***
NEW KARNER ROAD	WAE to Charles Park	1160	1175	1300	1300	Columbia Circle/ McKenzie	13	90	1173	1265	140	11%	125	10%	127	10%	35	3%
						Washington Plaza	2	9	1162	1184	140	11%	125	10%	138	11%	116	9%
						Crossgates Commons	37	30	1197	1205	140	11%	125	10%	103	8%	95	7%
						Touhey	4	27	1164	1202	140	11%	125	10%	136	10%	98	8%
						Pine Lane	8	10	1168	1185	140	11%	125	10%	132	10%	115	9%
						Karner Road Industrial Park	30	6	1190	1181	140	11%	125	10%	110	8%	119	9%
						Gas/Convenience Store	37	27	1197	1202	140	11%	125	10%	103	8%	98	8%
						Total All Developments	***131***	***199***	***1291***	***1374***	***140***	***11%***	***125***	***10%***	***9***	***1%***	***-74***	***-6%***

Table 9
(continued)

Highway	Segment	2000 Volume		Maximum Acceptable Capacity		Development	Projected Increase in Volume		Projected Total Volume		2000 Reserve Capacity (no additional development)				Projected Reserve Capacity (with additional development)			
		EB	WB	EB	WB		EB	WB	EB	WB	EB	%	WB	%	EB	%	WB	%
NEW KARNER ROAD	Charles Park Western Ave	835	1325	1300	1300	Columbia Circle/ McKenzie	13	90	848	1415	465	36%	-25	-2%	452	35%	-115	-9%
						Washington Plaza	2	9	837	1334	465	36%	-25	-2%	463	36%	-34	-3%
						Crossgates Commons	37	30	872	1355	465	36%	-25	-2%	428	33%	-55	-4%
						Touhey	4	27	839	1352	465	36%	-25	-2%	461	35%	-52	-4%
						Pine Lane	8	10	843	1335	465	36%	-25	-2%	457	35%	-35	-3%
						Karner Road Industrial Park	9	25	844	1350	465	36%	-25	-2%	456	35%	-50	-4%
						Gas/Convenience Store	24	18	859	1343	465	36%	-25	-2%	441	34%	-43	-3%
						Total All Developments	***97***	***209***	***932***	***1534***	***465***	***36%***	***-25***	***-2%***	***368***	***28%***	***-234***	***-18%***

productions and attractions) impact of this development on Washington Avenue Extension and New Karner Road.

Touhey Property: The estimated productions and attractions from the construction of 75,000 square feet of office space on the Touhey Property (located on the south side of Washington Avenue Extension west of Pitch Pine Road) were distributed on the surrounding highway system using current trip distribution. The results of this procedure are summarized in Table 9. It is clear from Table 9 that full development of the Touhey property, for the most part, will have little negative impact on the midblock operation of the Washington Avenue Extension corridor.

Crossgates Commons: it is possible that one additional retail building will be constructed at Crossgates Commons. This building will provide up to 130,000 of retail space and is expected to produce and attract a total of 415 trips in the pm peak hour. The expected increase in trips were distributed using trip distribution figures that were collected at the existing intersection of Washington Avenue Extension and Crossgates Commons. Approximately 65 percent of the outbound trips will travel eastbound on WAE and almost 62 percent of the trips destined to Crossgates Commons originate from the east. Table 9 identifies the potential impact that the additional retail space will have on the surrounding highway system.

Pine Lane: Pine Lane is a residential area located south of Washington Avenue Extension on the west side of Rapp Road. Approximately 100 dwelling units will be constructed in this development. These dwelling units have the potential to produce 65 trips and attract 36 trips in the pm peak hour. Trip distribution was modeling using existing counts at the Springsteen Road/ Washington Avenue Extension developments. The potential impact of this development on traffic congestion is small.

Karner Road Industrial Park: Approximately 80,000 square feet of industrial space will be constructed at the Karner Road Industrial Park. Existing traffic patterns at the entrance of the park and New Karner Road were used to distribute the trips that will be created if this space is built. ITE trip generation data suggest that this development will create 70 trips during the pm peak, but given the existing work shifts at the site, it is expected that less than 70 trips will occur during the pm peak. Nonetheless, the analysis was performed using the 70 trip figure as a "worst case" scenario. Table 9 contains the results of this exercise.

Gas Station/Convenience Store: The Albany County department of Public Works indicated that a proposal is on hold to build a gas station/convenience store on the east side of New Karner Road between Gladwish Avenue and the industrial park. Detailed information was not available. It was assumed that the station would have an average of 10 vehicle fueling stations (ITE Trip generation average). This development has the potential to produce/attract 134 trips in the pm peak hour. A large portion of patrons utilizing a gas/convenience market are typically using that portion of highway on the way to or from a destination other than the gas station (pass-by trips). The potential productions/attractions were not reduced, however, because the actual size of the development is not known. Consequently, the data shown portray the worst case impact of this potential development.

Table 9 provides an analysis of the cumulative impact of all the above referenced developments on the transportation system in the Pinebush Study Area. From Table 9 it can be concluded that mid-block volumes on Washington Avenue Extension will not approach threshold volumes, even if all of the expected development occurs. New Karner Road, on the other hand, currently has little reserve capacity, and from a mid-block capacity perspective, can ill afford to carry the trips from the proposed developments. For example, New Karner Road has a reserve capacity of 2 percent and 7 percent in the northbound and southbound direction, respectively, between Old State Road and Albany Street. Most of the larger individual developments, such as Columbia Circle, Crossgates Commons and the Touhey development, potentially create a negative reserve capacity in the northbound direction on this link. The cumulative impact of all six developments pushes the reserve capacity of the northbound link to -15 percent and leaves a reserve capacity of just 4 percent in the southbound direction. Similar patterns are evident on the links between WAE and Western Avenue. Here, the cumulative impact of developing the seven parcels creates a negative reserve capacity on the southbound link on NKR between WAE and Charles Blvd. Each individual proposed development creates a negative reserve capacity on the both the northbound and southbound links of New Karner Road between Charles Blvd. and Western Avenue. The cumulative impact of the seven developments creates a negative reserve capacity of 2 percent in the northbound direction and 18 percent on this link.

It should be noted, however, that mid-block reserve capacity does not tell the whole story with regard to the overall operation of a facility. The reserve capacity data must be reviewed with the intersection level of service analyses and the speed delay data to get a true indication of how much additional traffic a road can handle.

Conclusions

Development in the Pinebush Study Area has been quite extensive since the 1985 Traffic study was completed. From this development, one would expect that the traffic levels on the roads and highways within the study area would have increased to a point of gridlock during the pm peak hour. However, this did not occur. For the most part, traffic growth was modest or flat, and in some cases traffic volumes declined. Several come to play in explaining this phenomena:

1. Crossgates Ramp to Fuller Road Alternate Northbound--This ramp was constructed during the 1990's and provides an alternative for persons shopping at Crossgates and Crossgates Commons to access I-87 Northbound and I-90 east and westbound with out traveling through the Fuller Road/Washington Ave or Fuller Road Alternate/Western Avenue intersections. The ramp carries close to 1200 vehicles in the pm peak hour. The construction of this ramp also changed peak direction traffic patterns of Washington Avenue Extension between Pine West and Crossgates.

In addition, it appears that the Crossgates Ring Road is serving as a major highway connector, a function that was not anticipated when the mall was built.

2. ShuttleBug Service--CDTC instituted its ShuttleBug service in January 1998. The ShuttleBug provides shuttle transit service from Crossgates Mall to the office buildings along Washington Avenue Extension. The route was expanded in late 2001 to include New Karner Road

businesses, including Charles Park and New Karner Industrial Park. Average daily ridership in 2000 was 230. It is estimated that 35 percent occurred in the pm peak.

3. E-ZPass--The New York State Thruway installed E-ZPass in the Capital District during 1995. This system allows for electronic toll collection. E-ZPass usage at the exit 24 and 25 toll plazas is nearly 65 percent during the pm peak. The E-ZPass system has all but eliminated large queues at the toll plazas during peak travel times. This system, in addition to the increased speed limit on this facility (from 55 mph to 65 mph) has encouraged commuters to use the Thruway rather than the local roads that parallel it, such as Washington Avenue Extension. Although definitive figures are not available regarding the impact of E-ZPass on the WAE traffic volumes, it is safe to say that volumes on Washington Avenue Extension have been reduced as a direct result of the popularity of the E-ZPass system.

4. Flexible Work Hours/Compressed Work Weeks/Telecommuting--A higher percentage of women are in the workforce today, than were in 1985. The 1990's were a decade of economic boom and full employment, which made it difficult for employers to attract and retain workers. In order to retain workers, particularly women with school age children, employers instituted flexible work schedule and compressed workweeks. Flexible work hours provide the employee to work their hours around their personal schedules. For instance an employee might choose to start work at 7:00 am in order to meet their child at the bus stop at 3:00 pm. Or an employee might choose to work a 30 hour workweek (five six hour days) to provide flexibility that is needed for their children's schedules. Ostensibly, these flexible schedules remove a portion of the commuting public from the peak commute hours.

Telecommuting often goes hand in hand with flexible work schedules. Telecommuters typically work from home several days a week, although sometimes telecommuters work at home as few as one day a week or as many as five days a week (and make arrangements to physically go to the office for monthly meetings). Telecommuting has become more popular with the introduction of affordable personal computer systems. These systems were not readily available to the general public in 1985. According to the 1995 Nationwide Personal Transportation Survey, five percent of the workers in the Capital District worked at home on a given day. Telecommuting, like flexible work schedules, reduces the number of vehicles that travel during peak commute periods.

Compressed workweeks allow employees to work their typical workweek (e.g. 40 hours) in 4 days rather than five, or their typical two-week work period of 80 hours in nine days rather than 10. Compressed workweeks require employees to stretch their workday to 9 or 10 hour days, which automatically moves one or both ends of the commute outside the peak. In addition, compressed workweek schedules reduce the number of days that the employee commutes.

5. Peak Spreading--Two hour traffic count data from the 1985 study were not available to compare with the two hour counts taken during 2000/01. However, AADT data and hourly variation in daily traffic data (Table 2 and Figures 1 through 5) clearly suggest that much of the anticipated growth in trips in the Pinebush area did occur, but over a larger part of the day, not during the pm peak. It can be concluded from these data that equilibrium has been reached with regard to traffic volume and delays in the Pinebush area. It appears that Pinebush area residents,

shoppers and employees have altered their travel patterns to a time during the day that is an "acceptable" level of congestion. Speed delay and intersection level of service data confirms this phenomena.

It is difficult to quantify the cumulative impact of five items listed above. However, given the comparison of traffic counts between 1985 and 2000/01 (Table 1), it can be concluded that these changes in behavior have significantly impacted traffic congestion in the Pinebush Study area. In addition, CDTC staff is observing that traffic levels that were at one time considered theoretically impossible by Highway Capacity Manual standards, are experienced daily on roads and highways within the Capital District and are handled and accepted in absence of incidents and bad weather. For example, engineers did not think that is was possible for the Northway to carry 2200 vehicles per lane per hour in the peak hour without serious gridlock occurring. This level of traffic occurs daily. Likewise, travel on most sections of New Karner Road exceeds 1300 vehicles per lane in the pm peak hour, yet only a few segments function at an unacceptable level-of-service in the PM peak hour. In fact, overall travel speed along the New Karner Road corridor between Central Avenue and Western Avenue is over 24 mph in both directions (LOS D). This suggests that perhaps we shouldn't be as concerned with "building our way out of congestion" as with "managing" the traffic better. Consequently, many of the high cost and controversial transportation improvements that were identified as possible solutions to the pending traffic doom in the Pinebush area should be re-thought, and some innovative traffic management/calming techniques should be considered.

The 1985 Pinebush Transportation Study was organized into six chapters. The sixth Chapter provided an analysis of transportation alternatives that would address expected year 2010 transportation deficiencies. Transportation improvements outlined under ***Alternative C2*** in this report were considered the "best" group of improvements. The major improvements considered under Alternative C2 included widening New Karner Road to four lanes, widening Washington Avenue Extension to six lanes or grade separating the intersections along WAE, grade separating the intersection of New Karner Road and Washington Avenue Extension, and realigning Old State Road with Old Karner Road. Other less capital-intensive strategies were also recommended, such as improving intersection capacity through lane additions and signal improvements and offering travel demand management options. Accordingly, many of the major capital transportation improvements recommended in Chapter VI *Long-Range Alternatives Analysis* (April 1990) of the Pinebush Transportation Study under Alternative C2 need to be reevaluated.

In addition, greater emphasis was placed on safety, bicycle/pedestrian accommodation and context sensitive design in the ISTEA and TEA-21 legislation, which was passed subsequent to the first Pinebush Transportation Study. This change in thinking is reflected in the recommendations put forth below.

Review of the 1990 Recommendations Under Preferred Alternative C2 and Updated Recommendations

Travel Demand Management Actions: Travel Demand Management (TDM) refers to a range of techniques used to reduce peak hour congestion on the highway system. Strategies used include

the promotion of increased use of the transit system, flexible work hours for employees, carpools and vanpools, telecommuting and other work at home mechanisms, and measures to increase bicycle use, such as provision of showers and bike lockers by employers. Some demand management actions eliminate trips; others eliminate only the use of vehicles in making trips; and others simply shift the time of trip making to less congested periods of the day.

The 1990 findings assumed that aggressive TDM efforts in the Pinebush Study area would reduce pm peak hour trips by 15 percent along New Karner Road and Washington Avenue Extension and by five percent elsewhere. Modeling work performed by the CDTC staff for the regional transportation plan shows a 20 percent reduction in peak hour work-related trips at major New York State employment sites and a 10 percent reduction at other major employment sites located in the Capital District.

Status: Although the incidence of carpooling is not significant in the Capital District, other TDM strategies, such as flexible and staggered work hours and telecommuting have taken hold. Recent Census data verify that almost three percent of the area's workers worked at home several days a week or more (up from just over 2 percent in 1990). As discussed previously, a fair amount of traffic reduction has occurred from these strategies in the Pinebush study area. In addition, CDTA's ShuttleBug service was instituted subsequent to the completion of the completion of the 1985 Pinebush Transportation Study and has recently been expanded to serve points along New Karner Road. These strategies have all contributed to the slower than expected traffic growth rate in the Pinebush Study area. Consequently, TDM still has merit for incorporation into a "transportation plan" for the area. In fact, in accordance with CDTC's draft *Congestion Management Principles*, any facility constructed with federal-aid which increases capacity for single occupant vehicles, must incorporate all reasonable TDM strategies to manage the facility effectively.

Updated Recommendations: TDM strategies, from transit incentive programs to carpool programs to staggered work hour programs should continue to be progressed in the area.

Transportation System Management and Land Use Design Actions: Traffic management in its broadest sense includes all actions to maintain or improve roadway operating conditions short of major widening or construction of new roads. Improvements such as low-cost signal timing and lane striping changes are many times more cost effective than physical expansion. Systems management for the next ten years must also involve active arterial management planning to preserve or restore the through-traffic carrying capacity of roads like Western Avenue, Washington Avenue Extension and New Karner Road. By definition, "arterial management" is intended to provide access to land development while simultaneously preserving the arterial function of major roads.

Toward this end, it was recommended that as development occurs in the study area, vehicle conflict points be limited, driveways be consolidated, vehicles and queues be removed from travel lanes and signals within corridors be coordinated. These recommendations hold true as a strategy to pursue to manage the traffic in the Pinebush Transportation area. Encouragement of

use of bicycles and walking has also become very important system management actions. Using existing transportation corridors to accommodate multiple modes of travel increases efficiency. Safe pedestrian and bicycle accommodations have the potential to contribute to reduce travel congestion, emissions and energy consumption.

Status: Transportation System Management has occurred in the Pinebush Study area to a fair degree. Signals along Western Avenue have been re-timed with the expansion of Crossgates and circulation on the Crossgates Ring Road was studied. The Ring Road was connected to Rapp Road for better access/egress. Bicycle and pedestrian amenities are still lacking, although CDTA installed a park and ride area at Crossgates Mall, with appropriate striping for transit users. The park-and-ride lot serves as a transfer point for several bus routes.

Updated Recommendations: CDTC's analysis of the traffic operations in the Pinebush Transportation Study area concluded that there are several opportunities to promote traffic management actions in the study area to handle projected volumes of traffic. These are:

1. **Driveway Consolidation:** Consolidate driveways along the Western Avenue corridor to reduce movement conflicts and consequently process the projected additional through traffic. This recommendation applies to the other major corridors in the area, including Washington Avenue Extension, New Karner Road and Fuller Road. However, the frontage road system has all but eliminated driveways along Washington Avenue Extension. New Karner Road and Fuller Road have few driveway curb cuts so the existing potential for improving level-of-service with this strategy is small. Nonetheless, analysis of the existing operation of driveways along these busy corridors should be performed when pavement and shoulder improvement projects are programmed. Approval of additional curb cuts should be carefully considered.

It should be noted that Creighton Manning Engineering recently completed a linkage study of the "McKownville Corridor", which encompasses much of Western Avenue that is within the confines of the Pinebush Study area (Johnston Road to Schoolhouse Road). This report puts forth specific driveway consolidation recommendations as well as other traffic calming recommendations for this portion of Western Avenue. Since this report is quite lengthy and available for review, the findings will not be enumerated here.

2. **Signal Coordination:** Coordinate timing of the traffic signals located along the Western Avenue and New Karner Road corridors. As noted in the analysis of existing traffic conditions, almost all of the delay detected during the speed-delay runs on these corridors was due to delay at traffic signals. Signal coordination should help process traffic through and between the intersections, which theoretically improves level-of-service in the corridor.

With regard to signal coordination along Washington Avenue Extension, it is possible that the lack of signal coordination could actually be metering the traffic between New Karner Road and Fuller Road, which are two very constrained intersections at either end

of Washington Avenue Extension. While typical recommendations would be to encourage ITS/signal coordination, it is not recommended that signal coordination be pursued along this corridor until the lack of capacity that currently exists at both ends of the corridor is addressed.

3. **Bicycle and Pedestrian Accommodations:** From the standpoint of trip locations and physical conditions, improvements to accommodate bicyclists and pedestrians should be considered in the context of highway repair or land use development. Specifically, bicycle and pedestrian amenities are mainly absent in most of the transportation study area, with a couple of exceptions. A recreational mountain bike trail system is located in the dunes of the Pinebush. This system is accessible from Rapp Road, New Karner Road, Madison Avenue Extension and Pitch Pine Road in the Dunes. There is a mix of shoulders, striped bicycle lanes and a wide shared travel lane for bicycles along Western Avenue. Bicyclists can travel along Washington Avenue Extension on its shoulders and on Fuller Road using the wide shared travel lane between Western Avenue and Washington Avenue Extension. Sidewalks were recently constructed along portions of Fuller Road (from Western Avenue to Loughlin Street). Audible crossing signals were installed at the intersection of Washington Avenue and Fuller Road and at the intersection of Tricentennial Drive and Fuller Road, although access to the SUNY property west of Fuller Road remains inadequate.

Crossgates Commons is now opposite Crossgates Mall, yet there is no pedestrian/bicycle accommodation for travelling between the malls. Low-cost steps to improve bicycle/pedestrian facilities should be considered--"bicycle stop lines" should be created at intersections to increase rider visibility and safety; bicycle "safe zones" should be created for non-turning cyclists in areas with vehicular right turn lanes; existing circulation barriers such as poles, signs, etc. should be removed from sidewalks and crosswalks should be striped.

The CDTC Bicycle and Pedestrian Issues Task Force, in the 1995 report entitled, *Making the Capital District More Bicycle and Pedestrian Friendly: A Toolbox and Game Plan*, recommended that approximately 353 miles of roadway in the Capital District should be assigned to a *Priority Bicycle/Pedestrian Network.* The goal is to make this network more bicycle and pedestrian friendly in the coming years. A notable portion of the recommended Priority Bicycle/Pedestrian Network in Albany County is located in and around the Pinebush Transportation Study Area. Most notably, the entire sections of NY 155, Western Avenue and Fuller Road located in the study area were identified as part of the bicycle/pedestrian priority network. (MAP 15). The task force proposed that improvements to roads designated as the Priority Bicycle/Pedestrian Network should include bike route designation and bike lane striping where appropriate; improvement to "group B/C" (average adult cyclists and children) standards-- five to six foot striped bikelanes along the network; installation of "share the road", "ped xing", "bike route" and other signage; more frequent sweeping and other routine maintenance, and provision of pedestrian and bicycle amenities such as crosswalks, walk/don't walk lights and bike racks.

Map 15 here

The McKownville Corridor study outlines specific bicycle and pedestrian amenities that should be provided along Western Avenue. The recommendations (and associated costs) are detailed in the January 2003 summary report entitled, McKownville Corridor Study. Briefly, the study recommends visibly striped crosswalks, countdown pedestrian signals and new construction/reconstruction of sidewalks throughout the McKownville Study area. Transit bulbouts are also recommended along the Western Avenue corridor.

Additionally, the municipalities in the Pinebush should actively preserve available "rights of way" for future construction of bike and recreational paths; enhance bicycle/pedestrian linkages from residential areas to employment centers and shopping centers through additional construction of sidewalks and bikeways; incorporate facilities to safely accommodate pedestrians and bicycles on existing automobile bridges and build additional sidewalks and bikeways with particular attention to transit boarding areas and areas with high levels of bicycle/pedestrian activity.

4. **Low Cost Intersection Improvements:** The 1990 Plan suggested that all of the signalized intersections in the Pinebush Transportation Study Area would benefit from increasing intersection capacity through lane additions and signal improvements. Specifics were not identified. This recommendation holds true under today's traffic conditions, considering that only one of the signalized intersections within the study area operates acceptably. This intersection, Schoolhouse Road at Western Avenue was improved during the 1990's as per recommendations in the 1990 study. Each of the remaining signalized intersections would require detailed engineering analysis to identify specific improvements at each. Signal coordination, a common ITS strategy of the 90's, should be pursued along Western Avenue and New Karner Road.

In NYSDOT's view, many of the intersections within the Pinebush Study Area are too complex or wide to consider adding turn lanes. Nonetheless, many of the intersections could be "tweaked" to gain better movement and pedestrian accommodation. The McKownville Corridor Study identifies several low-cost improvements that should be considered for four intersections along Western Avenue—Western Avenue and Schoolhouse Road, Western Avenue and Fuller Road, Western Avenue and Crossgates and Western Avenue and Johnston Road. The recommendations in this report primarily focus on accommodating the bicyclist and pedestrian, with a secondary focus of improving traffic flow through the intersection.

Major Capital Improvement Recommendations: The ability to provide adequate transportation service through implementation of travel demand actions and traffic management strategies has a definite limit. Consequently, several alternative traffic-engineering options were identified in 1990 to mitigate the expected future problems in the study area that would not be addressed by simpler options. These are discussed and reevaluated below. Funding for projects that are still considered valid, in many cases is not in place. Any recommended project, if advanced by NYSDOT or the town to CDTC for TIP consideration, would need to compete for funding with other candidate projects around the region. CDTC solicits candidate projects every two years; the last update began in November 2002.

Status: Some of the major capital improvements recommended under Alternative C2 from the 1990 study have been completed. The status of all the projects under this category is described below.

1. Construct a Ramp Connecting Crossgates to Fuller Road Alternate Northbound: This project was constructed during 1995 as part of the Crossgates Mall Expansion. The developer financed this project. As discussed, this ramp carries over 1200 vehicles in the pm peak hour.

2. Realign Rapp Road with Johnston Road (at Western Avenue): This project was constructed during 1995 as part of the Crossgates Mall Expansion. The developer financed the project. This intersection operates at LOS F, with little reserve capacity. The unsignalized intersection of Rapp Road and Western Avenue operated at LOS E in 1985, while the signalized intersection of Western Avenue and Johnston Road operated at LOS B. Although this realignment of Rapp and Johnston Road was a system improvement with regard to access management, it did little to improve the overall flow of traffic on Western Avenue. Nonetheless, this improvement handles the additional traffic that has been generated by the expansion of Crossgates far better than the previous configuration would have.

3. Realign Rapp Road with Jupiter Lane to Provide a New RR Crossing and Service Road Connections: This recommendation was proposed for several purposes--a) to eliminate the existing grade crossing on Lincoln Avenue which is a safety concern b) to remove through traffic from the Lincoln Avenue residential area in the Village of Colonie c) to provide system access to existing and light industrial development in the village and d) to provide a collector/minor arterial connection from Washington Avenue Extension to Central Avenue. TIP Project A289 calls for the grade separation of Lincoln Avenue and Amtrak and includes a new road from the end of Walker Way to Rapp Road and for the rehabilitation of Rapp Road. The $3.3 million construction project is scheduled for 2004-05. Several alternative designs have been suggested for this project. Final engineering design has not been determined. As an interim traffic management solution, pm peak period traffic in the northbound direction on Lincoln Avenue has been rerouted to Petra Lane/Walker Way/Jupiter Lane. In addition, TIP project A347 --Lincoln Avenue Sidewalks, was completed in 2001.

4. Widen New Karner Road/Grade Separate WAE/NKR: In 1985 New Karner Road carried nearly the same volume of traffic during the peaks that is does today. At that time, the impact of pending development loomed on the horizon, creating few alternatives to relieve the gridlock that was expected to occur. Consequently, it was recommended that two additional travel lanes be constructed on New Karner Road between Central Avenue and Western Avenue and that the intersection at Washington Avenue Extension be grade separated. Subsequent to the 1990 findings, environmental groups in the Pinebush reacted to the recommendation in a negative manner, stating that the widening project would have a harmful impact on the Karner Blue Butterfly

population in the area (an endangered species). Little work was progressed on the project, due to the high cost of the project, limited funding, and other issues.

In 1993, as a result of CDTC's New Visions Effort, five major capacity/mobility projects were programmed in the 1993-97 Transportation Improvement Program. Project A295 was one of these five. The description of project A295: "New Karner Road from US 20 to Route 5; add two lanes, Grade Separation on Washington Avenue Extension and Environmental Analysis" was programmed with the assumption that half of the cost of the project would be financed with private funds using Transportation Development District (TDD) legislation). Most of the work on the project was programmed for post 1999 with some preliminary engineering and the environmental study programmed for 1999.

The environmental study was conducted during 1999, under contract to the Department of Transportation, as part of TIP Project A295, to identify the ecological uniqueness of the Pinebush area, and how that uniqueness would be affected by widening New Karner Road. (*Threatened and Endangered Species Along County Route 155 Through the Albany Pine Bush*, Lawler, Matusky & Skelly Engineers, LLP, 2000) This study made it clear that "widening NY 155 may impact the viability of existing Karner Blue as well as other threatened and endangered species (TES) because wider highways are expected to be a greater hindrance, if not a complete barrier to dispersal". However, the study went on to state that selective widening with habitat accommodation might be acceptable.

5. Realign Old State Road with Old Karner and Widen Old State Road to Four Lanes: This project was recommended because it had several benefits-- a) it consolidates access at one signalized intersection b) it stretches out the weaving and queuing distance between Washington Avenue Extension and Old State Road and c) it provides a reduction of length of roadway that cuts through the Pinebush Preserve Area and fragments habitat areas). The Lawler (et al) report identifies this project as a potential solution to the fragmented habitat areas that exist because Old State Road divides preserve area. No further work has been progressed to date.

6. Widen WAE to Six Lanes or Grade Separate Intersections and Eliminate Signal Control: This project was recommended because projected pm peak hour directional volumes were in the vicinity of 3500+ vehicles, well above the LOS E threshold volumes. Expected measures of traffic volumes have not materialized on Washington Avenue Extension. Because there has not been a significant volume change along the corridor, no additional studies have been performed to assess the feasibility of this recommendation.

Updated Recommendations: Although it is clear that some of the major capital improvements, such as widening Washington Avenue Extension are not warranted given the analysis of the recent transportation data collected, transportation problems in the Pinebush Study area still exist. The following provides recommendations for improvements/further study:

1. Crossgates Mall Ring Road: The Crossgates Ring road and ramps to and from Fuller Road Alternate are serving a function not originally designed for. The ring road and ramps are serving a large portion of the increase in traffic that has occurred in the study area. The ring road/ramp configuration warrants redesign if significant traffic is to be added, or if Crossgates expands again. Connections to this area, particularly the ramps to/from Fuller Road Alternate/I-90 and I-87 is being studied as part of the $750,000 NYS Thruway Study. The NYS Thruway Authority has contracted a consultant to study the Thruway corridor between Exits 21A and 25A. The project is looking at interchanges both on and off the system, recognizing that the system does not end at the tollbooth. For example, the consultant will look at exit 24 from Western Avenue to Exit 2 of the Northway in addition to the Exit 24 interchange. The project should result in a set of recommendations, both on and off the system that should be implemented over a 20-year time span. One project considered involves the installation of a direct E-ZPass system from exit 24 to the Northway. The potential of a high-speed connection between the Northway and Thruway could severely impact treatments of Crossgates backups. CDTC has addressed this issue with the NYSDOT in the past in a memo dated February 1, 2000. This memo poses the "option of making the southbound exit ramp into Crossgates a continuous, right-turn-only connection to the Crossgates ring road." The memo states that "with this, the traffic light at the ring road could be eliminated. In combination with signing on the mainline that indicates to approaching motorists to use the exit ramp for certain stores (Penney's, etc.) and to access Crossgates via Western Ave. for other stores (Filene's, etc.), the right turn only exit ramp could effectively eliminate queuing back onto the mainline." Although this option appears “doable”, there are barriers to implementation. First, the Crossgates Mall Ramp Study (Creighton Manning Engineering, November 2001) concluded that this configuration would create backups on the connector road between Western Avenue and the Ring Road on Saturdays during the holiday shopping season. Second, Albany County Department of Public Works has indicated that Crossgates has control over the Ring Road and is unwilling at this time to improve to the Ring Road to acceptable highway standards.

An issue related to Crossgates deals with the bicycle/pedestrian connectivity between Crossgates and Stuyvesant Plaza. CDTC's McKownville Linkage study has recommended that a pedestrian/bicycle link between these two retail centers be considered. This connection will likely be designed when the Crossgates/Fuller Road Alternate access/design issues are addressed as part of the Thruway Study.

2. Old State Road/New Karner Road: Old State Road currently carries much higher traffic volumes than for what it was designed for. This road carries over 900 vehicles in the westbound direction in the PM peak hour. In addition, the entering volumes at the intersection of OSR/NKR exceed threshold capacity by 24 percent. The current configuration of this intersection is becoming a safety issue. Thirty-nine accidents have occurred at this location over the past four years. One third are rear-end crashes and half of the vehicles involved were travelling in the southbound direction. The

addition of approach lanes would help alleviate safety problems as would realignment as was suggested in CDTC's previous study and the Lawler report. This report substantiates CDTC's 1985 recommendation of realigning Old State Road to the north (possibly to connect with VFW drive on the eastern side of NKR), thereby providing a larger contiguous Pine Barrens habitat where it once was divided. This recommendation would also eliminate one intersection (and attendant conflict points) along this heavily traveled portion of New Karner Road.

Independent of realignment, the intersection (whether it is relocated or not) could potentially benefit from construction of a roundabout. Roundabouts have received a vast amount attention over the past several years as traffic calming measures and as designs that help traffic flow. A roundabout is a circular intersection that is designed to slow traffic while lowering delays. A well designed roundabout can improve safety for vehicles, pedestrians and bicycles. Their advantage also lies in providing a more aesthetically pleasing intersection design since there is less pavement and the central island offers an opportunity for landscaping features. Operations are improved by smooth flowing traffic, with less stop and go than a signalized intersection offers. Any discussion regarding this intersection will involve the Pine Bush Preserve Commission, as well as NYSDOT, Albany County, and the City of Albany given that sensitive Pinebush lands could be impacted by suggested improvements.

3. New Karner Road: Because the need for a four-lane or five-lane cross-section on New Karner Rd. is not as great as previously believed, and because there is an urgent need to rehabilitate and preserve the existing pavement and shoulders, a thorough pavement rehab project is warranted in the near future. Albany County is exploring a "Safe Track" project for New Karner Road from Western Avenue to Watervliet Shaker Road. This project would make minor repairs to the existing concrete roadway, repair the shoulders, pave the existing lanes with several inches of asphalt and if possible construct turning lanes at Charles Park/Corporate Circle. The estimated cost of this project is $5 million with the potential of completing the project with county funds. This project is contingent upon the approval of jurisdictional transfer of highways between Albany County and New York State.

Once the pavement conditions are stabilized on New Karner Road., it would be appropriate to continue the exploration of the funding for and details of longer range strategies for the corridor. Longer-range strategies include conversion of the facility into a "parkway" with advanced design treatment for wildlife crossing (as suggested in the Pine Bush Commission's design exercise) and advanced design treatment at intersections (such as roundabouts). Funding for the longer-range strategies cannot be expected to include the degree of private financing that had been anticipated when the widening project was added to the TIP in 1993. CDTC will need to explore the ability of routine sources of highway funding (TIP funding) to support some or all of the longer-range concepts; any linear work such as parkway creation would not be scheduled to occur prior to the end of the life of the upcoming pavement repairs.

Intersection work such as roundabout consideration could be pulled out and advanced sooner, as funding and TIP priorities permit.

Furthermore, the Lawler report recommended that the surrounding habitat should be enhanced with roadside plantings of wild lupines and nectar species. It was also suggested to create environmental corridors on either side of New Karner Road with lupine seedings, planting of nectar species and other vegetation used by the Karner Blue for roosting and cover.

During the 1980's, Transportation Development Districts (TDD's) were on the horizon and expected to put mechanisms in place to allow for public/private financing. The New Karner Road project on the TIP (project A295) was programmed under the assumption that a TDD would be formed in the study area and that the project would be funded with 50 percent public and 50 percent private funds (based on the estimate that 50 percent of the traffic was through traffic). The TDD legislation was never passed and was dropped from legislative agendas. As demonstrated throughout this report, the increase in peak hour traffic was not commensurate with the development activity in the area. Since development did occur, and people need to access work sites in the area, it is reasonable to believe that the percentage of "through trips" declined. Convenience of traveling through the local road system (excluding the NYS Thruway) diminished, which further substantiates the estimate that through trips have declined in the area. Finally, Thruway volumes increased dramatically over the 15 year period, which indicates that people previously accessing the local roads in the Pinebush for through travel are now utilizing the Thruway instead. These factors clearly indicated the need for reevaluatingt the 50/50 public/private financing obligation outlined in the Transportation Improvement Program for the New Karner Road project.

The 2003-08 Transportation Improvement Program is currently being updated. CDTC’s Planning Committee has agreed to maintain a TIP commitment to the New Karner Road corridor in the draft 2003-08 TIP. The draft listing shows $375,000 for scoping and $750,000 for design for corridor improvement within five years and $15.4 million for construction post 2008. The 50% private financing requirement is no longer listed.

4. New Karner Road/Washington Avenue Extension: Alternative C2 recommended that this intersection be grade separated. Grade separation is expensive, requires land acquisition and may no longer be a valid recommendation for this intersection, given the environmental concerns for the New Karner Reoad corridor. Obviously, design of this intersection will be tied with the results of a thorough study of the long range strategies for the New Karner Road corridor.

It should be noted that a Short-Term Accident Reduction (STAR) project is programmed for the intersection of New Karner Road and Washington Avenue Extension. While details are sketchy (this project has not yet gone through project

design), the project will likely eliminate the continuous right-turn lanes (WB and NB) and signalize this movement. This is *a short-term* solution to a rear-end accident problem at this intersection. This project does not address (nor was it intended to address) capacity issues at the intersection.

5. Fuller Road: Although not identified as mitigation measures under Alternative C2, it should be noted that significant modifications to Fuller Road were also made during the fifteen year time frame. Specifically, Fuller Road between Washington Avenue Extension and Western Avenue is now made up of two 14-foot travel lanes and a flush median which forms a two-way left turn lane between Western Avenue and Washington Avenue Extension. The southbound lane now transitions from the two-lane configuration at WAE to one travel lane before reaching Tricentennial Drive. After this point, the single lane transitions into a 14 foot southbound lane and an exclusive 12 foot left-turn lane at Tricentennial Drive. The southbound lane transitions into two lanes at Stuyvesant Plaza.

There is concern that these improvements will not be sufficient to handle the increase in traffic that is expected once Sematech North locates their research facility in Albany as part of the CESTM research complex at Fuller Road and Washington Avenue Extension. The analysis of this impact is beyond the purview of this study. However, it is recommended that the University and other players in the public-private partnership hire a consultant to conduct a traffic impact analysis of the development. *At minimum, adequate pedestrian and bicycle accommodations, from the CESTM site to the University should be provided*.

6. Pinehurst Boulevard: Pinehurst Boulevard provides access to a residential neighborhood that is located just south of Washington Avenue Extension, west of New Karner Road. This is an unsignalized intersection, which causes major delays for residents trying to access or egress the development from and to New Karner Road, especially the northbound lanes of New Karner Road. CDTC staff studied this intersection during the am and pm peak in 2003. During the am peak, 53 vehicles turned left from Pinehurst Boulevard onto New Karner Road. Of these, five had to wait 60 seconds to find an available gap in traffic. The average delay to turn left onto New Karner Road was 27 seconds. The situation is much worse during the pm peak. About one-third of the 18 vehicles turning left onto New Karner Road experienced delay ranging from 60 seconds to four minutes. The average delay was 55 seconds. During both the am and pm peaks, cars turning left onto Pinehurst Boulevard from New Karner Road wait in the middle of the road, while through traffic uses the shoulder to continue north on New Karner Road. While the field data show delay to residents, traffic volumes at this intersection do not warrant an additional traffic light on New Karner Road. One potential solution to providing access involves extending Pinehurst Boulevard westward and northward, to connect to Madison Avenue Extension. Residents could then access New Karner Road at the intersection of Madison Avenue and New Karner Road. This solution would have to be looked at carefully, given that sensitive Pinebush lands surround the residential development.

7. Environmental Justice Concerns: Year 2000 Census data indicate that the population distribution in many of the residential developments located in the Pinebush Transportation Study Area meet the Environmental Justice definition of "minority" population. Over the past two decades, a significant growth in population and attendant number of black and Asian populations has occurred in the study area. A majority of these households, however, do not meet the definition of "low income". All of the recommended transportation improvements listed above enhance the walkability and traffic flow in the study area and are not anticipated to displace residential property. Nonetheless, as engineering design and construction occurs, specific attention should be focused on the impact to these neighborhoods.

It should not be concluded from this report that there are many "quick fixes" to the transportation problems in the Pinebush Study Area. Many of the intersections are "maxed out" with multiple turn lanes and complex signal phasings, which makes it inadvisable to widen further and add turn lanes. One must weigh the trade-off between widening with right-of-way and drainage impacts, and also with the goal of maintaining bicycle and pedestrian friendly corridors. It has been demonstrated that the traveling public has made travel choices to avoid the Pinebush Study Area during peak commute times and an equilibrium of sorts has been reached. The "solution" to the transportation problems in the Pinebush, therefore, might be to calm traffic in the area, add improvements where feasible, and admit that that is the "best" that can be done for the transportation network in the area.

It is acknowledged that the Pinebush study area lies within the Pine Bush Protection area as defined by the Albany Pine Bush Preserve Commission. It is recommended that all potential transportation solutions should be evaluated within the context of the Pine Bush Preserve Commission's *Albany Pine Bush Management Plan* and within the context of the Commission's ability to protect and manage the Pine Bush habitat.