GREAT NECK ROAD TRAFFIC CALMING

NYSDOT PIN NO. 0757.94.121

POST CONSTRUCTION STUDY

Prepared for:

THE INCORPORATED VILLAGE OF
GREAT NECK PLAZA

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The Incorporated Village of Great Neck Plaza – Great Neck Road Traffic Calming

Abstract. This paper will address the implementation of a road diet along Great Neck Road as a traffic calming and safety initiative that was constructed in the Incorporated Village of Great Neck Plaza. The subject project is located in the business district along Great Neck Road which is approximately a half mile in total length. Great Neck Road is a county owned facility that runs primarily in the east-west direction of travel that connects Middle Neck Road and Cutter Mill Road/Bayview Avenue, which is also located adjacent to the Great Neck Railroad Station. This station has a direct connection to New York City and AM and PM peak hour travel times produce a large number of commuters. Due to the conditions described above, pedestrian and motor vehicle activity is relatively high along the roadway corridor. The demographics of the population in the village shows that the over-65 age group comprises over 30% of the total population and a major senior citizen living community resides on Great Neck Road. This local connector roadway has had a long history of high rates of motor vehicle crashes, many of which are injury related and some have involved pedestrians. A road diet (the removal of a through lane of traffic in each direction of travel) was the proposed solution to address the issue of vehicular and pedestrian safety. The existing roadway corridor is subject to speeding and numerous accidents which will be documented through spot speed radar data acquisition and the retrieval of police accident report data for the three year period from January 2006 through December 2008. A detailed accident analysis was performed for the "before" condition to validate that the implementation of the road diet is necessary from a traffic safety standpoint for both motorists and pedestrians. Traffic counts will also be acquired and a capacity analysis will be performed to verify that the removal of one lane of traffic in each direction will not adversely affect the existing signalized intersection capacity. This paper will further discuss the geometric design principles involved with road diet design concepts that induce motorist speed reduction and reduce the number and injury severity of crashes. Other miscellaneous traffic calming design concepts for the project that are proposed to increase pedestrian safety will also be discussed.

INTRODUCTION AND BACKGROUND

The Incorporated Village of Great Neck Plaza (hereinafter referred to as "Village") is located on Long Island, NY, just east of the New York City line. Although the Village is small, approximately one-third of a square mile in area, it contains the Central Business District comprised of 250 boutique stores and service establishments, approximately ninety multiple-family apartment buildings, forty-five office buildings, a nursing home, and two senior independent living and assisted care facilities. The Village contains the Great Neck Long Island Rail Road (LIRR) train station, serving as the commercial and transportation hub for the entire Great Neck Peninsula, which encompasses eight other villages and several unincorporated areas of the Town of North Hempstead.

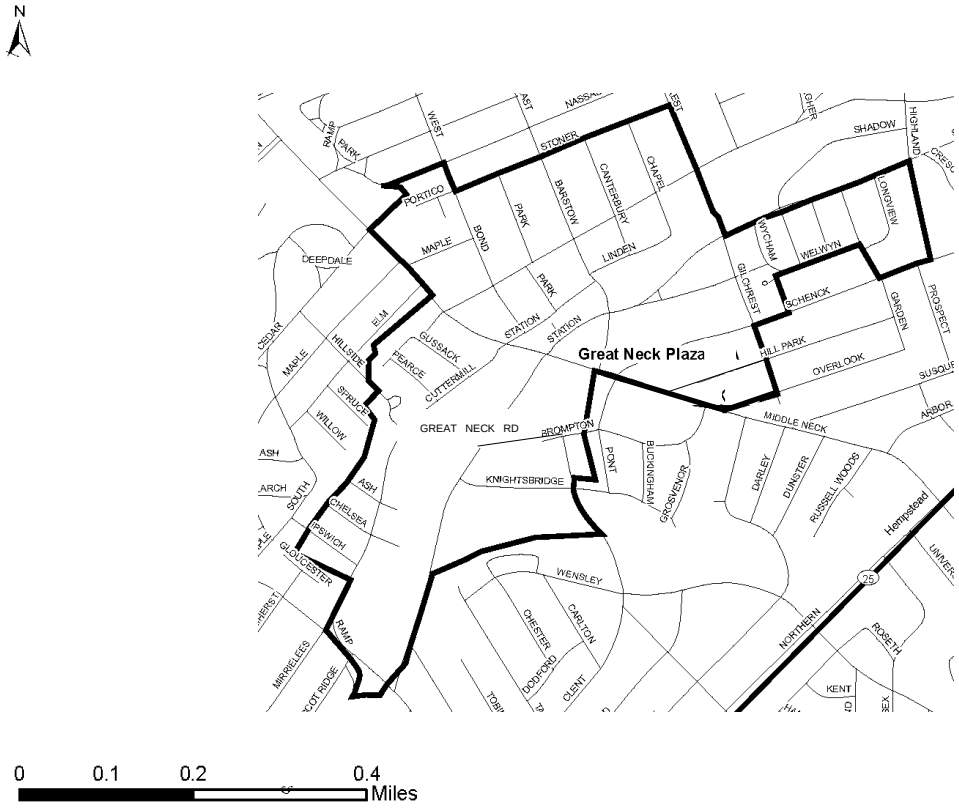


Figure 1. Map of the Incorporated Village of Great Neck Plaza, Long Island, New York

As a result, the Village is subject to the same traffic and pedestrian safety problems that are associated with busy city centers. These problems vary from gridlocked conditions in the commercial area adjacent to the LIRR station, to speeding vehicles approaching the commercial area. Since the Village has a large number of senior citizens, as well as three senior care facilities, much of the pedestrian traffic is comprised of slower-moving and slower-reacting older adults. The amount of senior citizens in the Village is increasing, and this age group now comprises over 30 percent of its population.

To address these concerns, the Village has embarked on a traffic calming program to improve pedestrian safety by reducing vehicular speed, enhance the visibility of pedestrians to approaching motorists, and improve safe crosswalk usage. Some of the traffic calming design features that the village elected officials and their residents have endorsed are:

- Installation of **Median Islands** to reduce vehicular speeding and create more organized and predictable vehicular movements throughout the Great Neck Road corridor.
- **Pedestrian Refuge Areas** and **Countdown Pedestrian Signal Indications** at signalized intersection crossing areas for additional pedestrian safety due to the 58 feet long roadway pavement width crossings.
- **Pavement Marking** applications and **Colored Crosswalk Pavement**, and improved **Signage** applications.

Traffic calming applications were selected based on the numerous complaints of vehicular speeding and the observed high rate of accidents that occurs throughout the entire roadway corridor of Great Neck Road. Great Neck Road is approximately ½ mile in length and

terminates at the intersections of Cuttermill Road to the west and Middle Neck Road to the east. Both Cuttermill Road and Middle Neck Road are major 4 lane collector roadways that are two of the three north-south arteries that service the remainder of the Great Neck peninsula, which comprises of a total of eight separate village and many other unincorporated areas. Great Neck Road runs primarily in the east-west direction and is located just east of the downtown area of the Village of Great Neck Plaza adjacent to the Great Neck train station on the Long Island Rail Road's Port Washington Branch which is one of the railroad's nine branches. The Long Island Rail Road is the busiest commuter railroad in North America, carrying an average of 274,000 customers each weekday to and from New York City. Therefore, there are many commuters which drive through the project roadway daily in a rush to catch a train, or use this route to arrive home at points west of the village in the evening. As a result, large platoons of commuters use parking facilities along Great Neck Road and walk across the various intersections, making their way to the Great Neck Train Station located at the intersection of Great Neck Road and Middle Neck Road. From a pedestrian and motor vehicle traffic standpoint, Great Neck Road has one of the busiest mixes of pedestrians and motor vehicle traffic throughout the entire village.

Since the roadway is a gateway to the downtown village and rail road located in the downtown area, there are numerous stores, shops, and restaurants that generate a great deal of pedestrian traffic along its east end, and a mix of business uses and large condominium complexes along the middle portion and western end. A very large senior citizen condominium center (The Atria) is located on the west end of the project, and a very busy shopping center (The Gardens) is located directly opposite the Atria. The Gardens shopping center contains various restaurants, a supermarket, and a drug store. The center is so busy and generates enough traffic that it requires a traffic signal at the ingress/egress driveway located on Great Neck Road. Throughout the day, slower moving senior citizens attempt to cross Great Neck

Road at the existing crosswalk to get to this center.

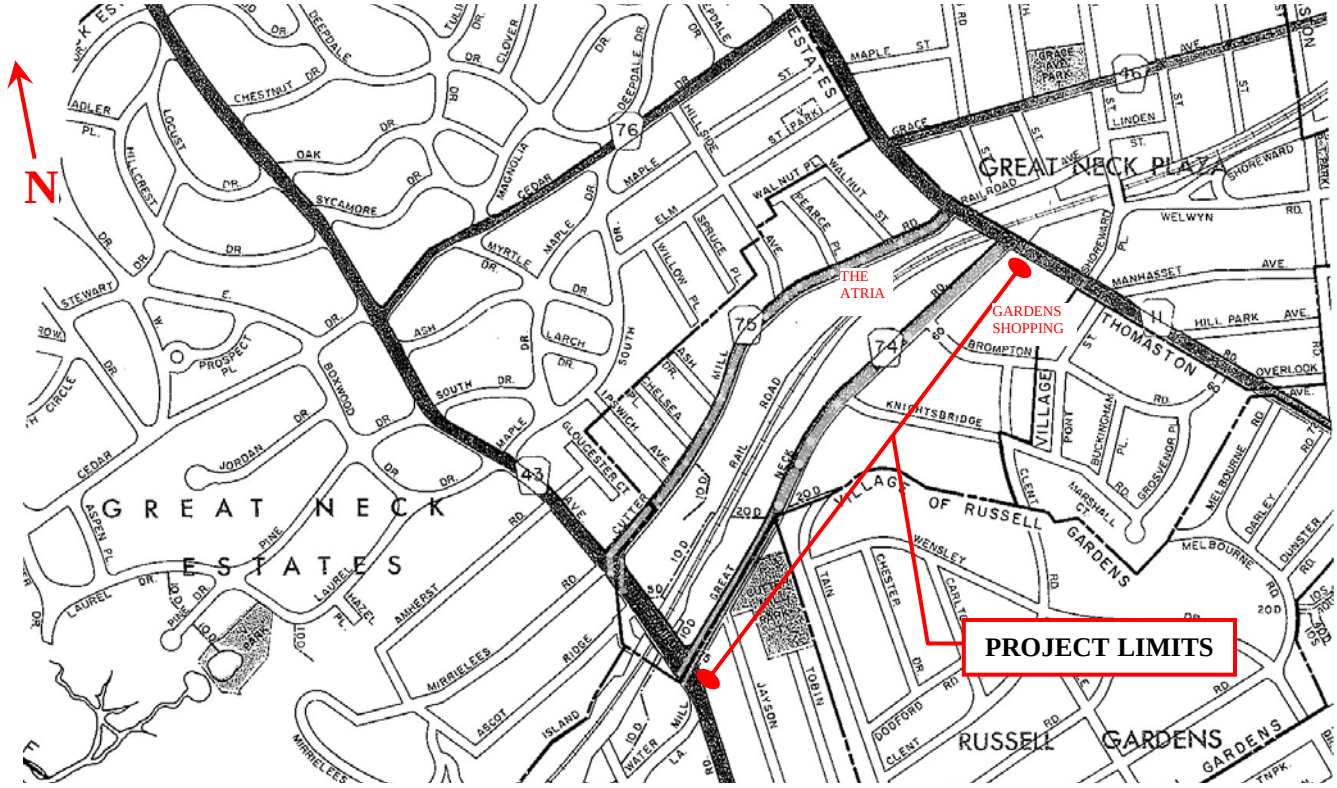


Figure 2. Great Neck Road Project Location Map

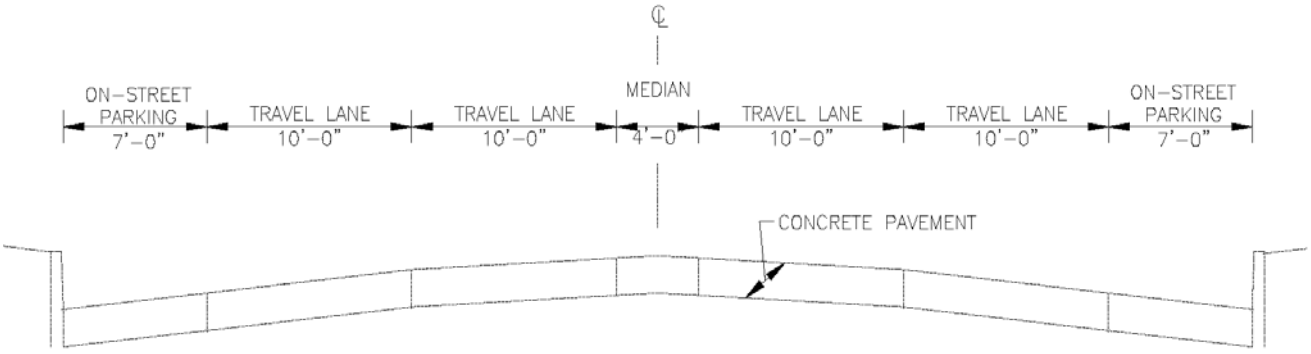
As can be seen in the project location map (Figure 2), the existing roadway runs primarily in an east-west route. Great Neck Road terminates at the east end at the intersection of Middle Neck Road and terminates on the west end at the intersection of Cuttermill Road/Bayview Avenue.

Great Neck Road has had a long history of being known by village residents for the numerous amount of motor vehicle crashes each year, as well as speeding vehicles. Attempts in the past were made to eliminate the speeding by installing digital feedback speed awareness devices in both directions but this application only helped for a short period of time. The existing concrete pavement roadway was originally constructed in 1928, and even though it had held up well for a road that is over eighty-years old with no surface treatment, the concrete top surface paste has worn down exposing the aggregate. The exposed aggregate has been polished over time due

to vehicular volume (see photo 1) which has reduces the skid resistance of the surface to a level far below what is acceptable based on County and State minimum standards. A good deal of the accidents, particularly the rear-end type occurred in inclement weather where vehicle skidding on pavement was reported by the driver.

Photo 1 – The existing concrete pavement depicting the polished aggregate due to wear over time. This condition reduces friction resistance of the pavement and contributes to the skidding of vehicles, particularly in inclement weather.

Another problem with Great Neck Road was the existing design and lane configuration; the roadway pavement width from curb to curb is 58 feet, comprised of four – ten foot travel lanes (2 in each direction of travel), seven foot shoulders used for parking, and an existing slightly raised four feet wide median (see Figure 3) which had numerous openings and curb-cuts created over time to allow access for businesses as part of their site plan submissions.



<u>Figure 3.</u> Existing Typical Section of Great Neck Road

This existing typical pavement section as described above has numerous non-standard features. Ten foot lanes are not adequate for the buses and trucks that use this corridor daily, particularly the outside lanes which are directly adjacent to on-street parking along the entire length of the shoulders throughout the project. Since the roadway traffic volume varies, many times during the off peak travel periods large vehicles (and many times smaller passenger vehicles) can be observed driving down the center of both lanes. Where vehicles stay in their respective lanes during peak period travel times, many sideswipe type accidents have occurred when parked vehicles doors are opened, and when speeding vehicles attempt to overtake the vehicle in the adjacent lane in a rush to and from the railroad. The existing four foot wide slightly raised median with a mountable curb facing is also a problem with its numerous openings. Vehicles entering and exiting the businesses and offices along the entire corridor will unexpectantly use these openings to cross the road at inconspicuous locations. When this occurs with the vehicular speeding as described earlier with a very low gap acceptance due to the general aggressive driving nature of this urban environment, a large number of right angle accidents have occurred that involve a high rate of injury severity. The detailed crash data analysis can be observed in Appendix 1. The roadway corridor's land use over the past ten years has been changing over from commercial office buildings to condominium housing and apartment complexes. The increase of mixed-use of the adjacent parcels has led to an increase in pedestrian traffic which use the shops, restaurants, grocery, drug stores, and the railroad located on the eastern end of the project roadway to commute to work. Based on the conditions described above and the numerous complaints from the local residents, village officials determined that actions needed to be implemented to create a safer and more walkable neighborhood.

PROJECT DESCRIPTION

The primary concern and directive from village officials was to increase the roadway corridor's overall level of safety for both motorists and pedestrians. Secondary factors for improvements included intersection capacity, mobility, accessibility aesthetics, life cycle cost, and inclusion of sustainable and context sensitive solutions. After careful consideration of the existing geometric and physical roadway problems in conjunction with the traffic volumes, vehicular speeding, and crash history, the suggested proposed potential solution was to physically convert the existing 4-lane facility to 2 lanes and narrow the roadway pavement with the addition of a raised median. The narrowing of the roadway from four lanes to two lanes is a traffic calming application that has been coined the term "road diet." It was felt that the road diet application was the overall best solution to address the existing problems for this project location.

A road diet constricts a roadway corridor in terms of the number of travel lanes available to motorists. Dependent upon the existing traffic volumes, the directional distribution, and the number of existing travel lanes, this may involve the removal of one or more lanes in either one or both directions. One of the primary considerations is the existing traffic volume and roadway capacity. Generally, when considering a road diet for a four lane roadway, an average daily traffic (ADT) volume should be in the range of 8,000 to 18,000 (Burden, Lagerway, 1999).

When designing a road diet, keeping the full number of lanes at intersections when considering 4-lane to 2-lane conversions, will in many cases maintain the same level of service from a capacity standpoint as the original 4-lane roadway. The additional pavement area at the intersections can be used for left and right turn lanes which can improve intersection capacity.

The reduction of the number of thru travel lanes will serve to create a more uniform traffic flow with more predictable gaps in traffic flow and better sight distance (see Figure 5), which will

reduce the number of conflict points at the intersections (see Figure 4) and the overall number of vehicular crashes.

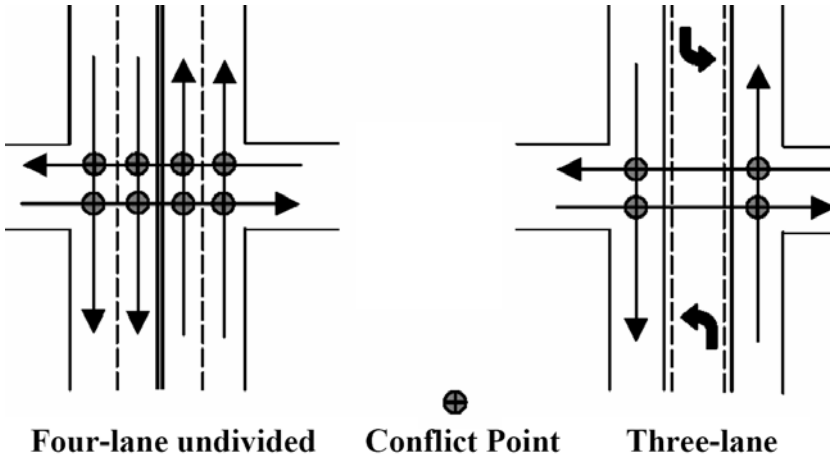
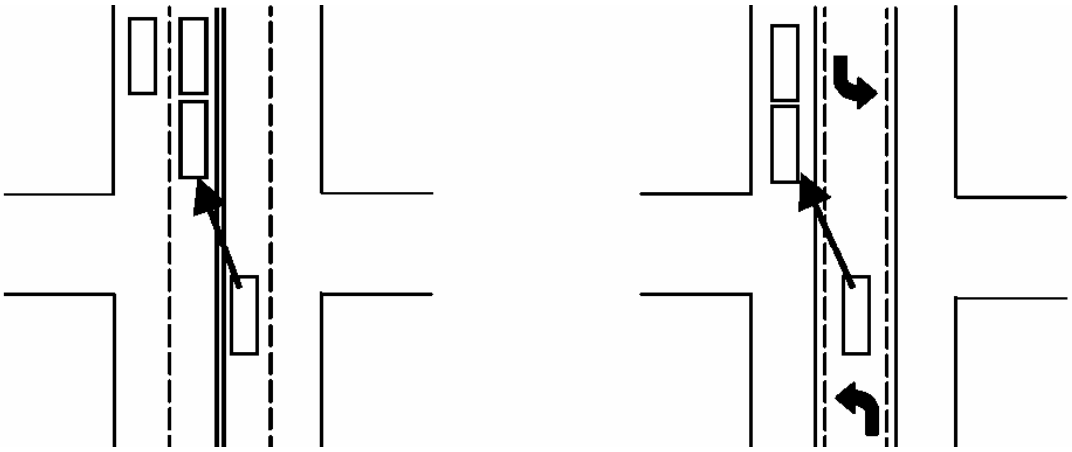


Figure 4 – Reduction of conflict points from a conversion of a 4–lane roadway to 2 lanes

At signalized or stop controlled intersections it has been found that about 53 percent (Robinson, Rodegerdts, Scarborough, et al. 2000) of all collisions involve left-turn or right-turn collisions. They occur because a left turning driver misjudges the approaching gap in vehicles, and/or the speed of approaching vehicles. These types of collisions can be greatly reduced with a road diet conversion.



Existing four-lane sight distance problem with inside lane blocking view of approaching outside vehicle.

Proposed Two-Lane Road Diet with left turn bay/center left turn lane eliminates the hidden approaching outside vehicle.

Figure 5 – Removal of sight distance issue when converting a 4–lane roadway to 2 lanes

There are many types of potential roadway conversions that are possible (see Figure 6 below for examples). The final selection of a road diet conversion typical section should be based on adjacent land use, and other planning considerations such as the extension of an existing bike lane system. The end result of a successful implementation of a road diet is a more efficient roadway for motorists and a more comfortable and safer roadway for pedestrians and other non-motorized users.

Due to budgetary constraints of the awarded grant amount, the project was confined to performing the work within the existing pavement area, such that limited work would occur behind the existing curbs within the existing right-of-way. Physically narrowing the roadway by moving the curbs in and providing additional drainage was not feasible from a cost standpoint, and therefore it was necessary to look at options that would constrict the roadway pavement surface from the inside-out. The preferred solution proposed a variable width median that was typically ten feet in width that reduced where left turn/u-turn lane openings were provided for accessibility.

The road diet was designed in accordance with Federal Highway Administration standards, and was designed to be safely negotiated by commuter buses en route to the train station. Additional requirements included a minimum of 17 feet of passable travel way which was stipulated by the local fire department as a covenant in a Memorandum of Understanding (MOU) that was entered into with the village to gain support for the project.

The proposed typical section for the Great Neck Road - Road Diet consists of the following elements below and is depicted in Figure 7 below:

- One continuous 12 feet wide travel lane in each direction of travel.

- A 10 feet wide median that narrows to accommodate left turn lanes at the intersections.
- A 7 foot shoulder/parking lane on both sides of the roadway with a 2 foot hatched buffer areas to facilitate ingress/egress and the opening of car doors.
- A 3 foot left shoulder in both directions to accommodate the bypass of vehicles and emergency response units when an event occurs that blocks the travel lane.

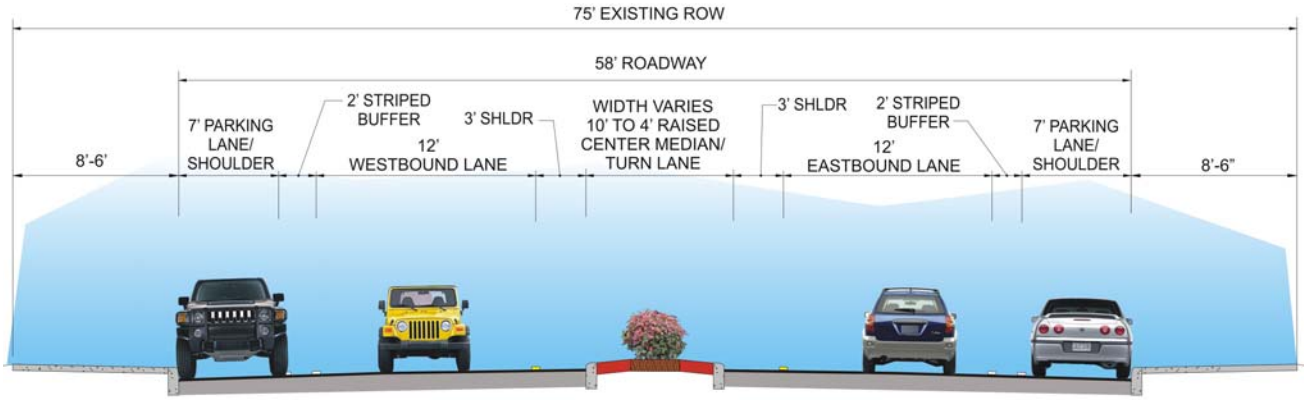


Figure 6. Great Neck Road Proposed Road Diet Typical Section

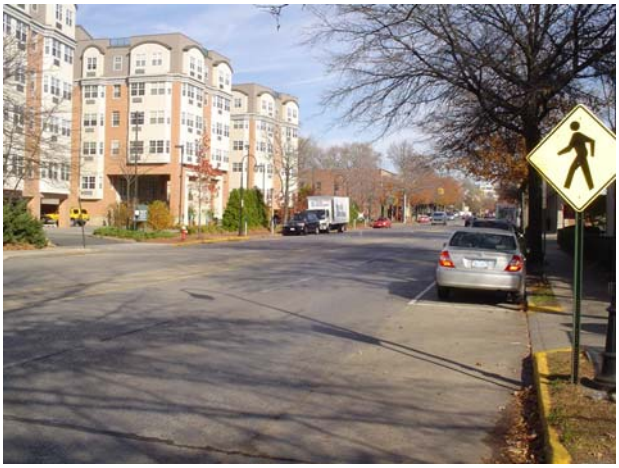
As previously mentioned, the existing typical roadway section is 58 feet in width which has created long crosswalks for the many pedestrians who use them daily (refer to the crosswalk shown in Photo 3). The long lengths of crosswalk created problems in crossing from the many pedestrians who used them, and the safety risk of excessive exposure to vehicular traffic. The crosswalk configuration of the intersection at the Atria to the Gardens shopping center, as shown in (Photo 3), is an example of the long pedestrian crossings previously described. This configuration required a traffic signal due to the large volume of turning movements at this location such that the commercial driveways function as a conventional intersection. The driveway for the Atria at the top of the photo below is one-way egress and the driveway at the end of the crosswalk for the Gardens Shopping Center (bottom of photo 3) is both ingress and egress. This signal was also upgraded by adding of pedestrian countdown timers to provide better feedback for the large number of senior citizens which use this crossing every day.

Photo 3 – The existing geometry of the wide roadway (58 foot wide roadway with slightly crosswalk depicted above). The top of the crosswalk in the photo is where the senior citizens center (The Atria) resident pedestrians attempt daily to cross the intersection to go to the "Gardens" shopping center.

In addition, openings were located in the median islands at crosswalk locations to provide pedestrian refuge at intersection approaches. The openings serve to minimize the exposure of pedestrians to traffic by enabling two-stage crossings and provide a place to stop for slower moving pedestrians who might otherwise get trapped in the center of the roadway pavement. Pedestrian countdown signals were also included for additional safety along with upgraded traffic signage and pavement markings. Below is a (Photo 4) of the recently completed construction of the Gardens intersection crossing.

Photo 4 – Photo of the constructed round diet along Great Neck Road with pedestrian refuge area at the Gardens Shopping Center.

Great Neck Road terminates at the intersections of Middle Neck Road to the west and Cutter Mill Road to the east. At both ends of the project, the existing roadway configuration was left unchanged so that the capacity and level of service for the intersections would operate as it does in its current state, to reduce public concerns of queuing and potential cut-through traffic on the adjoining side streets. The Great Neck Road - Road Diet project completed the public participation process and the final design in 2007. Below is a photo-rendering of the proposed project superimposed over an existing photo:



Existing photo of the Great Neck Road (looking west)

Proposed rendering of the Road Diet

Construction of the federally funded Great Neck Road Traffic Calming project (NYSDOT PIN 0757.94.121) began in April 2008, and was subsequently completed in September of the same year.

GENERAL METHODOLOGY

The Great Neck Road Traffic Calming project analysis objectives were to determine the viability of conversion from the existing four-lane roadway section to a two-lane roadway with a raised landscaped center median, including the provision of left turn lane median openings at existing signalized intersections and at specific major traffic generators within the project limits. The project analysis involved the primary considerations:

- Will the conversion detrimentally impact the facility from a roadway capacity Level of Service (LOS) standpoint?
- Will the conversion reduce the overall 85th percentile speed, the total number of collisions, and the collision severity within the project limits?
- How will the change in roadway geometry affect how the existing facility operates, from an accessibility and mobility standpoint?

The methodology started with collection of existing traffic volume, speed, and crash data. The Nassau County Police Department was contacted in regards to obtaining the prior three years crash report data within the project limits. The baseline crash data were able to be obtained for the study period from January 2005 – August 2007. Crash data were then retrieved for 2008, during which an approximate five-month period (April 2008 – September 2008) involved the construction of the project. Additional crash data were collected for the post construction period from October 2008 – November 2010. The crash data obtained were utilized to compare the existing total number of vehicle crashes, crash types, and severity levels prior to construction to the immediate time period after construction. All of the crash data that were obtained is summarized and presented in the Appendix of this study.

Traffic volume counts were taken in the expected AM and PM Peak hour periods of 7am-9am and 4pm-6pm. These are the peak commuter train hours where it had been previously observed that the traffic volume increases along this facility due in large part to railroad commuters is driven by commuters which use this route daily. After recording the total traffic volumes, the PM peak hour was by far the larger of the two volumes, therefore the analysis presented in this paper focused on LOS analysis using the PM count data. The Average Daily Traffic (ADT) was obtained from available Nassau County traffic volume count data, and was found to be approximately 12,700 vehicles per day after accounting for seasonal variation. The traffic volume data were then utilized to calculate both the existing LOS for the baseline condition, and the proposed future LOS for the potential 2-lane build condition. All of the traffic volume count data can be found in the Appendix of this study.

Spot speed radar data within the project limits was also obtained from a previous village-wide speed study that was performed by VHB/Eschbacher engineering. The 85th percentile speed radar data that was obtained in 2006 and early 2008 from the study were found to be 39mph and 37mph respectively in the westbound and eastbound directions of travel. The posted speed limit on Great Neck Road is 30mph in both directions, so motor vehicle speeding was previously identified as an issue along this facility. Spot speed radar data was acquired post construction in April of 2010 in both directions of travel during off-peak travel times to compare the impact on motor vehicle speed after implementation of the Great Neck Road – Road Diet project. All of the motor vehicle speed data and calculations are summarized in the Appendix.

RESULTS AND CONCLUSIONS

A signalized intersection capacity analysis was performed at the two signalized intersections within the project limits at the intersections of Great Neck Road and Knightsbridge Road and at Great Neck Road and the Atria/Gardens Shopping Center driveway. The capacity analysis was performed using Highway Capacity Software (HCS) to determine the level of service and the overall intersection delay. The results of the analysis can be seen in the following Table 1 & Table 2 below:

The HCS analysis was performed using counts in October 2007 for a project that was planned for an estimated time for completion (ETC) in June 2008. The traffic volume was not projected using any growth factor. The existing growth factor for this area was based on New York State planning data which was very small due to the existing and future land use, which is primarily built out in the entire peninsula.

Great Neck Road at Knightsbridge Road

		PM Peak Hour				
Condition	**Mvmnt.**	**Mvmnt. Delay** (sec/veh)	**Mvmnt. V/C** (sec/veh)	**Mvmnt. LOS**	**Inter. Delay** (sec/veh)	**Inter. LOS**
Existing	EB-TR	8.2	0.30	A	8.4	A
	WB-LT	8.1	0.28	A		
	NB-LR	15.3	0.07	B		
Build (Existing Volumes)	EB-TR	11.9	0.58	B	11.1	B
	WB-L	8.0	0.11	A		
	T	9.8	0.43	A		
	NB-LR	15.3	0.07	B		

Table 1 - Signalized Intersection Analysis Summary Table for Knightsbridge Road

Great Neck Road at Shopping Center Driveway

Condition	Mvmnt.	PM Peak Hour				
		Mvmnt. Delay (sec/veh)	Mvmnt. V/C (sec/veh)	Mvmnt. LOS	Inter. Delay (sec/veh)	Inter. LOS
Existing	EB-TR	9.0	0.34	A	10.6	B
	WB-LT	8.8	0.30	A		
	NB-L	17.8	0.33	B		
	NB-R	17.1	0.24	B		
	SB-LTR	15.7	0.03	B		
Build (Existing Volumes)	EB-L	6.9	0.00	A	13.3	B
	TR	13.9	0.64	B		
	WB-L	8.8	0.18	A		
	T	10.2	0.41	B		
	NB-L	17.8	0.33	B		
	R	17.1	0.24	B		
	SB-LTR	15.7	0.03	B		

Table 2 - Signalized Intersection Analysis Summary Table for Atria/Gardens Shopping Ctr.

Based on the results of the HCS analysis the level of service for the signalized intersection of Knightsbridge Road and Great Neck Road was reduced from an LOS A to LOS B. Although the reduction in the Level of Service was reduced, the overall intersection delay only experienced an increase in total delay of 2.7 sec./veh. in the peak hour. This can be observed in table 1 above as the difference in the existing (8.4 sec./veh.) to the proposed Road Diet conversion (11.1 sec./veh.). Road users will not notice an overall level of service reduction of this magnitude. The results of the capacity analysis for the intersection of Great Neck Road and the Atria/Gardens Shopping Center remained at a LOS B for both the existing condition and the proposed Road Diet conversion. Again, there was only a slight increase in the overall intersection delay calculating to be 2.7 sec./veh. The primary reason for the intersection delay only increasing by a few seconds per vehicle at both locations was the inclusion of

left/u-turn lanes on both approaches. The inclusion of the separate left turn lanes served to reduce congestion by adding capacity back to these locations that was lost from removing a travel lane.

The results of the crash data that were acquired had some interesting findings. The reported crash data obtained within the project limits revealed 172 total crashes within the 31 1/2 month period between January 2005 and December 2007 (a 4 ½ month period from mid-August 2006 to December 2006, crash data were not available). These values equate to a crash rate of 65.5 crashes per year. When relating the ADT volume of 12,700veh./day over the ½ mile project length to the average number of crashes per year, the crash rate along Great Neck Road prior to the road diet was calculated to be **28.3 acc./mvm** (million vehicle miles). Using current New York State crash data for an urban 4-lane, free access facility (see Appendix 4) the Statewide Average was found to be **4.27 acc./mvm**. The comparison of these results yields an outcome that is **6.62 times greater** than the statewide average. Based on these evident results, Great Neck Road has a lot more accidents than similar roads of its type, and something needed to be done to mitigate the problems that existed.

Other significant traffic crash data observations found during the 2005 - 2007 study period prior to the implementation of the road diet for Great Neck Road that were noted:

- 13.4% of the reported crashes that occurred resulted in personal injury. After the road diet was constructed in 2008, the crash data for January 2009 through November 2010 revealed that there was **6 total injury related crashes in the time period which accounted for only 6.8% of the total crashes. The road diet implementation resulted in a 64.3% annualized reduction in the total number of injury related crashes.**
- 25% of the crashes were related to left turning vehicles at intersections or left turns to cross over the road to driveways accessible in the exiting condition from the opposite side of the road. The inclusion of the median and placement of openings at predictable locations helped to slightly reduce the amount of left turning crashes to a total rate of 15.9%.
- 19% of the total number crashes are due to vehicles backing into a parking stall. After the road diet was constructed in 2008, the crash data for January 2009

through November 2010 the total crash rate due to backing of vehicles reduced to 13.6%. Based on the narrow 7 foot parking lane and 10 foot adjacent outside travel lane, and the reported speed problems on this roadway, backing a vehicle into an open stall was a difficult movement which would produce the reported crash result. The inclusion of a 2 foot buffer area adjacent to the existing parking lane and the removal of the outside travel lane with a single 12 foot wide travel lane provided more room for maneuverability, improved sight distance, and additional buffer to enter into an open parking stall which result in the reduction in the rate of these types of crashes.

- 9.3% of the total number of crashes was related to changing lanes with the original four lane highway with narrow travel lane widths. After the removal of a travel lane in each direction, only 3.4% crashes were related to changing lanes. These crashes occurred due to vehicles entering the turning lanes and attempting to change lanes back into the thru lanes. **The total number of crashes related to lane changing resulted in a 74.3% annualized reduction overall after the road diet was implemented.**

The most significant finding relating to the crashes along Great Neck Road was the total reduction of vehicle crashes. The total number of overall crashes was calculated to be 172 crashes during the 2005-2007 (31.5 month) study period. This equates to an equivalent crash rate of 65.5 crashes per year. After the implementation of the road diet, the total number of crashes was found to be 88 crashes during the period of January 2009 through November 2010 (23 months). This equates to an equivalent crash rate of 45.9 crashes per year. **Therefore, the total annual crash rate has reduced 29.9%.** It is also important to note that there were a **total of 55 crashes from January 2009 – December 2009 period** just after the implementation of the road diet, and **the total crash rate from January 2010 to November 2010 further reduced significantly to only 33 crashes.** This is an indication that the road users are becoming more familiar with the roadway changes and that the constructed road diet has provided a significant traffic calming benefit. Further observation in future time periods is necessary to determine what the total overall effect that the road diet has on crashes.

The existing 85th percentile spot speed data that was obtained along Great Neck Road in 2006 as part of a previous village LSSTC Grant Study (NYSDOT PIN 0757.74.326) performed by Eschbacher/VHB Engineering. The spot speed study results prior to the construction of the road diet project found that the 85th percentile speeds were 37mph in the eastbound and 39 mph in the westbound direction of travel respectively.

After the Road Diet conversion was completed additional speed data were obtained in April 2010 for comparison purposes. The radar spot speed data revealed a 37 mph and 38 mph 85th percentile speeds in the respective eastbound and westbound directions of travel. The comparison of the speed data results revealed no reduction in speed in the eastbound direction and a 1 mph reduction in the westbound direction of travel.

The combination of installing the raised medians, reducing the number of thru lanes from two in each direction to one, and providing improved visual buffers with the inclusion of improved pavement markings could have shown a reduction of speeds up to 10 mph based on historical data. The Great Neck Road – road diet conversion required three foot wide left shoulders to provide accessibility for emergency services. The overall increase in pavement width is most likely the reason for only a slight reduction in the overall travel speed.

SUMMARY AND OBSERVATIONS

The Great Neck Road – road diet conversion based on traffic count information, capacity analysis, crash data results, experienced observation, meetings with various agencies and other vested parties, and the product of the public participation efforts provided the additional findings:

Fully comprehending the intended function of the roadway being considered for a road diet is critical to its viability as a preferred alternative. Multiple jurisdictions, agencies, the local community, and other interested road user groups are often involved in the details of the final decisions. In certain situations, concessions may need to be made as a compromise to satisfy general concerns. In these situations, a Memorandum of Understanding (MOU) of the proposed purpose of the project can be particularly useful as an agreement tool.

When considering a road diet, intersection operations are critical to the success of any roadway cross section conversion. If acquiring additional right-of-way at critical intersections is not feasible due to budgetary constraints, it becomes imperative that the designs of the proposed roadway geometrics including accommodations for turning movements at the intersections are handled appropriately.

Road diet conversions will generally result in larger impacts on heavy vehicles (at any percentage). The mobility of truck traffic can be reduced, including trucks ingress/egress to adjacent businesses on a converted roadway needs to be designed properly. The impact of heavy vehicles on roadway operations should be minimized by providing accommodating geometric design in terms of accessibility.

When contemplating a road diet, cross section consistency and maintenance operations must also be a consideration in the process. Without consistency in the roadway section under contemplation, it can increase the maintenance costs of the facility in terms of snow removal and sweeping operations. Consistency of cross section is also important to limit the amount of transitions which can lead to an increase in crashes and a decrease in overall user safety.

Pedestrians are generally are agreeable to the conversion of four-lane undivided roadway to two lanes. Conversions of roadways that have locations with large pedestrian volumes, however, need to be carefully considered. Raised medians, pedestrian refuges providing two-stage crossing, and/or other pedestrian crossing enhancements such as countdown signals are important options to consider during the design process. The implementation of a raised median, however, will limit access to adjacent properties; therefore median opening spacing and location must also be carefully contemplated. In addition, any potential impacts on vehicle safety and operations (e.g. emergency vehicle accessibility) due to the addition of a raised median also need to be addressed.

The conversion of a four-lane undivided roadway to two lanes is challenging process that requires a significant amount of planning and public involvement. Implementing this type of conversion for the first time in any jurisdiction should be done cautiously and at a location where success is the likely outcome. As with any progressive traffic calming application, if the road diet conversion fails, the public and the municipality will be less likely to grant approval to subsequent road diet proposals.

In conclusion, the general project outcome was found to be very successful. Follow up discussions on the Great Neck Road – road diet project have been held with local residents, and business owners who have provided the following the additional findings:

- The general public reaction is that it “feels safer” and has more of a “boulevard effect” following the construction.
- Moves traffic more efficiently and with less delay, thereby providing less air and noise pollution in the downtown village.
- More aesthetic and sustainable “greener” treatment with plantings in the median island and improved streetscaping.
- Shorter pedestrian crossings and refuge from vehicular movements with improved walkways makes it more “people friendly.”

Depicted below are photos (5 thru 8) of Great Neck Road “before” and “after” the road diet conversion:

Photo 5 – Existing photograph of Great Neck Road prior to construction. Notice the wide concrete pavement and old markings that can barely be seen. Looks more like a highway than a local collector road.

Photo 6 – Another existing photograph of Great Neck Road prior to construction at the Gardens shopping center intersection. The crosswalk terminates in the Atria senior center driveway.

Photo 7 – Photo of the completed road diet along Great Neck Road. The center median was designed with low lying, drought-tolerant landscaping, and a textured and colored asphalt pavement treatment to simulate red brick laid in a running bond pattern. Notice the hatched buffer adjacent to the parked cars to give the effect of a narrowed section and provide additional clearance.

Photo 8 – “After” construction Photograph of the road diet with median island, single travel lane and 3’ inside shoulders. Notice how the final constructed product aesthetically changed the look of this facility to more of a residential “boulevard effect” from the existing “sea of concrete pavement” that gave the appearance of a highway and induced speeding as shown above.

ACKNOWLEDGMENTS

The author would like to acknowledge the New York State Department of Transportation for the funding and support of this project through the federally funded Local Safe Streets and Traffic Calming program. Without the financial support and understanding in the area of traffic calming, local villages like the Incorporated Village of Great Neck Plaza would not have the financial ability to execute important projects such as this.

A special acknowledgement should be noted for the honorable Mayor Jean A. Celender. Without the foresight to identify the traffic problems and implement the traffic calming grant to obtain the necessary funding, this project would not have been possible. Mayor Celender's dedication and determination to complete this contentious project from concept through the construction to improve the roadway conditions and overall safety along Great Neck Road for the local residents of the Incorporated Village of Great Neck Plaza and all of the users of the facility, has truly been an inspiration to me.

APPENDICES

APPENDIX 1

Great Neck Road Year 2005 Crash Summary Report

Period Covered: January 2005 - December 2005
Total Accidents: 61

Great Neck Road Pre-Construction

WEATHER	# ACC	%
Clear	38	62%
Cloudy	12	20%
Rain	11	18%
Snow	0	0%
Sleet/ Hail/ Freezing Rain	0	0%
Total	61	100%

PAVEMENT	# ACC	%
Dry	45	73.8%
Wet	16	26.2%
Snow/ Ice	0	0.0%
Total	61	100.0%

TIME OF YEAR	# ACC	%
Winter (Dec-Feb)	14	23.0%
Spring (Mar-May)	17	27.9%
Summer (June- Aug)	9	14.8%
Fall (Sept-Nov)	21	34.4%
Total	61	100.0%

DAY OF WEEK	# ACC	%
Monday	10	16.4%
Tuesday	13	21.3%
Wednesday	9	14.8%
Thursday	12	19.7%
Friday	8	13.1%
Saturday	6	9.8%
Sunday	3	4.9%
Total	61	100.0%

COLLISION TYPE	# ACC	%
VS. Pedestrian	1	1.6%
VS. Vehicle	57	93.4%
Curbing	1	1.6%
Utility Pole/ Light Support	2	3.3%
Total	61	100.0%

ACC. TYPE	# ACC	%
Turning	13	21.3%
Backing	8	13.1%
Hit Parked Vehicle	8	13.1%
Passing	3	4.9%
Starting from Parking	2	3.3%
Changing Lanes	7	11.5%
Rear-end	11	18.0%
Making U-Turn	2	3.3%
Other	7	11.5%
Total	61	100.0%

ACC. SEVERITY	# ACC	%
Non-Fatal Injury	8	13.1%
Property Damage Only	53	86.9%
Total	61	100.0%

TIME OF DAY	# ACC	%
12 MID - 6 AM	2	3%
6 AM - 10 AM	6	10%
10 AM - 4 PM	32	52%
4 PM - 7 PM	12	20%
7 PM - 12 MID	9	15%
Unspecified	0	0%
Total	61	100%

LIGHT CONDITIONS	# ACC	%
Daylight	48	78.7%
Dark Rd. Lighted	12	19.7%
Unspecified	1	1.6%
Total	61	100.0%

Note: ACC. = Accident

Great Neck Road Year 2006 Crash Summary Report

Period Covered: January 2006 - Mid-August 2006
Total Accidents: 42

Great Neck Road Pre-Construction

WEATHER	# ACC	%
Clear	27	64%
Cloudy	11	26%
Rain	4	10%
Snow	0	0%
Sleet/ Hail/ Freezing Rain	0	0%
Total	42	100%

PAVEMENT	# ACC	%
Dry	34	81.0%
Wet	7	16.7%
Slush	1	2.4%
Total	42	100.0%

TIME OF YEAR	# ACC	%
Winter (Dec-Feb)	11	26.2%
Spring (Mar-May)	10	23.8%
Summer (June- Aug)	21	50.0%
Fall (Sept-Nov)	0	0.0%
Total	42	100.0%

DAY OF WEEK	# ACC	%
Monday	10	23.8%
Tuesday	5	11.9%
Wednesday	2	4.8%
Thursday	8	19.0%
Friday	8	19.0%
Saturday	5	11.9%
Sunday	4	9.5%
Total	42	100.0%

COLLISION TYPE	# ACC	%
VS. Pedestrian	1	2.4%
VS. Vehicle	37	88.1%
Culvert/ Head Wall	1	2.4%
Deer	1	2.4%
Utility Pole/ Light Support	2	4.8%
Total	42	100.0%

ACC. TYPE	# ACC	%
Turning	10	23.8%
Backing	9	21.4%
Hit Parked Vehicle	5	11.9%
Passing	0	0.0%
Starting from Parking	3	7.1%
Changing Lanes	3	7.1%
Rear-end	5	11.9%
Making U-Turn	0	0.0%
Parking	3	7.1%
Other	4	9.5%
Total	42	100.0%

ACC. SEVERITY	# ACC	%
Non-Fatal Injury	4	9.5%
Property Damage Only	38	90.5%
Total	42	100.0%

TIME OF DAY	# ACC	%
12 MID - 6 AM	0	0%
6 AM - 10 AM	3	7%
10 AM - 4 PM	28	67%
4 PM - 7 PM	9	21%
7 PM - 12 MID	2	5%
Unspecified	0	0%
Total	42	100%

LIGHT CONDITIONS	# ACC	%
Daylight	37	88.1%
Dark Rd. Lighted	5	11.9%
Unspecified	0	0.0%
Total	42	100.0%

Note: ACC. = Accident

Great Neck Road Year 2007 Crash Summary Report

Period Covered: January 2007 - December 2007
Total Accidents: 69

Great Neck Road Pre-Construction

WEATHER	# ACC	%
Clear	41	59%
Cloudy	17	25%
Rain	10	14%
Snow	0	0%
Sleet/ Hail/ Freezing Rain	1	1%
Total	69	100%

PAVEMENT	# ACC	%
Dry	51	73.9%
Wet	14	20.3%
Snow/ Ice	4	5.8%
Total	69	100.0%

TIME OF YEAR	# ACC	%
Winter (Dec-Feb)	14	20.3%
Spring (Mar-May)	13	18.8%
Summer (June- Aug)	19	27.5%
Fall (Sept-Nov)	23	33.3%
Total	69	100.0%

DAY OF WEEK	# ACC	%
Monday	8	11.6%
Tuesday	12	17.4%
Wednesday	8	11.6%
Thursday	14	20.3%
Friday	17	24.6%
Saturday	6	8.7%
Sunday	4	5.8%
Total	69	100.0%

COLLISION TYPE	# ACC	%
VS. Pedestrian	3	4.3%
VS. Vehicle	66	95.7%
Total	69	100.0%

ACC. TYPE	# ACC	%
Turning	20	29.0%
Backing	14	20.3%
Hit Parked Vehicle	3	4.3%
Passing	1	1.4%
Starting from Parking	1	1.4%
Changing Lanes	6	8.7%
Rear-end	11	15.9%
Making U-Turn	1	1.4%
Parking	3	4.3%
Other	9	13.0%
Total	69	100.0%

ACC. SEVERITY	# ACC	%
Non-Fatal Injury	11	15.9%
Property Damage Only	58	84.1%
Total	69	100.0%

TIME OF DAY	# ACC	%
12 MID - 6 AM	0	0%
6 AM - 10 AM	13	19%
10 AM - 4 PM	34	49%
4 PM - 7 PM	13	19%
7 PM - 12 MID	8	12%
Unspecified	1	1%
Total	69	100%

LIGHT CONDITIONS	# ACC	%
Daylight	58	84.1%
Dark Rd. Lighted	10	14.5%
Dawn	1	1.4%
Total	69	100.0%

Note: ACC. = Accident

Great Neck Road Year 2008 Crash Summary Report

Period Covered: January 2008 - December 2008
Total Accidents: 77

Great Neck Road - Construction Season

WEATHER	# ACC	%
Clear	51	66.2%
Cloudy	12	15.6%
Rain	12	15.6%
Snow	1	1.3%
Unspecified	1	1.3%
Total	77	100.0%

PAVEMENT	# ACC	%
Dry	61	79.2%
Wet	15	19.5%
Unspecified	1	1.3%
Total	77	100.0%

TIME OF YEAR	# ACC	%
Winter (Dec-Feb)	16	20.8%
Spring (Mar-May)	24	31.2%
Summer (June- Aug)	22	28.6%
Fall (Sept-Nov)	15	19.5%
Total	77	100.0%

DAY OF WEEK	# ACC	%
Monday	20	26.0%
Tuesday	13	16.9%
Wednesday	13	16.9%
Thursday	12	15.6%
Friday	12	15.6%
Saturday	1	1.3%
Sunday	6	7.8%
Total	77	100.0%

COLLISION TYPE	# ACC	%
VS. Pedestrian	5	6.5%
VS. Vehicle	64	83.1%
Other Object (Not Fixed)	1	1.3%
Sign Post	1	1.3%
Fence	1	1.3%
Other Object (Fixed)	2	2.6%
Tree	2	2.6%
Unspecified	1	1.3%
Total	77	100.0%

ACC. TYPE	# ACC	%
Turning	15	19.5%
Backing	15	19.5%
Hit Parked Vehicle	7	9.1%
Avoiding Object in Roadway	1	1.3%
Starting from Parking	4	5.2%
Changing Lanes	6	7.8%
Rear-end	10	13.0%
Making U-Turn	3	3.9%
Parking	7	9.1%
Other	9	11.7%
Total	77	100.0%

ACC. SEVERITY	# ACC	%
Non-Fatal Injury	9	11.7%
Property Damage Only	68	88.3%
Total	77	100.0%

TIME OF DAY	# ACC	%
12 MID - 6 AM	0	0%
6 AM - 10 AM	13	17%
10 AM - 4 PM	29	38%
4 PM - 7 PM	25	32%
7 PM - 12 MID	8	10%
Unspecified	2	3%
Total	77	100%

LIGHT CONDITIONS	# ACC	%
Daylight	65	84.4%
Dark Rd. Lighted	8	10.4%
Dusk	3	3.9%
Unspecified	1	1.3%
Total	77	100.0%

Note: ACC. = Accident

Great Neck Road Year 2009 Crash Summary Report

Period Covered: January 2009 - December 2009
Total Accidents: 55

Great Neck Road Post-Construction

WEATHER	# ACC	%
Clear	35	64%
Cloudy	17	31%
Rain	2	4%
Snow	1	2%
Total	55	100%

PAVEMENT	# ACC	%
Dry	48	87.3%
Wet	6	10.9%
Snow/ Ice	1	1.8%
Total	55	100.0%

TIME OF YEAR	# ACC	%
Winter (Dec-Feb)	13	23.6%
Spring (Mar-May)	9	16.4%
Summer (June- Aug)	17	30.9%
Fall (Sept-Nov)	16	29.1%
Total	55	100.0%

DAY OF WEEK	# ACC	%
Monday	8	14.5%
Tuesday	5	9.1%
Wednesday	8	14.5%
Thursday	12	21.8%
Friday	11	20.0%
Saturday	3	5.5%
Sunday	8	14.5%
Total	55	100.0%

COLLISION TYPE	# ACC	%
VS. Pedestrian	2	3.6%
VS. Vehicle	50	90.9%
Light Support/Utility Pole	1	1.8%
Sign Post	1	1.8%
Unspecified	1	1.8%
Total	55	100.0%

ACC. TYPE	# ACC	%
Turning	13	23.6%
Backing	7	12.7%
Hit Parked Vehicle	5	9.1%
Starting from Parking	4	7.3%
Changing Lanes	3	5.5%
Rear-end	9	16.4%
Making U-Turn	2	3.6%
Parking	6	10.9%
Other	6	10.9%
Total	55	100.0%

ACC. SEVERITY	# ACC	%
Non-Fatal Injury	2	3.6%
Property Damage Only	53	96.4%
Total	55	100.0%

TIME OF DAY	# ACC	%
12 MID - 6 AM	1	2%
6 AM - 10 AM	8	15%
10 AM - 4 PM	21	38%
4 PM - 7 PM	19	35%
7 PM - 12 MID	6	11%
Unspecified	0	0%
Total	55	100%

LIGHT CONDITIONS	# ACC	%
Daylight	41	74.5%
Dark Rd. Lighted	13	23.6%
Dawn	1	1.8%
Total	55	100.0%

Note: ACC. = Accident

Great Neck Road Year 2010 Crash Summary Report

Period Covered: January 2010 - November 2010
Total Accidents: 33

Great Neck Road Post-Construction

WEATHER	# ACC	%
Clear	22	67%
Cloudy	6	18%
Rain	4	12%
Snow	1	3%
Total	33	100%

PAVEMENT	# ACC	%
Dry	29	87.9%
Wet	3	9.1%
Snow/ Ice	1	3.0%
Total	33	100.0%

TIME OF YEAR	# ACC	%
Winter (Dec-Feb)	5	15.2%
Spring (Mar-May)	10	30.3%
Summer (June- Aug)	5	N/A
Fall (Sept-Nov)	13	N/A
Total	33	100.0%

DAY OF WEEK	# ACC	%
Monday	4	12.1%
Tuesday	4	12.1%
Wednesday	2	6.1%
Thursday	7	21.2%
Friday	12	36.4%
Saturday	2	6.1%
Sunday	2	6.1%
Total	33	100.0%

COLLISION TYPE	# ACC	%
VS. Pedestrian	5	15.2%
VS. Vehicle	27	81.8%
Light Support/Utility Pole	0	0.0%
Other Object (Not Fixed)	1	3.0%
Total	33	100.0%

ACC. TYPE	# ACC	%
Turning	7	21.2%
Backing	5	15.2%
Hit Parked Vehicle	10	30.3%
Starting from Parking	1	3.0%
Changing Lanes	0	0.0%
Rear-end	7	21.2%
Making U-Turn	0	0.0%
Parking	2	6.1%
Other	1	3.0%
Total	33	100.0%

ACC. SEVERITY	# ACC	%
Non-Fatal Injury	4	12.1%
Property Damage Only	29	87.9%
Total	33	100.0%

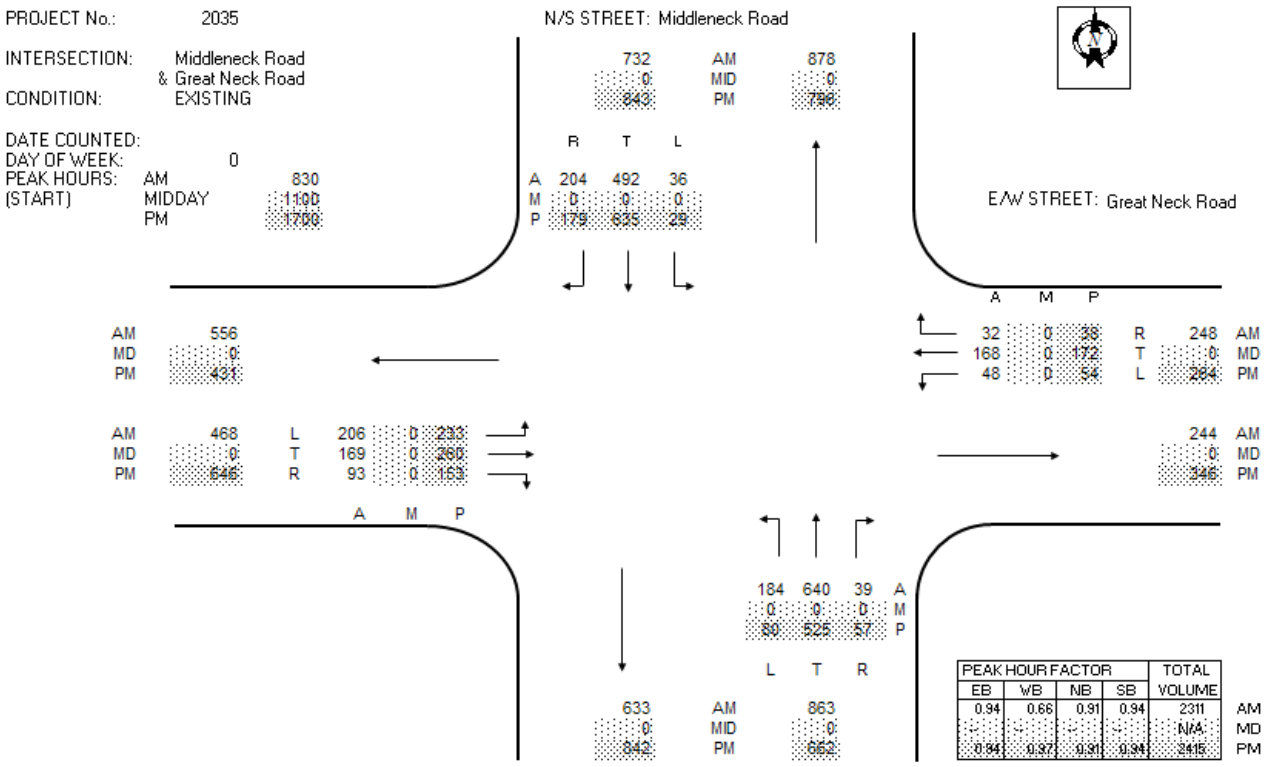
TIME OF DAY	# ACC	%
12 MID - 6 AM	1	3%
6 AM - 10 AM	6	18%
10 AM - 4 PM	18	55%
4 PM - 7 PM	7	21%
7 PM - 12 MID	1	3%
Unspecified	0	0%
Total	33	100%

LIGHT CONDITIONS	# ACC	%
Daylight	26	78.8%
Dark Rd. Lighted	4	12.1%
Dawn	3	9.1%
Total	33	100.0%

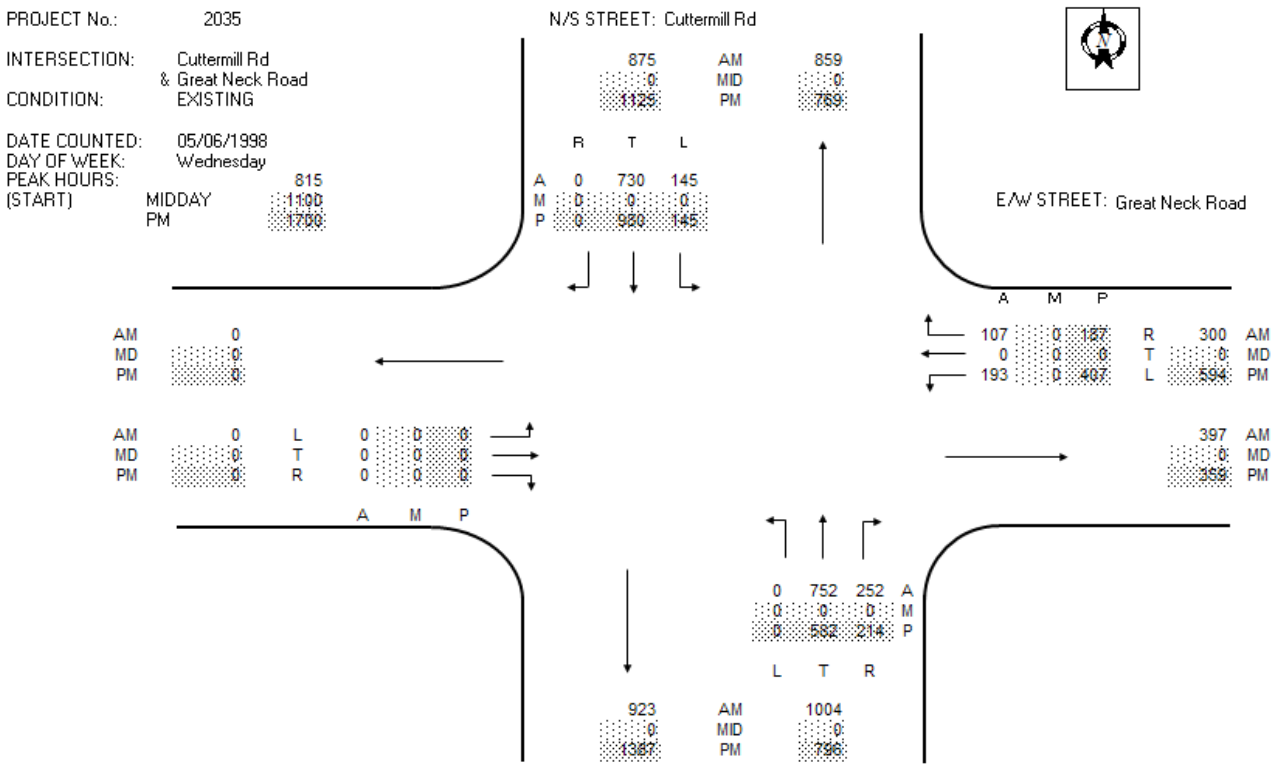
Note: ACC. = Accident

APPENDIX 2

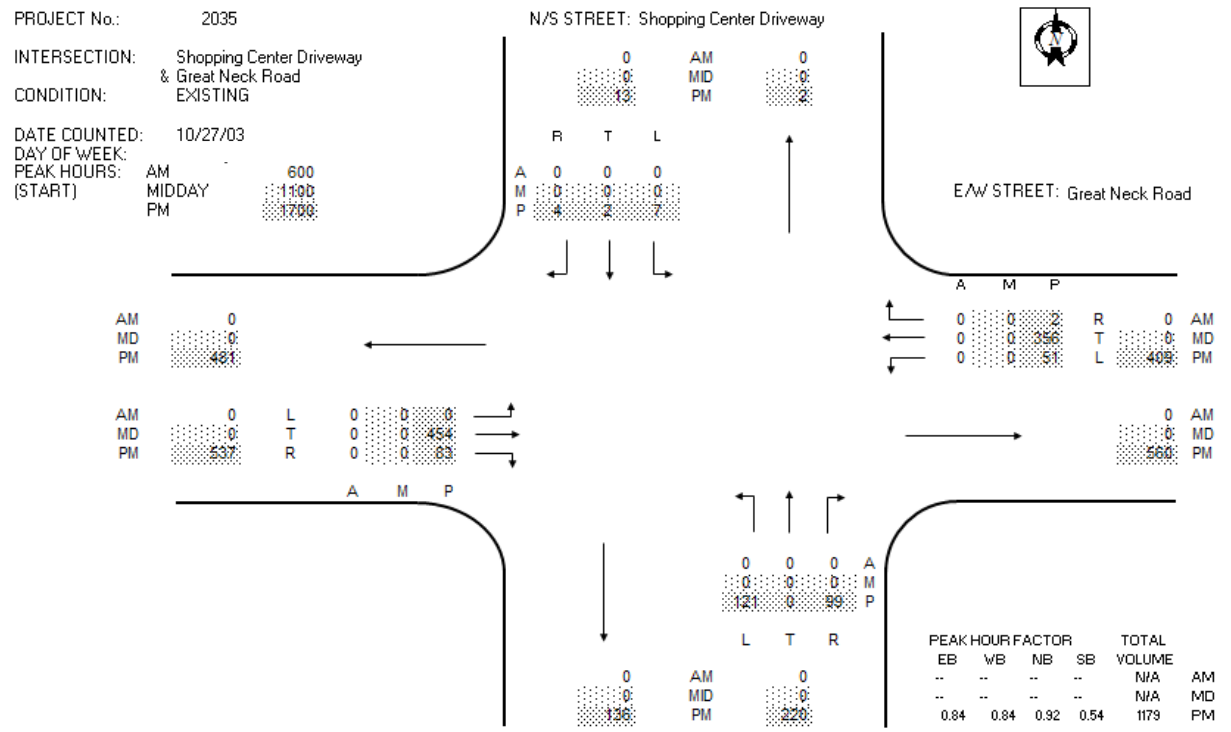
GREAT NECK ROAD SIGNALIZED INTERSECTIONS - EXISTING TRAFFIC COUNT DATA



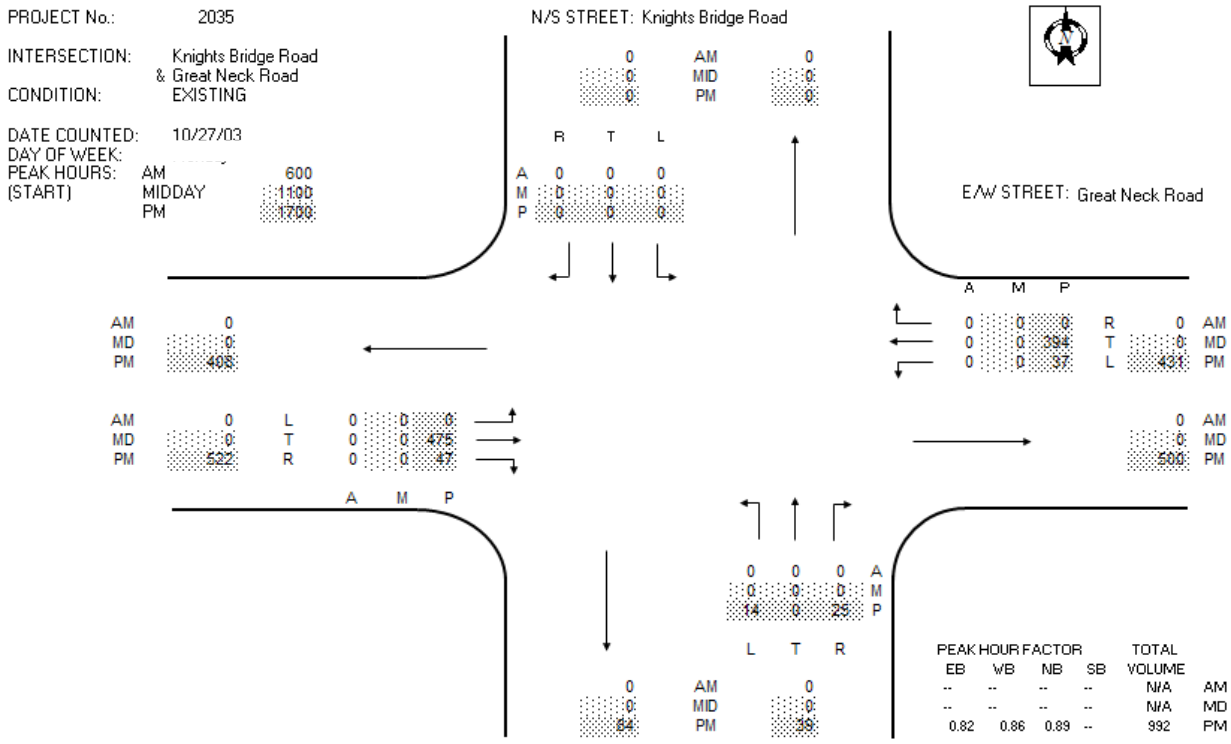
Intersection of Great Neck Road & Middle Neck Road



Intersection of Great Neck Road & Cuttermill Road



Intersection of Great Neck Road & Gardens Shopping Center/Atria Driveways



Intersection of Great Neck Road & Knightsbridge Road

APPENDIX 3

Signalized Intersection Analysis
Knightsbridge Road & Great Neck Road - Existing Conditions

HCS2000: Signalized Intersections Release 4.1d

Analyst: ATD
Agency: L.K. Mclean Associates
Date: 10/29/07
Period: Weekday PM
Project ID: Great Neck Road Study (With 2 Thru Lanes)
E/W St: Great Neck Rd

Inter.: 1
Area Type: All other areas
Jurisd: VOGNP
Year : Existing 2008
N/S St: Knights Bridge Rd

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	0	0	2	0	0	0	0	0	0	0
LGConfig		TR			LT			LR				
Volume		475	47	37	394		14		25			
Lane Width		10.0			10.0			14.0				
RTOR Vol			0						0			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left					NB Left	A			
Thru		P			Thru				
Right		P			Right	A			
Peds					Peds				
WB Left		P			SB Left				
Thru		P			Thru				
Right					Right				
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green		35.0				20.0			
Yellow		3.0				3.0			
All Red		2.0				2.0			

Cycle Length: 65.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
TR	1907	3443	0.30	0.55	8.2	A	8.2	A
Westbound								
LT	1699	3067	0.28	0.55	8.1	A	8.1	A
Northbound								
LR	588	1819	0.07	0.32	15.3	B	15.3	B
Southbound								

Intersection Delay = 8.4 (sec/veh) Intersection LOS = A

Signalized Intersection Analysis
Knightsbridge Road & Great Neck Road - Proposed Road Diet

HCS2000: Signalized Intersections Release 4.1d

Analyst: ATD
Agency: L.K. Mclean Associates
Date: 10/29/07
Period: Weekday PM
Project ID: Great Neck Road Study (with LTL and 1 Thru Lane) U-turns
E/W St: Great Neck Rd

Inter.: 1
Area Type: All other areas
Jurisd: VOGNP
Year : Build 2008
N/S St: KnightsBridge Rd

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	0	0	0	0	0
LGConfig		TR		L	T			LR				
Volume		475	47	37	394		14		25			
Lane Width		12.0		10.0	12.0			14.0				
RTOR Vol			0						0			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left					NB Left	A			
Thru		P			Thru				
Right		P			Right	A			
Peds					Peds				
WB Left		P			SB Left				
Thru		P			Thru				
Right					Right				
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green		35.0				20.0			
Yellow		3.0				3.0			
All Red		2.0				2.0			

Cycle Length: 65.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
TR	1005	1814	0.58	0.55	11.9	B	11.9	B
Westbound								
L	358	664	0.11	0.54	8.0	A		
T	1017	1837	0.43	0.55	9.8	A	9.7	A
Northbound								
LR	588	1819	0.07	0.32	15.3	B	15.3	B
Southbound								

Intersection Delay = 11.1 (sec/veh) Intersection LOS = B

Signalized Intersection Analysis
Gardens Shopping Center Drive & Great Neck Road - Existing Conditions

HCS2000: Signalized Intersections Release 4.1d

Analyst: ATD
Agency: L.K. Mclean Associates
Date: 10/29/08
Period: Weekday PM
Project ID: Great Neck Road Study (with 2 Thru Lanes)
E/W St: Great Neck Rd

Inter.: 2
Area Type: All other areas
Jurisd: VOGNP
Year : Existing 2008
N/S St: Shopping Center Driveway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	0	0	2	0	1	0	1	0	1	0
LGConfig		TR			LT		L		R		LTR	
Volume		454	83	51	356		121		99	7	2	4
Lane Width		10.0			10.0		10.0		10.0		12.0	
RTOR Vol			0						0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4			5	6	7	8
EB Left					NB	Left	A			
Thru		P				Thru				
Right		P				Right	A			
Peds						Peds				
WB Left		P			SB	Left	A			
Thru		P				Thru	A			
Right						Right	A			
Peds						Peds				
NB Right					EB	Right				
SB Right					WB	Right				
Green		35.0					20.0			
Yellow		3.0					3.0			
All Red		2.0					2.0			

Cycle Length: 65.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
TR	1772	3291	0.34	0.54	9.0	A	9.0	A
Westbound								
LT	1508	2801	0.30	0.54	8.8	A	8.8	A
Northbound								
L	408	1327	0.33	0.31	17.8	B	17.5	B
R	464	1507	0.24	0.31	17.1	B		
Southbound								
LTR	546	1776	0.03	0.31	15.7	B	15.7	B

Intersection Delay = 10.6 (sec/veh) Intersection LOS = B

Signalized Intersection Analysis
Gardens Shopping Center Drive & Great Neck Road - Proposed Road Diet

HCS2000: Signalized Intersections Release 4.1c

Analyst: ATD
Agency: L.K. Mclean Associates
Date: 10/29/07
Period: Weekday PM
Project ID: Great Neck Road Study (with TWLTL and 1 Thru Lane)
E/W St: Great Neck Rd

Inter.: 2
Area Type: All other areas
Jurisd: VOGNP
Year : Build 2008
N/S St: Shopping Center Driveway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	0	1	0	1	0
LGConfig	L	TR		L	T		L		R		LTR	
Volume	0	454	83	51	356		121		99	7	2	4
Lane Width	10.0	12.0		10.0	12.0		10.0		10.0		12.0	
RTOR Vol			0						0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	P				NB Left	A			
Thru	P				Thru				
Right	P				Right	A			
Peds					Peds				
WB Left	P				SB Left	A			
Thru	P				Thru	A			
Right					Right	A			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	35.0					20.0			
Yellow	3.0					3.0			
All Red	2.0					2.0			

Cycle Length: 65.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	487	905	0.00	0.54	6.9	A		
TR	933	1732	0.64	0.54	13.9	B	13.9	B
Westbound								
L	323	600	0.18	0.54	8.8	A		
T	955	1773	0.41	0.54	10.2	B	10.1	B
Northbound								
L	408	1327	0.33	0.31	17.8	B		
							17.5	B
R	464	1507	0.24	0.31	17.1	B		
Southbound								
LTR	546	1776	0.03	0.31	15.7	B	15.7	B

Intersection Delay = 13.3 (sec/veh) Intersection LOS = B

APPENDIX 4

GLOSSARY

85th-percentile speed—a speed value obtained from a set of field-measured speeds where only 15 percent of the observed speeds are greater (source: HCM 2000).
AADT—see average annual daily traffic.
AASHTO—American Association of State Highway and Transportation Officials.
ADA—Americans with Disabilities Act.
average annual daily traffic (AADT)—the total volume passing a point or segment of a highway facility in both directions for one year divided by the number of days in the year (source: HCM 2000).
average daily traffic (ADT)— Average daily traffic (ADT) represents the total traffic for a year divided by 365, or the average traffic volume per day.
bulb-out—see curb extension.
conflict point—a location where the paths of two vehicles, or a vehicle and a bicycle or pedestrian, merge, diverge, cross, or queue behind each other.
crash—a collision between a vehicle and another vehicle, a pedestrian, a bicycle, or a fixed object.
crash frequency—the average number of crashes at a location per period of time.
crash rate—the number of crashes at a location or on a roadway segment, divided by the number of vehicles entering the location or by the length of the segment.
crossing conflict—the intersection of two traffic streams, including pedestrians. Crossing conflicts are the most severe type of conflict.
curb extension—the construction of curbing such that the width of a street is reduced. Often used to provide space for parking or a bus stop or to reduce pedestrian crossing distances.
curb ramp—a short ramp cutting through a curb or built up to it (source: ADAAG).
design vehicle—the largest vehicle that can reasonably be anticipated to use a facility.
detectable warning surface—a standardized surface feature built in or applied to walking surfaces or other elements to warn visually impaired people of hazards on a circulation path (source: ADAAG).
geometric design—a term used in this document to describe the design of horizontal and vertical alignment and cross-sectional elements of a roadway.
intersection—an at-grade junction of two or more roadways.
intersection sight distance—the distance required for a driver without the right-of-way to perceive and react to the presence of conflicting vehicles.
ITE—Institute of Transportation Engineers.
level of service—a qualitative measure describing operational conditions within a traffic stream, generally described in terms of service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience.

measures of effectiveness—a quantitative parameter whose value is an indicator of the performance of a transportation facility or service from the perspective of the users of the facility or service.

mountable—used to describe geometric features that can be driven upon by vehicles without damage, but not intended to be in the normal path of traffic.

MUTCD—Manual on Uniform Traffic Control Devices.

pedestrian refuge—an at-grade opening within a median island that allows pedestrians to safely wait for an acceptable gap in traffic.

platoon—a group of vehicles or pedestrians traveling together as a group, either voluntarily or involuntarily because of signal control, geometrics, or other factors.

priority—the assignment of right-of-way to a particular traffic stream or movement.

raised—used to describe geometric features with a sharp elevation change.

right-of-way—(1) an intersection user that has priority over other users. (2) Land owned by a public agency for transportation uses.

stopping sight distance—the distance along a roadway required for a driver to perceive and react to an object in the roadway and to brake to a complete stop before reaching that object.

traffic calming—geometric treatments used to slow traffic speeds or to discourage the use of a roadway by nonlocal traffic.

two-stage crossing—a process in which pedestrians cross a roadway by crossing one direction of traffic at a time, waiting in a pedestrian refuge between the two traffic streams if necessary before completing the crossing.

U-turn—a turning movement at an intersection in which a vehicle departs the intersection using the same roadway it used to enter the intersection.

upstream—the direction from which traffic is flowing (source: HCM 2000).

yield—an intersection control in which controlled traffic must stop only if higher priority traffic is present.

APPENDIX 5

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