Evaluation of Existing Conditions

Traffic

Level of Service Analysis and Methodology

The operation of signalized intersections within the study area was analyzed applying the methodologies presented in the 2000 *Highway Capacity Manual* (HCM2000). These procedures evaluate signalized intersections for average delay per vehicle and level of service (LOS).

Signalized Intersections

The capacity analysis methodology separates an intersection approach into lane groups on the basis of the movements occurring during each signal phase. The lane groups are then analyzed to determine the specific vehicular capacity and LOS. This analysis requires the following input parameters: intersection geometry, lane utilization, number of travel lanes, width of travel lanes, on-street parking conditions, locations of bus stops, number of buses stopping per hour, vehicle turning movements, vehicle classification, conflicting pedestrian movements, traffic signal cycle length, and allocation of green time.

The operating characteristics of signalized intersections can be estimated and evaluated by analyzing capacity and performance. The capacity of an intersection represents the through put of a facility (i.e., the maximum number of vehicles that can be served in one hour). Capacity analysis results in the volume-to-capacity ratio (v/c ratio) which presents the proportion of capacity (supply) utilized by the existing traffic volume (demand). High v/c ratios (>0.85) indicate some traffic congestion, and low v/c ratios (<0.60) indicate smooth traffic flow.

The performance of an intersection is based on the estimated average delay time (i.e., the average stopped time per vehicle) for each vehicle utilizing a roadway segment. Delay time is determined by the capacity of a lane group, the amount of green time allotted to a lane group, and the signal cycle length. Delay time is the factor which determines the LOS for a lane group.

Short delays receive a good LOS while long delays receive a poor LOS. For example, an average delay of up to ten seconds per vehicle corresponds to LOS A, while an average delay of 45 seconds corresponds to LOS D. Table 17 describes the LOS definitions for signalized intersections, and Table 18 describes the LOS definitions for unsignalized intersections.

<u>Intersection Analysis</u>

A total of 26 intersections were selected for analysis, of which 7 are signalized and 19 are unsignalized. Figure 10 illustrates the locations of these selected intersections within the Charleston study area. The following is a list of the signalized intersections:

Bloomingdale Road & Arthur Kill Road
Bloomingdale Road & Veterans Road West
Bloomingdale Road & Woodrow Road
Bloomingdale Road & Clay Pit Road
Bloomingdale Road & Sharrotts Road
Bloomingdale Road & Drumgoole Road West
Richmond Valley Road & Page Avenue

Table 17
Level of Service Definitions for Signalized Intersections

Flow Quality	Description
Level A	Describes operation with very low delay, i.e., less than or equal to 10 seconds per vehicle. This occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
Level B	Describes operation with delay in the range of >10-20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
Level C	Describes operation with delay in the range of >20-35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although some may still pass through the intersection without stopping.
Level D	Describes operation with delay in the range of >35-55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, longer cycle lengths, or high v/c ratios. Many vehicles stop and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
Level E	Describes operation with delay in the range of >55-80 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
Level F	Describes operation with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.
Source:	*Highway Capacity Manual*, Transportation Research Board, National Research Council, Washington, D.C., 2000

Table 18
Level of Service Definitions for Unsignalized Intersections

Level of Service	Control Delay (s/veh)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

The following is a list of the unsignalized intersections:
Arthur Kill Road & Rossville Avenue
Veterans Road West & Rossville Avenue
Veterans Road East & Rossville Avenue
Veterans Road West & Sharrotts Road
Veterans Road East & Sharrotts Road
Veterans Road West & Englewood Avenue
Veterans Road East & Englewood Avenue
Bloomingdale Road & Drumgoole Road East
Arthur Kill Road & Sharrotts Road
Arthur Kill Road & Kreischer Street
Arthur Kill Road & Veterans Road West
Veterans Road West & West Shore Parkway
Veterans Road West & Tyrellan Avenue
Arthur Kill Road & Bridge Street North
Bridge Street South & Page Avenue (at the time of data collection, this location had no signal)
Boscombe Avenue & WSE ramp
Boscombe Avenue & Tyrellan Avenue
Arthur Kill Road & Richmond Valley Road
Arthur Kill Road & Bentley Street

Existing Level of Service Conditions
The traffic analysis focused on the peak hour of traffic volume. The peak hour typically represents the most critical period of operation and has the highest capacity requirements.

Traffic volume, turning movement, and vehicle classification counts were performed during the weekday morning, midday, and evening hours at selected intersections within the study area. The peak hour was identified as 7:15AM to 8:15AM for the morning period, 12:00 noon to 1:00 PM for the midday period, and 4:00PM to 5:00PM for the evening period. Tables 19 and 20 present the existing LOS conditions for the selected signalized and unsignalized intersections within the study area.

Table 19
Existing Conditions - Signalized Intersections

Intersection	Appr.	AM			MD			PM		
		v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
Arthur Kill Road at Bloomingdale Road										
Eastbound	TR	0.48	12.9	B	0.63	15.7	B	0.83	23.2	C
Westbound	LT	0.16	9.2	A	0.19	9.4	A	0.20	9.5	A
Northbound	L	0.53	17.6	B	0.32	14.5	B	0.45	16.2	B
	LR	0.05	11.9	B	0.08	12.2	B	0.04	11.8	B
Southbound										
Intersection Delay			**14.1**	**B**		**14.0**	**B**		**19.1**	**B**
Bloomingdale Road at Clay Pit Road										
Eastbound	L	0.06	20.2	C	0.10	20.6	C	0.07	20.3	C
	R	0.05	20.1	C	0.04	20.0	B	0.07	20.3	C
Westbound										
Northbound	LT	0.21	11.0	B	0.18	10.8	B	0.28	11.7	B
Southbound	TR	0.46	14.3	B	0.40	13.4	B	0.53	15.2	B
Intersection Delay			**13.4**	**B**		**13.1**	**B**		**14.1**	**B**
Bloomingdale Road at Drumgoole Road West										
Eastbound	L	0.02	21.0	C	0.02	21.0	C	0.02	21.0	C
	R	0.17	22.9	C	0.14	22.5	C	0.31	25.1	C
Westbound	L	0.25	18.6	B	0.29	19.0	B	0.36	20.0	B
	T	0.45	21.7	C	0.36	20.1	C	0.52	22.6	C
	R	0.32	19.7	B	0.33	19.9	B	0.62	26.0	C
Northbound	LT	0.22	15.6	B	0.23	15.6	B	0.26	15.9	B
Southbound	TR	0.36	16.8	B	0.33	16.5	B	0.46	17.8	B
Intersection Delay			**18.3**	**B**		**17.9**	**B**		**20.3**	
Bloomingdale Road at Sharrotts Road										
Eastbound	L	0.08	14.1	B	0.07	14.0	B	0.10	14.2	B
	R	0.06	14.0	B	0.07	14.1	B	0.10	14.3	B
Westbound										
Northbound	LT	0.16	7.4	A	0.17	7.5	A	0.26	8.1	A
Southbound	TR	0.19	7.6	A	0.19	7.6	A	0.27	8.0	A
Intersection Delay			**8.2**	**A**		**8.2**	**A**		**8.6**	**A**
Bloomingdale Road at Veterans Road West										
Eastbound										
Westbound	L	0.38	24.3	C	0.46	26.0	C	0.78	37.6	D
	T	0.03	19.9	B	0.05	20.1	C	0.07	20.3	C
	R	0.43	25.5	C	0.26	22.7	C	0.33	23.7	C
Northbound	DefL							0.27	20.9	C
	LT	0.15	18.0	B	0.16	18.2	B			
	T							0.19	18.7	B
Southbound	TR	0.22	18.8	B	0.27	19.3	B	0.36	20.1	C
Intersection Delay			**21.9**	**C**		**21.4**	**C**		**25.8**	**C**
Bloomingdale Road at Woodrow Road										
Eastbound										
Westbound	L	0.18	21.5	C	0.23	22.1	C	0.31	23.2	C
	R	0.14	21.3	C	0.10	20.7	C	0.15	21.3	C
Northbound	TR	0.33	20.3	C	0.31	19.5	B	0.43	21.9	C
	R	0.16	18.4	B	0.24	18.7	B	0.26	19.6	B
Southbound	L	0.17	19.0	B	0.24	20.0	C	0.39	23.7	C
	LT	0.53	24.2	C	0.39	21.5	C	0.52	23.8	C
Intersection Delay			**21.6**	**C**		**20.6**	**C**		**22.4**	**C**
Page Avenue at Richmond Valley Road										
Eastbound	DefL	0.27	26.3	C				0.18	25.0	C
	LTR				0.17	24.4	C			
	TR	0.12	24.0	C				0.14	24.3	C
Westbound	LTR	0.04	23.0	C	0.06	23.2	C	0.07	23.3	C
	R	0.04	23.1	C	0.05	23.2	C	0.05	23.2	C
Northbound	LTR	0.37	10.2	B	0.34	9.9	A	0.35	10.1	B
Southbound	LTR	0.22	9.0	A	0.17	8.6	A	0.24	9.1	A
	R	0.12	8.4	A	0.07	8.0	A	0.09	8.2	A
Intersection Delay			**11.9**	**B**		**11.9**	**B**		**11.8**	**B**

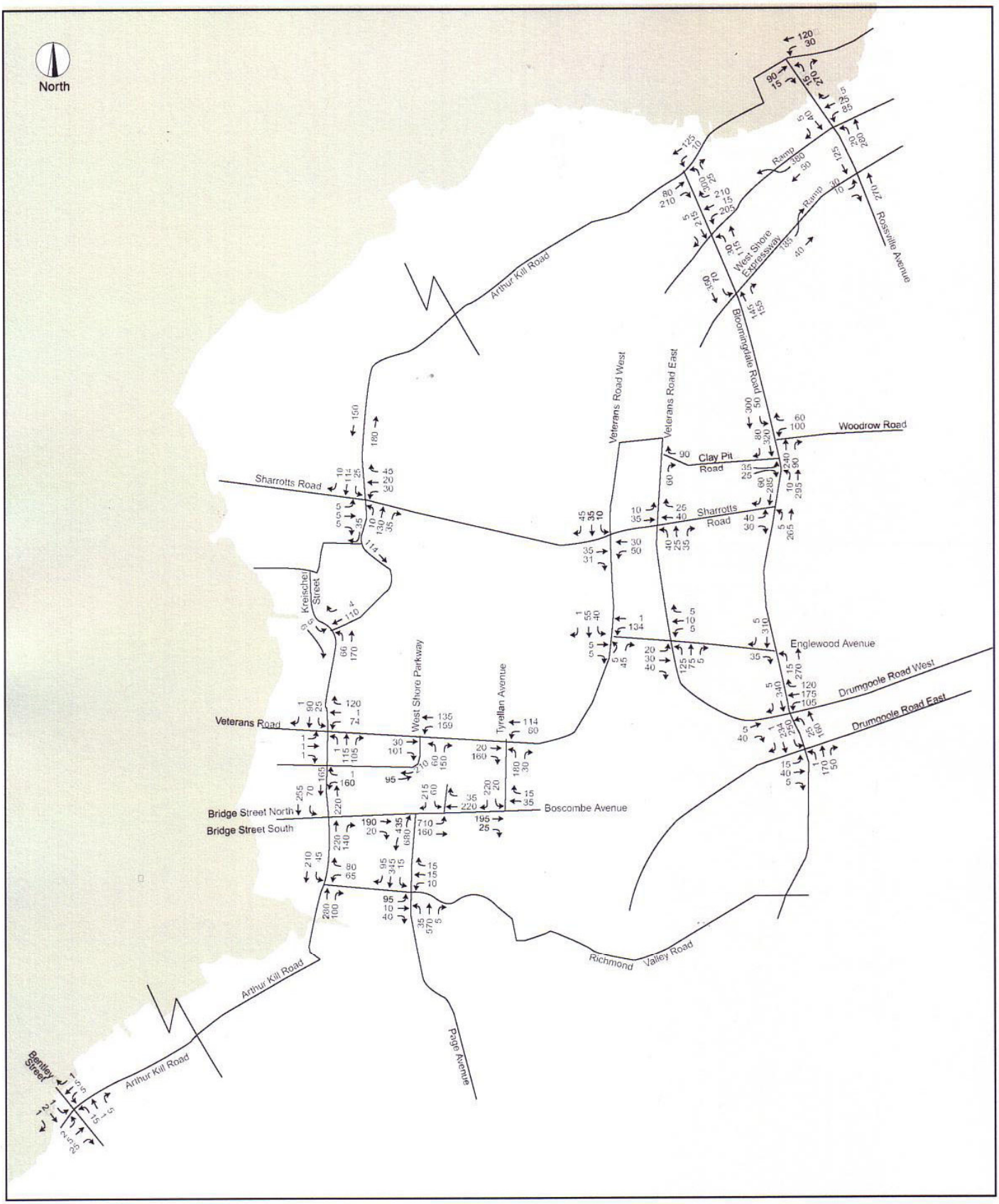
Table 20
Unsignalized Intersections

Intersection	Appr.	AM			Midday			PM		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Arthur Kill Road at Bentley Street (AWSC)										
Eastbound	LTR		6.62	A		6.62	A		6.59	A
Westbound	LTR		7.07	A		7.09	A		7.10	A
Northbound	LTR		7.10	A		7.21	A		7.31	A
Southbound	LTR		6.93	A		6.84	A		6.90	A
Intersection Delay			**6.86**	**A**		**7.10**	**A**		**7.05**	**A**
Arthur Kill Road at Bridge Street North (AWSC)										
Eastbound										
Westbound	L		9.93	A		9.87	A		11.83	B
	R		7.37	A		7.57	A		7.80	A
Northbound	T		10.04	B		9.82	A		10.49	B
Southbound	T		10.01	B		11.18	B		13.10	B
Intersection Delay			**9.99**	**A**		**10.41**	**B**		**11.99**	**B**
Arthur Kill Road at Kreischer Street (TWSC)										
Northbound	LT	0.05	7.8	A	0.01	7.80	A		8.0	A
Southbound										
Westbound										
Eastbound	L	0.01	11.3	B	0.01	10.90	B		11.6	B
	R	0.01	8.6	A	0.02	9.00	A		9.2	A
Intersection Delay			**9.8**	**A**		**9.30**	**A**		**9.8**	**A**
Arthur Kill Road at Richmond Valley Road (AWSC)										
Eastbound										
Westbound	L		9.91	A		9.23	A		10.36	B
	R		8.81	A		8.91	A		9.64	A
Northbound	TR		12.78	B		10.72	B		13.59	B
Southbound	LT		11.24	B		12.13	B		21.32	C
Intersection Delay			**11.64**	**B**		**10.95**	**B**		**16.65**	**C**
Arthur Kill Road at Rosseville Avenue (TWSC)										
Eastbound										
Westbound	LT	0.02	7.5	A	0.03	7.70	A	0.04	7.70	A
Northbound	L	0.02	10.6	B	0.04	11.30	B	0.05	11.80	B
	R	0.32	10.6	B	0.23	10.30	B	0.24	10.30	B
Southbound										
Intersection Delay			**10.6**	**B**		**10.40**	**B**		**10.50**	**B**
Arthur Kill Road at Sharrotts Road (AWSC)										
Eastbound	L		9.31	A		9.08	A		9.32	A
	TR		8.16	A		8.51	A		8.60	A
Westbound	L		8.95	A		9.15	A		9.59	A
	TR		8.71	A		8.60	A		8.69	A
Northbound	LTR		9.17	A		9.42	A		9.31	A
Southbound	LTR		9.12	A		9.86	A		11.24	B
Intersection Delay			**9.05**	**A**		**9.42**	**A**		**10.18**	**B**
Arthur Kill Road at Veterans Road West (AWSC)										
Eastbound	LT		8.90	A		8.82	A		9.54	A
	TR		8.05	A		8.68	A		8.67	A
Westbound	LT		9.78	A		10.49	B		11.85	B
	TR		8.42	A		8.24	A		8.59	A
Northbound	LTR		9.38	A		9.58	A		9.96	A
Southbound	LTR		9.18	A		10.32	B		12.16	B
Intersection Delay			**9.17**	**A**		**9.84**	**A**		**11.09**	**B**

Intersection	Appr.	AM			Midday			PM		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Drumgoole Road East at Bloomingdale Road (AWSC)										
Eastbound	L		8.93	A		8.85	A		9.38	A
	TR		9.00	A		8.74	A		9.16	A
Westbound										
Northbound	L		8.43	A		8.31	A		8.61	A
	TR		10.92	B		10.80	B		12.57	B
Southbound	L		11.88	B		10.63	B		15.32	C
	TR		10.59	B		10.86	B		12.47	B
Intersection Delay			**10.98**	**B**		**10.67**	**B**		**13.36**	**B**
Tyrellan Avenue at Boscombe Avenue (TWSC)										
Eastbound	L	0.14	7.7	A	0.12	7.7	A	0.13	7.7	A
Westbound										
Northbound										
Southbound	L	0.05	13.2	B	0.04	12.2	B	0.07	13.0	B
	R	0.24	9.6	A	0.22	9.5	A	0.34	10.1	B
Intersection Delay			**9.9**	**A**		**9.7**	**A**		**10.4**	**B**
Boscombe Avenue at WSE Ramp (TWSC)										
Eastbound	L	0.62	12.4	B	0.46	10.1	B	0.55	11.8	B
Westbound										
Northbound										
Southbound	L	0.97	215.0	**F**	0.37	86.0	F	0.77	231.5	**F**
	R	0.30	11.6	B	0.14	10.1	B	0.26	11.5	B
Intersection Delay			**52.5**	**F**		**24.2**	**C**		**41.5**	**E**
Englewood Avenue at Veterans Road East (AWSC)										
Eastbound	L		8.42	A		8.57	A		8.93	A
	TR		7.83	A		7.56	A		8.08	A
Westbound	L		8.35	A		8.33	A		8.61	A
	TR		7.69	A		7.58	A		8.05	A
Northbound	L		8.27	A		8.31	A		9.15	A
	TR		7.74	A		7.74	A		8.00	A
Southbound										
Intersection Delay			**8.02**	**A**		**8.05**	**A**		**8.63**	**A**
Englewood Avenue at Veterans Road West (AWSC)										
Eastbound	T		7.77	A		7.72	A		8.06	A
	R		7.06	A		7.04	A		7.50	A
Westbound	L		9.63	A		9.69	A		11.25	B
	T		7.61	A		7.65	A		7.99	A
Northbound	L		8.27	A		8.28	A		8.58	A
	R		7.31	A		7.31	A		7.88	A
Southbound	L		8.57	A		8.51	A		9.11	A
	TR		8.13	A		8.14	A		8.71	A
Intersection Delay			**8.74**	**A**		**8.80**	**A**		**9.78**	**A**
Veterans Road East at Rosseville Avenue (TWSC)										
Eastbound	L	0.02	7.2	A	0.01	7.2	A	0.02	7.2	A
Westbound										
Northbound	T	0.38	12.3	B	0.26	10.8	B	0.26	11.0	B
Southbound	T	0.18	10.7	B	0.29	11.1	B	0.53	14.8	B
Intersection Delay			**12.3**	**B**		**11.1**	**B**		**14.8**	**B**
Veterans Road West at Rossville Avenue (AWSC)										
Eastbound										
Westbound	L		8.79	A		9.38	A		11.87	B
	TR		7.98	A		8.06	A		7.95	A
Northbound	L		8.26	A		8.56	A		9.03	A
	T		11.58	B		10.24	B		11.20	B
Southbound	T		8.17	A		8.60	A		9.69	A
	R		7.41	A		7.39	A		7.80	A
Intersection Delay			**10.36**	**B**		**9.43**	**A**		**10.94**	**B**

Intersection	Appr.	AM			Midday			PM		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
S. Bridge Street at Boscombe/Page Avenues (TWSC)										
Northbound										
Southbound										
Westbound										
Eastbound	L	0.54	24.4	C	0.35	15.7	C	0.54	22.7	C
	R	0.03	9.9	A	0.06	9.5	A	0.05	10.1	B
Intersection Delay			**23.0**	**C**		**14.3**	**B**		**20.9**	**C**
Sharrotts Road at Veterans Road East (AWSC)										
Eastbound	L		8.08	A		8.17	A		8.23	A
	T		7.74	A		7.80	A		7.99	A
Westbound	T		7.77	A		7.97	A		8.06	A
	R		7.08	A		7.01	A		7.01	A
Northbound	L		7.74	A		7.84	A		7.97	A
	TR		7.11	A		7.35	A		7.36	A
Southbound										
Intersection Delay			**7.51**	**A**		**7.65**	**A**		**7.75**	**A**
Sharrotts Road at Veterans Road West (AWSC)										
Eastbound	T		7.76	A		7.71	A		7.99	A
	R		6.96	A		6.87	A		7.10	A
Westbound	L		8.25	A		8.15	A		8.38	A
	T		8.17	A		8.16	A		8.13	A
Northbound										
Southbound	L		7.67	A		7.58	A		7.74	A
	TR		7.38	A		7.36	A		7.54	A
Intersection Delay			**7.74**	**A**		**7.71**	**A**		**7.80**	**A**
Tyrellan Avenue at Veterans Road West (AWSC)										
Eastbound	T		8.23	A		8.15	A		8.49	A
	R		8.89	A		8.50	A		9.71	A
Westbound	L		9.47	A		9.53	A		10.57	B
	T		9.21	A		8.93	A		10.03	B
Northbound	L		10.05	B		9.90	A		10.45	B
	R		7.45	A		7.39	A		8.01	A
	TR									
Southbound	LTR									
Intersection Delay			**9.29**	**A**		**9.08**	**A**		**9.93**	**A**
West Shore Parkway at Veterans Road West (AWSC)										
Eastbound	T		8.42	A		8.34	A		9.24	A
	R		8.24	A		8.05	A		8.73	A
Westbound	L		10.61	B		10.42	B		11.66	B
	T		9.35	A		8.97	A		9.77	A
Northbound	L		8.94	A		8.64	A		9.46	A
	R		8.66	A		8.17	A		9.04	A
	TR									
Southbound	LTR									
Intersection Delay			**9.24**	**A**		**8.99**	**A**		**9.79**	**A**

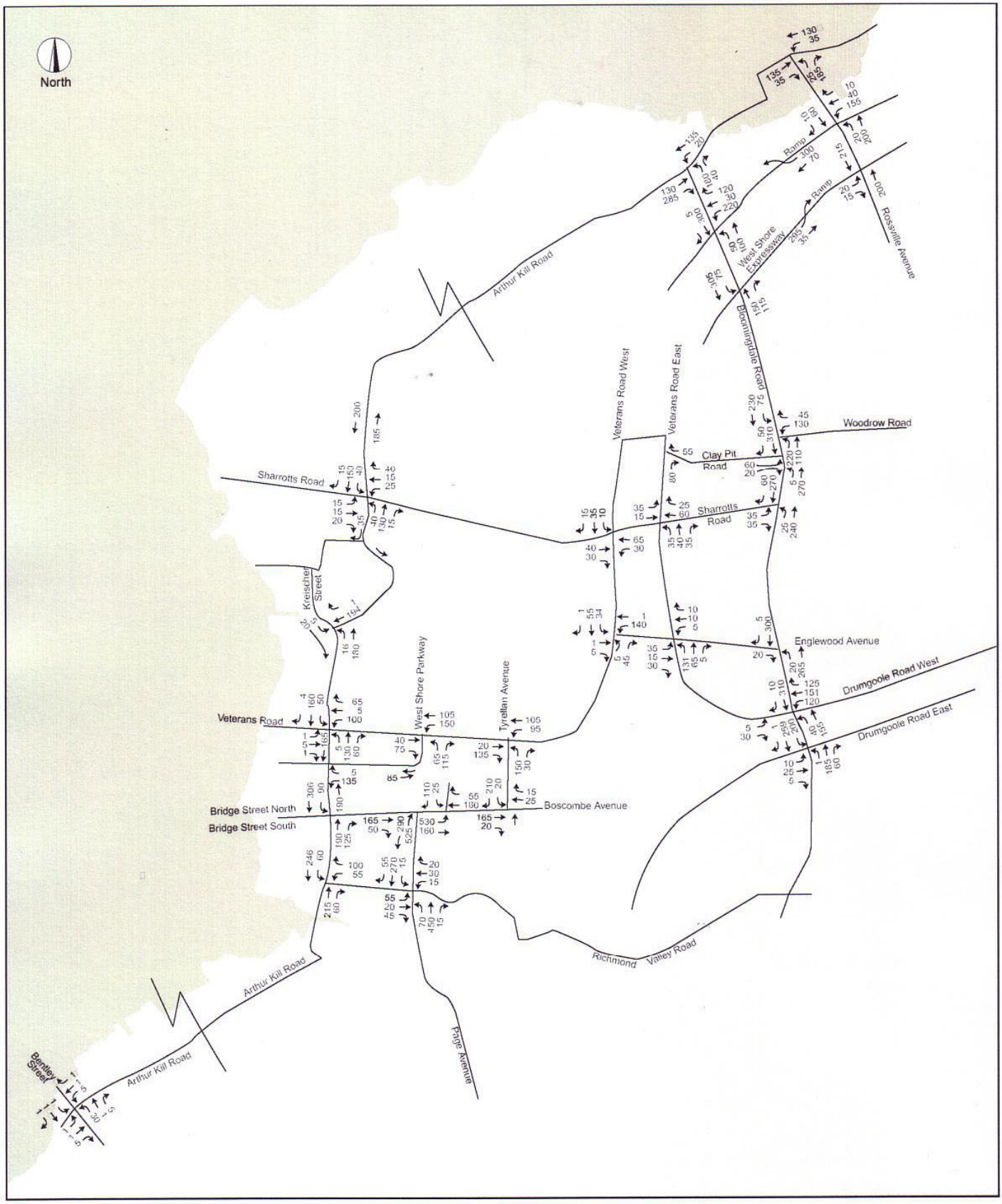
The New York City Department of City Planning (NYCDCP), in conjunction with the consulting firm of American Traffic Information, Inc., collected all necessary data for the study. Existing traffic volumes were based on weekday morning, midday, and evening hours. The data was collected in October 2002. The existing balanced traffic volumes for weekday morning, midday, and evening peak hours are presented in Figures 11A, 11M, and 11P, respectively. For each signalized intersection, the signal timing, cycle length, and phasing were obtained from the New York City Department of Transportation (NYCDOT).



Existing 2002 Balanced Traffic Volumes - AM (7:15 - 8:15)

Charleston Transportation Study Area Boundary
NYC Department of City Planning

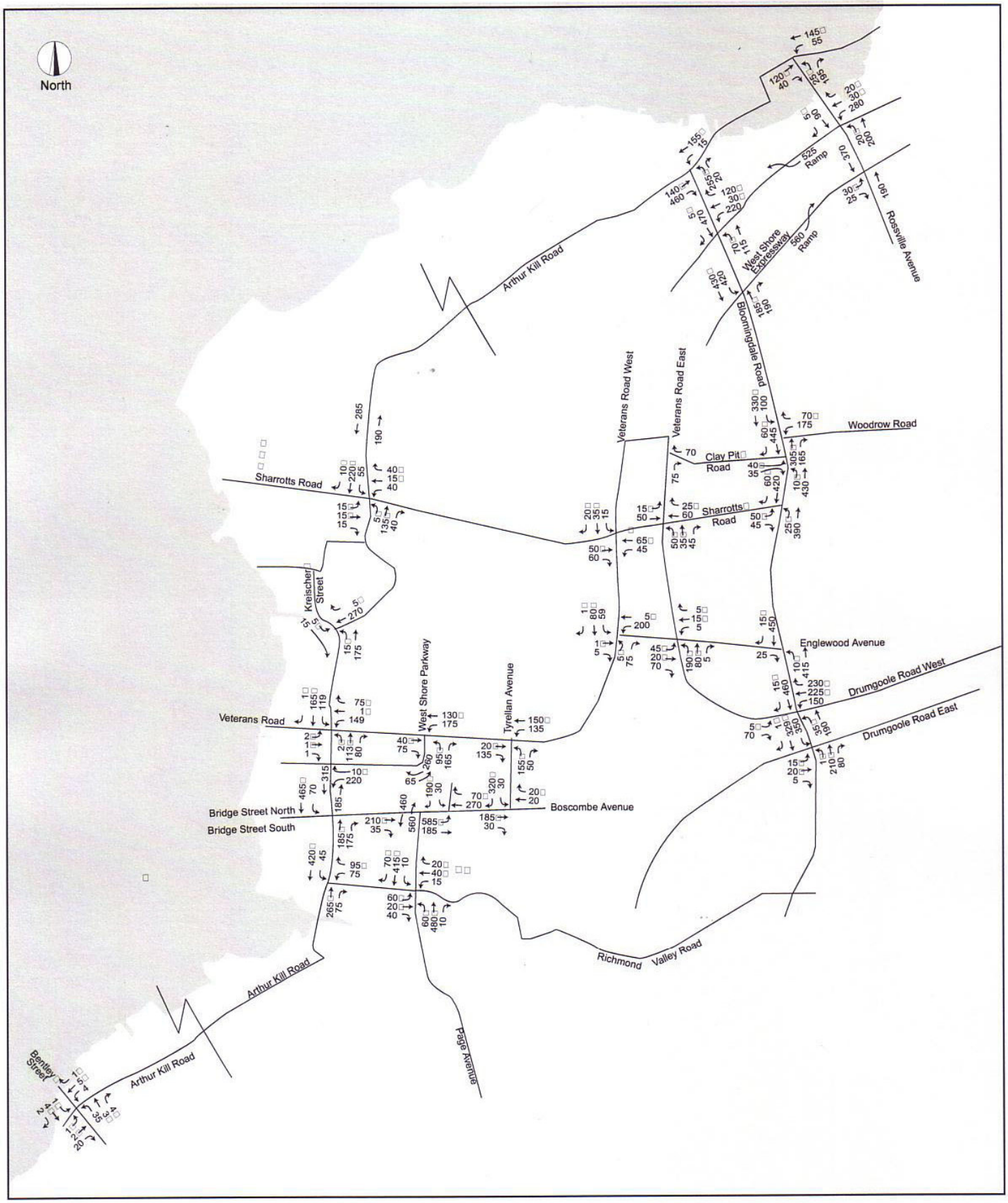
Figure 11A



Existing 2002 Balanced Traffic Volumes - MD (12:00 - 1:00)

Charleston Transportation Study
NYC Department of City Planning

Figure 11M



Existing 2002 Balanced Traffic Volumes - PM (4:00 - 5:00)

Charleston Transportation Study
NYC Department of City Planning

Figure 11P

Automatic Traffic Recorders (ATR) were used to conduct automatic 24-hour traffic counts for one full week (seven consecutive days), during the same week as manual vehicular and pedestrian counts were done, at the following five locations:

- Bloomingdale Road & Veterans Road West;
- Bloomingdale Road & Drumgoole Road West;
- Veterans Road West & West Shore Parkway;
- Bridge Street South & Page Avenue; and
- Arthur Kill Road & Sharrotts Road.

ATR counts revealed that weekend traffic volumes are lower than weekday volumes. Therefore, the study did not include a weekend analysis.

The HCM summary sheets, which document the existing signal timing, phasing, allowed traffic movements, traffic volumes, peak hour factors, percent of heavy vehicles, LOS by approach, and LOS for the entire intersection, are on file at the NYCDCP.

The capacity analysis suggests that most intersection approaches operate acceptably, at LOS C or better, for all peak hours. However, one unsignalized intersection approach operates at LOS E and LOS F as follows:

During the Morning Peak Hour:
The southbound West Shore Expressway Ramp left-turn approach movement at Boscombe Avenue operates at LOS F with a delay of 241.0 seconds per vehicle.

During the Midday Peak Hour:
The southbound West Shore Expressway Ramp left-turn approach movement at Boscombe Avenue operates at LOS F with a delay of 86.0 seconds per vehicle.

During the Evening Peak Hour:
The southbound West Shore Expressway Ramp left-turn approach movement at Boscombe Avenue operates at LOS F with a delay of 231.5 seconds per vehicle.

Presently, NYCDOT is working on installation of a signal at this intersection.

Parking

Off-Street Parking

The survey, conducted in October 2002, indicated that there are no off-street public parking lots and garages within the study area. There is one recently built park-and-ride facility at the interchange of the West Shore Expressway and the Korean War Veterans Parkway.

On-Street Parking

The on-street parking regulations within the study area do not vary considerably. However, they can be grouped into the following two major categories:

I. No Standing
No Standing Any Time
No Standing Handicap Bus Symbol
No Standing 10 p.m.- 6 a.m. including Sundays

No Standing Handicap Express Bus Symbol 5 a.m.- 10 a.m. Monday thru Friday
No Standing Handicap Express Bus Symbol 3 p.m.- 10 p.m. Monday thru Friday
No Standing Police Vehicles Only

No Standing rules (during a defined time period) are posted on streets where through traffic movement is important or where curb-side space is needed for trucks and/or other authorized vehicles. The major No Standing rules are:
No Standing Any Time, No Standing Any Time - Bus Stop
No Standing during morning or/and evening rush hours
No Standing Except Authorized Vehicles (such as Police, Fire, Taxis, etc.)
No Standing rules are restricted to fewer days than No Parking regulations, such as Monday through Friday, or during school days, etc. This variation in time and day represents the NYCDOT's effort to respond to the specific needs of land uses within the study area as well as to accommodate and facilitate the traffic and transit needs of the area as a whole.

These on-street parking regulations are, generally in response to the traffic (i.e. movement of raffic) or land use needs, as well as the sanitation and safety, of the area (i.e. street cleaning, snow emergency, and fire).

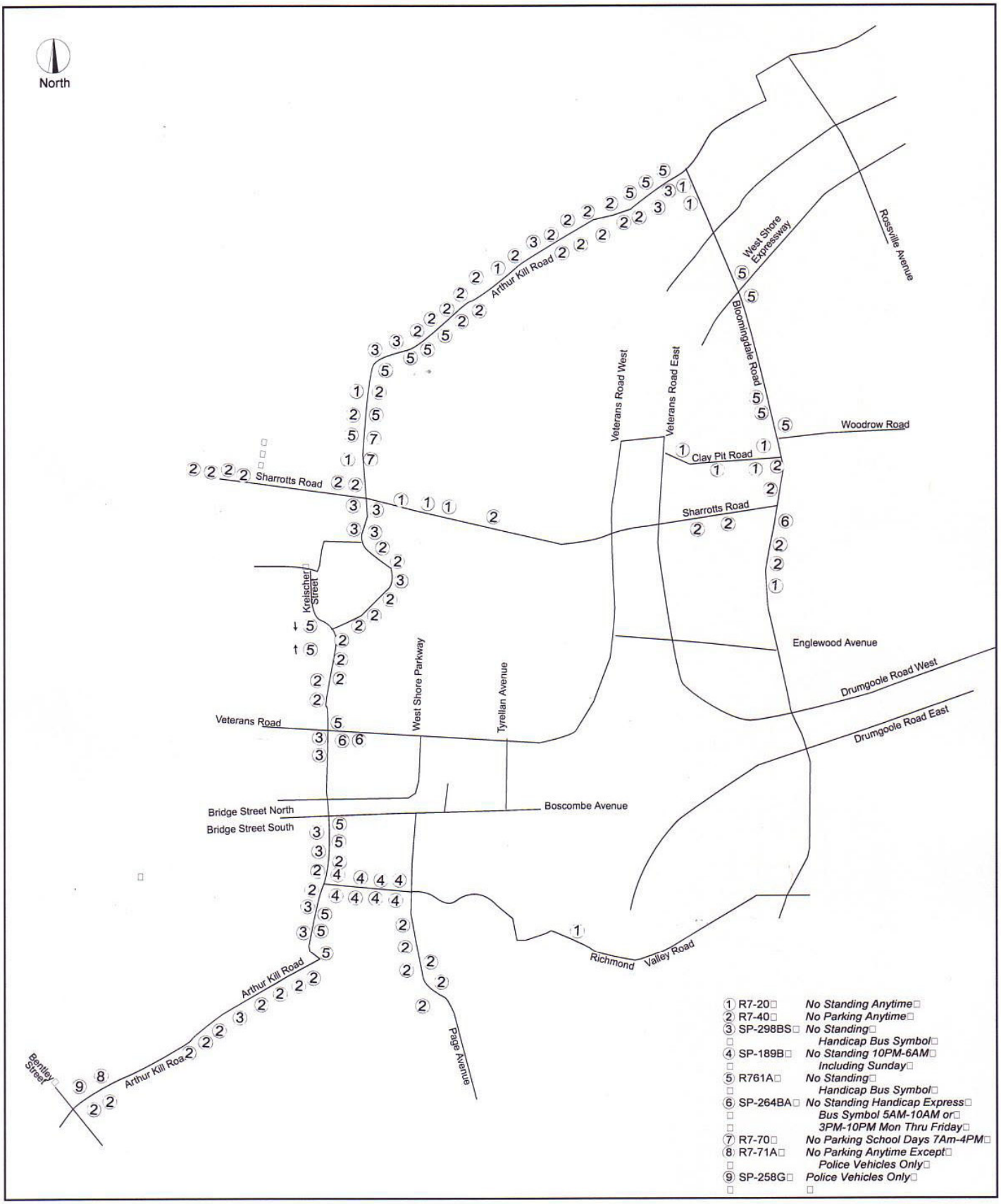
Parking, in general, is permitted within the study area, except at locations where the traffic flow would be adversely affected (especially during the AM and PM peak periods) or where curb-space is needed for trucks and/or other authorized vehicles (Police, Fire, Taxis, etc.).

II. No Parking
No Parking Any Time
No Parking Monday thru Friday and/or including or excluding Sunday
No Parking School Days 7 a.m.-4 p.m.
No Parking During Snow Emergency

There are several different On-Street Parking regulations within the study area. These regulations are tabulated and displayed in Table 21, and plotted on an area street map in Figure 12.

Table 21
On-Street Parking Regulations

Type	Regulation
I. No Standing	
R7-20	No Standing Anytime
SP-298BS	No Standing Handicap Bus Symbol
SP-189B	No Standing 10 PM-6 AM including Sunday
R7-61A	No Standing Handicap Bus Symbol
SP-264BA	No Standing Handicap Express Bus Symbol 5AM-10AM or 3PM-10PM Mon thru Fri
II. No Parking	
R7-40	No Parking Anytime
R7-70	No Parking School Days 7AM-10AM



Existing Parking Regulations

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Figure 12

Within the study area, the No Parking regulations are posted on streets that are not critical to through-traffic movement, such as Page Avenue, and Sharrotts Road. However, adjacent land uses require short-term parking (i.e. standing) for local delivery purposes.

The No Parking regulations include:
No Parking Any Time
No Parking during specific days or specific time slots, such as Monday-Friday 7AM-4PM.

Transit

Staten Island Railroad (SIR)

Staten Island Railroad (SIR) operates within the study area. It serves the southern portion of the study area, from Pleasant Plains Avenue to Arthur Kill Road. Figure 13 shows the locations of the railroad station.

The railroad generally has an east/west orientation within the study area. This railroad connects the Charleston neighborhood with St. George Ferry to Lower Manhattan.

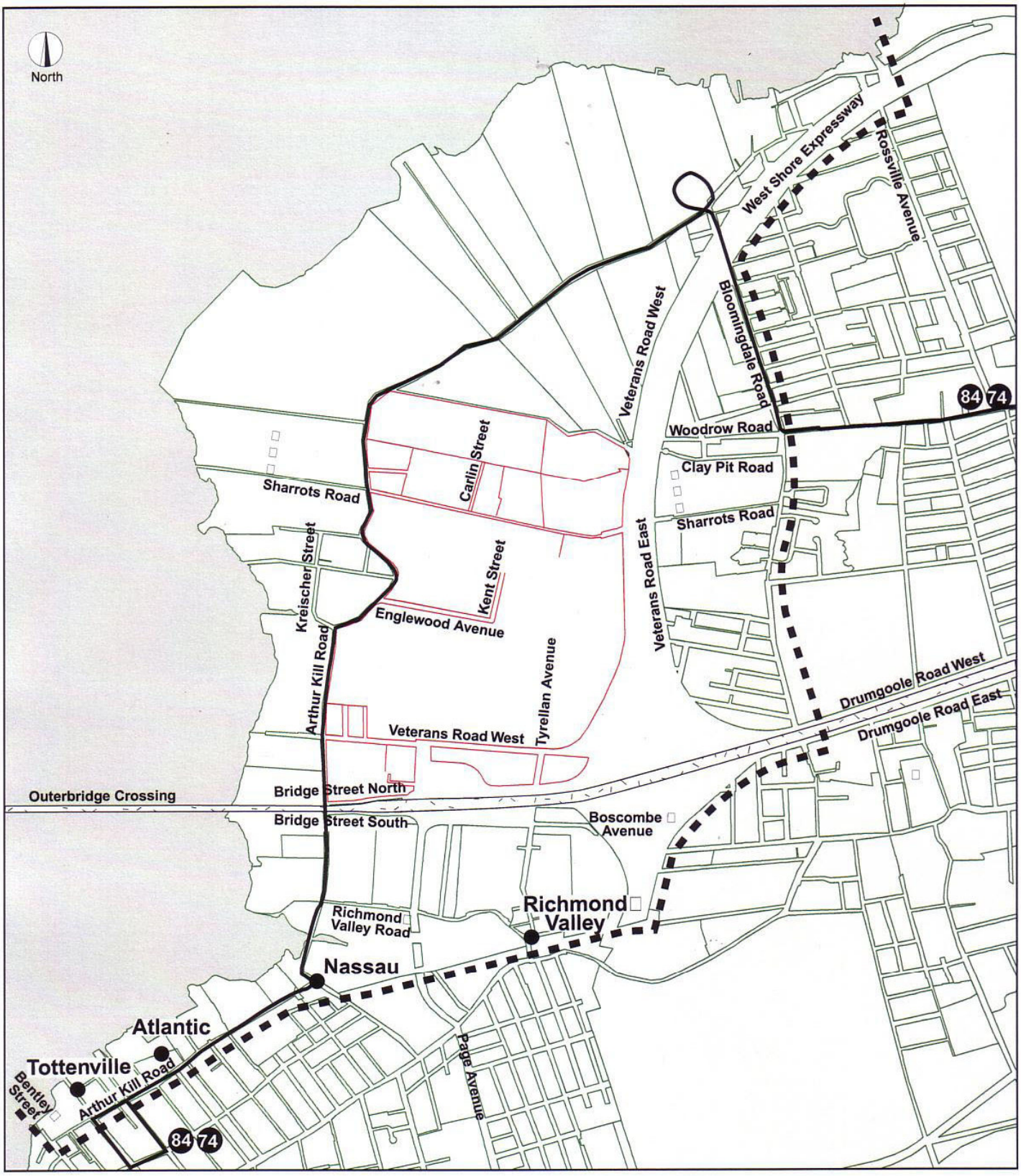
A railroad station analysis was prepared using the design capacities for stairs, as specified in the New York City Transit Authority's (NYCTA) *Stations Planning and Design Guidelines* (December 3, 1990), as well as with the procedures set forth in *Pedestrian Planning and Design* (1971) by John. J. Fruin. All analyses reflect peak 15-minute conditions in the AM and PM peak hours at the four railroad stations.

Demand levels were estimated for the railroad station elements, and passenger volumes were compared with the computed volumes that each station element is capable of handling. Various capacity-reducing factors were applied to the station elements to account for pedestrian flow characteristics, such as friction caused by bi-directional flow, width reductions in stairwells prompted by handrails, and peaking characteristics generated by surge periods in the peak hour.

The service volume flow rate at the midpoint of LOS C and LOS D (SVCD), which is the level employed by the Metropolitan Transportation Authority (MTA), was used to determine the adequacy of various stations elements to accommodate demand levels at an acceptable LOS. When actual or projected demands are less than the calculated SVCD, the LOS is considered to be acceptable.

Table 22 shows the Volume/SVCD (V/SVCD) ratios with the corresponding LOS. V/SVCD ratios between 0.00 and 0.45 represent LOS A, while V/SVCD ratios between 0.46 and 0.70 describe LOS B. V/SVCD ratios between 0.71 and 1.00 represent LOS C, while LOS D indicates a moderate degree of congestion with a V/SVCD ratio range between 1.01 and 1.33. At LOS E, when pedestrian volumes are unstable and congestion occurs, the V/SVCD ratio range is between 1.34 and 1.67. Finally, excessive delays occur at LOS F which is represented by a V/SVCD ratio equal to or greater than 1.68. LOS F indicates that demand exceeds capacity of the element.

Table 23 shows the results of the analysis of the existing conditions of railroad station elements in the AM and PM peak hours. As indicated in the tables, all elements operate at LOS A. The existing service conditions of the station elements at each railroad station are described below.



Existing Transit Network

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Figure 13

Table 22
V/SVCD Ratio Definitions

LOS	Description	V/SVCD Ratio
A	Unrestricted.	< 0.45
B	Slightly restricted, no impact on speed.	0.46 to 0.70
C	Speeds reduced, difficult to pass.	0.71 to 1.00
D	Restricted, reverse flow conflicts.	1.01 to 1.33
E	Severely restricted.	1.34 to 1.67
F	Many stoppages, no discernible flow.	> 1.68
Source: *CEQR Technical Manual*, City of New York, October 2001		

Richmond Valley Station
The existing conditions for the pedestrian flow at four control areas (Amboy Road, two locations to/from pedestrian bridge and Champ Court, and Richmond Valley Road north and southbound service platforms) were analyzed for this station and are summarized in Table 23. All of the station's elements operate at LOS A.

Nassau Station
The existing conditions for the pedestrian flow at four control areas (St. Andrews Place northbound service platform, to/from pedestrian bridge and Nassau place southbound service platform, to/from pedestrian bridge) were analyzed for this station and are summarized in Table 23. All of the station's elements operate at LOS A.

Atlantic Station
The existing conditions for the pedestrian flow at four control areas (Tracy Avenue, to/from pedestrian bridge, and Ellis Street, to/from pedestrian bridge) were analyzed for this station and are summarized in Table 23. All of the station's elements operate at LOS A.

Tottenville Station
The existing conditions for the pedestrian flow at four control areas (Bentley Street, to/from pedestrian bridge, Ellis Street, Utah/Main streets and center platform stairs) were analyzed for this station and are summarized in Table 23. All of the station's elements operate at LOS A.

Buses
Two NYCT local bus routes service the Charleston study area. The S74 and S84 bus routes are primarily north/south routes.

The S84 is a new route, recently added to the study area; therefore, there is no data available for analysis. Table 24 provides a summary of existing conditions for the S74 local bus routes analyzed in this study. The following is a brief description.

Table 23
2002 Existing Conditions
Staten Island Railroad

Stations Stairs			15-Minute Pedestrian Volume		15-Minute SVCD Capacity		V/SVCD Ratio		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
Tottenville Station	Width (ft)	Effect. Width (ft)	Down/ Up	Down/ Up						
Bentley Street	5.3	4.3	17	10	581	581	0.03	0.02	A	A
To/From Pedestrain Bridge										
Ellis Street	2.8	1.8	3	18	243	243	0.01	0.07	A	A
Utah at Main streets	3.1	2.1	23	13	284	284	0.08	0.05	A	A
Center Platform stairs	3.3	2.3	26	31	311	311	0.08	0.10	A	A
Atlantic Station										
Tracy Avenue	4.0	3.0	30	18	405	405	0.07	0.04	A	A
To/From Pedestrian Bridge	3.8	2.8	2	11	378	378	0.01	0.03	A	A
To/From Pedestrian Bridge	3.7	2.7	2	11	365	365	0.01	0.03	A	A
Ellis Street	3.2	2.2	4	11	297	297	0.01	0.04	A	A
Nassau Station										
St. Andrew Place										
Northbound Service Platform	3.5	2.5	38	10	338	338	0.11	0.03	A	A
To/From Pedestrian Bridge	5.2	4.2	22	18	567	567	0.04	0.03	A	A
To/From Pedestrian Bridge										
Southbound Service Platform	3.4	2.4	10	4	324	324	0.03	0.01	A	A
Nassau Place	4.7	3.7	14	18	499	499	0.03	0.04	A	A
Richmond Valley Station										
Amboy Road	3.5	2.5	36	5	338	338	0.11	0.01	A	A
To/From Pedestrian Bridge	3.0	2.0	29	1	270	270	0.11	0.00	A	A
To/From Pedestrian Bridge	3.0	2.0	29	1	270	270	0.11	0.00	A	A
Champ Court	3.2	2.2	1	3	297	297	0.00	0.01	A	A
Richmond Valley Road										
Northbound Service Platform	4.3	3.3	3	0	445	445	0.01	0.00	A	A
Southbound Service Platform	4.3	3.3	3	4	445	445	0.01	0.01	A	A

Note: The Capacity for Stairs = 10 persons per minute per foot
(1) Used actual existing peak 15 minute pedestrian volume.

Source: New York City Transit, Stations Operations Planning Division
Environmental Assessment and Review Division, Department of City Planning, October, 2001.
City Environmental Quality Review Technical Manual

Table 24
2002 Existing Local Bus Conditions

Bus Line	Direct	AM Peak Hour					PM Peak Hour				
		Buses per Hour	Hourly Capacity	Hour. Vol.	Average Volume per Bus	Availab. Capacity	Buses per Hour	Hourly Capacity	Hour. Vol.	Average Volume per Bus	Available Capacity
S74	NB	4	280	165	41	115	7	490	236	34	254
	SB	7	490	334	48	156	7	490	167	24	165
S84	NB	N/A									
	SB										

Source: NYC Transit - 2001, Scheduled Dept. - Surface & Rapid
Note: New York City Transit calculates capacity at 70 passengers per bus.

The S74 is a bus route that runs along Richmond and Arthur Kill roads with most buses operating daily between St. George Ferry Terminal (Ramp B) and Main Street/Amboy Road. However, some buses operate only between St. George Terminal (Ramp B) and Arthur Kill Road to Tottenville. The new S84 bus follows the S74 route, operating as an express between the St. George Terminal (Ramp B) and Arthur Kill Road, and as a local between Arthur Kill Road and Tottenville.

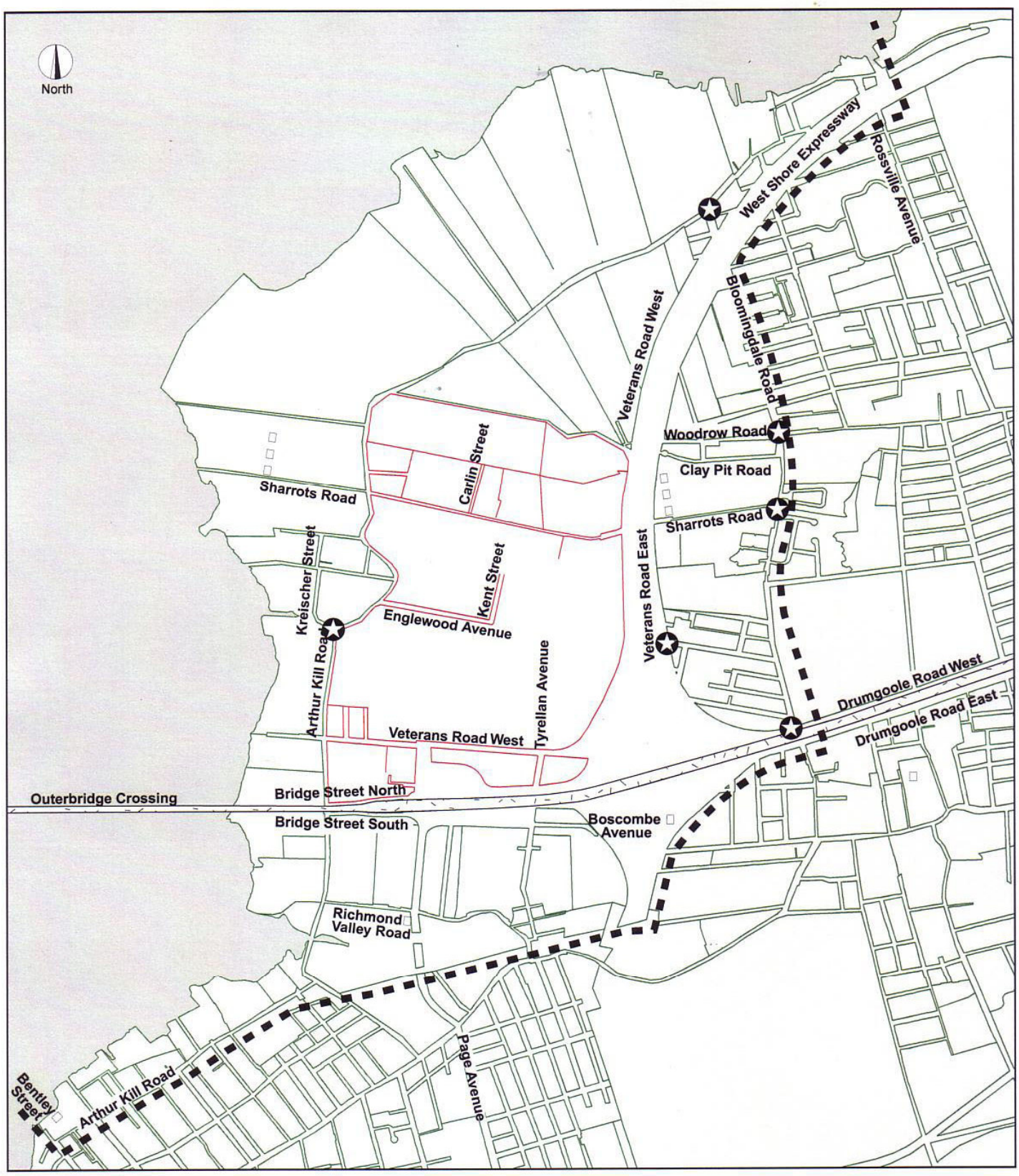
The hours of operations for both directions, toward Main Street and toward the St. George Ferry are at all times during the weekdays, Saturdays and Sundays. The scheduled frequency of service varies. The weekday frequencies of service in both directions are 11 minutes (AM), 20 minutes (Noon), 12 minutes (PM), 20 minutes (Evening), and 60 minutes (Night). The Saturday frequency of service are 20 minutes (AM, Noon and PM), 30 minutes (Evening), and 60 minutes (Night) in both directions. The Sunday frequency of service is 39 minutes (AM), 20 minutes (Noon, and PM), 30 minutes (Evening), and 60 minutes (Night).

Pedestrians
The existing conditions analysis is used to determine existing volumes, pedestrian flow patterns, and levels of service (measure of congestion) in order to provide a baseline from which future conditions can be predicted. This analysis includes data about the capacity of sidewalks, crosswalks, and intersection corners where pedestrians wait for a green traffic light enabling them to cross the street.

This analysis identified six potential locations (as indicated in Figure 14) that could be affected in the future. The following locations were recommended:

- Bloomingdale Road at Arthur Kill Road
- Bloomingdale Road at Woodrow Road
- Bloomingdale Road at Sharrotts Road
- Bloomingdale Road at Drumgoole Road West
- Veterans Road East at Englewood Avenue
- Arthur Kill Road at Kreischer Avenue

Level of Service Analysis and Methodology
The pedestrian LOS, which is measured by the pedestrian flow rate per foot of width per minute (PFM), was analyzed applying the methodologies presented in the 2000 HCM. The PFM indicates



Intersections Selected for Pedestrian Analysis

▪ ▪ ▪ *Study Area Boundary*

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Figure 14

the quality of pedestrian movement and comfort, and is defined by a density-comfort relationship (see Table 25). Crosswalk analyses were conducted for the average pedestrian flow conditions during a full peak hour and were recorded in 15 minute increments.

Table 25
Level of Service Definitions for Pedestrians

Flow Quality	Space (Sq Ft/Ped)	Description	Density
LOS A	> 60	Unrestricted	5 PFM or less
LOS B	> 40-60	Slightly restricted	5 to 7 PFM
LOS C	> 24-40	Restricted but fluid	7 to 10 PFM
LOS D	> 15-24	Restricted; necessary to continuously alter walking stride and direction	10 to 15 PFM
LOS E	> 8-15	Severely restricted	15 to 23 PFM
LOS F	< 8	Forward progress only by shuffling; no reverse movement possible	23 PFM or more

Source: *Highway Capacity Manual*, Transportation Research Board, National Research Council, Washington, D.C., 2000

Sidewalk Analysis

The sidewalk midblock analysis measures the average flow rate LOS, which occurs when transit vehicles release large groups of pedestrians in a short period of time. An analysis of existing conditions at selected intersections indicates that walkways generally operate at a comfortable LOS A, during the three peak periods. There are many locations where there are no sidewalks. Table 26 presents a summary of the LOS results for sidewalks.

Table 26
2002 Existing Conditions - Sidewalk Level of Service

Walkway location	Walkway #	AM		MD		PM	
		p/min/f	LOS	p/min/f	LOS	p/min/f	LOS
Bloomingdale Road at Arthur Kill Road							
north		no walkways					
south/west							
south/east							
Bloomingdale Road at Woodrow Road							
west		no walkway					
north/east	1	0.1	A	0	A	0	A
	2	0.1	A	0.1	A	0.1	A
south/east	1	0.1	A	0.1	A	0.1	A
	2	0.1	A	0	A	0	A
Bloomingdale Road at Sharrotts Road							
north/west	1	0.1	A	0	A	0.1	A
	2	0	A	0	A	0	A
south/west	1	0.3	A	0.1	A	0	A
	2	0.1	A	0.1	A	0	A
east	1	0.2	A	0	A	0	A
	2	0.4	A	0.1	A	0	A
Bloomingdale Road at Veterans Road East/ Drumgoole Road West							
north/west		no walkway					
south/west	1	0	A	0.1	A	0	A
	2	0.1	A	0	A	0.1	A
north/east		no walkway					
south/east	1	0	A	0	A	0	A
	2	no walkway					
Veterans Road East at Englewood Avenue							
north/west	1	no walkway					
	2	0.1	A	0.1	A	0.1	A
south/west	1	no walkway					
	2	0	A	0	A	0	A
north/east	1	0	A	0.1	A	0.1	A
	2	0.1	A	0	A	0.1	A
south/east	1	no walkway					
	2						
Arthur Kill Road at Kreischer Street							
north/west	1	no walkway					
	2						
south/west	1	no walkway					
	2						
east	1	no walkway					
	2						

Corner Analysis

Street corner and crosswalk analyses are more complex than sidewalk analysis since they involve sidewalk flows, pedestrian crossings, and other queued pedestrians waiting for the traffic signal to change. Analysis of the existing corners indicate that, during the three peak periods, corners generally operate at LOS C or better for all peak periods. One corner, located on the northeast side of the intersection of Bloomingdale and Woodrow roads, operates at LOS D. There are some locations where there are no corners. Table 27 presents the results of the analysis. The HCM summary package, which documents the existing pedestrian LOS, is on file at the NYCDCP.

Table 27
2002 Existing Conditions - Corner Level of Service

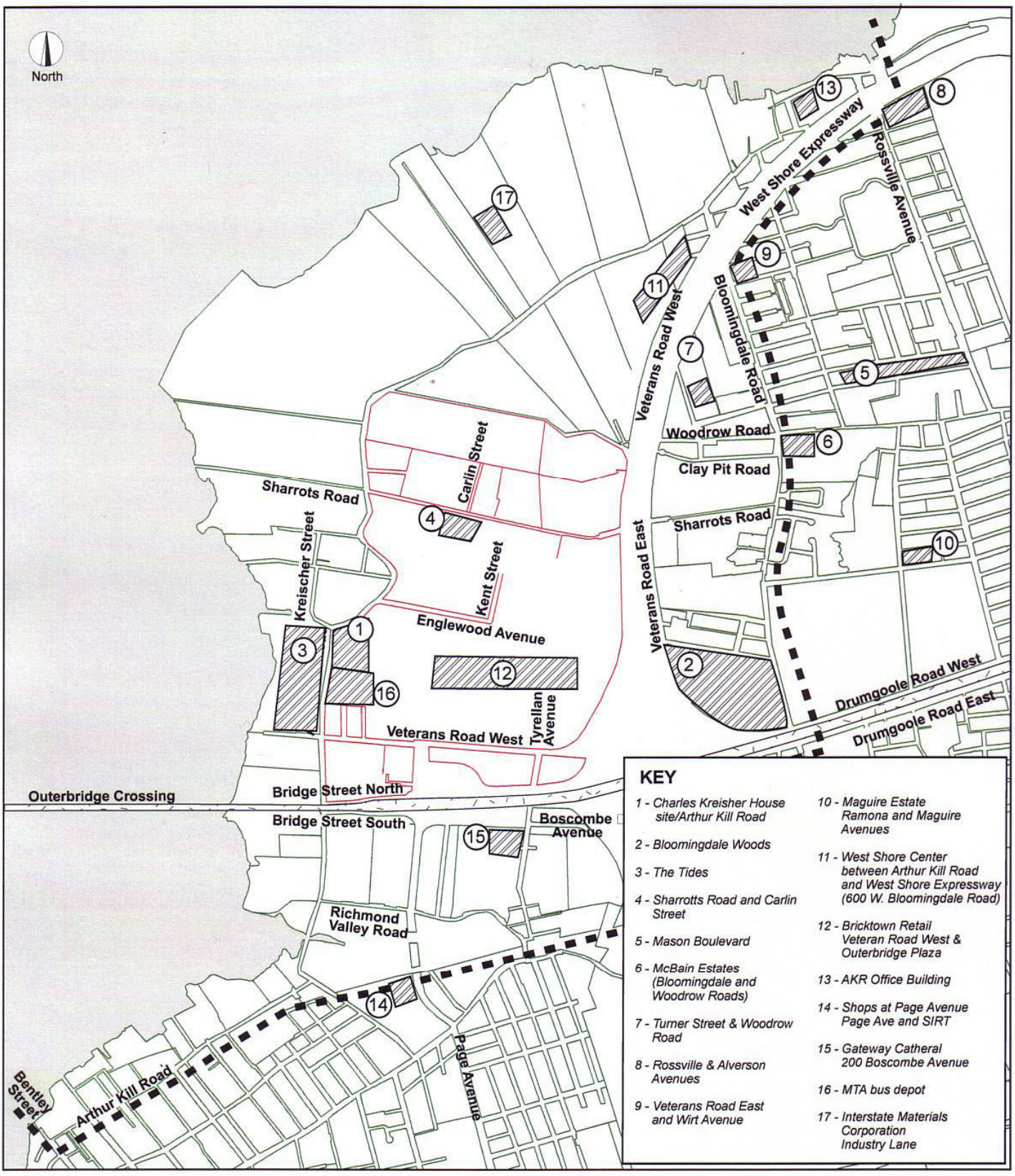
Intersection	Corner	AM		MID		PM	
		SF/P	LOS	SF/P	LOS	SF/P	LOS
Bloomingdale Road at Arthur Kill Road	Southeast	no corner					
	Southwest	no corner					
Bloomingdale Road at Woodrow Road	Northeast	22.94	D	81.71	A	74.69	A
	Southeast	59.24	B	150.41	A	243.8	A
Bloomingdale Road at Sharrotts Road	Northwest	64.36	A	126.75	A	71.59	A
	Southwest	38.25	C	110.57	A	387	A
Bloomingdale Road at Veterans Road East/Drumgoole Road West	Northeast	no corner					
	Southeast	914.36	A	1899	A	3169.5	A
	Southwest	36.55	C	964.12	A	275.46	A
	Northwest	no corner					

Crosswalk Analysis

Analysis of the existing crosswalks indicate that, during the three peak periods, crosswalks generally operate at LOS A. There are some locations where there are no crosswalks. Table 28 presents the results of the existing crosswalk conditions. The HCM summary package, which documents the existing pedestrian LOS, is on file at the NYCDCP.

Table 28
2002 Existing Conditions - Crosswalks Level of Service

Intersection	Location	AM		MD		PM	
		SF/P	LOS	SF/P	LOS	SF/P	LOS
Bloomingdale Road at Arthur Kill Road							
	East	no crosswalk					
	South	no crosswalk					
	West	no crosswalk					
Bloomingdale Road at Woodrow Road							
	North	7097.83	A	14242.5	A	14151.4	A
	South	no crosswalk					
	East	516.23	A	2075.21	A	2067.5	A
Bloomingdale Road at Sharrotts Road							
	North	1790.36	A	10768.8	A	10768.8	A
	South	1332.99	A	10680.1	A	10627.2	A
	West	2942.19	A	4907.72	A	14747.6	A
Bloomingdale Road at Veterans Road East/Drumgoole Road West							
	North	5946.08	A	2979.45	A	5946.08	A
	East	2150.73	A	5381.53	A	10772.4	A
	South	no crosswalk					
	West	644.08	A	10974.51	A	908.08	A



Proposed Future Development Scenario

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Figure 15