New York City Department of Transportation

Office of School Safety Engineering

School Safety Engineering Project

FINAL REPORT: J.H.S. 291, Roland Hayes School, Brooklyn

Prepared by
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School Safety Engineering Project
J.H.S. 291, Roland Hayes School, Brooklyn

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1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Department of Transportation has developed school safety maps for 1,471 schools throughout the City. Schools currently in the program are primarily elementary and intermediate schools with an enrollment of at least 250 students. The safety plans include the designation of official school crosswalks, identified by prominent warning signs and roadway markings. DOT also designates curbside locations for school bus loading and unloading and other parking controls to improve conditions for students. In addition, nearly 600 speed reducers (humps) have been installed in the immediate vicinity of schools.

Under this consultant study, the School Safety Engineering Project, accident data in the vicinity of all program schools was reviewed. As a result, schools were ranked in terms of pedestrian safety, and 135 "priority" schools were identified Citywide. At each of these priority schools safety improvements are being recommended (e.g., new school crosswalks, new traffic signals and signal timing modifications, new speed reducers). In addition, 32 of these schools will receive further investigation to design physical improvements (e.g., raised center medians, widened sidewalks, "neckdowns" or "bulbouts" at intersections). J.H.S. 291 (Roland Hayes School) in Brooklyn is one of the 135 priority schools.

2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS

[redacted]

2.2 NEIGHBORHOOD DESCRIPTION

Located at 231 Palmetto Street, J.H.S. 291 occupies the city block bounded by Wilson Avenue, Gates Avenue, Knickerbocker Avenue and Palmetto Street. The surrounding area is generally residential with a combination of private homes and 2-3 story buildings (see Exhibit 1 for Aerial Photograph).

Figure 1: Palmetto Street, in front of J.H.S. 291

2.3 MEETING WITH SCHOOL REPRESENTATIVES

The consultant team and the school representatives from J.H.S. 291 met at the school on the afternoon of June 23, 2004 (see the Appendix for a list of attendees).

According to representatives of the school, the identifiable problems that student pedestrians encounter on a regular basis include the following:

- Vehicles speeding on Gates Avenue;
- Vehicles speeding on Palmetto Street;
- Children crossing at the mid-block locations on Palmetto Street and Gates Avenue
- No crossing guards assigned to J.H.S. 291

1 inch equals 175 feet

EXHIBIT 1

ROLAND HAYES SCHOOL
J.H.S. 291, BROOKLYN

AERIAL PHOTOGRAPH

1 inch equals 400 feet

CATCHMENT AREA

EXHIBIT 2

ROLAND HAYES SCHOOL
J.H.S. 291, BROOKLYN

CATCHMENT AREA

2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL

According to school officials, approximately 80% of students walk to J.H.S. 291, 5% arrive via public transportation, 10% are driven by a parent or guardian, and the remaining 5% arrive by school buses. See Table 1 for school's estimate of the modes of travel. The catchment area for this school is shown on Exhibit 2.

TABLE 1: MODES OF TRAVEL
(AS ESTIMATED BY SCHOOL OFFICIALS)

Description	Percentage
Walk	80%
Driven by a parent or guardian	10%
School bus	5%
MTA bus or subway	5%
TOTAL	100%

2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS

Several public schools are located within a few blocks of J.H.S. 291 with a total enrollment of approximately 4700 students. Bushwick High School, P.S. 377, I.S. 383, P.S. 376, P.S. 106, P.S. 86, and P.S. 116 are located within a few city blocks from J.H.S. 291. P.S. 106, P.S. 116 and P.S. 86 are priority schools.

2.8 CROSSING GUARD LOCATIONS

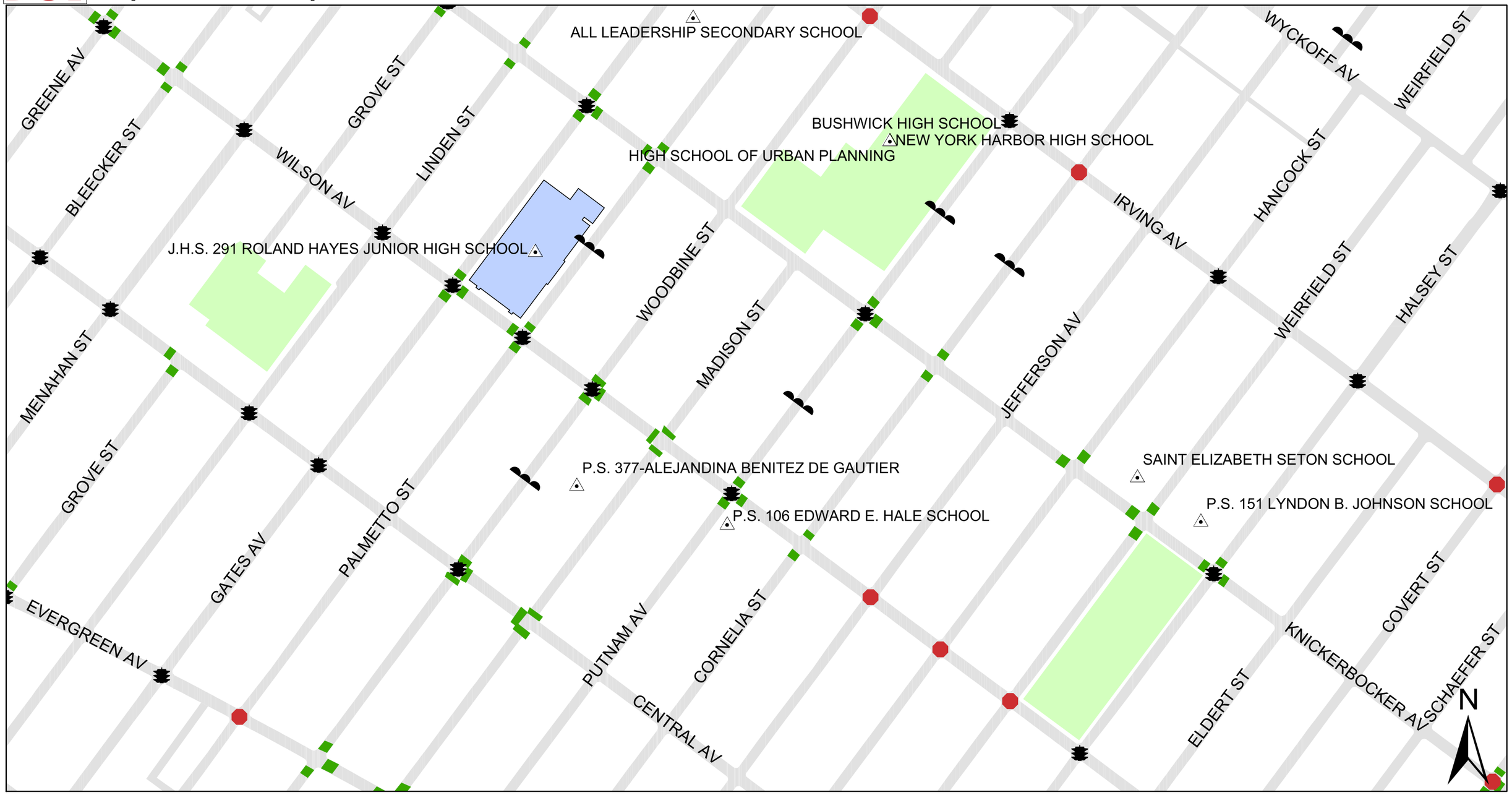
There are no crossing guards assigned to J.H.S. 291. However, nine school safety officers were present at dismissal time during the school visit. They were observed directing students to the intersections, prohibiting mid-block crossing and accompanying students to the school buses waiting on Palmetto Street in front of the school's main entrance.

Figure 3 - J.H.S. 291 safety officers in front of main entrance during school dismissal time

New York City
Department of Transportation

School Traffic Safety Map

Traffic Operations Division



The School Traffic Safety Map was established to help provide the maximum degree of safety for children going to and from school - by indicating the location of speed reducers, school crosswalks and some traffic control devices. (While virtually all intersections in NYC benefit from traffic control devices - such as stop signs, traffic signals, yield signs, and all way stop signs - this map shows only traffic signals and all way stop signs.) The school crosswalks that are shown are ladder striped and make the crosswalk more visible to drivers and help make the intersection safer. These crosswalks are where school children are recommended to cross.

Note: Every attempt has been made to provide complete and accurate information that is updated regularly. The City's streets are constantly changing and it is not always possible to present information without error.

LEGEND:

- SCHOOL LOCATION
- SCHOOL CROSSWALK
- TRAFFIC SIGNAL
- ALL - WAY STOP
- SPEED REDUCER

IS 291 Brooklyn
ROLAND HAYES SCHOOL

Prepared by the NEW YORK CITY DEPARTMENT OF TRANSPORTATION, Iris Weinshall, COMMISSIONER.

Map created on 11/16/2006

EXHIBIT 3

COMM. BOARD: 304
PRECINCT: 83

1.5.1

3. TRAFFIC OPERATIONS

3.1 SCHOOL BUS OPERATIONS

It was observed during school dismissal time, that three school buses picked up students on Palmetto Street in front of the school's main entrance. Since Palmetto Street is a 28-foot wide street, and parking is allowed along both sides, school buses block moving traffic while loading and unloading students. (Figure 4).

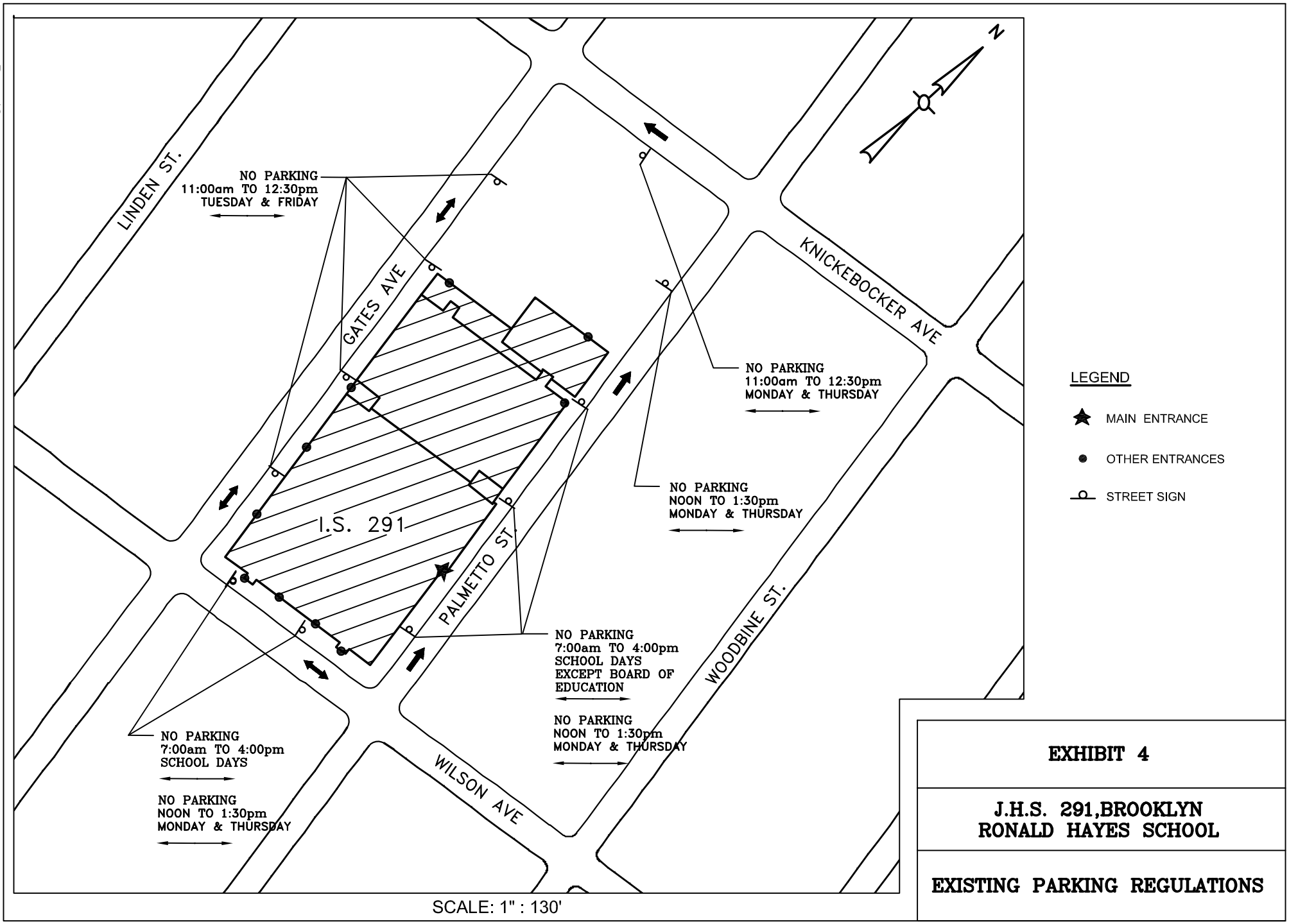
Figure 4: Double-parked school buses on Palmetto Street during dismissal time in front of J.H.S. 291

3.2 PARENT DROP-OFF OPERATIONS

School officials have indicated that approximately 10% of J.H.S. 291 students are driven to and from school by parents or guardians. Field observations indicated that parents use both Gates Avenue and Palmetto Street as student pick-up/drop-off points.

3.3 PARKING REGULATIONS

A "NO PARKING, 7 AM - 4 PM, SCHOOL DAYS, EXCEPT BOARD OF EDUCATION" parking regulation is posted in the front of the school's main entrance on Palmetto Street. "NO PARKING, 7 AM - 4 PM, SCHOOL DAYS" is posted on Wilson Avenue. Parking is prohibited on alternating sides of the roadways from 12:00 pm to 1:30 pm on Wilson Avenue and Palmetto Street and from 11:00 am to 12:30 pm on Gates Avenue and Knickerbocker Avenue. Exhibit 4 shows parking regulations on the street surrounding the school.



SCALE: 1" : 130'

EXHIBIT 4

J.H.S. 291,BROOKLYN
RONALD HAYES SCHOOL

EXISTING PARKING REGULATIONS

Figure 5: Parking regulations on Palmetto Street in front of J.H.S. 291

3.4 EXISTING SCHOOL SIGNS AND MARKINGS

The Traffic Safety Plan, Exhibit 3, shows existing crosswalk pavement markings in the vicinity of the school. It is noted that a citywide signage program is currently underway to upgrade school signage to current Federal Manual of Uniform Traffic Control Devices (MUTCD) standards of fluorescent yellow-green signs accompanied by downward pointing arrows. Signs scheduled to be installed under this program are shown as "existing" on Exhibit 7.

3.5 ACCIDENT SUMMARY

Exhibit 5 and Table 2 show a summary of accidents, as obtained from the New York State Department of Motor Vehicles (DMV), in the vicinity of J.H.S. 291 for the three-year period from January 1, 1998 through December 31, 2000. The DMV data provides some detail relating to the circumstances and cause of the accident. Table 3 is a summary of more recent accident data obtained from the NYC Police Department (NYPD). Though current through 2004, the NYPD data does not provide the same level of detail as the DMV data.

This report targets intersections closest to the school where the highest concentrations of student pedestrians occur. Intersections that are farther from the school which did not have detailed data available at the time of this study will be addressed with DOT's School Safety Engineering Program's ongoing work. DMV accident data is discussed in Section 3.6, Traffic Operations and Issues.

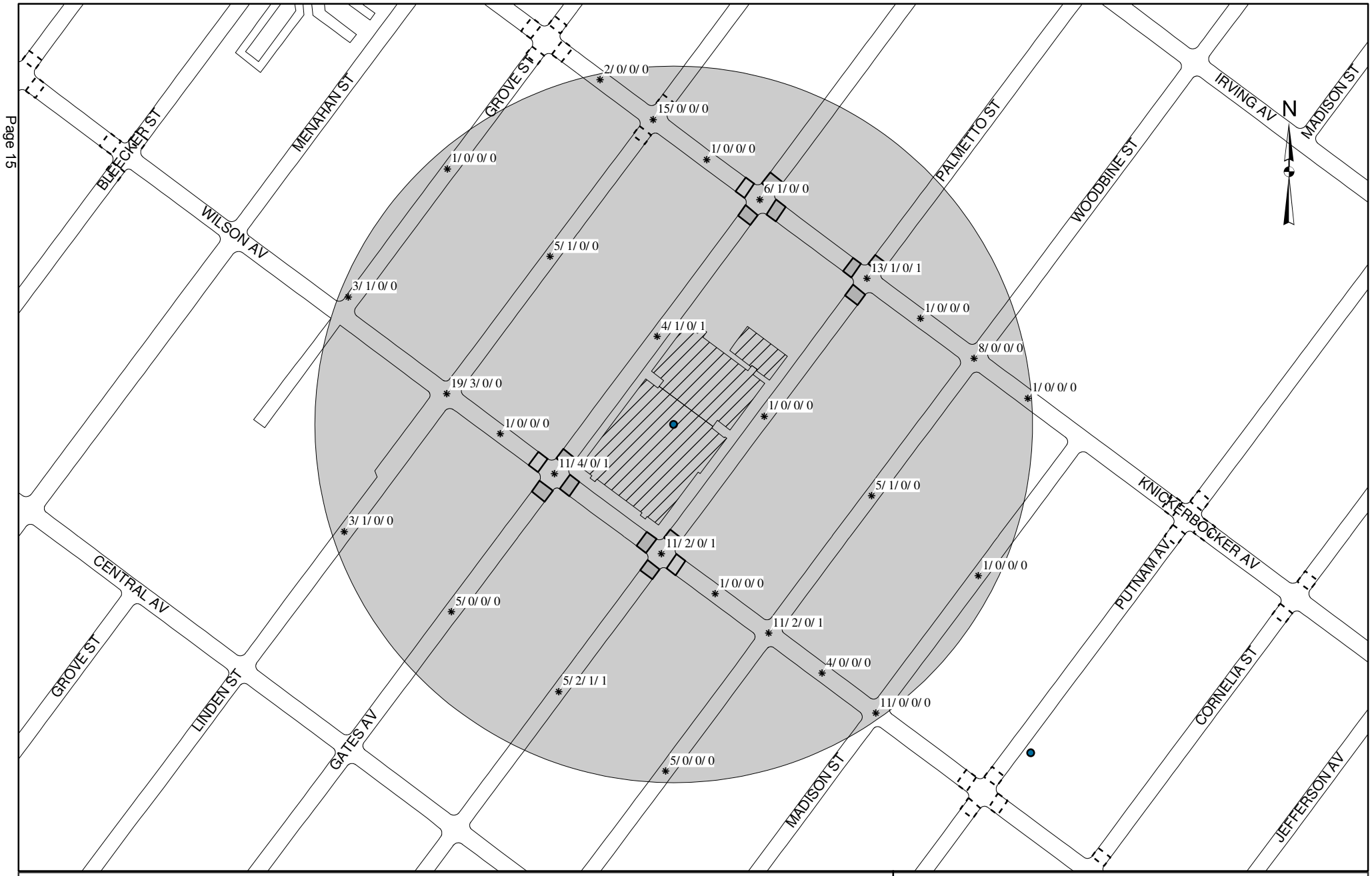
TABLE 2: DMV THREE-YEAR ACCIDENT SUMMARY (1998-2000)

INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED* ACCIDENTS
Wilson Ave. and Gates Ave.	11	4	0	1
Knickerbocker Ave. and Gates Ave.	6	1	0	0
Palmetto Street and Wilson Ave.	11	2	0	1
Knickerbocker Ave. and Palmetto St.	13	1	0	1
Woodbine Street and Wilson Ave.	11	2	0	1
TOTAL	52	10	0	4

TABLE 3: NYPD FOUR-YEAR ACCIDENT SUMMARY (2001-2004)

INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED* ACCIDENTS
Wilson Ave and Gates Ave.	30	7	0	2
Knickerbocker Ave. and Gates Ave.	38	10	0	0
Palmetto Street and Wilson Ave.	20	5	0	1
Knickerbocker Ave. and Palmetto St.	15	3	0	2
Woodbine Street and Wilson Ave.	30	1	0	0
TOTAL	133	26	0	5

* School-Related Accidents are defined as accidents involving school-age pedestrians (age 4 – 14), occurring weekdays during the school year.



ACCIDENT LOCATION *

SCHOOL CROSSWALK ASSIGNED TO I.S. 291

SCHOOL CROSSWALK ASSIGNED TO ANOTHER SCHOOL

CROSSWALK

X/X/X/X

TOTAL ACCIDENTS / PED ACCIDENTS / PED FATAL / SCHOOL_PED ACCIDENTS

EXHIBIT 5

ROLAND HAYES SCHOOL

J.H.S. 291, BROOKLYN

ACCIDENT SUMMARY
THREE YEAR PERIOD
1998-2000

3.6 TRAFFIC OPERATIONS AND ISSUES

The following describes traffic accidents and operational issues at intersections in the vicinity of J.H.S. 291.

3.6.1 Gates Avenue and Wilson Avenue

This is a standard four leg signalized intersection (Figure 6). Both Gates Avenue and Wilson Avenue are approximately 32 feet wide, two-way streets with one travel lane in each direction and parking along both sides of the street. School crosswalks are on the north, south and east legs of the intersection. During the field visit, it was noted that the pedestrian ramps are substandard at both the southeast and northeast corners of the intersection.

Eleven accidents occurred at this intersection, including four pedestrian accidents. One pedestrian accident was a school related accident. According to the accident data, two pedestrians were struck by left turning vehicles while crossing at the crosswalk with the signal. Both accidents were attributed to the driver failing to yield to crossing pedestrians. A 13-year old pedestrian was struck while crossing against the signal. There is no detailed information on the fourth pedestrian accident.

In addition, four accidents occurred in the mid-block of Gates Avenue between Wilson Avenue and Knickerbocker Avenue. One accident involved a pedestrian, who was a school student. According to the accident data, this 11-year-old pedestrian was crossing mid-block when struck by a vehicle traveling southbound.

Traffic counts were conducted at this intersection on June 14, 2005 between 2:30 pm and 3:30 pm (see Exhibit 6A). The possibility of installing a Leading Pedestrian Interval (LPI) was considered; however, the collected traffic data indicates the current vehicular and pedestrian volumes do not meet the LPI criteria.

School representatives indicated that vehicles were speeding on Gates Avenue. A spot speed survey was conducted on Gates Avenue between Wilson Avenue and Knickerbocker Avenue, on March 14, 2005. The results are shown in Table 4 and in the Appendix. The 85th percentile speed on Gates Avenue was 30 mph. A speed reducer (hump) is not recommended for Gates Avenue since the 85th percentile speed does not exceed the legal speed limit of 30 mph. In addition a speed reducer is not feasible as Gates Avenue is a bus route for the B52.

TABLE 4: SPOT SPEED STUDY (GATES AVENUE)

LOCATION	MEDIAN SPEED (MPH)	85TH PERCENTILE SPEED (MPH)
Gates Avenue between Wilson Avenue and Knickerbocker Avenue	25	30

Figure 6: The intersection of Wilson Avenue and Gates Avenue (looking west)

3.6.2 Knickerbocker Avenue and Gates Avenue

This is a signalized intersection with school crosswalks on the north, south and east legs. Knickerbocker Avenue is a 34-foot wide, one-way street with two travel lanes and parking lanes on both sides of the street.

Six accidents occurred at this intersection between 1998 and 2000, including one pedestrian accident. According to the accident data, the pedestrian was struck by a northbound vehicle. No further information on this accident is available.

3.6.3 Knickerbocker Avenue and Palmetto Street

The intersection is stop controlled for northbound vehicles on Palmetto Street, while traffic on Knickerbocker Avenue is uncontrolled. Palmetto Street is a 28-foot wide street with one travel lane and parking along both sides of the street. Both Knickerbocker Avenue and Palmetto Street are one-way streets. School crosswalks are on the north, south and west legs of the intersection.

Thirteen accidents occurred during the 1998-2000 study period. One accident involved a school age pedestrian. According to the accident data, the 12-year old pedestrian was crossing outside of the marked crosswalk, when struck by a westbound vehicle.

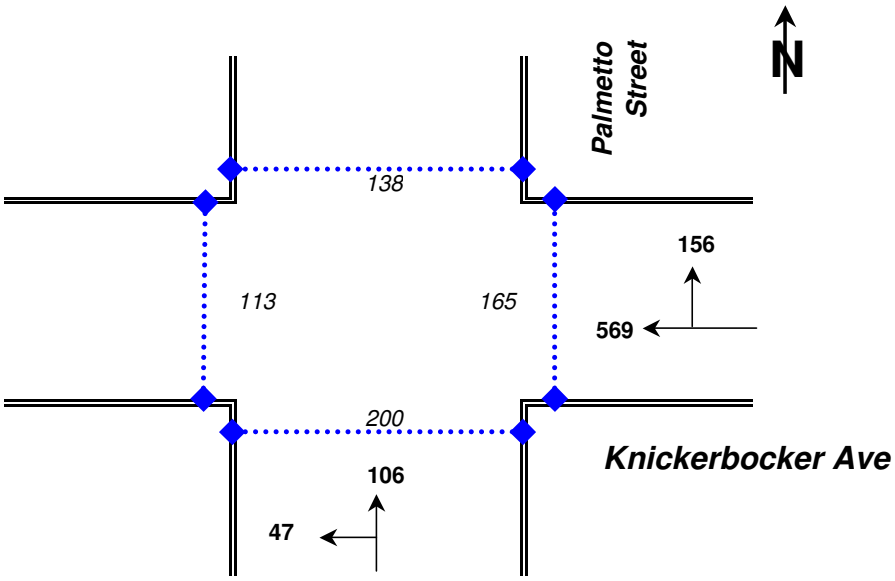
Traffic counts were performed for this intersection on May 24, 2005 between 7:30 am and 8:30am (see Exhibit 6A). A total of 878 vehicles and 616 pedestrians utilized this un-signalized intersection during this hour. A total of 569 vehicles traveling westbound on Knickerbocker Avenue conflict with 278 (113+165) pedestrians crossing Knickerbocker Avenue, and 156 right turning vehicles onto Palmetto Street conflict with 138 pedestrians crossing Palmetto Street on the north crosswalk. In addition, a gap study was conducted at this location on May 2, 2006 between 7:30 am and 8:30 am. The gap study showed that there were a total of 66 gaps of 14 or more seconds for pedestrians to cross Knickerbocker Avenue.

Based on MUTCD Section 4C.05 Signal Warrant 4 (Pedestrian Volume) the need for a traffic control signal at an intersection shall be considered if an engineering study finds that the pedestrian volume crossing the major street at an intersection during an average day is 190 or more during any one hour. In addition, there must be fewer than 60 gaps per hour in the traffic stream of adequate length to allow pedestrians to cross during the same period to meet the pedestrian volume criterion.

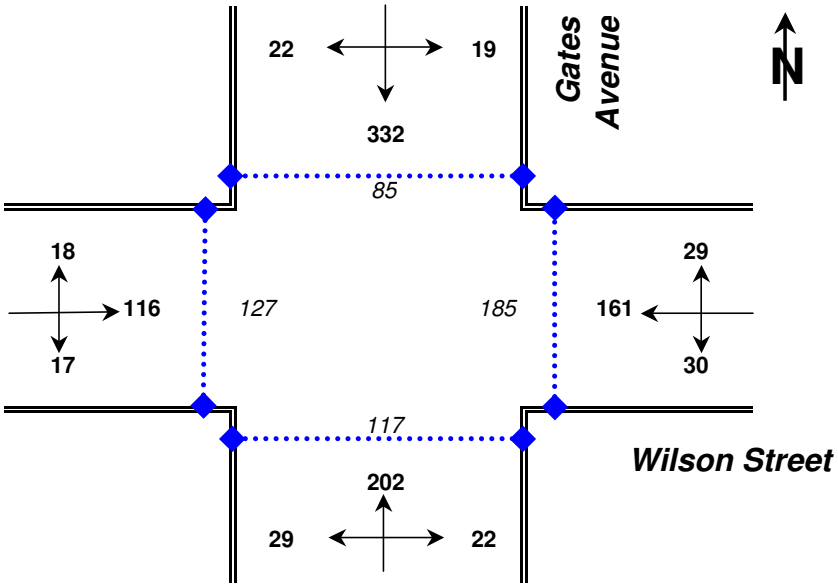
The number of pedestrians crossing Knickerbocker Avenue exceeds the minimum number of pedestrians (278 vs. 190) crossing the major street required in order to meet the signal warrant. However, the number of gaps (66 vs. 60) does not meet the warrant criteria since there are more than 60 gaps in one study hour. Therefore, based on one-hour traffic counts neither a signal nor an all-way stop is justified at this location at this time. However, it is recommended that DOT conduct a full traffic signal warrant study for this intersection. In the meantime, a crossing guard is recommended at this intersection to assist the students crossing Knickerbocker Avenue during morning arrival and afternoon dismissal.

Figure 7: Palmetto Street and Knickerbocker Avenue intersection (looking east on Palmetto Street)

One Hour Traffic Count Volumes



Intersection of Palmetto Street and Knickerbocker Avenue - (7:30 AM - 8:30 AM May 24, 2005)



Intersection of Gates Avenue and Wilson Avenue - (2:30 PM - 3:30 PM, June 14, 2005)

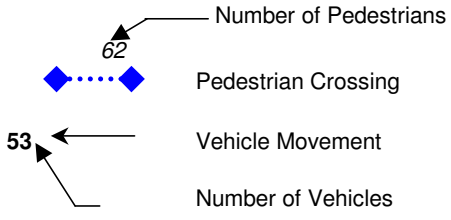
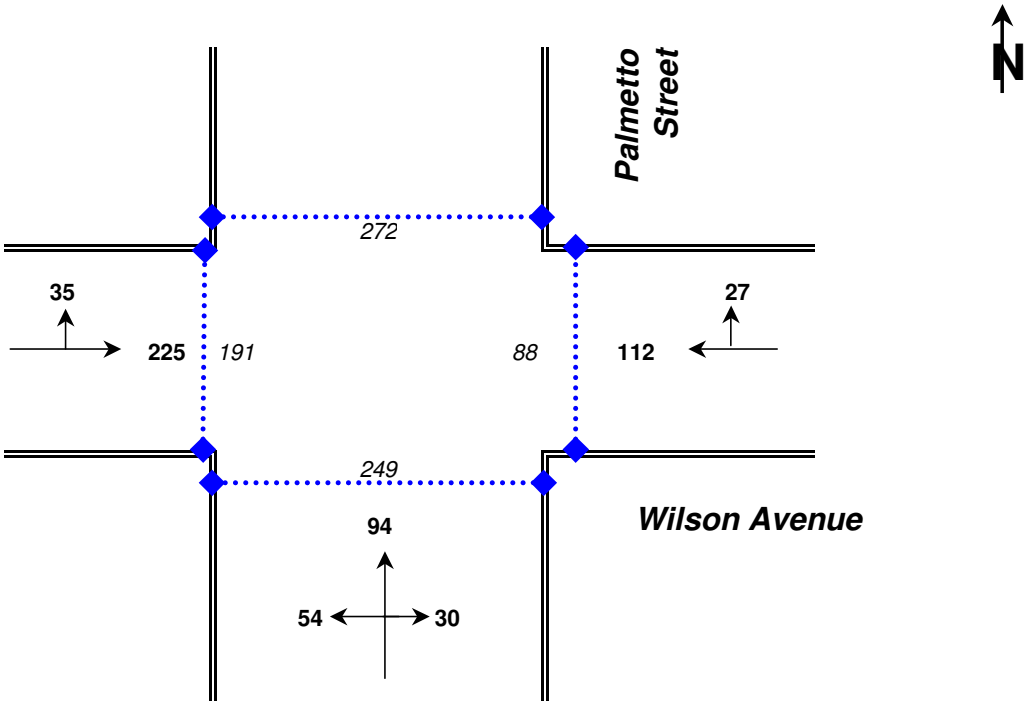


EXHIBIT 6A
J.H.S. 291, BROOKLYN ROLAND HAYES SCHOOL
TRAFFIC COUNTS

One Hour Traffic Count Volumes



Intersection of Palmetto Street and Wilson Avenue - (2:30 PM - 3:30 PM June 14, 2005)

62 Number of Pedestrians

Pedestrian Crossing

53 Vehicle Movement

Number of Vehicles

EXHIBIT 6B
J.H.S. 291, BROOKLYN **ROLAND HAYES SCHOOL**
TRAFFIC COUNTS

3.6.4 Palmetto Street and Wilson Avenue

The intersection of Palmetto Street and Wilson Avenue is signal controlled. According to school officials this intersection is the most utilized by J.H.S. 291 students of all the intersections surrounding the school. School crosswalks are on the north, south and west legs of the intersection.

Eleven accidents occurred at this location between 1998 and 2000, including two pedestrian accidents, one of which was a school related accident. The school related pedestrian accident was attributed to both driver's and pedestrian's error although no specifics of the accident were cited. The second pedestrian accident was attributed to pedestrian error due to crossing outside the crosswalk area.

There were two pedestrian accidents on Palmetto Street mid-block between Wilson Avenue and Central Avenue. One accident was school related which was also a fatal accident. An eight-year old child was killed when crossing Palmetto Street at 8am on 12/03/1999. The other accident involved a driver who struck a pedestrian when avoiding an object on the roadway.

Traffic counts were conducted at this intersection on June 14, 2005 between 2:30 pm and 3:30 pm (see Exhibit 6B). The possibility of installing a Leading Pedestrian Interval (LPI) was considered; however, the collected traffic data indicates the current vehicular and pedestrian volumes do not met the LPI criteria.

Figure 8: Palmetto Street intersection with Wilson Avenue (on Palmetto Street looking east)

3.6.5 Wilson Avenue and Woodbine Street

This is a signalized intersection with school crosswalks on the north, south and east legs. Woodbine Street is a 30-foot wide, one-way southbound street with one travel lane and parking on both sides of the street.

Eleven accidents occurred at this intersection between 1998 and 2000, including two pedestrian accidents, one of which was a school related accident. According to the accident data, a northbound vehicle making a right turn struck an 11-year old child who was crossing outside of the crosswalk. The second accident involved a driver making a left turn.

3.7 SIGNAL TIMING: PEDESTRIAN PHASE

Pedestrian crossing time was field verified at all signalized intersections in the vicinity of J.H.S. 291, and found to be adequate for a child pedestrian walking rate of three feet per second in all directions and approaches.

TABLE 5: PEDESTRIAN CROSSING TIME AT SIGNALIZED INTERSECTIONS

Intersection Name	Crosswalk Length (Feet)	Ped. Phase (Seconds)	Ped. Phase Req'd (Seconds)	Timing (Yes/No)
Wilson Ave and Gates				
crossing Wilson Avenue	34	25	14	NO
crossing Gates Avenue	32	25	13	NO
Wilson Ave and Palmetto				
crossing Wilson Avenue	34	20	14	NO
crossing Palmetto Street	28	30	13	NO
Knickerbocker Ave and				
crossing Knickerbocker	34	30	14	NO
crossing Gates Avenue	32	20	13	NO

Note – A rate of three feet per second plus three seconds reaction time was utilized as the child pedestrian walking rate

3.8 PHYSICAL CONDITIONS (ROADWAYS AND SIDEWALKS)

The roadways and sidewalks in the vicinity of the school were generally observed to be in good condition.

Figure 9: Sidewalk on Palmetto Street in front of main school entrance (looking north)

4. POTENTIAL MEASURES TO IMPROVE STUDENT PEDESTRIAN SAFETY

This section describes potential countermeasures. Recommendations are divided into short-term and long-term measures. Short-term measures are those that potentially can be performed in-house, long term measures are capital improvements.

4.1 SHORT-TERM MEASURES

- *No Standing Zone on Palmetto Street*

  "NO STANDING 7 AM - 4 PM, SCHOOL DAYS" parking regulations should be considered in front of main school entrance on Palmetto Street for a length of 60 feet to provide sufficient clear frontage for school buses to drop-off and pick-up students. Existing teacher parking on Palmetto Street could be relocated to Gates Avenue.

- *Submit request to the Police Department for crossing guards*

  It is recommended that crossing guards be requested for the intersection of Palmetto Street and Knickerbocker Avenue and intersection of Palmetto Street and Wilson Avenue.

- *Install two speed reducers (humps) on Palmetto Street, between Wilson Avenue and Knickerbocker Avenue*

  A spot speed survey was conducted on Palmetto Street between Wilson Avenue and Knickerbocker Avenue on March 14, 2005. The objective of the survey was to determine if there is a speeding problem on this section of Palmetto Street, as school officials have reported.

  The speed study results are shown in Table 7 and in the Appendix. The 85th percentile speed on Palmetto Street was 31 mph, which exceeds the legal speed limit of 30 mph. Therefore, to reduce speeding in the vicinity of J.H.S. 291, the installation of two speed reducers (humps) is recommended on Palmetto Street between Wilson Avenue and Knickerbocker Avenue. The location of speed reducers (humps) will be determined by NYCDOT.

TABLE 6: SPOT SPEED STUDY (PALMETTO STREET)

LOCATION	MEDIAN SPEED (MPH)	85TH PERCENTILE SPEED (MPH)
Palmetto Street between Wilson Avenue and Knickerbocker Avenue	27	31

Note: At time of report release NYCDOT had installed the recommended speed reducers.

- *Place stop bars ten feet in advance of school crosswalks.*

  The MUTCD and New York City DOT standard for placement of a stop bar is four feet in advance of a marked crosswalk. At signalized (or stop controlled) crosswalks, the vehicle stop line can be placed farther back from the crosswalk in

order to maximize visibility of pedestrians and to minimize the potential for pedestrian/vehicle conflicts. Therefore, it is recommended that stop bars be placed ten feet in advance of all school crosswalks.

- *Administer student pedestrian safety education program*

  It is recommended that the NYCDOT Safety Education Program work with the school to educate the students on pedestrian safety, including crossing the street with the WALK phase, and the meaning of the WALK - FLASHING DON'T WALK - DON'T WALK pedestrian signal sequence. It is also recommended that the students be educated not to cross at mid-block locations.

- *Review bus management / staging procedures*

  Sixty feet of curbside space has been provided for school bus operations on Palmetto Street. This might require some buses to stage at other locations until sufficient curbside space becomes available. School officials should review the bus operations at the school and consider the following:

  - Restrict drop-off/pick-up of students from school buses except at the designated curbside fronting the school
  - Define a staging area for buses to queue until they can safely pull into the curbside directly fronting the school for drop-off/pick-up operations.

  It is important that students not enter/exit buses while the buses are in the staging area. By reducing the number of students entering or exiting the buses at one time, it may be easier to manage the students' actions at arrival and dismissal times.

4.2 LONG-TERM MEASURES

- *Consider curb extensions at the following intersections:*

  Consideration should be given to installing a curb extension at the following locations, provided that the Final Design confirms that construction of the recommended curb extension would be feasible and would not interfere with traffic operations. Final details pertaining to the number, location and geometry of curb extensions will be developed during the Final Design/Contract Document preparation.

  - Gates Avenue and Knickerbocker Avenue – northeast and southeast corners
  - Wilson Avenue and Palmetto Street – northwest and southwest corners
  - Knickerbocker Avenue and Palmetto Street - northwest and southeast corners
  - Wilson Avenue and Gates Avenue – northeast corner

  Curb extensions should be considered at the corners as shown in Exhibit 7.

  The purpose of the curb extensions is to shorten the crossing distance for pedestrians, and to reduce speeds of vehicles approaching and turning at these heavily utilized school crosswalks (or intersections). These curb extensions would not eliminate or reduce the width of any moving lanes.

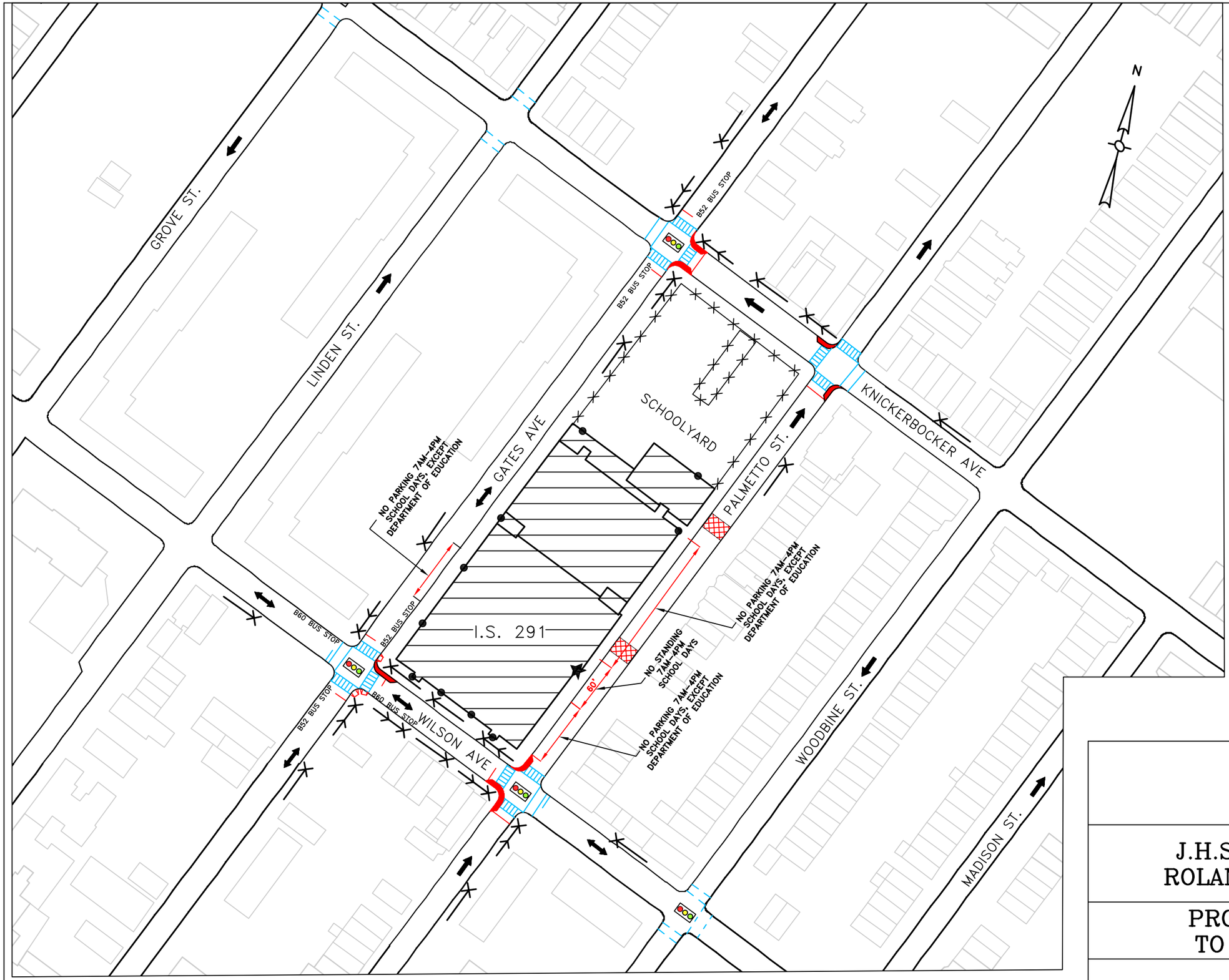
- *Installation/Replacement of complex pedestrian ramps at the intersection of Wilson Avenue with Gates Avenue*

  Due to existing signal pole conflicts, the following pedestrian ramps are considered complex. Consideration should be given to the installation of pedestrian ramps per NYCDOT standards on the southeast and southwest corners of the intersection of Wilson Avenue and Gates Avenue.

- *Utilization of buses equipped with left hand side exit doors*

  Currently buses unload J.H.S. 291 students through right hand side doors, though the school entrance is on the left side of the bus. The Department of Education bus fleet includes buses with left side doors. Therefore, it is recommended that buses with left side doors be used to transport students to and from J.H.S. 291.

  This measure in conjunction with “No Standing 7am-4pm” in front of the school entrance would allow students to load and unload from the bus, at the curbside, directly in front of the school.



LEGEND

- MAIN ENTRANCE
- OTHER ENTRANCES
- EXISTING (OR SCHEDULED TO BE INSTALLED BY DOT) ADVANCE WARNING SIGN WITH ARROW
- EXISTING ADVANCE WARNING SIGN
- EXISTING TRAVEL DIRECTION
- SIGNALIZED INTERSECTION
- EXISTING SCHOOL CROSSWALK
- EXISTING STANDARD (NON-SCHOOL) CROSSWALK
- EXISTING SCHOOL CROSSWALK ASSOC. WITH OTHER SCHOOL
- PROPOSED PEDESTRAIN RAMP
- PROPOSED STOP LINE
- PROPOSED TRAFFIC SIGN
- PROPOSED CURB EXTENSION (NECKDOWN)
- PROPOSED SPEED HUMP
- 60' PROPOSED PARKING REGULATIONS

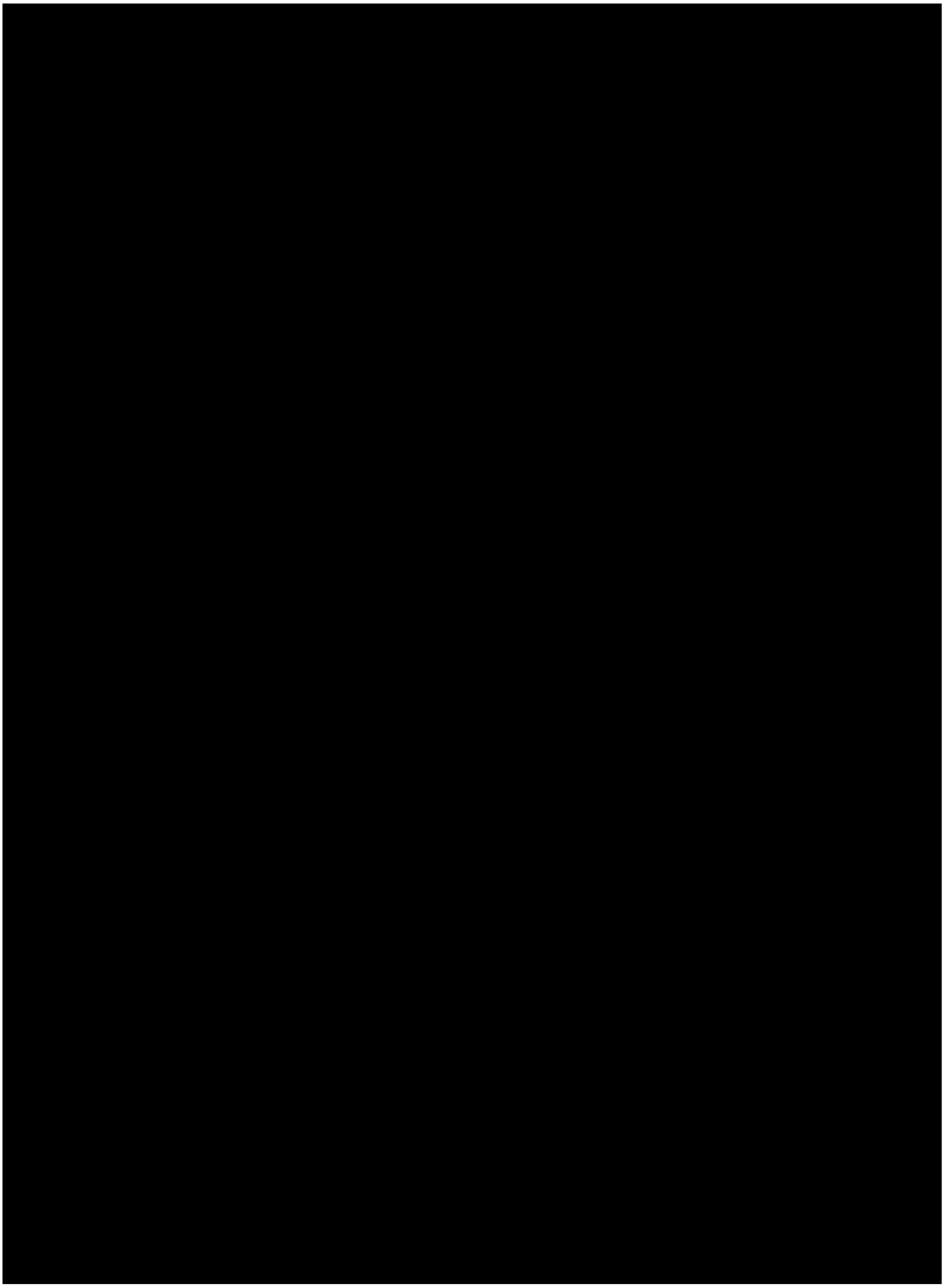
SCALE: 1" : 120'

EXHIBIT 7

J.H.S. 291, BROOKLYN
ROLAND HAYES SCHOOL

PROPOSED MEASURES TO IMPROVE SAFETY

APPENDIX



SPOT SPEED STUDY

Date: **March 14, 2005** Time: **12:00 PM To 1:30 PM** School: **I.S. 291**
Location: **Palmetto Street btw. Wilson Ave and Knickerbocker Ave** Direction: **NE**
Surveyor: **Eyad Yousef** Comments: **Sunny and Dry**

Speed *S* (mph)	No. of Vehicles in Group *n*	% of Vehicles in Group	% Cumulative Vehicles	*nS*	nS^2
8	0	0.0%	0.0%	0	0
9	0	0.0%	0.0%	0	0
10	0	0.0%	0.0%	0	0
11	0	0.0%	0.0%	0	0
12	0	0.0%	0.0%	0	0
13	0	0.0%	0.0%	0	0
14	0	0.0%	0.0%	0	0
15	0	0.0%	0.0%	0	0
16	0	0.0%	0.0%	0	0
17	0	0.0%	0.0%	0	0
18	0	0.0%	0.0%	0	0
19	0	0.0%	0.0%	0	0
20	0	0.0%	0.0%	0	0
21	0	0.0%	0.0%	0	0
22	12	11.8%	11.8%	264	5808
23	13	12.7%	24.5%	299	6877
24	10	9.8%	34.3%	240	5760
25	10	9.8%	44.1%	250	6250
26	8	7.8%	52.0%	208	5408
27	8	7.8%	59.8%	216	5832
28	9	8.8%	68.6%	252	7056
29	8	7.8%	76.5%	232	6728
30	4	3.9%	80.4%	120	3600
31	4	3.9%	84.3%	124	3844
32	6	5.9%	90.2%	192	6144
33	5	4.9%	95.1%	165	5445
34	1	1.0%	96.1%	34	1156
35	2	2.0%	98.0%	70	2450
36	0	0.0%	98.0%	0	0
37	1	1.0%	99.0%	37	1369
38	0	0.0%	99.0%	0	0
39	0	0.0%	99.0%	0	0
40	0	0.0%	99.0%	0	0
41	0	0.0%	99.0%	0	0
42	0	0.0%	99.0%	0	0
43	1	1.0%	100.0%	43	1849
44	0	0.0%	100.0%	0	0
45	0	0.0%	100.0%	0	0
46	0	0.0%	100.0%	0	0
47	0	0.0%	100.0%	0	0
48	0	0.0%	100.0%	0	0
49	0	0.0%	100.0%	0	0
50	0	0.0%	100.0%	0	0
51	0	0.0%	100.0%	0	0
52	0	0.0%	100.0%	0	0
53	0	0.0%	100.0%	0	0
54	0	0.0%	100.0%	0	0
55	0	0.0%	100.0%	0	0
56	0	0.0%	100.0%	0	0
	102	100.0%		2746	75576

Mean Speed = 26.9 mph
Standard Deviation = 4.0 mph
Margin of Error (95% Confidence) = ± 0.8 mph

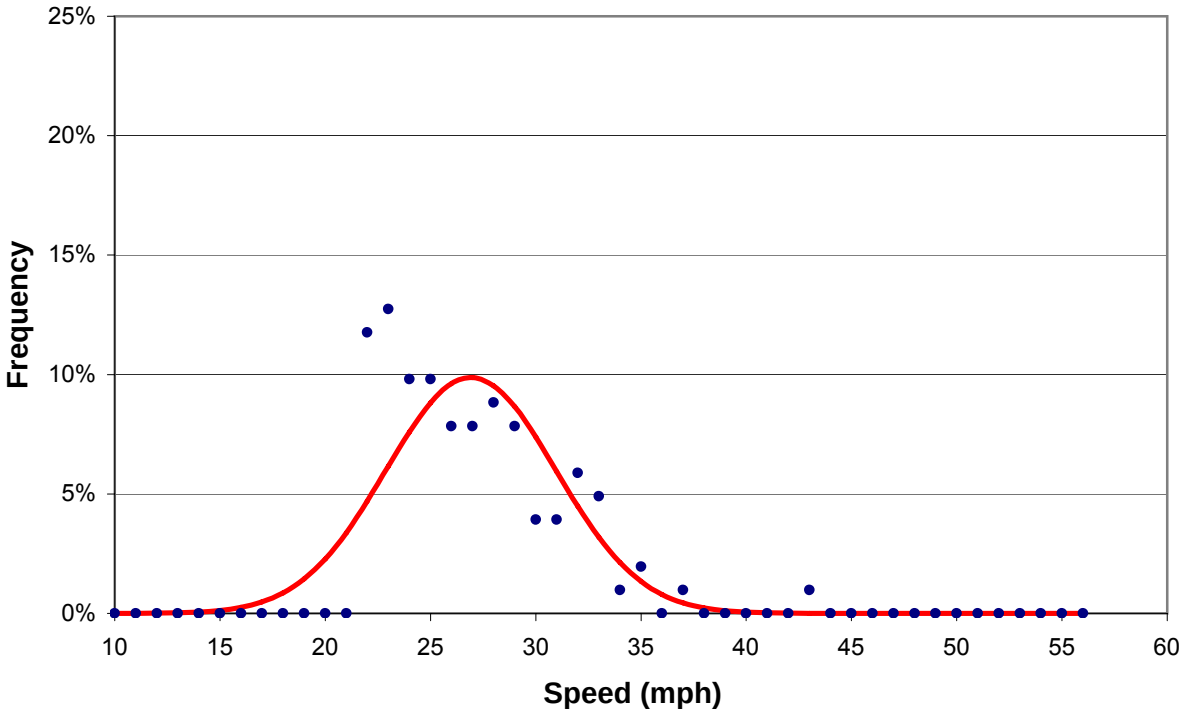
Median Speed = 26.9 mph
15th Percentile Speed = 22.7 mph
85th Percentile Speed = 31.1 mph

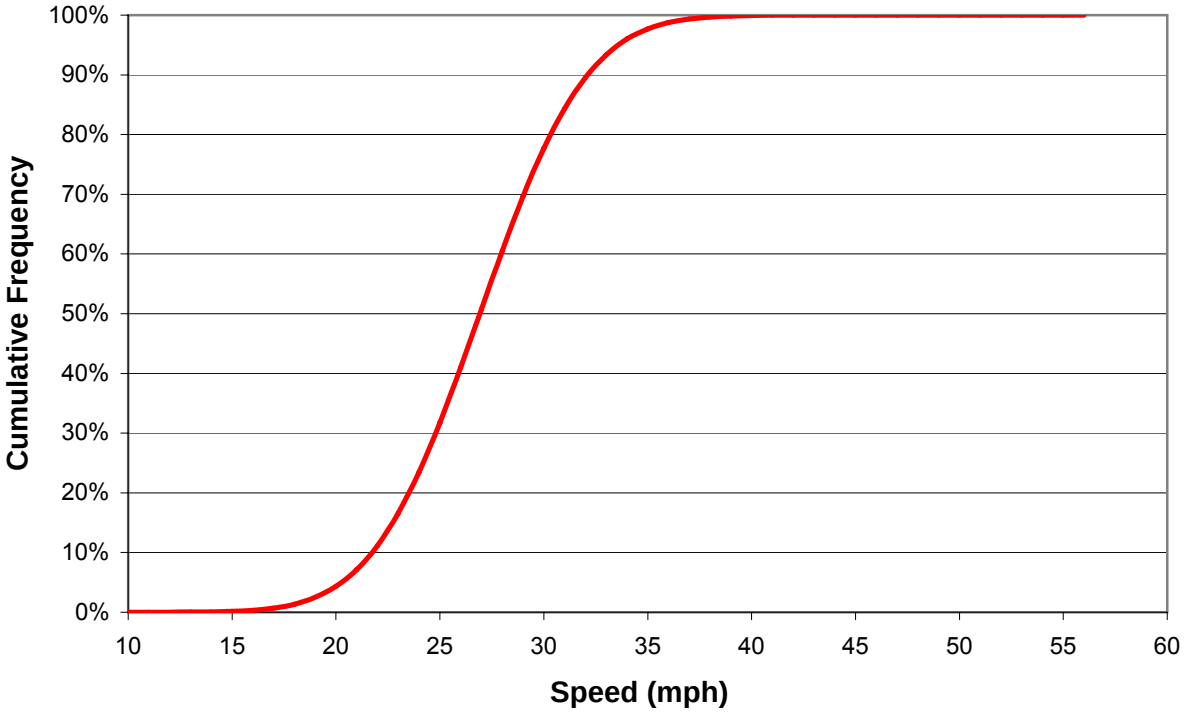
SPOT SPEED STUDY

Date: **March 14, 2005** Time: **12:00 PM To 1:30 PM** School: **I.S. 291**
Location: **Palmetto Street btw. Wilson Ave and Knickerbocker Ave** Direction: **NE**
Surveyor: **Eyad Yousef** Comments: **Sunny and Dry**

Mean Speed = 26.9 mph
Standard Deviation = 4.0 mph
Margin of Error (95% Confidence) = ± 0.8 mph

Median Speed = 26.9 mph
15th Percentile Speed = 22.7 mph
85th Percentile Speed = 31.1 mph





SPOT SPEED STUDY

Date: **March 14, 2005** Time: **2:15 PM To 3:11 PM** School: **I.S. 291**
Location: **Gates Ave btw. Wilson Ave and Knickerbocker Ave** Direction: **NE**
Surveyor: **Eyad Yousef** Comments: **Sunny and Dry**

Speed *S* (mph)	No. of Vehicles in Group *n*	% of Vehicles in Group	% Cumulative Vehicles	*nS*	nS^2
8	0	0.0%	0.0%	0	0
9	0	0.0%	0.0%	0	0
10	0	0.0%	0.0%	0	0
11	0	0.0%	0.0%	0	0
12	0	0.0%	0.0%	0	0
13	0	0.0%	0.0%	0	0
14	0	0.0%	0.0%	0	0
15	0	0.0%	0.0%	0	0
16	0	0.0%	0.0%	0	0
17	0	0.0%	0.0%	0	0
18	0	0.0%	0.0%	0	0
19	0	0.0%	0.0%	0	0
20	10	9.6%	9.6%	200	4000
21	10	9.6%	19.2%	210	4410
22	12	11.5%	30.8%	264	5808
23	13	12.5%	43.3%	299	6877
24	10	9.6%	52.9%	240	5760
25	11	10.6%	63.5%	275	6875
26	7	6.7%	70.2%	182	4732
27	8	7.7%	77.9%	216	5832
28	2	1.9%	79.8%	56	1568
29	3	2.9%	82.7%	87	2523
30	2	1.9%	84.6%	60	1800
31	3	2.9%	87.5%	93	2883
32	3	2.9%	90.4%	96	3072
33	2	1.9%	92.3%	66	2178
34	1	1.0%	93.3%	34	1156
35	2	1.9%	95.2%	70	2450
36	1	1.0%	96.2%	36	1296
37	1	1.0%	97.1%	37	1369
38	1	1.0%	98.1%	38	1444
39	1	1.0%	99.0%	39	1521
40	0	0.0%	99.0%	0	0
41	1	1.0%	100.0%	41	1681
42	0	0.0%	100.0%	0	0
43	0	0.0%	100.0%	0	0
44	0	0.0%	100.0%	0	0
45	0	0.0%	100.0%	0	0
46	0	0.0%	100.0%	0	0
47	0	0.0%	100.0%	0	0
48	0	0.0%	100.0%	0	0
49	0	0.0%	100.0%	0	0
50	0	0.0%	100.0%	0	0
51	0	0.0%	100.0%	0	0
52	0	0.0%	100.0%	0	0
53	0	0.0%	100.0%	0	0
54	0	0.0%	100.0%	0	0
55	0	0.0%	100.0%	0	0
56	0	0.0%	100.0%	0	0
	104	100.0%		2639	69235

Mean Speed = 25.4 mph
Standard Deviation = 4.7 mph
Margin of Error (95% Confidence) = ± 0.9 mph

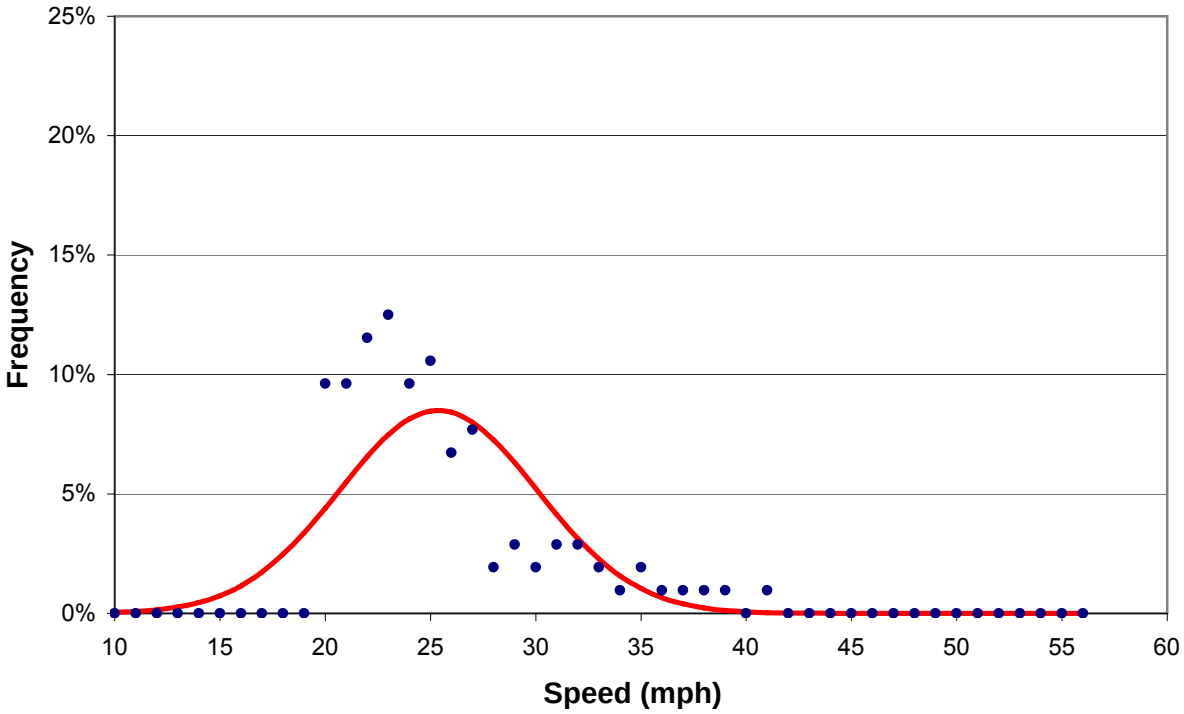
Median Speed = 25.4 mph
15th Percentile Speed = 20.5 mph
85th Percentile Speed = 30.2 mph

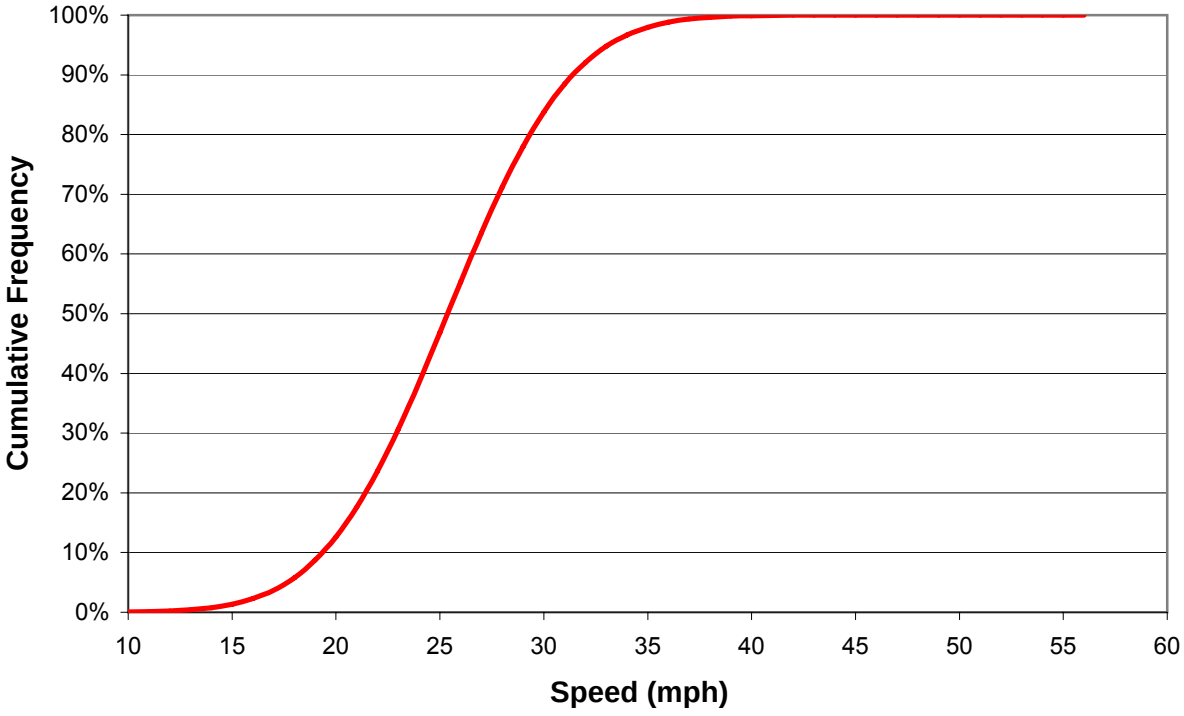
SPOT SPEED STUDY

Date: **March 14, 2005** Time: **2:15 PM To 3:11 PM** School: **I.S. 291**
Location: **Gates Ave btw. Wilson Ave and Knickerbocker Ave** Direction: **NE**
Surveyor: **Eyad Yousef** Comments: **Sunny and Dry**

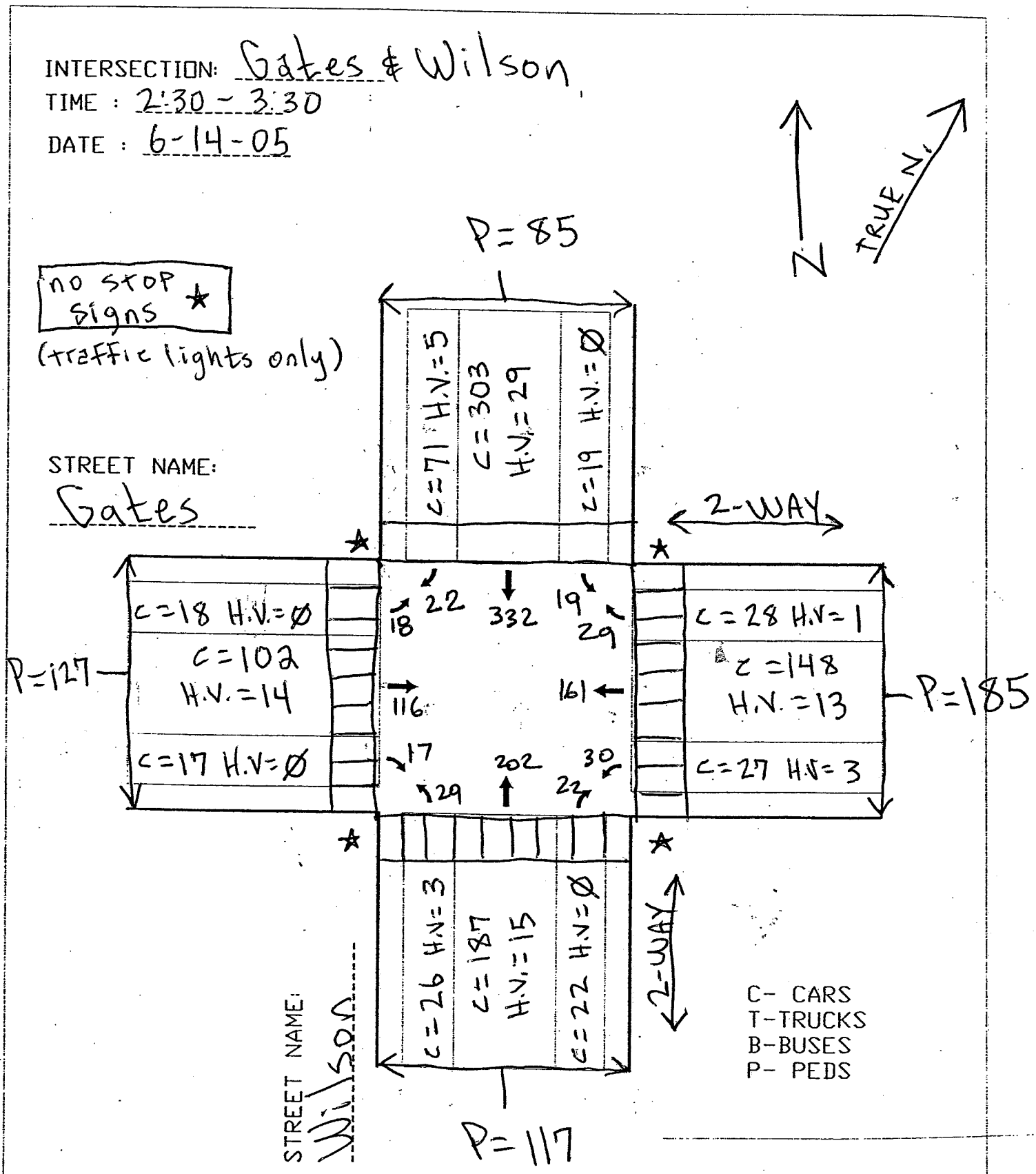
Mean Speed = 25.4 mph
Standard Deviation = 4.7 mph
Margin of Error (95% Confidence) = ± 0.9 mph

Median Speed = 25.4 mph
15th Percentile Speed = 20.5 mph
85th Percentile Speed = 30.2 mph



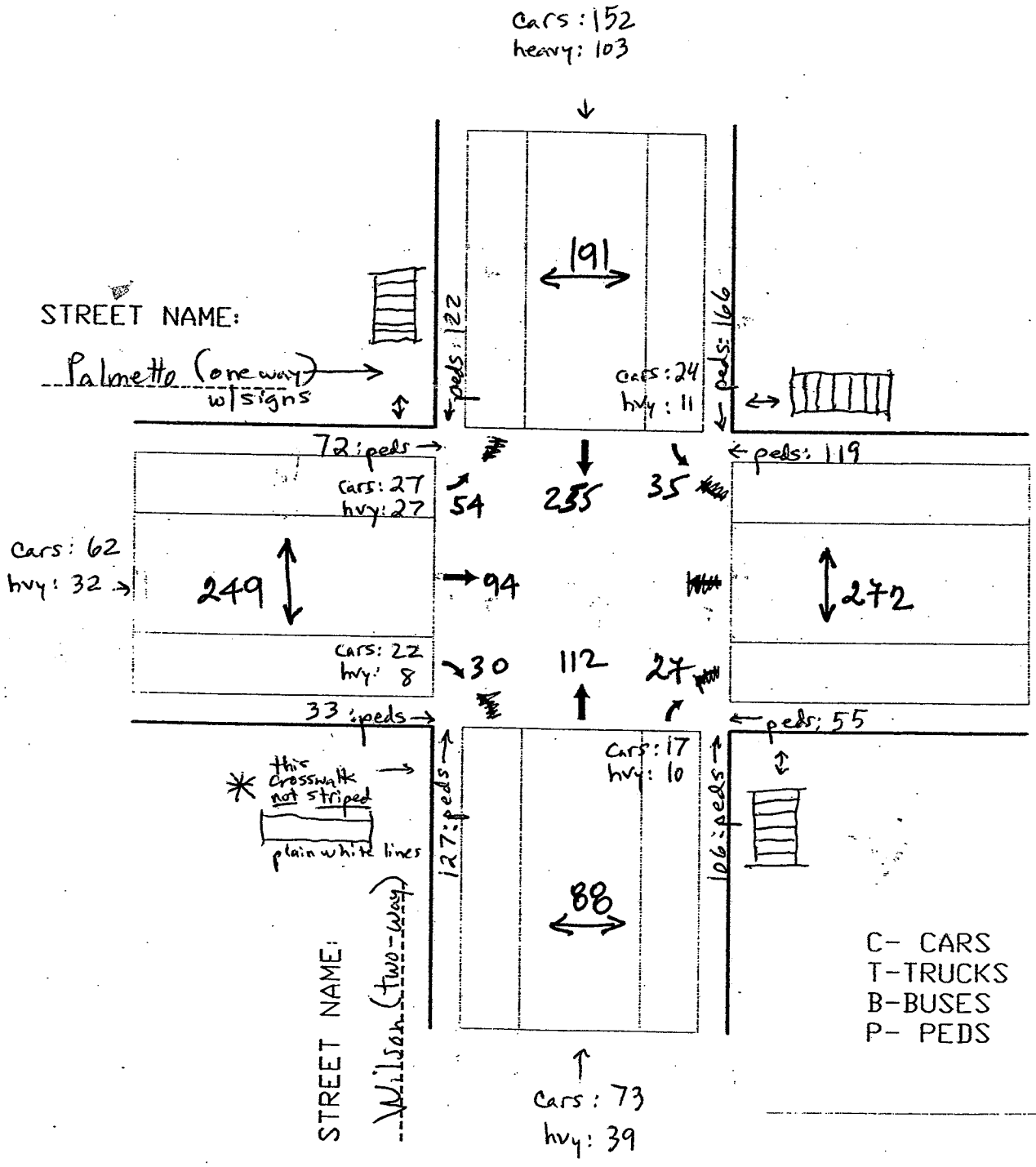


INTERSECTION: Gates & Wilson
TIME : 2:30 ~ 3:30
DATE : 6-14-05



INTERSECTION: Wilson / Palmetto
TIME : 2:30 — 3:30
DATE : 6/14/2005

- Signals on all corners (no stop signs
- wide, striped school crosswalks at all but one location (see below)



I.S. 291

May 24, 2005
7:30 am - 8:30 am

Title1 : SCHOOL SAFETY ENGINEERING
Title2 : BOROUGH OF BROOKLYN
Title3 : NYC-DOT

Site:
Date: 05/24/05

Combined
**Peds not included in table data*

Begin		PALMETTO ST.			KNICKERBOCKER AVE			PALMETTO ST.			KNICKERBOCKER AVE		
Time	**Total**				**W-R**	**W-T**			**N-T**	**N-L**			
07:30:00	238	0	0	0	37	156	0	0	34	11	0	0	0
07:45:00	228	0	0	0	44	149	0	0	23	12	0	0	0
08:00:00	221	0	0	0	39	151	0	0	21	10	0	0	0
08:15:00	191	0	0	0	36	113	0	0	28	14	0	0	0
	878	0	0	0	156	569	0	0	106	47	0	0	0

Peak Volume Periods *(1 hour Res:15 min.)*

	Period			Peak Period			Volume
AM	05:00:00	To	10:00:00	07:30:00	To	08:30:00	878
Noon	10:00:00	To	15:00:00	NA	To	NA	0
PM	15:00:00	To	20:00:00	NA	To	NA	0

I.S. 291

May 24, 2005
7:30 am - 8:30 am

Title1 : SCHOOL SAFETY ENGINEERING
Title2 : BOROUGH OF BROOKLYN
Title3 : NYC-DOT

Site:
Date: 05/24/05

Combined
**Peds not included in table data*