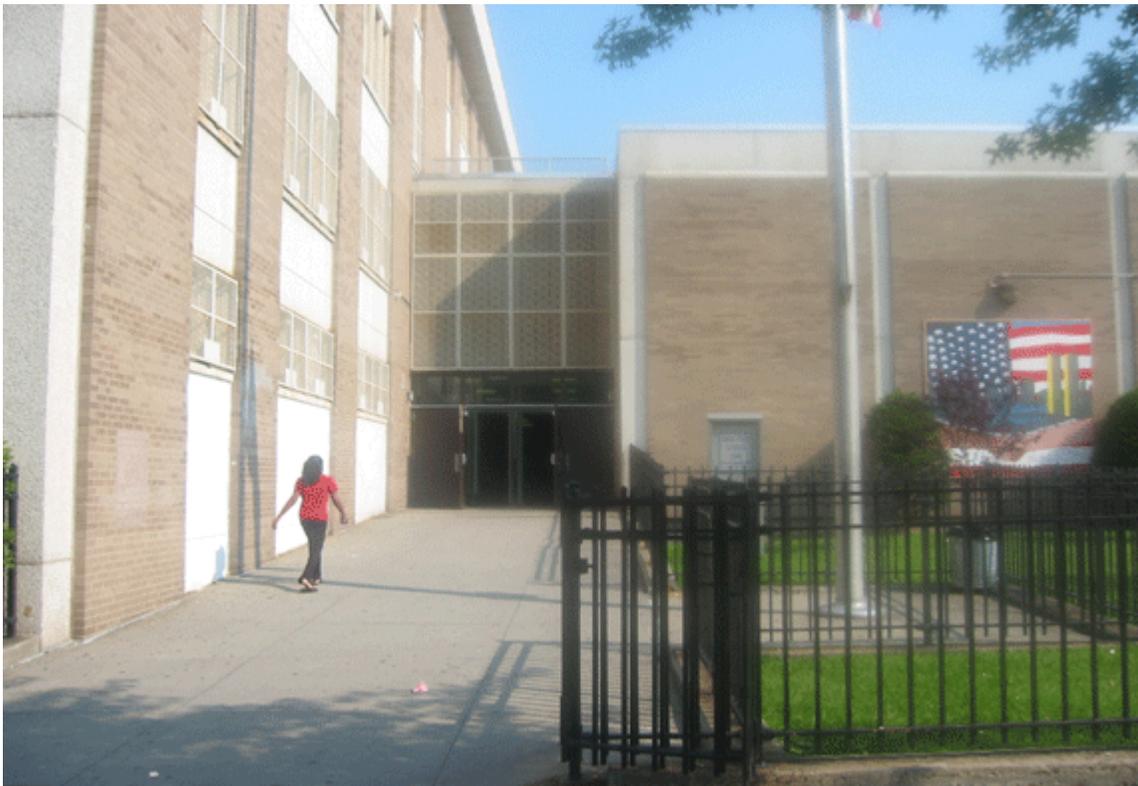


**New York City Department of Transportation  
Office of School Safety Engineering**



**School Safety Engineering Project**

**FINAL REPORT: J.H.S. 210 (Elizabeth Blackwell School), Queens**



**Prepared by  
The RBA Group and URBITRAN Associates Inc.**



**September 21, 2006**

**School Safety Engineering Project  
Final Report: J.H.S. 210, Queens**

**TABLE OF CONTENTS**

**1. INTRODUCTION..... 3**

    1.1 PROJECT DESCRIPTION ..... 3

**2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS ..... 4**

    2.2 NEIGHBORHOOD DESCRIPTION ..... 4

    2.3 MEETING WITH SCHOOL REPRESENTATIVES ..... 4

    2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL ..... 5

    2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS ..... 6

    2.8 CROSSING GUARD LOCATIONS..... 6

**3. TRAFFIC OPERATIONS ..... 10**

    3.1 SCHOOL BUS OPERATIONS ..... 10

    3.2 PARENT DROP-OFF OPERATIONS ..... 10

    3.3 PARKING REGULATIONS ..... 10

    3.4 EXISTING SCHOOL SIGNS AND MARKINGS ..... 10

    3.5 ACCIDENT SUMMARY ..... 12

    3.6 TRAFFIC OPERATIONS AND ISSUES..... 15

        3.6.1 *101<sup>st</sup> Avenue and 93<sup>rd</sup> Street* ..... 15

        3.6.2 *101<sup>st</sup> Avenue and 94<sup>th</sup> Street*..... 17

        3.6.3 *101<sup>st</sup> Avenue and Woodhaven Boulevard*..... 18

        3.6.4 *97<sup>th</sup> Avenue and 93<sup>rd</sup> Street* ..... 20

        3.6.5 *97<sup>th</sup> Avenue and 94<sup>th</sup> Street* ..... 22

        3.6.6 *97<sup>th</sup> Avenue and Woodhaven Boulevard* ..... 23

    3.7 SIGNAL TIMING ..... 25

    3.8 PHYSICAL CONDITIONS ..... 26

        3.8.1 *Roadways and Sidewalks* ..... 26

        3.8.2 *Pedestrian Ramps* ..... 26

**4. POTENTIAL MEASURES TO IMPROVE STUDENT PEDESTRIAN SAFETY** ..... **29**

4.1 SHORT-TERM MEASURES ..... 29

4.2 LONG-TERM MEASURES ..... 30

**EXHIBITS**

EXHIBIT 1 - AERIAL PHOTOGRAPH ..... 7

EXHIBIT 2 - CATCHMENT AREA ..... 8

EXHIBIT 3 - SCHOOL TRAFFIC SAFETY MAP ..... 9

EXHIBIT 4 - EXISTING PARKING REGULATIONS ..... 11

EXHIBIT 5 - ACCIDENT SUMMARY ..... 14

EXHIBIT 6 - TRAFFIC COUNT AT 101<sup>ST</sup> AVENUE AND WOODHAVEN BOULEVARD ..... 28

EXHIBIT 7 - POTENTIAL MEASURES TO IMPROVE STUDENT PEDESTRIAN SAFETY ..... 32

**TABLES**

TABLE 1: MODES OF TRAVEL ..... 6

TABLE 2: ACCIDENT SUMMARY OF NYS DMV DATA (1998-2000) ..... 12

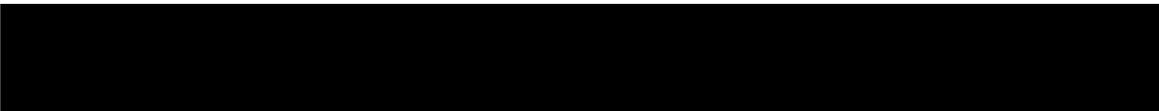
TABLE 3: ACCIDENT SUMMARY OF NYPD DATA (2001-2004) ..... 13

TABLE 4: VEHICLE VOLUMES (7:45-8:45 AM) ..... 20

TABLE 5: PEDESTRIAN VOLUMES (7:45-8:45 AM) ..... 20

TABLE 6: PEDESTRIAN CROSSING TIMES AT SIGNALIZED INTERSECTIONS ..... 26

**APPENDIX**

A large black rectangular redaction box covers the top portion of the Appendix table of contents.

SPEED SURVEY DATA .....A7-A14

## **1. INTRODUCTION**

### **1.1 PROJECT DESCRIPTION**

The Department of Transportation (DOT) 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 350 speed reducers (humps) have been installed in the immediate vicinity of schools.

Under this consultant study, the School Safety Engineering Project, crash 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. 210 (Elizabeth Blackwell School) in Queens is one of the 135 “priority” schools identified by the New York City Department of Transportation, Office of School Safety Engineering.

## **2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS**

### **2.2 NEIGHBORHOOD DESCRIPTION**

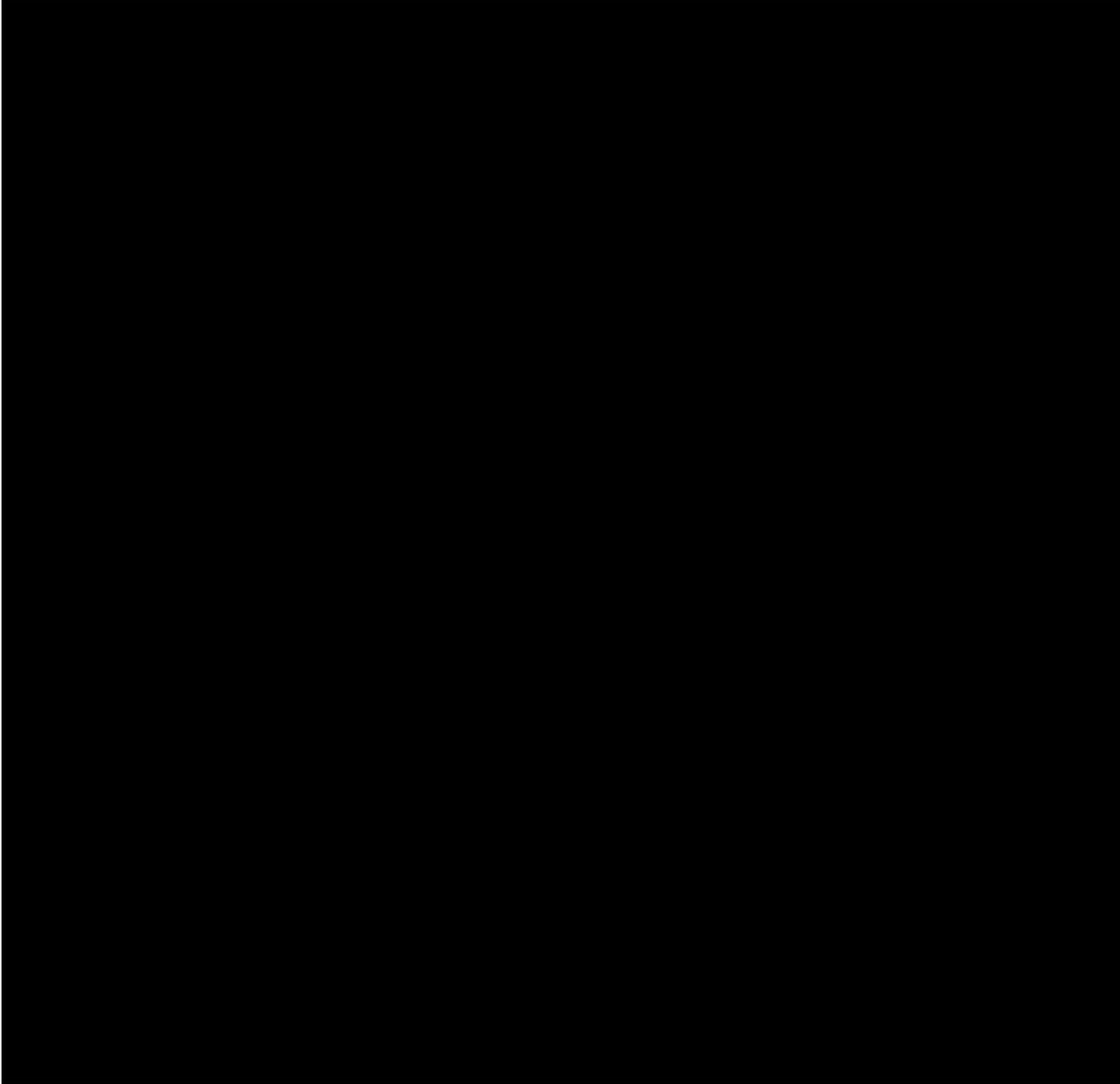
Exhibit 1 shows an aerial view of the neighborhood surrounding the school. J.H.S. 210 is bounded by 93<sup>rd</sup> Street on the west, 94<sup>th</sup> Street on the east, 101<sup>st</sup> Avenue on the south, and 97<sup>th</sup> Avenue to the north. The area surrounding the school is generally residential in nature. Woodhaven Boulevard is one block to the east, has many commercial activities, and carries higher traffic volumes.

### **2.3 MEETING WITH SCHOOL REPRESENTATIVES**

Two Assistant Principals of J.H.S. 210, the Queens Borough Commissioner, the Youth Commissioner for Community Board #9, the School Safety Officer, and the Parent Coordinator for the Department of Education met with members of the consultant team at the school on the morning of Tuesday, June 8, 2004. According to the school officials, student pedestrians at J.H.S. 210 face the following problems:

- There is a need for a crossing guard or some form of supervision to cross Woodhaven Boulevard.
- Excessive vehicle speeds on Woodhaven Boulevard.
- Children are crossing at mid-block locations on Woodhaven Boulevard between 93<sup>rd</sup> Street and 94<sup>th</sup> Street.
- The traffic signal at Woodhaven Boulevard and 101<sup>st</sup> Avenue does not allow enough time for a child pedestrian to cross 101<sup>st</sup> Avenue.
- Illegal double-parking is a problem on 93<sup>rd</sup> Street, 94<sup>th</sup> Street, and Woodhaven Boulevard.

(See the Appendix for a summary of school concerns, and the school's survey response.)



## **2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL**

The school’s “catchment area” as defined by the Department of Education is shown in Exhibit 2. The catchment area is described as follows: The western boundary runs along Drew Street and then along Eldert Lane to Park Lane; the northern boundary runs along Park Lane to 107th Street; the eastern boundary runs along 107th Street to Liberty Avenue; and the southern boundary is Liberty Avenue.

Table 1 presents the modes of travel for J.H.S. 210 as identified by school representatives.

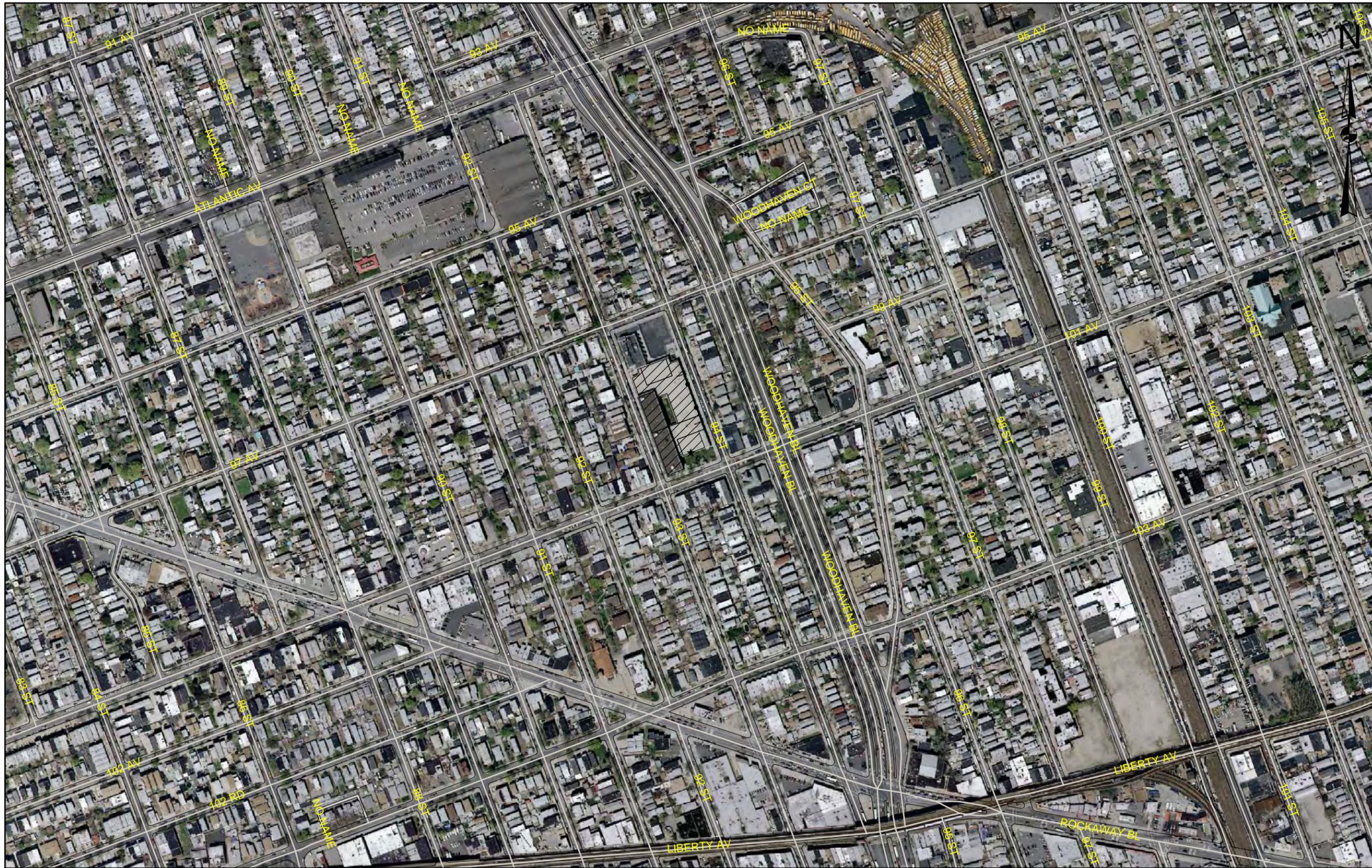
<b>TABLE 1: MODES OF TRAVEL (AS ESTIMATED BY SCHOOL OFFICIALS)</b>	<b>STUDENTS (Percentage)</b>
Walk	40%
Driven by car	20%
School bus	3%
MTA Bus/Subway	37%
Bicycle	0%
<b>TOTAL</b>	<b>100%</b>

## **2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS**

On the south side of 101<sup>st</sup> Avenue, there are some commercial uses, including a deli, that are attractions for J.H.S. 210 student pedestrians.

## **2.8 CROSSING GUARD LOCATIONS**

According to the school officials, there are no crossing guards assigned to J.H.S. 210.



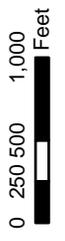
**EXHIBIT 1**  
**J.H.S. 210 QUEENS**  
**E. BLACKWELL J.H.S**  
**AERIAL PHOTOGRAPH**



**EXHIBIT 2**  
**J.H.S. 210 QUEENS**  
**E. BLACKWELL J.H.S.**  
**CATCHMENT AREA**

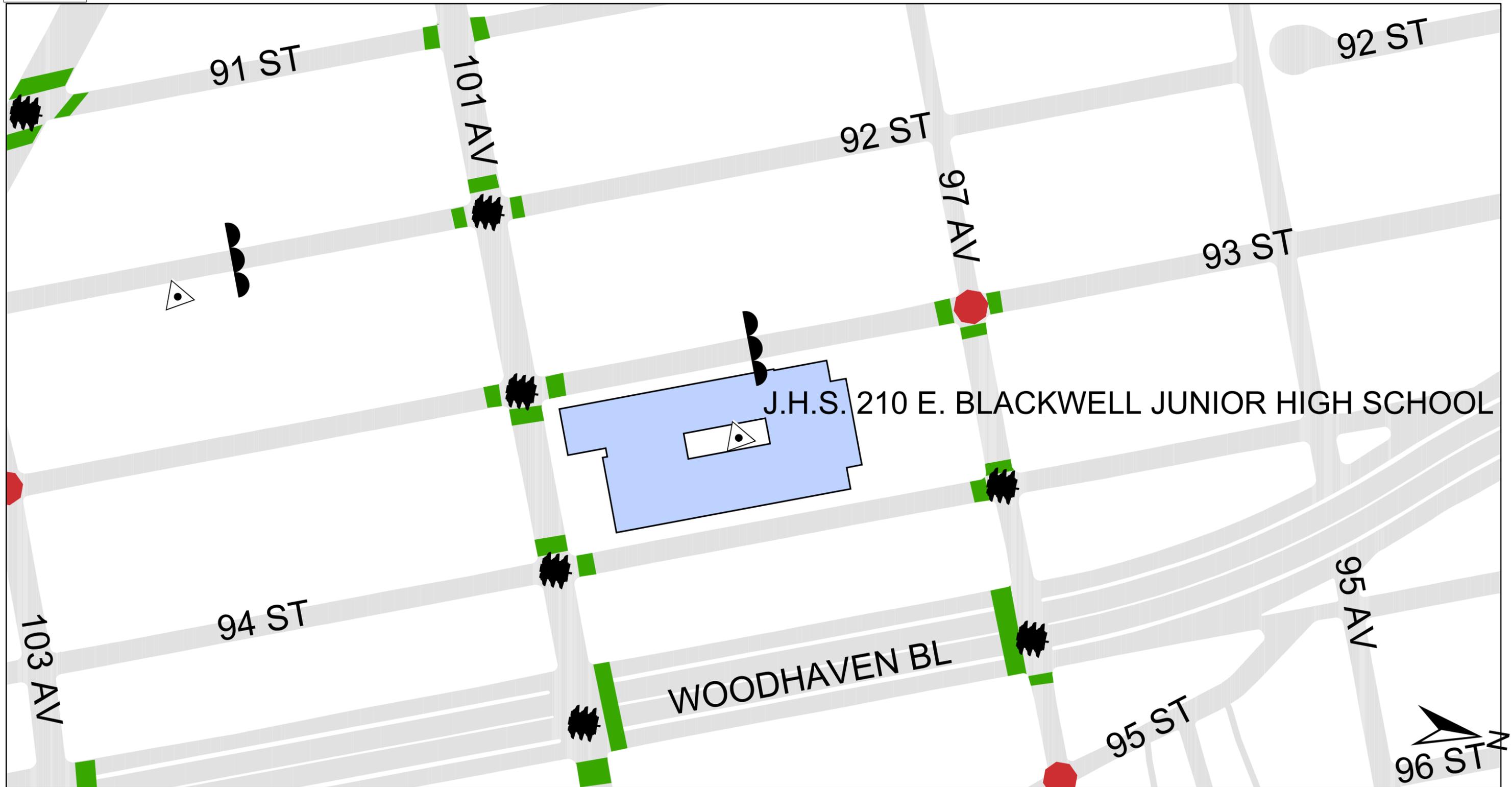


**LEGEND:**  
 CATCHMENT AREA, (DEPARTMENT OF EDUCATION DESIGNATED AREA FROM WITHIN WHICH STUDENTS ARE ENTITLED TO ATTEND J.H.S. 210)





# School Traffic Safety Map



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		TRAFFIC SIGNAL	
SCHOOL CROSSWALK		ALL - WAY STOP	
		SPEED REDUCER	

**MS 210 Queens  
E. BLACKWELL MIDDLE SCHOOL**

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

Map created on 11/17/2006

**EXHIBIT 3**

COMM. BOARD: 409  
PRECINCT: 102

1.5.1 9

### **3. TRAFFIC OPERATIONS**

#### **3.1 SCHOOL BUS OPERATIONS**

According to school representatives, there are approximately 850 students who ride an MTA bus to school, and approximately 70 who ride a special education bus to school. There are nine special education buses serving the students. MTA buses, including the Q8 and Q11 buses, stop to pick up students on 94<sup>th</sup> Street and 101<sup>st</sup> Avenue adjacent to the school.

#### **3.2 PARENT DROP-OFF OPERATIONS**

According to school representatives, 20% of the students are currently being dropped off. Congestion and double-parking around the school are common during arrival and dismissal times.

#### **3.3 PARKING REGULATIONS**

Parking regulations around the school block are shown in Exhibit 4 in this section.

#### **3.4 EXISTING SCHOOL SIGNS AND MARKINGS**

Exhibit 3 shows the existing school signals and pavement markings around J.H.S. 210. It should be noted that a citywide signage program is currently underway to upgrade school signage to current Federal Manual on Uniform Traffic Control Devices (MUTCD) standards of fluorescent yellow-green signs accompanied by downward pointing arrows. This will make the school crossing warning signs more visible to motorists. Signs scheduled to be installed under this program are shown as “existing” in Exhibit 7.

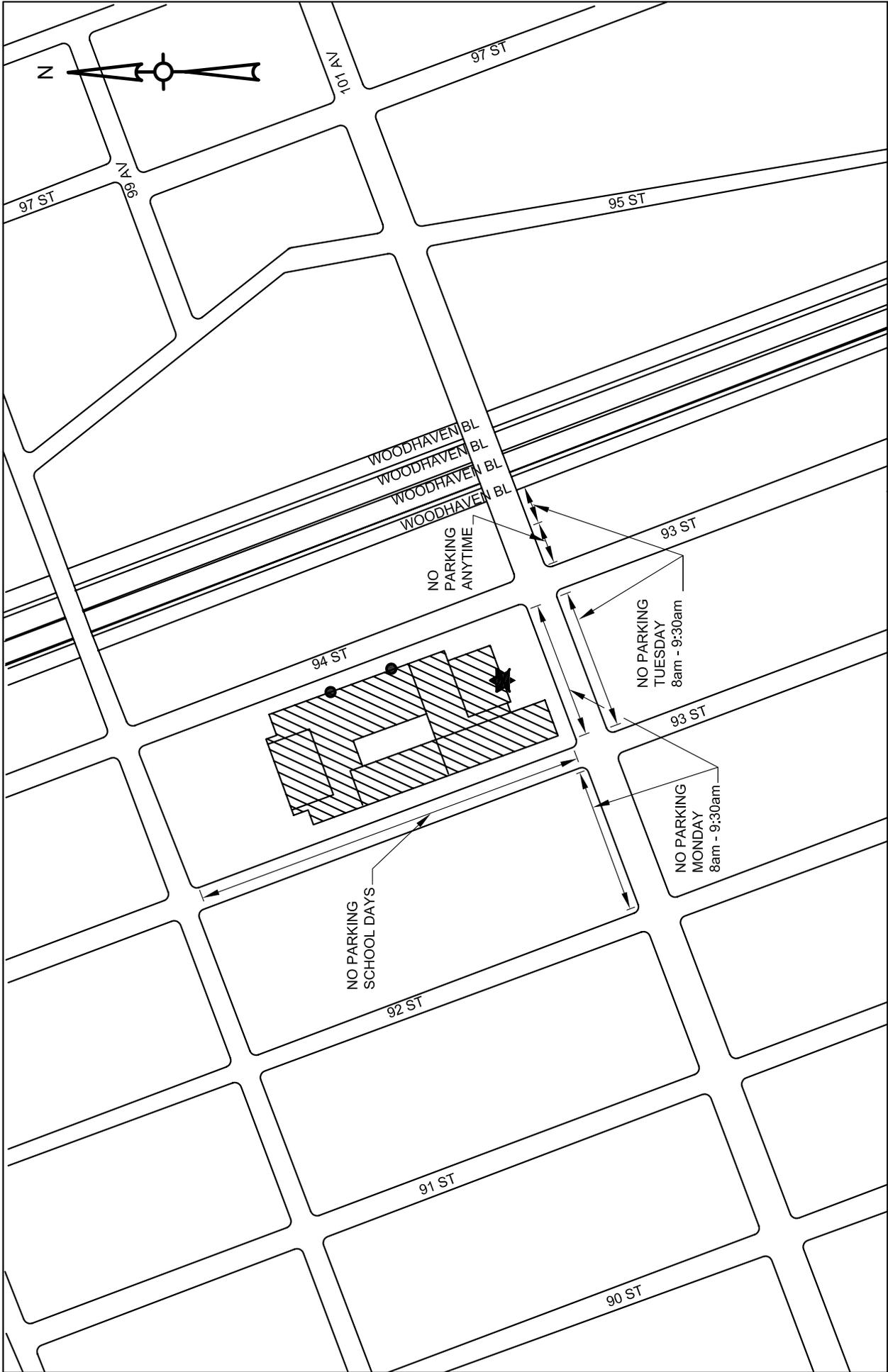
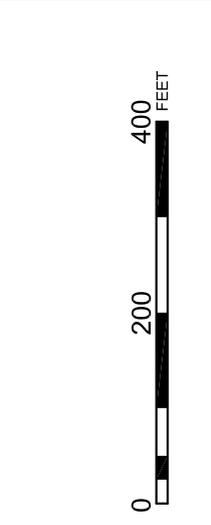


EXHIBIT 4  
 J.H.S. 210 QUEENS  
 E. BLACKWELL J.H.S.  
 EXISTING PARKING REGULATION



**LEGEND:**

- ★ MAIN ENTRANCE
- ENTRANCE

### 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. 210 for the three-year period from January 1, 1998 through December 31, 2000. The DMV data provides some detail relating to the circumstances and probable causes of the accidents. 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 concentration of student pedestrians occurs. Intersections farther from the school and locations for which detailed data was not available at the time of this study will be addressed with the ongoing work of NYCDOT's School Safety Engineering Program. DMV accident data is discussed in Section 3.6, Traffic Operations and Issues.

<b>TABLE 2: ACCIDENT SUMMARY OF NYS DMV DATA (1998-2000)</b>				
<b>INTERSECTION</b>	<b>TOTAL ACCIDENTS</b>	<b>PEDESTRIAN ACCIDENTS</b>	<b>PEDESTRIAN FATALITIES</b>	<b>SCHOOL-RELATED ACCIDENTS*</b>
101 <sup>st</sup> Avenue and 91 <sup>st</sup> Street	2	0	0	0
101 <sup>st</sup> Avenue and 92 <sup>nd</sup> Street	2	0	0	0
101 <sup>st</sup> Avenue and 93 <sup>rd</sup> Street	15	1	0	1
101 <sup>st</sup> Avenue and 94 <sup>th</sup> Street	8	1	0	0
101 <sup>st</sup> Avenue and Woodhaven Blvd.	160	5	0	0
97 <sup>th</sup> Avenue and 92 <sup>nd</sup> Street	4	0	0	0
97 <sup>th</sup> Avenue and 93 <sup>rd</sup> Street	4	0	0	0
97 <sup>th</sup> Avenue and 94 <sup>th</sup> Street	7	0	0	0
97 <sup>th</sup> Avenue and Woodhaven Boulevard	71	0	0	0
<b>TOTAL</b>	<b>273</b>	<b>7</b>	<b>0</b>	<b>1</b>

\* School-related accidents are defined as accidents involving school-age pedestrians (age 4 to 14), occurring on weekdays during the school year.

**TABLE 3: ACCIDENT SUMMARY OF NYPD DATA (2001-2004)**

<b>INTERSECTION</b>	<b>TOTAL ACCIDENTS</b>	<b>PEDESTRIAN ACCIDENTS</b>	<b>PEDESTRIAN FATALITIES</b>	<b>SCHOOL-RELATED ACCIDENTS*</b>
101 <sup>st</sup> Avenue and 91 <sup>st</sup> Street	11	0	0	0
101 <sup>st</sup> Avenue and 92 <sup>nd</sup> Street	7	0	0	0
101 <sup>st</sup> Avenue and 93 <sup>rd</sup> Street	19	2	0	1
101 <sup>st</sup> Avenue and 94 <sup>th</sup> Street	18	2	0	1
101 <sup>st</sup> Avenue and Woodhaven Blvd.	213	11	0	1
97 <sup>th</sup> Avenue and 92 <sup>nd</sup> Street	4	1	0	0
97 <sup>th</sup> Avenue and 93 <sup>rd</sup> Street	4	1	0	0
97 <sup>th</sup> Avenue and 94 <sup>th</sup> Street	9	0	0	0
97 <sup>th</sup> Avenue and Woodhaven Boulevard	72	4	0	0
<b>TOTAL</b>	<b>357</b>	<b>21</b>	<b>0</b>	<b>3</b>

\* School-related accidents are defined as accidents involving school-age pedestrians (age 4 to 14), occurring on weekdays during the school year.



### **3.6 TRAFFIC OPERATIONS AND ISSUES**

The specific roadway-related physical conditions for each location within the school's vicinity directly affect the safety and efficiency of operations for both pedestrian and vehicular traffic. These conditions are required information when analyzing a location, and are the starting point for any revisions that may be considered to improve safety and/or efficiency.

The following sub-sections outline the physical conditions and issues concerning traffic operations and accidents at the intersections in the vicinity of J.H.S. 210. Details on specific intersections or roadway segments are given in the following sections.

#### *3.6.1 101<sup>st</sup> Avenue and 93<sup>rd</sup> Street*

This is a signalized intersection with school crosswalks located across the north and south legs of 93<sup>rd</sup> Street and the east leg of 101<sup>st</sup> Avenue, with a pedestrian crosswalk located across the west leg of 101<sup>st</sup> Avenue. 101<sup>st</sup> Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. 93<sup>rd</sup> Street is a one-way northbound street with one travel lane and parking on both sides of the roadway (see Figures 3 and 4). 101<sup>st</sup> Avenue carries heavier volumes of traffic.

There were a total of 15 accidents reported at this intersection between 1998 and 2000, including one pedestrian accident which was also school-related (Table 2). In the school-related accident, a 13-year old pedestrian sustained a "possible injury" on Friday, March 17, 2000 at approximately 3:00 pm while crossing with the traffic signal at the intersection. The roadway surface was reported as being wet and the weather was cloudy. There were no fatal pedestrian accidents reported at this intersection.



*Figure 2: Looking northeast across 101<sup>st</sup> Avenue at its intersection with 93<sup>rd</sup> Street (J.H.S. 210 is on the left)*



*Figure 3: Looking north along 93<sup>rd</sup> Street across the 101<sup>st</sup> Avenue intersection (J.H.S. 210 is on the right)*

### 3.6.2 101<sup>st</sup> Avenue and 94<sup>th</sup> Street

This is a signalized intersection with school crosswalks located across the north and west legs and pedestrian crosswalks located across the east and south legs. 101<sup>st</sup> Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. 94<sup>th</sup> Street is a one-way southbound street with one travel lane and parking on both sides of the roadway (see Figure 5).

There were eight accidents reported at this intersection between 1998 and 2000, including one pedestrian accident which was not school-related (Table 2). There were also a total of three mid-block accidents on 94<sup>th</sup> Street between 97<sup>th</sup> Avenue and 101<sup>st</sup> Avenue between 1998 and 2000, including one pedestrian accident that was also school-related. This school-related accident occurred at approximately 3:00 pm on May 27, 1999 when a 13-year-old pedestrian sustained a “possible injury” while crossing 94<sup>th</sup> Street mid-block. The accident occurred under clear, daylight conditions, and the road surface was reported as dry. There were no fatal pedestrian accidents reported at this intersection.



*Figure 4: Looking northwest (toward J.H.S. 210) across 101<sup>st</sup> Avenue at the intersection of 94<sup>th</sup> Street*

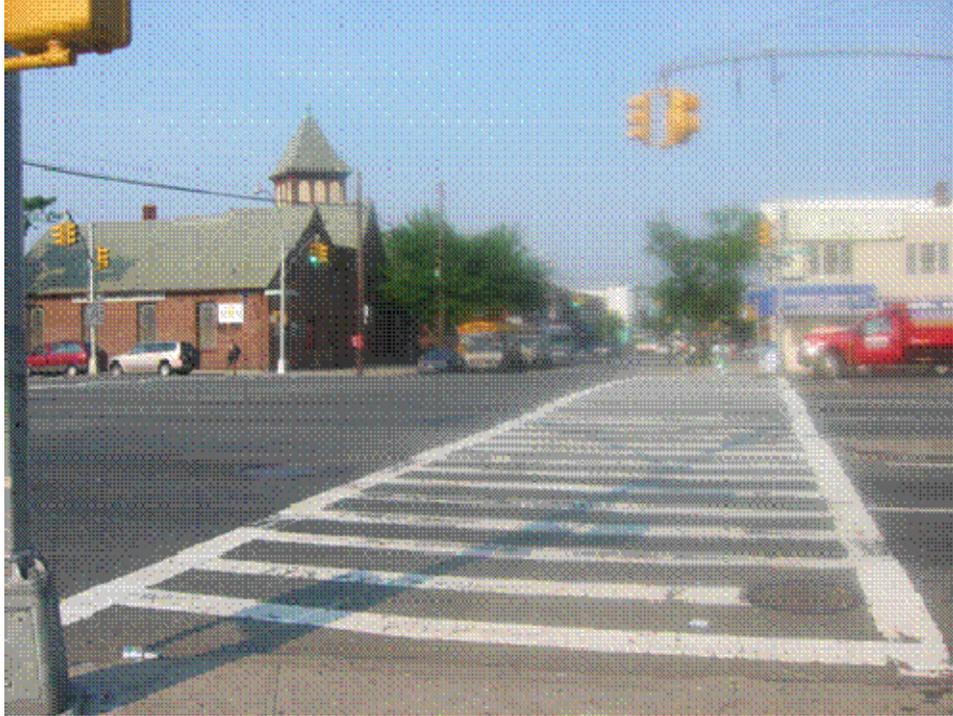


*Figure 5: Looking south on 94<sup>th</sup> Street toward the intersection with 101<sup>st</sup> Avenue*

### 3.6.3 101<sup>st</sup> Avenue and Woodhaven Boulevard

This is a signalized intersection with school crosswalks located across the north leg of Woodhaven Boulevard and the east leg of 101<sup>st</sup> Avenue. Pedestrian crosswalks are located across the south leg of Woodhaven Boulevard and the west leg of 101<sup>st</sup> Avenue. Woodhaven Boulevard is a major, north-south corridor in Queens, extending from Rockaway Boulevard (where it connects directly with Cross Bay Boulevard at its southern terminus) to Queens Boulevard (just north of the Long Island Expressway at its northern terminus). In the vicinity of J.H.S. 210, Woodhaven Boulevard consists of both mainline and service roadways in each direction. The mainline roadway of Woodhaven Boulevard carries three travel lanes in both the northbound and southbound directions, separated by an approximately four-foot wide raised concrete median. Both the north and southbound service roads have two travel lanes and one right-side parking lane. The outer roadways serve as local (service) roadways and the inner roadways serve as mainline (through) roadways. Separating each mainline and service roadway is an approximately seven-foot wide raised concrete median. 101<sup>st</sup> Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway (see Figure 7).

This intersection was the site of 160 accidents between 1998 and 2000, including five pedestrian accidents, none of which were school-related. There were no pedestrian fatalities at this intersection



*Figure 6: Looking west on 101<sup>st</sup> Avenue across Woodhaven Boulevard*

School officials reported a speeding problem on Woodhaven Boulevard. Therefore, a speed survey was conducted along both the mainline and the service roadways of Woodhaven Boulevard, between 97<sup>th</sup> Avenue and 101<sup>st</sup> Avenue, in order to verify the existence of a speeding problem and to determine its extent. It should be noted that the limit on Woodhaven Boulevard is 35 mph.

The 85<sup>th</sup> percentile speed for northbound vehicles on the Woodhaven Boulevard mainline, between 97<sup>th</sup> Avenue and 101<sup>st</sup> Avenue, was found to be 36 miles per hour (mph). The 85<sup>th</sup> percentile speed for northbound vehicles on the same section of the Woodhaven Boulevard service road was found to be 34 mph.

The 85<sup>th</sup> percentile speed for southbound vehicles on the Woodhaven Boulevard mainline, between 97<sup>th</sup> Avenue and 101<sup>st</sup> Avenue, was found to be 34 mph. The 85<sup>th</sup> percentile speed for southbound vehicles on the same section of the Woodhaven Boulevard service road was found to be 36 mph.

The 85<sup>th</sup> percentile speeds recorded are considered to be the representative speed for the street segment. The detailed results of the spot speed survey for Woodhaven Boulevard between 97<sup>th</sup> Avenue and 101<sup>st</sup> Avenue are shown in an appendix at the end of this document.

To assess vehicle and pedestrian volumes at 101<sup>st</sup> Avenue and Woodhaven Boulevard, a traffic count was conducted at the intersection from 7:30 to 9:00 am on Wednesday, June 22, 2005. The results of the peak hour (7:45 to 8:45 am) count are shown in Tables 4 and 5, and in Exhibit 6 at the end of this section.

TABLE 4: VEHICLE VOLUMES (7:45-8:45 AM)												
INTERSECTION	101 <sup>st</sup> Avenue EASTBOUND			101 <sup>st</sup> Avenue WESTBOUND			Woodhaven Blvd. NORTHBOUND			Woodhaven Blvd. SOUTHBOUND		
	Left	Straight	Right	Left	Straight	Right	Left	Straight	Right	Left	Straight	Right
101 <sup>st</sup> Avenue and Woodhaven Blvd.	61	128	16	64	162	70	0	969	31	94	1216	38
<b>TOTAL</b>	205			296			1000			1348		

TABLE 5: PEDESTRIAN VOLUMES (7:45-8:45 AM)								
INTERSECTION	Crossing 101 <sup>st</sup> Avenue WEST-LEG CROSSWALK		Crossing 101 <sup>st</sup> Avenue EAST-LEG CROSSWALK		Crossing Woodhaven Blvd. SOUTH-LEG CROSSWALK		Crossing Woodhaven Blvd. NORTH-LEG CROSSWALK	
	101 <sup>st</sup> Avenue and Woodhaven Blvd.	20	(13 / 7) *	15	(9 / 6) *	49	(36 / 13) *	52

\* Numbers in parentheses indicate (adults / students).

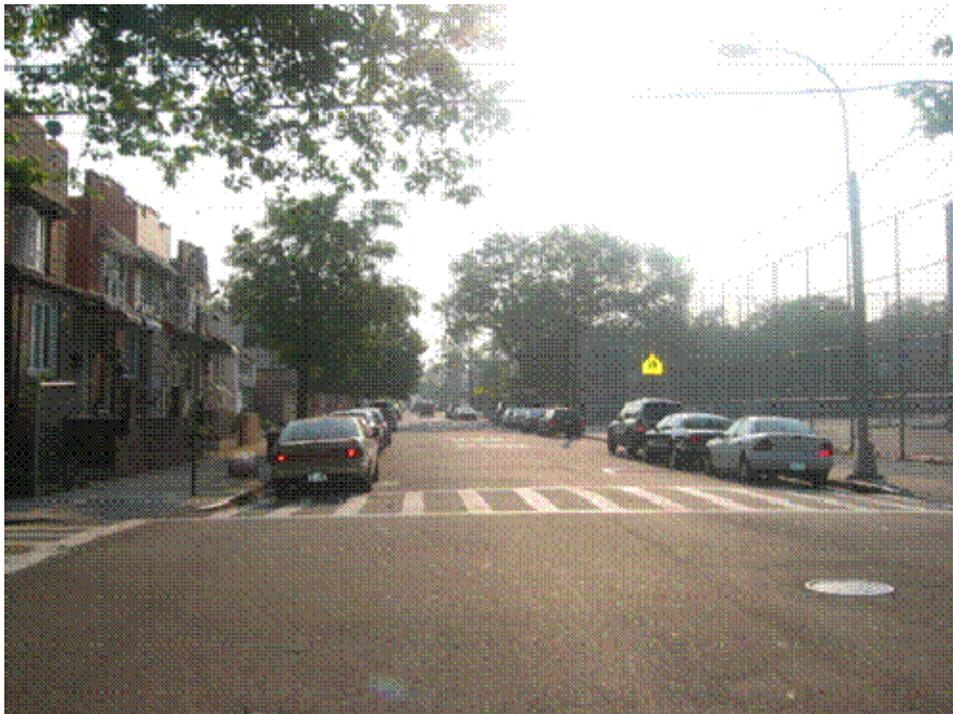
### 3.6.4 97<sup>th</sup> Avenue and 93<sup>rd</sup> Street

This is an all-way stop-controlled intersection with school crosswalks located across the north, south, and east legs, and a pedestrian crosswalk located across the west leg. 97<sup>th</sup> Avenue is a one-way eastbound street with one travel lane and parking on both sides of the roadway. 93<sup>rd</sup> Street is a one-way northbound street with one travel lane and parking on both sides of the roadway (see Figures 7 and 8).

This intersection was the site of four accidents between 1998 and 2000, none of which were pedestrian accidents.



*Figure 7: Looking south on 93<sup>rd</sup> Street across the intersection with 97<sup>th</sup> Avenue (J.H.S. 210 is shown on the left)*

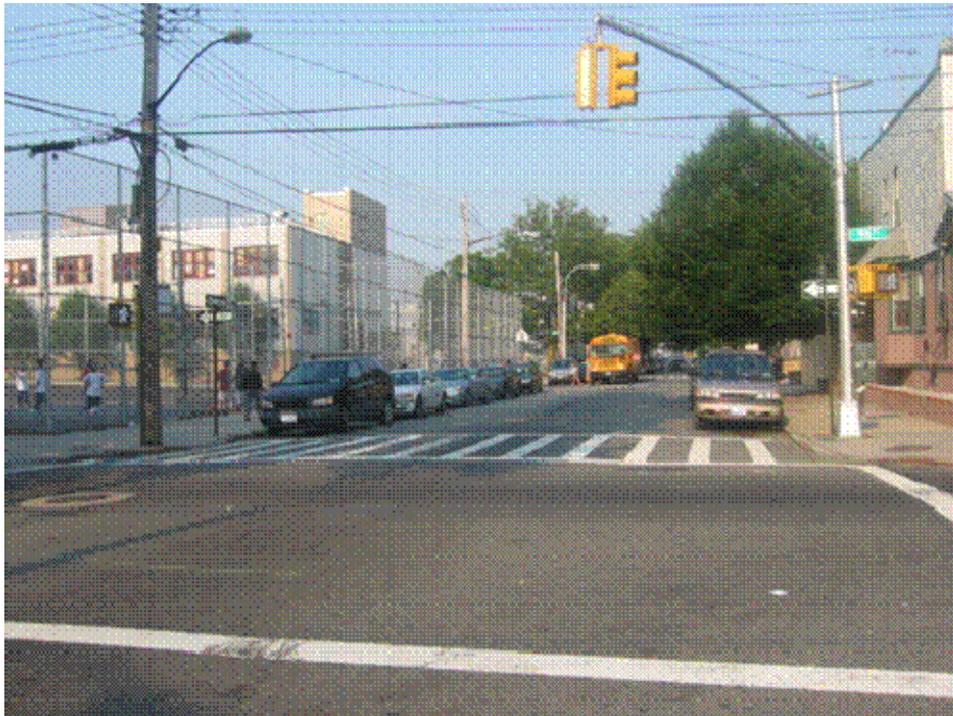


*Figure 8: Looking east on 97<sup>th</sup> Avenue across the intersection with 93<sup>rd</sup> Street*

### 3.6.5 97<sup>th</sup> Avenue and 94<sup>th</sup> Street

This is a signalized intersection with school crosswalks located across the west leg of 97<sup>th</sup> Avenue and the south leg of 94<sup>th</sup> Street. Pedestrian crosswalks are located across the east leg of 97<sup>th</sup> Avenue and the north leg of 94<sup>th</sup> Street. 97<sup>th</sup> Avenue is a one-way eastbound street with one travel lane and parking on both sides of the roadway. 94<sup>th</sup> Street is a one-way southbound street with one travel lane and parking on both sides of the roadway (see Figures 9 and 10).

This intersection was the site of seven accidents between 1998 and 2000, none of which were pedestrian accidents.



*Figure 9: Looking west on 97<sup>th</sup> Avenue across the intersection with 94<sup>th</sup> Street*



*Figure 10: Looking south on 94<sup>th</sup> Street across the intersection with 97<sup>th</sup> Avenue  
(J.H.S. 210 is shown on the right)*

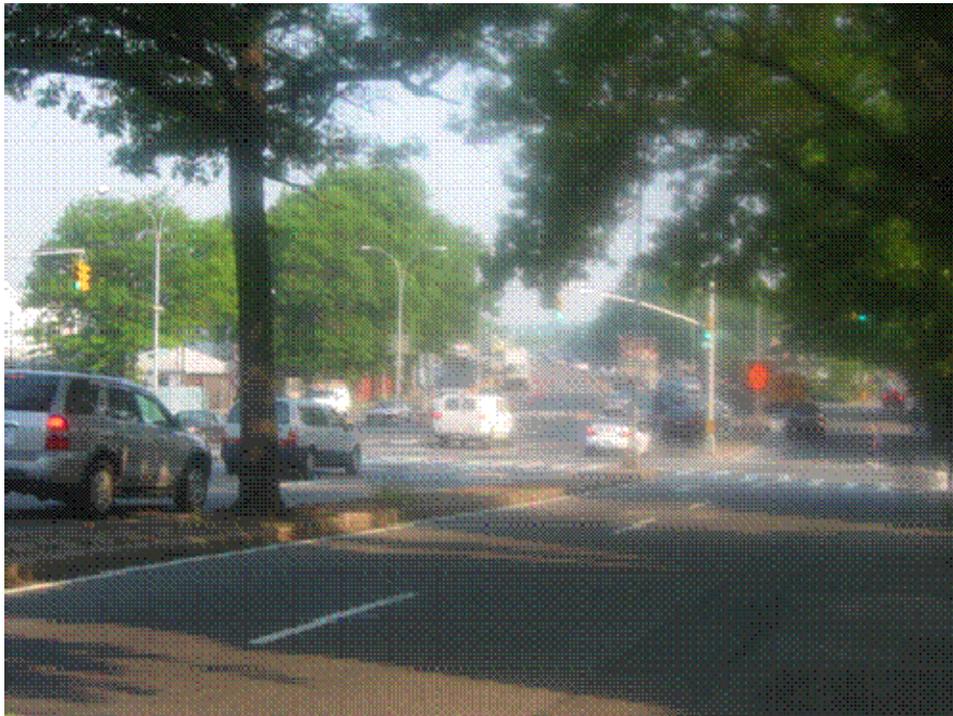
### 3.6.6 97<sup>th</sup> Avenue and Woodhaven Boulevard

This is a signalized intersection with school crosswalks located across the south leg of Woodhaven Boulevard and the east leg of 97<sup>th</sup> Avenue. Pedestrian crosswalks are located across the north leg of Woodhaven Boulevard and the west leg of 97<sup>th</sup> Avenue. In the vicinity of J.H.S. 210, Woodhaven Boulevard consists of both mainline and service roadways in each direction. The mainline roadway on Woodhaven Boulevard includes three travel lanes in both the north and southbound directions, which are separated by an approximate four foot wide raised concrete median. Both the north and southbound service roads have two travel lanes and one parking lane. The outer roadways serve as local (service) roadways and the inner roadways serve as mainline (through) roadways. Separating each mainline and service roadway is an approximately seven-foot wide raised concrete median. 97<sup>th</sup> Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway (see Figures 11, 12, and 13).

This intersection was the site of 71 accidents between 1998 and 2000, none of which were pedestrian accidents. There were no pedestrian fatalities at this intersection.



*Figure 11: Looking east on 97<sup>th</sup> Avenue across the intersection of Woodhaven Boulevard*



*Figure 12: Looking north on Woodhaven Boulevard from the northbound service roadway toward the intersection with 97<sup>th</sup> Avenue*



*Figure 13: Looking north between the southbound mainline and service roadways on Woodhaven Boulevard toward the intersection with 97<sup>th</sup> Avenue*

### **3.7 SIGNAL TIMING**

Pedestrian crossing times were field-verified for crosswalks at signalized intersections in the vicinity of J.H.S. 210, and were found to be adequate in most directions and approaches based upon a child pedestrian walking at the rate of 3 feet per second. Exceptions to this are the crossings on Woodhaven Boulevard at both 97<sup>th</sup> Avenue and 101<sup>st</sup> Avenue, where 46 seconds and 47 seconds, respectively, are required for a child pedestrian to completely cross Woodhaven Boulevard. Currently, only 45 seconds and 36 seconds, respectively, are available for children to complete these crossings. At these locations, pedestrian are required to cross in two signal phases, waiting in the center medians between signal times. The traffic signal timings and pedestrian crossing time calculations are shown in Table 6.

<b>TABLE 6: PEDESTRIAN CROSSING TIMES AT SIGNALIZED INTERSECTIONS</b>				
<b>INTERSECTION</b>	<b>CROSSWALK WIDTH (FEET)</b>	<b>PEDESTRIAN TIME ACTUAL (SECONDS)</b>	<b>PEDESTRIAN TIME REQUIRED (SECONDS) <sup>(1)</sup></b>	<b>TIMING ADJUSTMENT REQUIRED?</b>
<b>101<sup>st</sup> Avenue and 93<sup>rd</sup> Street</b>				
crossing 101 <sup>st</sup> Avenue	44	23	18	NO
crossing 93 <sup>rd</sup> Street	30	35	13	NO
<b>101<sup>st</sup> Avenue and 94<sup>th</sup> Street</b>				
crossing 101 <sup>st</sup> Avenue	44	23	18	NO
crossing 94 <sup>th</sup> Street	30	35	13	NO
<b>101<sup>st</sup> Avenue and Woodhaven Boulevard</b>				
crossing 101 <sup>st</sup> Avenue	40	60	17	NO
crossing Woodhaven Boulevard	126	45	45	NO
crossing Woodhaven Boulevard to far-side mainline/service roadway median	97	45	36	NO
<b>97<sup>th</sup> Avenue and 94<sup>th</sup> Street</b>				
crossing 97 <sup>th</sup> Avenue	36	24	15	NO
crossing 94 <sup>th</sup> Street	30	36.	13	NO
<b>97<sup>th</sup> Avenue and Woodhaven Boulevard</b>				
crossing 97 <sup>th</sup> Avenue	30	86	13	NO
crossing Woodhaven Boulevard	128	36	46	NO <sup>(2)</sup>
crossing Woodhaven Blvdoulevard to far-side mainline/service roadway median	97	36	36	NO

1. A rate of 3 ft/sec plus 3 seconds reaction time was utilized as the child pedestrian walking rate.
2. The provided time is sufficient for pedestrians to cross the street in two signal cycles. It is standard NYCDOT practice to provide sufficient time for pedestrians to reach the center median in order to wait between signal cycles.

### **3.8 PHYSICAL CONDITIONS**

#### 3.8.1 Roadways and Sidewalks

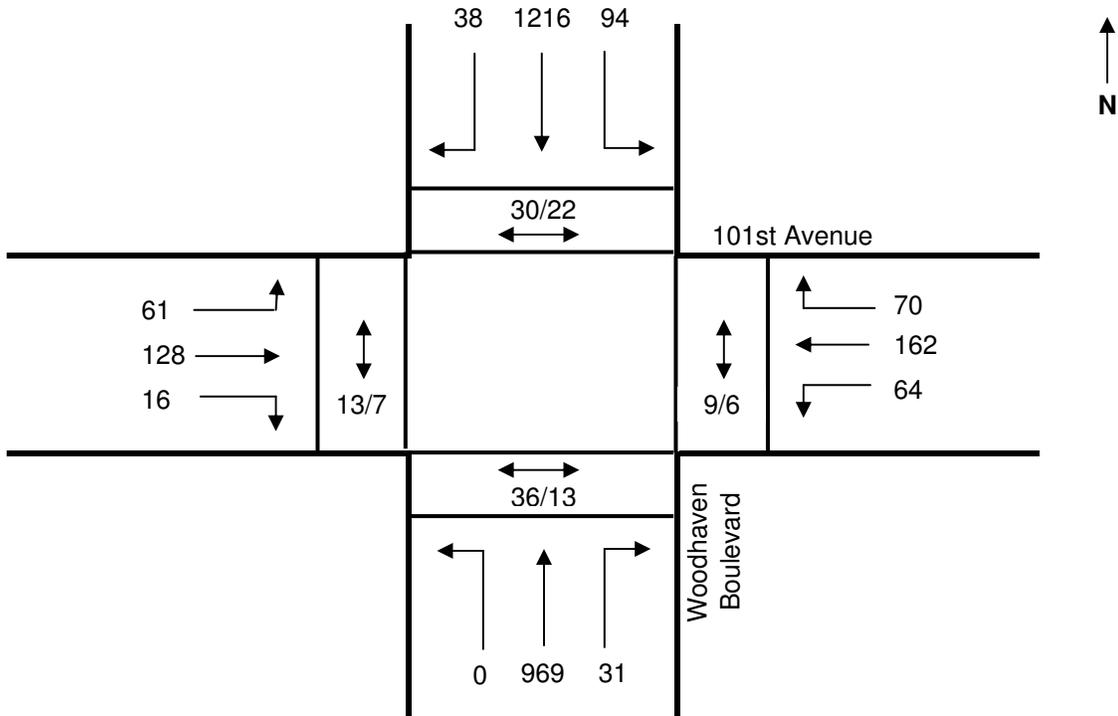
The roadways in the vicinity of J.H.S. 210 are generally in fair condition. On the school block face, sidewalks are currently 10 to 15 feet wide and in fair condition.

#### 3.8.2 Pedestrian Ramps

Overall, pedestrian ramps in the vicinity of the school appear to be standard. There are, however, several locations where there are obstructions to the crosswalk paths. These obstructions are located as follows:

- A trash basket situated on the southeast corner of 101<sup>st</sup> Avenue and 93<sup>rd</sup> Street is in the path of the crosswalk located across the east leg of 101<sup>st</sup> Avenue.
- A trash basket situated on the northwest corner of 101<sup>st</sup> Avenue and 93<sup>rd</sup> Street is in the path of the crosswalk located across the west leg of 101<sup>st</sup> Avenue.
- A traffic signal pole on the northeast corner of Woodhaven Boulevard and 97<sup>th</sup> Avenue is in the path of the crosswalk located across the north leg of Woodhaven Boulevard.
- The traffic signal pole on the southeast corner of Woodhaven Boulevard and 97<sup>th</sup> Avenue is in the path of the crosswalk located across the south leg.

**One Hour Traffic Volumes**  
**Monday, June 20th, 2005 7:45 am - 8:45 am**



**Intersection of Woodhaven Boulevard and 101st Avenue**

<b>Legend</b>	
	Pedestrian Counts (Adult/Child)
	Vehicle Movement

<b>EXHIBIT 6</b>	
<b>J.H.S. 210 QUEENS</b>	
<b>ELIZABETH BLACKWELL</b>	
<b>TRAFFIC AND PEDESTRIAN COUNTS</b>	

#### 4. PROPOSED MEASURES TO IMPROVE SCHOOL PEDESTRIAN SAFETY

This section describes the proposed measures to improve school pedestrian safety around J.H.S. 210. The proposed 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 involve capital improvements. Each of the short- and long-term measures recommended for J.H.S. 210 is discussed as follows, and is shown in more detail in Exhibit 7 at the end of this section.

##### 4.1 SHORT-TERM MEASURES

➤ Install “NO STANDING 7AM - 4PM SCHOOL DAYS” signs

A parking regulation should be instituted and signs installed reading: “NO STANDING 7AM - 4PM SCHOOL DAYS” for 30 feet in front of the school at the main entrance of the school. (This is a typical requirement for all NYC schools in order to provide for emergency access to and from the school.)

➤ Place advance stop bar before 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.

➤ Remove crosswalk obstructions

Trash baskets situated on the southeast and northwest corners of the 101<sup>st</sup> Avenue and 93<sup>rd</sup> Street intersection are in the path of the crosswalks located across the east and west legs of 101<sup>st</sup> Avenue, respectively.

It is therefore recommended to:

- Relocate the trash basket situated on the southeast corner of 101<sup>st</sup> Avenue and 93<sup>rd</sup> Street from the path of the crosswalk located across the east leg of 101<sup>st</sup> Avenue.
- Relocate the trash basket situated on the northwest corner of 101<sup>st</sup> Avenue and 93<sup>rd</sup> Street from the path of the crosswalk located across the west leg of 101<sup>st</sup> Avenue.

➤ Assign crossing guards

There were five pedestrian accidents between 2001 and 2004 at the intersections of Woodhaven Boulevard with 101<sup>st</sup> Avenue and 97<sup>th</sup> Avenue. The school principal also mentioned the need for crossing guards at these intersections.

It is therefore recommended:

- Assign a crossing guard to the intersection of Woodhaven Boulevard and 101<sup>st</sup> Avenue.
- Assign a crossing guard to the intersection of Woodhaven Boulevard and 97<sup>th</sup> Avenue.

➤ Administer student pedestrian safety education program

The school officials reported that students cross at mid-block locations along Woodhaven Boulevard, 93<sup>rd</sup> Street, and 94<sup>th</sup> Street. It is therefore recommended that:

- The school should participate in the NYCDOT Safety Education Program to educate students to use designated school crosswalks while crossing the street, not to cross mid-block, not to cross against signals, and not to run out between cars.

#### 4.2 LONG-TERM MEASURES

➤ Consider installing curb extensions at the following locations

Consideration should be given to installing curb extensions at the following locations, provided that the Final Design confirms that construction of the recommended curb extensions would be feasible and 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.

- All four corners of 97<sup>th</sup> Avenue at its intersection with 93<sup>rd</sup> Street.
- All four corners of 97<sup>th</sup> Avenue at its intersection with 94<sup>th</sup> Street.
- All four corners of 101<sup>st</sup> Avenue at its intersection with 93<sup>rd</sup> Street.
- All four corners of 101<sup>st</sup> Avenue at its intersection with 94<sup>th</sup> Street.
- All four corners of the Woodhaven Boulevard service road at its intersection with 97<sup>th</sup> Avenue.
- All four corners of the Woodhaven Boulevard service road at its intersection with 101<sup>st</sup> Avenue.

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. These curb extensions would not eliminate or reduce the width of any moving lanes.

➤ Consider refuge islands at the following intersections as shown in Exhibit 7

There is a four foot wide raised concrete median along the center of Woodhaven Boulevard, separating eastbound and westbound traffic. In addition, the mainline and service roads in each direction are separated by a seven foot wide raised median. It is therefore recommended to:

- Extend the median through the school crosswalks on the north and south legs of the Woodhaven Boulevard and 97<sup>th</sup> Avenue intersection and also on the north and south legs of the Woodhaven Boulevard and 101<sup>st</sup> Avenue intersection.
- Widen the four foot wide median to at least six feet by reducing the raised concrete medians which separate the mainline and service road from seven feet to six feet, and shifting the travel lanes.

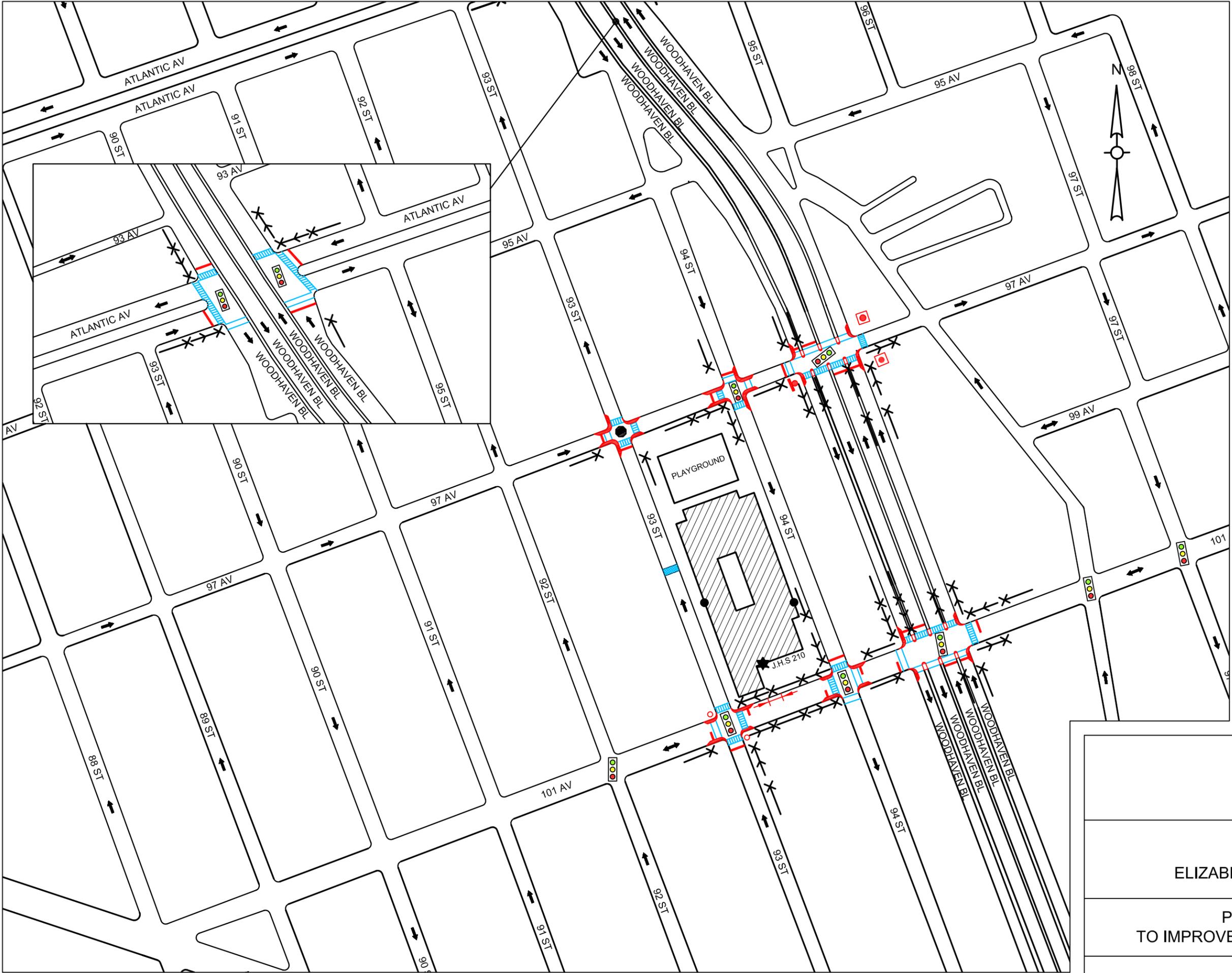
The refuge islands with extended medians will provide a refuge for pedestrians who do not complete the crossing during the flashing “DON’T WALK” indication. The proposed median should be at least six feet wide, extend beyond the crosswalk, and have at least five feet at grade cut through section. These medians are not proposed where they would hinder the ability of vehicles to turn. Details pertaining to the proposed refuge islands and curb extensions will be developed during Preliminary and Final Design.

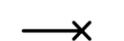
➤ Remove Crosswalk Obstructions

Traffic signal poles on the northeast and southeast corners of Woodhaven Boulevard at 97<sup>th</sup> Avenue are in the paths of the crosswalks located across the north and south legs, respectively.

It is therefore recommended to:

- Relocate the traffic signal pole on the northeast corner of Woodhaven Boulevard at 97<sup>th</sup> Avenue from the path of the crosswalk located across the north leg of Woodhaven Boulevard.
- Relocate the traffic signal pole on the southeast corner of Woodhaven Boulevard at 97<sup>th</sup> Avenue from the path of the crosswalk located across the south leg.



- LEGEND**
-  MAIN ENTRANCE
  -  OTHER ENTRANCES
  -  EXISTING TRAVEL DIRECTION
  -  EXISTING ADVANCE WARNING SIGN OR SCHEDULED TO BE INSTALLED
  -  EXISTING SCHOOL CROSSWALK WARNING ASSEMBLY OR SCHEDULED TO BE INSTALLED
  -  EXISTING SIGNALIZED LOCATION
  -  EXISTING ALL WAY STOP LOCATION
  -  EXISTING SPEED REDUCER (HUMP)
  -  EXISTING SCHOOL CROSSWALK
  -  EXISTING PEDESTRIAN CROSSWALK
  -  TRAFFIC SIGNAL POLE TO BE RELOCATED
  -  PROPOSED TRAFFIC SIGN
  -  PROPOSED STOP LINE IN ADVANCE OF SCHOOL CROSSWALK
  -  PROPOSED "NO STANDING 7:00AM - 4:00PM SCHOOL DAYS"
  -  PROPOSED CONCRETE REFUGE ISLAND
  -  PROPOSED CURB EXTENSION (NECKDOWN)
  -  RELOCATE TRASH BASKET

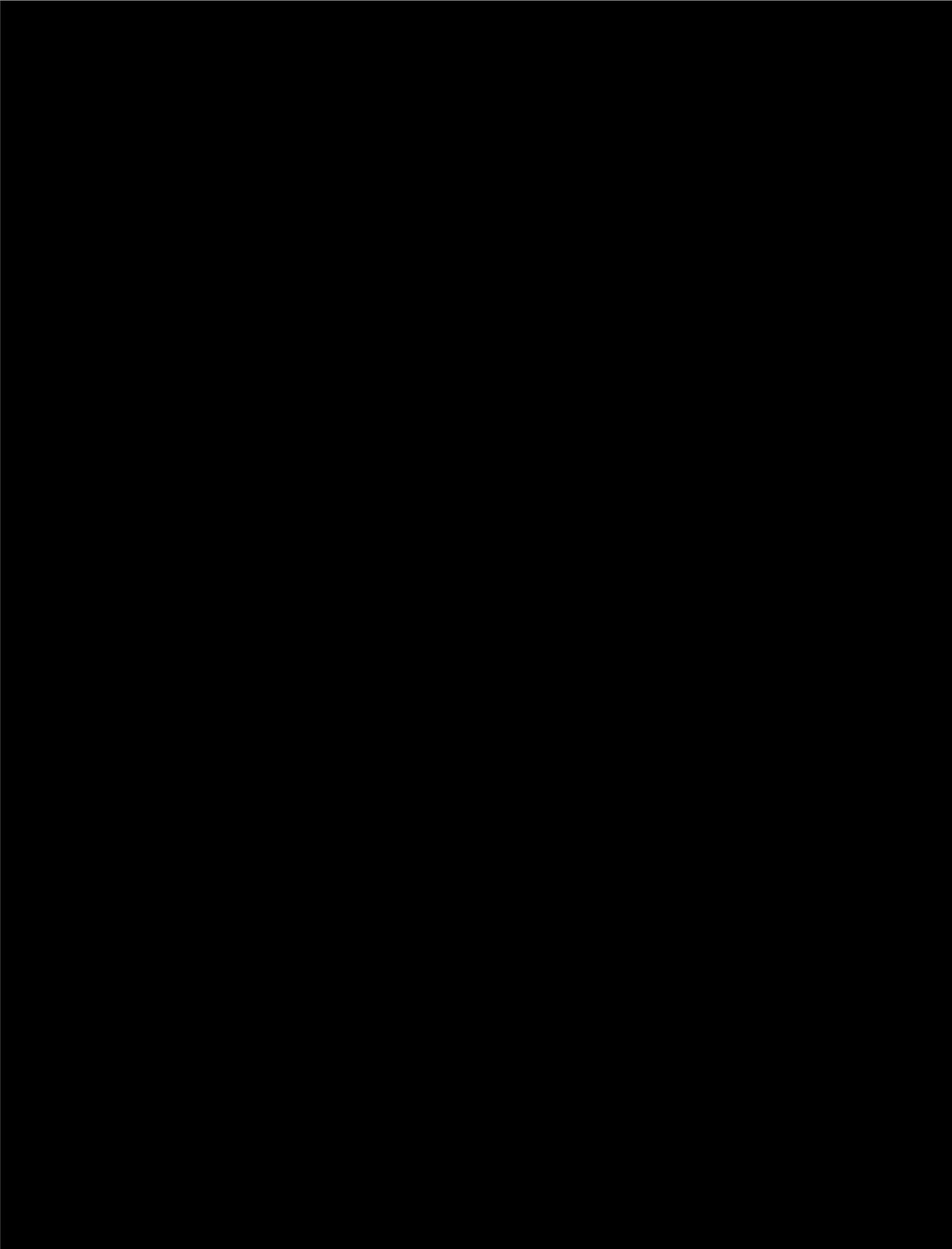
1" = 200'

EXHIBIT 7

J.H.S 210 QUEENS  
ELIZABETH BLACKWELL SCHOOL

POTENTIAL MEASURES  
TO IMPROVE STUDENT PEDESTRIAN SAFETY

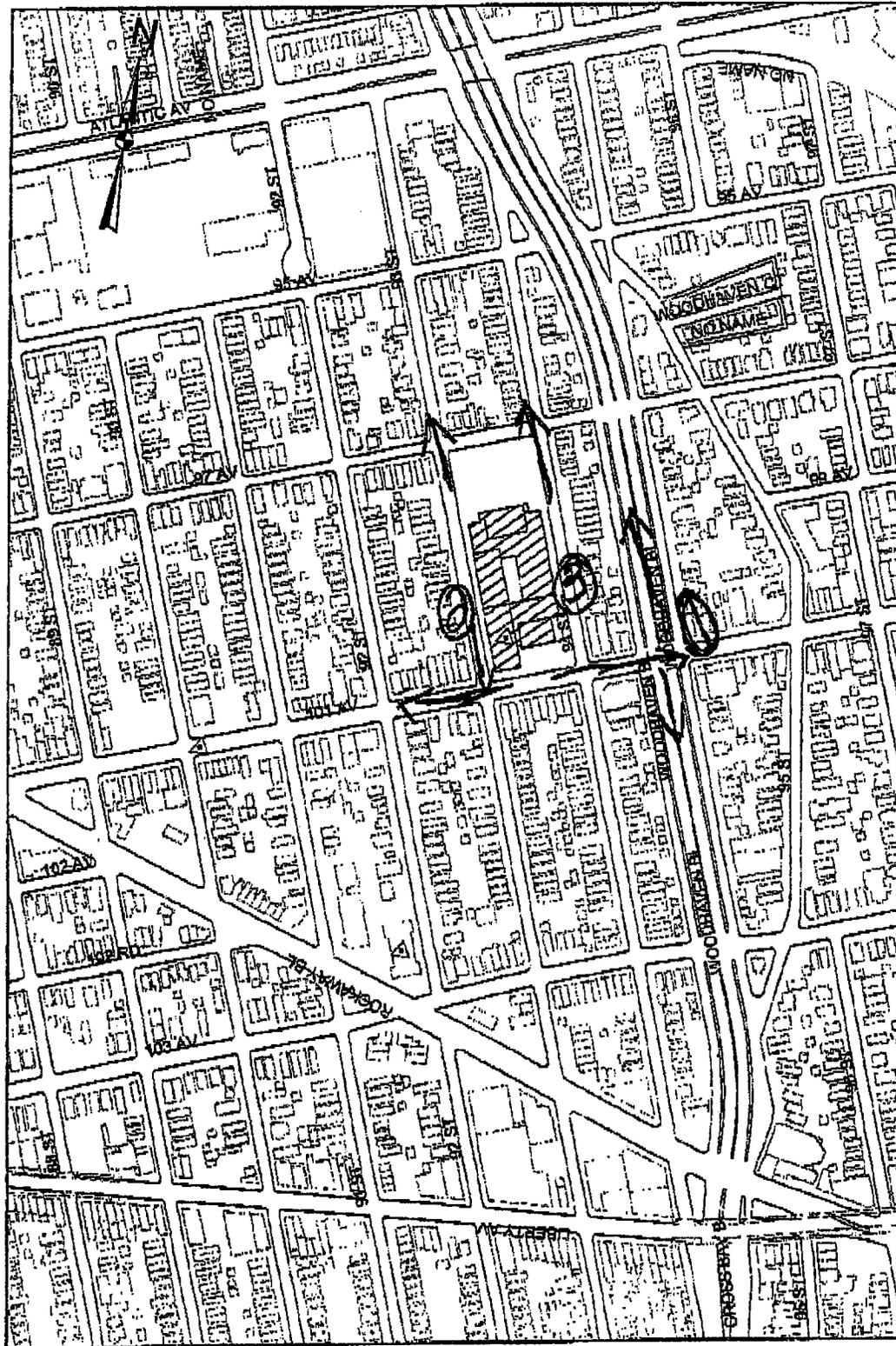
# APPENDIX



# TRAFFIC SAFETY PLAN OFFICIAL ROUTES TO SCHOOL

NEW YORK CITY  
DEPT. OF TRANSPORTATION

BUREAU OF TRAFFIC



## J.H.S. 210

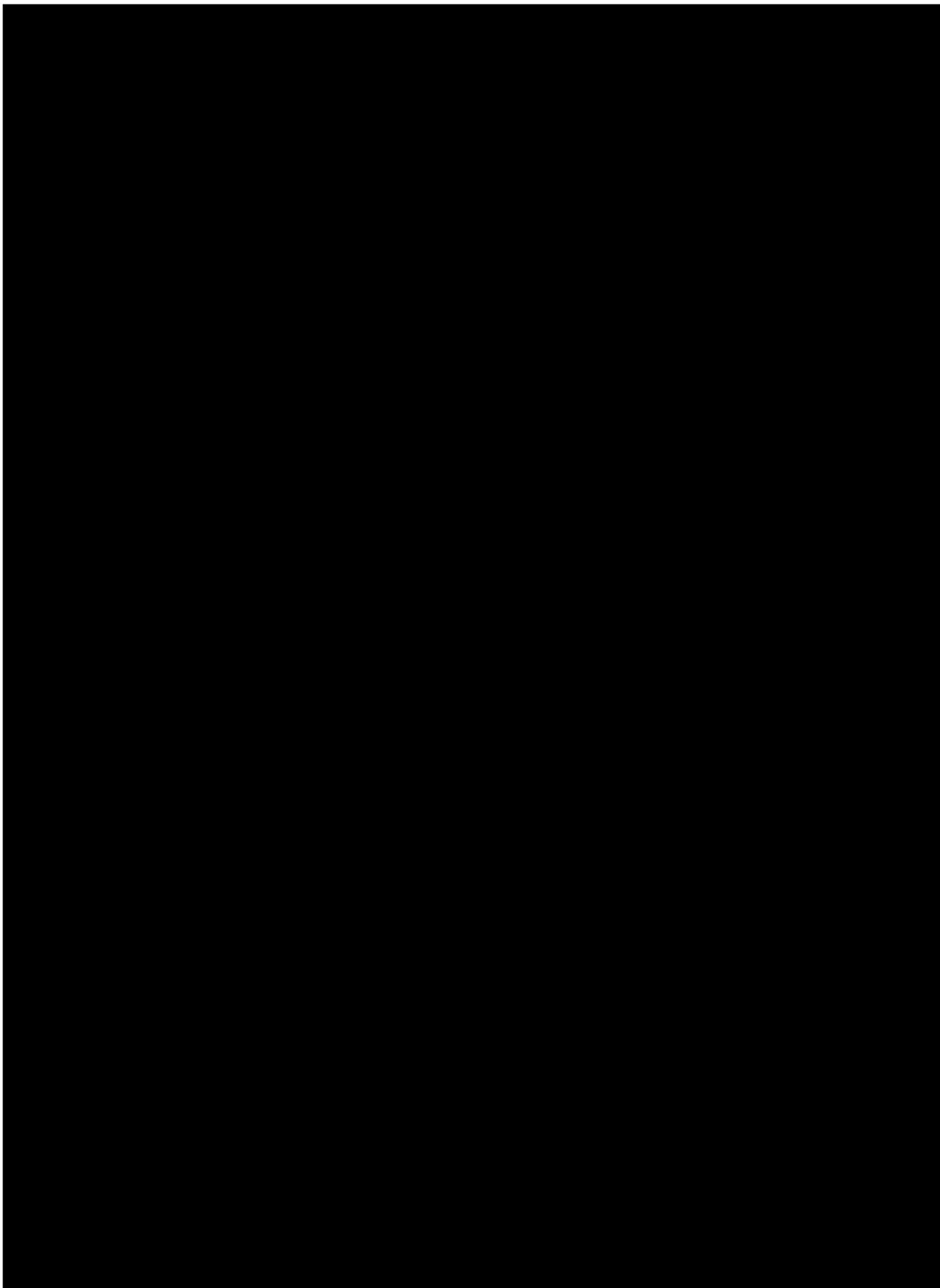
Prepared by the NEW YORK CITY DEPARTMENT OF TRANSPORTATION,  
the Metropolitan COMMISSIONER, in cooperation with SCHOOL, and  
POLICE OFFICIALS.

ORIG. DATE: 11/19/85  
GIS CONTR: 04-2002  
REVISED: \_\_\_\_\_  
DRAWING NO. \_\_\_\_\_  
COC-717  
MS-4469  
CB  
JURENS  
102  
BOROUGH  
PCT.

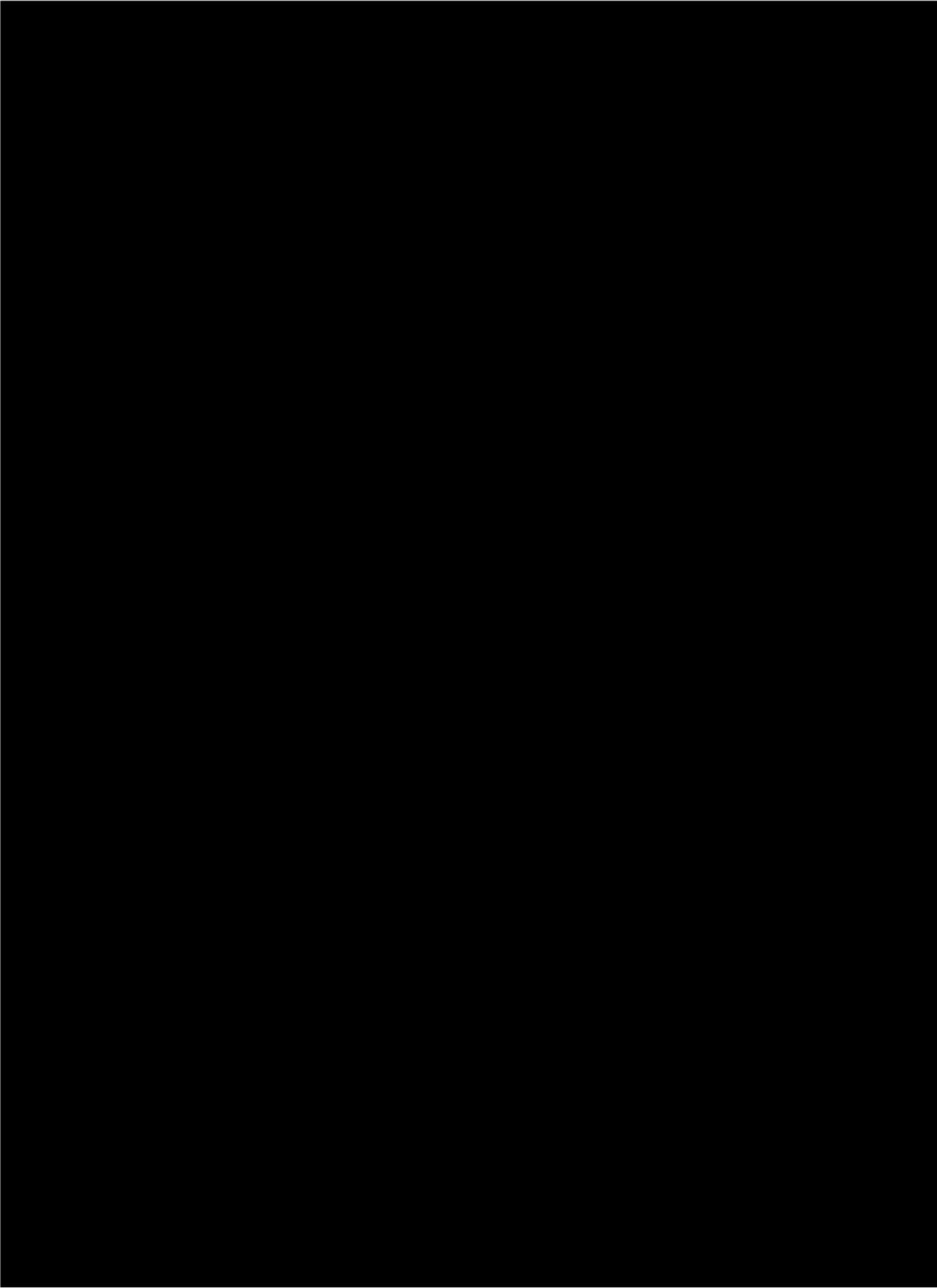
- LEGEND**
- STOP LINE
  - ROUTE TO SCHOOL
  - TRAFFIC SIGNAL
  - SCHOOL GUARD
  - POLICE OFFICER
  - PED. XV
  - HIGH VIS. XV
  - SCHOOL CROSBWALK
  - ADU. WARNING SIGN

The TRAFFIC SAFETY PLAN shown on this map was established to provide the maximum degree of safety for children going to and from school. It is required that all children follow the prescribed routes & use the designated crosswalks.









## SPOT SPEED STUDY

Date: **June 20, 2005**                      Time: **12:15 pm**  
 Location: **Woohaven Boulevard between 101st Avenue & 97th Avenue**  
 Surveyor: **Richard Calvache & Hugo Salinas**

School: **J.H.S. 210**  
 Direction: **Northbound (service road)**  
 Comments:

Speed S (mph)	No. of Vehicles in Group n	% of Vehicles in Group	% Cumulative Vehicles	nS	nS <sup>2</sup>
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	0	0.0%	0.0%	0	0
23	1	1.0%	1.0%	23	529
24	1	1.0%	2.0%	24	576
25	2	2.0%	4.0%	50	1250
26	2	2.0%	6.0%	52	1352
27	9	9.0%	15.0%	243	6561
28	18	18.0%	33.0%	504	14112
29	14	14.0%	47.0%	406	11774
30	14	14.0%	61.0%	420	12600
31	6	6.0%	67.0%	186	5766
32	9	9.0%	76.0%	288	9216
33	4	4.0%	80.0%	132	4356
34	3	3.0%	83.0%	102	3468
35	6	6.0%	89.0%	210	7350
36	6	6.0%	95.0%	216	7776
37	2	2.0%	97.0%	74	2738
38	0	0.0%	97.0%	0	0
39	0	0.0%	97.0%	0	0
40	2	2.0%	99.0%	80	3200
41	0	0.0%	99.0%	0	0
42	1	1.0%	100.0%	42	1764
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
	100	100.0%		3052	94388

Mean Speed = 30.5 mph                      Median Speed = 30.5 mph  
 Standard Deviation = 3.5 mph              15th Percentile Speed = 26.9 mph  
 Margin of Error (95% Confidence) = ± 0.7 mph      85th Percentile Speed = 34.2 mph

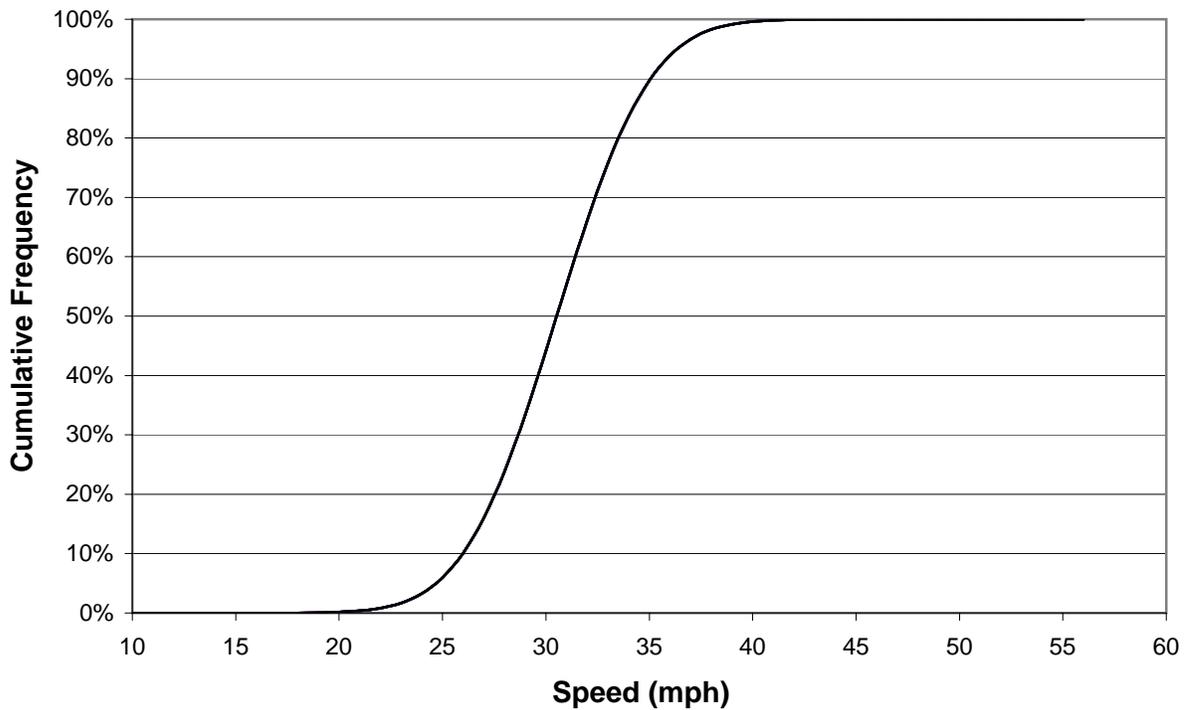
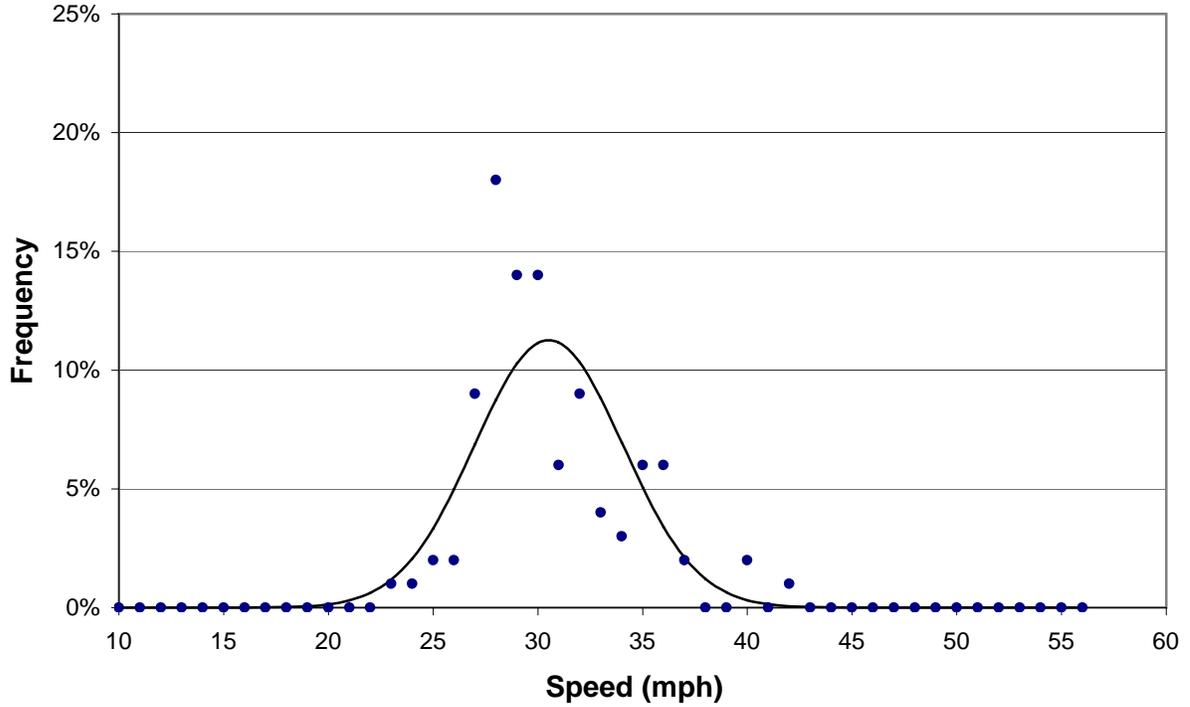
# SPOT SPEED STUDY

Date: **June 20, 2005**  
 Location: **Woohaven Boulevard between 101st Avenue & 97th Avenue**  
 Surveyor: **Richard Calvache & Hugo Salinas**

Time: **12:15 pm**  
 School: **J.H.S. 210**  
 Direction: **Northbound (service road)**  
 Comments:

Mean Speed = 30.5 mph  
 Standard Deviation = 3.5 mph  
 Margin of Error (95% Confidence) =  $\pm 0.7$  mph

Median Speed = 30.5 mph  
 15th Percentile Speed = 26.9 mph  
 85th Percentile Speed = 34.2 mph



## SPOT SPEED STUDY

Date: **June 20, 2005**                      Time: **11:05 am**  
 Location: **Woohaven Boulevard between 101st Avenue & 97th Avenue**  
 Surveyor: **Richard Calvache & Hugo Salinas**

School: **J.H.S. 210**  
 Direction: **Southbound (main road)**  
 Comments:

Speed S (mph)	No. of Vehicles in Group n	% of Vehicles in Group	% Cumulative Vehicles	nS	nS <sup>2</sup>
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	2	2.0%	2.0%	40	800
21	0	0.0%	2.0%	0	0
22	1	1.0%	3.0%	22	484
23	0	0.0%	3.0%	0	0
24	3	3.0%	5.9%	72	1728
25	8	7.9%	13.9%	200	5000
26	8	7.9%	21.8%	208	5408
27	8	7.9%	29.7%	216	5832
28	9	8.9%	38.6%	252	7056
29	11	10.9%	49.5%	319	9251
30	14	13.9%	63.4%	420	12600
31	8	7.9%	71.3%	248	7688
32	7	6.9%	78.2%	224	7168
33	6	5.9%	84.2%	198	6534
34	4	4.0%	88.1%	136	4624
35	4	4.0%	92.1%	140	4900
36	0	0.0%	92.1%	0	0
37	1	1.0%	93.1%	37	1369
38	1	1.0%	94.1%	38	1444
39	0	0.0%	94.1%	0	0
40	4	4.0%	98.0%	160	6400
41	0	0.0%	98.0%	0	0
42	1	1.0%	99.0%	42	1764
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
	101	100.0%		3015	91899

Mean Speed = 29.9 mph  
 Standard Deviation = 4.4 mph  
 Margin of Error (95% Confidence) = ± 0.8 mph

Median Speed = 29.9 mph  
 15th Percentile Speed = 25.3 mph  
 85th Percentile Speed = 34.4 mph

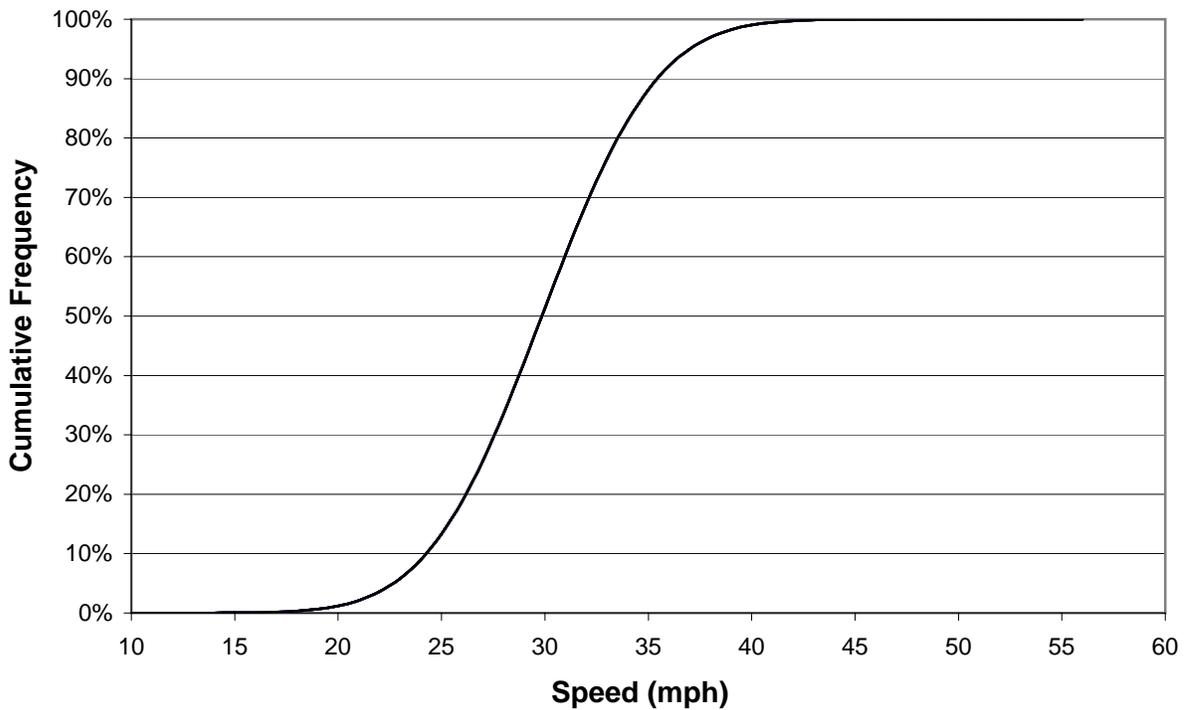
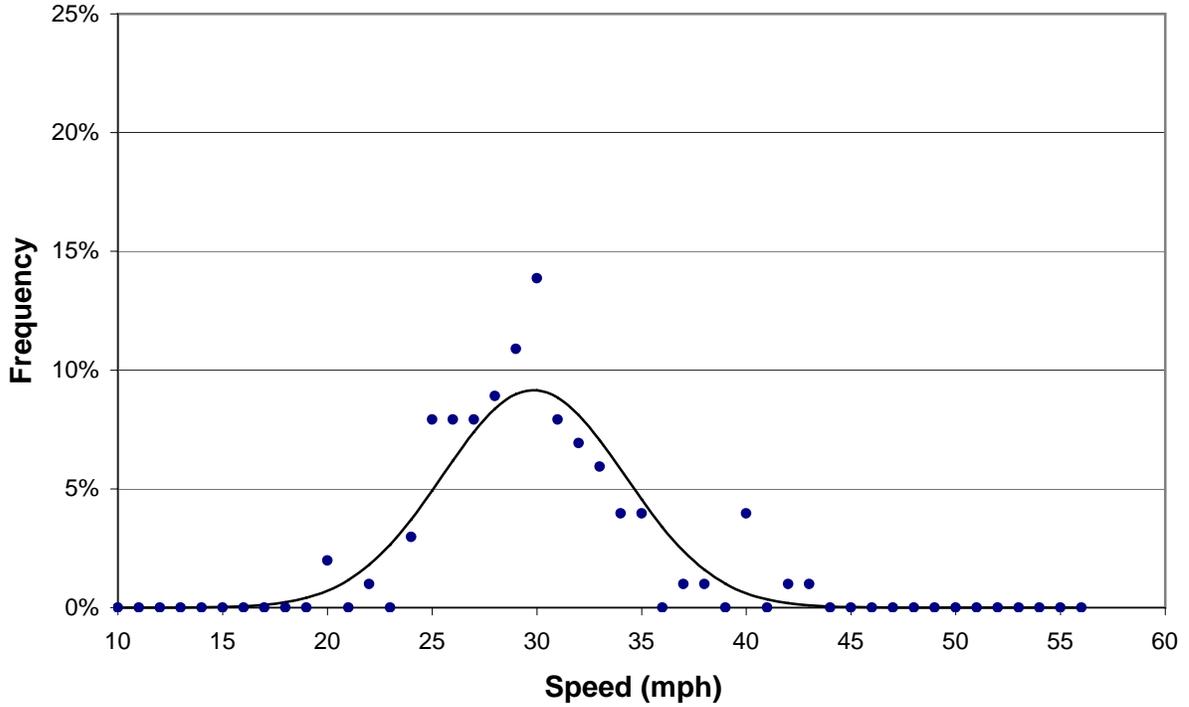
# SPOT SPEED STUDY

Date: **June 20, 2005**  
 Location: **Woohaven Boulevard between 101st Avenue & 97th Avenue**  
 Surveyor: **Richard Calvache & Hugo Salinas**

Time: **11:05 am**  
 School: **J.H.S. 210**  
 Direction: **Southbound (main road)**  
 Comments:

Mean Speed = 29.9 mph  
 Standard Deviation = 4.4 mph  
 Margin of Error (95% Confidence) =  $\pm 0.8$  mph

Median Speed = 29.9 mph  
 15th Percentile Speed = 25.3 mph  
 85th Percentile Speed = 34.4 mph



## SPOT SPEED STUDY

Date: **June 20, 2005**                      Time: **11:05 am**  
 Location: **Woohaven Boulevard between 101st Avenue & 97th Avenue**  
 Surveyor: **Richard Calvache & Hugo Salinas**

School: **J.H.S. 210**  
 Direction: **Northbound (main road)**  
 Comments:

Speed S (mph)	No. of Vehicles in Group n	% of Vehicles in Group	% Cumulative Vehicles	nS	nS <sup>2</sup>
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	1	1.0%	1.0%	22	484
23	0	0.0%	1.0%	0	0
24	0	0.0%	1.0%	0	0
25	0	0.0%	1.0%	0	0
26	2	2.0%	3.0%	52	1352
27	5	5.0%	8.0%	135	3645
28	7	7.0%	15.0%	196	5488
29	8	8.0%	23.0%	232	6728
30	18	18.0%	41.0%	540	16200
31	7	7.0%	48.0%	217	6727
32	14	14.0%	62.0%	448	14336
33	5	5.0%	67.0%	165	5445
34	8	8.0%	75.0%	272	9248
35	10	10.0%	85.0%	350	12250
36	4	4.0%	89.0%	144	5184
37	5	5.0%	94.0%	185	6845
38	1	1.0%	95.0%	38	1444
39	0	0.0%	95.0%	0	0
40	0	0.0%	95.0%	0	0
41	2	2.0%	97.0%	82	3362
42	1	1.0%	98.0%	42	1764
43	1	1.0%	99.0%	43	1849
44	0	0.0%	99.0%	0	0
45	0	0.0%	99.0%	0	0
46	0	0.0%	99.0%	0	0
47	0	0.0%	99.0%	0	0
48	0	0.0%	99.0%	0	0
49	0	0.0%	99.0%	0	0
50	0	0.0%	99.0%	0	0
51	0	0.0%	99.0%	0	0
52	1	1.0%	100.0%	52	2704
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
	100	100.0%		3215	105055

Mean Speed = 32.2 mph  
 Standard Deviation = 4.1 mph  
 Margin of Error (95% Confidence) = ± 0.8 mph

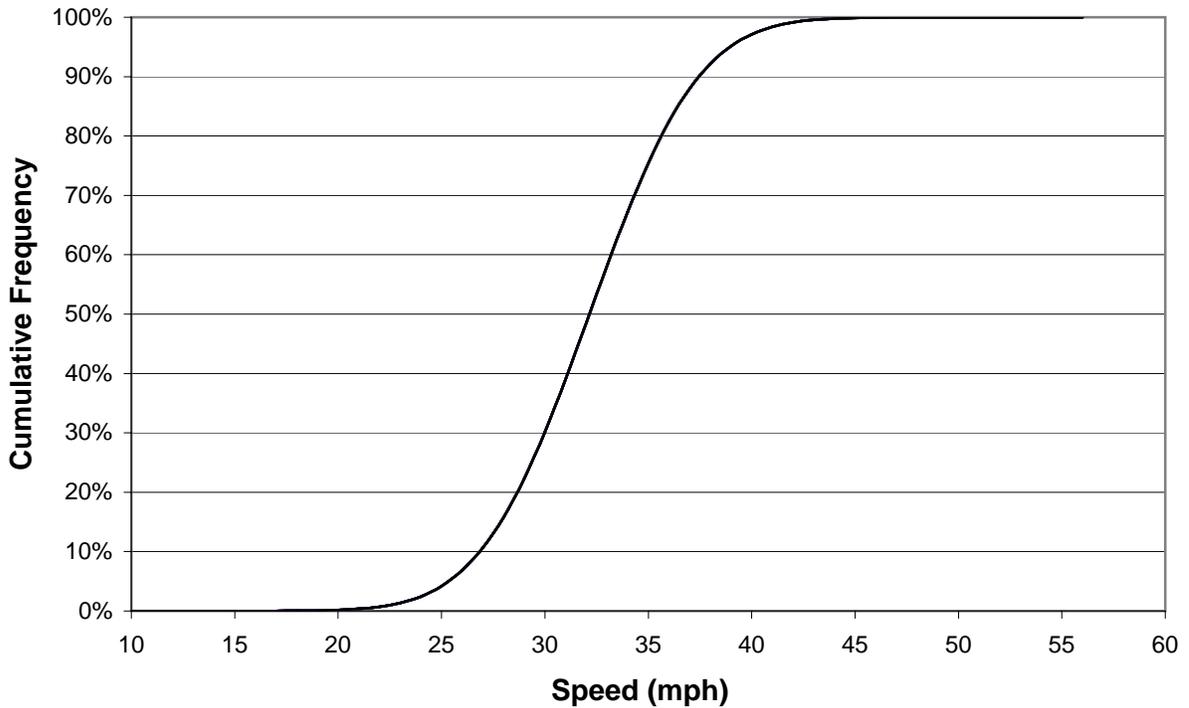
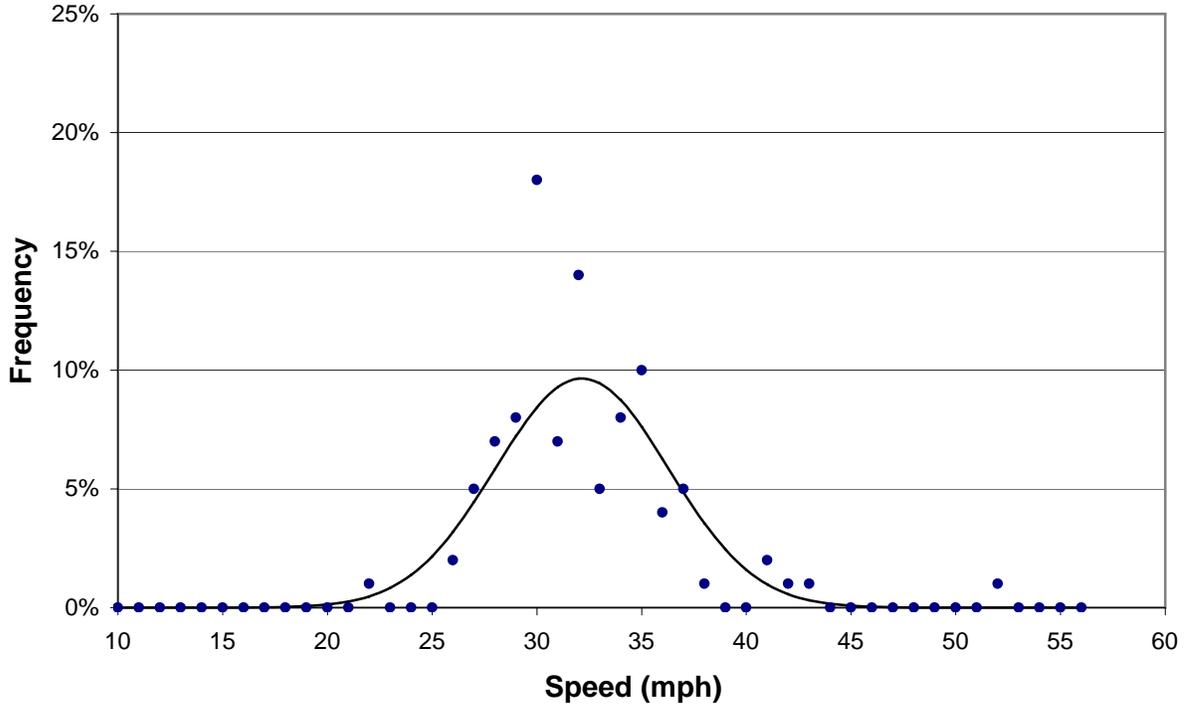
Median Speed = 32.2 mph  
 15th Percentile Speed = 27.9 mph  
 85th Percentile Speed = 36.4 mph

# SPOT SPEED STUDY

Date: **June 20, 2005**      Time: **11:05 am**  
 Location: **Woohaven Boulevard between 101st Avenue & 97th Avenue**  
 Surveyor: **Richard Calvache & Hugo Salinas**

School: **J.H.S. 210**  
 Direction: **Northbound (main road)**  
 Comments:

Mean Speed = 32.2 mph      Median Speed = 32.2 mph  
 Standard Deviation = 4.1 mph      15th Percentile Speed = 27.9 mph  
 Margin of Error (95% Confidence) = ± 0.8 mph      85th Percentile Speed = 36.4 mph



## SPOT SPEED STUDY

Date: **June 20, 2005**                      Time: **10:00 am**  
 Location: **Woohaven Boulevard between 101st Avenue & 97th Avenue**  
 Surveyor: **Richard Calvache & Hugo Salinas**

School: **J.H.S. 210**  
 Direction: **Southbound (service road)**  
 Comments:

Speed S (mph)	No. of Vehicles in Group n	% of Vehicles in Group	% Cumulative Vehicles	nS	nS <sup>2</sup>
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	0	0.0%	0.0%	0	0
23	0	0.0%	0.0%	0	0
24	1	1.1%	1.1%	24	576
25	2	2.2%	3.3%	50	1250
26	2	2.2%	5.4%	52	1352
27	4	4.3%	9.8%	108	2916
28	12	13.0%	22.8%	336	9408
29	6	6.5%	29.3%	174	5046
30	10	10.9%	40.2%	300	9000
31	10	10.9%	51.1%	310	9610
32	17	18.5%	69.6%	544	17408
33	7	7.6%	77.2%	231	7623
34	3	3.3%	80.4%	102	3468
35	6	6.5%	87.0%	210	7350
36	4	4.3%	91.3%	144	5184
37	2	2.2%	93.5%	74	2738
38	0	0.0%	93.5%	0	0
39	1	1.1%	94.6%	39	1521
40	2	2.2%	96.7%	80	3200
41	0	0.0%	96.7%	0	0
42	0	0.0%	96.7%	0	0
43	0	0.0%	96.7%	0	0
44	0	0.0%	96.7%	0	0
45	1	1.1%	97.8%	45	2025
46	1	1.1%	98.9%	46	2116
47	0	0.0%	98.9%	0	0
48	0	0.0%	98.9%	0	0
49	0	0.0%	98.9%	0	0
50	0	0.0%	98.9%	0	0
51	0	0.0%	98.9%	0	0
52	0	0.0%	98.9%	0	0
53	1	1.1%	100.0%	53	2809
54	0	0.0%	100.0%	0	0
55	0	0.0%	100.0%	0	0
56	0	0.0%	100.0%	0	0
	92	100.0%		2922	94600

Mean Speed = 31.8 mph  
 Standard Deviation = 4.4 mph  
 Margin of Error (95% Confidence) = ± 0.9 mph

Median Speed = 31.8 mph  
 15th Percentile Speed = 27.2 mph  
 85th Percentile Speed = 36.4 mph

# SPOT SPEED STUDY

Date: **June 20, 2005**  
 Location: **Woohaven Boulevard between 101st Avenue & 97th Avenue**  
 Surveyor: **Richard Calvache & Hugo Salinas**

Time: **10:00 am**  
 School: **J.H.S. 210**  
 Direction: **Southbound (service road)**  
 Comments:

Mean Speed = 31.8 mph  
 Standard Deviation = 4.4 mph  
 Margin of Error (95% Confidence) =  $\pm 0.9$  mph

Median Speed = 31.8 mph  
 15th Percentile Speed = 27.2 mph  
 85th Percentile Speed = 36.4 mph

