

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



**School Safety Engineering Project**

**FINAL REPORT: I.S. 227 (Louis Armstrong Middle School), Queens**



**Prepared by  
The RBA Group/Urbitrans Associates**



**OCTOBER 6, 2006**

**School Safety Engineering Project**  
**I.S. 227, Louis Armstrong Middle School, Queens**

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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 350 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). I.S. 227 (Louis Armstrong School) in Queens is one of the 135 priority schools.

## 2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS

### 2.1 ABOUT THE SCHOOL

Situated in the East Elmhurst section of Queens, in a mixed residential and commercial neighborhood, I.S. 227 (Louis Armstrong Middle School) has been educating intermediate school children since 1979. I.S. 227 has an enrollment of 1,527 students, from fifth grade through eighth grade.



*Figure 1: Looking south on Junction Boulevard, East Elmhurst, Queens*

### 2.2 NEIGHBORHOOD DESCRIPTION

I.S. 227 is located at 32-02 Junction Boulevard, between Northern Boulevard and 32nd Avenue. Across the street (to the south and east) the land use is mixed-use. North of 32nd Avenue, Junction Boulevard becomes 94th Street and is primarily residential (See Exhibit 1 for Aerial Photograph).

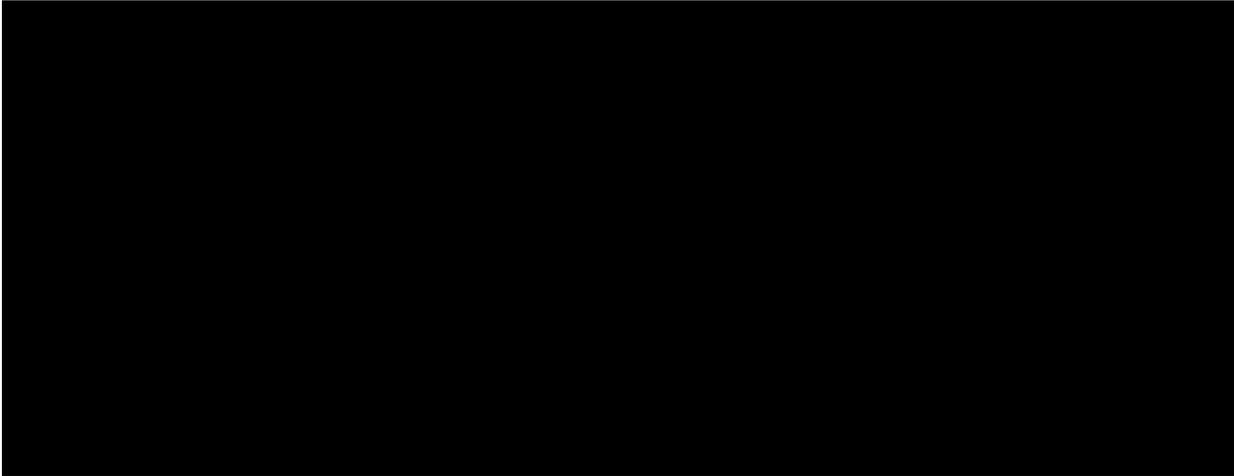
### 2.3 MEETING WITH SCHOOL REPRESENTATIVES

Representatives from I.S. 227 and the consultant team met at the school on the afternoon of June 18, 2004. The representatives from I.S. 227 included the school principal, school vice-principal, the parent coordinator, an NYPD School Safety Officer, and a parent (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 32<sup>nd</sup> Avenue in front of the school;
- Vehicles speeding on 93<sup>rd</sup> Street;
- An uncontrolled pedestrian crosswalk across 32<sup>nd</sup> Avenue at 93<sup>rd</sup> Street;
- As northbound vehicles turn right onto Jackson Mill Road from 94<sup>th</sup> Street, pedestrians cannot be seen by vehicles;

- Lack of crossing time at the intersection of Junction Boulevard, 94<sup>th</sup> Street and 32<sup>nd</sup> Avenue.

(See Appendix the school's survey response).



## 2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL

According to school officials, approximately 5% of students walk to I.S. 227, 10% arrive via public transportation, 5% are driven by a parent or guardian and 80% are driven by school bus. See Table 1 for the school's estimate of the modes of travel.

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

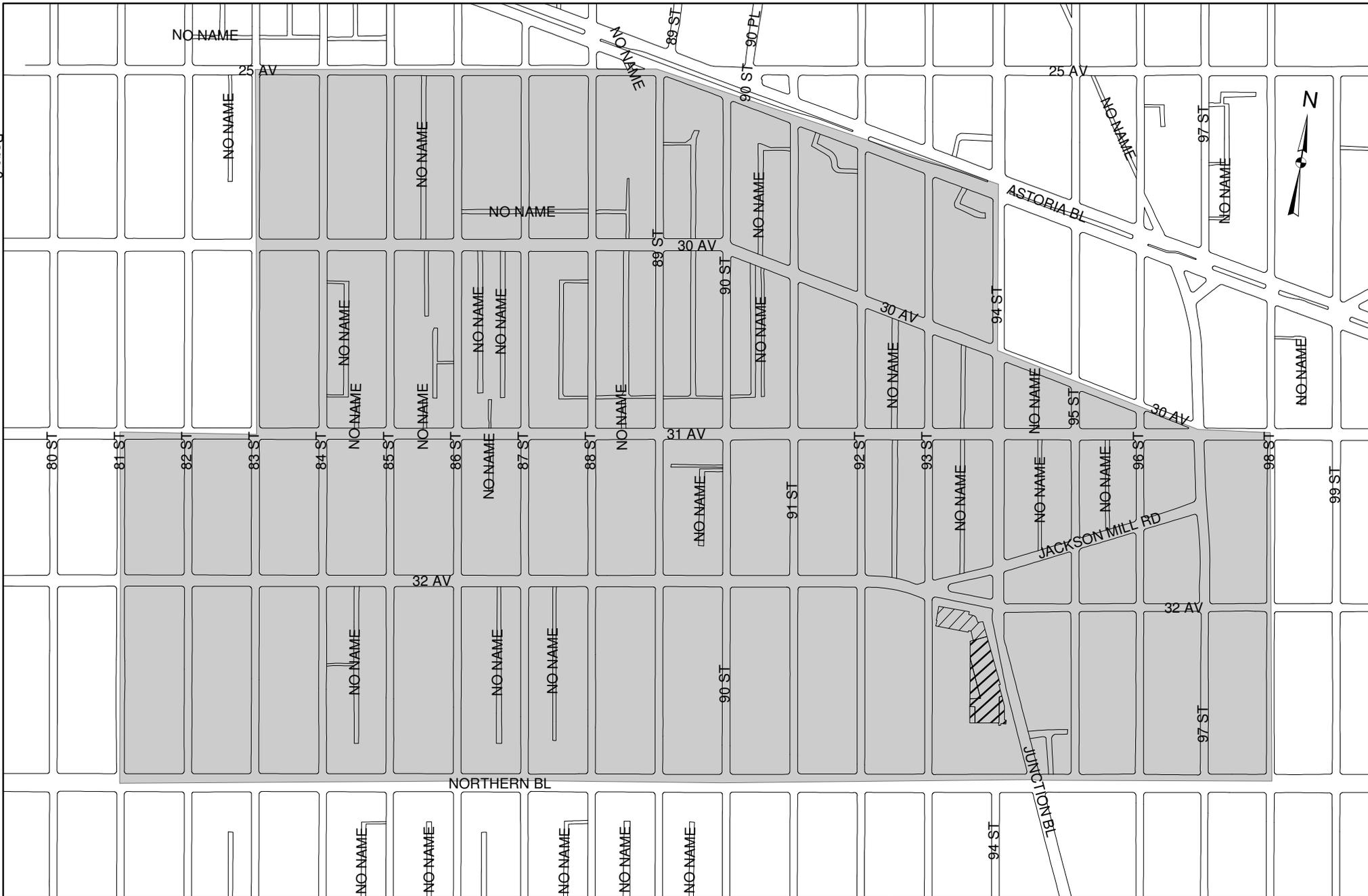
## 2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS

P.S. 228 is located on the northwest corner of Northern Boulevard and 93<sup>rd</sup> Street. Candy and convenience stores located on Junction Boulevard and Northern Boulevard (east of Junction Boulevard) are popular with school children from I.S. 227. Bus stops for the MTA Q66 bus line are located at the intersection of Northern Boulevard and Junction Boulevard, and for the Q77 line at the southwest corner of Junction Boulevard and 32<sup>nd</sup> Avenue.



1 inch equals 200 feet

**EXHIBIT 1**  
**I.S. 227, QUEENS**  
**LOUIS AMSTRONG SCHOOL**  
**AERIAL PHOTOGRAPH**



 CATCHMENT AREA

1 inch equals 500 feet

**EXHIBIT 2**  
**I.S. 227, QUEENS**  
**LOUIS ARMSTRONG SCHOOL**

**CATCHMENT AREA**

## 2.8 CROSSING GUARD LOCATIONS

According to school officials, there are no crossing guards assigned to I.S. 227. However, a crossing guard assigned to P.S. 228 is stationed at Northern Boulevard and 93<sup>rd</sup> Street. According to the school officials, another crossing guard (also assigned to P.S. 228) is periodically located at the intersection of Northern Boulevard and Junction Boulevard. See Exhibit 4 for a map of crossing guard locations.



*Figure 2- Northern Boulevard and Junction Boulevard at dismissal time*



# 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 

**IS 227 Queens**  
**LOUIS ARMSTRONG SCHOOL**

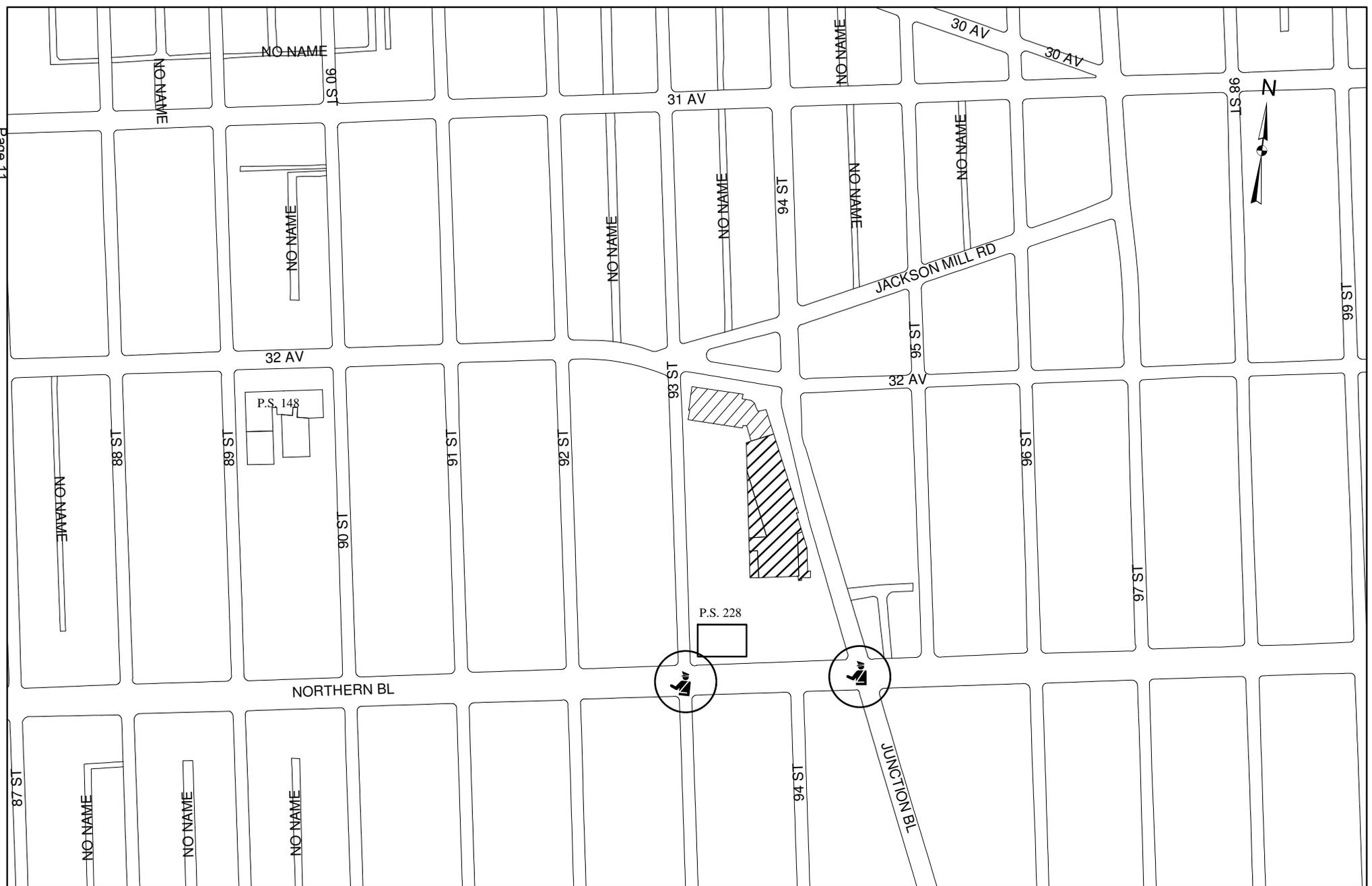
Prepared by the NEW YORK CITY DEPARTMENT OF TRANSPORTATION, Iris Weinsall, COMMISSIONER.

Map created on 11/17/2006

**Exhibit 3**

1.5.1

COMM. BOARD: 403
PRECINCT: 115



1 inch equals 300 feet



Crossing guard assigned to another school

**EXHIBIT 4**  
**I.S. 227, QUEENS**  
**LOUIS AMSTRONG SCHOOL**

**CROSSING GUARDS**

### 3. TRAFFIC OPERATIONS

#### 3.1 SCHOOL BUS OPERATIONS

According to school officials, approximately 70 buses (private and yellow school buses) transport I.S. 227 students. During the morning arrival, 51 buses transport students to the school, of which 20 buses transport approximately 260 disabled students, and 3 buses are private. Private buses are those that are not provided by the Department of Education and are paid for by parents of students. In the morning, buses drop off students near the playground gate on Northern Boulevard. Buses transporting disabled students arrive at the school's front entrance on 32<sup>nd</sup> Avenue. During afternoon dismissal, 51 buses pick-up students during the general dismissal, and an additional 14 buses pick up students on days with late dismissal (see Section 2.4 for dismissal times). In the afternoon buses park, double-park and sometimes triple-park on 32<sup>nd</sup> Avenue, Junction Boulevard and Northern Boulevard. Westbound traffic on Northern Boulevard is significantly interrupted during school dismissal time. Junction Boulevard and 32<sup>nd</sup> Avenue also become congested. Since there is not sufficient curbside space for all the buses to drop off and pick up students at the curbside, they park on the surrounding streets adjacent to the school and wait for curbside space to open.



*Figure 3: Buses parked and double-parked on Junction Boulevard during student dismissal time*



*Figure 4: Buses parked and double-parked on Northern Boulevard during dismissal*

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

School officials have indicated that approximately 1% of I.S.227 students are driven by parents or guardians. Field observations showed that parents use 94<sup>th</sup> Street and 32<sup>nd</sup> Avenue as drop-off and pick-up points.

### **3.3 PARKING REGULATIONS**

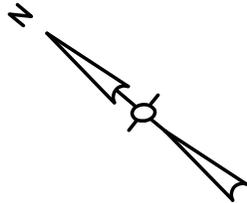
Parking regulations on 32<sup>nd</sup> Avenue are posted as “NO STANDING, SCHOOL DAYS, 7 AM – 4 PM, EXCEPT SCHOOL BUSES”. On Junction Boulevard parking regulations are posted as “NO PARKING, 7 AM – 4 PM, SCHOOL DAYS, EXCEPT SCHOOL BUSES” and “NO STANDING, 7 AM – 4 PM, SCHOOL DAYS”. Parking regulations on Northern Boulevard are posted as “NO STANDING, 7 AM - 4 PM, SCHOOL DAYS, EXCEPT SCHOOL BUSES”. Alternate side parking regulations are in place on 93<sup>rd</sup> Street, Junction Boulevard and 32<sup>nd</sup> Avenue. Exhibit 5 shows parking regulations on Junction Boulevard, Northern Boulevard and 32<sup>nd</sup> Avenue.



*Figure 5: Parking regulations on 32<sup>nd</sup> Avenue in front of I.S. 227*

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

The Traffic Safety Plan, Exhibit 3, shows existing signals and crosswalk pavement markings. 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 with downward pointing arrows. Signs scheduled to be installed under this program are shown as "existing" on Exhibit 8.



**LEGEND**



★ MAIN ENTRANCE



● OTHER ENTRANCES

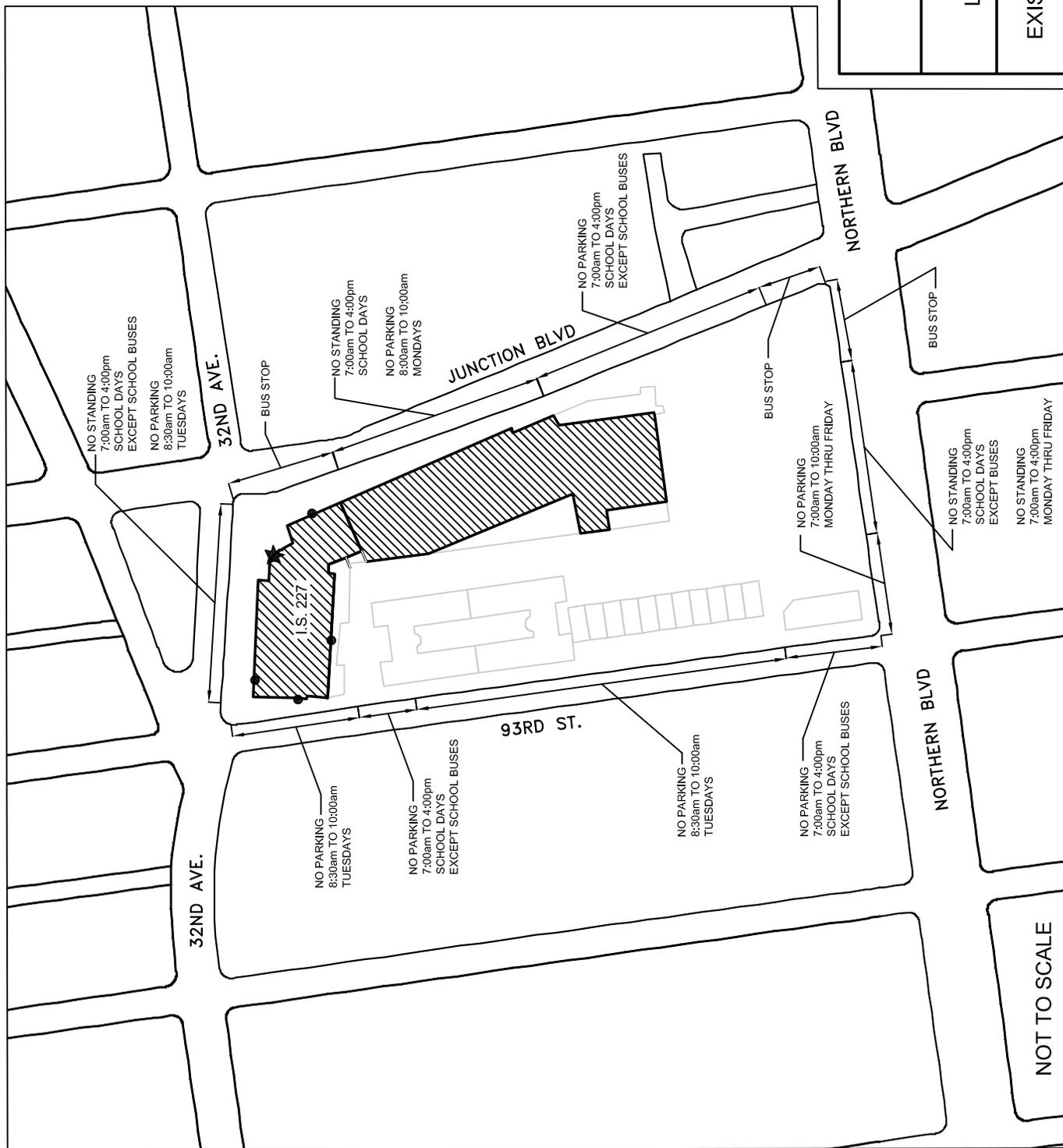


EXHIBIT 5

I.S. 227, QUEENS  
LOUIS ARMSTRONG SCHOOL

EXISTING PARKING REGULATIONS

NOT TO SCALE

### 3.5 ACCIDENT SUMMARY

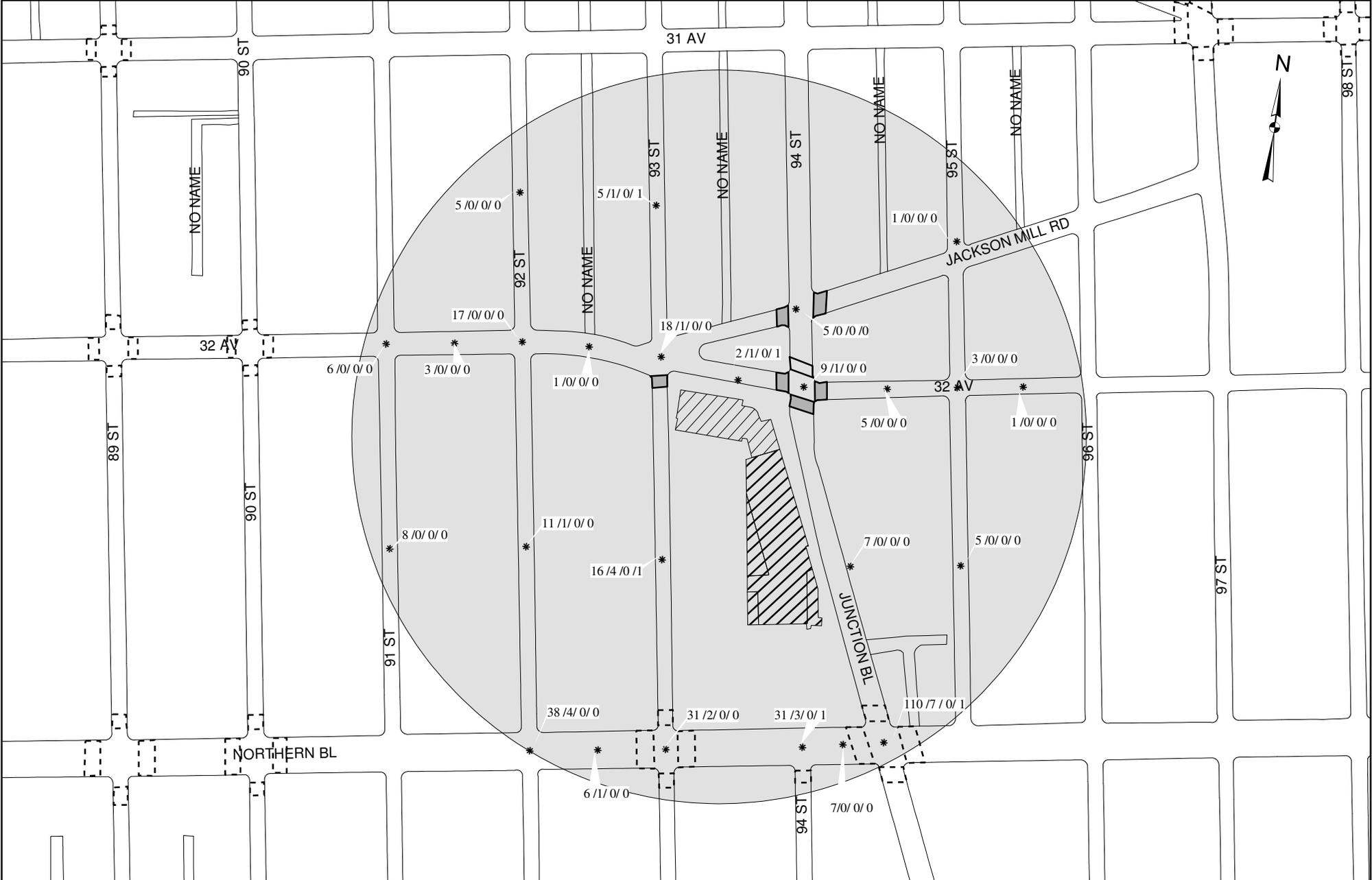
Exhibit 6 and Table 2 show a summary of accidents, as obtained from the New York State Department of Motor Vehicles (DMV), in the vicinity of I.S. 227 for the three-year period from January 1, 1998 through December 31, 2000. The DMV data provides some detail relating to the circumstances and cause of 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 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 DOT's School Safety Engineering Program. DMV accident data is discussed in Section 3.6, Traffic Operations and Issues.

<b>INTERSECTION</b>	<b>TOTAL ACCIDENTS</b>	<b>PEDESTRIAN ACCIDENTS</b>	<b>PEDESTRIAN FATALITIES</b>	<b>SCHOOL-RELATED* ACCIDENTS</b>
Northern Boulevard at Junction Blvd.	110	7	0	1
Northern Boulevard at 94 <sup>th</sup> Street	31	3	0	1
Northern Boulevard at 93 <sup>rd</sup> Street	31	2	0	0
Junction Boulevard at 32 <sup>nd</sup> Avenue	9	1	0	0
94 <sup>th</sup> Street at Jackson Mill Rd	5	0	0	0
32 <sup>nd</sup> Avenue at 93 <sup>rd</sup> Street	18	1	0	0
<b>TOTAL</b>	<b>204</b>	<b>14</b>	<b>0</b>	<b>2</b>

<b>INTERSECTION</b>	<b>TOTAL ACCIDENTS</b>	<b>PEDESTRIAN ACCIDENTS</b>	<b>PEDESTRIAN FATALITIES</b>	<b>SCHOOL-RELATED* ACCIDENTS</b>
Northern Boulevard at Junction Blvd.	132	10	0	1
Northern Boulevard at 94 <sup>th</sup> Street	45	5	0	0
Northern Boulevard at 93 <sup>rd</sup> Street	45	1	0	0
Junction Boulevard at 32 <sup>nd</sup> Avenue	40	5	0	0
94 <sup>th</sup> Street at Jackson Mill Rd	14	1	0	1
32 <sup>nd</sup> Avenue at 93 <sup>rd</sup> Street	33	0	0	0
<b>TOTAL</b>	<b>309</b>	<b>22</b>	<b>0</b>	<b>2</b>

\* 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. 227   
 SCHOOL CROSSWALK ASSIGNED TO ANOTHER SCHOOL   
 CROSSWALK

1 inch equals 250 feet

**EXHIBIT 6**  
**I.S. 227, QUEENS**  
**LOUIS ARMSTRONG SCHOOL**  
**ACCIDENT SUMMARY**  
**THREE YEAR PERIOD**  
**1998-2000**

X/X/X/X

TOTAL ACCIDENTS	PED ACCIDENTS	PED FATAL	SCHOOL PED ACCIDENTS
X	X	X	X

### 3.6 TRAFFIC OPERATIONS AND ISSUES

The following describes traffic accidents and operational issues at intersections in the vicinity of I.S. 227.

#### 3.6.1 Northern Boulevard and Junction Boulevard

Northern Boulevard is a 70-foot wide, two-way (east-west) roadway with five travel lanes (two through lanes and left turn bays for both directions) and parking along both outer lanes. Junction Boulevard is a two-way (north-south) 45-foot wide roadway with one travel lane and parking on both sides. The intersection is controlled by a two-phase traffic signal. There are school crosswalks on the west and north legs of the intersection.

There were 110 accidents during the 1998-2000 study period. Seven accidents involved pedestrians, including one school-related accident. Four pedestrians were struck while crossing against the signal, or outside a designated pedestrian crosswalk. Three pedestrian accidents were attributed to driver error (unsafe turning and failing to yield to pedestrians).

To determine vehicular speeds along Junction Boulevard, a spot speed study was conducted on Wednesday, November 15, 2005 on Junction Boulevard between 32<sup>nd</sup> Avenue and Northern Boulevard. The 85<sup>th</sup> percentile speed was found to be 23 mph, which is below the legal speed limit of 30 mph (see Table 4 and Appendix).

<b>TABLE 4: SPOT SPEED STUDIES (JUNCTION BLVD)</b>		
<b>LOCATION</b>	<b>MEDIAN SPEED (MPH)</b>	<b>85TH PERCENTILE SPEED (MPH)</b>
Junction Blvd. Btw. 32 <sup>nd</sup> Avenue and Northern Boulevard	21	23

#### 3.6.2 Northern Boulevard and 94<sup>th</sup> Street

94<sup>th</sup> Street is a 30-foot wide, one-way (southbound) roadway with one travel lane and parking on both sides. The eastbound direction of Northern Boulevard forms a T-intersection with 94<sup>th</sup> Street. This intersection is uncontrolled, since eastbound traffic on Northern Boulevard can only turn right onto 94<sup>th</sup> Street. There is a school crosswalk on the south leg of the intersection. There are no crosswalks on Northern Boulevard.

A total of 31 accidents occurred at this intersection during the 1998-2000 study period. Three accidents involved pedestrians, of which one accident was school-related. Two pedestrian accidents were attributed to pedestrian error due to crossing against the signal or outside a marked pedestrian crosswalk. One pedestrian was struck while crossing with the signal by a vehicle, which was improperly backing up.

### 3.6.3 Northern Boulevard and 93<sup>rd</sup> Street

93<sup>rd</sup> Street is a 30-foot wide, one-way (northbound) roadway with one travel lane and parking on both sides. The intersection is controlled by a two-phase signal. There are school crosswalks on the north, south, and east legs of the intersection.

A total of 31 accidents occurred at this intersection during the 1998-2000 study period. Two accidents involved pedestrians; however, neither was school-related. One pedestrian was struck while crossing against the signal. The second pedestrian was struck by a westbound vehicle, while crossing with the signal. According to the accident data this accident was attributed to driver inattention.

In addition, 16 accidents occurred on 93<sup>rd</sup> Street between Northern Boulevard and 32<sup>nd</sup> Avenue between 1998 and 2000. Four accidents involved pedestrians including one school age pedestrian. According to the accident data two pedestrians were struck while emerging from parked vehicles. One pedestrian was struck while playing on the street. There is no information on the fourth accident.

### 3.6.4 32<sup>nd</sup> Avenue/93<sup>rd</sup> Street and Jackson Mill Road

This is a five-leg stop controlled intersection with stop signs for traffic traveling north on 93<sup>rd</sup> Street and west on Jackson Mill Road. 32<sup>nd</sup> Avenue is a 45-foot wide two-way roadway with one travel lane in each direction and parking on both sides, west of 93<sup>rd</sup> Street; and a 32-foot wide two-way roadway with one moving lane and parking along the north curb between 93<sup>rd</sup> Street and Junction Boulevard. 32<sup>nd</sup> Avenue becomes one-way (westbound) east of Junction Boulevard. Jackson Mill Road, at this intersection, is a 30-foot one-way (westbound) roadway with one travel lane and parking along both sides. There is a school crosswalk on the south leg of the intersection.

A total of 18 accidents occurred at this intersection in the 1998-2000 study period. One accident involved a pedestrian. This was not a school-related accident. According to the accident data, this pedestrian was struck by a northbound vehicle, while emerging from a parked vehicle.

Five accidents occurred on 93<sup>rd</sup> Street between 31<sup>st</sup> Avenue and 32<sup>nd</sup> Avenue in the 1998-2000 study period. One accident involved a ten-year-old student who was struck while crossing the street.



*Figure 6: 32<sup>nd</sup> Avenue, prior to dismissal (buses waiting on south side of 32<sup>nd</sup> Ave)*

To determine vehicular speeds along 32<sup>nd</sup> Avenue, a spot speed study was conducted on Wednesday, November 15, 2005 on 32<sup>nd</sup> Avenue between 93<sup>rd</sup> Street and Junction Boulevard. The 85<sup>th</sup> percentile speed was found to be 23 mph, which is below the legal speed limit of 30 mph.

<b>TABLE 5: SPOT SPEED STUDIES (32<sup>ND</sup> AVENUE)</b>		
<b>LOCATION</b>	<b>MEDIAN SPEED (MPH)</b>	<b>85TH PERCENTILE SPEED (MPH)</b>
32 <sup>nd</sup> Avenue between Junction Blvd./94 <sup>th</sup> Street and 93 <sup>rd</sup> Street	21	23

### 3.6.5 Jackson Mill Road and 94<sup>th</sup> Street

Jackson Mill Road west of 94<sup>th</sup> Street is a 30-foot wide, one-way (westbound) roadway. It becomes a 40-foot wide, two-way (east-west) roadway east of 94<sup>th</sup> Street (94<sup>th</sup> Street south of 32<sup>nd</sup> Avenue becomes Junction Boulevard). Parking is allowed on both sides of the street. There are school crosswalks on the east and west legs of the intersection. This is a stop-controlled intersection (westbound traffic on Jackson Mill Road is stop-controlled).

There were five accidents at this intersection during the 1998-2000 study period. None of the accidents involved pedestrians.



*Figure 7: School crosswalk across west leg of the 94<sup>th</sup> Street- Jackson Mill Road intersection*

### 3.6.6 Junction Boulevard/94<sup>th</sup> Street and 32<sup>nd</sup> Avenue

This is a signalized intersection. I.S. 227 students use this intersection in large numbers during both the morning arrival and afternoon dismissal times. An MTA bus stop is located at the southwest corner of the intersection. There are school crosswalks on the east, west and south legs of the intersection.

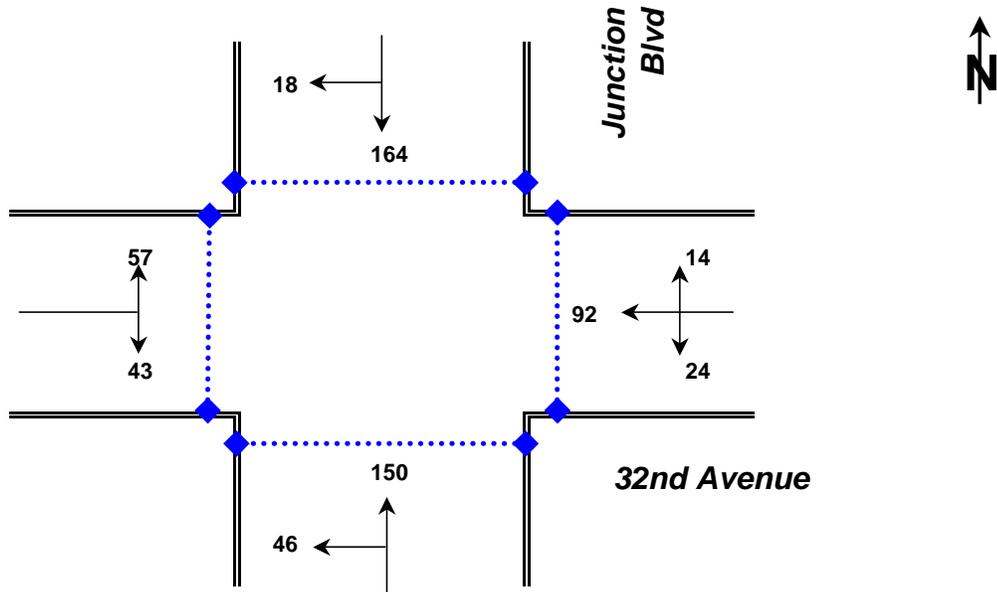
Nine accidents occurred at this location during the 1998-2000 study period. One accident involved a pedestrian. According to the accident data, this pedestrian was struck by a northbound vehicle, while emerging from a parked vehicle.



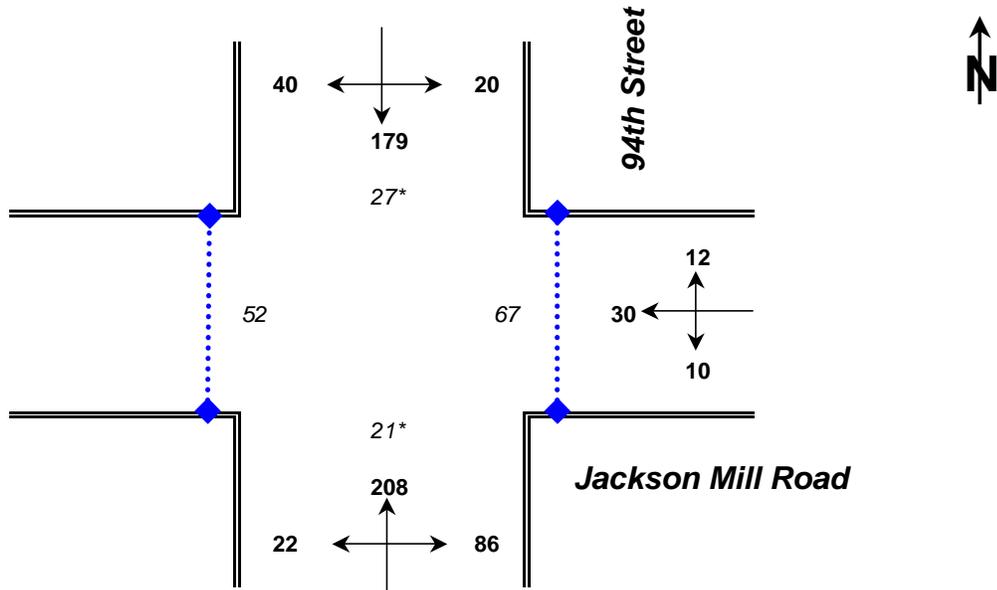
*Figure 8: Junction Boulevard/94<sup>th</sup> Street at 32<sup>nd</sup> Avenue (on 32<sup>nd</sup> Ave looking west)*

Also, two accidents occurred on 32<sup>nd</sup> Avenue between 93<sup>rd</sup> Street and Junction Boulevard in the 1998-2000 study period. One accident involved a school age pedestrian who was a ten-year-old student.

**One Hour Traffic Count Volumes**

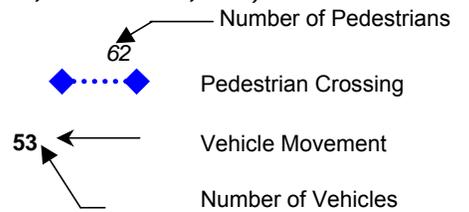


*Intersection of 32nd Avenue and 94th Street - (2:30 PM - 3:30 PM, November 10, 2005)*



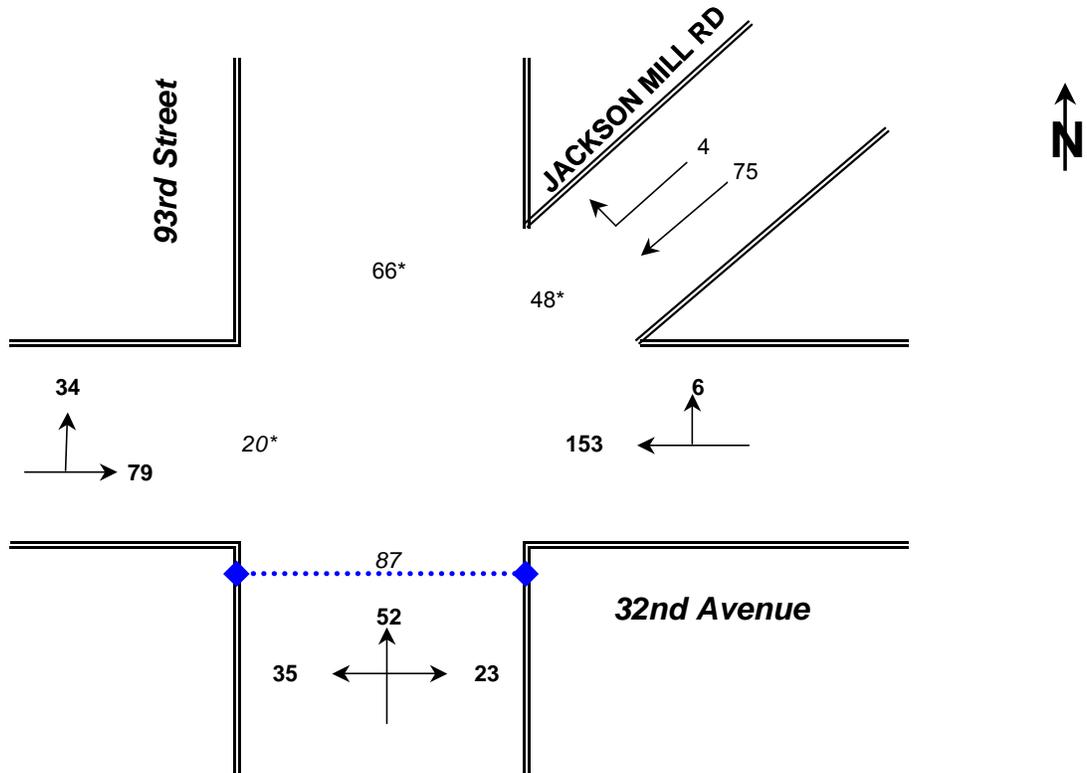
*Intersection of Jackson Mill Road and 94th Street - (2:30 PM - 3:30 PM, November 10, 2005)*

\* - No pedestrian crosswalk



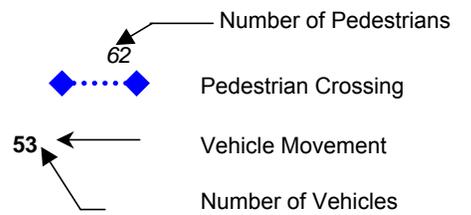
<b>EXHIBIT 7A</b>
<b>I.S. 227, QUEENS LOUIS ARMSTRONG SCHOOL</b>
<b>TRAFFIC COUNTS</b>

**One Hour Traffic Count Volumes**



*Intersection of 32nd Avenue and 93rd Street - (2:30 PM - 3:30 PM, November 10, 2005)*

| \* - No pedestrian crosswalk



<b>EXHIBIT 7B</b>
<b>I.S. 227, QUEENS LOUIS ARMSTRONG SCHOOL</b>
<b>TRAFFIC COUNTS</b>

### 3.7 SIGNAL TIMING: PEDESTRIAN PHASE

Pedestrian crossing time was field-verified at all signalized intersections in the vicinity of I.S. 227, and found to be adequate for a child pedestrian walking rate of three feet per second in all directions and approaches.

<b>TABLE 5: PEDESTRIAN CROSSING TIME AT SIGNALIZED INTERSECTIONS</b>				
Intersection Name	Crosswalk Width (Feet)	Ped. Phase Actual (Seconds)	Ped. Phase Req'd (Seconds)	Timing Adjustment? (Yes/No)
<b>Junction Boulevard at 32<sup>nd</sup> Avenue</b>				
crossing Junction Boulevard	35	20	15	NO
crossing 32 <sup>nd</sup> Avenue	28	30	13	NO
<b>Northern Blvd at Junction Blvd</b>				
crossing Northern Boulevard	80	71	30	NO
crossing Junction Boulevard	50	25	20	NO
<b>Northern Blvd at 93<sup>rd</sup> Street</b>				
crossing Northern Boulevard	80	55	30	NO
crossing 93 <sup>rd</sup> Street	30	39	20	NO

*Note – A rate of 3 ft/sec plus 3 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.

#### 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

- Install graphic “Yield to Pedestrian” sign

A “YIELD TO PEDESTRIAN” sign should be installed at the following approaches:

- West approach of Northern Boulevard at 94th Street
- South approach of 94<sup>th</sup> Street at Jackson Mill Road

- No Standing Zone on Junction Boulevard, Northern Boulevard, 32<sup>nd</sup> Avenue and 93<sup>rd</sup> Street

The existing “NO PARKING 7 AM – 4 PM, SCHOOL DAYS” parking regulation on the south side of 32<sup>nd</sup> Avenue should be upgraded to “NO STANDING 7 AM – 4 PM, SCHOOL DAYS” to provide sufficient clear frontage for school buses to drop off and pick up students.

The existing parking regulation “NO PARKING 7 AM - 4 PM, SCHOOL DAYS, EXCEPT SCHOOL BUSES” on the west side of Junction Boulevard, between two bus stops, should be upgraded to “NO STANDING 7 AM – 4 PM, SCHOOL DAYS”. (If the bus stop is relocated, this parking regulation should be extended to 32<sup>nd</sup> Avenue.)

The existing parking regulation “NO STANDING 7 AM - 4 PM, SCHOOL DAYS, EXCEPT SCHOOL BUSES” on Northern Boulevard should be extended to corner of Junction Boulevard (if the bus stop is relocated to the northeast corner).

The existing parking regulation “NO PARKING 7 AM - 4 PM, SCHOOL DAYS, EXCEPT SCHOOL BUSES” on 93<sup>rd</sup> Street should be upgraded to “NO STANDING 7 AM – 4 PM, SCHOOL DAYS.” In addition, it is recommended that this regulation be extended for 160 feet to provide for additional curb space for bus loading (see Exhibit 8 for details).

- Install new school crosswalks at the 32nd Avenue intersection with Jackson Mill Road/93rd Street at the following locations:

- On 93rd Street – north leg
- On Jackson Mill Road – east leg (stop-controlled)
- On 32<sup>nd</sup> Avenue – east leg (only in conjunction with a crossing guard)

Crosswalks should be installed as shown in Exhibit 8.

- 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.

- *Relocate existing NYC Transit Bus Stops on Junction Boulevard and Northern Boulevard*

The existing westbound Q66 Bus Stop on the farside of Northern Boulevard, at the intersection with Junction Boulevard, should be relocated to the nearside northeast corner of Northern Boulevard and Junction Boulevard. The existing southbound Q72 far side bus stop at the intersection with Junction Boulevard (south of 32<sup>nd</sup> Avenue) should be relocated adjacent to the nearside, north of 32<sup>nd</sup> Avenue. The relocation of these bus stops will allow the NYC Transit buses to proceed uninterrupted during arrival and dismissal periods of I.S. 227. Currently, yellow school buses utilize the public bus stop on Northern Boulevard as a parking area during arrival and dismissal times (see Figure 12) and the public bus stop on Junction Boulevard as a parking area during dismissal (see Figure 13). The “No Standing School Days” parking regulations would be extended on the block to include the existing public bus stop.



*Figure 12: Yellow school buses parked at Q66 bus stop (looking westbound on Northern Boulevard)*

- *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.



Figure 13: Yellow school buses parked at Q72 bus stop on Junction Boulevard

- Install/Replace pedestrian ramps

Pedestrian ramps per NYCDOT standards should be installed at 94<sup>th</sup> Street and Jackson Mill Road – northwest corner.

- Submit a request to the Police Department for a crossing guard

It is recommended that a request be submitted to the Police Department for crossing guards at the intersection of 32<sup>nd</sup> Avenue and 93<sup>rd</sup> Street/Jackson Mill Road.

- Install a speed reducer on 93<sup>rd</sup> Street

A spot speed survey was conducted on 93<sup>rd</sup> Street between Northern Boulevard and 32<sup>nd</sup> Avenue on November 15, 2005 between 10:30 pm and 11:30 am. The objective of the survey was to determine if there is a speeding problem on this section of 93<sup>rd</sup> Street, as was reported by several school officials.

The speed study results are shown Table 6 and in the Appendix. The 85<sup>th</sup> percentile speed is 31 mph, which exceeds the legal speed limit of 30 mph. Therefore, to reduce speeding in the vicinity of I.S. 227, a speed reducer (hump) should be installed on 93<sup>rd</sup> Street.

<b>TABLE 6: SPOT SPEED STUDY</b>		
<b>LOCATION</b>	<b>MEDIAN SPEED (MPH)</b>	<b>85TH PERCENTILE SPEED (MPH)</b>
93 <sup>rd</sup> Street btw. Northern Boulevard and 32 <sup>nd</sup> Avenue	26	31

## 4.2 LONG-TERM MEASURES

- Install 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.

- 32<sup>nd</sup> Avenue and Junction Boulevard
- Jackson Mill Road and 94<sup>th</sup> Street

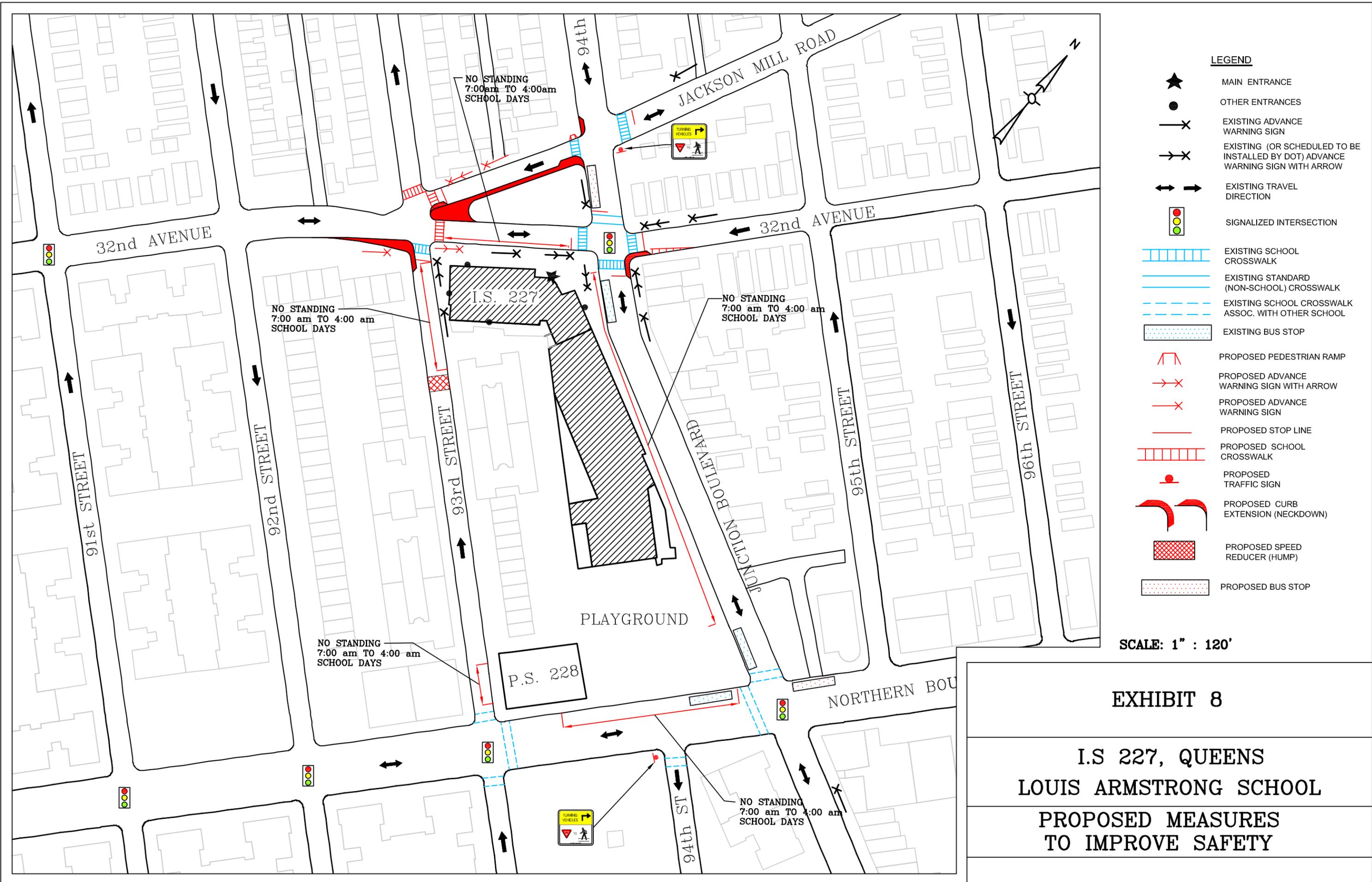
Curb extensions should be considered at the corners as shown in Exhibit 8.

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.

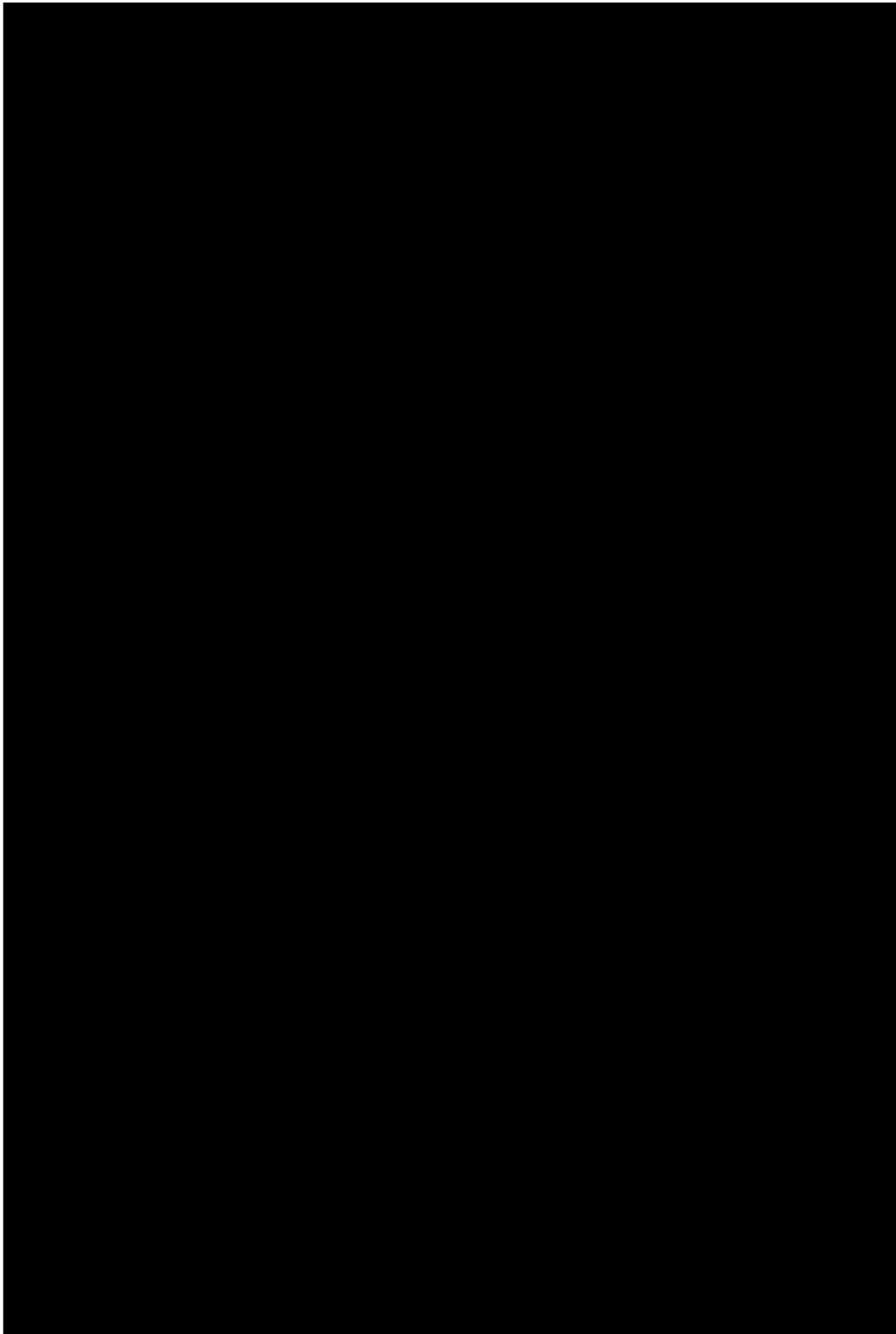
- Realign geometry of 93<sup>rd</sup> Street/32<sup>nd</sup> Avenue and Jackson Mill Road intersection and Jackson Mill Road between 93<sup>rd</sup> Street and 94<sup>th</sup> Street

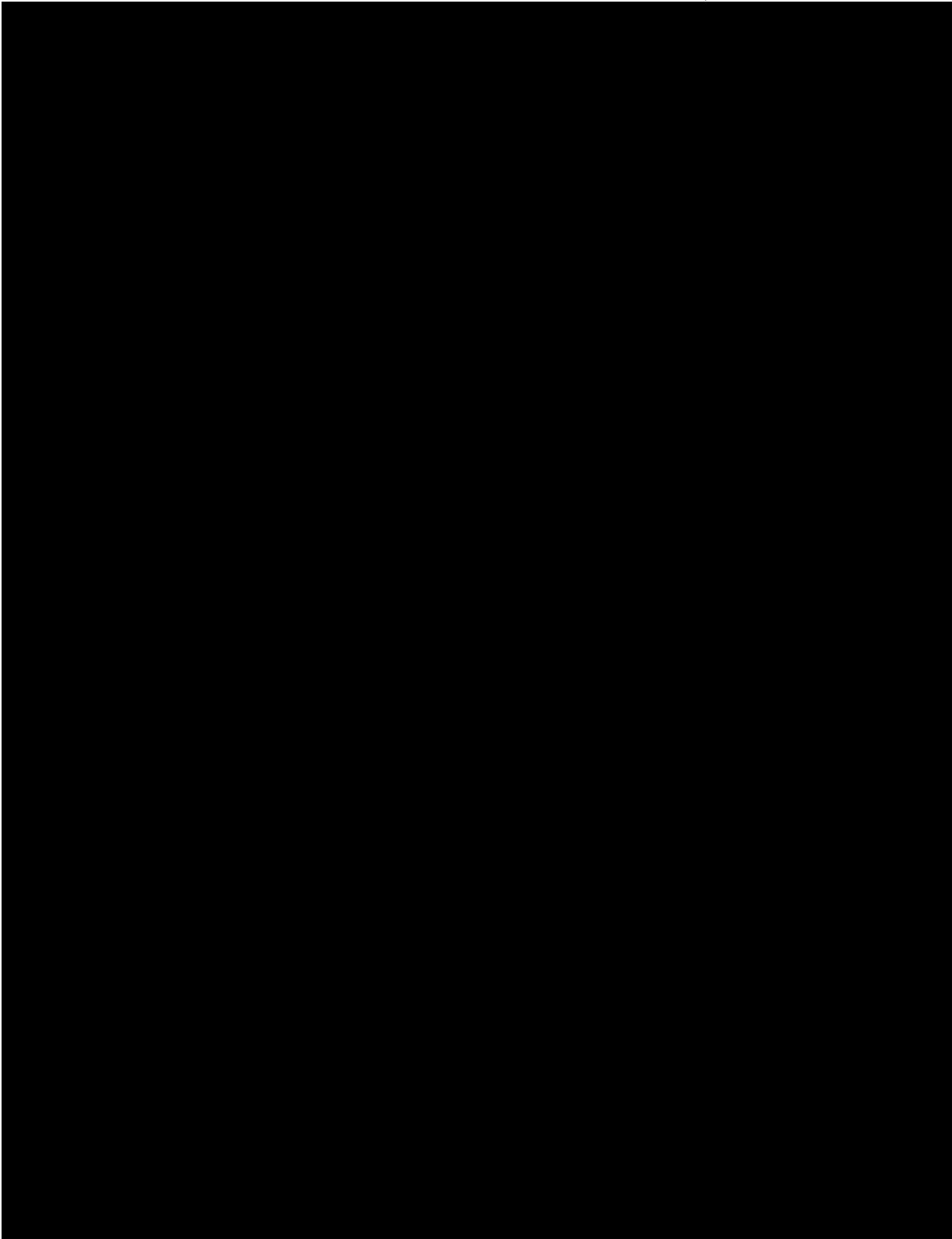
As described in Section 3.7.4, this intersection is a five-leg un-signalized intersection. Although there are no crosswalks across 32<sup>nd</sup> Avenue, school officials identified this intersection as a school crossing. To mitigate crossing conditions for pedestrians at this intersection the following geometric improvements are proposed:

- The existing island should be extended westward for approximately 55 feet and north for six feet.
- To shorten the crossing distance for pedestrians and improve intersection alignment, curb extensions are proposed on the southwest corner of the intersection and island as shown in Exhibit 8.
- Narrow Jackson Mill Road between 93<sup>rd</sup> Street and 94<sup>th</sup> Street by approximately six feet by extending the south curb in the north direction (as shown in Exhibit 8).



# APPENDIX





**I.S. 227**  
 NOVEMBER 15, 2005  
 2:30 PM - 3:30 PM

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

Site:  
 Date: 11/10/05

Combined  
*\*Peds not included in table data*

Begin Time	Total	94th Street			Jackson Mill Road			94th Street			Jackson Mill Road		
		S-R	S-T	S-L	W-R	W-T	W-L	N-R	N-T	N-L			
15:32:00	99	8	35	2	3	8	0	15	27	1	0	0	0
15:45:00	151	13	46	3	1	6	5	15	54	8	0	0	0
16:00:00	158	8	41	4	2	5	1	29	66	2	0	0	0
16:15:00	199	11	57	11	6	11	4	27	61	11	0	0	0
<b>607</b>		40	179	20	12	30	10	86	208	22	0	0	0

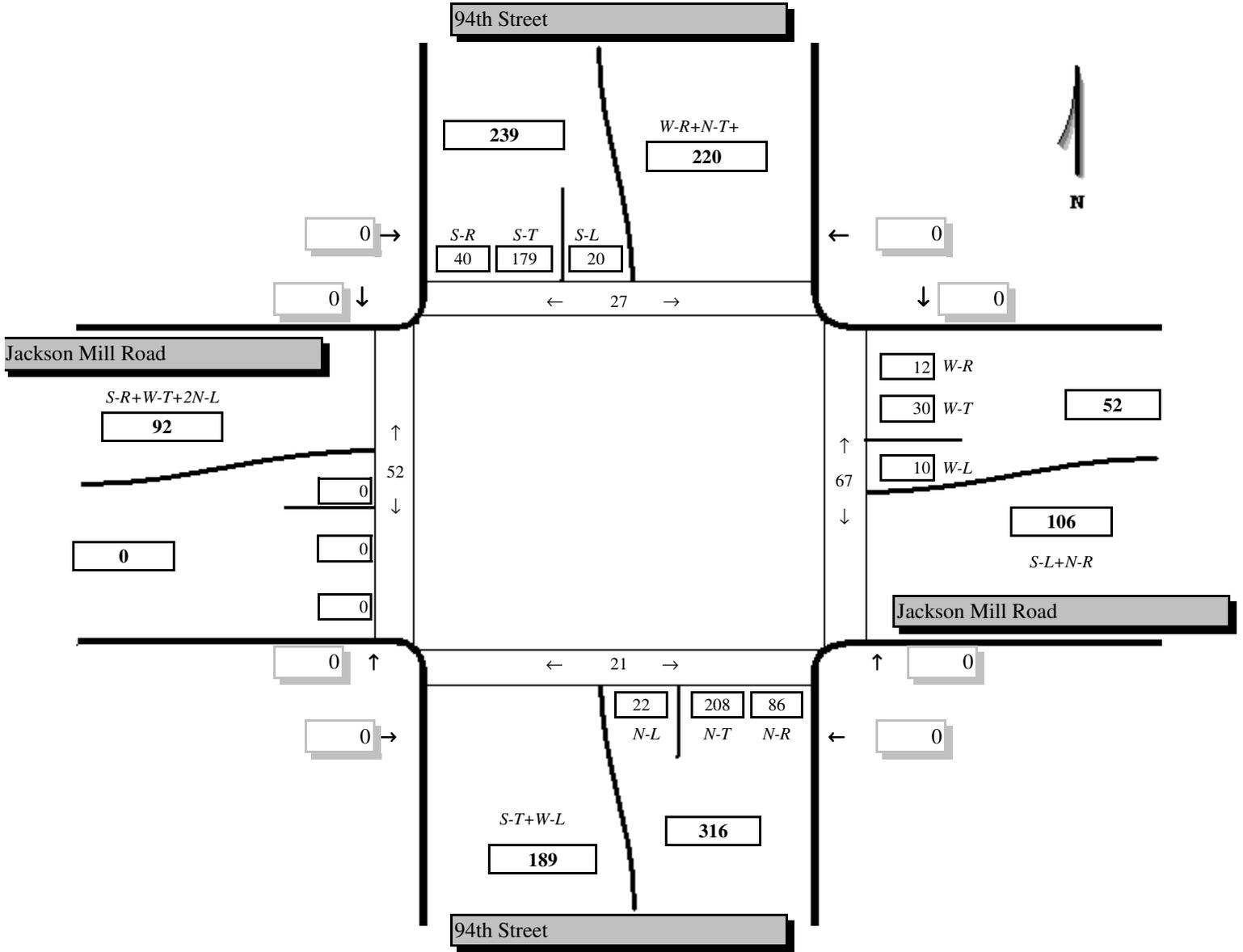
Peak Volume Periods (1 hour Res:15 min.)					
Period			Peak Period		Volume
<b>AM</b>	05:00:00	To 10:00:00	NA	To NA	0
<b>Noon</b>	10:00:00	To 15:00:00	NA	To NA	0
<b>PM</b>	15:00:00	To 20:00:00	15:30:00	To 16:30:00	607

**I.S. 227**  
 NOVEMBER 15, 2005  
 2:30 PM - 3:30 PM

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

Site:  
 Date: 11/10/05

Combined  
 \*Peds not included in table data

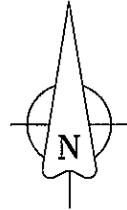


# SCHOOL SAFETY ENGINEERING

INTERSECTION: JUNCTION BLVD - 32<sup>ND</sup> AVE

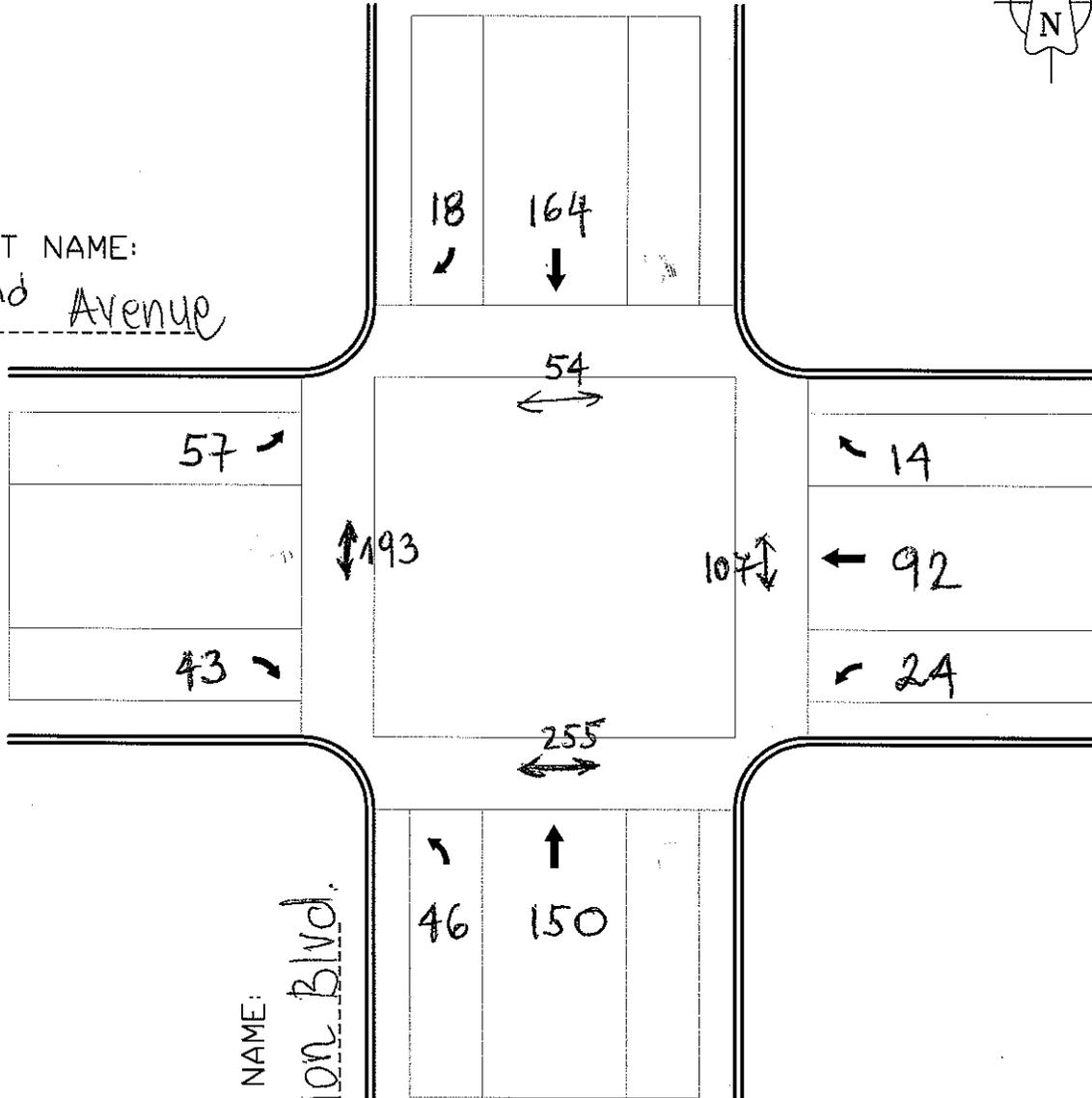
TIME : 230 PM - 330 PM

DATE : 11-15-05



STREET NAME:

32<sup>nd</sup> Avenue



STREET NAME:

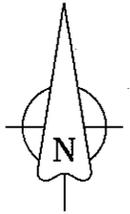
Junction Blvd.

# SCHOOL SAFETY ENGINEERING

INTERSECTION: 32<sup>ND</sup> AVE - 93<sup>RD</sup> ST / Jackson Mill Rd

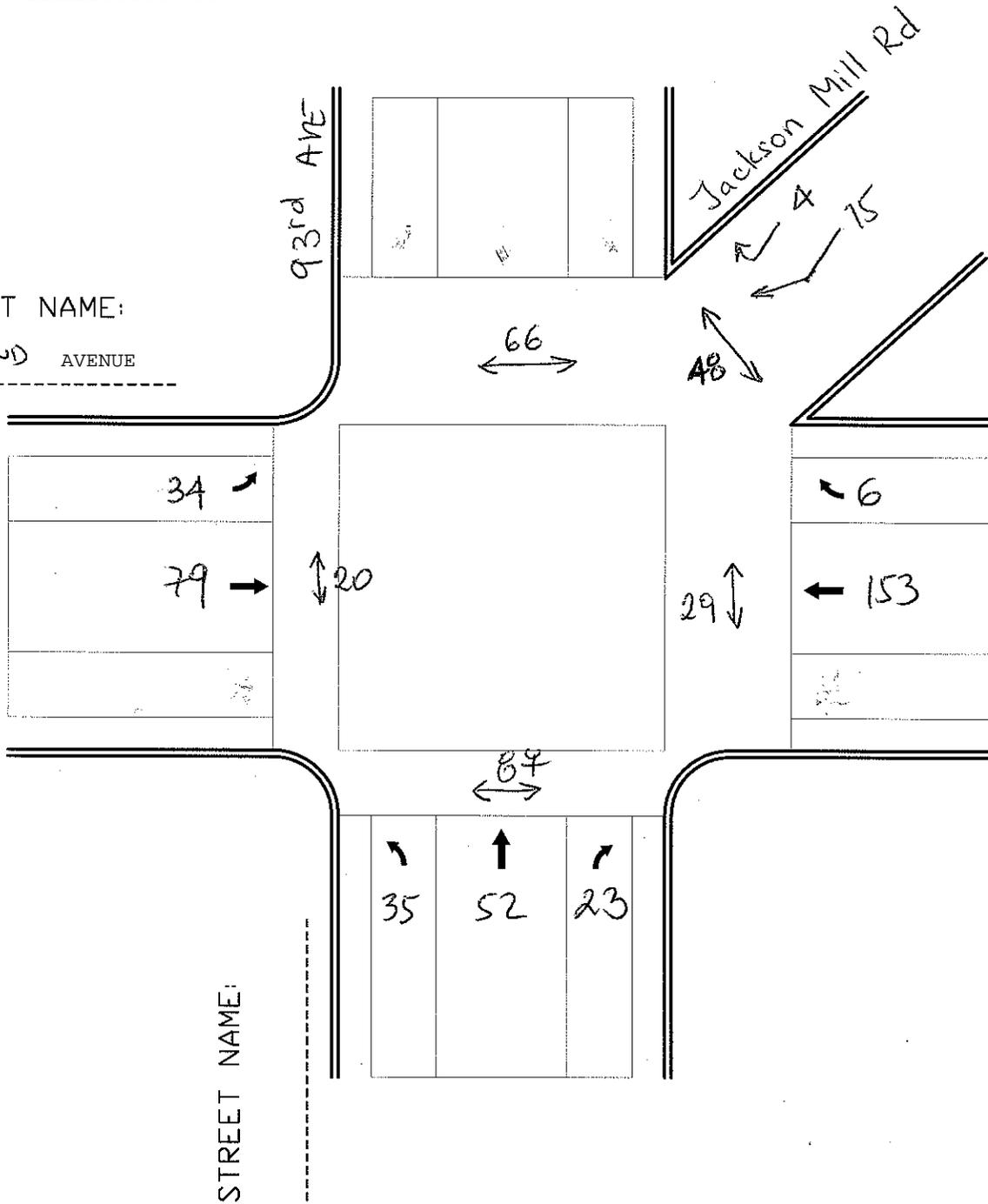
TIME : 23<sup>00</sup>PM - 33<sup>00</sup>PM

DATE : 11-16-05



STREET NAME:

32<sup>ND</sup> AVENUE



## SPOT SPEED STUDY

Date: **November 15, 2005**      Time: **11:30 am - 12:30 pm**  
 Location: **32nd Avenue between 93rd Street and Junction Boulevard**  
 Surveyor: **Eyad Yousef**

School: **I.S. 227**  
 Direction: **EW**  
 Comments: **Sunny and Dry**

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	1	1.4%	1.4%	16	256
17	7	10.1%	11.6%	119	2023
18	3	4.3%	15.9%	54	972
19	3	4.3%	20.3%	57	1083
20	13	18.8%	39.1%	260	5200
21	9	13.0%	52.2%	189	3969
22	18	26.1%	78.3%	396	8712
23	11	15.9%	94.2%	253	5819
24	3	4.3%	98.6%	72	1728
25	0	0.0%	98.6%	0	0
26	1	1.4%	100.0%	26	676
27	0	0.0%	100.0%	0	0
28	0	0.0%	100.0%	0	0
29	0	0.0%	100.0%	0	0
30	0	0.0%	100.0%	0	0
31	0	0.0%	100.0%	0	0
32	0	0.0%	100.0%	0	0
33	0	0.0%	100.0%	0	0
34	0	0.0%	100.0%	0	0
35	0	0.0%	100.0%	0	0
36	0	0.0%	100.0%	0	0
37	0	0.0%	100.0%	0	0
38	0	0.0%	100.0%	0	0
39	0	0.0%	100.0%	0	0
40	0	0.0%	100.0%	0	0
41	0	0.0%	100.0%	0	0
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
	69	100.0%		1442	30438

Mean Speed = 20.9 mph      Median Speed = 20.9 mph  
 Standard Deviation = 2.1 mph      15th Percentile Speed = 18.7 mph  
 Margin of Error (95% Confidence) = ± 0.5 mph      85th Percentile Speed = 23.1 mph

# SPOT SPEED STUDY

Date: **November 15, 2005**

Time: **11:30 am - 12:30 pm**

School: **I.S. 227**

Location: **32nd Avenue between 93rd Street and Junction Boulevard**

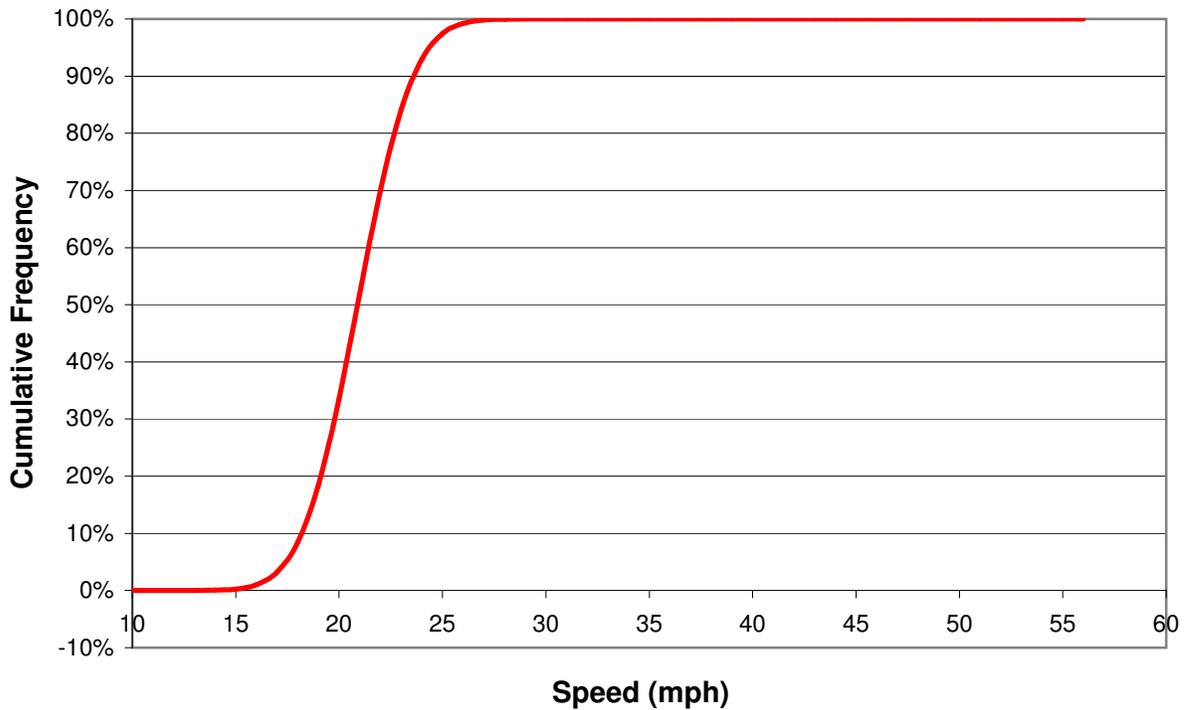
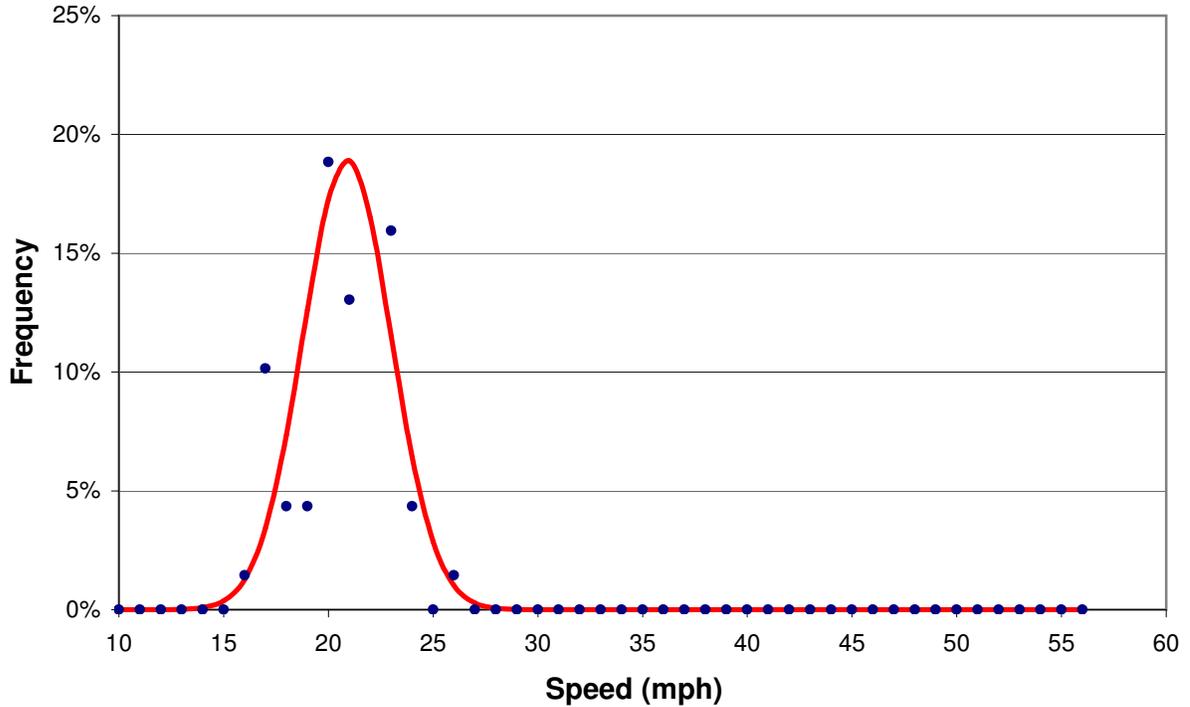
Direction: **EW**

Surveyor: **Eyad Yousef**

Comments: **Sunny and Dry**

Mean Speed = 20.9 mph  
Standard Deviation = 2.1 mph  
Margin of Error (95% Confidence) =  $\pm 0.5$  mph

Median Speed = 20.9 mph  
15th Percentile Speed = 18.7 mph  
85th Percentile Speed = 23.1 mph



# SPOT SPEED STUDY

Date: **November 15, 2005**      Time: **10:30 am - 11:30 am**  
 Location: **93rd Street between 32nd Avenue and Northern Boulevard**  
 Surveyor: **Eyad Yousef**

School: **I.S. 227**  
 Direction: **North**  
 Comments: **Sunny and Dry**

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	6	8.1%	8.1%	120	2400
21	2	2.7%	10.8%	42	882
22	7	9.5%	20.3%	154	3388
23	12	16.2%	36.5%	276	6348
24	3	4.1%	40.5%	72	1728
25	1	1.4%	41.9%	25	625
26	4	5.4%	47.3%	104	2704
27	7	9.5%	56.8%	189	5103
28	13	17.6%	74.3%	364	10192
29	0	0.0%	74.3%	0	0
30	2	2.7%	77.0%	60	1800
31	9	12.2%	89.2%	279	8649
32	1	1.4%	90.5%	32	1024
33	2	2.7%	93.2%	66	2178
34	1	1.4%	94.6%	34	1156
35	2	2.7%	97.3%	70	2450
36	2	2.7%	100.0%	72	2592
37	0	0.0%	100.0%	0	0
38	0	0.0%	100.0%	0	0
39	0	0.0%	100.0%	0	0
40	0	0.0%	100.0%	0	0
41	0	0.0%	100.0%	0	0
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
	74	100.0%		1959	53219

Mean Speed = 26.5 mph      Median Speed = 26.5 mph  
 Standard Deviation = 4.3 mph      15th Percentile Speed = 22.0 mph  
 Margin of Error (95% Confidence) = ± 1.0 mph      85th Percentile Speed = 30.9 mph

# SPOT SPEED STUDY

Date: **November 15, 2005**

Time: **10:30 am - 11:30 am**

School: **I.S. 227**

Location: **93rd Street between 32nd Avenue and Northern Boulevard**

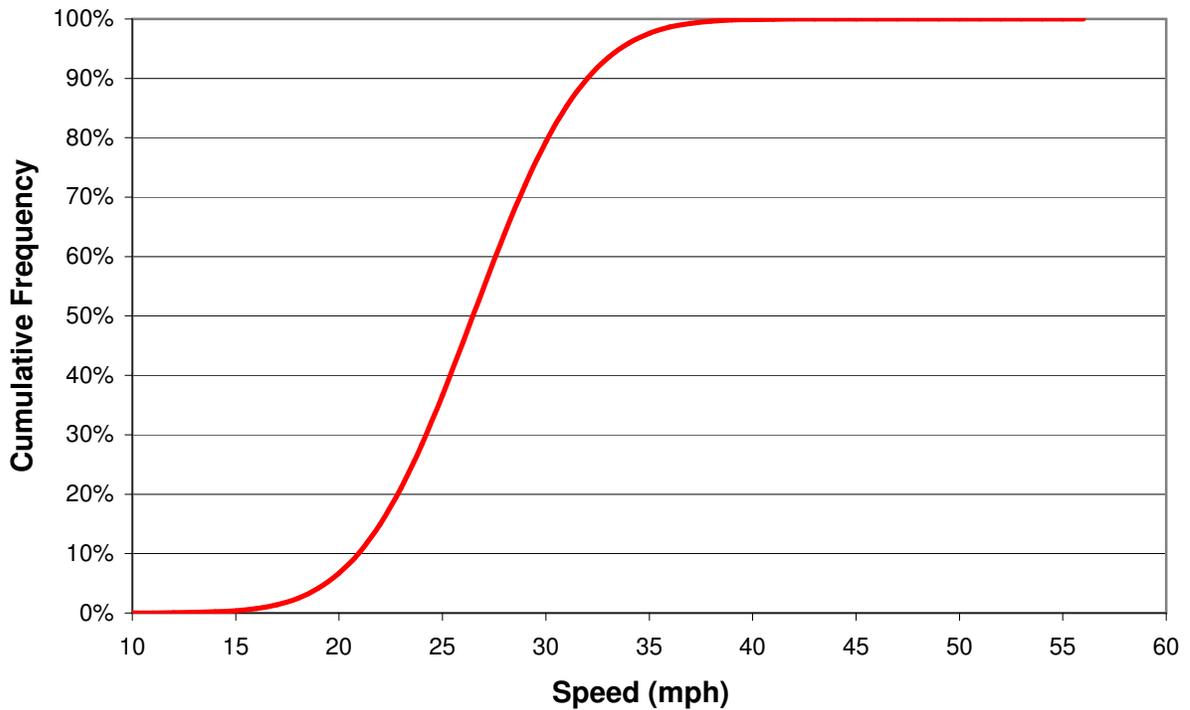
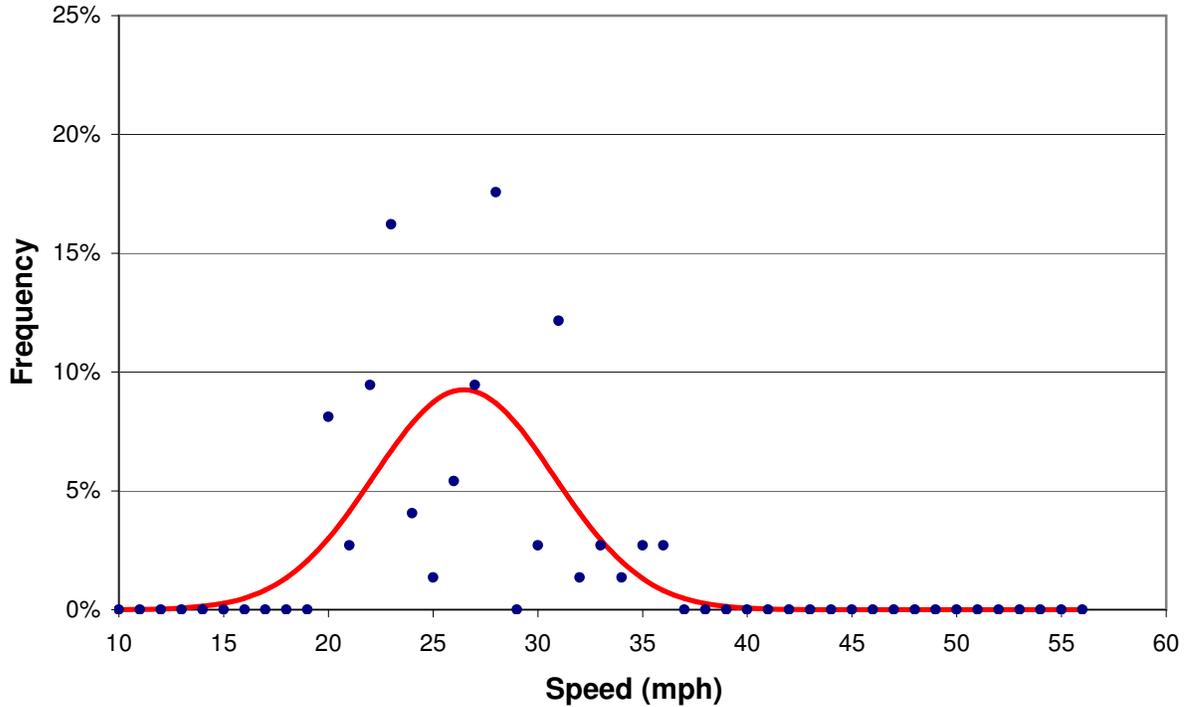
Direction: **North**

Surveyor: **Eyad Yousef**

Comments: **Sunny and Dry**

Mean Speed = 26.5 mph  
Standard Deviation = 4.3 mph  
Margin of Error (95% Confidence) =  $\pm 1.0$  mph

Median Speed = 26.5 mph  
15th Percentile Speed = 22.0 mph  
85th Percentile Speed = 30.9 mph



## SPOT SPEED STUDY

Date: **November 15, 2005**      Time: **12:00 pm - 1:30 pm**  
 Location: **Junction Boulevard between 32nd Avenue and Northern Boulevard**  
 Surveyor: **Eyad Yousef**

School: **I.S. 227**  
 Direction: **NS**  
 Comments: **Sunny and Dry**

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	4	4.4%	4.4%	64	1024
17	7	7.7%	12.1%	119	2023
18	3	3.3%	15.4%	54	972
19	7	7.7%	23.1%	133	2527
20	14	15.4%	38.5%	280	5600
21	18	19.8%	58.2%	378	7938
22	12	13.2%	71.4%	264	5808
23	22	24.2%	95.6%	506	11638
24	0	0.0%	95.6%	0	0
25	0	0.0%	95.6%	0	0
26	1	1.1%	96.7%	26	676
27	3	3.3%	100.0%	81	2187
28	0	0.0%	100.0%	0	0
29	0	0.0%	100.0%	0	0
30	0	0.0%	100.0%	0	0
31	0	0.0%	100.0%	0	0
32	0	0.0%	100.0%	0	0
33	0	0.0%	100.0%	0	0
34	0	0.0%	100.0%	0	0
35	0	0.0%	100.0%	0	0
36	0	0.0%	100.0%	0	0
37	0	0.0%	100.0%	0	0
38	0	0.0%	100.0%	0	0
39	0	0.0%	100.0%	0	0
40	0	0.0%	100.0%	0	0
41	0	0.0%	100.0%	0	0
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
	91	100.0%		1905	40393

Mean Speed = 20.9 mph      Median Speed = 20.9 mph  
 Standard Deviation = 2.4 mph      15th Percentile Speed = 18.5 mph  
 Margin of Error (95% Confidence) = ± 0.5 mph      85th Percentile Speed = 23.4 mph

# SPOT SPEED STUDY

Date: **November 15, 2005**  
Location: **Junction Boulevard between 32nd Avenue and Northern Boulevard**  
Surveyor: **Eyad Yousef**

Time: **12:00 pm - 1:30 pm**

School: **I.S. 227**  
Direction: **NS**  
Comments: **Sunny and Dry**

Mean Speed = 20.9 mph  
Standard Deviation = 2.4 mph  
Margin of Error (95% Confidence) =  $\pm 0.5$  mph

Median Speed = 20.9 mph  
15th Percentile Speed = 18.5 mph  
85th Percentile Speed = 23.4 mph

