

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



School Safety Engineering Project

FINAL REPORT: J.H.S. 166, The George Gershwin School, Brooklyn



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



AUGUST 24, 2006

School Safety Engineering Project
J.H.S. 166, George Gershwin School, Brooklyn

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1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Department of Transportation has developed school safety maps for 1,471 schools throughout the City. Schools currently in the program are primarily elementary and intermediate schools with an enrollment of at least 250 students. The safety plans include the designation of official school crosswalks, identified by prominent warning signs and roadway markings. DOT also designates curbside locations for school bus loading and unloading and other parking controls to improve conditions for students. In addition, nearly 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). J.H.S. 166 (George Gershwin School) in Brooklyn is one of the 135 priority schools.

2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS

2.2 NEIGHBORHOOD DESCRIPTION

J.H.S. 166 is located on Van Siclen Avenue, taking up the entire block from Stanley Avenue to Linden Boulevard (see Exhibit 1 for Aerial Photograph). The school's main entrance is on Van Siclen Avenue.

The surrounding land use is primarily residential with mixed-use commercial on Linden Boulevard, Van Siclen Avenue, Stanley Avenue, and Vermont Street (Figure 1). A large urban park with athletic fields is located on the south side of Linden Boulevard to the west of J.H.S. 166. The B83 bus route operates on Van Siclen Avenue. In addition, there is a subway station located on Van Siclen Avenue at Livonia Avenue, four blocks away from J.H.S. 166.

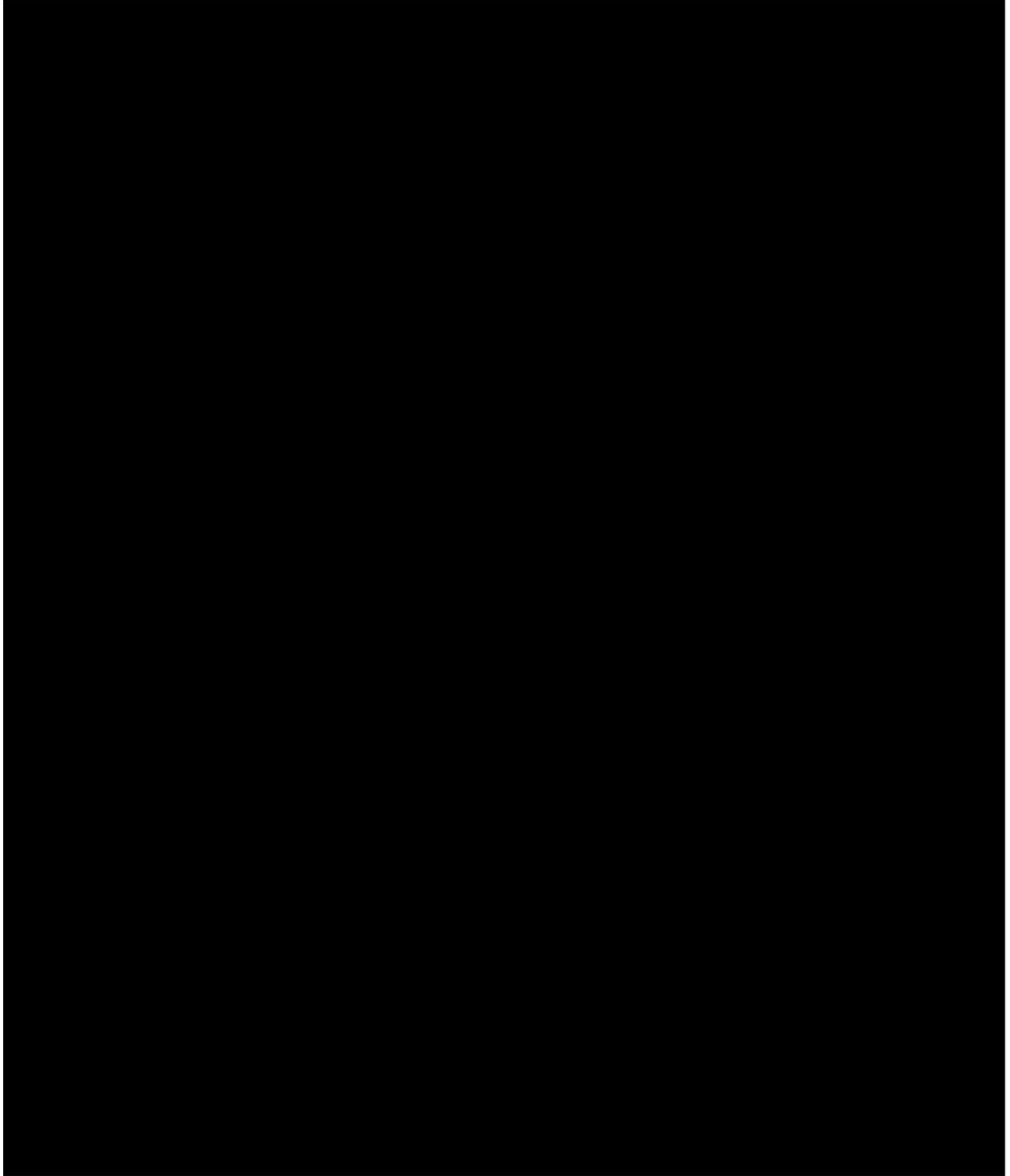


Figure 1: Looking south on Van Siclen, J.H.S. 166 is on right

2.3 MEETING WITH SCHOOL REPRESENTATIVES

The consultant team and representatives from J.H.S. 166 met at the school on the morning of May 26, 2004. (See the Appendix for a list of attendees). According to representatives of the school, the identifiable pedestrian concerns that are encountered on a regular basis include the following:

- Students crossing mid-block on Van Siclen Avenue
- Pedestrian safety at the long crossing at the intersection of Linden Boulevard and Van Siclen Avenue.





1 inch equals 250 feet

EXHIBIT 1
J.H.S. 166, BROOKLYN
GEORGE GERSHWIN SCHOOL
AERIAL PHOTOGRAPH



1 inch equals 500 feet



CATCHMENT AREA

EXHIBIT 2
J.H.S. 166, BROOKLYN
GEORGE GERSHWIN SCHOOL

CATCHMENT AREA

2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL

According to school officials, a majority (approximately 77 %) of students walk to J.H.S. 166; 20% utilize the MTA bus or subway system, 2% are transported by school buses, and 1% are driven by parents or guardians. See Table 1 for the school’s estimate of the modes of travel.

TABLE 1: MODES OF TRAVEL	
(AS ESTIMATED BY SCHOOL OFFICIALS)	
DESCRIPTION	PERCENTAGE
Walk	77%
Driven by parents or guardians	1%
School bus	2%
MTA bus or subway	20%
TOTAL	100%

2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS

There are two other public schools in the vicinity of J.H.S. 166: P.S. 213 and P.S. 306. P.S. 213 (a priority school) is on Linden Boulevard between Vermont Street and New Jersey Avenue. P.S. 306 is on Vermont Street south of Wortman Avenue. In addition, three private schools are located in the area: East New York Family Academy is on Linden Boulevard opposite J.H.S. 166; Boulevard NRSY School and St. Paul’s Community Christian School are along Schenck Avenue between Linden Boulevard and Stanley Avenue.

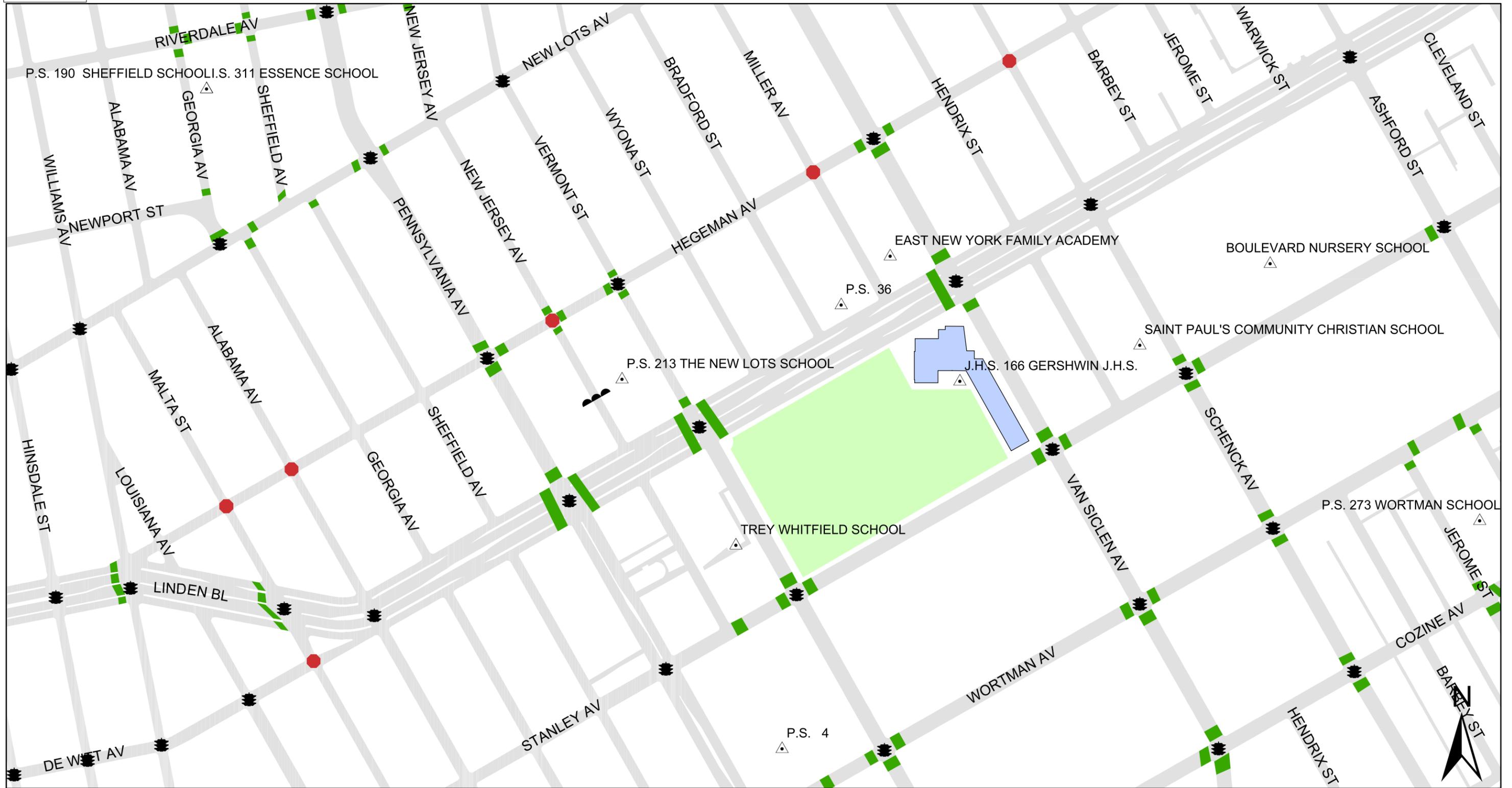
Numerous retail stores are located along Van Siclen Avenue. There are bus stops for the B83 route along Van Siclen Avenue and the B20 route along Wortman Avenue. There is also a subway stop for the Number 3 line on Van Siclen Avenue at Livonia Avenue.

2.8 CROSSING GUARD LOCATIONS

There are no crossing guards assigned to J.H.S. 166. However, a crossing guard assigned to P.S. 306 is stationed at the intersection of Linden Boulevard and Vermont Avenue.



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 

**JHS 166 Brooklyn
 GERSHWIN J.H.S.**

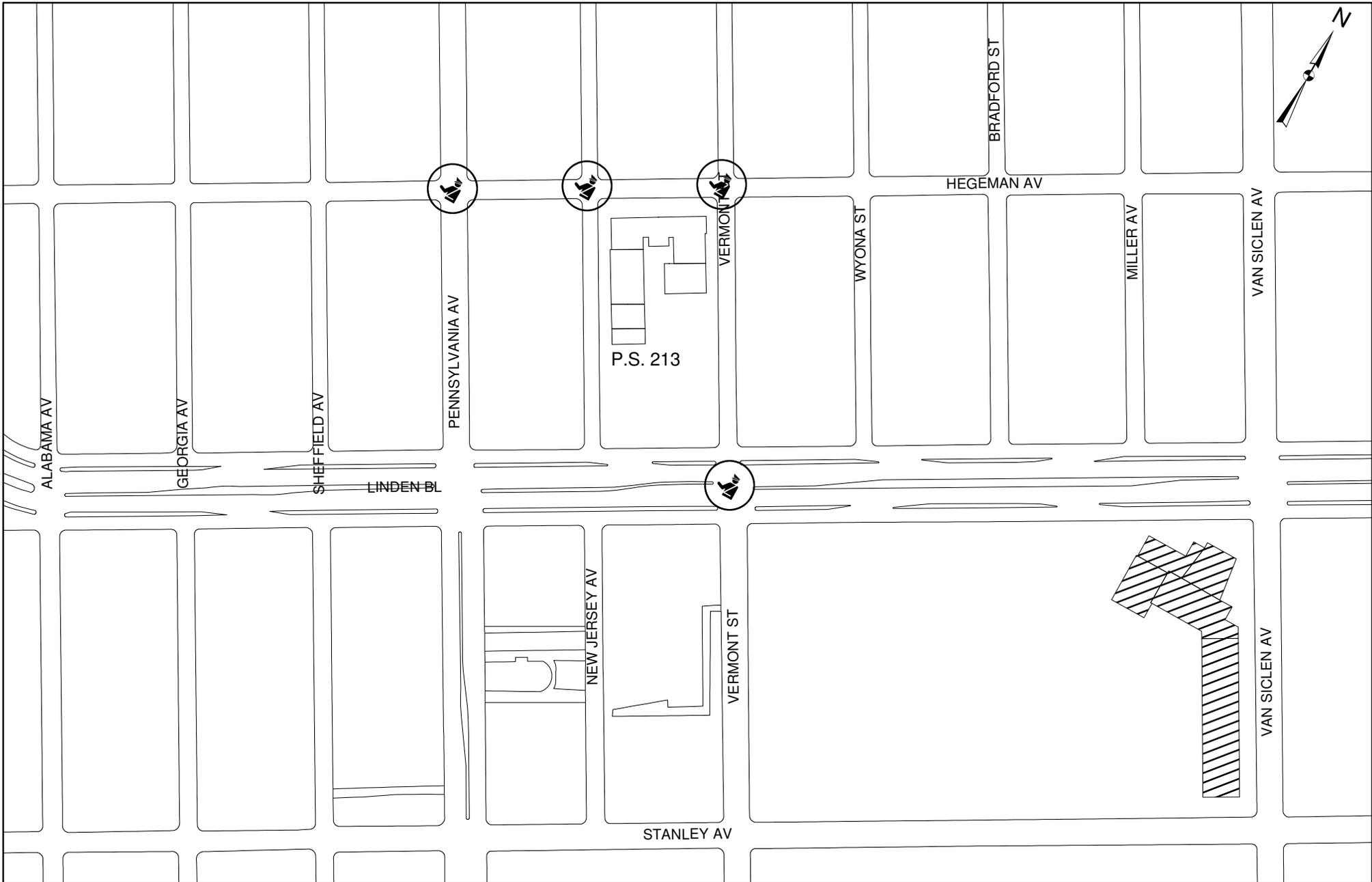
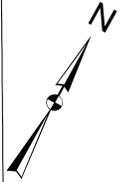
Prepared by the NEW YORK CITY DEPARTMENT OF TRANSPORTATION, Iris Weinsall, COMMISSIONER.

Map created on 11/16/2006

EXHIBIT 3

COMM. BOARD: 305
 PRECINCT: 75

1.5.1



1 inch equals 250 feet



CROSSING GUARDS ASSIGNED TO OTHER SCHOOLS

EXHIBIT 4
J.H.S. 166, BROOKLYN
GEORGE GERSHWIN SCHOOL

CROSSING GUARD

3. TRAFFIC OPERATIONS

3.1 SCHOOL BUS OPERATIONS

According to school representatives, four school buses transport J.H.S. 166 students. Three school buses serve special education students. One school bus drops off and picks up the students on Linden Boulevard in front of the school side door, and three other buses drop off and pick up the students on Van Siclen Avenue at the school's main entrance (Figure 3). School buses park or double-park, depending on traffic conditions, while dropping off or picking up students.



Figure 3: School bus turning onto Linden Boulevard

3.2 PARENT DROP-OFF OPERATIONS

According to school officials, only one percent of J.H.S. 166 students are driven to and from school by parents or guardians. During arrival and dismissal times, vehicles typically park or double-park on Van Siclen Avenue to pick up or drop off students (Figure 4).

3.3 PARKING REGULATIONS

Exhibit 5 shows the parking regulations on the roadways surrounding the school. “NO PARKING, 7:00AM – 4:00PM, SCHOOL DAYS EXCEPT BOARD OF EDUCATION” signs are posted on Van Siclen Avenue. Teacher parking is allowed along the west side of Van Siclen Avenue (Figure 5).

On Linden Boulevard, “NO PARKING, 7:00AM – 4:00PM, SCHOOL DAYS” signs are posted in front of the school.

Street cleaning regulations, which prohibit parking on alternate sides of the roadway, are in place near the school.



Figure 4: Student drop-off along Van Siclen Avenue

3.4 EXISTING SCHOOL SIGNS AND MARKINGS

The Traffic Safety Map, Exhibit 3, shows existing 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 accompanied by downward pointing arrows. Signs scheduled to be installed under this program are shown as “existing” on Exhibit 7.



Figure 5: Looking south on Van Siclen Avenue

VERMONT ST.

LINDEN BLVD.

NO PARKING
SCHOOL DAYS
7:00 am TO 4:00 pm
NO PARKING
11:00 am TO 12:30 pm
TUESDAY & FRIDAY

NO PARKING
SCHOOL DAYS
7:00 am TO 4:00 pm
NO PARKING
11:00 am TO 12:30 pm
TUESDAY & FRIDAY

NO PARKING
11:00 am TO 12:30 pm
TUESDAY & FRIDAY

NO PARKING
9:30 am TO 11:00 am
TUESDAY & FRIDAY

NO PARKING
SCHOOL DAYS
7:00 am TO 4:00 pm
EXCEPT BOARD
OF EDUCATION
NO PARKING
9:30 am TO 11:00 am
MONDAY & THURSDAY

NO PARKING
11:00 am TO 12:30 pm
TUESDAY & FRIDAY

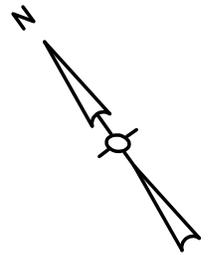
NO PARKING
SCHOOL DAYS
7:00 am TO 4:00 pm
EXCEPT BOARD
OF EDUCATION
NO PARKING
9:30 am TO 11:00 am
MONDAY & THURSDAY

NO PARKING
11:00 am TO 12:30 pm
TUESDAY & FRIDAY

NO PARKING
9:30 am TO 11:00 am
TUESDAY & FRIDAY

STANLEY AVENUE

VAN SICLEN AVENUE



LEGEND

- ★ MAIN ENTRANCE
- OTHER ENTRANCES

SCALE 1:150

EXHIBIT 5

**J.H.S. 166, BROOKLYN
GEORGE GERSHWIN SCHOOL**

EXISTING PARKING REGULATIONS

3.5 ACCIDENT SUMMARY

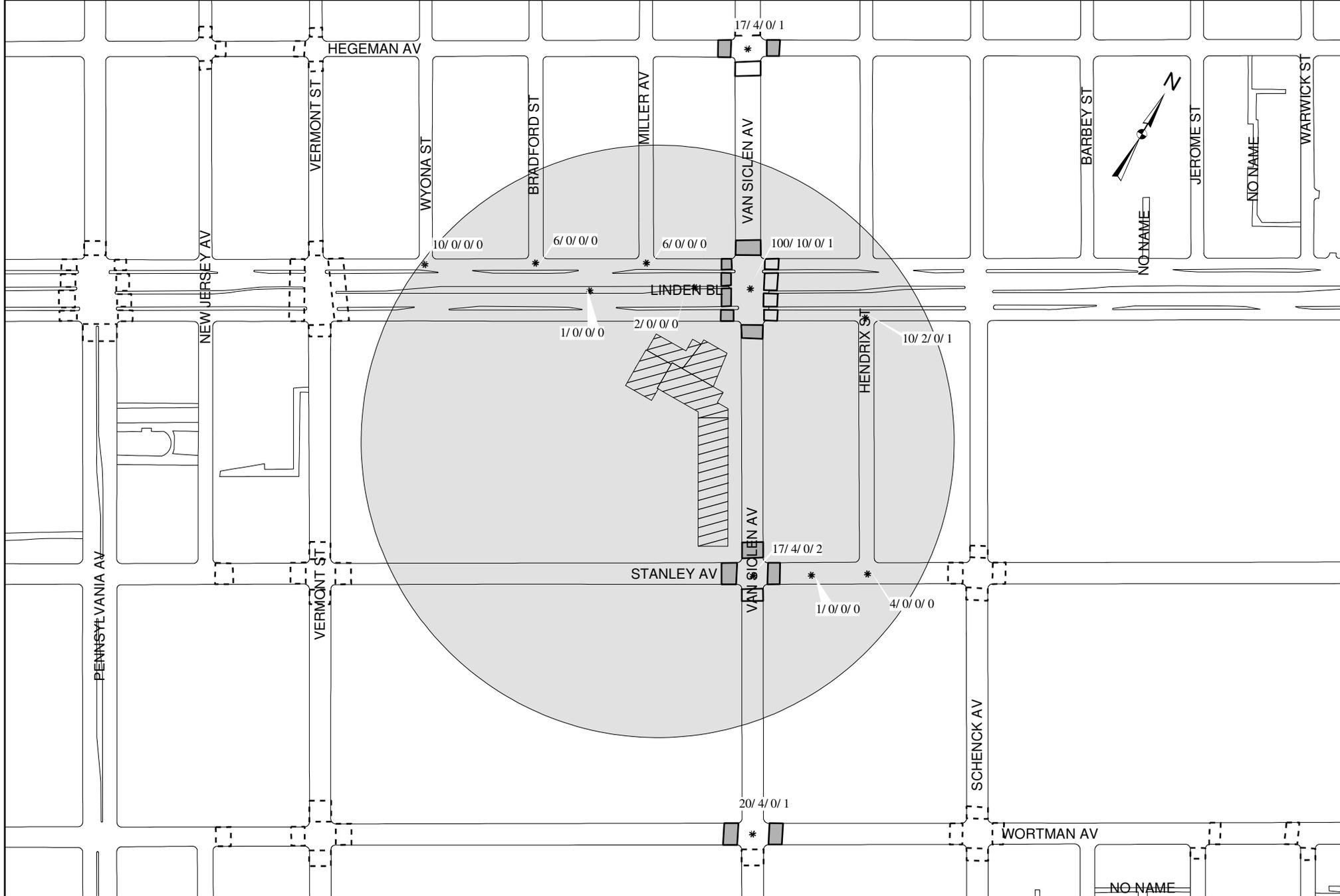
Exhibit 6 and Table 2 show a summary of accidents, as obtained from the New York State Department of Motor Vehicles (DMV), in the vicinity of J.H.S 166 for the three-year period from January 1, 1998 through December 31, 2000. The DMV data provides some detail relating to the circumstances and cause of the accidents. Table 2 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 DOT’s School Safety Engineering Program. DMV Accident data is discussed in Section 3.6, Traffic Operations and Issues.

TABLE 2: DMV THREE-YEAR ACCIDENT SUMMARY (1998-2000)				
INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED* ACCIDENTS
Linden Blvd. and Van Siclen Ave.	100	10	0	1
Stanley Ave. and Van Siclen Ave.	17	4	0	2
Hegeman Ave. and Van Siclen Ave.	17	4	0	1
Wortman Ave. and Van Siclen Ave.	20	4	0	1
Linden Blvd. South Service Road and Hendrix Street	10	2	0	1
TOTAL	164	24	0	6

TABLE 3: NYPD FOUR-YEAR ACCIDENT SUMMARY (2001-2004)				
INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED* ACCIDENTS
Linden Blvd. and Van Siclen Ave.	161	19	0	4
Stanley Ave. and Van Siclen Ave.	39	6	0	1
Hegeman Ave. and Van Siclen Ave.	18	2	0	0
Wortman Ave. and Van Siclen Ave.	37	4	0	1
Linden Blvd. South Service Road and Hendrix Street	18	0	0	0
TOTAL	273	31	0	6

* School-Related Accidents are defined as accidents involving school-age pedestrians (ages 4 to 14) occurring on weekdays during the school year



ACCIDENT LOCATION

SCHOOL CROSSWALK ASSIGNED TO J.H.S. 166

SCHOOL CROSSWALK ASSIGNED TO ANOTHER SCHOOL

CROSSWALK

X/X/X/X

TOTAL ACCIDENTS	PED ACCIDENTS	PED FATAL	SCHOOL PED ACCIDENTS
/	/	/	/

*



1 inch equals 300 feet

EXHIBIT 6

J.H.S. 166, BROOKLYN

GEORGE GERSHWIN SCHOOL

**ACCIDENT SUMMARY
THREE YEAR PERIOD
(1998-2000)**

3.6 TRAFFIC OPERATIONS AND ISSUES

The following describes traffic accidents and operational issues at intersections in the vicinity of J.H.S. 166.

3.6.1 Linden Boulevard and Van Siclen Avenue

Linden Boulevard is a 145-foot wide (including service roads) two-way arterial. The mainline is a two-way roadway with three through lanes and left turn bays in both directions. The roads are separated from the mainline by raised concrete medians. The eastbound and westbound service roads are 25-foot wide one-way roadways with one travel lane and parking on the right side. Van Siclen Avenue is a 50-foot wide two-way roadway with one travel lane in each direction south of Linden Boulevard, and a 60-foot wide with two travel lanes in each direction north of Linden Boulevard. Parking is allowed along both sides of the roadway. Several raised medians do not extend through the crosswalks (Figure 6). At-grade cut-throughs for the medians are positioned outside of the crosswalks (Figure 7). There are school crosswalks on the north, south and west legs of the intersection.



Figure 6 – Linden Boulevard at Van Siclen Avenue, looking south

Review of the existing signal timing shows that the pedestrian phase does not provide adequate time for pedestrians to cross Linden Boulevard in one cycle at a walking rate of three feet per second plus a three second reaction time. A school-age pedestrian needs two signal cycles to cross at three feet per second, stopping at the center raised medians (refuge islands) separating eastbound and westbound traffic to wait between cycles. However, both east and west center raised medians do not extend through the crosswalks.



Figure 7 – Linden Boulevard at Van Siclen Avenue. At-grade cut-through is outside of the marked crosswalk

A total of 100 accidents occurred at this intersection during the 1998-2000 study period. Ten accidents involved pedestrians, one of which was school-related. Six pedestrians were struck while crossing against the signal. One pedestrian was struck by a vehicle making a left turn, and another by a vehicle failing to yield the right-of-way. Details of the two remaining pedestrian accidents were not available.

3.6.2 Van Siclen Avenue and Stanley Avenue

Stanley Avenue is a 50-foot wide two-way roadway with one travel lane in each direction and parking on both sides. The intersection of Van Siclen Avenue and Stanley Avenue is controlled by a two-phase signal. All corners were recently reconstructed to include new pedestrian ramps and catch basins (Figure 8). There are school crosswalks on the east, west and north legs of the intersection.

A total of 17 accidents occurred at this location during the 1998 and 2000 study period. Four were pedestrian accidents, two of which were school-related. Two children (ages 10 and 12 years old) were crossing Stanley Avenue with the signal when struck by vehicles traveling at unsafe speeds. A nine-year-old child was struck while crossing outside of the crosswalk (this accident occurred during non-school hours). Another pedestrian was working on the roadway when struck by a vehicle pulling out of a parking spot.



Figure 8 – Looking north on Van Siclen Avenue at the intersection of Stanley Avenue and Van Siclen Avenue

3.6.3 Van Siclen Avenue and Hegeman Avenue

Hegeman Avenue is a 35-foot wide two-way roadway with one travel lane in each direction and parking on both sides. The intersection of Van Siclen Avenue and Hegeman Avenue is controlled by a two-phase signal. There are school crosswalks on the east and west legs. However, at the time of the field observation, there were no pedestrian signal displays on the east side of the intersection. All the pedestrian ramps are in good condition.

There were 17 accidents during the 1998-2000 study period at this location. Four accidents involved pedestrians, one of which one was school-related. Two pedestrians, including an eleven-year-old child, were crossing with the signal when struck by a vehicle; driver inattention was cited as the major factor in these accidents. The third pedestrian was involved in a left-turn accident. The details for the last pedestrian accident were not available.

3.6.4 Van Siclen Avenue and Wortman Avenue

Wortman Avenue is a 50-foot wide two-way roadway with one travel lane in each direction and parking on both sides. Right-angle (90 degree) back-in parking is provided along the south side of Wortman Avenue (Figure 9) and along the east side of Van Siclen Avenue south of the intersection with Wortman Avenue. The intersection of Van Siclen Avenue and Wortman Avenue is controlled by a two-phase signal. There are school crosswalks on the east, west, and south legs of the intersection.

There are bus shelters for the B83 route on Van Siclen Avenue, and bus shelters for the B20 route on Wortman Avenue at this intersection. All pedestrian ramps are in fair condition.



Figure 9 – Looking east on Wortman Avenue, at the intersection of Van Siclen Avenue and Wortman Avenue, right-angle parking along the south curb



Figure 10 – Looking north on Van Siclen Avenue, at the intersection of Van Siclen Avenue and Wortman Avenue

There were 20 accidents at this intersection during the 1998-2000 study period. Four accidents involved pedestrians, one of which was school-related. All four pedestrian accidents occurred as a result of pedestrians crossing outside the crosswalk. An eleven-year-old pedestrian was struck by a vehicle that was pulling out of a parking spot. Two pedestrians were struck by through moving vehicles. The fourth pedestrian was struck by a vehicle making a right turn.

3.6.5 Linden Boulevard South Service Road and Hendrix Street

This is an unsignalized and uncontrolled intersection. Hendrix Street is 35-foot wide one-way (southbound) roadway with one travel lane and parking on both sides. There are no crosswalks at this intersection.

There were 10 accidents at this location during the 1998-2000 study period. Two accidents involved pedestrians, one of which was school-related. According to the accident data, one pedestrian was struck while playing in the street by a vehicle traveling eastbound. The second accident occurred when a pedestrian was exiting a parked vehicle.

3.7 SIGNAL TIMING: PEDESTRIAN PHASE

Pedestrian crossing time was field-verified at all signalized intersections in the vicinity of J.H.S. 166, and found to be adequate for a child pedestrian walking rate of three feet per second in all directions and approaches.

TABLE 4: PEDESTRIAN CROSSING TIME AT SIGNALIZED INTERSECTIONS				
Intersection Name	Crosswalk Width (Feet)	Ped. Phase Actual (Seconds)	Ped. Phase Req'd (Seconds)	Timing Adjustment? (Yes/No)
Van Siclen Ave. and Linden Blvd.				
Crossing Linden Blvd.	75/75 ¹	40/40 ²	28/28	NO
Crossing Van Siclen Avenue	60	80	23	NO
Van Siclen Ave. and Stanley Ave.				
Crossing Stanley Avenue	50	45	20	NO
Crossing Van Siclen Avenue	50	45	20	NO
Van Siclen Ave. and Hegeman Ave.				
Crossing Hegeman Avenue	40	39	17	NO
Crossing Van Siclen Avenue	60	21	23	YES
Van Siclen Ave. and Wortman Ave.				
Crossing Wortman Avenue	50	35	20	NO
Crossing Van Siclen Avenue	50	25	20	NO

Notes:

* A rate of 3 feet per second plus 3 seconds reaction time was utilized as the child pedestrian walking rate

1. Eastbound and westbound Linden Boulevard are both 75 feet wide from the curb line to the raised center median.

2. A pedestrian needs two signal cycles to cross Linden Boulevard at a rate of three feet per second while stopping at the center raised medians separating eastbound and westbound traffic. The actual pedestrian phase in one signal cycle is 35 seconds to cross Linden Boulevard at Van Siclen Avenue.

3.8 PHYSICAL CONDITIONS (ROADWAY AND SIDEWALK)

The roadways in the vicinity of J.H.S. 166 were generally observed to be in good condition at the time of field observations.

4. PROPOSED MEASURES TO IMPROVE SCHOOL 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 proposed capital improvements. See Section 4.3 for additional recommendations developed in conjunction with the study of nearby priority schools.

4.1 SHORT-TERM MEASURES

- *Install No Standing Zone on Linden Boulevard*

“NO PARKING, 7:00AM - 4:00 PM, SCHOOL DAYS” parking regulations on Linden Boulevard should be upgraded to “NO STANDING, 7:00AM - 4:00 PM, SCHOOL DAYS” along the south side of the roadway. This will allow school buses a place to load and unload students at the curb, and improve visibility of students arriving and leaving the school.

- *Install No Standing Zone on Van Siclen Avenue*

“NO STANDING 7:00AM - 4:00 PM, SCHOOL DAYS” parking regulations should be provided on Van Siclen Avenue for a length of 60 feet in front of the school’s main entrance. This will allow school buses a place to load and unload students at the curb, and improve visibility of students arriving and leaving the school.

To preserve existing teacher parking capacity, an additional “NO PARKING 7:00AM - 4:00 PM SCHOOL DAYS, EXCEPT DEPARTMENT OF EDUCATION” parking regulation should be installed along the north side of Stanley Avenue, for a length of 60 feet west of Van Siclen Avenue (see Exhibit 7).

- *Install pedestrian information sign that explains the signal phases*

The safety of pedestrians at the wide intersections of Linden Boulevard and Van Siclen Avenue is the major concern of the school. Installation of a pedestrian information sign adjacent to each school crosswalk to explain the signal phases is recommended. The pedestrian should also be informed to wait at the refuge areas between signal cycles.

- *Submit Request to the Police Department for a Crossing Guard*

It is recommended that a crossing guard be requested at the intersection of Linden Boulevard and Van Siclen Avenue. The crossing guard will help the students to cross this wide intersection and guide them to wait at the refuge area. The crossing guard will also help inform the students not to cross mid-block or to linger on Linden Boulevard.

- Install enlarged signal lens

Install enlarged signal lens for vehicles at the following location:

- Linden Boulevard at Van Siclen Avenue

The larger lens will improve drivers' abilities to see the signal heads.

- Install new school crosswalk at the following intersections:

- Van Siclen Avenue and Hegeman Avenue – south leg
- Van Siclen Avenue and Wortman Avenue – north leg

Crosswalks at these two locations should be installed as school crosswalks to facilitate students walking to J.H.S. 166.

- Install painted buffers on Stanley Avenue

A spot speed survey was conducted on Stanley Avenue between Van Siclen Avenue and Vermont Street on Wednesday, July 27, 2005 from 10:00 am to 11:00 am. The objective of the survey was to determine whether there is a speeding problem on this section of Stanley Avenue.

The spot speed study shows that the 85th percentile speed was 35 mph, which exceeds the statutory speed limit of 30 mph. However, per DOT policy, speed reducers are not installed on streets over 40 feet wide, and Stanley Avenue is 50 feet wide. Therefore, to reduce speeding on Stanley Avenue, it is recommended to install 6-foot wide painted buffers that separate travel lanes and parking lanes on both sides of the street. With this alternative, travel lane widths will be narrowed from their existing 17 feet to 11 feet. It is expected that narrowing these lanes will encourage reduced operating speeds at this location. See Table 5 for a summary of the results and the Appendix for further detail.

TABLE 5: SPOT SPEED STUDIES		
(Wednesday, July 27, 2005 10:00 am – 11:00 am)		
LOCATION	MEDIAN SPEED (MPH)	85TH PERCENTILE SPEED (MPH)
Stanley Ave between Van Siclen Ave and Vermont St.	30	35

- Adjust signal timing for the intersection of Hegeman Avenue and Van Siclen Avenue

As shown in Table 4, at the intersection of Hegeman Avenue and Van Siclen Avenue, the pedestrian phase does not provide enough time for a pedestrian

to cross Van Siclen Avenue in one cycle, at an assumed walking rate of three feet per second plus a three second reaction time. Therefore, it is recommended that the signal timing at this intersection be adjusted to provide additional walking time for pedestrians to safely cross Van Siclen Avenue.

- *Install pedestrian signal displays*

Installation of pedestrian signal heads on the northeast and southeast sidewalk of Hegeman Avenue at Van Siclen Avenue is recommended. The proposed pedestrian heads will serve the school crosswalk on the east leg of the intersection.

- *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. The students should also be educated not to cross at mid-block locations.

- *Place advanced stop bars ten feet 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.

4.2 LONG-TERM MEASURES

- *Linden Boulevard and Van Siclen Avenue*

Review of the existing signal timing at the intersection of Linden Boulevard and Van Siclen Avenue indicates that the pedestrian phase does not provide adequate time for pedestrians to cross Linden Boulevard in one cycle at a walking rate of three feet per second plus a three second reaction time. A student pedestrian needs two cycles to cross Linden Boulevard as shown in Section 3.7 – Signal Timing.

- It is recommended that the center-raised medians be extended through the school crosswalks (as shown in Exhibit 7) at this intersection. This will provide a physically protected refuge area for pedestrians as they wait in the center for the second walk phase required to cross Linden Boulevard.

Review of the turning path of a Standard Unit Vehicle (SU) showed that these design vehicles would be able to complete a left turn movement with the new extended center medians.

ADA-compliant at-grade cut-throughs should be provided at all medians within the crosswalk.

- *Install curb extensions at:*

- Van Siclen Avenue and Stanley Avenue intersection

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

The purpose of the curb extensions is to shorten the crossing distance for pedestrians, and to reduce speeds of vehicles approaching and turning at school crosswalks.

These curb extensions will not eliminate or reduce the width of any moving lanes. Curb extensions are not proposed where they would hinder the ability of vehicles to turn. Final details pertaining to curb extensions will be developed during the Final Design/Contract Document preparation.

(See Section 4.3 for additional recommendations developed in conjunction with the study of nearby priority schools)

4.3 ADDITIONAL RECOMMENDATIONS FOR PRIORITY SCHOOLS IN THE VICINITY

4.3.1 RECOMMENDATIONS FOR P.S. 213:

(All references in Section 4.3.1 refer to the P.S. 213 Priority School Report)

- Install pedestrian information sign that explains the signal phases

Installation of a pedestrian information sign adjacent to each school crosswalk at the wide intersections of Linden Boulevard and Vermont Street is recommended. The sign will explain signal phases and inform the pedestrian to wait at the refuge between cycles.

- Install enlarged signal lenses

Install enlarged signal lens at the following intersections:

- Linden Boulevard and Vermont Street

The larger lens will improve drivers' ability to see the signal heads.

- Install new school crosswalks, signs and roadway markings

Install new school crosswalk and associated signage at the following locations:

- New Jersey Avenue and Hegeman Avenue - west leg
- Pennsylvania Avenue and Hegeman Avenue – north, south, and east legs
- Stanley Avenue and Vermont Avenue – north and east legs

The new crosswalks and signage will alert drivers that students cross the street at these locations en route to school.

- Install or replace pedestrian ramps

Install standard pedestrian ramps at all four corners of the intersection of New Jersey Avenue and Hegeman Avenue.

- Linden Boulevard and Vermont Street intersection

Review of existing signal timing at the intersection of Linden Boulevard and Vermont Street indicates that the pedestrian phase does not provide adequate time for pedestrians to cross Linden Boulevard in one cycle at a walking rate of three feet per second plus a three second reaction time. It is assumed that a pedestrian will need two cycles to cross Linden Boulevard as shown in Section 3.7 – Signal Timing and medians should be provided as a refuge area where pedestrians can wait between cycles.

- In order to provide a refuge that allows pedestrians to wait for the next walk phase and cross Linden Boulevard in two cycles, it is recommended that the center-raised medians be extended through the school crosswalks (as shown in Exhibit 8). This will provide a

physically protected refuge location for pedestrians to wait between cycles.

Review of the turning path of a Standard Unit Vehicle (SU) showed that these vehicles will be able to complete a left turn movement with the new extended center median. The final design should allow at least a six-foot clearance between turning vehicles on Linden Boulevard.

ADA compliant at-grade cut-throughs should be provided at all medians within the crosswalk.

▪ Consider curb extensions at the following intersections:

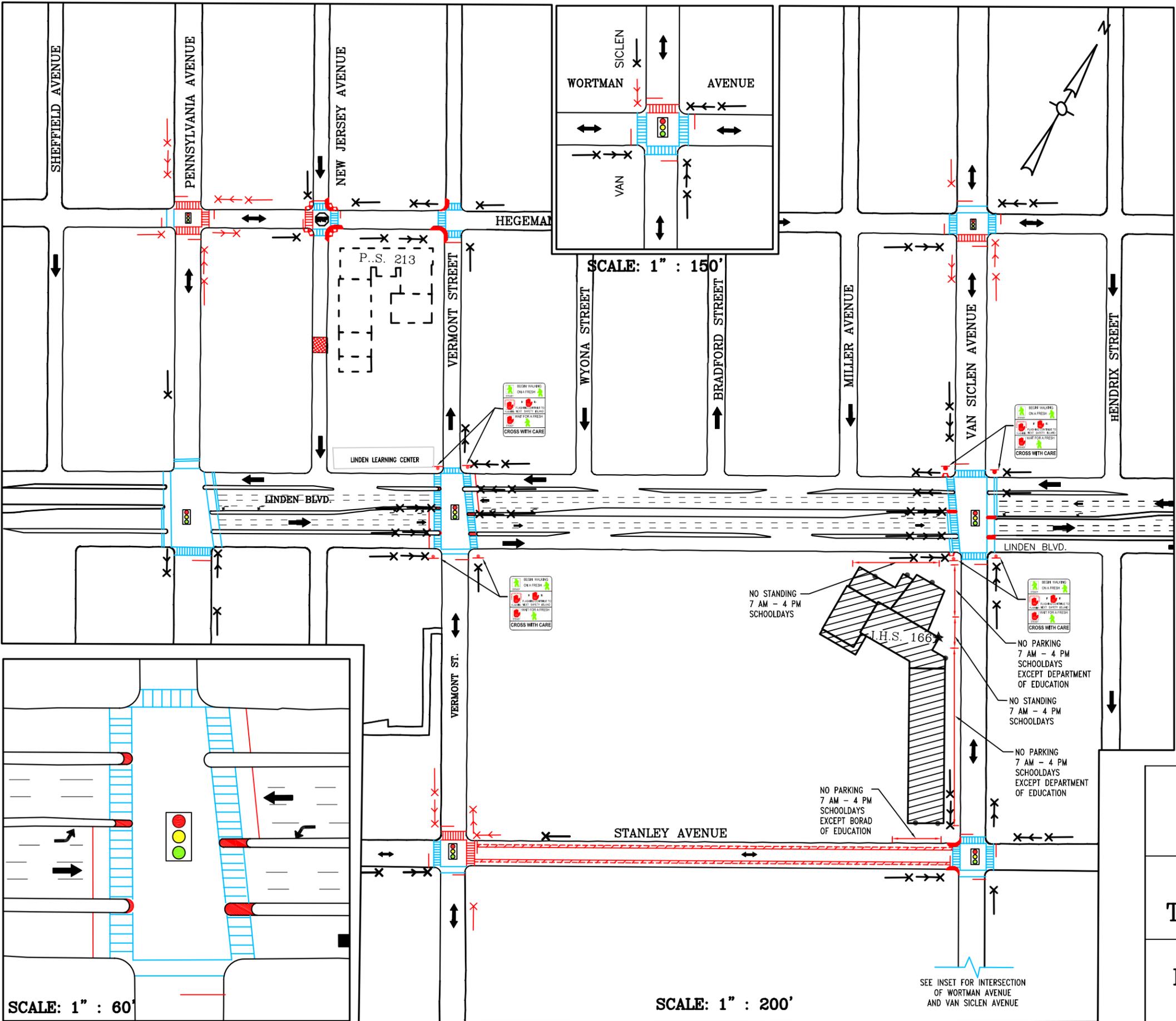
- Hegeman Avenue and New Jersey Avenue
- Hegeman Avenue and Vermont Street

Curb extensions should be installed 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 school crosswalks. These curb extensions will not eliminate or reduce the width of any moving lanes. Curb extensions are not proposed where they would hinder the ability of vehicles to turn. Final details pertaining to curb extensions will be developed during the Final Design/Contract Document preparation.

LEGEND

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



SCALE: 1" : 60'

SCALE: 1" : 200'

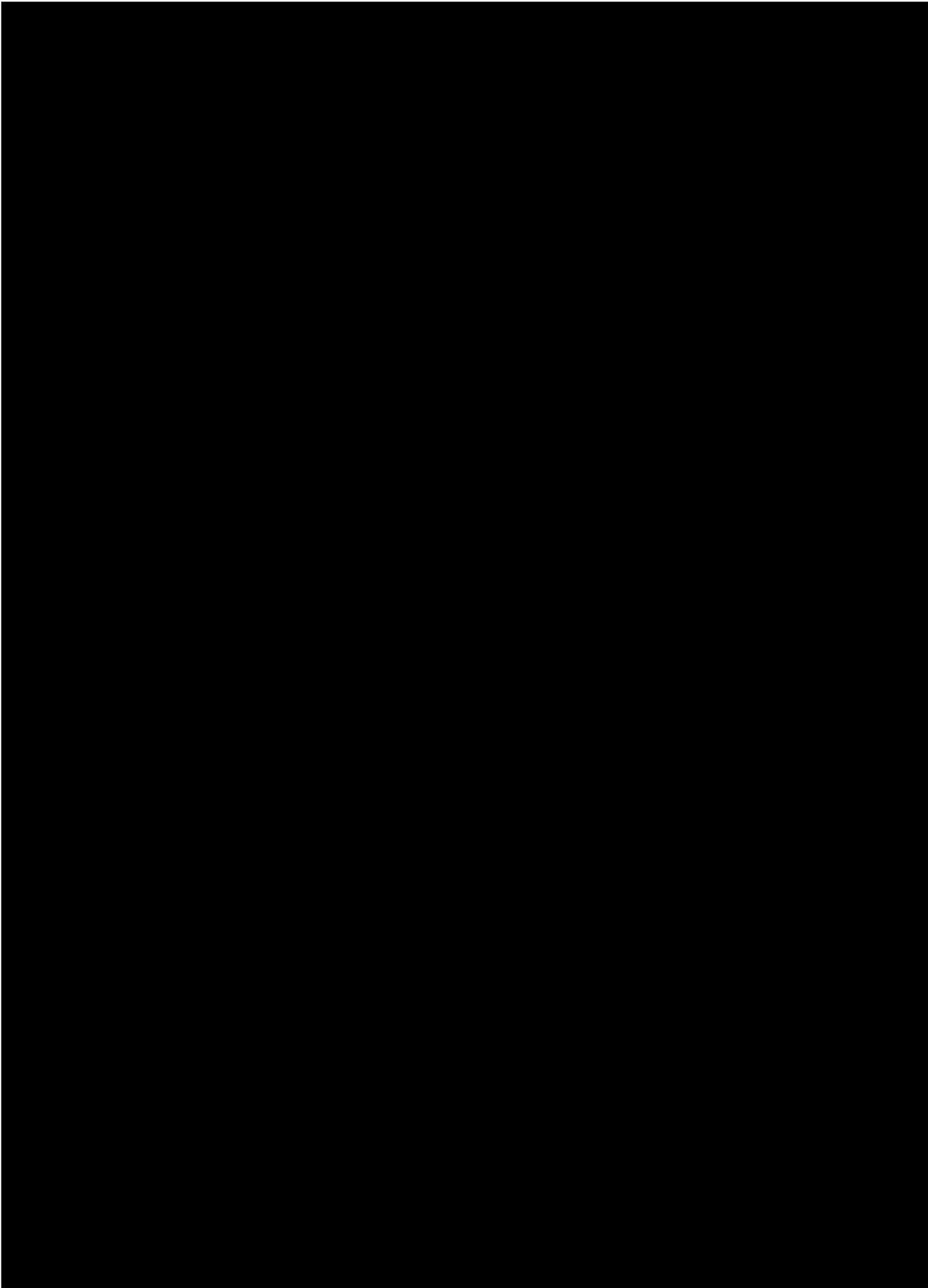
SEE INSET FOR INTERSECTION OF WORTMAN AVENUE AND VAN SICLEN AVENUE

EXHIBIT 7

**J.H.S. 166, BROOKLYN
THE GEORGE GERSHWIN SCHOOL**

**PROPOSED MEASURES TO IMPROVE
STUDENT PEDESTRIAN SAFETY**

APPENDIX



SPOT SPEED STUDY

Date: **July 27, 2005** Time: **10:00 am - 11:00 am**
 Location: **Stanley Avenue between Van Scilen Avenue and Vermont Avenue**
 Surveyor:

School: **J.H.S. 166**
 Direction:
 Comments:

Speed S (mph)	No. of Vehicles in Group n	% of Vehicles in Group	% Cumulative Vehicles	nS	nS ²
8	0	0.0%	0.0%	0	0
9	0	0.0%	0.0%	0	0
10	0	0.0%	0.0%	0	0
11	0	0.0%	0.0%	0	0
12	0	0.0%	0.0%	0	0
13	0	0.0%	0.0%	0	0
14	0	0.0%	0.0%	0	0
15	0	0.0%	0.0%	0	0
16	0	0.0%	0.0%	0	0
17	0	0.0%	0.0%	0	0
18	0	0.0%	0.0%	0	0
19	0	0.0%	0.0%	0	0
20	0	0.0%	0.0%	0	0
21	0	0.0%	0.0%	0	0
22	3	3.8%	3.8%	66	1452
23	4	5.0%	8.8%	92	2116
24	4	5.0%	13.8%	96	2304
25	5	6.3%	20.0%	125	3125
26	3	3.8%	23.8%	78	2028
27	4	5.0%	28.8%	108	2916
28	7	8.8%	37.5%	196	5488
29	8	10.0%	47.5%	232	6728
30	3	3.8%	51.3%	90	2700
31	5	6.3%	57.5%	155	4805
32	16	20.0%	77.5%	512	16384
33	2	2.5%	80.0%	66	2178
34	6	7.5%	87.5%	204	6936
35	3	3.8%	91.3%	105	3675
36	2	2.5%	93.8%	72	2592
37	0	0.0%	93.8%	0	0
38	0	0.0%	93.8%	0	0
39	1	1.3%	95.0%	39	1521
40	1	1.3%	96.3%	40	1600
41	1	1.3%	97.5%	41	1681
42	1	1.3%	98.8%	42	1764
43	0	0.0%	98.8%	0	0
44	0	0.0%	98.8%	0	0
45	0	0.0%	98.8%	0	0
46	0	0.0%	98.8%	0	0
47	0	0.0%	98.8%	0	0
48	0	0.0%	98.8%	0	0
49	1	1.3%	100.0%	49	2401
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
	80	100.0%		2408	74394

Mean Speed = 30.1 mph
 Standard Deviation = 4.9 mph
 Margin of Error (95% Confidence) = ± 1.1 mph

Median Speed = 30.1 mph
 15th Percentile Speed = 25.0 mph
 85th Percentile Speed = 35.2 mph

SPOT SPEED STUDY

Date: **July 27, 2005**
Location: **Stanley Avenue between Van Scilen Avenue and Vermont Avenue**
Surveyor:

Time: **10:00 am - 11:00 am**

School: **J.H.S. 166**
Direction:
Comments:

Mean Speed = 30.1 mph
Standard Deviation = 4.9 mph
Margin of Error (95% Confidence) = ± 1.1 mph

Median Speed = 30.1 mph
15th Percentile Speed = 25.0 mph
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