Phil T. Feola
202.457.7317
pfeola@wilkesartis.com

Wilkes Artis

Chartered
Attorneys at Law

Suite 300, 1666 K Street, NW
Washington, DC 20006-2803
202.457.7800
Fax: 202.457.7814

May 19, 2000

BY HAND DELIVERY

Sheila Cross-Reid, Chairperson
Board of Zoning Adjustment
441 4th Street, N.W.
Suite 210
Washington, D.C. 20001

DISTRICT OF COLUMBIA
OFFICE OF ZONING
00 MAY 19 P3:17

Re: BZA Application No.16559
The Field School (the "Applicant")
2301 Foxhall Road, N.W.

Dear Commissioner Reid and Members of the Board:

In accordance with the instructions of the Board, enclosed please find a comprehensive Traffic Impact Analysis and The Field School's Transportation Management Plan prepared by Gorove/Slade Associates, Inc. As requested by the Board, the technical appendices upon which the conclusions in the Analysis are based are also attached. Also enclosed is a summary of Foxhall Road accident data which was requested by Boardmember Renshaw.

By this letter, the Applicant is also sending copies of the above-mentioned documents to the legal representatives of the three parties in opposition to this case as well as ANC 3D.

If you have any questions or comments, please feel free to call the undersigned.

Very truly yours,

Phil T. Feola

Paul A. Tummonds, Jr.

Enclosures
cc: Advisory Neighborhood Commission 3D (Hand Delivery)
Richard Aguglia, Esq. (Hand Delivery)
Jeffrey Bolotin, Esq. (Hand Delivery)
Alan Swendiman, Esq. (Hand Delivery)

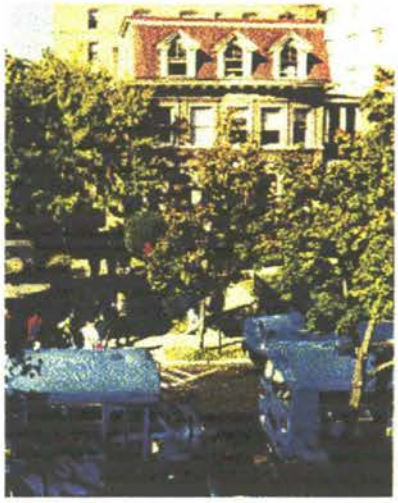
BZA
Case No. 16559
Exhibit No. 437-A

BZA
Case No. 16559
Exhibit No. 437

Board of Zoning Adjustment
District of Columbia
CASE NO.16559
EXHIBIT NO.437A

Traffic Impact Analysis
The Field School

Prepared For



The Field School

Washington, D.C.

Prepared by
Gorove/Slade Associates, Inc.

1140 Connecticut Avenue NW
Suite 700
Washington, D.C. 20036
202-296-8625

May 19, 2000

BZA
Case No. 16559
Exhibit No 437-B

TRAFFIC IMPACT ANALYSIS
THE FIELD SCHOOL
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INTRODUCTION

The purpose of this report is to present the findings of a Traffic Impact Analysis (TIA) for the proposed relocation and expansion of the Field School in the northwest section of Washington, D.C. This report supersedes previous reports prepared and submitted on behalf of the special exception application for this project. This document provides a comprehensive analysis that addresses traffic and parking-related issues associated with the Field School. The analysis presented in this report accounts for the school's proposal to install a southbound Foxhall Road left-turn lane to serve school-related traffic approaching from the north and the school's commitment to implement transportation management measures to minimize the amount of traffic generated by the Field School.

The Field School is proposing to relocate its existing campus on Wyoming Avenue to a new site on Foxhall Avenue north of W Street. In addition to this relocation, the Field School is proposing to add 48 students and 11 employees to its existing student population of 212 and existing employee population of 49, with the ability to increase over time to a maximum student enrollment of 320 students and a maximum employee population of 74 employees. This study will determine the impacts of the proposed relocated school on existing traffic levels and will identify improvements necessary to satisfy the traffic requirements. Although the school plans to expand to 260 students and 60 employees as part of its relocation program, this traffic impact analysis accounts for a maximum development of 320 students and 74 employees that would be achieved gradually over several years. This report presents existing conditions, estimates of future Field School traffic characteristics and parking requirements, and preliminary recommendations regarding the school access and circulation plan.

Based on meetings with community representatives, this report also outlines a revised transportation management program geared to address community concerns. The key elements of the revised transportation management plan include an expanded shuttle bus service to several off-site locations and the installation of a southbound Foxhall Road left-turn lane to serve school-related traffic approaching from the north. The impacts of these key elements are accounted for in the analysis detailed within this report. The scope of work undertaken for this study is as follows:

- Review proposed development plans.
- Data collection efforts which include manual traffic turning movement counts at major intersections surrounding the newly relocated site, mode choice observations and surveys, and tabulation of zip code information.
- A site and roadway reconnaissance to determine access opportunities and constraints.
- Analysis of existing conditions using intersection capacity analysis.
- Analysis of possible alternatives for future internal site operations.
- Analysis of future conditions based on future site configurations and operations.

Sources of data for this study include: The District of Columbia Department of Public Works, the Field School, KressCox Architects, and the files and library of Gorove/Slade Associates, Inc.

EXISTING CONDITIONS

Description of Existing School Characteristics

The Field School is currently located at 2126 Wyoming Avenue NW, just west of Connecticut Avenue NW. Due to its proximity to the major commuting corridor of Connecticut Avenue, access to the site on Wyoming Avenue is relatively convenient. Ample public transportation opportunities exist with the presence of Metrobus Route L1 on Connecticut Avenue in the vicinity of the existing school site and various other Metrobus routes at Dupont Circle, which is an approximate 5-minute walk from The Field School. In addition to the Metrobus routes, The Field School is within a 5-10 minute walk to both the Dupont Circle and the Woodley Park/National Zoo Metrorail stations along the Red Line.

The existing student and employee populations consist of 212 students and 49 employees. Limited parking is provided within the property of the school. Residential permit parking along Wyoming Avenue NW is currently implemented to deter school-related vehicles from parking in the immediate residential neighborhood surrounding the existing Field School site.

Description of Existing Conditions at the Proposed Relocation Site

The proposed Field School relocation site is bordered by Foxhall Road to the west, the Glover-Archbold Parkway to the east, W Street for a small portion to the southeast and the terminus of 44th Street to the northeast. This site has limited existing public transportation opportunities with no Metrorail stations within a reasonable walking distance. The nearest public transportation opportunity to this site consists of the D4 Metrobus route that traverses along MacArthur Boulevard and Reservoir Road, which is an approximate 5-minute walk from the relocation site.

Existing Roadway Network

The relocation site is served by two parallel north-south commuting corridors: MacArthur Boulevard and Foxhall Road. These two arterials provide access from northern portions of the northwest area of the District to Georgetown and downtown areas of the District. The regional roadway network that serves the site and the site location are presented in Figure 1. A description of the roadways serving the relocation site is detailed below:

- Foxhall Road: Foxhall Road is a major local north-south roadway that extends from the north at the intersection of Nebraska Avenue and Loughboro Road to the intersection of MacArthur Boulevard and Canal Road.
- Garfield Street: Garfield Street is a local east-west roadway, which extends from 49th Street to the west and New Mexico Avenue to the east. This roadway primarily serves local residential traffic and provides a route that will eventually lead to Wisconsin Avenue, a major north-south commuting corridor, via New Mexico Avenue and Fulton Street.
- W Street: W Street is a local east-west roadway that primarily serves local residential traffic. This roadway provides a connection between MacArthur

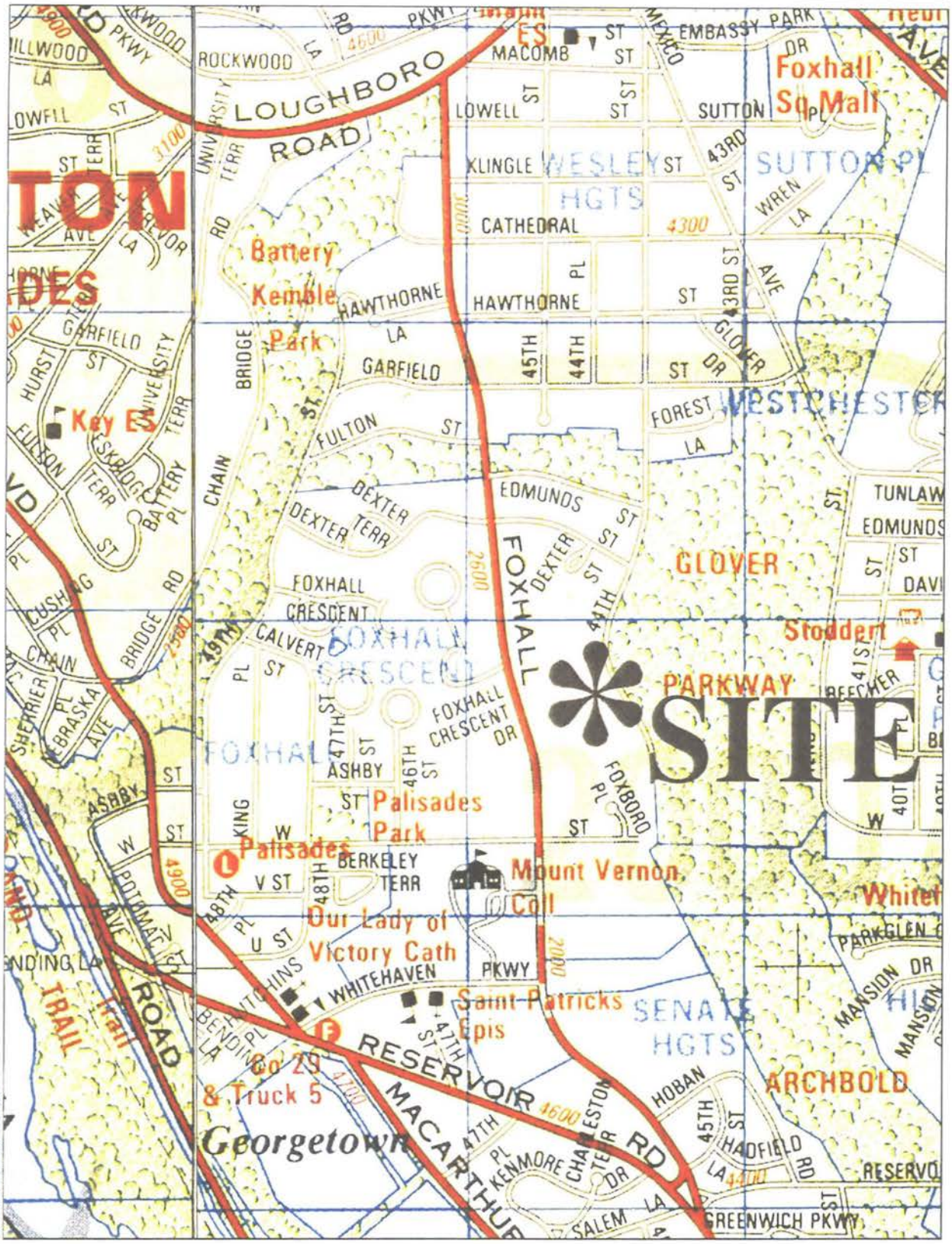


Figure 1
Site Location and Regional Roadway Network

Boulevard and Foxhall Road and offers direct access to George Washington University at Mount Vernon College (GW/MVC).

- MacArthur Boulevard: MacArthur Boulevard is a major arterial that serves a large commuting population from Montgomery County destined for downtown Washington, DC. MacArthur Boulevard currently provides a parallel commuting route to Canal Road, which currently has directional restrictions during peak hour commuting periods. This roadway is a four-lane divided boulevard that extends from Montgomery County to the north and terminates at Canal Road to the south.

Descriptions of the existing traffic control operations at the study area intersections are provided below:

- Foxhall Road and Garfield Street: This intersection is controlled by a two-phase traffic signal with a cycle length of 70 seconds. The eastbound and northbound directions have "No Turn on Red" restrictions due to poor sight distances of vehicles along Foxhall Road.
- Foxhall Road and W Street: This intersection is unsignalized with stop sign control for the eastbound and westbound approaches of the intersection.
- Foxhall Road and Whitehaven Parkway: This intersection is unsignalized with stop sign control for the eastbound approach of the intersection.

Figure 2 presents the existing stop control operations and lane configurations for the study area intersections.

Existing Traffic Conditions

Peak morning and afternoon manual turning counts were performed on Thursday March 11, 1999 and Tuesday, April 6, 1999 to obtain a baseline of traffic levels along Foxhall Road. Supplemental data collection efforts that included videotaping were conducted on January 18, 2000 to confirm the validity of these traffic counts and to identify existing queues at the intersection of Garfield Street and Foxhall Road. Figure 3 graphically presents the existing volumes for the peak morning and afternoon hours.

Capacity analyses were conducted for the AM and PM peak hours at the intersections of Foxhall Road with W Street and Garfield Street. The results from these analyses are expressed in levels of service, which are based on the methodologies specified by the Transportation Research Board, Special Report 209: *Highway Capacity Manual (HCM),* 1994. Levels of service (LOS) range from A to F. A brief description of each level of service for signalized and unsignalized intersections is provided below:

Signalized Intersections: Level of service is based upon the traffic volume present at the intersection, the capacity of each lane at the intersection and the resultant control delay associated with each directional movement. The average intersection control delay is calculated from the weighted average of the delay for each movement and accounts for stopped delay plus all of the acceleration/deceleration delay. The levels of service for signalized intersections are defined by average control delay as described below:

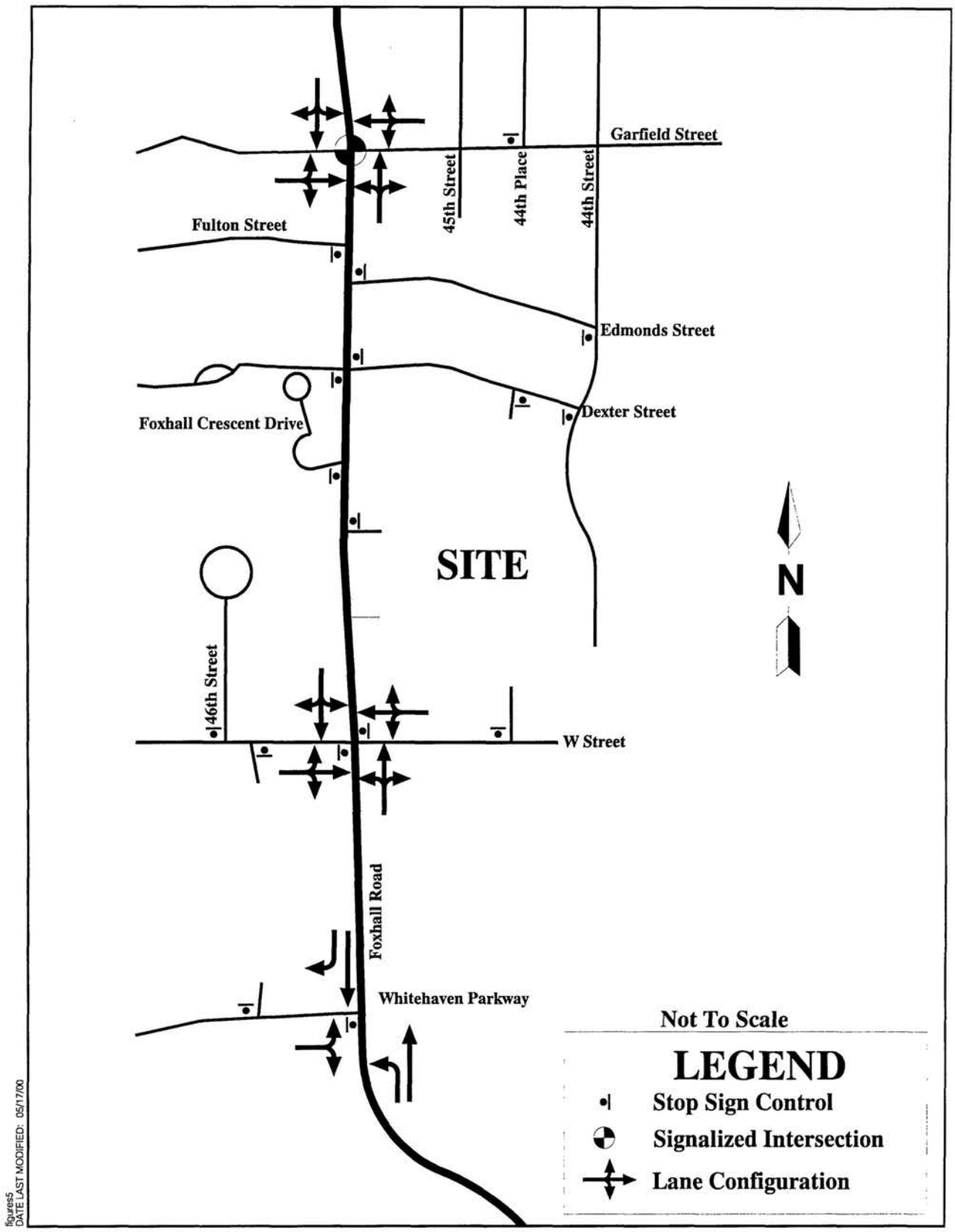
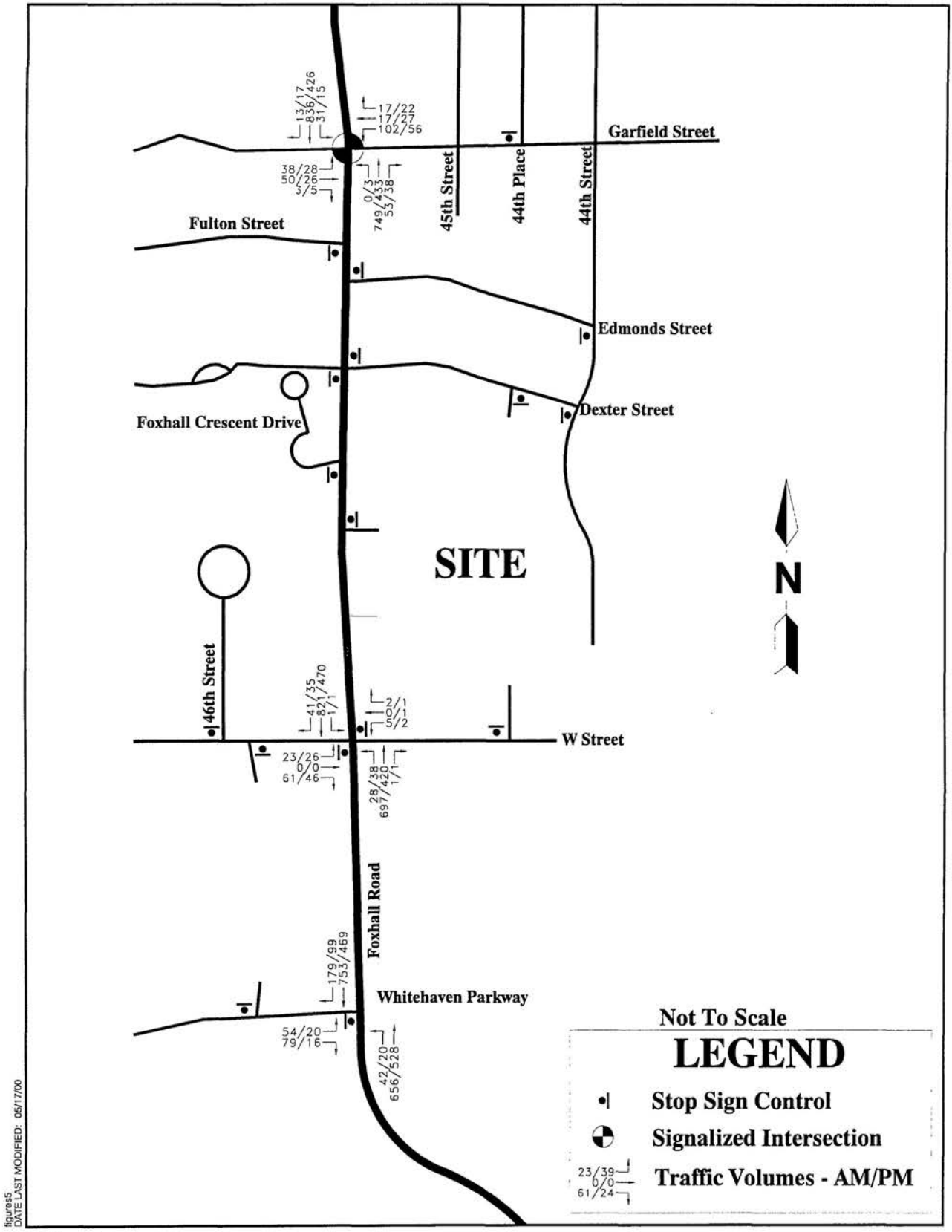


Figure 2
Existing Lane Configurartion



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Figure 3
Existing Traffic Volumes

- Level of Service A describes operations with very low average control delay per vehicle, i.e., less than 10.0 seconds. This occurs when signal timing between successive intersections is extremely favorable (i.e. very good progression), and most vehicles arrive during the green phase. Most vehicles do not stop. Short signal cycle lengths may also contribute to low delay.

- Level of Service B describes operations with average control delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

- Level of Service C describes operations with average control delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures when not all waiting vehicles clear the intersection during one green period may begin to appear at this level. The number of vehicles stopping is noticeable at this level although many still pass through the intersection without stopping. This is generally considered the lower end of the range of the acceptable level of service in rural areas.

- Level of Service D describes operations with average delay per vehicle in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high traffic volumes as compared to the roadway capacity. Many vehicles are required to stop and the number of vehicles that do not have to stop declines. Individual signal cycle failures, where all waiting vehicles do not clear the intersection during a single green time, are noticeable. This is the design level of service for high volume suburban intersections.

- Level of Service E describes operations with average control delay in the range of 55.1 to 80.0 seconds per vehicle. These higher delay values generally indicate poor progression, long cycle lengths, and high traffic volumes. Individual cycle failures are frequent occurrences. (LOS E has been set as the limit of acceptable conditions in congested areas.)

- Level of Service F describes operations with average control delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when traffic arrives at a rate that exceeds the capacity of the intersection. It may also occur at high volumes with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such delays.

Unsignalized Intersections: The unsignalized intersection level of service analysis does not account for variations in driver behavior or the effects of nearby traffic signals. Therefore, the results from this analysis usually indicates worse levels of service than may be experienced in the field. The unsignalized intersection level of service descriptions are provided below:

- Level of Service A. Describes operations where there is very little to no conflicting traffic for a minor side street movement, i.e., an average total control delay of less than 10.0 seconds per vehicle.
- Level of Service B. Describes operations with average total control delay in the range of 10.1 to 15.0 seconds per vehicle.
- Level of Service C. Describes operations with average total control delay in the range of 15.1 to 25.0 seconds per vehicle.
- Level of Service D. Describes operations with average total control delay in the range of 25.1 to 35.0 seconds per vehicle.
- Level of Service E. Describes operations with average total control delay in the range of 35.1 to 50.0 seconds per vehicle.
- Level of Service F. Describes operations with average total control delay greater than 50.0 seconds per vehicle. LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through or enter a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches. It is important to note that LOS F may not always result in long queues or delays but may result in adjustments to normal driver behavior.

Existing Levels of Service

Table 1 summarizes the existing baseline traffic operations within the study area designated for the proposed school relocation during the critical AM and PM peak hours. The AM peak hour studied is 7:45 AM - 8:45 AM and the PM peak hour studied is 2:00 PM - 3:00 PM.

The results of the existing capacity analysis indicate that the signalized intersection of Foxhall Road and Garfield Street operate at an overall acceptable level of service during the AM and PM peak hours. The major commuter through movements at the intersections of Foxhall Road with W Street and with Whitehaven Parkway operate at very good levels of service during the AM and PM peak hours. The minor eastbound and westbound approaches to Foxhall Road from W Street and from Whitehaven Parkway experience significantly longer delays due to high commuting volumes along Foxhall Road. This is the case at many of the unsignalized intersections along Foxhall Road. This situation is also compounded with the poor sight distance for vehicles waiting to turn left from W Street onto Foxhall Road.

TABLE 1
Existing Capacity Analysis Levels of Service (LOS)

Roadway Intersection	**AM Peak Hour**	**PM Peak Hour**
Signalized Intersection	***LOS***	***LOS***
Foxhall Road and Garfield Street	C	B
Unsignalized Intersections	***LOS***	***LOS***
Foxhall Road and W Street		
Northbound Approach	A	A
Southbound Approach	A	A
Eastbound Approach	E	C
Westbound Approach	F	C
Foxhall Road and Whitehaven Parkway		
Northbound Approach	A	A
Southbound Approach	A	A
Eastbound Approach	F	C

Identification of Existing Traffic Issues

Within the vicinity of the relocation site, there are several traffic-related issues that have been identified as areas of concern. These issues have been identified from general observations made during field visits to the proposed relocation site. These traffic issues include the following:

1. The sight distances along Foxhall Road in the vicinity of the school relocation site are not favorable due to the existing vertical and horizontal curvatures of the roadway.
2. Vehicular speeds along the Foxhall Road corridor exceed the posted speed limit of 25 mph in the vicinity of the relocation site.
3. Foxhall Road serves a significant amount of north-south commuter traffic by providing access from Nebraska Avenue and Loughboro Road to Georgetown and the Whitehurst Freeway. This commuter traffic contributes to the speeding and congestion experienced by motorists in the Foxhall Road corridor.

FUTURE CONDITIONS

Proposed Site Access

Existing vehicular access to this site consists of two driveways along the east side of Foxhall Road connected by a front door loop. Proposed vehicular access to the site will be provided only on Foxhall Road, although the property has limited frontage on 44th Street and W Street. As part of the development proposal, the northern driveway will be maintained and the southern driveway will be relocated to a point approximately 215 feet from the southern property line. The relocation of this southern driveway allows for the installation of a southbound left-turn lane with adequate sight distances for vehicles approaching the school from the north and south. The installation of a southbound left-turn lane is a major component of the site access plan that provides the opportunity for 10 vehicles to wait in the left-turn lane to access the Field School property, although it is projected that the school will only need the ability to stack a maximum of 3 vehicles during the AM or PM peak periods. This southern entrance will allow only right turns into and out of the property to avoid difficult left turns out of the site at this location.

The existing northern entrance on Foxhall Road is the safest existing location for vehicles to turn left into and out of the site because the sight distance at this location is adequate. With the installation of a southbound Foxhall Road left-turn lane and with the relocation of the southern entrance to a point approximately 215 feet from the southern property line, vehicles would have the ability to turn left into the Field School property safely at the southern entrance. Therefore, it would be possible to accommodate left turns into the site at both the northern and southern entrances. However, in order to minimize the impact of school-related traffic on the existing Foxhall Road traffic flows, left turns into the site will only be allowed at the southern entrance with the installation of the southbound left-turn lane. During the morning peak period, all exiting traffic will be required to turn right out of the school entrances. As part of the left-turn lane proposal, conduit will be installed at the southern entrance to allow for a potential traffic signal, if future traffic patterns warranted its installation in the future. The school will provide a traffic officer on duty to assist with safe access and traffic control during the morning and afternoon peak periods. This will have the added benefit of reducing speeding due to the police presence. Right turns into and out of the site will be accommodated at both entrances at all times.

School zone warning signs will be posted along Foxhall Road at the appropriate locations as detailed in the Manual on Uniform Traffic Control Devices (MUTCD) to alert motorists to the approach to the school entrances. These signs will have flashing lights to accompany the 15 mph speed limit during the school traffic peaks. Research has shown that these devices significantly reduce speeding as indicated in the October 1993 Institute of Traffic Engineers article (see appendix for article).

Proposed School Program

The Field School is proposing to add 48 students and 11 employees to its existing student population of 212 and existing employee population of 49, with the ability to increase over time to a maximum student enrollment of 320 students and employee population of 74 employees. The planned relocation and expansion will be accommodated at the relocation site with an expansion to the Cafritz house, the construction of two academic buildings, the addition of a gymnasium and athletic field, and the installation of surface parking. The footprint of the

building development also includes a future building to hold all-school assemblies. As noted above, the new plan maintains the existing northern entrance, removes the existing southern driveway, and proposes an additional right-turn in/right-turn out driveway along Foxhall Road to accommodate the anticipated traffic flow of vehicles into and out of the campus.

Projected Trip Generation

The number of vehicle trips that will be generated by the proposed development were estimated using traffic surveys distributed to parents of the existing school population and mode choice and travel pattern observations performed at the existing school site. The surveys provided useful information on the general travel patterns of the school population and identified the need for public transportation opportunities. Table 2 presents the trip generation estimates for the AM and PM peak hours.

As part of this analysis, several assumptions were made to determine the anticipated traffic and parking demand. These assumptions include the following:

- Based on the surveys, the need for a shuttle to the Metrorail and bus system was identified. Surveys indicate that 90% of the respondents would consider utilizing the shuttle bus service, but for this analysis, a conservative estimate of 36% was assumed to utilize shuttle bus service because this percentage represents the existing utilization of public transportation at the existing school site. In addition to providing shuttle service for Metrorail users, the school has decided that it will expand and promote the shuttle bus service to pick up students at remote pick-up points for the convenience of the parents and to meet the simultaneous goal of keeping Field School-related vehicles away from the Foxhall Road corridor.

  For this analysis, it was assumed that shuttle bus service will be provided for students to and from the Tenleytown station (Red Line), the Foggy Bottom station (Blue and Orange Lines), and other off-site locations in the vicinity of the intersections of MacArthur Boulevard/Loughboro Road and Massachusetts Avenue/Nebraska Avenue. The two planned shuttle bus routes would consist of a route from the Foggy Bottom station to the Field School and of a circular route that would serve the off-site locations in the vicinity of the intersections of MacArthur Boulevard/Loughboro Road and Massachusetts Avenue/Nebraska Avenue and would continue to the Tenleytown station before arriving at the Field School campus. Due to this expanded shuttle bus service, it was projected that an additional 10% of the school population would utilize the parent drop-off at the shuttle bus stops. This expanded service was geared to meet the demand of parents for this alternative transportation solution.

- Employees who will drive to the Field School will be required to arrive at the school before the AM peak hour. It was projected that half of the employee population would leave during the PM peak hour and the other half would stay at the school to assist with extracurricular activities and to perform other school functions.

- The school will require that students driving to the school will also take at least two other students in his or her car. Based on the number of siblings and on the distribution of student residences, it was projected that 38 student drivers, which is based on the driving rate at the current Field School location, would transport 2.5 students per vehicle.

- The shuttle bus trips would consist of 3 trips arriving and 3 trips exiting from the circular route serving the off-site locations in the vicinity of the intersections of MacArthur Boulevard/Loughboro Road and Massachusetts Avenue/Nebraska Avenue and the Tenleytown station and 2 trips arriving and 2 trips exiting from the Foggy Bottom station during the AM and PM peak hour.

TABLE 2
Projected Vehicular Trip Generation
at Maximum Enrollment of 320 Students and 74 Employees

	Students/ Employees	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
		Enter	Exit	**Total**	Enter	Exit	**Total**
Students Who Drive	95[(a)]	38	0	38	0	21	21
Students Who Are Driven	80	63	63	126	9[(b)]	9[(b)]	18[(b)]
Students Who Take Shuttle	145	5[(c)]	5[(c)]	10[(c)]	5[(c)]	5[(c)]	10[(c)]
Employees	74[(d)]	0[(d)]	0[(d)]	0[(d)]	0	37	37
Total	394	106	68	174	14	72	86

Note: **(a)** - represents the requirement for student drivers to drive at least two other students to school, with the projection that each vehicle would be transporting 2.5 students per car

(b) - represents a majority of the student population staying afterschool to participate in athletics and extracurricular activities

(c) - represents 3 shuttle bus trips arriving and departing from Tenleytown Metro and other off-site locations, and 2 shuttle bus trips arriving and departing from Foggy Bottom Metro

(d) - represents the arrival of faculty and staff before the AM peak hour and departure of half the faculty/staff during the PM peak hour

Based on the trip generation analysis, the Field School is projected to generate 106 inbound trips and 68 outbound trips during the AM peak hour. During the PM peak hour, the Field School is projected to generate 14 inbound trips and 72 outbound trips.

The school will stagger its start time by 20 minutes with the 7th and 8th graders (50 students) starting at 8:00 AM and 9th-12th graders (270 students) starting at 8:20 AM. This practice is an effective means to reduce the peak impact of arrivals at the Field School by distributing traffic over a longer period of time in the morning.

Directional Distribution

Using student zip code information, and student surveys, the directional distribution of the projected vehicular trips was determined to be 65% of the site generated traffic originating from north of the site and 35 % from south of the site. Figure 4 presents the directional distribution of the site generated trips of passenger vehicles to the proposed school site.

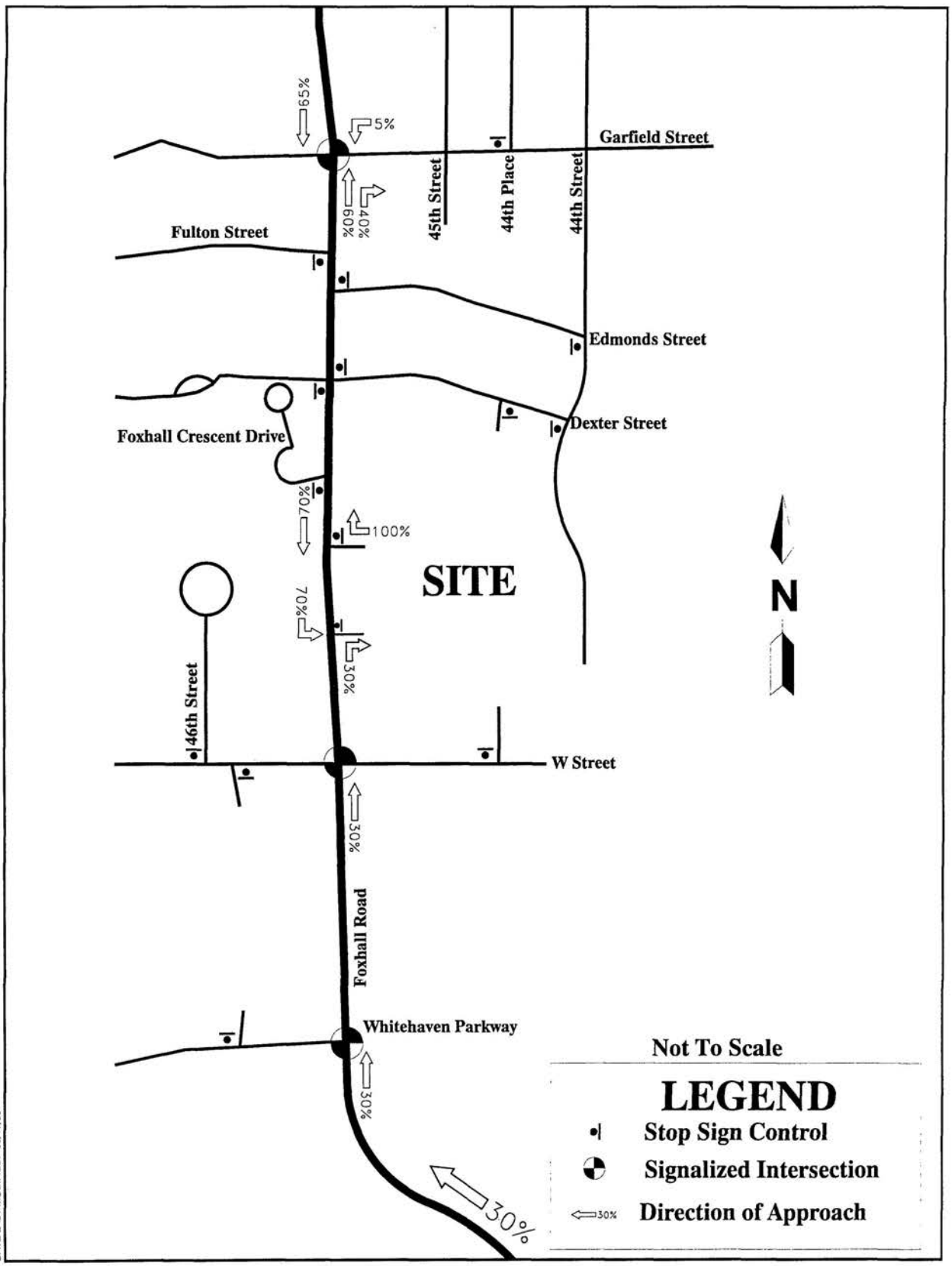


Figure 4
Directional Distribution

Future Traffic Volumes

Using existing traffic volumes as a baseline level of traffic activity, future volumes were determined by adding the proposed vehicular trip generation to the existing traffic volumes and by applying the directional distribution percentages to account for the origins and destinations of the school-related traffic. Figure 5 presents the site generated traffic volumes for the Field School. Figure 6 presents the future traffic volumes with the projected future GW/MVC development and with the relocation of the Field School to Foxhall Road.

Total Future Levels of Service

In response to community concerns regarding delays associated with turning onto Foxhall Road from minor street approaches and general traffic safety in the Foxhall Road corridor, the District of Columbia Department of Public Works (DCDPW) has proposed to install traffic signals at the intersection of Foxhall Road/Whitehaven Parkway. The installation of this signal will provide the opportunity for motorists to turn to and from Foxhall Road safely with acceptable delays. It is expected that the Foxhall Road/Whitehaven Parkway intersection will have a fully functioning traffic signal by the summer of 2001.

As part of the future traffic capacity analysis, the proposed signal at W Street and Foxhall Road were accounted for. In addition, the future traffic associated with the Master Plan development of George Washington University at Mount Vernon College was also accounted for in the future capacity analysis. Table 3 summarizes the total future traffic operations within the study area designated for the proposed school relocation during the critical AM and PM peak hours.

TABLE 3

Total Future Capacity Analysis Levels of Service (LOS)

Roadway Intersection	**AM Peak Hour**	**PM Peak Hour**
Signalized Intersections	***LOS***	***LOS***
Foxhall Road and Garfield Street	C	B
Foxhall Road and Whitehaven Parkway	A	A
Unsignalized Intersection	***LOS***	***LOS***
Foxhall Road and W Street		
Northbound Approach	A	A
Southbound Approach	A	A
Eastbound Approach	E	C
Westbound Approach	F	C

The results of the total future capacity analysis indicate that all of the studied signalized intersections along Foxhall Road are projected to operate at an overall acceptable level of service during the AM and PM peak hours. The unsignalized intersection of W Street and Foxhall Road will continue to operate with long delays for the W Street approaches to Foxhall Road. However, the presence of a traffic signal at the intersection of Whitehaven Parkway and Foxhall

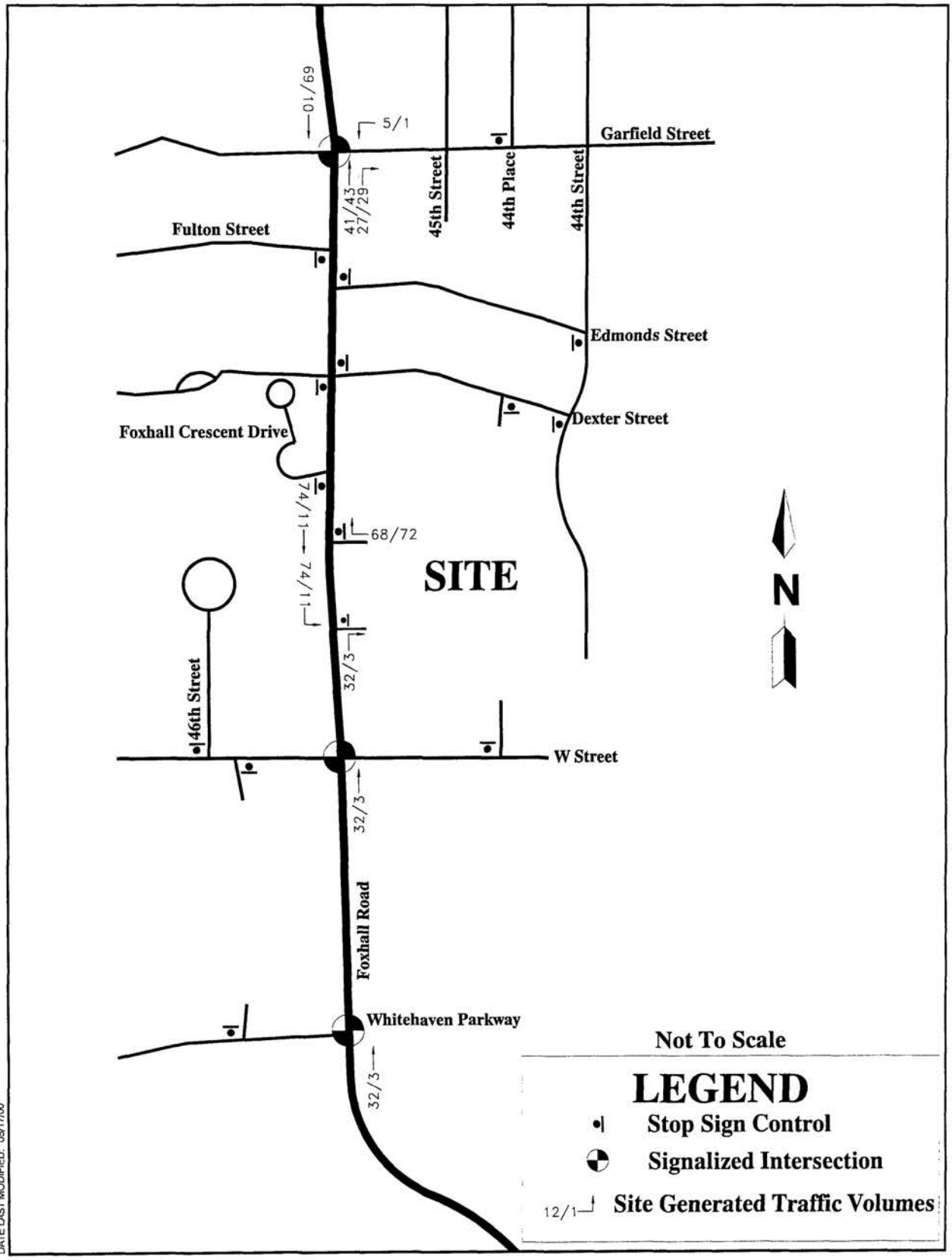
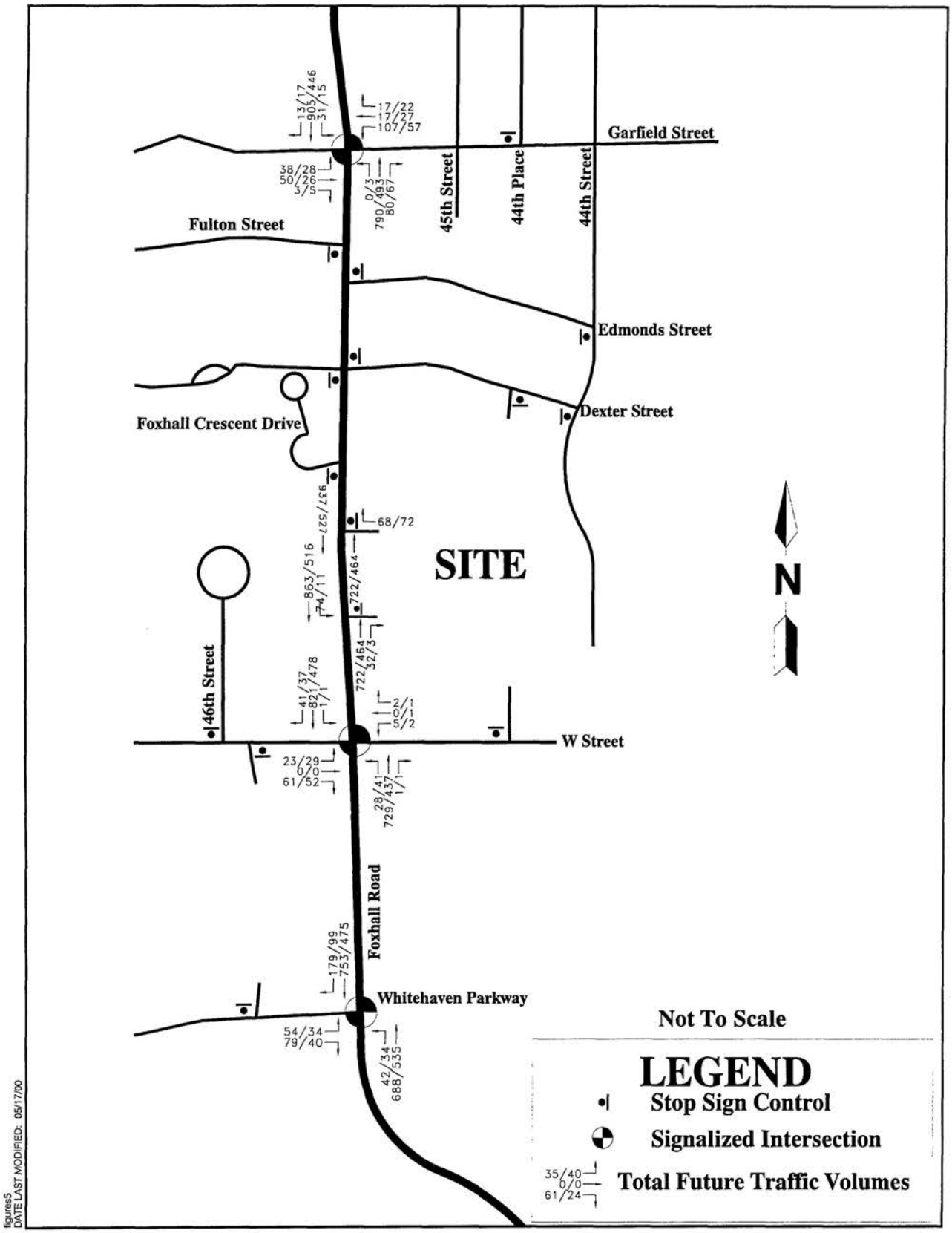


Figure 5
Future AM Site Generated Traffic Volumes



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Figure 6
Future Traffic Volumes

Road would provide a major benefit for the entire Foxhall Road corridor between Reservoir Road and Garfield Street. This proposed traffic signal would create gaps in the Foxhall Road traffic stream to allow vehicles on the minor street approaches, such as W Street, to turn safely onto Foxhall Road. Therefore, motorists on the minor street approaches along Foxhall Road, such as the W Street approaches, will be able to take advantage of the gaps in the traffic stream created by the proposed traffic signal at the Foxhall Road/Whitehaven Parkway intersection to turn more efficiently onto Foxhall Road.

Shuttle Bus Program

As identified by the survey responses, shuttle bus linkages to the Metrorail and Metrobus systems are an important part of the school transportation system. In addition to providing shuttle service for Metrorail users, the school has decided that it will expand and promote the shuttle bus service to pick up students at remote pick-up points for the convenience of the parents and to meet the simultaneous goal of keeping Field School-related vehicles away from the Foxhall Road corridor.

Shuttle bus service will be provided for students to and from the Tenleytown station (Red Line), the Foggy Bottom station (Blue and Orange Lines), and other off-site locations in the vicinity of the intersections of MacArthur Boulevard/Loughboro Road and Massachusetts Avenue/Nebraska Avenue. The two planned shuttle bus routes would consist of a route from the Foggy Bottom station to the Field School and of a circular route that would serve the off-site locations in the vicinity of the intersections of MacArthur Boulevard/Loughboro Road and Massachusetts Avenue/Nebraska Avenue and would continue to the Tenleytown station before arriving at the Field School campus. This expanded service was geared to meet the demand of parents for this alternative transportation solution. Connections to the Tenleytown and Foggy Bottom stations would serve the nearest and most convenient Metrorail stations to the school relocation site. The school is investigating other possible remote pick-up/drop-off locations.

Circulation and Stacking Considerations

The existing school site at Wyoming Avenue experiences relatively small queues for both AM drop-off and PM pick-up operations. During the AM peak hour, the maximum queuing consisted of 4 vehicles arriving at the school at one time to drop off their children. Similarly, during the PM peak hour, the maximum queuing also resulted in 4 vehicles arriving at the school at one time to pick up children. In order to accommodate the anticipated traffic demand at the relocation site, it is recommended that the on-site stacking capacity be sufficient to accommodate a maximum of 10 vehicles waiting to pick up or drop off students. Based on the submitted site plan, the site will be able to accommodate this queuing requirement with significant additional capacity remaining.

Due to the presence of two driveways, it is recommended that the roadway in front of the school be two-way to allow for vehicles from either driveway to access the front door of the school. It is recommended that a travel lane in each direction, as well as a pull-off lane in each direction be provided to allow for efficient and safe pick up and drop off operations.

The school will provide a traffic officer on duty to assist with safe access and traffic control during the morning and afternoon peak periods. This officer would also ensure the adequacy of the left-turn lane to serve southbound vehicles waiting to turn left into the school during the morning peak period. School zone warning signs and beacons will be installed along Foxhall

Road at the appropriate locations in coordination with the District of Columbia Department of Public Works to reduce the speed limit during school arrival and dismissal to 15 mph. These traffic control signs and devices would facilitate the speed control of vehicles in the vicinity of the Field School on Foxhall Road.

Projected Parking Demand

In order to determine the minimum parking requirements for the Field School, the zoning regulations mandate the following parking requirements:

- 2 spaces for every 3 employees (based on 74 employees): 50 parking spaces
- 1 space for each 10 seats in the largest public assembly area (assuming 400 seats): 40 spaces

The minimum parking requirement as specified by zoning regulations is 90 parking spaces.

Because there is no convenient on street parking areas, it is important for the school to provide sufficient parking on-site. Based on the trip generation projected for the Field School, the following parking requirements were identified:

- Spaces for employees (based on 74 employees): 50 spaces
- 1 space per student driver: 38 spaces
- Parking for visitors based on experience at the existing site: 10 spaces

Based on the requirements detailed above, the practical parking requirement for the Field School is 98 parking spaces. The parking proposed for the relocation site is 128 parking spaces, which will be sufficient to accommodate the parking demand experienced on a daily basis.

CONCLUSIONS

The objective of this study was to determine the traffic issues and possible solutions surrounding the proposed relocation and expansion of The Field School in Washington, D.C. The major findings and conclusions reached through this study are as follows:

Existing Conditions

- For the studied intersections, the Foxhall Road approaches currently operate at acceptable levels of service during the AM and PM peak hours. For the minor street approaches of W Street and Whitehaven Parkway to Foxhall Road, extensive delays occur due to the heavy commuter through volumes along Foxhall Road, thus making it difficult for motorists to turn onto Foxhall Road.
- The major community-related traffic issues consist of poor sight distances along Foxhall Road, excessive vehicular speeds within the Foxhall Road corridor, and excessive delays for traffic entering Foxhall Road from unsignalized local streets.

Future Proposed Conditions

- The Field School will generate traffic levels which can be accommodated by the public street system without adverse impacts.
- All of the studied signalized intersections will operate at acceptable levels of service during the AM and PM peak hours with the installation of a traffic signal at the intersection of Whitehaven Parkway/Foxhall Road proposed by DCDPW. For the minor street approaches of W Street to Foxhall Road, extensive delays are projected to continue to occur due to the heavy commuter through volumes along Foxhall Road. However, the presence of a traffic signal at the intersection of Whitehaven Parkway and Foxhall Road would create gaps in the Foxhall Road traffic stream to allow vehicles on the minor street approaches, such as W Street, to turn safely onto Foxhall Road.
- Access to the site would only be provided from Foxhall Road. The access plan maintains the existing northern entrance, removes the existing southern driveway, and proposes a new southern entrance approximately 215 feet from the southern property line to accommodate the anticipated traffic flow of vehicles into and out of the campus, while providing the opportunity for access at both entrances with adequate sight distance. Left turns into the site would only be allowed at the southern entrance with the installation of a southbound Foxhall Road left-turn lane. Left turns out of the Field School would only be allowed at the northern entrance during non-peak hours. Right turns into and out of the site will be allowed at both entrances.
- Shuttle bus service will be provided for students to and from the Foggy Bottom station (Blue and Orange Lines), the Tenleytown station (Red Line), and other off-site locations in the vicinity of the intersections of MacArthur Boulevard/Loughboro Road and Massachusetts Avenue/Nebraska Avenue. In addition to providing shuttle service for Metrorail users, the school has decided that it will expand and promote the shuttle bus service to pick up students at remote pick-up points for the convenience of the parents and to meet the simultaneous goal of keeping Field School-related vehicles away from the Foxhall Road corridor.

- The proposed development plan will adequately provide 128 parking spaces to accommodate the projected parking demand of approximately 98 parking spaces.
- The school will provide a traffic officer on duty to assist with safe access and traffic control during the morning and afternoon peak periods. This officer would also ensure the adequacy of the left-turn lane to serve southbound vehicles waiting to turn left into the school during the morning peak period. This situation will also be conducive to controlling vehicular speeds along Foxhall Road in the vicinity of the Field School.
- School zone warning signs and beacons will be installed along Foxhall Road at the appropriate locations in coordination with the District of Columbia Department of Public Works to reduce the speed limit during school arrival and dismissal to 15 mph. These traffic control signs and devices would facilitate the speed control of vehicles in the vicinity of the Field School on Foxhall Road.

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GOROVE/SLADE ASSOCIATES, Inc.
Suite 700 / 1140 Connecticut Ave. NW / Washington, DC 20036
Phone: (202) 296-8625
Fax: (202) 785-1276
Toll Free: (888) 212-4242

THE FIELD SCHOOL
TRANSPORTATION MANAGEMENT PLAN
May 19, 2000

The Transportation Management Plan (TMP) for the Field School provides strict guidelines and policies for managing the following elements of the school transportation system:

- Access and Circulation
- Shuttle Bus Program
- Parking
- Safety
- Enforcement and Community Coordination

The following sections present the specific guidelines for each component of the TMP.

Access, Circulation, and Carpool Operations

- Access to the site will only be provided from Foxhall Road. No access to the campus will be provided from 44th Street.

- Right turns into and out of the school are allowed at all times.

- Left turns into the school are only allowed at the southern entrance, where sight distance is adequate with the installation of a southbound left-turn lane on Foxhall Road.

- All exiting vehicles during the AM peak period must turn right to exit the campus.

- The internal circulation and stacking capacity will be adequate to serve the peak morning and afternoon queues associated with the drop-off and pick-up operations.

- Morning drop-off operations will be staggered with 7th and 8th graders (50 students) starting at 8:00 AM and 9th-12th graders (270 students) starting at 8:20 AM. This will allow for all of the 7th and 8th graders to arrive before most of the 9th-12th graders arrive.

- Afternoon pick-up operations are naturally staggered due to the participation of a large majority of the student population in physical education, interscholastic athletics, and extracurricular activities.

- Faculty and staff driving to the Field School will be required to arrive before 7:30 AM.

- Field School will not provide lighted outdoor athletic facilities that will generate traffic in the evenings.

BZA
Case No. 16559
Exhibit No. 437-C

Shuttle Bus Program

- Shuttle bus service will be provided for students to and from the Tenleytown station (Red Line), the Foggy Bottom station (Blue and Orange Lines), and other off-site locations in the vicinity of the intersections of MacArthur Boulevard/Loughboro Road and Massachusetts Avenue/Nebraska Avenue.

- The school will expand and promote the shuttle bus service to pick up students at remote pick-up points for the convenience of the parents and to meet the simultaneous goal of keeping Field School-related vehicles away from the Foxhall Road corridor. The school will arrange for off-site pick-up points, such as near the intersections of MacArthur Boulevard/Loughboro Road and Massachusetts Avenue/Nebraska Avenue and other commuting arteries into the District of Columbia in order to avoid adding traffic onto Foxhall Road.

- The two planned shuttle bus routes would consist of a route from the Foggy Bottom station to the Field School and of a circular route that would serve the off-site locations in the vicinity of the intersections of MacArthur Boulevard/Loughboro Road and Massachusetts Avenue/Nebraska Avenue and would continue to the Tenleytown station before arriving at the Field School campus.

- The school is investigating other off-site shuttle bus locations that could be used as drop-off and pick-up points for parents to utilize.

- The current school location has limited parking. As a result, some Field School employees have utilized public transportation to arrive at work. The shuttle bus service will allow for some employees to continue to use public transportation to arrive at work.

Parking

- Adequate parking is provided to meet the projected daily parking demands of faculty/staff, students, and visitors driving to the Field School.

- All faculty/staff, students, and visitors driving to the Field School are required to park on campus.

- Student drivers will be required to bring at least two additional students with him or her as a requirement of their parking privilege.

- Student drivers will be issued parking stickers that will readily identify his or her vehicle as a Field School-related vehicle. Students who do not have a parking sticker will be prohibited from driving to school. Enrollment contracts will mandate the loss of driving privileges for students who attempt to park in the neighborhood. Disciplinary measures up to and including suspension and/or expulsion will be utilized to enforce parking regulations.

- Faculty and staff will be encouraged to carpool or take public transportation and the associated shuttle bus program to the Field School. Based on the existing parking patterns and the shuttle bus program, it is projected that 50 parking spaces will be needed to meet the faculty/staff parking demand. This demand can be adequately served by the proposed supply of 128 parking spaces.

- For special events that occur no more than four times a year, Field School will operate shuttle buses to available off-site parking locations. Field School will enforce its ban on neighborhood parking during these events.

Safety

- Field School will install a sidewalk for public use within the school's property with a significant buffer between the sidewalk and Foxhall Road.

- A traffic control officer will be present to assist vehicles entering and exiting the property during the AM and PM peak period. The presence of this officer will be conducive to controlling vehicular speeds along Foxhall Road in the vicinity of the Field School.

- Flashing school zone warning signs reducing the speed limit to 15 mph will be installed along Foxhall Road at the appropriate locations in coordination with the District of Columbia Department of Public Works. These traffic control signs and devices will be installed in accordance with guidelines set in the Manual on Uniform Traffic Control Devices (MUTCD) and will facilitate the speed control of vehicles in the vicinity of the Field School on Foxhall Road.

Enforcement and Community Coordination

- Parking enforcement of student drivers will consist of students registering their vehicles and requiring them to park on campus. Students who do not register their vehicles and attempt to park in the neighborhood will be subject to disciplinary measures up to and including suspension and/or expulsion.

- Field School will meet quarterly with a neighborhood committee to address any traffic issues that may arise. This neighborhood committee would consist of one representative from the Field School, the Neighborhood Alliance, Foxhall Crescents Citizens Association, Palisades Citizens Association, ANC 3D, and from the neighboring properties along W Street and Foxboro Place.

- Field School will cooperate with other schools in the area to address community concerns.

GOROVE/SLADE ASSOCIATES, Inc.
Suite 700 / 1140 Connecticut Ave. NW / Washington, DC 20036
Phone: (202) 296-8625
Fax: (202) 785-1276
Toll Free: (888) 212-4242

MEMORANDUM

TO: Board of Zoning Adjustment

FROM: Erwin N. Andres
Louis J. Slade, P.E.

DATE: May 19, 2000

SUBJECT: Foxhall Road Accident Data Summary

INTRODUCTION

This memorandum presents a summary of traffic data for Foxhall Road from 1995 to 1999 that includes annual summaries of accidents reported and injuries sustained in those accidents. Figure 1 presents a tabular summary of the accidents reported along Foxhall Road. Also attached are the raw accident information sheets obtained from the District of Columbia Department of Public Works (DCDPW) and the Metropolitan Police Department (MPD).

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BZA
Case No. 16559
Exhibit No. 43-01

Table 1
Foxhall Road Automobile Accident Data Summary

Foxhall Road Intersection with	YEAR					
	1995		1997		July 1998 - July 1999	
	Number of Accidents	Number of Injuries	Number of Accidents	Number of Injuries	Number of Accidents	Number of Injuries
Reservoir Road/Salem Lane	3	2	3	1	-	-
Whitehaven Parkway	3	1	1	0	-	-
W Street	2	0	6	3	5	1
Dexter Street	2	2	2	0	-	-
Garfield Street	1	1	4	2	-	-

Table 1
Foxhall Road Automobile Accident Data Summary

Foxhall Road Intersection with	YEAR					
	1995		1997		July 1998 - July 1999	
	Number of Accidents	Number of Injuries	Number of Accidents	Number of Injuries	Number of Accidents	Number of Injuries
Reservoir Road/Salem lane	3	2	3	1	-	-
Whitehaven Parkway	3	1	1	0	-	-
W Street	2	0	6	3	5	1
Dexter Street	2	2	2	0	-	-
Garfield Street	1	1	4	2	-	-

FY-00 HIGHWAY SAFETY IMPROVEMENT PROGRAM
DC DPW: ACCIDENT SUMMARY REPORT (R-7)

Link Location
FOXHALL RD & RESERVOIR RD & SALEM LN NW

1995		1996		1997	
Accidents	Injuries	Accidents	Injuries	Accidents	Injuries
3	2	0	0	3	1

1995 - 1997 SUMMARIES

CONTRIBUTING FACTORS:

Driver		Vehicle		Roadway		Unknown	
2	33.3%	2	33.3%	0	0.0%	2	33.3%

COLLISION TYPES:

TOTAL	RA	LT	RT	RE	SS	HO	PK	FO	RO	PED	BACKING	NC	OT
6	0	0	0	3	2	0	0	0	0	0	0	0	1

ACCIDENT TIMES:

TIME	1995		1996		1997	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
7:30-09:30	0	0.0%	0	0.0%	0	0.0%
9:30-11:30	0	0.0%	0	0.0%	0	0.0%
11:30-13:30	1	33.3%	0	0.0%	0	0.0%
13:30-16:00	1	33.3%	0	0.0%	0	0.0%
16:00-18:30	1	33.3%	0	0.0%	2	66.7%
18:30-07:30	0	0.0%	0	0.0%	1	33.3%
TOTAL	3	100.0%	0	0.0%	3	100.0%
WEEKDAY	1	33.3%	0	0.0%	3	100.0%
WEEKEND	2	66.7%	0	0.0%	0	0.0%

SYMPTOM	SOLUTION ALTERNATIVE	RECOMMENDATION

FY-00 HIGHWAY SAFETY IMPROVEMENT PROGRAM
DC DPW: ACCIDENT SUMMARY REPORT (R-7)

ank Location
FOXHALL RD & RESERVOIR RD & SALEM LN NW

1995		1996		1997	
Accidents	Injuries	Accidents	Injuries	Accidents	Injuries
3	2	0	0	3	1

995 - 1997 SUMMARIES

ONTRIBUTING FACTORS:

Driver		Vehicle		Roadway		Unknown	
2	33.3%	2	33.3%	0	0.0%	2	33.3%

OLLISION TYPES:

TAL	RA	LT	RT	RE	SS	HO	PK	FO	RO	PED	BACKING	NC	OT
6	0	0	0	3	2	0	0	0	0	0	0	0	1

CCIDENT TIMES:

TIME	1995		1996		1997	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
:30-09:30	0	0.0%	0	0.0%	0	0.0%
:30-11:30	0	0.0%	0	0.0%	0	0.0%
:30-13:30	1	33.3%	0	0.0%	0	0.0%
:30-16:00	1	33.3%	0	0.0%	0	0.0%
:00-18:30	1	33.3%	0	0.0%	2	66.7%
:30-07:30	0	0.0%	0	0.0%	1	33.3%
TOTAL	3	100.0%	0	0.0%	3	100.0%
EKDAY	1	33.3%	0	0.0%	3	100.0%
EKEND	2	66.7%	0	0.0%	0	0.0%

SYMPTOM	SOLUTION ALTERNATIVE	RECOMMENDATION

GE: 1

FY-00 HIGHWAY SAFETY IMPROVEMENT PROGRAM
DC DPW: ACCIDENT SUMMARY REPORT (R-7)

DATE: 03/27/00

nk Location
FOXHALL RD & WHITEHAVEN PKY NW

1995		1996		1997	
Accidents	Injuries	Accidents	Injuries	Accidents	Injuries
3	1	0	0	1	0

'95 - 1997 SUMMARIES

)NTRIBUTING FACTORS:

Driver		Vehicle		Roadway		Unknown	
1	25.0%	2	50.0%	0	0.0%	1	25.0%

)LLISION TYPES:

)TAL	RA	LT	RT	RE	SS	HO	PK	FO	RO	PED	BACKING	NC	OT
4	0	0	0	1	1	0	0	1	0	0	0	0	1

:CIDENT TIMES:

TIME	1995		1996		1997	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
7:30-09:30	2	66.7%	0	0.0%	0	0.0%
9:30-11:30	1	33.3%	0	0.0%	0	0.0%
1:30-13:30	0	0.0%	0	0.0%	0	0.0%
3:30-16:00	0	0.0%	0	0.0%	1	100.0%
5:00-18:30	0	0.0%	0	0.0%	0	0.0%
8:30-07:30	0	0.0%	0	0.0%	0	0.0%
TOTAL	3	100.0%	0	0.0%	1	100.0%
EEKDAY	2	66.7%	0	0.0%	1	100.0%
EEKEND	1	33.3%	0	0.0%	0	0.0%

SYMPTOM	SOLUTION ALTERNATIVE	RECOMMENDATION

AGE: 1

FY-00 HIGHWAY SAFETY IMPROVEMENT PROGRAM
DC DPW: ACCIDENT SUMMARY REPORT (R-7)

DATE: 03/27/00

ank Location

FOXHALL RD & W ST NW

1995		1996		1997	
Accidents	Injuries	Accidents	Injuries	Accidents	Injuries
2	0	0	0	6	3

995 - 1997 SUMMARIES

ONTRIBUTING FACTORS:

Driver		Vehicle		Roadway		Unknown	
5	62.5%	1	12.5%	0	0.0%	2	25.0%

OLLISION TYPES:

OTAL	RA	LT	RT	RE	SS	HO	PK	FO	RO	PED	BACKING	NC	OT
8	1	0	0	3	0	0	0	0	1	0	0	0	3

CCIDENT TIMES:

TIME	1995		1996		1997	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
07:30-09:30	1	50.0%	0	0.0%	0	0.0%
09:30-11:30	0	0.0%	0	0.0%	0	0.0%
11:30-13:30	0	0.0%	0	0.0%	0	0.0%
13:30-16:00	0	0.0%	0	0.0%	2	33.3%
16:00-18:30	1	50.0%	0	0.0%	2	33.3%
18:30-07:30	0	0.0%	0	0.0%	2	33.3%
TOTAL	2	100.0%	0	0.0%	6	100.0%
WEEKDAY	1	50.0%	0	0.0%	5	83.3%
WEEKEND	1	50.0%	0	0.0%	1	16.7%

SYMPTOM	SOLUTION ALTERNATIVE	RECOMMENDATION

FY-00 HIGHWAY SAFETY IMPROVEMENT PROGRAM
DC DPW: ACCIDENT SUMMARY REPORT (R-7)

DATE: 03/27/00

ank Location

DEXTER ST & FOXHALL RD NW

1995		1996		1997	
Accidents	Injuries	Accidents	Injuries	Accidents	Injuries
2	2	0	0	2	0

995 - 1997 SUMMARIES

ONTRIBUTING FACTORS:

Driver		Vehicle		Roadway		Unknown	
2	50.0%	2	50.0%	0	0.0%	0	0.0%

OLLISION TYPES:

OTAL	RA	LT	RT	RE	SS	HO	PK	FO	RO	PED	BACKING	NC	OT
4	1	0	0	2	0	1	0	0	0	0	0	0	0

CCIDENT TIMES:

TIME	1995		1996		1997	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
7:30-09:30	0	0.0%	0	0.0%	0	0.0%
9:30-11:30	0	0.0%	0	0.0%	0	0.0%
1:30-13:30	1	50.0%	0	0.0%	0	0.0%
3:30-16:00	0	0.0%	0	0.0%	0	0.0%
6:00-18:30	0	0.0%	0	0.0%	1	50.0%
8:30-07:30	1	50.0%	0	0.0%	1	50.0%
TOTAL	2	100.0%	0	0.0%	2	100.0%
EEKDAY	1	50.0%	0	0.0%	2	100.0%
EEKEND	1	50.0%	0	0.0%	0	0.0%

SYMPTOM	SOLUTION ALTERNATIVE	RECOMMENDATION

GE: 1

FY-00 HIGHWAY SAFETY IMPROVEMENT PROGRAM
DC DPW: ACCIDENT SUMMARY REPORT (R-7)

DATE: 03/27/00

nk Location

FOXHALL RD & GARFIELD ST NW

1995		1996		1997	
Accidents	Injuries	Accidents	Injuries	Accidents	Injuries
1	1	0	0	4	2

95 - 1997 SUMMARIES

NTRIBUTING FACTORS:

Driver		Vehicle		Roadway		Unknown	
1	20.0%	1	20.0%	1	20.0%	2	40.0%

LLISION TYPES:

TAL	RA	LT	RT	RE	SS	HO	PK	FO	RO	PED	BACKING	NC	OT
5	0	1	0	1	1	1	0	1	0	0	0	0	0

CIDENT TIMES:

TIME	1995		1996		1997	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
:30-09:30	0	0.0%	0	0.0%	0	0.0%
:30-11:30	0	0.0%	0	0.0%	2	50.0%
:30-13:30	0	0.0%	0	0.0%	0	0.0%
:30-16:00	0	0.0%	0	0.0%	0	0.0%
:00-18:30	0	0.0%	0	0.0%	2	50.0%
:30-07:30	1	100.0%	0	0.0%	0	0.0%
TOTAL	1	100.0%	0	0.0%	4	100.0%
EKDAY	1	100.0%	0	0.0%	4	100.0%
EKEND	0	0.0%	0	0.0%	0	0.0%

SYMPTOM	SOLUTION ALTERNATIVE	RECOMMENDATION

METROPOLITAN POLICE DEPARTMENT
COMPUTER ASSISTED DISPATCHING SYSTEM
RADIO RUNS BY ADDRESS..... FOXHALL RD NW/W ST NW
PROGRAM CREATED BY LORENZO 06:12:10 Aug 13 1999
FROM 07/01/98 THROUGH 07/31/99

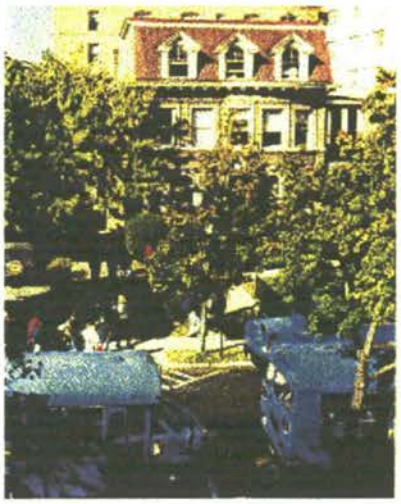
DATE....	TIME....	ADDRESS.....	NATURE.....	REPORT....	R	PRI.	UNIT	COUNT		
09/19/98	16:29:20	FOXHALL RD NW/W ST NW	DAUT-DISABLED AUTO	98-0525658	N	2032		1		
09/27/98	22:36:24	FOXHALL RD NW/W ST NW	DISO-DISORDERLY CONDUCT	98-0543437	N	2031		1		
12/11/98	06:16:17	FOXHALL RD NW/W ST NW	OTHR-OTHER	98-0696983	N	2031		1		
12/15/98	08:14:47	FOXHALL RD NW/W ST NW	DAUT-DISABLED AUTO	98-0704763	N	2031		1		
12/23/98	17:32:12	FOXHALL RD NW/W ST NW	ACCP-ACCIDENT PROPERTY DAMAGE ONLY	98-0720901	N	2051		1	/	
12/29/98	17:16:56	FOXHALL RD NW/W ST NW	ACIJ-ACCIDENT / INJURY	98-0730851	Y	2031		1	/	INJURY
02/23/99	23:53:21	FOXHALL RD NW/W ST NW	TCMP-TRAFFIC COMPLAINT	99-0101467	N	2031		1		
03/09/99	09:57:43	FOXHALL RD NW/W ST NW	ACCP-ACCIDENT PROPERTY DAMAGE ONLY	99-0126981	N	22222		1	/	
03/16/99	23:07:44	FOXHALL RD NW/W ST NW	ASSS-ASSIST	99-0140759	N	2062		1		
03/23/99	23:40:30	FOXHALL RD NW/W ST NW	ACCP-ACCIDENT PROPERTY DAMAGE ONLY	99-0154456	N	2031		1	/	
04/24/99	13:38:52	FOXHALL RD NW/W ST NW	ACCP-ACCIDENT PROPERTY DAMAGE ONLY	99-0218788	N	2052		1	/	
07/26/99	08:25:52	FOXHALL RD NW/W ST NW	ANCT-ANIMAL COMPLAINT	99-0418132	N	2032		1		
07/28/99	00:05:38	FOXHALL RD NW/W ST NW	TRAFFIC STOP		N	2032		1		
		**********						---		
		FOXHALL RD NW/W ST NW						13		
								=====		
TOTAL								13		

13 records listed

MAY. -08' 00(MON) 09:44 WILKES ARTIS TEL:202 457 7362 P. 007

Technical Appendix
The Field School

Prepared For



The Field School

Washington, D.C.

Prepared by
Gorove/Slade Associates, Inc.

1140 Connecticut Avenue NW
Suite 700
Washington, D.C. 20036
202-296-8625

May 19, 2000

BZA
Case No. 16559
Exhibit No. 43 J-E

Do Advance School Flashers Reduce Speed?

BY GIAN C. AGGARWAL AND STACEY L. MORTENSEN

In 1990, more than 6,400 pedestrians died in traffic accidents on American roads and highways. Nearly one in six people killed in motor vehicle accidents was a pedestrian. The annual cost of these accidents to society exceeds one billion dollars.

Historically, pedestrians older than 65 and younger than 14 are more likely to be involved in traffic fatalities. In major urban areas, they account for one-half of the motor vehicle-related deaths. Traffic accidents involving pedestrians become a major emotional public issue if the pedestrian happens to be a child walking to or from school. Although the safety record for school crossings is excellent, traffic engineers, in general, show extreme caution when planning safe school crossings. These safety measures are highly critical if the roadway in question is a high-speed roadway. In these situations, the Institute of Transportation Engineers and other professional organizations recommend alternatives that might include installation of flashing yellow beacons, traffic signals and pedestrian bridges. Although these are costly alternatives, cost becomes a secondary issue when considering the safety of the school children.

Background

The city of Vacaville, Calif., is on Interstate 80 midway between San Francisco and Sacramento. Both cities are within easy commute from Vacaville. Vacaville has been experiencing tremendous growth and was cited as the second fastest-growing city in Northern California in 1991. Between 1980 and 1990, the population grew by about 50 percent, bringing the total to about 75,000 people. In the past few years, more than 2,000 homes have been constructed in the vicinity of Browns Valley Road, which created the need for a new elementary school to accommodate the added enrollment. The new Browns Valley Elementary School is on Wrentham Drive off of Browns Valley Road, as shown in Figure 1.

Browns Valley Road is a major, high-speed arterial connecting the northern part of the city and the county to downtown Vacaville through E. Monte Avenue. It also intersects another major east-west arterial, Vaca Valley Parkway, which provides connections to Interstate 80 and Interstate 505.

Before the scheduled opening of this school, the school superintendent made a specific request to install traffic signals or flashing yellow beacons on Browns Valley Road. This was to reduce the speed of traffic passing through the school zone so that the school children could cross Browns Valley Road safely at the designated school crossings. The posted speed limit on this section of Browns Valley Road was 40 miles per hour (mph).

Selection of Traffic Control Measures

Traffic control devices aid pedestrians and drivers in making safe and efficient use of the road by regulating the assignment of the right-of-way, including giving information on crosswalks and their use. In studying the effectiveness of a traffic control device, it is necessary to take the existing traffic conditions into account.

Various locations were evaluated for potential school crossings from the east side of Browns Valley Road to the west side. Each location was reviewed with regard to the available sight distance, and the safest, most direct route to the school site.

Prior speed zone surveys conducted in 1988 on this segment of Browns Valley Road indicated that the average speed is 45 mph. Because of the prevailing high speeds, the following traffic control measures were considered in addition to the standard traffic signs and pavement markings:

- Flashing yellow beacons
- Fully actuated traffic signals
- Pedestrian bridge

Economic restrictions and the low side-street traffic volumes made it impractical to install a pedestrian bridge or traffic signals at any of the potential locations. However, the traffic manual of the California Department of Transportation (Caltran) suggests the supplemental installation of advance flashing yellow beacons if the "critical approach speed exceeds 35 mph." Flashing beacons, when activated, draw a driver's attention to unusual traffic conditions, which in this case, would be the presence of school children in the

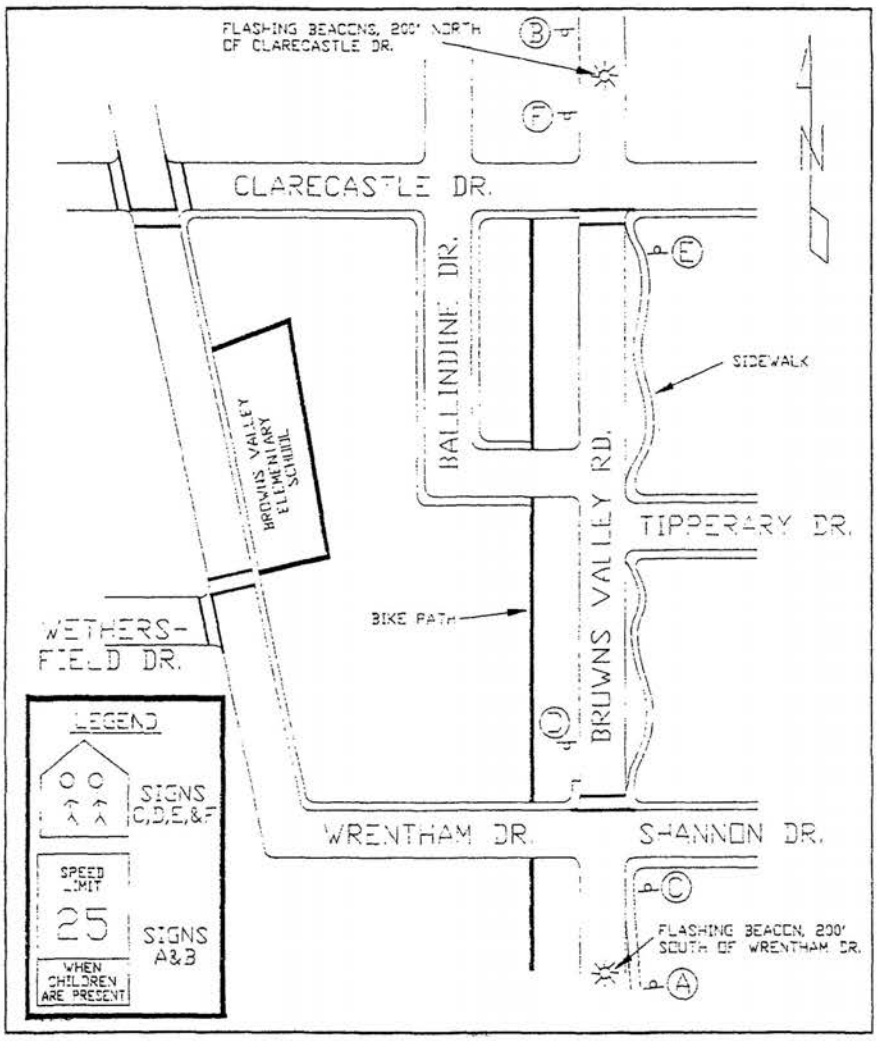


Figure 1. School site and various traffic controls.

crosswalk. Therefore, the installation of flashing beacons was recommended in addition to the standard signing and pavement markings for crosswalks.

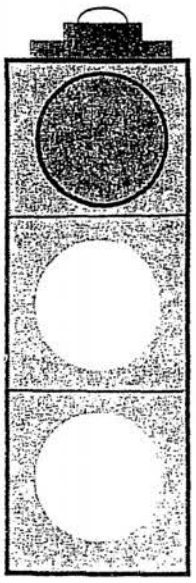
Installation and Operation of Flashers

Based on the above criteria, it was decided to provide the following traffic controls:

- Install yellow crosswalks on Browns Valley Road at Clarescastle Way and at Wrentham Drive, as shown in Figure 1, and assign an adult crossing guard to each location. School crossing signs also were installed for each direction of vehicular traffic to alert motorists to the existence of the crosswalks. These intersections provide the best available sight distance and service to school children from all areas of the east side of Browns Valley Road.
- Install "SLOW SCHOOL XING" pavement legends for each direction of vehicular traffic in advance of each crosswalk.
- Install advance flashing yellow beacons or flashers (as these are commonly called) and advance school crossing signs on Browns Valley Road at each of the school crossing zones to alert motorists to the upcoming crosswalk.
- Install 25 mph speed limit signs with "SCHOOL" and "WHEN CHILDREN ARE PRESENT" signs in advance of flashing beacons.

All the recommended traffic control measures, including the advance flashers, were installed before the school opened for the new school year on July 1, 1991.

Since the secondary power source was quite a distance away from the flashers and installing conduit, wire and pullboxes were not cost effective, it was



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Figure 2. Advance school flashers with "School Xing" sign. Note solar panel on top of the pole.

decided to power these flashers by solar energy, as is shown in Figure 2.

The flashers were programmed to operate only for one hour during the school starting and quitting time, that is from 8 to 9 a.m. and from 2 to 3 p.m., Monday through Friday. All other hours the flashers would be off to avoid becoming a nuisance to the motoring public and to preserve their effectiveness. By operating only when school children are present, the flashers command more obedience and respect from drivers.

Field Data Collection and Analysis

Since the basic request for the flashers was based on the assumption that their installation would result in lower speeds during the period when the flashers are on, it was decided to conduct speed studies after the traffic conditions stabilized on this section of the roadway.

Speed study data was collected during the months of March and April 1992 at the school starting and quitting times. Tuesdays and Wednesdays were chosen for conducting these studies to nullify the effect of weekend and holiday traffic speeds.

Eight sets of speed studies (16 studies in all) were conducted—eight for the northbound direction and the other eight for southbound direction. Out of these eight studies, four were for the period when the flashers were off and the other four were when the flashers were in operation. Speed samples of 100 vehicles each were studied during a one-hour period when the flashers were off and during one hour when the flashers were on. Speeds for both northbound and southbound directions also were studied. Another precaution taken to assure consistency was to have all the observations taken by the same person.

The field data collected for these 16 speed studies was analyzed. In order to test the significance of the percentage change, a statistical analysis was conducted, as shown in the Appendix (see page 29). Tables 1 and 2 represent the analyzed data for northbound and southbound directions, respectively.

Out of the four sets of studies for northbound direction, the absolute reduction in average speeds for three sets of studies varies from 6.6 mph to 12.5 mph. The statistical analysis indicates a significant decrease in average speeds. These values translate into 16 percent to 32 percent reduction in average speeds when the flashers are on.

For the fourth study set, there is a slight increase of 0.3 mph in average speed. This increase is shown to be insignificant on the basis of the statistical analysis and can be ignored. These results are summarized in Table 3 and are shown in Figure 3.

For the southbound direction, the absolute reduction in average speeds for all four sets of studies varies from 2.8 mph to 7.6 mph and is shown to be significant based on this analysis. After calculating the percentages, these represent an 8 percent to 22 percent reduction in average speeds. These results are summarized in Table 4 and are shown in Figure 4.

An analysis of the 85th percentile speeds indicates that these speeds decreased for all eight sets of studies as shown in Tables 3 and 4. The reduction varied from 5 percent to 28 percent for the seven sets of studies while the results for studies III and IV were ignored. These 85th percentile speeds are represented in Figures 5 and 6.

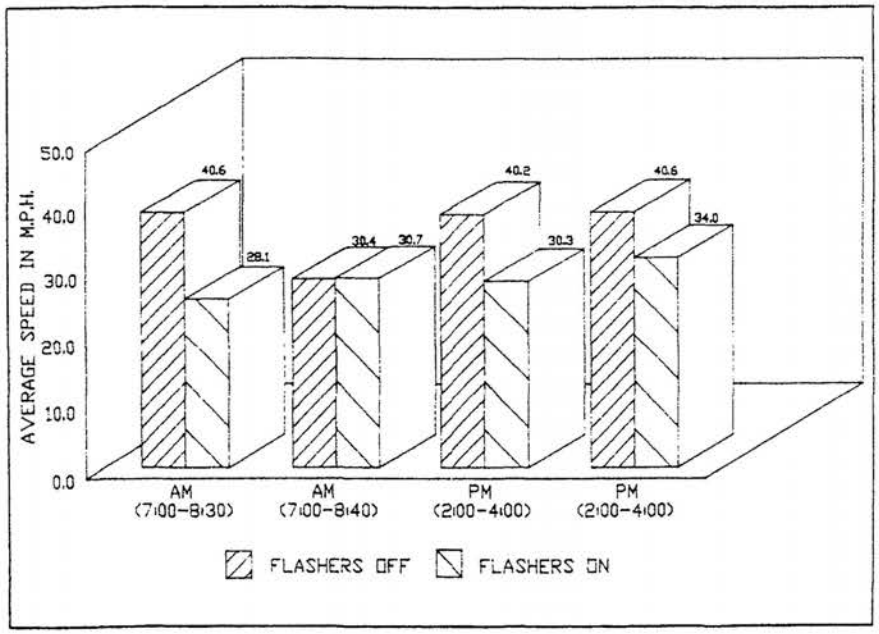


Figure 3. Average speed for northbound traffic.

Conclusions

Literature search indicates that the flashing beacons do not offer any benefits for pedestrian crossings in urban environments. Some studies even suggest that a significant increase in operating speeds occurred after flashers were added to the standard school crossing traffic controls.[1] The results of the present study are quite contrary to these findings and identify a considerable reduction in average speeds during the periods when these advance school flashers were operating. These decreases might be attributed to the local drivers' awareness and their respect for the traffic control devices.

Although the average speeds and the 85th percentile speeds seem to have

decreased considerably during the flashing operation, they are far from complying with the posted speed of "25 mph when children are present." However, this study indicates that the average speeds were reduced from a high of 38 mph to 31 mph, which is substantially closer to the goal of 25 mph.

The authors suggest that additional studies be conducted regarding the impacts of advance school flashers on the average speeds in school zones. If nothing more, flashers at least serve the purpose of warning drivers about the unusual traffic conditions on the roadway and in the present study, the average driver has reduced speed, which clearly supports the findings of this study.

Acknowledgments

The authors wish to express their gratitude to Mr. Dale Pfeiffer, director of Public Works, for his encouragement during the preparation of this article. Sincere thanks also are due to the staff of Traffic Engineering Division for their assistance in collecting field data.

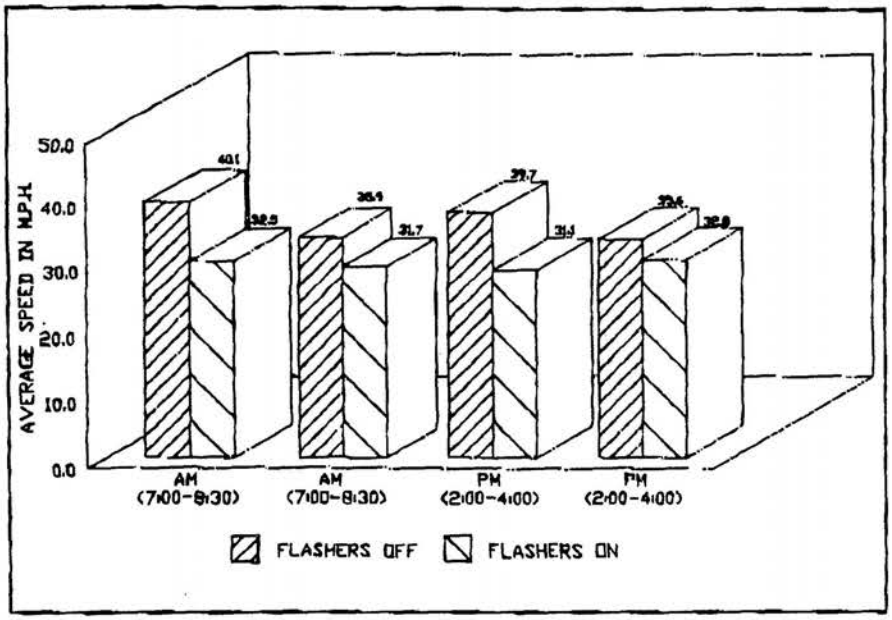


Figure 4. Average speed for southbound traffic.

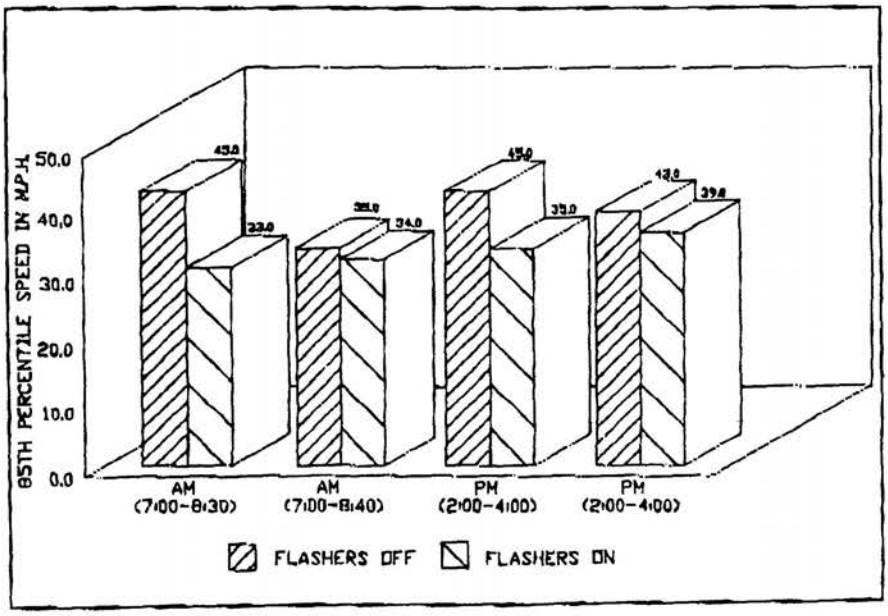
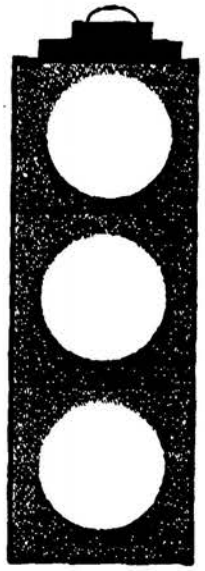


Figure 5. 85th percentile speed for northbound traffic.



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preparing exhibits and typing the manuscript.

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Table 1. Speed Studies (Northbound Traffic)

Study #	Day, Date & Time of Study	Flashers Off		Study #	Day, Date & Time of Study	Flashers On		Standard Deviation of the Difference in Means 6d	Absolute Difference in Value |d|	Remarks |d|>2x6d
		Mean Speed ü	Standard Error of Mean			Mean Speed ü	Standard Error of Mean			
I	Tuesday, March 3, 1992 7-7:45 a.m.	40.6 mph	0.6 mph	II	Tuesday, March 3, 1992 7:45-8:30 a.m.	28.1 mph	.5 mph	.7	12.5	Significant
III*	Wednesday, April 15, 1992 7-7:45 a.m.	30.4 mph	0.6 mph	IV	Wednesday, April 15, 1992 7:45-8:40 a.m.	30.7 mph	.5 mph	.8	.3	Insignificant
V	Tuesday, March 3, 1992 2-3 p.m.	40.2 mph	0.6 mph	VI	Tuesday, March 3, 1992 3-4 p.m.	30.3 mph	.5 mph	.8	10.0	Significant
VII	Wednesday, March 4, 1992 2-3 p.m.	40.6 mph	0.5 mph	VIII	Wednesday, March 4, 1992 3-4 p.m.	34.0 mph	.7 mph	.8	6.6	Significant

*This observation for Study III may be ignored because of bad weather conditions.

Table 2. Speed Studies (Southbound Traffic)

Study #	Day, Date & Time of Study	Flashers Off		Study #	Day, Date & Time of Study	Flashers On		Standard Deviation of the Difference in Means 6d	Absolute Difference in Value |d|	Remarks |d|>2x6d
		Mean Speed ü	Standard Error of Mean			Mean Speed ü	Standard Error of Mean			
IX	Tuesday, March 24, 1992 7-7:45 a.m.	40.1 mph	.5 mph	X	Tuesday, March 24, 1992 7:45-8:30 a.m.	32.5 mph	0.7 mph	.9	7.6	Significant
XI	Wednesday, March 4, 1992 7-7:45 a.m.	35.9 mph	.5 mph	XII	Wednesday, March 4, 1992 7:45-8:40 a.m.	31.7 mph	0.6 mph	.7	4.2	Significant
XIII	Tuesday, March 24, 1992 2-3 p.m.	39.7 mph	.6 mph	XIV	Tuesday, March 3, 1992 3-4 p.m.	31.1 mph	0.5 mph	.8	8.6	Significant
XV	Wednesday, April 15, 1992 2-3 p.m.	35.6 mph	.5 mph	XVI	Wednesday, April 15, 1992 3-4 p.m.	32.8 mph	0.6 mph	.8	2.8	Significant

Appendix

Average mean of speed:

$$\ddot{u} = \frac{\Sigma f_n \cdot u_n}{N}$$

where,
$\ddot{u}$ = mean or average speed
f_n = number of observations
u_n = speed
N = total number of vehicles observed
Standard Deviation:

$$\sigma = \sqrt{\frac{\Sigma f_n \cdot (u_n)^2}{N\text{-}1} - \left(\frac{\Sigma f_n \cdot u_n}{N}\right)^2}$$

where,
σ = standard deviation
Standard Error of Mean:

$$\sigma_{\ddot{u}} = \sqrt{\frac{\sigma^2}{N}}$$

where,
$\sigma_{\ddot{u}}$ = standard error of the sample mean
If, σ_d is the standard deviation of the difference in means,

$$\sigma_d = \sigma_{\ddot{u}1}^2 + \sigma_{\ddot{u}2}^2$$

where,
$\sigma_{\ddot{u}1}^2$ = variance of the mean for Study 1
where,
$\sigma_{\ddot{u}2}^2$ = variance of the mean for Study 2

If the absolute of the difference in sample mean speeds is greater than twice the standard deviation of the difference in mean, that is, if

$$| d = \ddot{u}_1 - \ddot{u}_2 | > 2\sigma_d$$

where,
$\ddot{u}_1$ = mean speed of Study 1
where,
$\ddot{u}_2$ = mean speed of Study 2 ∎



Gian C. Aggarwal, *city traffic engineer of the city of Vacaville, Calif., has more than 26 years of experience in traffic engineering operations, transportation planning and transportation engineering administration. He previously worked as a traffic engineer with the Detroit Department of Transportation. He holds a B.S. and M.S. degree in civil engineering and is a Member of ITE.*



Stacey L. Mortensen *is currently an associate transportation planner for San Joaquin County, Stockton, Ca. She previously worked for the Traffic Engineering Division for the City of Vacaville Public Works Department. She has a B.S. degree in environmental planning and management from the University of California–Davis.*

Tables 3 and 4 are shown on page 30

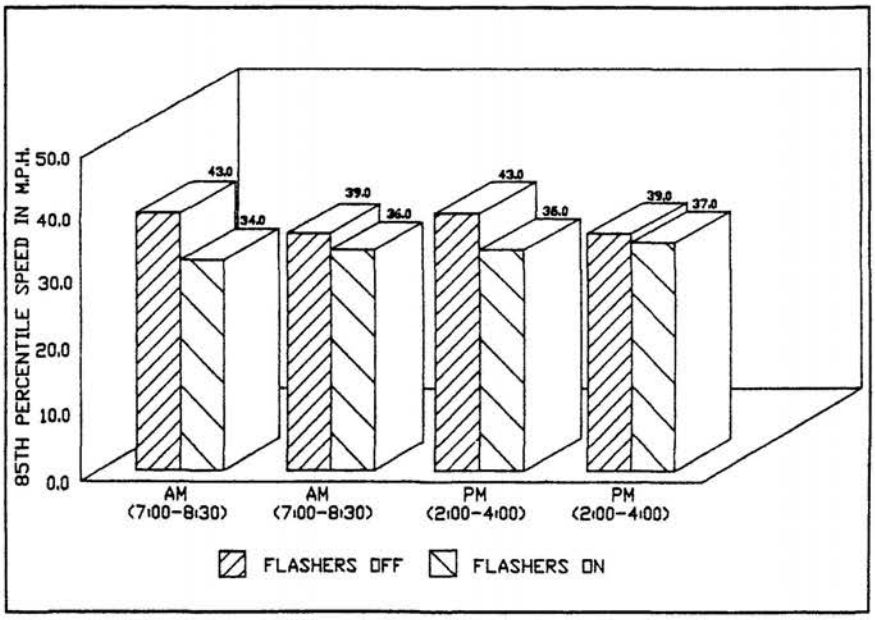
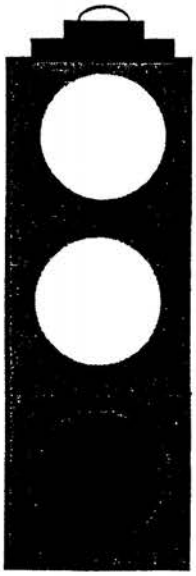


Figure 6. 85th percentile speed for southbound traffic.



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Table 3. Average Speeds (Northbound Traffic)

Study #	Flashers Off		Study #	Flashers On		Percentage Reduction (Increase) In	
	85th Percentile Speed	Average Speed		85th Percentile Speed	Average Speeds	85th Percentile Speed	Average Speed
I	45 mph	40.6 mph	II	33 mph	28.1 mph	26.7%	31.8%
III*	35 mph	30.4 mph	IV	34 mph	30.7 mph	2.9%	(1.0%)
V	45 mph	40.2 mph	VI	35 mph	30.3 mph	28.6%	24.7%
VII	43 mph	40.6 mph	VIII	39 mph	34.0 mph	9.3%	16.3%

*This observation for Study III may be ignored because of bad weather conditions.

Table 4. Average Speeds (Southbound Traffic)

Study #	Flashers Off		Study #	Flashers On		Percentage Reduction (Increase) In	
	85th Percentile Speed	Average Speed		85th Percentile Speed	Average Speed	85th Percentile Speed	Average Speed
IX	43 mph	40.1 mph	X	39 mph	32.5 mph	9.3%	19.0%
XI	39 mph	35.9 mph	XII	36 mph	31.7 mph	7.7%	11.7%
XIII	43 mph	39.7 mph	XIV	36 mph	31.1 mph	16.3%	21.7%
XV	39 mph	35.6 mph	XVI	37 mph	32.8 mph	5.1%	7.9%

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EXISTING TRAFFIC VOLUMES

Intersection Traffic Volume Counts and Peak Hour Volume

AM
PEAK HOUR

JOB NAME:	The Field School	**COUNTED BY:**	Kerri Nolan
PROJECT NO.	1634-006	**DAY & DATE:**	March 11, 1999
LOCATION:	Foxhall Road and Whitehaven Pkwy		**INTERVAL:** 15 min
CITY/COUNTY:	Palisades, NW Washington	**STATE:** DC	**WEATHER:** cold

NB. APPROACH: Foxhall Road
SB. APPROACH: Foxhall Road
EB. APPROACH: Whitehaven Pkwy
WB. APPROACH: Whitehaven Pkwy

COUNTS

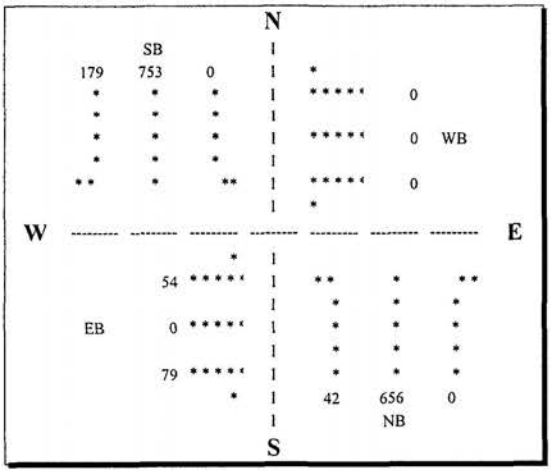
AM	Southbound			Westbound			Northbound			Eastbound			TOTAL VEH.	HOURLY TOTAL	PHF	AM
	R	T	L	R	T	L	R	T	L	R	T	L				
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
06:00 AM - 06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	06:00 AM - 06:15 AM
06:15 AM - 06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	245	0.25	06:15 AM - 06:30 AM
06:30 AM - 06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.47	06:30 AM - 06:45 AM
06:45 AM - 07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	819	0.70	06:45 AM - 07:00 AM
07:00 AM - 07:15 AM	6	85	0	0	0	0	0	149	2	1	0	2	245	1293	0.68	07:00 AM - 07:15 AM
07:15 AM - 07:30 AM	16	113	0	0	0	0	0	141	5	1	0	6	282	1572	0.75	07:15 AM - 07:30 AM
07:30 AM - 07:45 AM	25	133	0	0	0	0	0	118	6	3	0	7	292	1668	0.80	07:30 AM - 07:45 AM
07:45 AM - 08:00 AM	57	199	0	0	0	0	0	181	10	19	0	8	474	1763	0.84	07:45 AM - 08:00 AM
08:00 AM - 08:15 AM	95	218	0	0	0	0	0	143	24	28	0	16	524	1630	0.78	08:00 AM - 08:15 AM
08:15 AM - 08:30 AM	18	149	0	0	0	0	0	163	7	20	0	21	378	1106	0.71	08:15 AM - 08:30 AM
08:30 AM - 08:45 AM	9	187	0	0	0	0	0	169	1	12	0	9	387	728	0.47	08:30 AM - 08:45 AM
08:45 AM - 09:00 AM	11	146	0	0	0	0	0	167	5	7	0	5	341	341	0.25	08:45 AM - 09:00 AM
09:00 AM - 09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	09:00 AM - 09:15 AM
09:15 AM - 09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0			09:15 AM - 09:30 AM
09:30 AM - 09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0			09:30 AM - 09:45 AM
09:45 AM - 10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0			09:45 AM - 10:00 AM
AM TOTAL	**237**	**1230**	**0**	**0**	**0**	**0**	**0**	**1231**	**60**	**91**	**0**	**74**	**2923**	**1763**		**AM TOTAL**

PEAK HOUR VOLUMES

AM	Southbound			Westbound			Northbound			Eastbound			TOTAL VEH.	HOURLY TOTAL	PHF	AM
	R	T	L	R	T	L	R	T	L	R	T	L				
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
07:45 AM - 08:00 AM	57	199	0	0	0	0	0	181	10	19	0	8	474	---	---	07:45 AM - 08:00 AM
08:00 AM - 08:15 AM	95	218	0	0	0	0	0	143	24	28	0	16	524	---	---	08:00 AM - 08:15 AM
08:15 AM - 08:30 AM	18	149	0	0	0	0	0	163	7	20	0	21	378	---	---	08:15 AM - 08:30 AM
08:30 AM - 08:45 AM	9	187	0	0	0	0	0	169	1	12	0	9	387	---	---	08:30 AM - 08:45 AM
TOTAL	**179**	**753**	**0**	**0**	**0**	**0**	**0**	**656**	**42**	**79**	**0**	**54**	**1763**	**0**		**AM TOTAL**

AM Peak Volumes

DIAGRAM



APPROACH/DEPARTURE VOLUMES

SB		
	APPROACH:	932
	DEPART:	832
WB		
	APPROACH:	0
	DEPART:	221
NB		
	APPROACH:	698
	DEPART:	710
EB		
	APPROACH:	133
	DEPART:	0

Intersection Traffic Volume Counts and Peak Hour Volume

PM
PEAK HOUR

JOB NAME:	The Field School	**COUNTED BY:**	Raynette Savoy
PROJECT NO.	1636-002	**DAY & DATE:**	Wednesday, 05/19/99
LOCATION:	Whitehaven Pkwy & Foxhall Rd		**INTERVAL:** 15 Min.
CITY/COUNTY:	Washington	**STATE:** DC	**WEATHER:** Fair

NB. APPROACH: Foxhall Rd.
SB. APPROACH: Foxhall Rd.
EB. APPROACH: Whitehaven Pkwy.
WB. APPROACH:

COUNTS

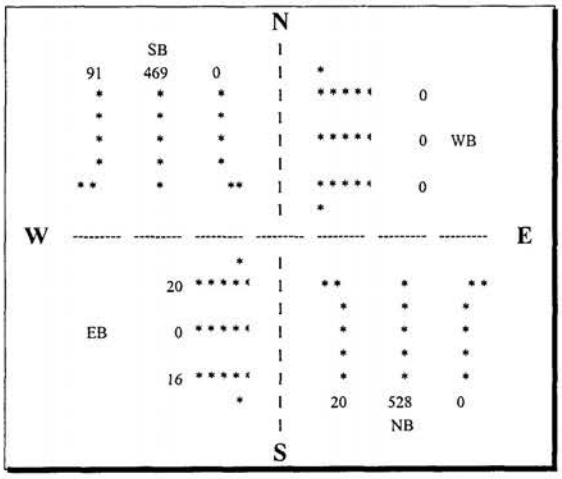
PM	Southbound			Westbound			Northbound			Eastbound			TOTAL	HOURLY		PM
	R	T	L	R	T	L	R	T	L	R	T	L	VEH.	TOTAL	PHF	
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
02:00 PM - 02:15 PM	2	88	0	0	0	0	0	112	2	3	0	3	210	1144	0.89	02:00 PM - 02:15 PM
02:15 PM - 02:30 PM	12	116	0	0	0	0	0	149	5	4	0	6	292	1290	0.91	02:15 PM - 02:30 PM
02:30 PM - 02:45 PM	30	138	0	0	0	0	0	142	7	4	0	2	323	1332	0.94	02:30 PM - 02:45 PM
02:45 PM - 03:00 PM	47	127	0	0	0	0	0	125	6	5	0	9	319	1316	0.92	02:45 PM - 03:00 PM
03:00 PM - 03:15 PM	32	158	0	0	0	0	0	139	14	5	0	8	356	1077	0.76	03:00 PM - 03:15 PM
03:15 PM - 03:30 PM	13	152	0	0	0	0	0	147	4	6	0	12	334	721	0.54	03:15 PM - 03:30 PM
03:30 PM - 03:45 PM	4	144	0	0	0	0	0	127	5	11	0	16	307	387	0.32	03:30 PM - 03:45 PM
03:45 PM - 04:00 PM	3	30	0	0	0	0	0	41	4	0	0	2	80	80	0.25	03:45 PM - 04:00 PM
04:00 PM - 04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:00 PM - 04:15 PM
04:15 PM - 04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:15 PM - 04:30 PM
04:30 PM - 04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:30 PM - 04:45 PM
04:45 PM - 05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:45 PM - 05:00 PM
05:00 PM - 05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	05:00 PM - 05:15 PM
05:15 PM - 05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0			05:15 PM - 05:30 PM
05:30 PM - 05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0			05:30 PM - 05:45 PM
05:45 PM - 06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0			05:45 PM - 06:00 PM
PM TOTAL	**143**	**953**	**0**	**0**	**0**	**0**	**0**	**982**	**47**	**38**	**0**	**58**	**2221**	**1332**		**PM TOTAL**

PEAK HOUR VOLUMES

PM	Southbound			Westbound			Northbound			Eastbound			TOTAL	HOURLY		PM
	R	T	L	R	T	L	R	T	L	R	T	L	VEH.	TOTAL	PHF	
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
02:00 PM - 02:15 PM	2	88	0	0	0	0	0	112	2	3	0	3	210	---	---	02:00 PM - 02:15 PM
02:15 PM - 02:30 PM	12	116	0	0	0	0	0	149	5	4	0	6	292	---	---	02:15 PM - 02:30 PM
02:30 PM - 02:45 PM	30	138	0	0	0	0	0	142	7	4	0	2	323	---	---	02:30 PM - 02:45 PM
02:45 PM - 03:00 PM	47	127	0	0	0	0	0	125	6	5	0	9	319	---	---	02:45 PM - 03:00 PM
TOTAL	**91**	**469**	**0**	**0**	**0**	**0**	**0**	**528**	**20**	**16**	**0**	**20**	**1144**	**0**		**PM TOTAL**

PM Peak Volumes

DIAGRAM



APPROACH/DEPARTURE VOLUMES

SB		
	APPROACH:	560
	DEPART:	485
WB		
	APPROACH:	0
	DEPART:	111
NB		
	APPROACH:	548
	DEPART:	548
EB		
	APPROACH:	36
	DEPART:	0

Intersection Traffic Volume Counts and Peak Hour Volume

AM
PEAK HOUR

JOB NAME:	The Field School	**COUNTED BY:**	Chad Baird and David Beardsley
PROJECT NO.	1634-006	**DAY & DATE:**	March 9, 11, 1999
LOCATION:	Foxhall Road and "W" Street		**INTERVAL:** 15 min
CITY/COUNTY:	Palisades, NW Washington	**STATE:** DC	**WEATHER:** cold

NB. APPROACH: Foxhall Road
SB. APPROACH: Foxhall Road
EB. APPROACH: W" Street
WB. APPROACH: W" Street

COUNTS

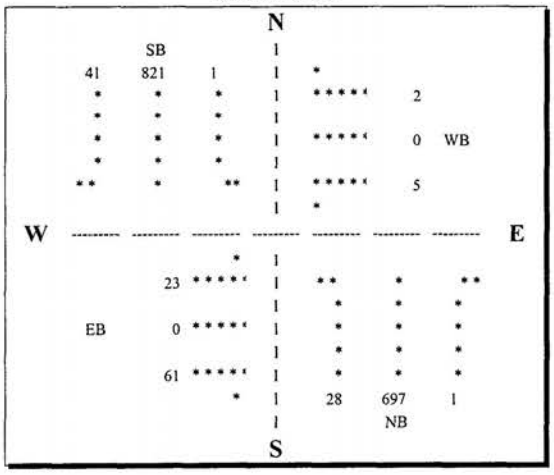
AM	Southbound			Westbound			Northbound			Eastbound			TOTAL VEH.	HOURLY TOTAL	PHF	AM
	R	T	L	R	T	L	R	T	L	R	T	L				
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
06:00 AM - 06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	06:00 AM - 06:15 AM
06:15 AM - 06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	208	0.25	06:15 AM - 06:30 AM
06:30 AM - 06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	466	0.45	06:30 AM - 06:45 AM
06:45 AM - 07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	786	0.61	06:45 AM - 07:00 AM
07:00 AM - 07:15 AM	3	74	0	0	0	1	0	119	5	5	0	1	208	1250	0.67	07:00 AM - 07:15 AM
07:15 AM - 07:30 AM	8	111	2	1	0	0	1	123	3	4	0	5	258	1459	0.79	07:15 AM - 07:30 AM
07:30 AM - 07:45 AM	4	145	1	0	0	1	1	147	5	12	0	4	320	1612	0.87	07:30 AM - 07:45 AM
07:45 AM - 08:00 AM	10	244	0	0	0	3	1	182	5	16	0	3	464	1680	0.91	07:45 AM - 08:00 AM
08:00 AM - 08:15 AM	11	229	0	0	0	0	0	142	9	22	0	4	417	1524	0.91	08:00 AM - 08:15 AM
08:15 AM - 08:30 AM	11	179	1	0	0	0	0	193	9	9	0	9	411	1107	0.67	08:15 AM - 08:30 AM
08:30 AM - 08:45 AM	9	169	0	2	0	2	0	180	5	14	0	7	388	696	0.45	08:30 AM - 08:45 AM
08:45 AM - 09:00 AM	8	136	0	0	0	0	1	141	5	10	0	7	308	308	0.25	08:45 AM - 09:00 AM
09:00 AM - 09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	09:00 AM - 09:15 AM
09:15 AM - 09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0			09:15 AM - 09:30 AM
09:30 AM - 09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0			09:30 AM - 09:45 AM
09:45 AM - 10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0			09:45 AM - 10:00 AM
AM TOTAL	64	1287	4	3	0	7	4	1227	46	92	0	40	2774	1680		AM TOTAL

PEAK HOUR VOLUMES

AM	Southbound			Westbound			Northbound			Eastbound			TOTAL VEH.	HOURLY TOTAL	PHF	AM
	R	T	L	R	T	L	R	T	L	R	T	L				
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
07:45 AM - 08:00 AM	10	244	0	0	0	3	1	182	5	16	0	3	464	---	---	07:45 AM - 08:00 AM
08:00 AM - 08:15 AM	11	229	0	0	0	0	0	142	9	22	0	4	417	---	---	08:00 AM - 08:15 AM
08:15 AM - 08:30 AM	11	179	1	0	0	0	0	193	9	9	0	9	411	---	---	08:15 AM - 08:30 AM
08:30 AM - 08:45 AM	9	169	0	2	0	2	0	180	5	14	0	7	388	---	---	08:30 AM - 08:45 AM
TOTAL	41	821	1	2	0	5	1	697	28	61	0	23	1680	0		AM TOTAL

AM Peak Volumes

DIAGRAM



APPROACH/DEPARTURE VOLUMES

SB		
	APPROACH:	863
	DEPART:	887
WB		
	APPROACH:	7
	DEPART:	69
NB		
	APPROACH:	726
	DEPART:	722
EB		
	APPROACH:	84
	DEPART:	2

Intersection Traffic Volume Counts and Peak Hour Volume

PM
PEAK HOUR

JOB NAME:	The Field School	**COUNTED BY:**	Raynette Savoy
PROJECT NO.	1636-002	**DAY & DATE:**	Wednesday, 05/19/99
LOCATION:	W Street & Foxhall Rd		**INTERVAL:** 15 Min.
CITY/COUNTY:	Washington	**STATE:** DC	**WEATHER:** Fair

NB. APPROACH: Foxhall Rd.
SB. APPROACH: Foxhall Rd.
EB. APPROACH: W Street
WB. APPROACH: W Street

COUNTS

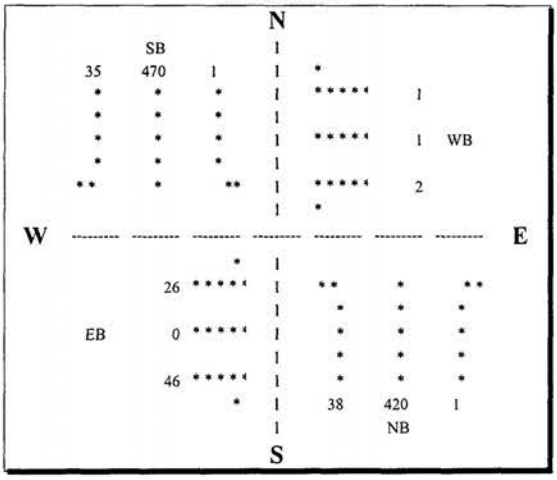
PM	Southbound			Westbound			Northbound			Eastbound			TOTAL	HOURLY		PM
	R	T	L	R	T	L	R	T	L	R	T	L	VEH.	TOTAL	PHF	
OVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
01:30 PM - 01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	468	0.46	01:30 PM - 01:45 PM
01:45 PM - 02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	700	0.68	01:45 PM - 02:00 PM
02:00 PM - 02:15 PM	8	105	0	0	0	0	0	121	9	7	0	6	256	1041	0.76	02:00 PM - 02:15 PM
02:15 PM - 02:30 PM	11	94	1	1	0	0	0	85	7	6	0	7	212	1132	0.82	02:15 PM - 02:30 PM
02:30 PM - 02:45 PM	5	102	0	0	0	0	1	98	10	11	0	5	232	1214	0.87	02:30 PM - 02:45 PM
02:45 PM - 03:00 PM	11	169	0	0	1	2	0	116	12	22	0	8	341	1434	0.79	02:45 PM - 03:00 PM
03:00 PM - 03:15 PM	15	173	0	1	0	1	0	114	10	18	0	15	347	1396	0.77	03:00 PM - 03:15 PM
03:15 PM - 03:30 PM	14	110	0	0	0	0	0	130	8	16	0	16	294	1049	0.58	03:15 PM - 03:30 PM
03:30 PM - 03:45 PM	24	167	2	0	0	0	0	178	15	31	0	35	452	755	0.42	03:30 PM - 03:45 PM
03:45 PM - 04:00 PM	7	134	1	0	0	0	0	123	15	10	0	13	303	303	0.25	03:45 PM - 04:00 PM
04:00 PM - 04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:00 PM - 04:15 PM
04:15 PM - 04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:15 PM - 04:30 PM
04:30 PM - 04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:30 PM - 04:45 PM
04:45 PM - 05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:45 PM - 05:00 PM
05:00 PM - 05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	05:00 PM - 05:15 PM
05:15 PM - 05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	05:15 PM - 05:30 PM
05:30 PM - 05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	05:30 PM - 05:45 PM
05:45 PM - 06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		0.25	05:45 PM - 06:00 PM
06:00 PM - 06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		0.25	06:00 PM - 06:15 PM
06:15 PM - 06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		0.25	06:15 PM - 06:30 PM
PM TOTAL	**95**	**1054**	**4**	**2**	**1**	**3**	**1**	**965**	**86**	**121**	**0**	**105**	**2437**	**1434**		**PM TOTAL**

PEAK HOUR VOLUMES

PM	Southbound			Westbound			Northbound			Eastbound			TOTAL	HOURLY		PM
	R	T	L	R	T	L	R	T	L	R	T	L	VEH.	TOTAL	PHF	
OVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
02:00 PM - 02:15 PM	8	105	0	0	0	0	0	121	9	7	0	6	256	---	---	02:00 PM - 02:15 PM
02:15 PM - 02:30 PM	11	94	1	1	0	0	0	85	7	6	0	7	212	---	---	02:15 PM - 02:30 PM
02:30 PM - 02:45 PM	5	102	0	0	0	0	1	98	10	11	0	5	232	---	---	02:30 PM - 02:45 PM
02:45 PM - 03:00 PM	11	169	0	0	1	2	0	116	12	22	0	8	341	---	---	02:45 PM - 03:00 PM
TOTAL	**35**	**470**	**1**	**1**	**1**	**2**	**1**	**420**	**38**	**46**	**0**	**26**	**1041**	**0**		**PM TOTAL**

PM Peak Volumes

DIAGRAM



APPROACH/DEPARTURE VOLUMES

SB		
	APPROACH:	506
	DEPART:	518
WB		
	APPROACH:	4
	DEPART:	74
NB		
	APPROACH:	459
	DEPART:	447
EB		
	APPROACH:	72
	DEPART:	2

Intersection Traffic Volume Counts and Peak Hour Volume

AM
PEAK HOUR

JOB NAME:	The Field School	**COUNTED BY:**	Chad Baird and Erwin Andres
PROJECT NO.	1634-006	**DAY & DATE:**	April 6, 1999
LOCATION:	Garfield Avenue and Foxhall Road		**INTERVAL:** 15 min
CITY/COUNTY:	Palisades, NW Washington	**STATE:** DC	**WEATHER:** cold

NB. APPROACH: Foxhall Road
SB. APPROACH: Foxhall Road
EB. APPROACH: Garfield Avenue
WB. APPROACH: Garfield Avenue

COUNTS

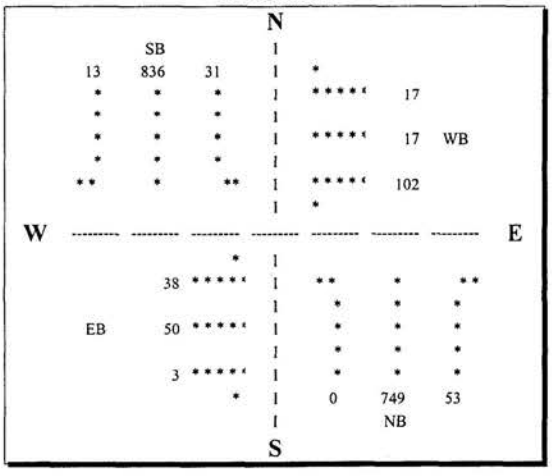
AM	Southbound			Westbound			Northbound			Eastbound			TOTAL	HOURLY		AM
	R	T	L	R	T	L	R	T	L	R	T	L	VEH.	TOTAL	PHF	
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
06:00 AM - 06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	06:00 AM - 06:15 AM
06:15 AM - 06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	243	0.25	06:15 AM - 06:30 AM
06:30 AM - 06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	528	0.46	06:30 AM - 06:45 AM
06:45 AM - 07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	851	0.66	06:45 AM - 07:00 AM
07:00 AM - 07:15 AM	1	98	3	0	4	16	5	110	0	0	4	2	243	1357	0.67	07:00 AM - 07:15 AM
07:15 AM - 07:30 AM	2	111	5	1	5	13	13	130	1	1	2	1	285	1613	0.80	07:15 AM - 07:30 AM
07:30 AM - 07:45 AM	1	112	10	6	3	18	15	142	0	1	10	5	323	1791	0.88	07:30 AM - 07:45 AM
07:45 AM - 08:00 AM	3	249	9	4	6	31	5	187	0	0	6	6	506	1909	0.94	07:45 AM - 08:00 AM
08:00 AM - 08:15 AM	4	221	6	6	5	31	16	185	0	1	12	12	499	1780	0.89	08:00 AM - 08:15 AM
08:15 AM - 08:30 AM	3	193	7	5	4	23	11	182	0	0	24	11	463	1281	0.69	08:15 AM - 08:30 AM
08:30 AM - 08:45 AM	3	173	9	2	2	17	21	195	0	2	8	9	441	818	0.46	08:30 AM - 08:45 AM
08:45 AM - 09:00 AM	2	157	10	3	7	12	9	164	0	1	6	6	377	377	0.25	08:45 AM - 09:00 AM
09:00 AM - 09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	09:00 AM - 09:15 AM
09:15 AM - 09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0			09:15 AM - 09:30 AM
09:30 AM - 09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0			09:30 AM - 09:45 AM
09:45 AM - 10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0			09:45 AM - 10:00 AM
AM TOTAL	19	1314	59	27	36	161	95	1295	1	6	72	52	3137	1909		AM TOTAL

PEAK HOUR VOLUMES

AM	Southbound			Westbound			Northbound			Eastbound			TOTAL	HOURLY		AM
	R	T	L	R	T	L	R	T	L	R	T	L	VEH.	TOTAL	PHF	
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
07:45 AM - 08:00 AM	3	249	9	4	6	31	5	187	0	0	6	6	506	---	---	07:45 AM - 08:00 AM
08:00 AM - 08:15 AM	4	221	6	6	5	31	16	185	0	1	12	12	499	---	---	08:00 AM - 08:15 AM
08:15 AM - 08:30 AM	3	193	7	5	4	23	11	182	0	0	24	11	463	---	---	08:15 AM - 08:30 AM
08:30 AM - 08:45 AM	3	173	9	2	2	17	21	195	0	2	8	9	441	---	---	08:30 AM - 08:45 AM
TOTAL	13	836	31	17	17	102	53	749	0	3	50	38	1909	0		AM TOTAL

AM Peak Volumes

DIAGRAM



APPROACH/DEPARTURE VOLUMES

SB		
	APPROACH:	880
	DEPART:	941
WB		
	APPROACH:	136
	DEPART:	30
NB		
	APPROACH:	802
	DEPART:	804
EB		
	APPROACH:	91
	DEPART:	134

Intersection Traffic Volume Counts and Peak Hour Volume

PM
PEAK HOUR

JOB NAME:	The Field School	**COUNTED BY:**	Raynette Savoy
PROJECT NO.	1636-002	**DAY & DATE:**	Wednesday, 05/19/99
LOCATION:	Garfield Street & Foxhall Rd		**INTERVAL:** 15 Min.
CITY/COUNTY:	Washington	**STATE:** DC	**WEATHER:** Fair

NB. APPROACH: Foxhall Rd.
SB. APPROACH: Foxhall Rd.
EB. APPROACH: Garfield Street
WB. APPROACH: Garfield Street

COUNTS

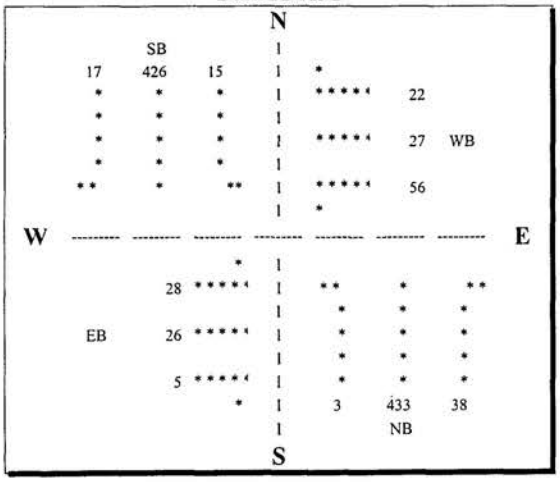
PM	Southbound			Westbound			Northbound			Eastbound			TOTAL VEH.	HOURLY TOTAL	PHF	PM
	R	T	L	R	T	L	R	T	L	R	T	L				
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
01:30 PM - 01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.49	01:30 PM - 01:45 PM
01:45 PM - 02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	786	0.73	01:45 PM - 02:00 PM
02:00 PM - 02:15 PM	6	102	3	5	8	15	7	109	1	1	5	7	269	1096	0.88	02:00 PM - 02:15 PM
02:15 PM - 02:30 PM	4	99	2	3	6	12	12	104	0	2	8	6	258	1168	0.86	02:15 PM - 02:30 PM
02:30 PM - 02:45 PM	5	96	6	10	6	9	8	101	1	2	6	9	259	1228	0.90	02:30 PM - 02:45 PM
02:45 PM - 03:00 PM	2	129	4	4	7	20	11	119	1	0	7	6	310	1351	0.88	02:45 PM - 03:00 PM
03:00 PM - 03:15 PM	2	139	3	6	6	19	14	129	0	0	16	7	341	1422	0.93	03:00 PM - 03:15 PM
03:15 PM - 03:30 PM	6	102	4	2	10	16	20	139	1	1	8	9	318	1081	0.71	03:15 PM - 03:30 PM
03:30 PM - 03:45 PM	6	142	2	5	9	16	21	170	0	0	5	6	382	763	0.50	03:30 PM - 03:45 PM
03:45 PM - 04:00 PM	21	149	0	0	12	9	7	137	3	9	15	19	381	381	0.25	03:45 PM - 04:00 PM
04:00 PM - 04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:00 PM - 04:15 PM
04:15 PM - 04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:15 PM - 04:30 PM
04:30 PM - 04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:30 PM - 04:45 PM
04:45 PM - 05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	04:45 PM - 05:00 PM
05:00 PM - 05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	05:00 PM - 05:15 PM
05:15 PM - 05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	05:15 PM - 05:30 PM
05:30 PM - 05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	05:30 PM - 05:45 PM
05:45 PM - 06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		0.25	05:45 PM - 06:00 PM
06:00 PM - 06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		0.25	06:00 PM - 06:15 PM
06:15 PM - 06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		0.25	06:15 PM - 06:30 PM
PM TOTAL	**52**	**958**	**24**	**35**	**64**	**116**	**100**	**1008**	**7**	**15**	**70**	**69**	**2518**	**1422**		**PM TOTAL**

PEAK HOUR VOLUMES

PM	Southbound			Westbound			Northbound			Eastbound			TOTAL VEH.	HOURLY TOTAL	PHF	PM
	R	T	L	R	T	L	R	T	L	R	T	L				
MOVEMENT #	1	2	3	4	5	6	7	8	9	10	11	12				
02:00 PM - 02:15 PM	6	102	3	5	8	15	7	109	1	1	5	7	269	---	---	02:00 PM - 02:15 PM
02:15 PM - 02:30 PM	4	99	2	3	6	12	12	104	0	2	8	6	258	---	---	02:15 PM - 02:30 PM
02:30 PM - 02:45 PM	5	96	6	10	6	9	8	101	1	2	6	9	259	---	---	02:30 PM - 02:45 PM
02:45 PM - 03:00 PM	2	129	4	4	7	20	11	119	1	0	7	6	310	---	---	02:45 PM - 03:00 PM
TOTAL	**17**	**426**	**15**	**22**	**27**	**56**	**38**	**433**	**3**	**5**	**26**	**28**	**1096**	**0**		**PM TOTAL**

PM Peak Volumes

DIAGRAM



APPROACH/DEPARTURE VOLUMES

SB		
	APPROACH:	458
	DEPART:	487
WB		
	APPROACH:	105
	DEPART:	47
NB		
	APPROACH:	474
	DEPART:	483
EB		
	APPROACH:	59
	DEPART:	79

EXISTING HIGHWAY CAPACITY ANALYSIS

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: Chad A Baird
Intersection: Foxhall Road and "W" Street
Count Date: Kerri A. Nolan
Time Period: AM - Existing

Intersection Orientation: North-South Major St.

Vehicle Volume Data:

Movements:	1	2	3	4	5	6	7	8	9	10	11	12
Volume:	28	697	1	1	821	41	5	0	2	23	0	61
HFR:	28	697	1	1	821	41	5	0	2	23	0	61
PHF:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHV:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:

Flow:
Lane width:
Walk speed:
% Blockage:

Median Type: None
# of vehicles: 0

Flared approach Movements:

# of vehicles: Eastbound 0
# of vehicles: Westbound 0

Lane usage for movements 1,2&3 approach:

	Lane 1			Lane 2			Lane 3	
L	T	R	L	T	R	L	T	R
Y	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 4,5&6 approach:

	Lane 1			Lane 2			Lane 3	
L	T	R	L	T	R	L	T	R
Y	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 7,8&9 approach:

	Lane 1			Lane 2			Lane 3	
L	T	R	L	T	R	L	T	R
Y	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 10,11&12 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Northbound	Southbound
Shared ln volume, major th vehicles:	697	821
Shared ln volume, major rt vehicles:	1	41
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	1700	1700
Number of major street through lanes:	1	1

Length of study period, hrs: 0.25

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	1	4	7	8	9	10	11	12
t c,base	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2
t c,hv	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
P hv	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
t c,g		0.2	0.2	0.1	0.2	0.2	0.1	
G	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
t 3,lt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
t c,T:								
1 stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
t c								
1 stage	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2

Follow Up Time Calculations:

Movement	1	4	7	8	9	10	11	12
t f,base	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3
t f,HV	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
P hv	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
t f	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	698	842
Potential Capacity	444	367
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	444	367
Probability of Queue free St.	1.00	0.83

Step 2: LT from Major St.	4	1
Conflicting Flows	698	862
Potential Capacity	908	789
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	908	789
Probability of Queue free St.	1.00	0.96
Maj. L Shared In. Prob. Queue Free St.	1.00	0.94

Step 3: TH from Minor St. 8 11

Conflicting Flows	1618		1598		
Potential Capacity	105		108		
Pedestrian Impedance Factor		1.00		1.00	
Cap. Adj. factor due to Impeding mvmnt		0.94		0.94	
Movement Capacity	98		101		
Probability of Queue free St.	1.00		1.00		

Step 4: LT from Minor St.	7		10		
Conflicting Flows	1628		1598		
Potential Capacity	83		87		
Pedestrian Impedance Factor		1.00		1.00	
Maj. L, Min T Impedance factor		0.94		0.94	
Maj. L, Min T Adj. Imp Factor.	0.95		0.95		
Cap. Adj. factor due to Impeding mvmnt		0.79		0.95	
Movement Capacity	66		82		

Worksheet 8 Shared Lane Calculations

Shared Lane Calculations

Movement	7	8	9	10	11	12
v(vph)	5	0	2	23	0	61
Movement Capacity	66	98	444	82	101	367
Shared Lane Capacity	87			188		

Worksheet 10 delay,queue length, and LOS

Movement	1	4	7	8	9	10	11	12
v(vph)	28	1	7			84		
C m(vph)	789	908	87			188		
v/c	0.04	0.00	0.08			0.45		
95% queue length								
Control Delay	9.7	9.0	50.1			38.6		
LOS	A	A	F			E		
Approach Delay			50.1			38.6		
Approach LOS			F			E		

Worksheet 11 Shared Major LT Impedance and Delay

Rank 1 Delay Calculations

Movement	2	5
P oj	0.96	1.00
V i1	697	821
V i2	1	41
S i1	1700	1700
S i2	1700	1700
P* 0j	0.94	1.00
D maj left	9.7	9.0
N number major st lanes	1	1
Delay, rank 1 mvmts	0.6	0.0

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: Chad A Baird
Intersection: Foxhall Road and "W" Street
Count Date: Kerri A. Nolan
Time Period: PM - Existing

Intersection Orientation: North-South Major St.

Vehicle Volume Data:

Movements:	1	2	3	4	5	6	7	8	9	10	11	12
Volume:	38	420	1	1	470	35	2	1	1	26	0	46
HFR:	38	420	1	1	470	35	2	1	1	26	0	46
PHF:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHV:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:

Flow:
Lane width:
Walk speed:
% Blockage:

Median Type: None
# of vehicles: 0

Flared approach Movements:

# of vehicles: Eastbound 0
# of vehicles: Westbound 0

Lane usage for movements 1,2&3 approach:

	Lane 1			Lane 2			Lane 3	
L	T	R	L	T	R	L	T	R
Y	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 4,5&6 approach:

	Lane 1			Lane 2			Lane 3	
L	T	R	L	T	R	L	T	R
Y	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 7,8&9 approach:

	Lane 1			Lane 2			Lane 3	
L	T	R	L	T	R	L	T	R
Y	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 10,11&12 approach: