Tab D A Traffic Management Plan

The project and the area in which the uses proposed would be established has been the subject of intensive professional study by recognized traffic and transportation consultants, the intensity of which parallels that a major new shopping center in a contentious suburban context, all this for a project that is of minor size and marginal impact as to traffic and transportation resources within the overall community in which it would be established. Kindly refer to the opening notes to Tab E, below.

These consultants prepared a typical Traffic Impact Analysis that was submitted when the case was first filed. It demonstrated that the impact, while discernable, would not be such that the uses proposed could be shown or expected to cause any future condition to pass any adverse tipping point, though noting that several intersections were either already over capacity or would get to that point prior to the opening of the project as construction completes and new occupants arrive.

Nevertheless, at the request of neighbors, area residents, the Advisory Neighborhood Commission representing the area (ANC 1-C), as well as the District of Columbia Department of Transportation, the study area's perimeter evaluated was expanded to include additional intersections.

The consultants also

- Undertook additional studies of the neighborhood, including studies of curbside parking and possible changes in traffic flow, the latter including such questions as changing two-way operation to one-way along various local streets surrounding the site and beyond.
- Studied the nearby Adams Morgan entertainment area as well as other area grocery stores to establish if their respective peaks differed or coincided, finding the nearby entertainment area's peak follows that both the normal p.m. commuter peak and the "grocery trip" peak that immediately follows the evening commuter peak where grocery stores are located.
- Prepared a possible Transportation Management Plan ("TMP"). This TMP is included within their overall report. ***REVISED Traffic Impact Analysis & Neighborhood Transportation Study,*** under the heading "Transportation Management Plan" (the entire report, less certain hightly technical appendices follows these remarks within this Tab.
    - As a practical matter, TMPs must be fine tuned once uses are established and employees and others coming there are established and evaluated. Applicant commits to establishing a TMP for the grocers employees and other tenants with five or more employees. Applicant further commits to evaluate the TMP from time to time after it is formally implemented and make such adjustments in it as are indicated. Applicant will provide the ANC with a copies of the TMP as adopted and if and as revised from time to time thereafter.

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The Citadel
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REVISED
Traffic Impact Analysis
&
Neighborhood Transportation Study

Prepared for:

Esocoff & Associates Architects
in coordination with
Faison Associates and Douglas Development
Washington, D.C.

Prepared by:



Gorove/Slade Associates, Inc.

February 28, 2005

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EXECUTIVE SUMMARY

This report presents the findings of a far-reaching traffic impact analysis and additional studies of neighborhood transportation issues for the planned redevelopment of the Citadel site located in the Kalorama neighborhood of Washington, DC. These findings are the results of an overall study of existing and projected future neighborhood traffic and transportation characteristics including those associated with the existing entertainment district on 18th Street in Adams Morgan, a study of the street parking in the vicinity of the site, analysis of truck access to the proposed on-site loading dock and capacity analyses of the following intersections, only two of which are currently signalized:

Unsignalized Intersections
- 17th Street NW and Columbia Road NW
- 17th Street NW and Euclid Street NW
- Champlain Street NW and Kalorama Road NW South
- Champlain Street NW and Kalorama Road NW North
- Ontario Road NW and Kalorama Road NW
- 17th Street NW and Kalorama Road NW
- 16th Street NW and Kalorama Road NW
- 16th Street NW and Belmont Street NW

Signalized Intersection
- 16th Street NW and Euclid Street NW
- 18th Street NW and Kalorama Road NW

The maximum sizes and uses of the major components of the redevelopment assumed for this analysis included the following:

- 43,312 square foot Harris Teeter grocery store, of which 4,756 square feet represents a perimeter mezzanine that is no longer contemplated;
- 7,458 square feet of other retail/service, of which half is entirely below grade; and
- 31,182 square feet of office space, of which 7,314 square feet represents a perimeter mezzanine that is no longer contemplated.

The 31,182 square feet designated as office space on an entirely new floor and a possible mezzanine above that may not in fact be used exclusively as office space. However, its occupancy by an office tenant was assumed in this analysis due to that land usehaving the most impact on the commuter peak period compared with other land uses. The analysis assumed the construction of the possible mezzanines in the proposed grocery store and office areas, however, these levels will not be built under the PUD as now sought. Therefore, the analysis results obtained are conservative, somewhat overstating the marginal impact the total project will have on the street network. A preliminary assessment (not presented here) indicates that the exclusion of these mezzanines will not result in any significant changes to the major conclusions that follow. The proposed development is scheduled to be complete by the year 2006 through which future conditions were analyzed in this report.

Based on the analysis, the following major conclusions were determined:

Existing (2004) Traffic Conditions

The capacity analyses show that the intersections currently operate at acceptable levels of service of D or better in the AM and PM peak hours with the exceptions of side street approaches to intersections of Belmont Street, Euclid Street and Kalorama Road at 16th Street. The volume of traffic that experiences extended delay is a small portion of the total traffic that passes through these intersections such that the vast majority of traffic experiences very little delay; the delays now experienced are concentrated where Euclid Street crosses and Kalorama Road and Belmont Street terminate at 16th Street.

Build Year (2006) with Other Pending Development (Future Background) Conditions

The future background capacity analyses show that the intersections are expected to operate at acceptable levels of service of D or better in the AM and PM peak hours with the exceptions of the side street approaches to intersections on 16th Street that experience extended delays in the existing condition. The anticipated additional background development traffic increases the expected delay on the eastbound approach to the intersection of Kalorama Road and 16th Street well beyond acceptable conditions. Acceptable operation levels can be achieved with the installation of a traffic signal at this intersection, but it would need to be coordinated with the traffic signal at the nearby intersections of 16th Street with Euclid Street and Crescent Place. Options for converting some neighborhood streets to one-way operation are currently being developed by the District Department of Transportation (DDOT) in conjunction with the local ANC. The traffic implications of any proposed one-way plan may also achieve acceptable levels of operation at this intersection without the installation of a traffic signal.

Build Year (2006) with Proposed Citadel Development (Total Future) Conditions

The total future capacity analyses with the signal mitigation measure described above show that the intersections will again be expected to operate at acceptable levels of service of D or better in the AM and PM peak hours with the exceptions of the Euclid Street and Belmont Street approaches to their respective intersections with 16th Street. With the signal mitigation at the intersection of Kalorama Road and 16th Street, the addition of future Citadel site traffic does not degrade the level of service at this intersection below acceptable levels. While the proposed development at the Citadel would increase the number of vehicles heading along Kalorama Road toward 16th Street, the total increase would not produce unacceptable levels of service at that intersection if it were signalized to solve problems that would become acute from the combination of current traffic and attributed to future conditions without development of the Citadel. The vast majority of traffic traveling through this intersection is expected to experience very little delay in the total future condition with overall levels of service within acceptable limits.

Analysis comparing existing peak traffic times to peak grocery activity found that the grocery store peak occurs after but slightly overlapping the commuter peak in traffic.

Parking

The Citadel will provide 126 parking spaces including ADA compliant handicap accessible spaces. Eighty-six of these spaces will be dedicated to the grocery store's use with the remainder used as supply for the office, other retail/service and six spaces for grocery store management use during business hours on weekdays. All but 6 parking spaces in the garage will be available to grocery store/retail/service patrons in the evenings and on weekends. This parking supply exceeds the zoning requirement and is expected to be sufficient for accommodating the needs of the Citadel's patrons and tenants based on Harris Teeter's understanding of market needs and when compared to similar grocery uses. Given the urban nature of the surrounding neighborhood, it is expected that a number of patrons and tenants will arrive to the site by means that will not require them to park in the garage (walking, bicycle, taxi, and/or drop-off/pick-up).

While a dense supply of on-street parking exists in the neighborhood surrounding the Citadel, this parking supply is generally exhausted by the parking demand of the neighborhood residents. Residential Permit Parking (RPP) spaces were 82% to 92% occupied between 8:00 AM and 8:00 PM and were filled beyond capacity in the evening and early morning. Observations also indicated that residents may use parking spaces marked or metered for two-hour parking as RPP spaces and that these restrictions are not closely enforced. Converting the restriction on these spaces to RPP is proposed to result in a net increase of parking available to residential permit holders, particularly those who store their vehicles on the street during the day.

Loading

A redesigned and expanded loading dock is proposed to serve the grocery store portion of the site that would accommodate two 40' long trucks and a trash compactor. The length of Harris Teeter delivery trucks will be limited to 40' and vendors will be notified of the restrictions of the on site loading dock and dimensions of neighborhood streets. In order to provide the space required for truck maneuvering and the loading and unloading of the proposed trash compactor, a minimum of 40 feet of curbside parking, approximately 2 spaces, is proposed to be removed opposite the loading dock entrance. The recommended reconfiguration of on street parking restrictions also includes the relocation of the existing loading zone on 17th Street to just south of the loading dock entrance.

A second loading zone is proposed to be located on the north side of Kalorama Road adjacent to the proposed office portion of the Citadel. This curbside area is expected to be adequate for accommodating the typical delivery profile of office tenants.

One-Way Street Options

A brief analysis of possible one-way street options was performed and a memorandum prepared under separate cover. That memorandum, included in the Technical Appendix, summarized advantages and disadvantages of converting streets in this neighborhood from two-way to one-way operation. The traffic associated with the Citadel is expected to function well, if not better, under several one-way options. However, this traffic would also function acceptably under the existing street pattern provided that mitigations measures identified above under Future Background Conditions are implemented. The proposed development of the Citadel is not the sole beneficiary nor is it the cause of the need for a traffic signal at the intersection of 16th Street and Kalorama Road if this street's operation remains two-way in the future.

INTRODUCTION

This report presents the findings of a traffic impact analysis for the redevelopment of the Citadel building in Washington, DC and assessment of the proximal neighborhood street network. The regional roadway network and site location are given in Figure 1. The Citadel building is located in the Kalorama neighborhood in the northeast quadrant of the intersection of 17th Street NW and Kalorama Road NW and is proposed to include a Harris Teeter grocery store and other retail/service tenants as well as office space. The project is scheduled to be complete by the year 2006. The maximum sizes and uses of the major components of the development include the following:

- 43,312 square foot Harris Teeter grocery store, of which 4,756 square feet is mezzanine space that was assumed in the analysis but which has been removed from the scope of this project.
- 7,458 square feet of other retail/service, of which half is entirely below grade.
- 31,182 square feet of office space, of which 7,314 square feet is mezzanine space that was assumed in the analysis but which has been removed from the scope of this project.
- 126 below grade parking spaces.
- enclosed on-site loading dock with 2 delivery-truck berths and 1 trash container attached to a compactor.

The following tasks were undertaken as part of the Traffic Impact Analysis:

- Field reconnaissance in the vicinity of the site was performed to collect information related to existing on-street parking, traffic controls, roadway geometry, and traffic flow characteristics.

- Manual vehicle traffic turning movement counts were conducted at nine intersections within the vicinity of the site, during morning and evening peak hours.

- Future traffic conditions were projected based on the development's square footage and proposed uses.

- Intersection capacity analyses were performed for existing, build year without development (2006) and build year with development (2006) peak hour traffic conditions at the intersections contained within the study area.

The following additional studies were also undertaken as part of the Neighborhood Transportation Analysis:

- Parking and loading characteristics of comparably sized and located grocery stores in the area were observed and compared to the program proposed at the Citadel.

- The relationship between projected Citadel activity and observations of traffic relating to the nightlife activity of bars and restaurants on 18th Street NW was analyzed.

- On street parking in a one block vicinity of the site was inventoried on detail and its utilization over the course of the day studied.

Sources of data for this study include the District Department of Transportation, the Citadel project team and the office files and field reconnaissance efforts of Gorove/Slade Associates.

Scope of Study

The following intersections were included in this study:

Unsignalized Intersections
- 17th Street NW and Columbia Road NW
- 17th Street NW and Euclid Street NW
- Champlain Street NW and Kalorama Road NW South
- Champlain Street NW and Kalorama Road NW North
- Ontario Road NW and Kalorama Road NW
- 17th Street NW and Kalorama Road NW
- 16th Street NW and Kalorama Road NW
- 16th Street NW and Belmont Street NW

Signalized Intersection
- 16th Street NW and Euclid Street NW
- 18th Street NW and Kalorama Road NW

The capacity analysis of the study intersections was conducted for the commuter peak hours in the AM and PM. Traffic associated with existing entertainment establishments on 18th Streets in Adams Morgan was also analyzed and is discussed in this report following the presentation of the Capacity Analyses of the study intersections.

This report presents a discussion and the findings of analyses performed for the following conditions:

- ***Existing Conditions (2004):***
  Considers existing traffic volumes and existing roadway configurations during the A.M. and P.M. peak hours;

- ***Build Year (2006) without Proposed Development (Future Background) Conditions:***
  Considers existing traffic volumes during the A.M. and P.M. peak hours after adding traffic associated with other known developments in the area and applying a growth rate of 1% per year for 2 years to account for an increase in background traffic;

- ***Build Year (2006) with Proposed Citadel Development (Total Future) Conditions:***
  Considers the total future condition 2006 during the A.M. and P.M. peak hours, which consists of traffic volumes associated with other known developments in the area and future site volumes generated from a 43,312 square foot Harris Teeter grocery store, 7,458 square feet of other retail, and 31,182 square feet of office space.

Site Area Transportation System Characteristics

The site is located in a residential neighborhood bounded by 17th Street to the west and Kalorama Road to the south and is several blocks from main business corridors on Columbia Road and 18th Street. It is one block west of a major north-south corridor – 16th Street. This neighborhood is densely populated with 4,718 residents, according to the 2000 Census, in approximately 0.14 square miles. (If this density were applied to the District as a whole, excluding large tracts of Federal land, Washington, DC would have a population in excess of 2 million people.) The site and neighborhood are also well served by Metrobus within 1 to 2 blocks of the site including routes 42, 90, 92, 93, 96, 98, S1, S2, S4 and others.

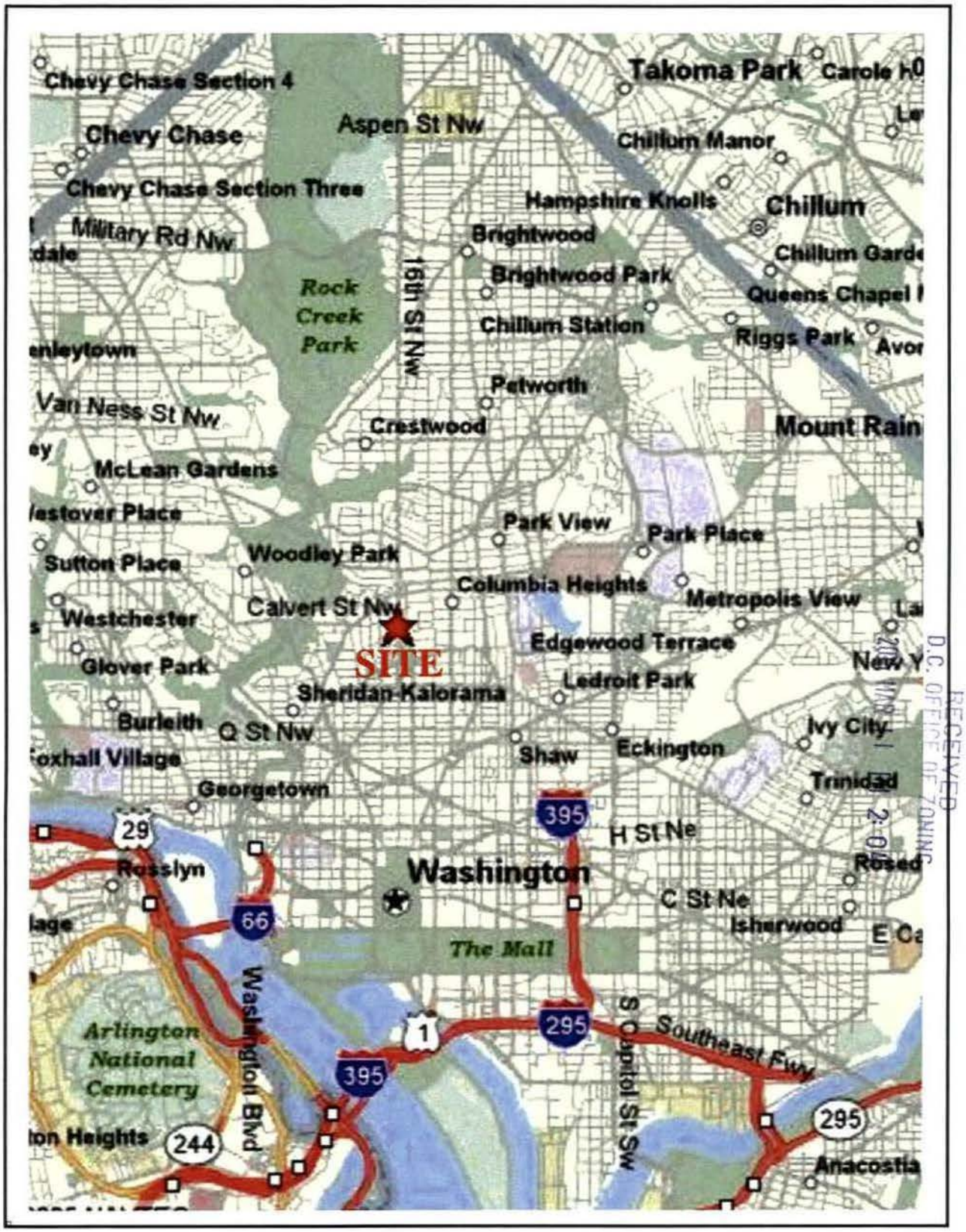


Figure 1 - Site Location Map

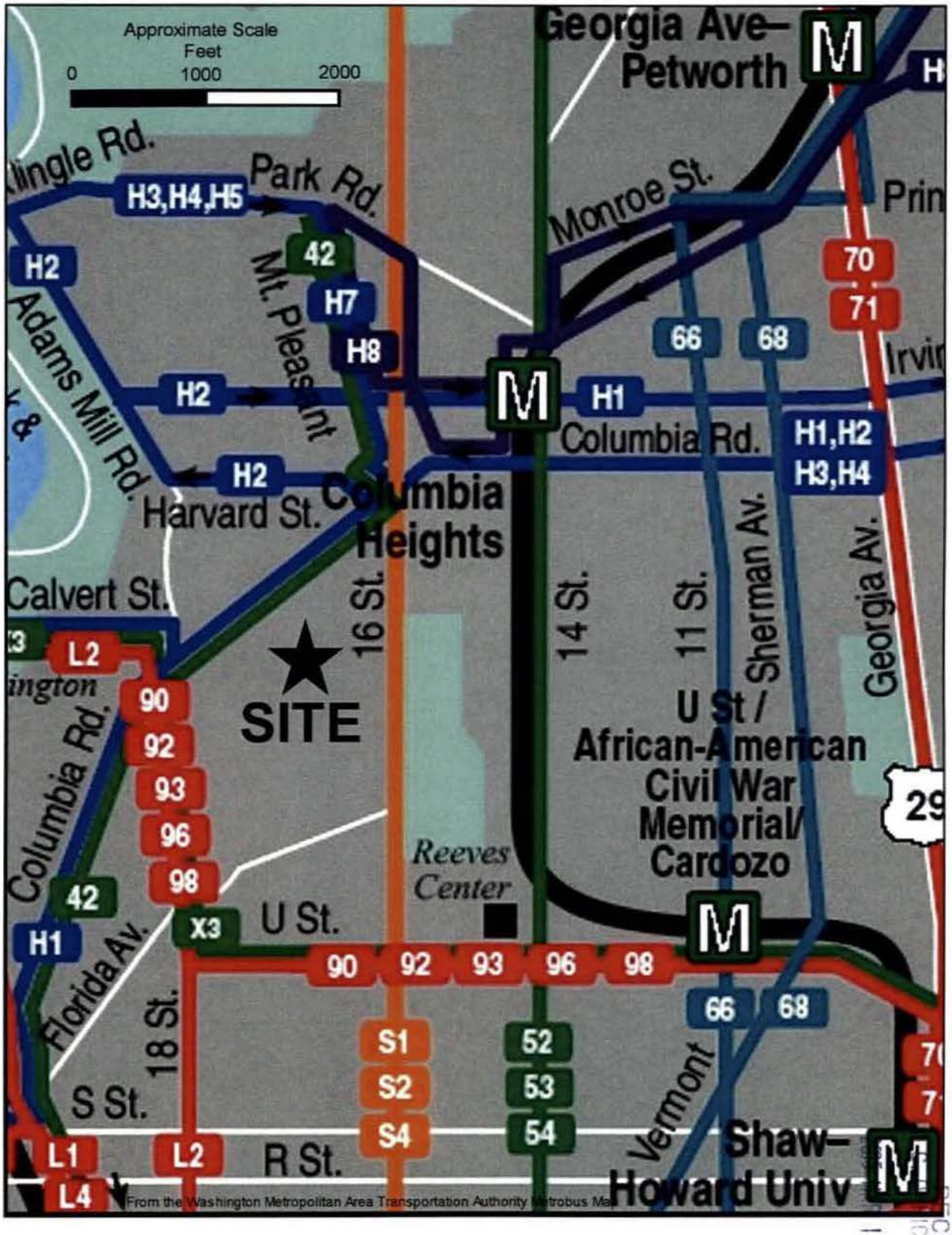


Figure 2 – Public Transportation Map

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Roadway Network within the Vicinity of the Site

Figure 3 illustrates the neighborhood location of the site and the immediate roadway network surrounding it along with the lane configurations of the study intersections. As can be seen in this figure, the existing roadway network is such that the site is somewhat isolated in this portion of the Kalorama neighborhood. This immediate neighborhood is bounded by four arterials: 16th Street, Florida Avenue, 18th Street and Columbia Avenue. Other characteristics of this neighborhood include Meridian Hill/Malcolm X Park and the jog in Euclid Street at 15th Street to the east, a jog in Kalorama Road at Champlain Street and to the west, the bend in 17th Street into Belmont Street to the south and several one-way streets. All streets within the neighborhood have pavement widths of 30' or less with parking on either side thus reducing the effective travel lane widths. All of these characteristics result in a traffic calming effect and discourage motorists from using the neighborhood roadways as throughways to other neighborhoods or as routes between arterials. The vast majority of the traffic on these roadways is destined to or originating from locations within this immediate neighborhood.

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Descriptions of the major roadways in the vicinity of the site are given below.

Perimeter Arterials

16th Street NW is a major north-south corridor in NW Washington, DC. In the vicinity of the site, this street consists of two northbound and three southbound travel lanes. This street provides access to the Capital Beltway to the north and Massachusetts Avenue to the south and is served by Metrobus routes S1, S2, and S4. Sixteenth Street is classified as a "Major Arterial" in the District of Columbia's Functional Classification map.

Florida Avenue is a "Minor Arterial" with traffic operating in both directions and acts as a southern boundary to this immediate neighborhood. As a "Minor Arterial," Florida Avenue carries more traffic volume than either "Local" or "Collector" streets, but less than "Major Arterials."

18th Street is a north-south street that is also classified as a "Minor Arterial" by the District of Columbia. At its signalized intersection with Kalorama Road, 18th Street consists of one lane in each direction with parking on either side of the street. Eighteenth Street is heavily traveled roadway in late evenings and on weekends due to the concentration of restaurants, bars and late night venues on this street to the north of its intersection with Kalorama Road.

Columbia Road is a major business corridor in this area of NW Washington with traffic operating in both the northeast and southwest directions. This road consists of one travel lane in each direction with a central, bi-directional left turn lane and metered parking on either side of the street. Columbia Road is functionally classified as a "Minor Arterial."

Interior Neighborhood Roadways

Kalorama Road is a neighborhood roadway with a 30' pavement width that serves traffic in both directions and parking on both sides of the street. This roadway intersects 17th Street with an all-way stop-controlled intersection and 16th Street with a "T" intersection with stop control on Kalorama. Kalorama Road is functionally classified as a "Local" street.

Euclid Street to the north of the site is a two-way east-west neighborhood street that intersects Columbia Road to the west and 16th Street to the east of the site. Its intersection with 16th is controlled by a traffic signal. Euclid Street is functionally classified as a "Collector" street, meaning it is intended to carry somewhat more traffic than those classified as "Local" ones.

17th Street is a 30' roadway with parking on both sides of the street. North of Kalorama Road, this neighborhood roadway operates in both directions and intersects Euclid Street with an all-way stop-controlled intersection and with Columbia Road with a "T" intersection with stop control on 17th. South of Kalorama Road, 17th Street operates one-way northbound. Seventeenth Street is functionally classified as a "Local" street.

Ontario Road is also a 30' "Local" street with parking on both sides. This roadway operates one-way northbound between Euclid Street and Columbia Road and operates in both directions between Euclid and Florida Avenue. Its "T" intersection with Columbia Road is signalized while the remaining intersections are stop controlled.

Champlain Street is a 30' wide "Local" street with parking on both sides and stretches from Columbia Road to a dead-end at the Marie Reed Learning Center. The reopening of Champlain Street to provide direct access to Florida Avenue is a possibility in the future. However, for the purposes of this analysis, its existing status was assumed to remain in the build year. Kalorama Road jogs at Champlain creating two unsignalized "T" intersections.

Belmont Street and Crescent Place create a one-way loop to primarily serve residents on Beekman Place and these two streets with access to 16th Street. Beekman Place stems off of Belmont a short distance west of 16th Street. While Belmont operates two-way between Beekman Place and 16th Street, the street operates one-way westbound west of Beekman Place and bends north leading to 17th Street which remains one-way northbound until Kalorama Road. Crescent Place operates one-way eastbound. Belmont Street, Crescent Place and Beekman Place are all classified as "Local" streets.

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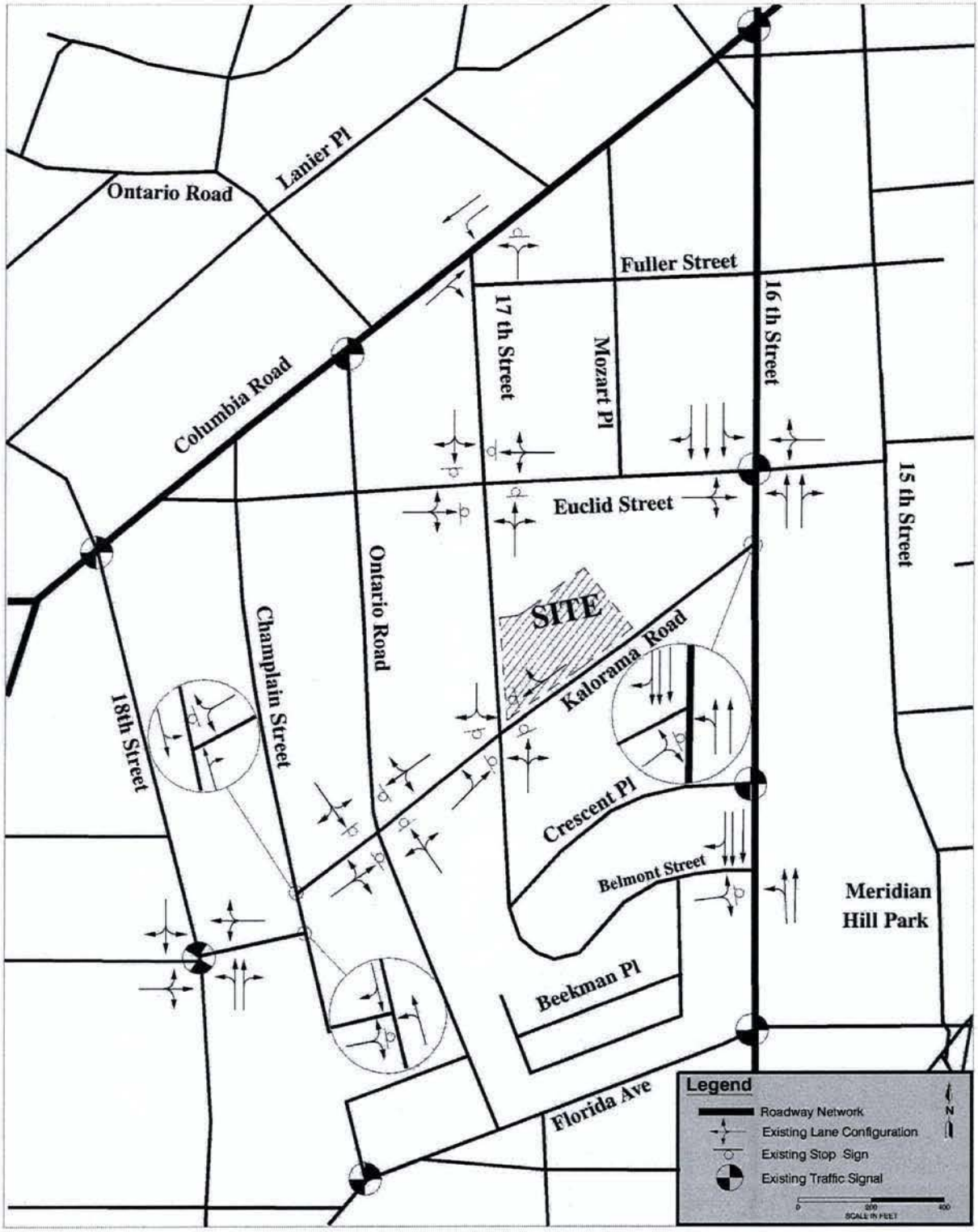


Figure 3 - Local Roadway Network and Study Intersection Lane Configuration

EXISTING (2004) TRAFFIC CONDITIONS

Existing (2004) Traffic Volumes

Existing weekday peak hour traffic counts were conducted at the study intersections on Tuesday September 14 and Tuesday December 14, 2004. The A.M. commuter peak hour occurs from 8:15 A.M. to 9:15 A.M. and the P.M. commuter peak hour occurs from 5:15 P.M. to 6:15 P.M. The peak hour volumes considered in this study are shown in Figure 4.

The traffic volumes that exist at this time at the selected intersections are consistent with the uses and densities within the area and, particularly for Euclid Street, the volume of traffic using it as east-west traffic. Given the other streets' geometries and the isolated nature of the surrounding network within the perimeter of the neighborhood, namely 18th Street on the west, 16th Street on the east, Columbia Road on the north, and Florida Avenue on the south, their traffic is believed to consist mostly of trips that originate within or are destined to the nearby neighborhood.

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Figure 4 - Existing (2004) Peak Hour Volumes

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BUILD YEAR WITH OTHER PENDING DEVELOPMENT (2006) CONDITIONS

Planned Roadway Improvements

There are no known roadway improvements planned in the vicinity of the site.

The District Department of Transportation and the local ANC are currently working together to develop a plan for a possible additional or revised one-way street network in this neighborhood. The details of any future one-way plan that may be approved and the timing of an ultimate implementation of such plan is not known at this time and therefore not assumed in this study. Any one-way plan proposed will need to be analyzed to determine the traffic implications to the entire neighborhood, including the developments cited in this report. Traffic associated with the Citadel is expected to operate satisfactorily under several one-way scenarios.

Future Background (2006) Traffic Volumes with the Citadel

The construction of the proposed development is anticipated to be complete in 2006. This neighborhood is currently experiencing a high level of development activity, which will have an impact on traffic volumes in the neighborhood and has been taken into account in this report. In the past decade, a number of buildings on 17th Street have been converted to condominiums or renovated as rental units. Other large apartment buildings are contributing to existing traffic in the neighborhood, such as Park Tower and The Envoy. This traffic is included in the existing traffic volumes discussed in the Existing (2004) Traffic Conditions section of this report.

Other developments were identified in the vicinity of the site that do not currently exist but which are expected to be occupied by 2006. The traffic associated with these background developments was determined using the Institute of Transportation Engineers (ITE) *Trip Generation, 7th Edition* for land uses #220 (Apartment) and #230 (Residential Condominium/Townhouse). A reduction in the trips obtained from the Trip Generation Manual was taken to reflect the use of public transportation according to the *Columbia Heights/Mount Pleasant Transportation Study* prepared for DDOT by Cambridge Systematics, Inc. dated July 2003. This study found that within the study area, 44% of residents used public transportation to commute to and from work while the average use of public transit in the District is 33%. The background developments are located outside of the report's study area by approximately one block to the south and one block to the west. While the proximity of the developments to the study area of the Cambridge report may warrant a transit reduction of 44%, the District average of 33% was used as a conservative assumption. The trip generation for the background developments is shown in Table 1 and the locations of these developments are illustrated in Figure 5.

An inherent traffic growth of 1% per year was also assumed to account for other developments in the area that may be completed by the anticipated build year of 2006. The inherent traffic growth and background development trips were added to the existing volumes in order to establish future background 2006 traffic volumes without the Citadel site trips. The future background traffic volumes are shown in Figure 5.

The trip generation and associated trip reduction for the proposed Citadel redevelopment will be discussed in the Build Year with Proposed Development (2006) Conditions section of this report.

Table 1 - Background Development Trip Generation

	Land Use	Quantity	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
A	**Dorchester Apartments**	145 units	15	60	75	63	34	97
	Transit Reduction (33%)		*-5*	*-20*	*-25*	*-21*	*-11*	*-32*
	Subtotal		**10**	**40**	**50**	**42**	**23**	**65**
B	**1700 Kalorama Lofts**	36 units	4	19	23	17	9	26
	Transit Reduction (33%)		*-1*	*-6-*	*-7*	*-6*	*-3*	*-9*
	Subtotal		**3**	**13**	**16**	**11**	**6**	**17**
C	**Adams Alley**	22 units	3	12	15	11	6	17
	Transit Reduction (33%)		*-1*	*-4*	*-5*	*-4*	*-2*	*-6*
	Subtotal		**2**	**8**	**10**	**7**	**4**	**11**
D	**Jemal's Wheel (1701 Kalorama)**	48 units	5	24	29	22	11	33
	Transit Reduction (33%)		*-2*	*-8*	*-10*	*-7*	*-4*	*-11*
	Subtotal		**3**	**16**	**19**	**15**	**7**	**22**
E	**Meridian Crescent**	29 units	*3*	*16*	*19*	*15*	*7*	22
	Transit Reduction (33%)		*-1*	*-5*	*-6*	*-5*	*-2*	*-7*
	Subtotal		**2**	**11**	**13**	**10**	**5**	**15**
F	**Adams Row**	68 units	*6*	*32*	*38*	*29*	*15*	*44*
	Transit Reduction (33%)		*-2*	*-11*	*-13*	*-10*	*-5*	*-15*
	Subtotal		**4**	**21**	**25**	**19**	**10**	**29**
Total Projected Trips		**348 units**	**24**	**109**	**133**	**105**	**55**	**160**

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According to 2000 Census data, this neighborhood had a population of 4,718. Three hundred and forty-eight new dwelling units are proposed to be constructed in the neighborhood. The population associated with these new developments is an increase that can be expected to generate a increase in vehicular traffic without the redevelopment of the Citadel. This specific development scenario results in approximately 40 AM trips and 45 PM trips for every 100 dwelling units of new development.

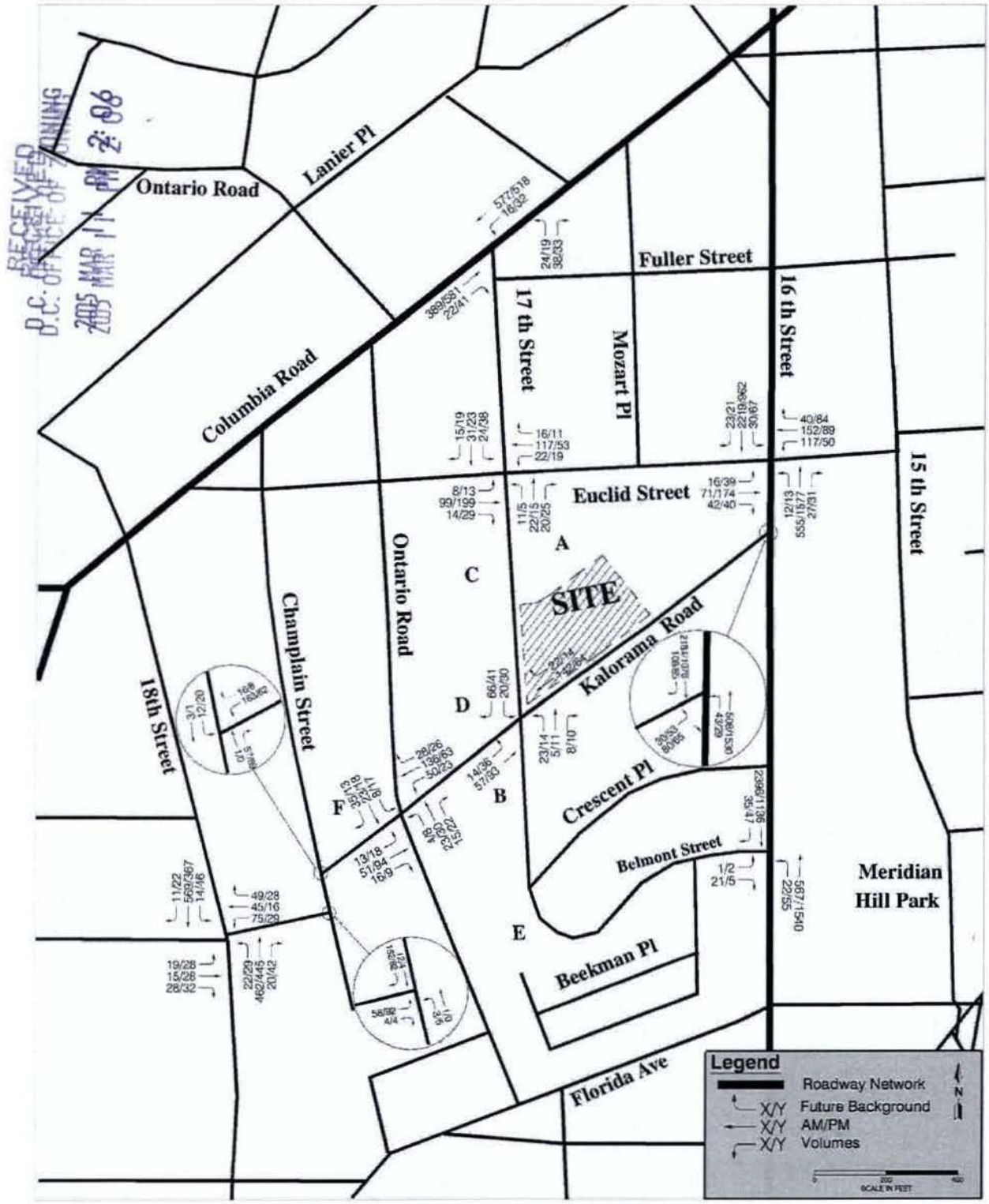


Figure 5 - Future Background (2006) Peak Hour Volumes

BUILD YEAR WITH PROPOSED CITADEL DEVELOPMENT (2006) CONDITIONS

Site Access

This office & retail development will maintain the one driveway to serve the patrons of the property. The driveway access point is located on Kalorama Road approximately 180 feet east of 17th Street and provides access to a two level parking garage. This garage is planned to accommodate both retail patrons and office employees.

Public Transit and Pedestrian Access

The site is located one block from major Metrobus corridors on 16th Street, 18th Street and Columbia Road. A Metrorail station serving Green Line trains is located approximately three blocks to the northeast at Harvard and 14th Streets. In addition, the location of the site within a residential neighborhood means that a large number of area residents will be within walking distance of the site. It is expected that a portion of patrons of the major component of the development, the grocery store, will arrive on foot, rather than by personal vehicle.

Observations were conducted at a similarly located grocery store – Whole Foods Market at 1450 P Street NW – on Wednesday September 15, 2004 from 12:00 PM to 7:00 PM and on Thursday and Friday December 9 and 10, 2004 from 6:00 PM until the store closed at 10:00 PM to determine an appropriate ratio of vehicle arrivals to pedestrian arrivals. These observations found that on a typical weekday, the average percentage of patrons that arrive either on foot or by public transit ranged between 57% and 68%. The remaining patrons arrived by either taxi or by personal vehicle. To avoid overestimating the proportion of non-automobile arrivals to the Citadel site, a value at the lower end of the range, 60%, was used in calculating the trip generation for the proposed site.

Site Generated Traffic Volumes

In order to determine the appropriate trip generation for this development the Institute of Transportation Engineers (ITE) *Trip Generation, 7th Edition* was used to determine the trips into and out of the proposed site. When using ITE's trip generation manual, the land uses used in calculations were #850 (Supermarket), #814 (Specialty Retail Center) and #710 (General Office Building). A reduction in trips, based on the results of the observations made at the P Street Whole Foods Market, was taken for the retail use. A reduction in trips was also taken for the office portion of the development according to the findings of the Cambridge Systematics, Inc. transportation study discussed previously in this report. The summary of the trips generated and reductions taken for the weekday peak hours is presented in Table 2.

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Table 2 - Trip Generation

Land Use	Quantity	AM Peak Hour			PM Peak Hour			Average Daily Traffic		
		In	Out	Total	In	Out	Total	In	Out	Total
Harris Teeter	43,312 SF	89	57	146	246	236	482	2,146	2,146	4,292
Transit Reduction (60%)		*-53*	*-34*	*-87*	*-148*	*-142*	*-290*	*-1,288*	*-1,288*	*-2,576*
Subtotal		36	23	59	98	94	192	858	858	1,716
Other Retail	7,458 SF	3	3	6	17	22	39	179	179	358
Transit Reduction (60%)		*-2*	*-2*	*-4*	*-10*	*-13*	*-23*	*-107*	*-107*	*-214*
Subtotal		1	1	2	7	9	16	72	72	144
Office	31,182 SF	65	9	74	19	95	114	272	272	544
Transit Reduction (33%)		*-22*	*-3*	*-25*	*-6*	*-32*	*-38*	*-91*	*-91*	*-182*
Subtotal		43	6	49	13	63	76	181	181	362
Total Proposed Trips		80	30	**110**	118	166	**284**	1,111	1,111	**2,222**

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The sizes of each of the land uses included in the trip generation calculations are areas that include the following which were previously contemplated, but which have been removed from the scope of this project:

- 4,756 SF of grocery store space on a mezzanine level
- 7,314 SF of office space on a mezzanine level

Excluding these areas from the analysis results in an 18% and 8% reduction in total AM and PM peak hour trips, respectively, and a 9% reduction in average daily trips. The square footages of both mezzanines were conservatively included in the capacity analysis.

It is possible that a use other than office could occupy the space designated as Office. For the purposes of this analysis, the use of this space by an office tenant was assumed due to this land use having a greater traffic impact on the commuter peak period compared with that of other possible uses.

The planned 7,458 square feet of retail consists of two levels of relative equal size. One of these levels is below grade and may not be deemed suitable as functional, occupied space for the future tenant. If this were the case, these retail trips could be cut in half. The traffic volumes used in the capacity analysis, therefore, lean toward conservative projections.

It is noted that the above table contains projected vehicle trips over the course of the peak AM and PM hours of a typical weekday. These numbers do not directly correlate to parking demand and are not indicative of parking supply needs. The number of trips projected in a peak hour is not equal to the parking demand because the average length of stay for the typical grocery retail trip is less than one hour. Parking needs associated with the proposed redevelopment program at the Citadel will be discussed in the Parking On-Site section of this report.

Directional Distribution and Trip Assignment

Census data was reviewed using GIS software to establish the population densities within the anticipated market area of the store given the location of other grocery food stores in the area. This likely market area was divided based on the most convenient access routes to the site. The resulting populations in each sub-area were used to determine the distribution of site trip percentages shown in Figure 6. The inbound and outbound site traffic assignments for the weekday A.M. and P.M. peak hours are illustrated in Figure 7.

The site trips were then combined with the future background volumes to arrive at total future peak hour traffic volumes. The resulting total future volumes are illustrated in Figure 8.

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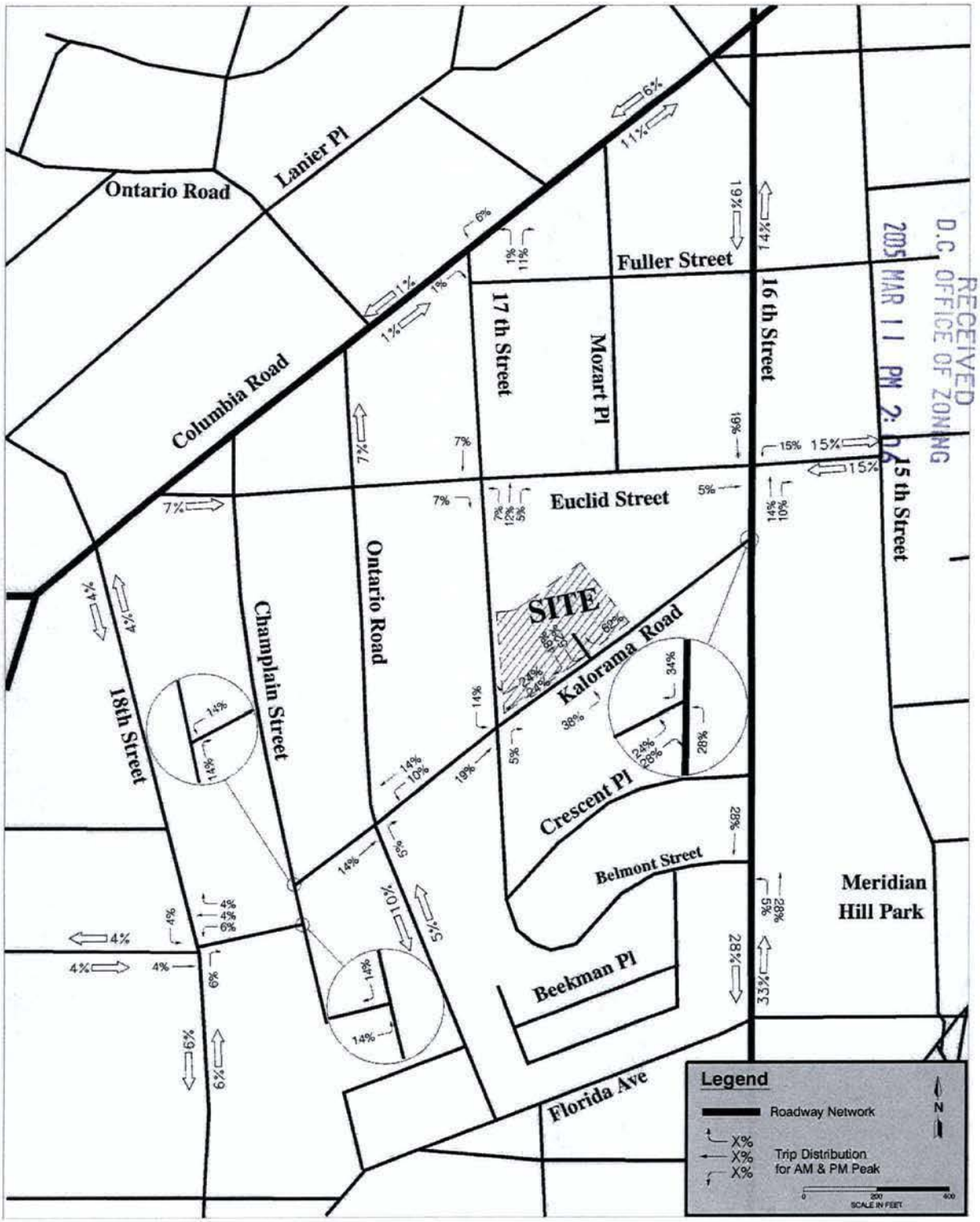


Figure 6 - Site Trip Distribution

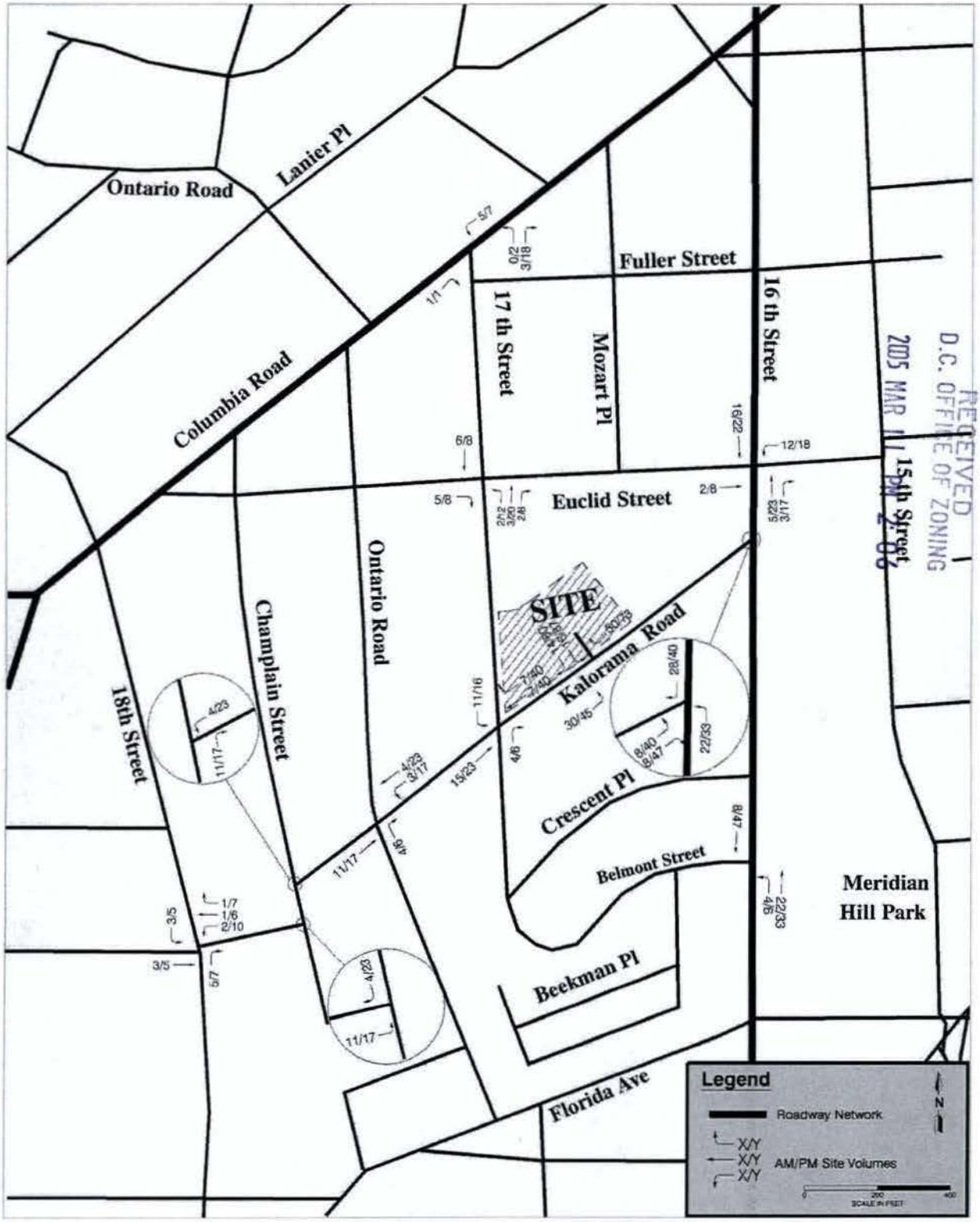


Figure 7 - Site Generated Peak Hour Volumes

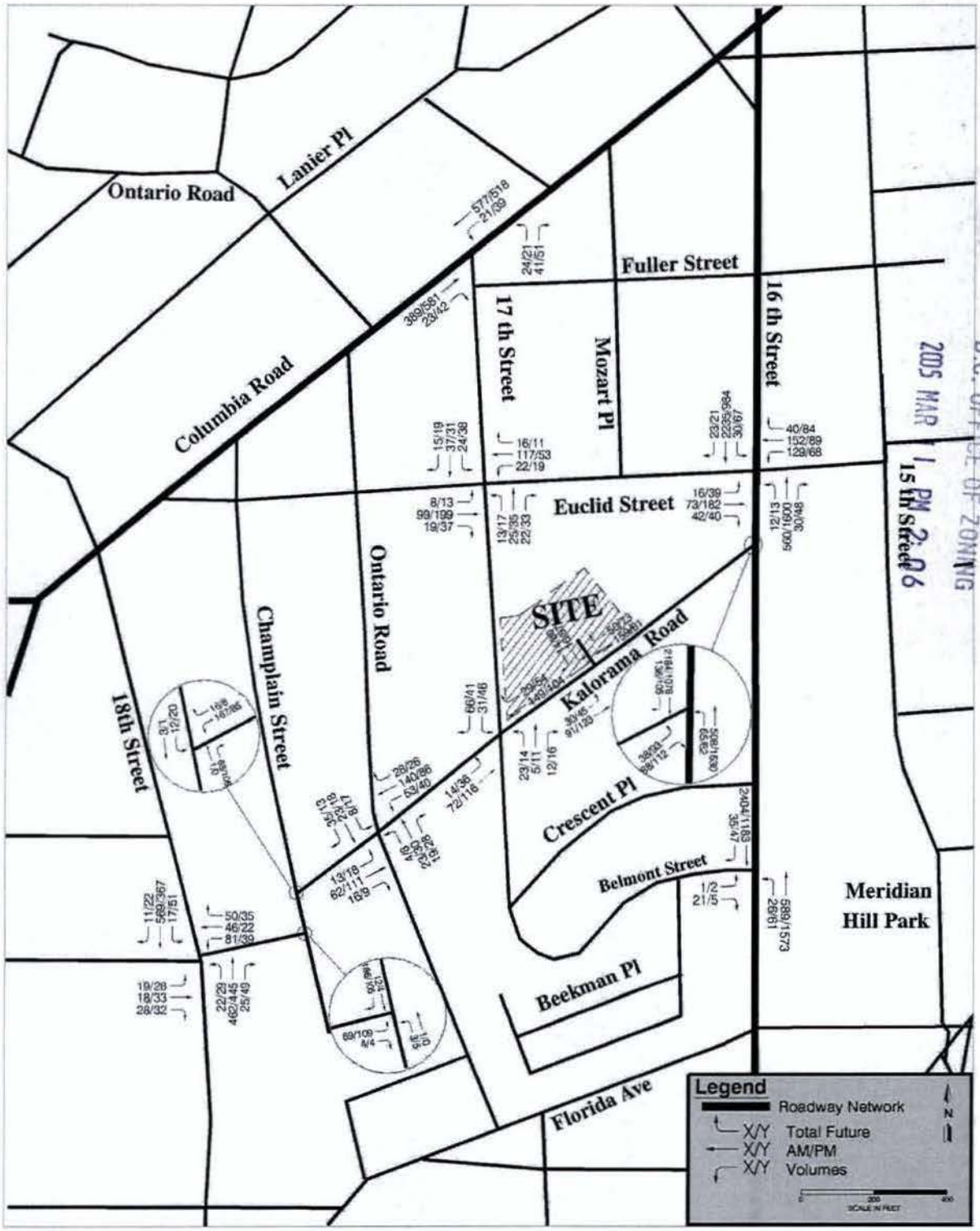


Figure 8 - Total Future (2006) Peak Hour Volumes

CAPACITY ANALYSES

Capacity analyses for the intersections within the study area were performed for the critical A.M. and P.M. commuter peak hours in the Existing **(EX)**, Future Background **(FB)** and Total Future **(TF)** conditions. They were analyzed with Highway Capacity Manual methodology using the Highway Capacity Software 2000 (HCS 4.1e). The results of the capacity analyses can be found in Table 3, and are expressed in levels of service (LOS) and delay (in seconds).

Table 3 - Capacity Analysis Results

Intersection	Movement	LOS - Level of Service (Delay)					
		AM Peak Hour			PM Peak Hour		
		Existing	Future Without Citadel	Future With Citadel	Existing	Future Without Citadel	Future With Citadel
17th Street and Columbia Road							
Unsignalized							
	Westbound Left	A (8.1)	A(8.1)	A(8.2)	A (8.8)	A(8.8)	A(8.9)
	Northbound Approach	C (15.2)	C(15.1)	C(15.2)	C (17.6)	C(18.0)	C(18.0)
17th Street and Euclid Street							
Unsignalized	Eastbound Approach	A (8.0)	A(8.0)	A(8.1)	A (8.7)	A(8.9)	A(9.2)
	Westbound Approach	A (8.2)	A(8.3)	A(8.3)	A (7.8)	A(7.9)	A(8.1)
	Northbound Approach	A (7.6)	A(7.7)	A(7.8)	A (7.6)	A(7.7)	A(8.2)
	Southbound Approach	A (7.9)	A(8.0)	A(8.0)	A (8.0)	A(8.2)	A(8.4)
	Overall	*A(8.0)*	*A(8.1)*	*A(8.1)*	*A(8.3)*	*A(8.5)*	*A(8.7)*
17th Street and Kalorama Road							
Unsignalized	Eastbound Approach	A (7.6)	A(7.8)	A(8.0)	A (7.7)	A(8.0)	A(8.4)
	Westbound Approach	A (7.9)	A(8.1)	A(8.3)	A (7.3)	A(7.6)	A(8.1)
	Northbound Approach	A (7.4)	A(7.7)	A(7.8)	A (7.4)	A(7.5)	A(7.8)
	Southbound Approach	A (7.3)	A(7.5)	A(7.7)	A (7.3)	A(7.5)	A(8.0)
	Overall	*A(7.6)*	*A(7.9)*	*A(8.0)*	*A(7.5)*	*A(7.8)*	*A(8.2)*
16th Street and Euclid Street							
Signalized							
	Eastbound Approach	D (40.8)	D(41.0)	D(41.1)	E (73.2)	**F(91.8)**	**F(98.0)**
	Westbound Approach	**F (213.9)**	**F(226.0)**	**F(260.1)**	**F (108.2)**	**F(128.3)**	**F(246.6)**
	Northbound Approach	A (6.3)	A(6.4)	A(6.4)	B (14.1)	B (15.2)	B (16.4)
	Southbound Approach	B (13.2)	B (14.0)	B (14.2)	A (7.5)	A(7.8)	A(8.0)
	Overall	*C (31.9)*	*C (33.5)*	*D (37.5)*	*C (23.4)*	*C (26.9)*	*D (37.3)*
16th Street and Kalorama Road							
Unsignalized							
	Eastbound Approach	**F (107.4)**	**F (203.5)**	**F(508.6)**	**F (65.8)**	**F(120.3)**	**F(479.5)**
	Northbound Approach	C (16.7)	C(19.3)	C(22.3)	B (10.2)	B(10.6)	B(11.2)
Signalized							
(Mitigated with a Signal in the Future Background Condition)	Eastbound Approach	n/a	D(38.7)	D(40.1)	n/a	D(39.1)	D(51.7)
	Northbound Approach	n/a	A(7.3)	A(8.3)	n/a	B(15.7)	C(31.9)
	Southbound Approach	n/a	B(12.0)	B(12.3)	n/a	A(6.6)	A(6.7)
	Overall	*n/a*	*B(12.1)*	*B(12.7)*	*n/a*	*B(13.0)*	*C(23.3)*

* -- The analysis result of D (33.8) is at the threshold between level of service D and E.

Note: The analysis results presented in this table assume that the existing directional operation of the streets will remain.

Table 3 (cont.) – Capacity Analysis Results

Intersection / Movement	LOS – Level of Service (Delay)					
	AM Peak Hour			PM Peak Hour		
	Existing	Future Without Citadel	Future With Citadel	Existing	Future Without Citadel	Future With Citadel
16th Street and Belmont Street						
Unsignalized						
Eastbound Approach	E(37.1)	E(41.6)	E(42.8)	D(29.5)	D*(33.8)	E(37.7)
Northbound Approach	C(23.5)	D(25.6)	D(26.2)	B(11.1)	B(11.6)	B(12.0)
Champlain Street & Kalorama Road North						
Unsignalized						
Westbound Approach	A(9.3)	A(9.6)	A(9.7)	A(9.1)	A(9.2)	A(9.4)
Southbound Approach	A(7.3)	A(7.3)	A(7.3)	A(7.3)	A(7.4)	A(7.4)
Champlain Street & Kalorama Road South						
Unsignalized Eastbound Approach	A(9.1)	A(9.3)	A(9.4)	A(9.0)	A(9.2)	A(9.3)
Northbound Approach	A(7.5)	A(7.6)	A(7.6)	A(7.4)	A(7.4)	A(7.4)
Ontario Road and Kalorama Road						
Unsignalized Eastbound Approach	A (7.6)	A(7.7)	A(7.8)	A (7.7)	A(8.0)	A(8.2)
Westbound Approach	A (8.1)	A(8.6)	A(8.7)	A (7.6)	A(7.8)	A(8.2)
Northbound Approach	A (7.5)	A(7.7)	A(7.7)	A (7.5)	A(7.6)	A(7.7)
Southbound Approach	A (7.5)	A(7.7)	A(7.7)	A (7.5)	A(7.7)	A(7.8)
Overall	*A(7.8)*	*A(8.2)*	*A(8.3)*	*A(7.6)*	*A(7.8)*	*A(8.1)*
18th Street and Kalorama Road						
Signalized						
Eastbound Approach	D(40.2)	D(40.8)	D(41.1)	D(43.0)	D(43.5)	D(44.0)
Westbound Approach	D(48.2)	E(75.1)	E(78.9)	D(40.9)	D(41.9)	D(45.7)
Northbound Approach	A(4.4)	A(4.4)	A(4.4)	A(4.4)	A(4.5)	A(4.5)
Southbound Approach	A(7.0)	A(7.2)	A(7.3)	A(5.7)	A(6.1)	A(6.3)
Overall	*B(11.4)*	*B(16.5)*	*B(17.2)*	*B(10.3)*	*B(10.7)*	*B(11.8)*
Kalorama Road and Site's Driveway						
Unsignalized						
Eastbound Approach	n/a	n/a	A(7.7)	n/a	n/a	A(7.6)
Southbound Approach	n/a	n/a	B(10.1)	n/a	n/a	B(11.1)

Note: The analysis results presented in this table assume that the existing directional operation of the streets will remain.

Existing (2004) Capacity Analysis

In the District of Columbia, a level of service D or better is considered acceptable during peak traffic times. The results of the existing capacity analysis indicate that all of the intersections operate at an acceptable level of service during the A.M. and P.M. commuter peak hours with the exception of side street approaches at the intersections on 16th Street. These approaches operate with very high delay, particularly westbound Euclid at 16th, however the volume of traffic that experiences extended delay is a small portion of the total traffic that passes through these intersections. The vast majority of the traffic experiences very little delay. The signal timing at this intersection could be modified to decrease the delay on the side street approaches. This, however, would result in increased delay for traffic on 16th Street. Since 16th street is a major north-south corridor, the District Department of Transportation has timed the signal to give

priority to the traffic on 16th Street. The results of the existing conditions capacity analysis are displayed graphically in Figure 9.

Future Background (2006) Capacity Analysis

The results of the future background capacity analysis indicate that all of the intersections operate at an acceptable level of service D or better during commuter peak hours with the exceptions of the side street approaches to the 16th Street intersections. The intersection approaches to 16th Street that experience excessive delay presently will be exacerbated by background traffic growth. Traffic on the eastbound approach to the unsignalized intersection of Kalorama Road and 16th Street will be especially impacted by this background growth. Eastbound Kalorama traffic is expected to experience unacceptable delays and maximum vehicle queues of 9 vehicles during the AM peak hour that would extend half way to 17th Street. These impacts could be mitigated with a traffic signal at the intersection. The results of the capacity analysis of this intersection with a traffic signal are included in Table 3 and show that a signal would improve the level of service of this intersection to within acceptable levels of D or better. This signal would need to be timed and coordinated with the existing signal at the intersections of 16th Street with Euclid Street and Crescent Place. Proper timing and coordination so that these two signals work together would help to maintain the current traffic progression that motorists experience today on this major corridor. The intersection of Belmont Street and 16th Street would continue to experience the level of service that it experiences currently. It is noted, however, that the capacity analysis result for the Belmont approach in the PM is at the threshold between level of service D and E. The result shows an average delay of 33.8 seconds and a level of service E is defined as an average delay of 35 seconds or more. The complete level of service definitions are included in the Technical Appendix. The results of the future background capacity analysis are illustrated in Figure 10.

Total Future (2006) Capacity Analysis

The results of the total future (2006) capacity analysis indicate that all of the intersections operate at an acceptable level of service D or better in the A.M. and P.M. peak hours with the exceptions of the side street approaches to the intersections of 16th Street with Euclid Street and Belmont Street. The results also show that if the intersection of Kalorama Road and 16th Street were to remain unsignalized, the already deficient level of service of this intersection with only background development would be in such a state that any additional traffic would greatly increase the delay. The installation of a traffic signal at this intersection is a mitigation measure to accommodate background development traffic with acceptable levels of delay. The above table shows the capacity analysis results of the intersection of Kalorama Road and 16th Street with the traffic signal introduced as mitigation for future background traffic conditions and shows that with the addition of Citadel related traffic, the intersection is expected to continue to operate at acceptable levels of service of D or better. The results of the total future capacity analyses with mitigation are shown in Figure 11.

A preliminary analysis found no significant change in the intersection capacity analysis results, the average delays or the levels of service at the study intersections when the mezzanine levels, which are no longer to be built as part of the PUD application, were excluded.

The detailed HCS analysis worksheets are contained in the Technical Appendix.

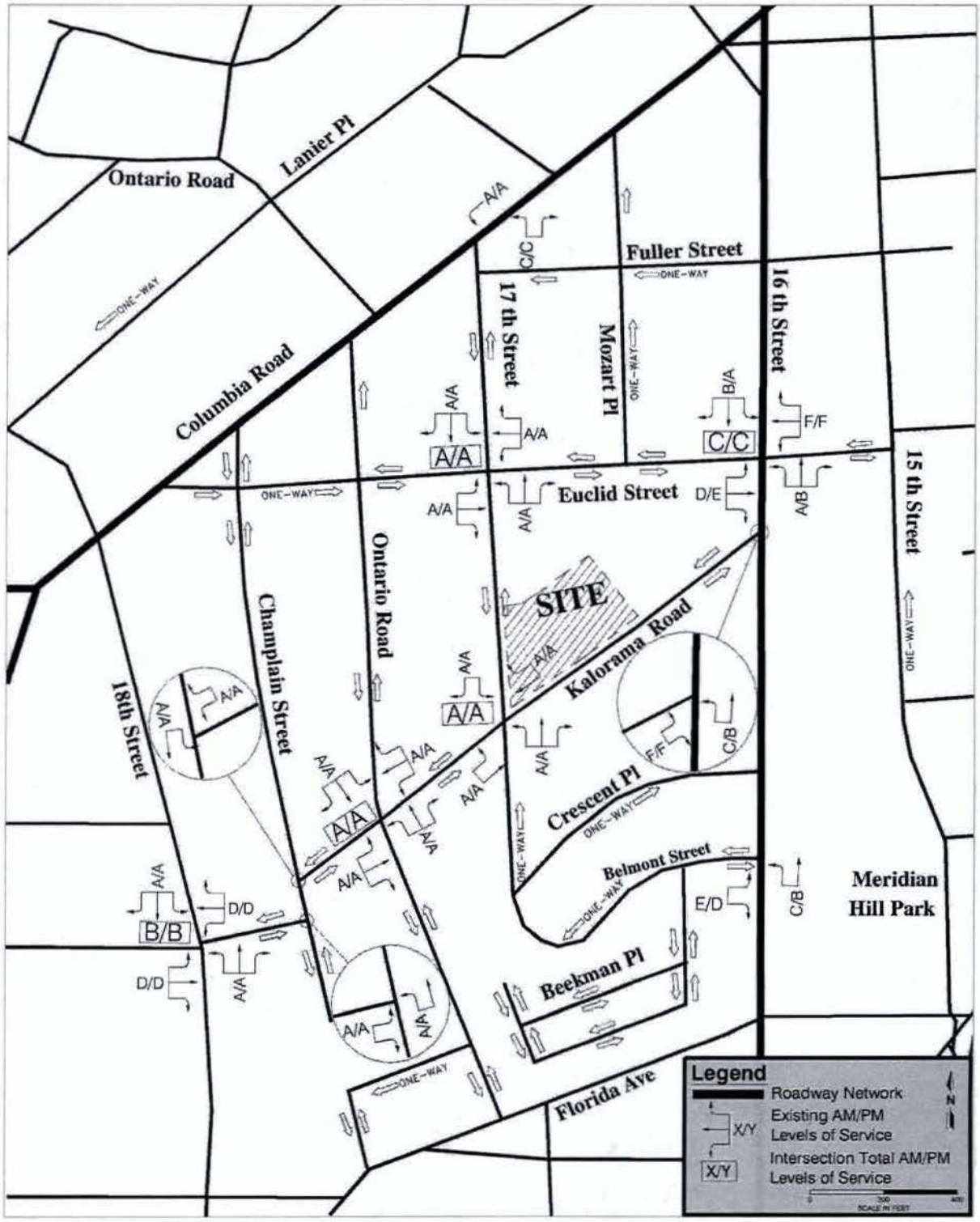


Figure 9 - Existing (2004) Levels of Service on Current Street Plan

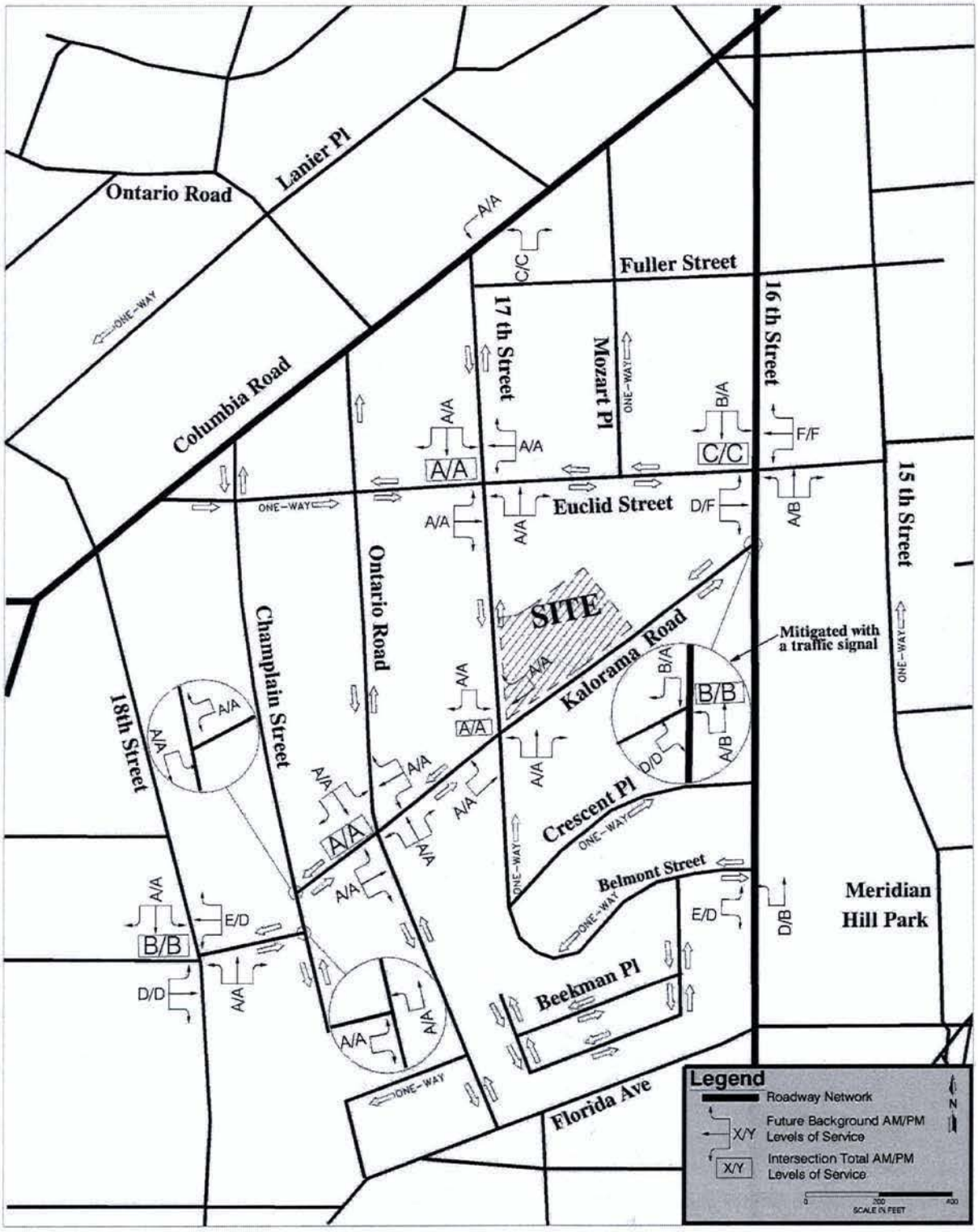


Figure 10 - Future Background (2006) Levels of Service with No Change to Street Plan

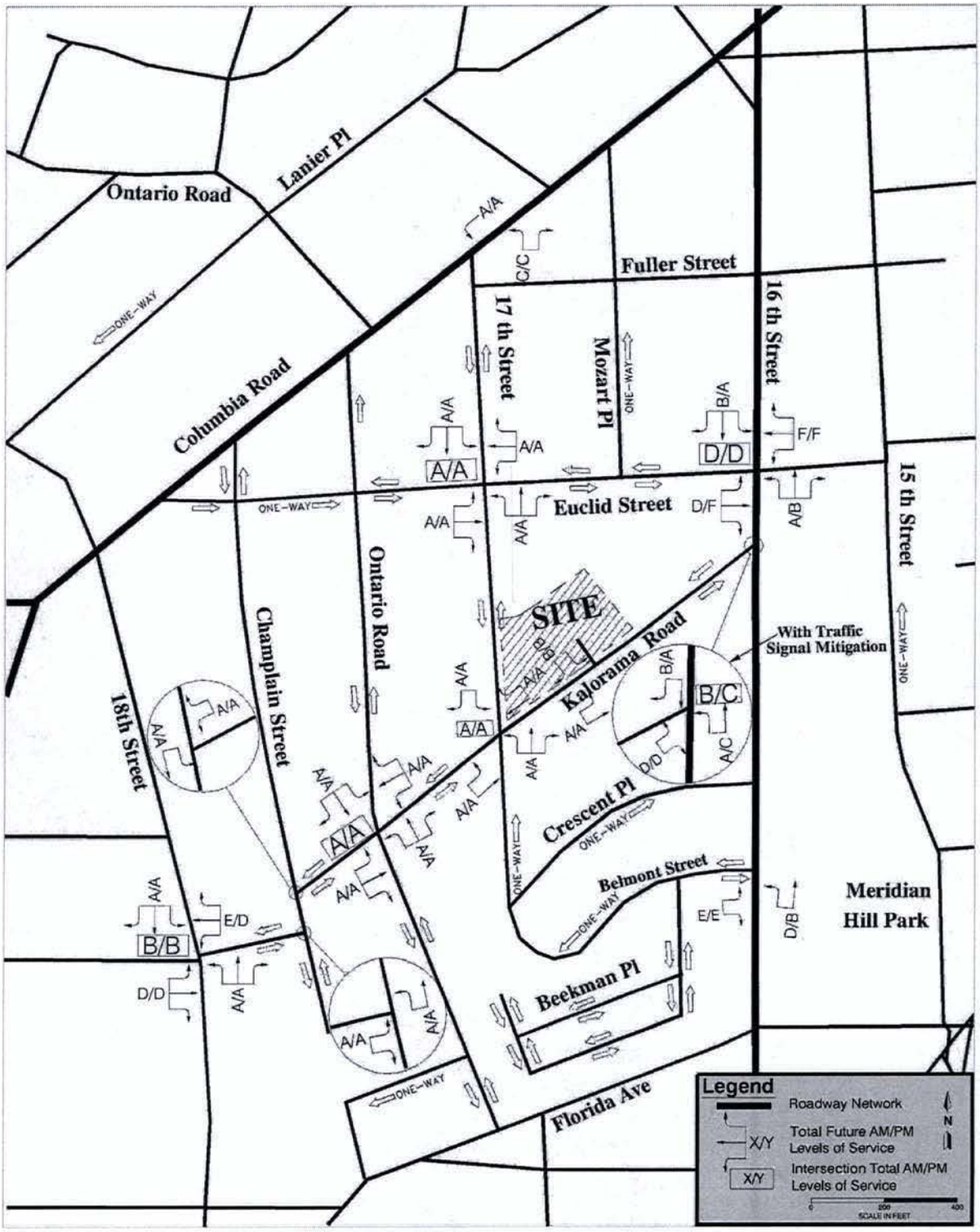


Figure 11 - Total Future (2006) Levels of Service with No Change to Street Plan

ADAMS MORGAN TRAFFIC ANALYSIS

The foregoing analysis focused on the commuter peak hours in the morning and evening as these times are typically the hours when the traffic volumes on the roadway network are at their highest demand. However, this neighborhood is in the vicinity of a concentration of restaurants, bars and clubs on 18th Street in the Adams Morgan neighborhood that produces an increase in traffic activity in the late evening hours. The extent of this increase in traffic and its relation to the projected traffic generation of the Citadel were analyzed to determine if further detailed analyses were warranted.

The data collection for this analysis consisted of installing Automatic Traffic Recorders (ATRs) at three locations to collect data 24 hours a day from a typical Thursday through Saturday. Data was collected from Thursday December 2 to Monday December 6 on 16th Street near its intersection with Kalorama Road and on Kalorama Road near the garage entrance to the Citadel. Data was also collected from Wednesday December 8 to Monday December 13, 2004 on 18th Street near its intersection with Kalorama Road.

During the hours that entertainment activity on 18th Street is increasing, the activity occurring at the Citadel would be that related to the grocery store and possibly the retail/service component of the site as the office component would not be active. The majority of site activity will be related to the grocery store. In order to determine the activity profile of an urban grocery store like that proposed for the site, the observations made at the Whole Foods Market on P Street NW discussed in the Build Year with Proposed Citadel Development (2006) Condition section of this report were used in conjunction with activity data from the files of Gorove/Slade Associates for other grocery stores in the DC metropolitan area, all of which have very similar and consistent activity profiles. This grocery store activity profile was then adjusted to reflect the volume of traffic expected to be associated with the Citadel development occurring where the traffic data was collected on Kalorama Road. This adjusted grocery store profile was assimilated with the traffic data collected on 18th Street, 16th Street and Kalorama Road. This information was charted and analyzed to determine what overlap, if any, existed between peak activity at the grocery store and any increase in traffic that may be associated with entertainment on 18th Street. These charts are located in the Technical Appendix of this report.

The following table summarizes the observed peaks in traffic and grocery store activity.

Table 4 - Evening Peaks in Existing Traffic and Projected Grocery Store Activity

		18th Street	16th Street	Kalorama Road	Grocery Store
Thursday	PM Peak Hour	5:15 – 6:15 PM	5:00 – 6:00 PM	3:00 – 4:00 PM	6:00 – 7:00 PM
	Peak Volume (veh.)	1118	2311	186	160
Friday	PM Peak Hour	4:30 – 5:30 PM	5:15 – 6:15 PM	3:30 –4:30 PM	6:00 – 7:00 PM
	Peak Volume (veh.)	1192	2820	230	160
Saturday	PM Peak Hour	11:00 – 12:00 PM	3:45 – 4:45 PM	10:30 – 11:30 PM	4:30 – 5:30 PM
	Peak Volume (veh.)	1089	1587	172	162

From this data, the following conclusions were drawn:

- Peak grocery store activity occurs after but slightly overlapping the commuter peak on weekdays. The data indicates that the grocery peak hour could be expected to occur from 6:00 – 7:00 PM. This peak is the result of people stopping at the grocery store on their way home from work. The grocery store activity decreases steadily after approximately 7:30 PM.
- Peak activity on Kalorama Road occurs mid-afternoon, most likely due to local school traffic followed by a slightly smaller peak during the PM commuter period on weekdays. On Saturday, traffic on Kalorama peaks in the late evening at a similar level experienced during weekday peaks. The peak hour of traffic experienced on Saturday night occurred between 10:30 and 11:30 PM related to increased neighborhood traffic related to the nearby entertainment uses.
- Traffic on 18th Street experienced peaks during the peak commuter times and another smaller increase in traffic in the late evening on Friday and Saturday. On Friday, the traffic activity on 18th Street remained fairly steady between the commuter peak and the late evening peak hour, which occurred from 10:30 to 11:30 PM. On Saturday, traffic on 18th Street began to steadily increase from approximately 6:45 PM until the peak hour of 11:00 PM to midnight.
- Sixteenth Street experienced significant peaks in traffic activity during the commuter peak hours on Thursday and Friday. Other minor peaks in traffic were experienced in the late evening hours corresponding to those described above.
- During the late evening peak hours observed on 18th Street, the grocery store activity is expected to be minimal. On a typical Saturday, the volume of traffic associated with the Citadel on Kalorama east of the site entrance can be expected to be approximately 40 vehicles in the same hour that traffic on 18th Street is at its late evening entertainment peak.

Additional analysis would be warranted if, from the data, it were apparent that the combination of 18th Street traffic and Citadel traffic might lead to levels of service worse than what can be expected during the hours for which capacity analyses were conducted in this study. The analysis described above has led to the conclusion that the peak traffic activity of the overall roadway network within the study area occurs during the commuter peak hours – the hours analyzed in this study. Therefore, further additional analysis is not warranted.

PARKING ON-SITE

The Citadel building was originally built with three levels. Vehicle access to the building was provided on the middle level with ramps to and from the lowest level. This lowest level was used for parking. The middle level may also have parked a small number of cars. These two lower levels are planned to be renovated to serve the parking demands of the proposed site uses. The parking layout will include 126 parking spaces. Twenty-five of these spaces are planned to be restricted for use by office employees during business hours, eight spaces are to be set aside for the use by the other retail/service tenant and seven are to be reserved for grocery store management. The remaining 86 spaces will be dedicated for use by the grocery store's patrons. In the evening and on the weekends, up to 119 parking spaces within the garage will be available to retail patrons. Due to the lack of public transit service in early morning and late evening hours, grocery store employees working early morning or late evening shifts will be allowed to park in the garage. It is expected that grocery store activity, and thus patron parking demand, will be low at these times such that employees' vehicles will not displace those of retail patrons. The garage will be managed in a way that an adequate number of parking spaces will be available to patrons.

The proposed number of parking spaces greatly exceeds that required by zoning regulations. It is expected to be a more than sufficient supply for serving the office and retail uses proposed for the site. While the trip generation calculations shown in Table 2 of this report show that the expected trips, at times, exceed the proposed parking supply, these trips are to occur over the course of one hour in the AM and one hour in the PM. Given that the average length of stay of a grocery store patron is typically less than one hour, the most convenient parking spaces in the grocery store section of the garage could be utilized 2 to 3 times in that hour by different patrons. It is not expected that all 86 grocery patron spaces in the garage will be utilized at the same time except during the very busiest shopping times when the most convenient spaces are full. Also, some of the vehicle trips are expected to be taxis or pick-up or drop-off trips that will not utilize garage parking.

DC zoning regulations for space size and aisle width were followed in designing the parking layout. The parking bays and aisles have been designed to maximize the efficiency of the garage in terms of circulation and parking supply. Given the constraints created by working within an existing structure, there are some spaces and aisle widths that do not fully comply with DC code. However, the encroachments are minimal and the proposed parking layout is expected to operate well in serving the future tenants of the site.

This garage has been designed under the assumption that no gates or revenue control equipment will be installed at the onset. Parking is expected to be controlled through signing, permit tags for office employees and enforcement of the parking restrictions. If deemed necessary in the future, the installation of parking control equipment could be possible with some impacts to the parking supply and, perhaps, circulation at the access point on Kalorama Road. Space does exist for the installation of an attendant booth, if necessary.

PARKING ON-STREET

On-street parking inventory and occupancy observations were conducted on Thursday December 9, 2004. The inventory was performed to determine the existing parking supply and utilization on the following streets:

- Kalorama Road between Ontario Road and 16th Street
- 17th Street between Belmont Street and Euclid Street

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Street parking spaces are not individually marked with striping, therefore measurements were taken to estimate the length of an average parking space. It was determined that the average parking space was approximately 20' in length. All parking spaces referenced in this report are assumed to be the equivalent of approximately 20' of curb space. The resulting parking supply on these streets is displayed in Table 5a. This tabulation reflects the existing parking restrictions. Table 5b displays the parking inventory on the street segments directly adjacent to the site. This is also illustrated in Figure 14.

Table 5a - Neighborhood On-Street Parking Inventory

Street	2-Hour Parking Meters	2-Hour Time Limit	Residential Permit Parking (RPP)	Loading Zone Spaces	Street Cleaning Restrictions	Other	Total
17th Street	--	8	55	4	Thurs. & Fri.	2	69
Kalorama Road	22	--	57	--	--	--	79
Total	22	8	112	4		2	148

Table 5b - Existing On-Street Parking Inventory Directly Adjacent to or Facing the Site

Street	2-Hour Parking Meters	2-Hour Time Limit	Residential Permit Parking (RPP)	Loading Zone Spaces	Street Cleaning Restrictions	Other	Total
17th Street	--	8	4	4	Thurs. & Fri.	--	16
Kalorama Road	--	--	25	--	--	--	25
Total	--	8	29	4	--	--	41

During the times of the year when street cleaning operations occur, the effective parking supply is less than that shown for two hours on two days of the week. When these observations were conducted, it did not appear that street cleaning was being performed; therefore the inventory and occupancy counts were not affected.

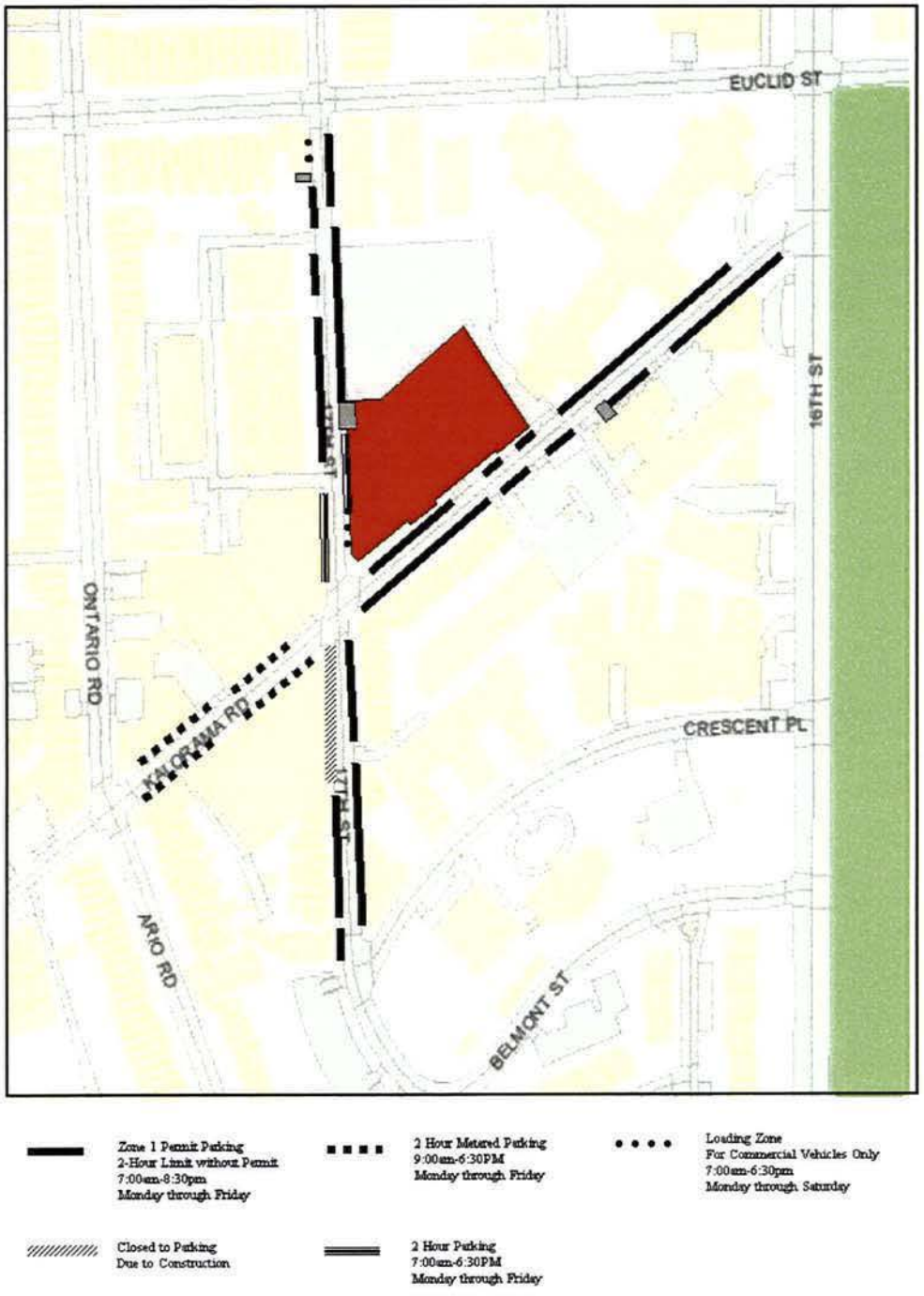
Detailed parking occupancy counts covered a study area, as shown in Figure 12, that extended one block in each direction from the intersection of Kalorama Road and 17th Street. The above table shows that the majority of parking (76%) on these streets is Zone 1 Residential permit parking (RPP). It is noted that approximately 8 to 10 parking spaces on the western curb of 17th Street between Kalorama Road and Crescent Place were closed to parking due to construction activity. The observations were conducted every two hours. The first count started at 6:00 AM December 9 and the last count began at 2:00 AM on December 10. It is noted that parking restrictions in marked loading zones began at 7:00 AM between the 6:00 AM and 8:00 AM counts and were lifted at 6:30 PM between the 6:00 PM and 8:00 PM counts.

These observations are summarized in Table 6 below. It was noted whether or not vehicles parked in Zone 1 residential permit parking (RPP) spaces were displaying a Zone 1 permit. The observations also identified which vehicles were parked illegally (i.e., outside of a marked parking area) and which of those had a parking ticket displayed on it.

Table 6 - Parking Occupancy Data in the Vicinity of the Citadel

Time of Day	2-Hour (Both metered & unmetered)	RPP with Permit	RPP without Permit	Loading	Illegal	Ticketed
6:00 AM	32	82	31	5	7	0
8:00 AM	31	66	33	1	10	9
10: 00 AM	23	62	30	1	4	4
12:00 PM	26	60	36	0	3	3
2:00 PM	26	62	35	1	3	3
4:00 PM	21	67	29	2	3	3
6:00 PM	18	79	24	1	1	1
8:00 PM	32	90	24	3	4	1
10:00 PM	34	88	26	7	1	1
12:00 AM	33	87	26	8	1	1

From this data, the chart shown in Figure 13 was derived.



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Figure 12 - Parking Restrictions in the Vicinity of the Citadel

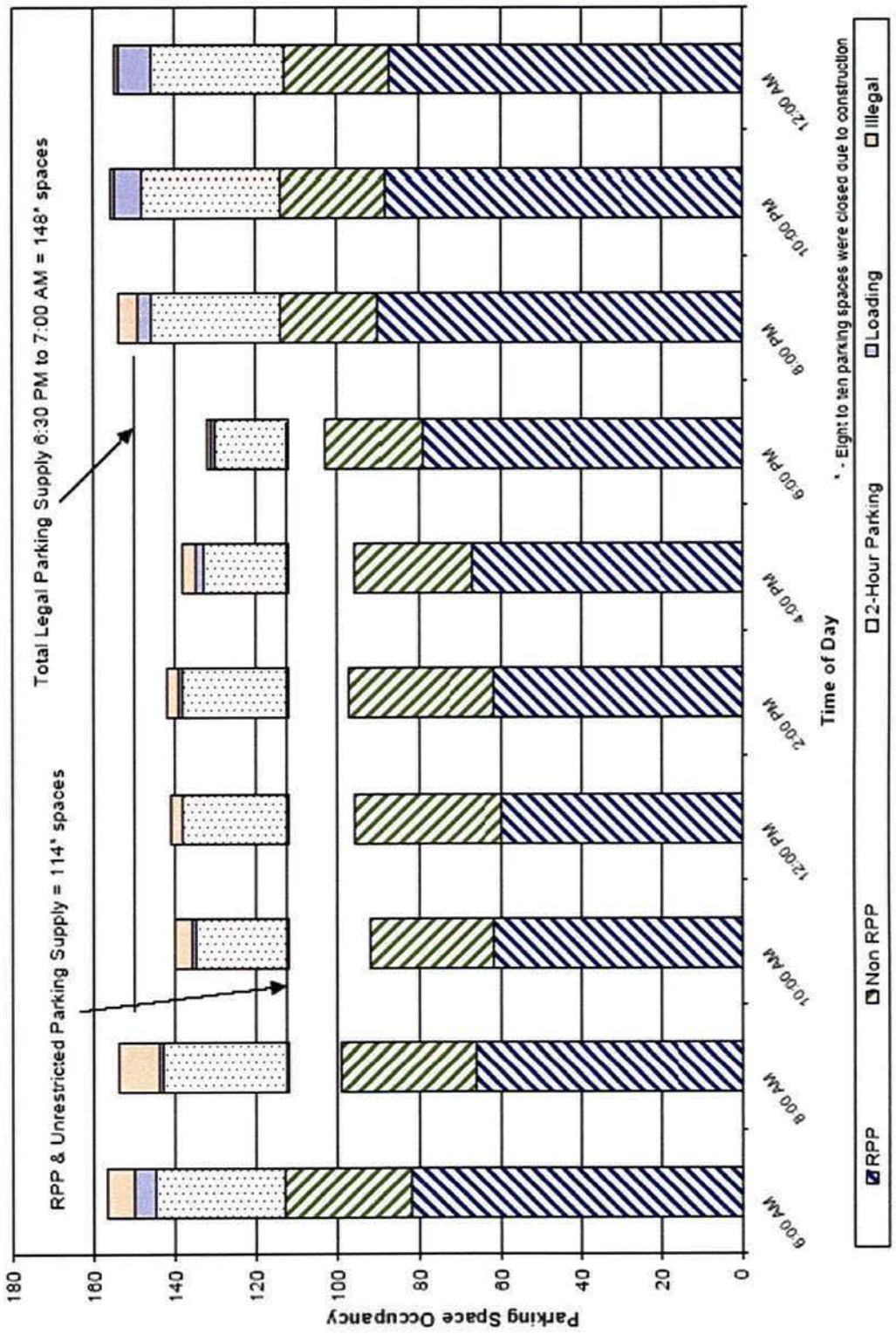


Figure 13 - Parking Occupancy in the Vicinity of the Citadel

This figure shows that during the day, 8% to 18% of RPP spaces are vacant on Kalorama Road and 17th Street in the vicinity of the Citadel. There also appears to be steady occupancy of parking spaces with two-hour time limits, including parking meters. Since the land uses in the immediate vicinity of these spaces is residential, a high turnover of the cars is not expected. It was noted that cars parked for longer than two hours, perhaps all day, did not appear to have received parking citations including those with and without Zone 1 parking permits. It is also possible that the vehicles parked in these two-hour restricted spaces were associated with the construction activity occurring on a number of developments nearby.

In the early morning and evening hours, the parking supply on Kalorama Road and 17th Street in the vicinity of the Citadel is filled to capacity with many vehicles parked outside of legally marked parking areas. At these times, parking restrictions in loading zones and at parking meters are not in affect. As a result, the effective available parking supply for residents is increased from the 114 RPP spaces to 148 spaces. In Figure 13, it is indicated that the legal parking occupancy can at times be greater than the available number of spaces identified in the On-Street Parking Inventory of Table 5. The inventory was conducted considering a typical parking space dimension of approximately 20 feet. However because parallel-parked vehicles in an urban condition can often be parked closer to each other, the number of vehicles that can be parked on a certain stretch of curb is increased.

Existing Conditions Summary

The following is a summary of the observations and analysis of existing on-street parking conditions in the immediate vicinity of the Citadel:

- The effective available parking supply for residents in the vicinity of the site increases from 114 Zone 1 residential permit parking (RPP) spaces between 7:00 AM and 6:30 PM to 148 RPP and unrestricted Loading Zone, Two-hour and Two-hour Metered spaces.
- Seventy-seven percent of the parking in the vicinity of the Citadel is designated Zone 1 residential permit parking.
- Residential permit parking is 82% to 92% occupied between 8:00 AM and 8:00 PM leaving 10 to 20 available parking spaces.
- It does not appear that the two-hour time limit at parking meters and other spaces with the same parking restrictions is being enforced. Subsequently, residents are using these spaces in the same manner as RPP spaces.
- In the early morning and evening hours, the number of vehicles parked on the street exceeded the apparent capacity by as many as 11 vehicles.
- Approximately 8-10 parking spaces on the west side of 17th Street south of Kalorama Road are temporarily closed to parking due to construction activity.

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Proposed On-Street Parking Configuration

Figures 14 and 15, respectively, show the existing and proposed on-street parking restrictions on the street segments directly adjacent to or facing the site.

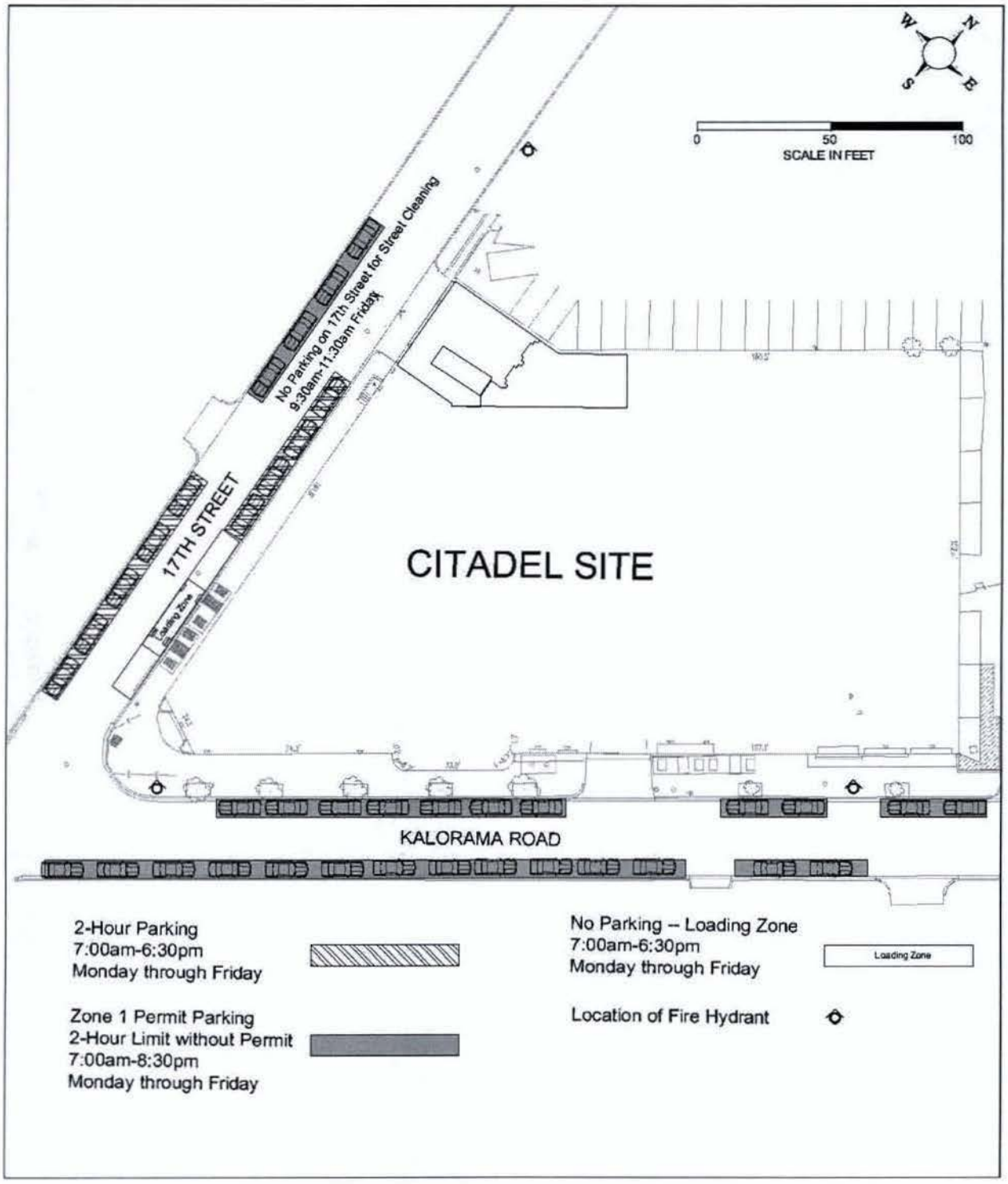


Figure 14 - Existing On-Street Parking Configuration Directly Adjacent to or Facing the Citadel

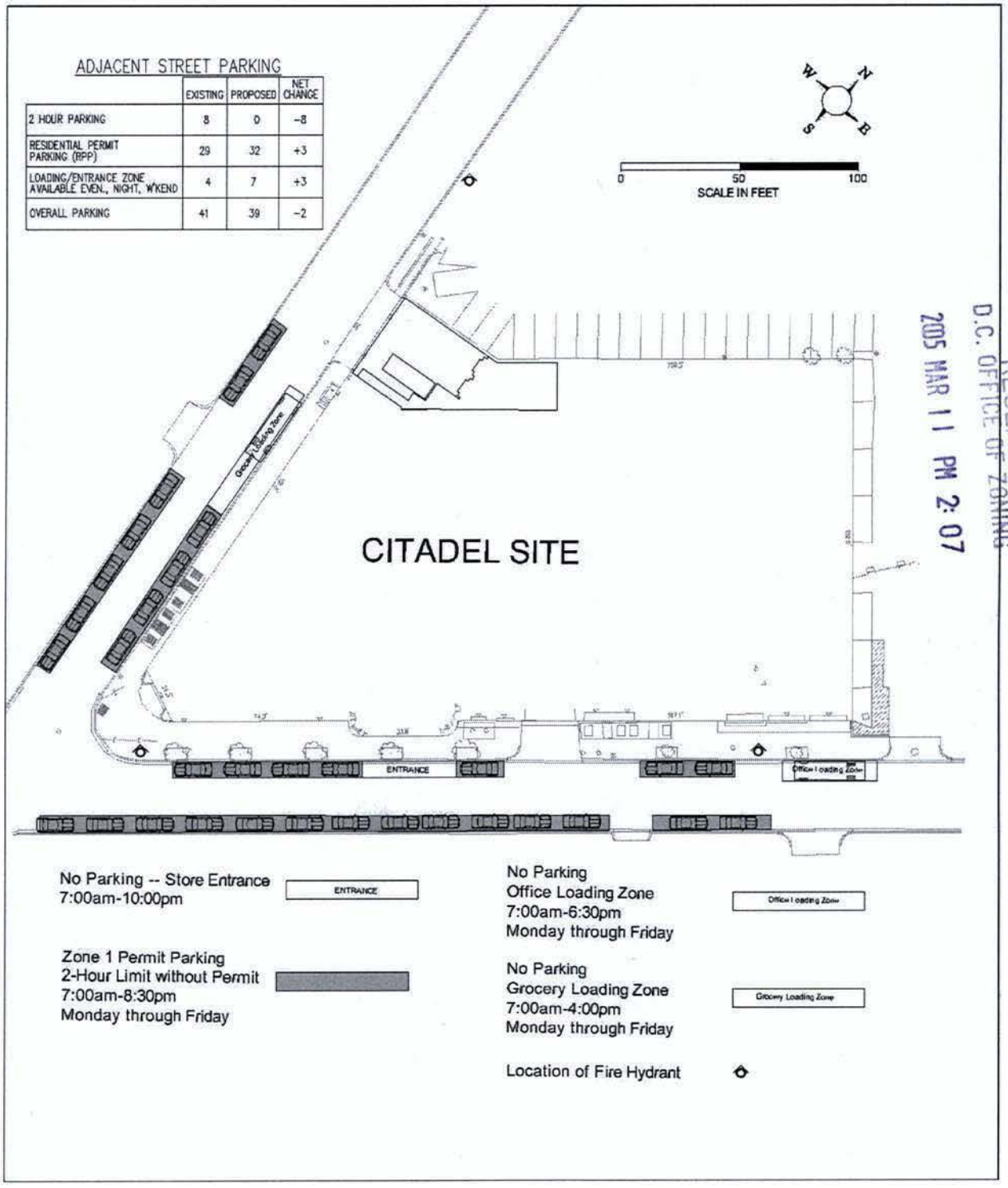


Figure 15 - Proposed On-Street Parking Configuration Directly Adjacent to or Facing the Citadel

The proposed street parking configuration shown in Figure 15 provides the required spaces for delivery trucks serving the office use, space for pick-up/drop-off activity at the grocery store entrance and space required for grocery store loading activity. Included in Figure 15 is a table showing the parking space inventory on the street segments directly adjacent to the site. Six additional parking spaces are proposed to be unavailable during certain hours of the day. As discussed later in this report, approximately 2 parking spaces are proposed to be removed on 17th Street directly across from the Citadel loading dock. While these spaces are currently designated RPP spaces, the proposal to reassign 9 two-hour parking spaces as Zone 1 RPP spaces would result in a net gain of 3 parking spaces designated as RPP.

Within the parking occupancy study area, 22 parking spaces are currently controlled by parking meters. These metered spaces may have been associated with the commercial land uses that previously existed in the area. The majority, if not all, of these land uses has since been converted to residential. If the need for metered parking in this neighborhood no longer exists, converting these spaces to Zone 1 RPP spaces may be warranted.

Since the Citadel was previously a commercial land use, the northern curb of Kalorama adjacent to the site contained metered parking spaces to serve it until two to three years ago. The director of Curbside Management at DDOT has stated that these parking spaces were converted to residential permit parking spaces at a time when road construction closed other streets to parking.

The Citadel parking garage is expected to accommodate the parking needs of the tenants of the site and the developer is not requesting that metered parking be returned to this section of Kalorama Road. Instead, the following measures are being taken to discourage the use of street parking by patrons and employees of the Citadel's tenants.

- Grocery carts will only be allowed inside the grocery store and the parking garage and will not be allowed on the sidewalks outside of the building.
- A Transportation Management Plan is being formulated to encourage the use of transit by office and retail employees.
- Harris Teeter will encourage the use of transit by employees who live outside of walking distance by providing new employees with information on public transit available in the area instituting Metrochek into the company's payroll system.

Harris Teeter is expecting that a significant number of its staff will be comprised of local residents who will most likely walk or take transit rather than drive to work. It is also expected that grocery store patrons, including short-term customers, will park in the garage to shop at the store. Pulling into a parking garage with available spaces and parking in a typical parking spaces can be preferred over circling city blocks looking for parking and parking parallel to the curb. However, it is possible that a resident of another neighborhood in Zone 1 could legally park in a vacant RPP space near the store to shop. Also, the existing parking restrictions allow any vehicle to park in RPP spaces for up to two hours. If, once the store opens, it becomes apparent that patrons of the Citadel are using street parking; it may be in the interest of residents to petition the District Department of Transportation for changes in parking regulations to discourage such practices, such as changing parking regulations to a shorter period.

TRUCK ACCESS AND LOADING

This site is proposed to include an on-site loading dock to accommodate a trash compactor and two delivery truck berths. Harris Teeter has determined that it will limit the total length of its delivery trucks to 40' and notify its vendors of the neighborhood street and site limitation regarding the size of their delivery vehicles. The existing loading dock is being reconfigured to accommodate a 40' long vehicle entirely within the dock with the loading dock door closed. Delivery trucks will either access the site from 16th Street via Kalorama Road and exit the site via 17th Street to Columbia Road or access the site from the north via 17th Street from Columbia Road and exit to 16th via Kalorama Road. The installation of signs restricting trucks to 17th Street and Kalorama Road is being discussed with DDOT.

It is understood that Harris Teeter intends to use a tandem tractor-trailer to serve this store. They will unhook one of the trailers offsite and bring each trailer in individually such that the total length of the truck accessing the Citadel site will not be longer than 40' including cab and trailer. Based on typical tractor and trailer dimensions for this type of operation, a design vehicle was developed to simulate the maneuvering necessary for this truck to access the loading dock. Figure 16 illustrates the dimensions of the design vehicle used in this analysis. The exact dimensions of the Harris Teeter trucks that will be accessing the site may vary slightly from the design vehicle used. However, the Harris Teeter vehicle will be no longer than a total of 40' and can be expected to have very similar maneuvering capabilities as the design vehicle depicted in Figure 16.

The swept path of this vehicle created when accessing and exiting each berth of the loading dock requires that some parking spaces on the street be removed. The impact varies depending on whether trucks arrive from the north or the south. Regardless of the direction, two spaces will need to be eliminated on the west side of 17th Street directly across from the dock entrance to allow for truck maneuvering in this area. The opening of this curb space will also accommodate the maneuvering necessary for the loading and unloading of the proposed trash compactor. If the trucks are to arrive from the south and exit to the north, then one parking space just north of the dock on the east side of 17th Street will also need to be removed. If all trucks arrive from the north and exit to the south, then the removal of this third parking space is not necessary for access to the dock. It should be noted that the street parking north of the dock may be impacted by an expansion of the adjacent Dorchester Apartments. An expansion has been proposed that includes a loading dock and parking garage with access on 17th Street just north of the Citadel site.

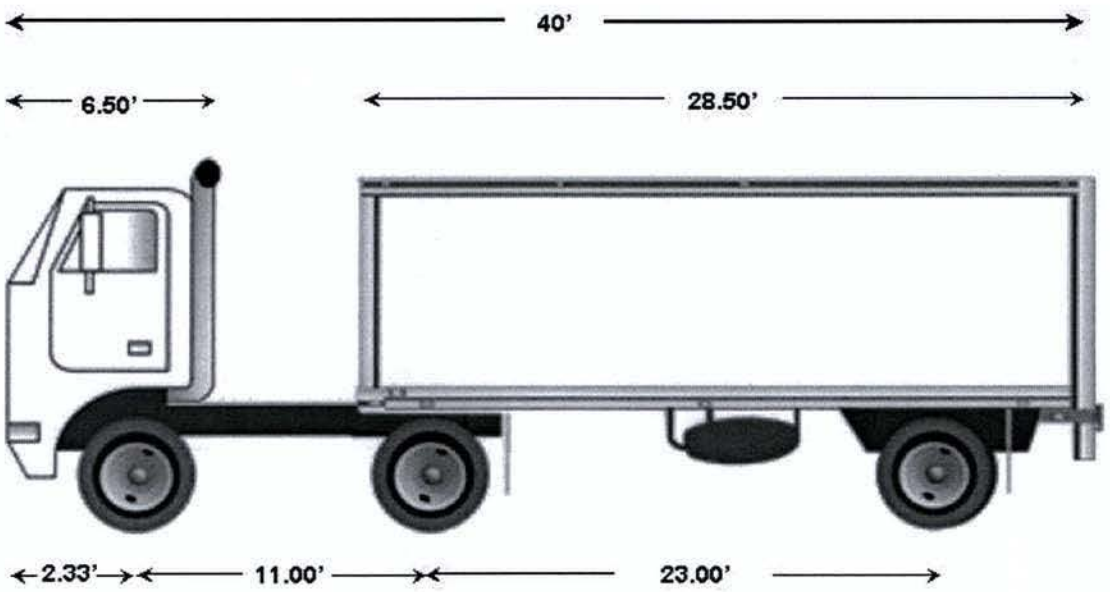


Figure 16 - Harris Teeter Deliver Truck Design Vehicle

An on-street loading zone is proposed to be located just south of the loading dock on 17th Street to provide a location for trucks to wait if a loading berth is occupied when they arrive. This area would also provide room for light unloading that does not require that the truck pull into the loading dock. A 75' loading zone currently exists on the east side of 17th Street just north of the intersection with Kalorama Road. It is proposed that the existing loading zone be reduced to 60' and be relocated to the north, just south of the dock entrance. While efforts will be made to schedule deliveries in an orderly fashion, if both loading truck berths and the loading area are full when another delivery truck arrives, that truck will be able to park on the street in front of the loading dock doors without blocking traffic.

All delivery activity related to the office portion of the development is expected to be accommodated in the proposed loading zone on Kalorama Road. As shown in Figure 15, all of the proposed curbside regulation changes result in an overall loss of 2 parking spaces and an increase of 3 RPP spaces. Figures 17 and 18 illustrate the expected vehicle swept paths of trucks accessing the loading dock from the north and south, respectively.

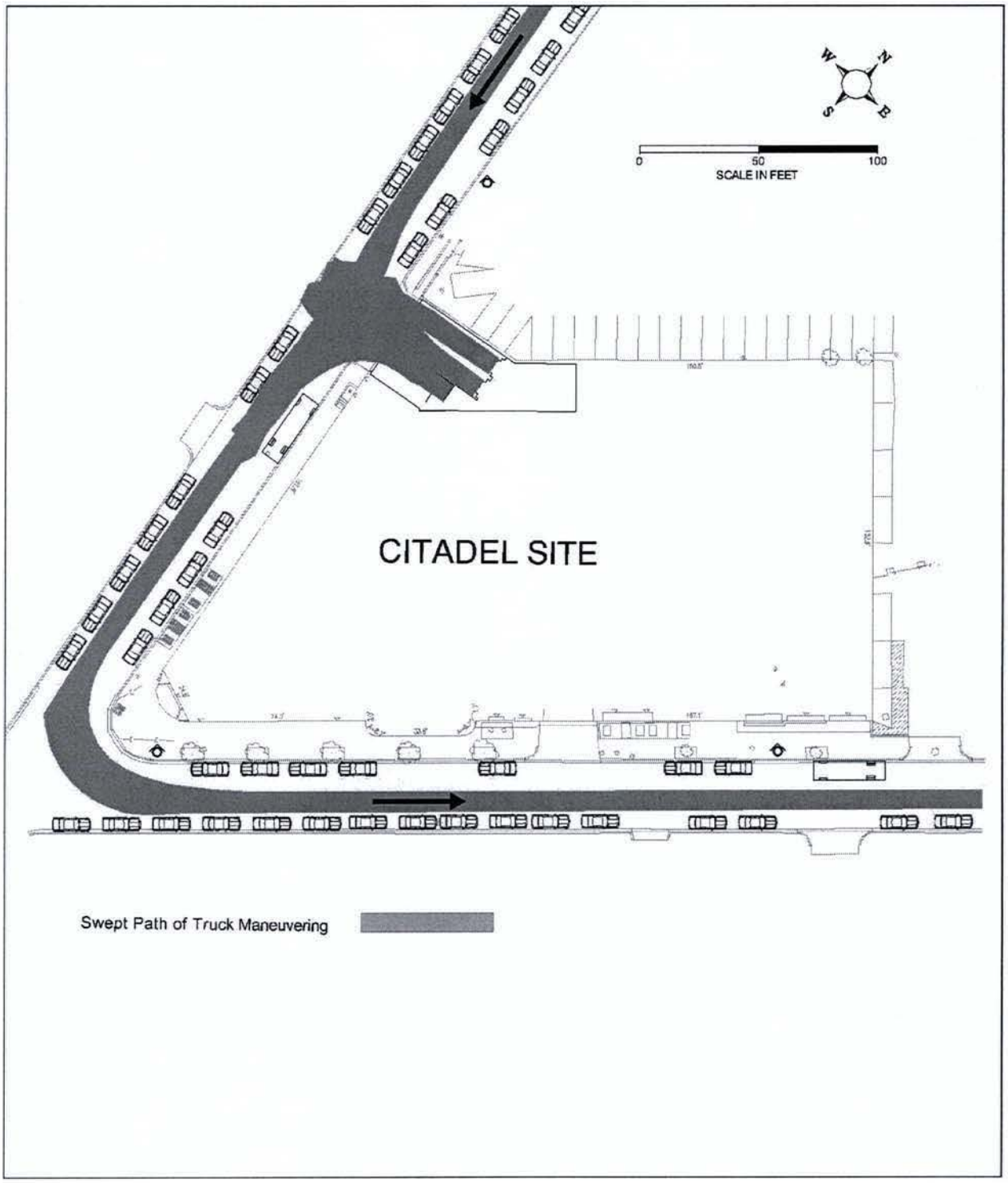


Figure 17 - Swept Path of Truck Maneuvering From the North

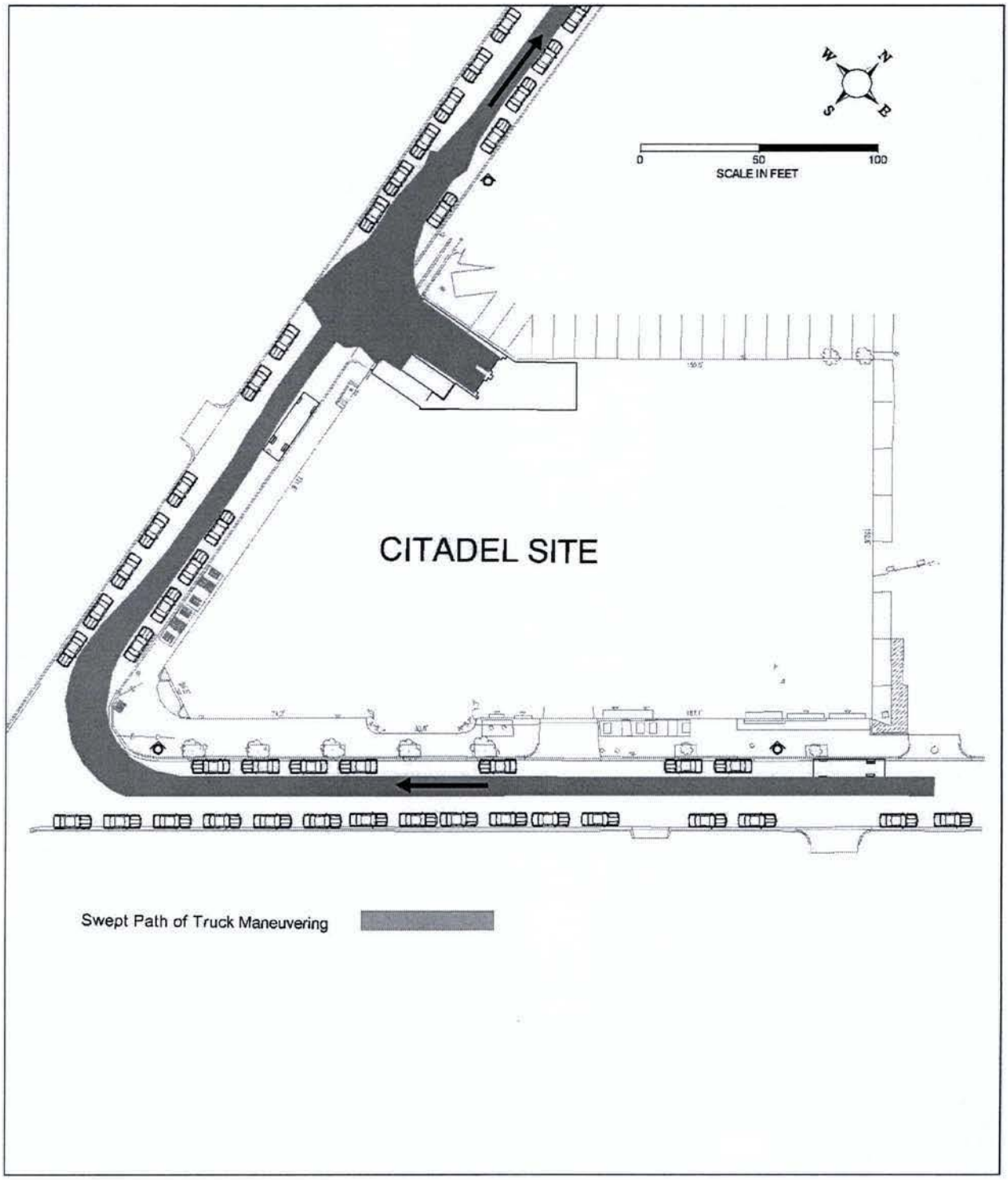


Figure 18 - Swept Path of Truck Maneuvering From the South

COMPARABLE SITES

Transportation elements at comparable supermarkets were studied and compared to the proposed parking and loading program at the Citadel. The following supermarkets were identified as being comparable to the proposed Harris Teeter store at the Citadel in their size and location:

- Safeway – Dupont Circle
- Safeway – Adams Morgan
- Whole Foods – Logan Circle
- Whole Foods – Glover Park
- Giant – Columbia Heights

Observations regarding the transportation characteristics of each of the comparables were made including the number of parking spaces, width of adjacent roadways, and size and location of loading docks/zones serving the site. Table 7 below summarizes these observations.

Table 7a - Comparable Site Observations

Store	Square Feet	# Parking Spaces	Parking Ratio (spaces per 1,000 SF)	Parking Management	# Loading Bays
Proposed Harris Teeter (Kalorama) 17th Street and Kalorama Road Washington, DC	38,556	86 weekdays 119 evenings and weekends	2.2 weekdays 3.1 evenings and weekends	Free Parking to grocery store and retail patrons while shopping on site.	2
Safeway (Dupont) 1701 Corcoran Street Northwest Washington, DC	13,572	0	0	N/A	1
Safeway (Adams Morgan) 1747 Columbia Road Northwest Washington, DC	26,153	32	1.2	60 min. free customer only parking in garage and alley behind store	1
Whole Foods (Logan Circle) 1440 P Street NW Logan Circle Washington, DC	40,200	185	4.6	Two-hour free customer only parking in basement and on roof; pay-on-foot machines by elevator	2
Whole Foods (Glover Park) 2323 Wisconsin Avenue Northwest Washington, DC	35,237	192	5.4	60 min. free parking for customers only on three garage levels	3
Giant (Columbia Hts.) 3460 14th Street Northwest Washington, DC	21,851	77	3.5	Two hour free parking for customers only in surface lot in front of store	1

Table 7b - Comparable Site Observations

Store	On-Street Parking Restriction Dimensions	Street Width Adjacent to Store	On-Street Parking Designations
Harris Teeter (Kalorama)	Parking restricted loading zone on 17th Street immediately south of the loading docks (40 feet)	Both 17th Street and Kalorama Road are 30 feet with two travel/parking lanes	See Figures 8 and 10
Safeway (Dupont)	Parking restricted loading zone on entire blockfront of 17th Street adjacent to store (200 feet)	17th Street is 40 feet with two travel and two parking lanes in the southbound direction; Corcoran Street has one 20-foot lanes eastbound	One hour metered parking on 17th Street; 2 hour metered parking on Corcoran Street
Safeway (Adams Morgan)	No parking on Columbia Road from alley immediately north of store to Ontario Road (50 feet)	Columbia Road is 40 feet wide with two 15-foot travel/parking lanes and one center turn lane	One hour metered parking on both sides of Columbia Road adjacent to storefront
Whole Foods (Logan Circle)	Parking restricted loading zone on opposite P Street blockfront to store (130 feet); small loading zone on SE corner of P and 15th Streets	P Street is 40 feet with two 20-foot travel/parking lanes	One-hour metered parking on store-side blockfront; loading zone on opposite blockfront to store
Whole Foods (Glover Park)	No parking immediately in front of store's main entrance on Wisconsin Ave. (70 feet)	Wisconsin Ave. is 52 feet two 15 foot outside travel lanes and two 11 foot inside travel lanes	Two-hour meter parking
Giant (Columbia Hts.)	No on-street loading zone	14th Street is 46 feet with two 11-foot travel lanes, two 5-foot bike lanes, and two 7-foot parking lanes	One-hour parking

While the respective parking ratios of the two Whole Foods stores are larger than that proposed for Harris Teeter in the Citadel, no parking demand study was conducted to determine the needs of these two stores. Observations have not indicated that the parking supply at these two stores is fully utilized. It has been observed that non-grocery store patrons park in the Whole Foods parking facilities, which may be a symptom of a parking supply that is consistently unutilized.

ONE-WAY STREET OPTIONS

Converting some or all of the streets in the Kalorama neighborhood to one-way has and is being explored as an option for improving the overall transportation within the neighborhood. Gorove/Slade performed a brief analysis of several one-way options. The analysis was captured in a memorandum dated December 29, 2004 and is included in the Technical Appendix of this report. This memorandum was presented to DDOT for their review and they are currently conducting their own more in depth analysis.

Gorove/Slade's preliminary analysis found that any option has advantages and disadvantages, but there is significant merit warranting further analysis. One advantage is that vehicles would not be required to pass one another as they currently do in two-way operation on these relatively narrow neighborhood roadways. Any proposed one-way option will need to be fully evaluated before it can be implemented.

While several one-way patterns may pose benefits to the transportation operations of this neighborhood, the analysis presented in this report shows that the intersections analyzed are expected to operate at acceptable levels in the future build year of 2006. These projections incorporate all of the known development that is currently underway in the neighborhood and assume that certain mitigation measures, including the installation of a traffic signal at 16th Street and Kalorama Road, will be implemented. The analysis shows that the need for a signal at this intersection is a result of the overall impact on traffic that development in this neighborhood is expected to have as a whole. The redevelopment of the Citadel is not the cause for the need of the signal, nor would it be its sole beneficiary. The analysis presented in this report assumed that the current operations of roadways in this neighborhood would remain in the future condition. Future analyses of several one-way options may or may not find that a traffic signal at 16th Street and Kalorama Road is warranted or needed.

TRANSPORTATION MANAGEMENT PLAN

The following is an outline of traffic, parking and loading dock management plans for the Citadel. Elements identified for the project include a grocery store as the major tenant, an office use located above the grocery store and a limited space allocation for another minor tenant such as a specialty retail shop.

Traffic Management Plan

I. Employees
   a. Citadel tenants' employees will be encouraged to use public transportation by providing transit literature in high visibility areas such as employee break rooms or in a kiosk located in a lobby area.
   b. Participation by tenants in the Metrochek program will be encouraged.
   c. Hiring from the neighborhood, particularly for the grocery store employees, will be encouraged through coordination with Jubilee Jobs.
   d. Limited employee parking will be allowed in the garage to discourage the use of private automobiles.
   e. A limited number of the most convenient office parking spaces will be reserved for carpools.
   f. Tenants' employees will be notified that parking on street in violation of RPP 2 hour limits is not acceptable.

II. Several one-way street operation options have been conveyed to DDOT who is currently analyzing options for implementing a one-way operation plan.

III. Load limits on streets will regulate those streets that can be used by trucks.

IV. DDOT is currently reviewing a proposal for installing a traffic signal at the intersection of Kalorama Road and 16th Street.

Parking Management Plan

I. DDOT is contemplating installing parking meters in the vicinity of the Citadel from which residents with RPP tags will be exempt. If implemented, patrons would be expected to prefer to park in the garage for free rather then pay to park at a parking meter on the street.

II. Patron garage parking validation can be implemented in the future if abuse of the parking garage by non-patrons becomes evident.

III. A parcel pick up station in the garage is part of the design.

IV. Shopping cart control will limit carts to the interior of the building and the parking garage. Patrons will not be allowed to take carts beyond the building, thus discouraging street parking.

Loading Dock Plan

I. A loading dock manager will be designated for the grocery store.

II. Communication links will be established with the dock manager including a fixed phone line, cell phone, radio, e-mail and fax. These communication links will be provided to vendors, local residents, security and police.

III. A set of control measures will be established and communicated to the appropriate parties. These control measures could include:
   a. Limited hours of operation
   b. Scheduled deliveries for specific vendors

c. Required contact with dock manager prior to delivery for unscheduled or unusual deliveries for approval on a case by case basis

IV. All grocer's delivery trucks will be of a size that fits within the loading dock behind closed doors.

V. All non-standard delivery trucks that do not fit behind closed doors must unload at curbside in front of 17th Street loading dock in a manner that does not block the use of public parking spaces. This curb loading must be done by hand dolly without the assistance of fork lifts or the like.

VI. The control plan will be issued to delivery companies and vendors. This plan will include good conduct rules for:
   a. Size of vehicles
   b. Hours of acceptable deliveries
   c. Required approach and exit routes
   d. Limiting noise
   e. Odor control
   f. Litter Control

This outline is a working draft that will be finalized once more details regarding future tenants, number of employees, employee schedules, and other issues related to transportation are known. This document will be produced, reviewed and submitted for approval by all parties involved.

CONCLUSIONS

The analysis presented in this report resulted in the following conclusions:

Existing Conditions (2004)

- All of the study intersections operate at acceptable levels with the exception of side street approaches to the three intersections on 16th Street, one of which is signalized.
- These side street approaches endure higher delays for the greater benefit of preserving the progression of traffic on the major north south corridor of 16th Street.

Build Year (2006) without Proposed Development (Future Background) Conditions

- All of the study intersections operate at acceptable levels with the exception of side street approaches to the three intersections on 16th Street, one of which is signalized.
- The expected future traffic without the redevelopment of the Citadel is expected to increase delays on the Kalorama approach to 16th Street beyond acceptable conditions.
- Conditions at this intersection could be improved to within acceptable parameters with the installation of a traffic signal at this intersection.

Build Year (2006) with Proposed Citadel Development (Total Future) Conditions

- All of the study intersections operate at acceptable levels with the exception of the Euclid Street and Belmont Street approaches to their respective intersections with 16th Street.
- Assuming the installation of a traffic signal at the intersection of Kalorama Road and 16th Street, the level of service at this intersection with the addition of site traffic remains above acceptable levels.
- Excluding the trips and other impacts associated with the mezzanine levels that were previously contemplated, but which are no longer planned, does not change any of the major conclusions presented here.

Parking On-Site

- The proposed parking supply is expected to be sufficient for serving the needs of the uses in the proposed redevelopment program.
- The proposed parking layout is expected to operate efficiently and has been designed according to DC zoning regulations as much as possible within the confines of the existing structure.

Parking On-Street

- Between 8% and 18% of the street parking supply in the vicinity of the Citadel is available between the hours of 8:00 AM and 8:00 PM.
- On-Street parking is currently filled to capacity in the early morning and evening hours.
- Proposed parking regulation changes adjacent to the site would result in a net decrease of 2 spaces and an increase of 3 RPP spaces.
- Converting additional metered parking spaces to RPP spaces within the study area may be warranted.
- Patrons and employees of the Citadel tenants are expected to utilize the parking garage since it is convenient, predictable and ample, rather than any available on-street parking.
- The developer and prospective tenant are taking measures to discourage the use of on-street parking and encourage the use of transit by both patrons and employees.

Truck Access and Loading

- Harris Teeter delivery trucks will be a maximum length of 40 feet and will be accommodated entirely within the proposed loading dock.
- Other grocery vendors will be notified of the site and access constraints related to truck size.
- All grocery store loading is expected to be accommodated within the loading dock, the proposed loading zone, and in front of the loading dock entrance without blocking traffic.
- All deliveries relating to office tenants is expected to be accommodated within the proposed 40' loading zone on Kalorama Road.
- It is recommended that a minimum of 40 feet, or approximately 2 parking spaces, be removed in the vicinity of the loading dock to accommodate truck maneuvering. Other curbside regulations are recommended such that there would be a net increase in Residential Permit Parking spaces.

One-Way Street Options

- Converting some or all of the streets in the neighborhood to one-way operation as a method of improving transportation has merit. However, any proposed plan to do so will have its advantages and disadvantages.
- If the current two-way roadway operations are not changed in the future, analysis presented in this report concluded that with the implementation of the identified mitigation measures, traffic and intersections would operate at acceptable levels.

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Note: While a single "original" copy of materials filed with the Office of Zoning includes all of the above Appendices, the additional copies provided that office and distributed to parties and others omit Appendices A, C, D, E, F and G. These are, however, available from Gorove/Slade Associates on request. However, copies of all technical appendices are being provided to the D. C. Department of Transportation.

TECHNICAL APPENDICES

APPENDIX A
EXISTING TRAFFIC VOLUMES & COUNT SHEETS

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APPENDIX B
LEVEL OF SERVICE DEFINITIONS

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APPENDIX B: LEVEL OF SERVICE DEFINITIONS

All capacity analyses are based on the procedures specified by the Transportation Research Board, Special Report 209: *Highway Capacity Manual (HCM),* 2000. 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 in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- Level of Service A describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, 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 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 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 may begin to appear at this level. The number of vehicles stopping is significant 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 delay 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 generally considered the lower end of the range of the acceptable level of service in urban areas.
- Level of Service E describes operations with 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.
- Level of Service F describes operations with average 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 flow 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: At an unsignalized intersection, the major street through traffic and right turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left turn traffic is dependent on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn. The level of service grade is provided for each conflicting movement at an unsignalized intersection and is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.

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 delay of less than 10.0 seconds per vehicle.

- Level of Service B. Describes operations with average total delay in the range of 10.1 to 15.0 seconds per vehicle.

- Level of Service C. Describes operations with average total delay in the range of 15.1 to 25.0 second per vehicle.

- Level of Service D. Describes operations with average total delay in the range of 25.1 to 35.0 seconds per vehicle.

- Level of Service E. Describes operations with average total delay in the range of 35.1 to 50.0 seconds per vehicle.

- Level of Service F. Describes operations with average total delay of 50 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 but may result in adjustments to normal driver behavior.

APPENDIX C

INTERSECTION CAPACITY ANALYSIS RESULTS – EXISTING VOLUME

APPENDIX D

INTERSECTION CAPACITY ANALYSIS RESULTS – BACKGROUND ONLY (2006)

APPENDIX E
INTERSECTION CAPACITY ANALYSIS RESULTS – TOTAL FUTURE (2006)

APPENDIX F

ADAMS MORGAN PEAK ACTIVITY ANALYSIS DATA COLLECTION

APPENDIX G
STREET PARKING DATA COLLECTION

APPENDIX H
ONE-WAY OPERATION MEMORANDUM

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

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MEMORANDUM

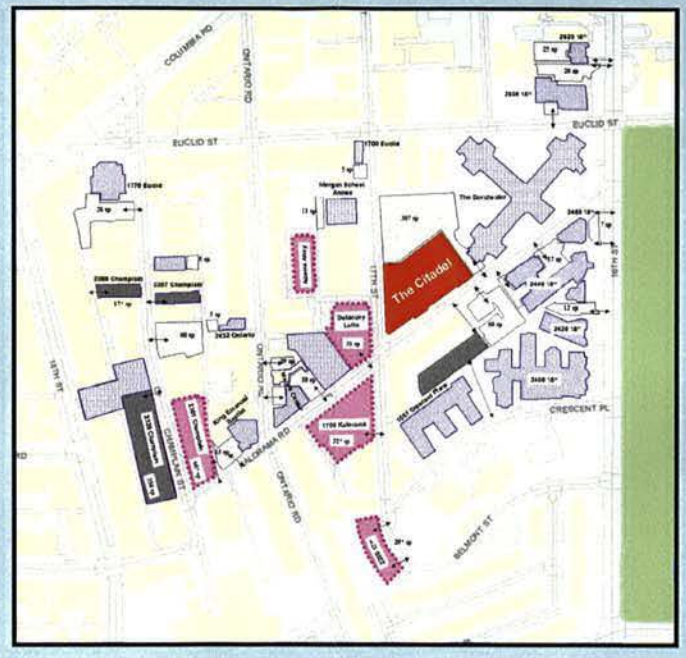
TO:	Kenneth Laden	DDOT
	Callistus Nwadike	DDOT
	Abdoulaye Bah	DDOT
	Maxine Brown-Roberts	DC Office of Planning
	Vivian Guevra	DC Office of Planning
CC:	Don Deutsch	Faison
	Lindsley Williams	Holland & Knight
	Chip Glasgow	Holland & Knight
	Peter Salter	Esocoff & Associates
	Karen Burditt	Esocoff & Associates
FROM:	Charles H. Teuer	
	Daniel B. VanPelt, P.E.	
	Frederick E. Gorove, P.E.	
DATE:	December 29, 2004	
SUBJECT:	The Citadel	
	One-Way Street Concepts	

The following assessment addresses the implications of modifying existing one way street patterns to reduce the difficulties caused by the narrowness of the streets. These difficulties include the fact that wider vehicles, typically trucks, going in opposite directions can not easily pass in an area that cars are parked on both sides of the street and private automobiles can also be constrained by wide trucks going in an opposing direction.

The Citadel is located in the northwest quadrant of the intersection of 17th Street and Kalorama Road in NW Washington. The streets within the neighborhood bounded by 18th and 16thStreets and Florida and Columbia Roads are all 30 feet or less in width with parking on both sides of the street. Some of these streets operate one-way today but the majority of the streets operate in both directions. While truck traffic is not new to this neighborhood, these streets currently operate in a situation that is not desirable by today's standards. Residents have expressed a concern that the operations of these relatively narrow two-way streets will be strained by the additional site traffic including both trucks and cars expected with the opening of a Harris Teeter grocery store in the Citadel. Therefore the following concepts for converting streets in the neighborhood to one-way operation have been explored and advantages and disadvantages of each have been identified.

Figure 1 shows current and future parking locations and access points within the neighborhood. Any concept that proposes changes to the operations of neighborhood streets would have an affect on access to and from these parking lots and garages.

Figure 1
Off-Street Parking Surrounding the Citadel Site



* Parking space estimates based on assumption of 1:1 ratio between residential units and parking spaces

Concept 1
No Change in Directionality

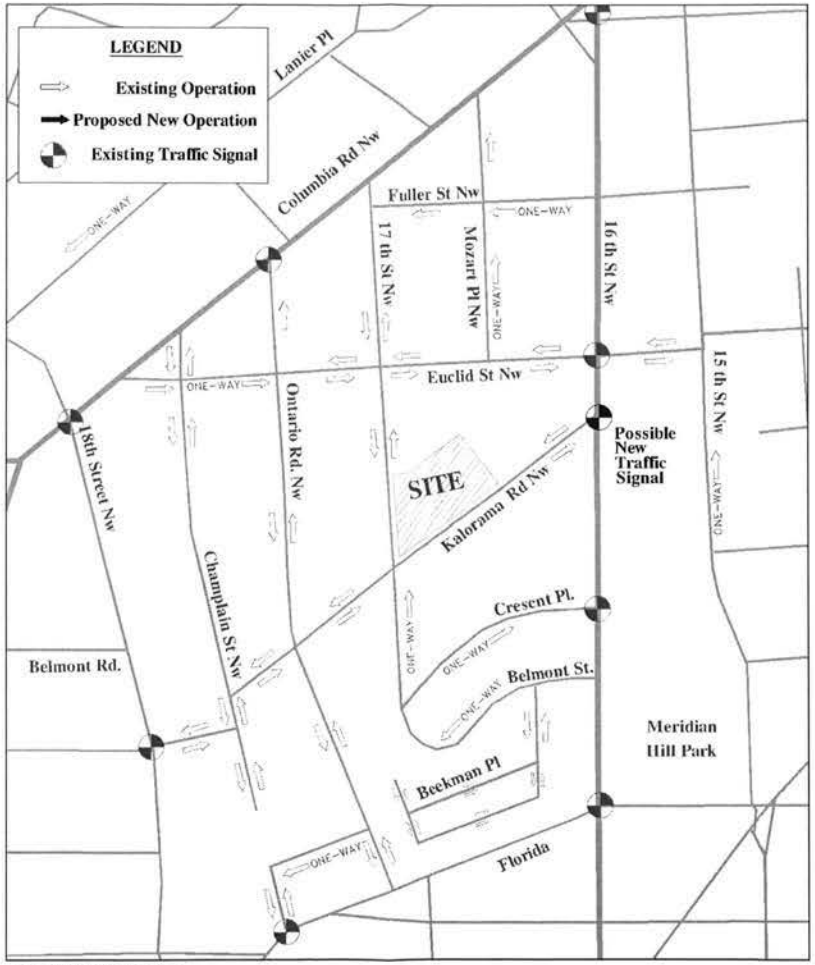
Figure 2 illustrates the roadway network, as it exists today.

Advantages

- Patrons and residents are acquainted with the existing circulation patterns, which would not change.
- Existing access points to parking lots in the area would not be affected (See Figure 1).
- Patrons would have direct access to the site from any direction.
- Trucks can access the site from either 16th Street via Kalorama Road or from Columbia Road via 17th Street.

Disadvantages

- No relief would be offered to diminish the constraints of the existing street widths.
- Situations where one truck is unable to pass an oncoming truck may occur more frequently. There is also not enough physical width for a truck to pass another truck that is double parked (i.e., a postal truck delivering a package to a residence).



One-Way Street Concepts
Figure 2
Existing Configuration

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December 29, 2004

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Concept 2
Convert Kalorama Road to one-way westbound between 16th and 17th Street

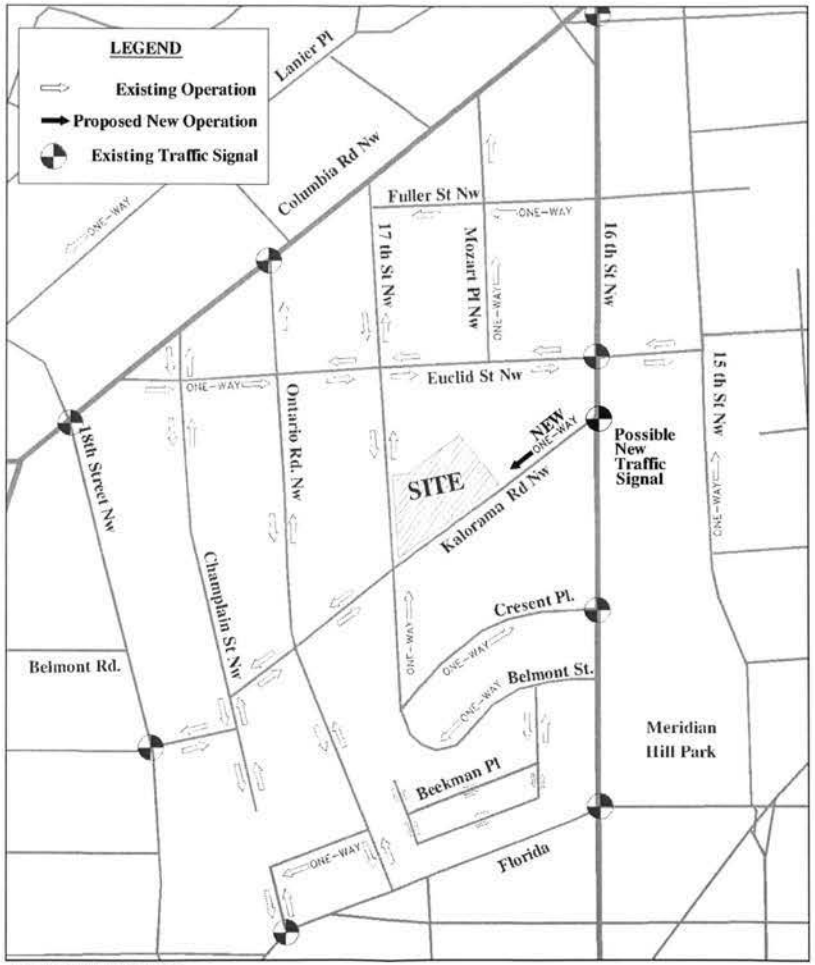
Figure 3 illustrates the proposed roadway network in this concept.

Advantages

- The site access to the parking garage would operate as a more efficient right-in/right-out access.
- Street operations on Kalorama would be eased when converted from one lane in each direction to two lanes in one direction.
- The one-way operation on Kalorama would result in less conflicting movements for both passenger cars and trucks.
- Trucks can access the site from either 16th Street via Kalorama Road or from Columbia Road via 17th Street.

Disadvantages

- Traffic from the neighborhood that would typically access 16th via Kalorama, including exiting site traffic, would be displaced to other roadways, such as Euclid. This would put additional strain on intersections that currently operate at poor levels of service.
- All access to the site would need to originate from 16th Street. The additional turning movements at this intersection would likely necessitate that a signal be installed.
- It would be more difficult for patrons to access the site from the west requiring that patrons coming from the west must utilize 16th Street.
- Two trucks could still oppose each other on 17th Street.
- Southbound trucks would be required to exit the site by heading north on 17th Street.
- It would still not be possible for a truck to pass another truck that may be double parked.
- All traffic from land uses east of the site with access on Kalorama would be required to head west on Kalorama increasing the volume of traffic that passes the site and residences.



One-Way Street Concepts
Figure 3

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Concept 3
Reorganize the neighborhood street network to a one-way system.

Figure 4 illustrates the operational revisions to the street network proposed in this concept.

Advantages

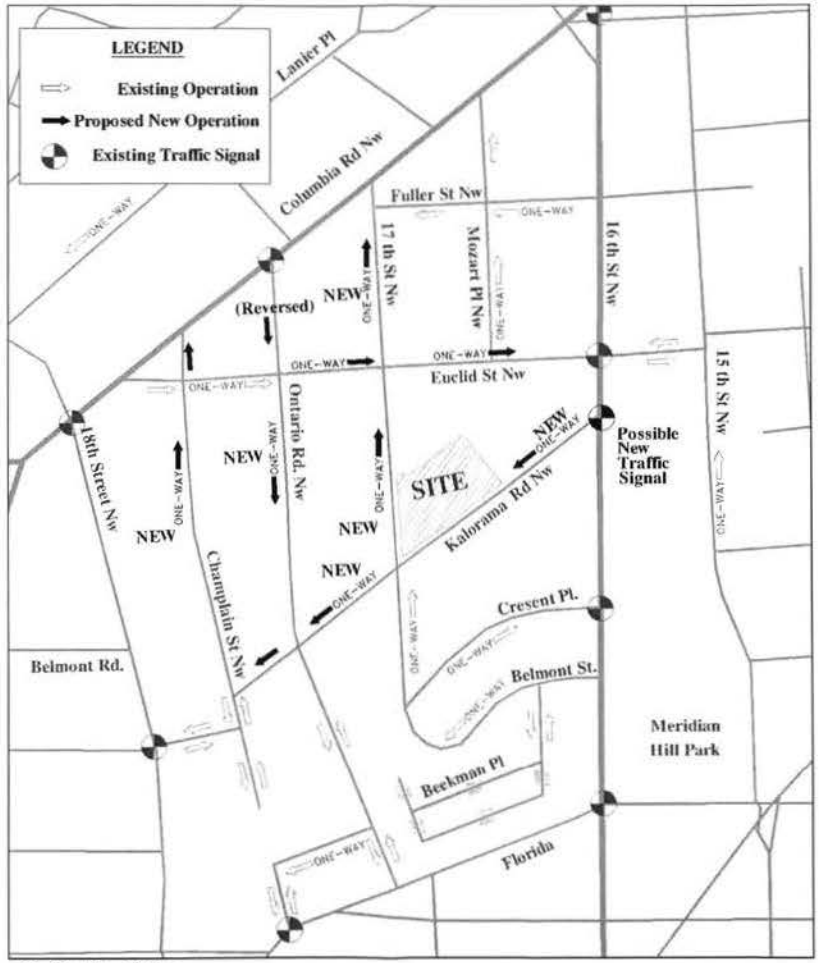
- There would be reduced conflicts between passenger cars and trucks on one-way streets.
- Street operations on all one-way streets would be eased when converted from one lane in each direction to two lanes in one direction.
- The site access to the parking garage would operate as a more efficient right-in/right-out access.

Disadvantages

- There would be reduced access to the neighborhood. Currently there are 8 access points from 18th, 16th Streets and Florida and Columbia Roads. This configuration reduces the number of access points to 6.
- Traffic circulation in the neighborhood would be clumsy and difficult, especially for unfamiliar motorists. The one way system forces motorist onto arterials such as Columbia Road and 16th Street, which can at times be congested, rather than allowing them to circulate within the neighborhood to a more preferable egress point.
- All access to the site would need to originate from 16th Street. The additional turning movements at this intersection would likely necessitate that a signal be installed.
- All trucks must access the site from 16th Street and exit to Columbia Road.
- The one-way operation coupled with an incomplete street grid make the one-way operation confusing to unfamiliar motorists and increases circulation patterns.
- It can be difficult to alert truck drivers in advance of a one-way system, which may cause confusion and unnecessary circulation.
- The one-way system concentrates traffic at certain intersections on 16th Street and Columbia Road, which may degrade the operation of these intersections.

Additional Concepts

Additional concepts may be possible but were not explored as the advantages and disadvantages of those would most likely be similar to those described above. A concept that includes Kalorama as an eastbound only street was explored briefly. This concept would have similar advantages with Concept 2 above, but would have significant disadvantages in terms of neighborhood circulation and access to the site.



One-Way Street Options
Figure 4

THE CITADEL
December 29, 2004

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APPENDIX B: LEVEL OF SERVICE DEFINITIONS

All capacity analyses are based on the procedures specified by the Transportation Research Board, Special Report 209: *Highway Capacity Manual (HCM),* 2000. 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 in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- Level of Service A describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, 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 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 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 may begin to appear at this level. The number of vehicles stopping is significant 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 delay 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 generally considered the lower end of the range of the acceptable level of service in urban areas.
- Level of Service E describes operations with 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.
- Level of Service F describes operations with average 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 flow 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: At an unsignalized intersection, the major street through traffic and right turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left turn traffic is dependent on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn. The level of service grade is provided for each conflicting movement at an unsignalized intersection and is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.

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 delay of less than 10.0 seconds per vehicle.

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