



TECHNICAL MEMORANDUM

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DATE: April 16, 2009

SUBJECT: Traffic Impact Study Addendum - Zoning Commission Case No. 08-33
Conference Center Associates PUD and Zoning Map Amendment Application

INTRODUCTION

This memorandum supplements information presented in the Traffic Impact Study (dated December 2008) prepared by Gorove Slade Associates in support of Zoning Commission Case No. 08-33. This document addresses issues raised by members of the Zoning Commission, Office of Planning (OP) and the District Department of Transportation (DDOT). These issues include the following:

- 1) Vehicular access to the site
- 2) Analysis of the proposed number and location of loading berths and delivery spaces
- 3) Pedestrian and Bicycle Levels of Service (LOS) for the area surrounding the site
- 4) Additional analysis regarding the utilization of the existing parking spaces on the site and the utilization of proposed parking spaces.

SITE ACCESS

Site access is currently provided via an unsignalized entrance along Irving Street and another along Michigan Avenue. The site development plan proposes to relocate the Irving Street access approximately 50 feet southeast of its current location and away from a horizontal roadway curve situated to the west. This access would be improved with auxiliary turn lanes and a traffic signal. The Michigan Avenue access would be relocated approximately 30 feet further from the Irving Street intersection. This location would remain unsignalized and continue to serve full access movements.

The DDOT staff has requested consideration of the following access alternatives by the development team:

- a) Restricting the Michigan Avenue access to trucks and buses only; and
- b) Restricting the Michigan Avenue access to right-in/right-out movements for all vehicles.

After reviewing the above alternatives, this study has determined that **maintaining full access at the Michigan Avenue entrance for all vehicles** is the best and preferred alternative for the following reasons:

- **Site Trip Generation.** The submitted traffic study indicates that the proposed hotel uses would account for approximately 70% of the projected future total site trips. The Institute of Transportation Engineers (ITE) Trip Generation Manual indicates that hotel uses tend to generate more trips during the weekday off-peak period and on weekends, compared with the weekday peak periods. During the off-peak periods, the traffic volumes along Michigan Avenue are and would remain significantly lower than the weekday peak periods. Therefore, the full operation of this site is anticipated to have minimal impacts during both peak and off-peak periods.
- **Left-Turn Restriction at Irving Street.** Left-turns are prohibited from Michigan Avenue to Irving Street. This presents a major difficulty for a significant proportion of the vehicles accessing the site from the City's Downtown and areas west of North Capitol Street (i.e., approximately 33% of the total site trips). It is expected that the majority of these vehicles would approach the site via Michigan Avenue. This is related to the fact that the distance and travel time from the North Capitol Street/Michigan Avenue intersection is and would be shorter and less circuitous, compared with traveling north along North Capitol Street and through the Irving Street interchange (or future at-grade intersection). Due to the left-turn restriction at the Irving Street intersection, those vehicles would need to make left-turns into the site at the Michigan Avenue entrance. Such movements would be facilitated by gaps provided in traffic flows by the Irving Street traffic signal, and would prevent the occurrence of circuitous movements (including illegal left-turns) in the vicinity of the National Shrine after motorists realize that left-turns cannot be made onto Irving Street from Michigan Avenue.
- **Outbound Left-Turn.** Of all the turning movements, this would likely be the most critical movement for vehicles using the Michigan Avenue access because such movements would require adequate gaps in both directions along Michigan Avenue. The traffic impact study assumed that the signalized Irving Street access would be used primarily by exiting vehicles destined to the east along Michigan Avenue. The remaining trips (i.e., those turning left from the site) would constitute approximately 5% or 8 vehicles during both the AM and PM peak hours. While restricting the access to right-in/right-out would eliminate left-turns and related issues, the volumes involved would be relatively low as noted above. Additionally, it is anticipated that left-turning motorists would make efficient use of the gaps provided by the traffic signal at the Irving Street intersection. This situation would be more efficient during the off-peak periods when vehicles volumes are significantly lower in both directions along Michigan Avenue. Based on these considerations, significant operational issues would not result from the proposed development providing full access on Michigan Avenue.

- **Supplemental Vehicular Access.** The Michigan Avenue entrance is necessary to provide additional access to the site for all vehicles, particularly if the main access is blocked due to an incident on the site or along Irving Street. Additionally, the Michigan Avenue entranceway would provide emergency responders another entrance that may be more convenient and time-responsive compared with the main entrance. In this context, it is noted that the site has no alleyway access. So having two access points is necessary and desirable to ensure that the access system allows motorists to enter, circulate and exit continuously as efficiently as possible.
- **Entranceway Design.** The proposed access will be relocated approximately 30 feet further away from the Irving Street intersection. The driveway design would facilitate pedestrian and bicycle circulation in front of and within the subject property. Adequate sight distances would be provided to make sure that pedestrians are seen by motorists and vice versa. The sidewalk would be designed with a continuous flat grade and surface to create a comfortable walking environment. Contrasting paving would band the sidewalk area that is also the driveway area to alert pedestrians that they are approaching the driveway.
- **Traffic Signal Warrant Analysis.** A preliminary signal warrant analysis was performed for the Michigan Avenue entrance, primarily considering the peak hour and four-hour vehicular volume warrants presented in the Manual of Uniform Traffic Control Devices (MUTCD) and the DDOT Design and Engineering Manual. The results indicate that none of these warrants is satisfied under existing or projected future build-out traffic conditions.

The factors presented above demonstrate that the two access alternatives would not provide any significant operational benefits to justify further consideration in lieu of the full access alternative.

LOADING DESIGN AND ACCESS EVALUATION

The Applicant proposes to provide sufficient loading facilities in accordance with the requirements of the District of Columbia Municipal Regulations and the proposed project needs. Phase I of the proposed development would include the following loading dock elements:

- One 55-foot loading berth, one 30-foot loading berth and a designated trash area for the proposed hotel/ conference center
- One 55-foot loading berth and a designated trash area for the proposed retail uses

These facilities would be located along the Michigan Avenue entranceway and all delivery and service vehicles would be programmed to access the facilities via this access point. The adequacy of the proposed loading facilities was confirmed based on delivery and service information obtained for a comparable development (Fairfield Inn and Suites in Baltimore, Maryland). Based on this information, the anticipated delivery and service operations would consist of the following elements:

Hotel

- Deliveries would be made primarily by single-unit (30-ft.) trucks. An average of 6 truck deliveries would occur per day, six days per week. Truck activity would be distributed primarily between 11:00 AM and 5:00 PM each day. The average delivery time would be 10 - 15 minutes.
- Deliveries involving 50-ft. trucks would be rare (i.e., one truck per month). The average delivery time would be approximately 15 - 20 minutes.

Restaurant/Retail/Ballroom

- Deliveries would be made primarily by single-unit (30-ft.) trucks. An average of 3 truck deliveries would occur per day, six days per week. These vehicles would arrive between 5:00 – 9:00 AM each day. The average delivery time would be 10 - 15 minutes.
- Deliveries involving 50-ft. trucks would be infrequent. The average delivery time would be approximately 15 - 20 minutes.

Conference Center

- Deliveries would be made by 30-ft. and 55-ft. trucks. An average of 1 truck delivery would occur per day, seven days per week. The average delivery time ranges from 10 - 20 minutes.

Trash - All Uses

- Trash collection would occur on three days per week, involving 30-ft. or smaller trucks.

Based on the delivery program outlined above, the anticipated demand during the peak 15-20 minute period would consist of 3 - 5 trucks including one 55-ft. truck. This demand would be satisfied adequately by the proposed project, considering the following:

- 1) The proposed project will include one 30-foot berth and two 55-foot berths.
- 2) The loading berths would be managed to allow the 55-ft berths to be used by smaller trucks during times when no large trucks are scheduled to arrive at the site. Should any truck queuing occur, the staging for these vehicles would be accommodated on site to minimize loading operations impacts on the adjacent streets.

Autoturn Software analyses were undertaken to ensure that the project provides adequate turning radii and maneuvering space in relation to all loading berths and access to/from Michigan Avenue. This study confirms that the proposed loading facilities would be adequate to meet the zoning requirements and the practical needs of the project. Access to and use of the loading facilities would not have any adverse impacts on the adjacent roadways.

PEDESTRIAN AND BICYCLE LEVEL OF SERVICE ASSESSMENT

Based on discussions with DDOT staff and relevant information presented in the “*Transportation Planning Handbook*”¹ and the “*Transportation Impact Analyses for Site Development*”², the study area pedestrian and bicycle LOS conditions were determined by undertaking the following:

- 1) Field observations of the operational and service characteristics of existing facilities.
- 2) Review of the District of Columbia Draft Pedestrian Master Plan (2008) and the District of Columbia Bicycle Master Plan (2005)³ to confirm field observations, obtain other relevant information and to determine the compatibility of the proposed development with planned facilities, policies or standards.
- 3) Quality of Life Assessment to determine the level of relative comfort currently experienced by pedestrians and bicyclists and would be experienced in the future along the roadways adjacent to the site.

Further discussion and analysis of the above factors are presented in the sections following.

Pedestrian Level of Service (LOS)

Field Observations

Pedestrian facilities in the vicinity of the site include 6-ft wide sidewalks along both sides of Michigan Avenue and a 6-ft wide sidewalk along the western/site frontage side of Irving Street. The buffer width is approximately 4 feet along the site frontage.

Pedestrian facilities at the adjacent Michigan Avenue/Irving Street consist of 12-ft wide crosswalks (which are consistent with the District Pedestrian Master Plan) and pedestrian countdown signals. Pedestrian volumes are quite low (i.e., in the range of 15 - 25 pedestrians along the Michigan Avenue site frontage during the morning and afternoon peak hours). Pedestrian activity is virtually non-existent along the Irving Street site frontage.

¹ *Transportation Planning Handbook*, ITE, 3rd Edition, ps. 986-990, 2009.

² *Transportation Impact Analyses for Site Development*, ITE, ps. 68-70, 2005.

³ <http://www.tooledesign.com/projects/dc/reports.html#dra> (DC Pedestrian Master Plan)

http://ddot.dc.gov/ddot/cwp/view.a,1245,q,634448,ddotNav_GID,1761,ddotNav.%7C34416%7C.asp (DC Bicycle Master Plan)

District of Columbia Draft Pedestrian Master Plan

The District Draft Pedestrian Master Plan characterizes the pedestrian facilities (along the site) as having moderate volumes and operational deficiency. The pedestrian deficiency was based on sidewalk gaps, width and buffer (with or without trees). Other factors included the number of travel lanes, volumes, speeds and the presence of medians along the adjacent roadways. A section of the Master Plan Pedestrian Activity/Deficiency Roadway Map is included as Figure 1.

The Pedestrian Master Plan does not recommend any improvements along the site frontage. However, the Applicant proposes to widen the existing sidewalks from 6 to 10 feet and the buffer from 4 to 6 feet with trees along the site frontages, in keeping with DDOT requirements. The unsignalized Michigan Avenue entrance will be provided with adequate sightlines to enable pedestrians and bicyclists to be seen by exiting vehicle drivers and vice versa. A new traffic signal including appropriate phasing and timing for bicyclists and pedestrians will be installed at the Irving Street entrance as part of the proposed development. Both entranceways will be provided with special pavement designs to alert pedestrians and cyclists of the potential presence of other users. Based on these considerations, the proposed development would enhance pedestrian travel along the site in keeping with the recommendations of the District planning and design requirements.

Quality of Life Assessment

This assessment evaluates the level of comfort provided to users of the pedestrian facilities within the vicinity of the site. The information presented above in relation to the District's master plans demonstrates that a high level of comfort is provided to pedestrian activity along the adjacent sidewalks and crosswalks.

Other supporting considerations are as follows:

Pedestrian Level of Service (with respect to pedestrian comfort)

This level of service was assessed based on a research paper entitled "*Modeling the Roadside Walking Environment: A Pedestrian Level of Service*"⁴. This document presents a statistical model for determining pedestrian LOS by "objectively quantifying the pedestrian perception of comfort and safety in the pedestrian environment". The model estimates pedestrian perception of comfort based on the lateral separation between pedestrians and vehicles. The model's primary inputs are sidewalk width, width and type of buffer between the sidewalk edge and the roadways edge, and the volume and speed of vehicular traffic. This methodology generates a numerical result, ranging from 0 to 5.5 or greater, that corresponds with LOS categories listed in Table 1. LOS "A" represents the most safe/comfortable (or least hazardous) travel conditions. LOS "F" represents the least safe/comfortable (or most hazardous) travel conditions.

⁴ *Modeling the Roadside Walking Environment: A Pedestrian Level of Service*," Transportation Research Board Paper No. 01-0511, 2001.

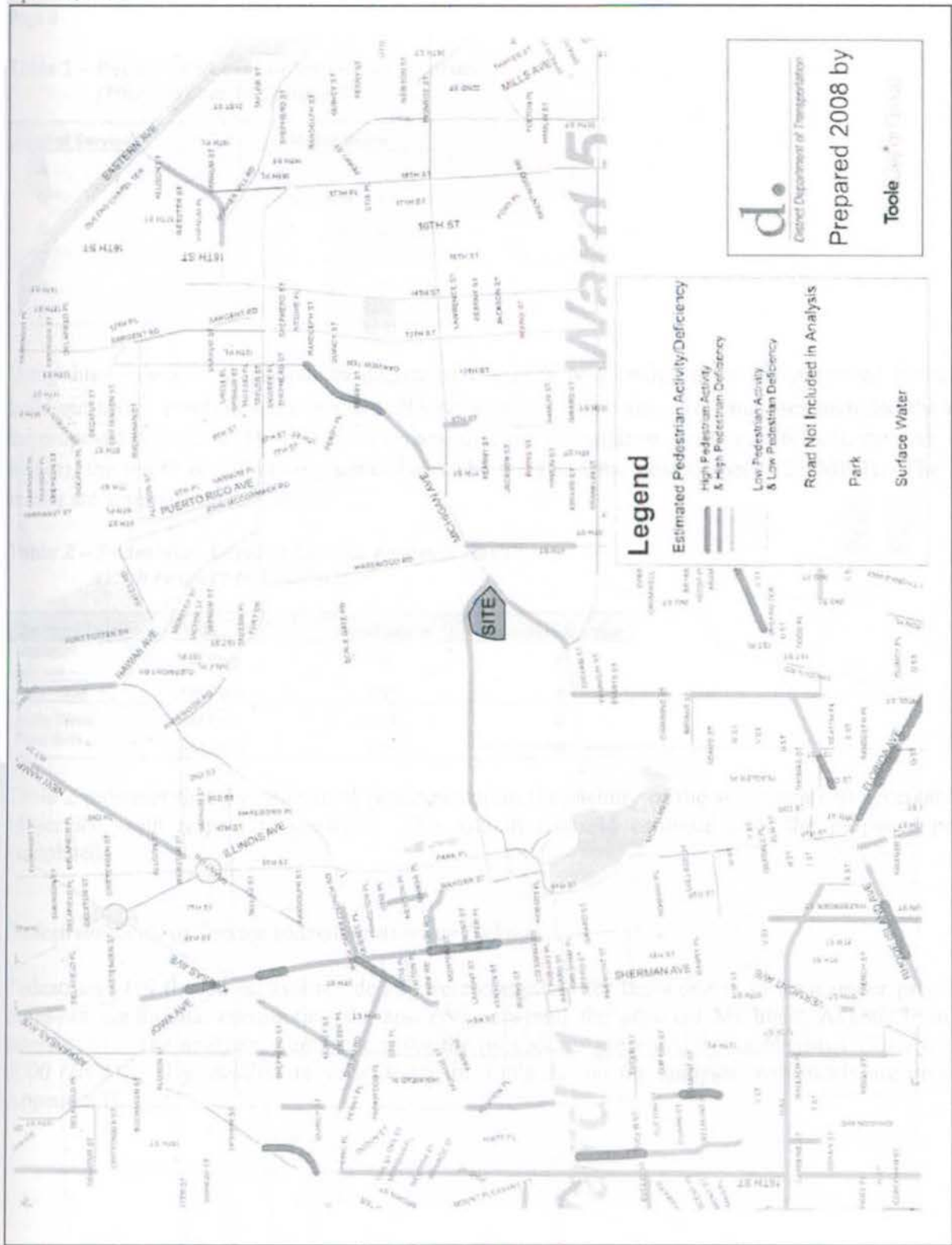


Figure 1 Pedestrian Activity Map

Table 1 – Pedestrian Level of Service Categories
(With respect to Comfort)

Level of Service	Model Score
A	≤ 1.5
B	> 1.5 and ≤ 2.5
C	> 2.5 and ≤ 3.5
D	> 3.5 and ≤ 4.5
E	> 4.5 and ≤ 5.5
F	> 5.5

Using this methodology, pedestrian quality of life LOS was analyzed for the projected future project build-out traffic conditions along the roadways adjacent to the site. The analyses included the width of the proposed sidewalks (10 feet), their separation from the adjacent roadways (6 feet), the curb width (6 inches), the width of the closest travel lanes (11 feet) and the posted speed (25 MPH). The analysis results are summarized in Table 2.

Table 2 – Pedestrian Level of Service Analysis Results
(With respect to Comfort)

Location	Time	Model Score	Level of Service
Michigan Avenue – North side	AM Peak	1.82	B
	PM Peak	1.95	B
Irving Street – West Side	AM Peak	1.72	B
	PM Peak	2.01	B

Table 2 indicates that the pedestrian facilities within the vicinity of the site operate at acceptable levels of service, with respect to comfort. This situation would continue after the proposed project is completed.

Pedestrian Level of Service (based on Average Delay)

Pedestrian LOS (based on average delay) were computed for the worst peak hour under projected site build-out conditions, considering the site entrances and the adjacent Michigan Avenue/Irving Street intersection. The analyses were done using the procedures presented in the *Highway Capacity Manual 2000 (HCM)*⁵. The results are summarized in Table 3, and the analysis worksheets are presented in Appendix B.

⁵ "Highway Capacity Manual 2000", Transportation Research Board, 2000.

**Table 3 – Pedestrian Level of Service Analysis Results
 (Based on Average Delay)**

Intersection	Average Pedestrian Delay (seconds)	Level of Service (LOS)
Michigan Avenue and Site Entrance*	2.0	A
Michigan Avenue and Irving Street**		
- Existing Crosswalk across Michigan Avenue	27.0	C
- Existing Crosswalk across Irving Street	3.0	A
Irving Street and Site Entrance**		
- Future Crosswalk across Irving Street	25	C
- Future Crosswalk across Site Entrance	5	A

* Unsignalized

** Signalized

Source: Highway Capacity Manual (2000) and Gorove Slade Associates.

Table 3 indicates that pedestrians would experience minimal delay at the site entrances and the adjacent Michigan Avenue/Irving Street intersection.

Bicycle Level of Service (LOS)

Field Observations

The pedestrian facilities (noted above) are also used for bicycle travel, since there are no on-street facilities in the vicinity of the site. Bicycle volumes are quite low (less than 10 during the morning or afternoon peak hour) along the Michigan Avenue site frontage. No bicycle activity was observed along the Irving Street site frontage.

District of Columbia Draft Pedestrian Master Plan

The District Bicycle Map and Master Plan confirm that the sidewalks are shared bicycle-pedestrian facilities and bicycle travel conditions are “fair”. The Bicycle Map also shows that the Irving Street sidewalk is part of a signed east-west bicycle route including Michigan Avenue to the east in the vicinity of the site. A section of the map showing the study area bicycle routes is included as Figure 2.

The Master Plan indicates that the segments of Michigan Avenue and Irving Street (adjacent to the site) operate acceptably at Level of Service D based on the application of a “scientifically-calibrated Bicycle Level of Service (Bicycle LOS) Model to evaluate the comfort of bicyclists on roadway segments” (page 13). A copy of the Master Plan LOS Map is included as Figure 3. This LOS result does not apply to bicycle travel on the proposed widened sidewalks and buffer areas, which would be characterized by higher LOS values.

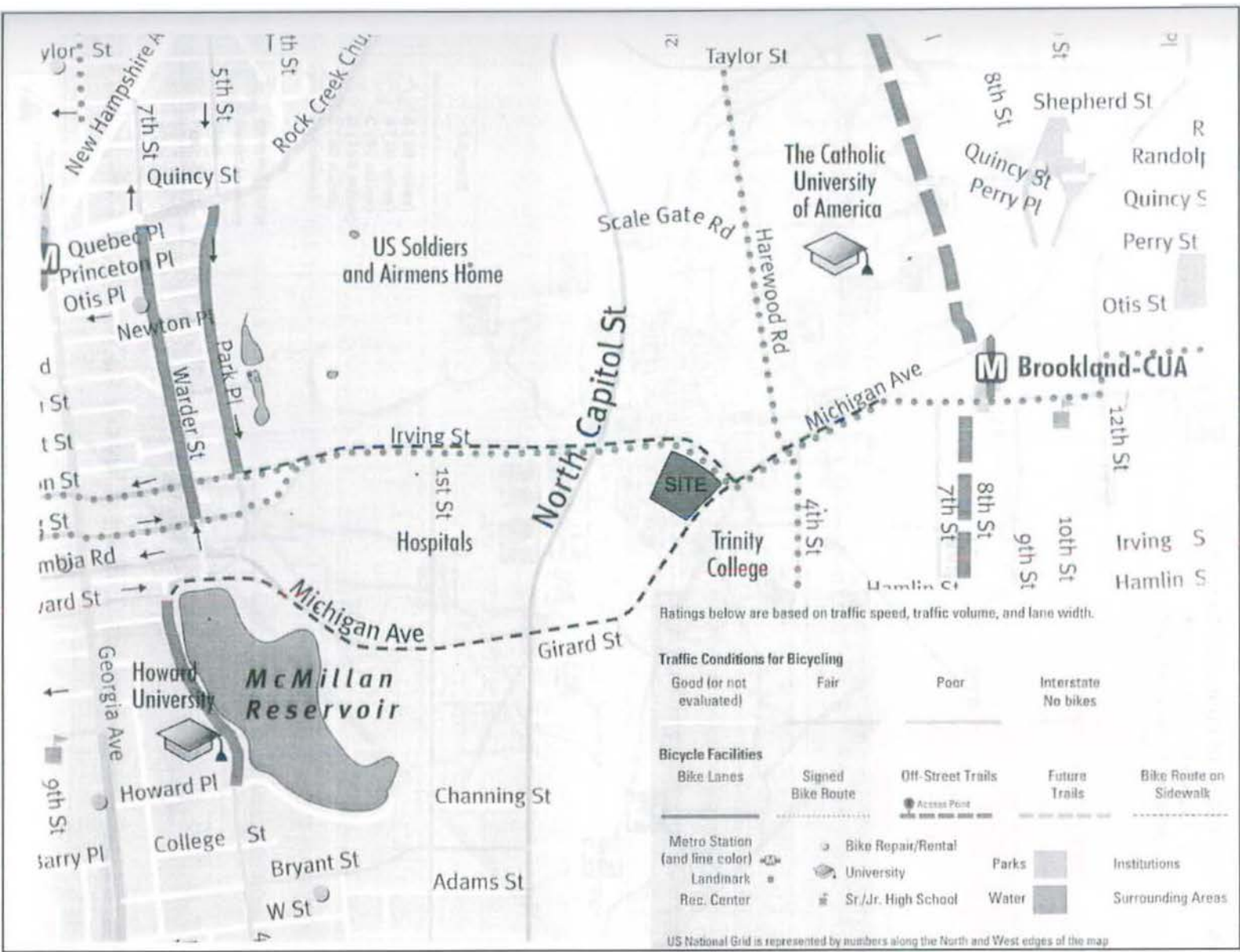


Figure 2: Section of District of Columbia Bicycle Map

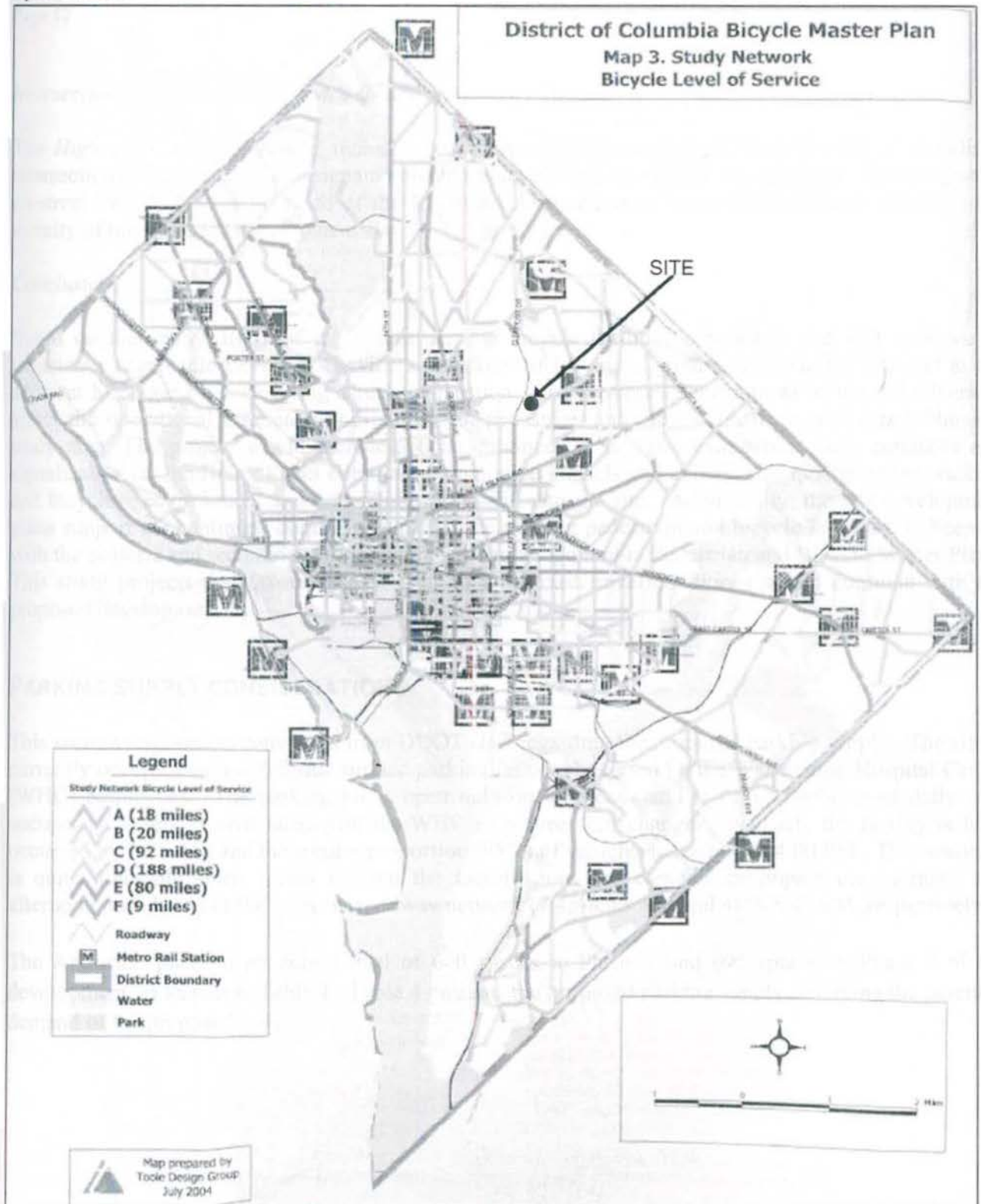


Figure 3 Bicycle LOS Map

Intersection Bicycle Level of Service (based on Average Delay)

The *Highway Capacity Manual* includes procedures for the analysis of bicycle LOS at signalized intersections where there is a designated on-street bicycle lane on at least one approach. No designated on-street bicycle lane is provided at the Michigan Avenue/Irving Street intersection or others in the vicinity of the proposed development site.

Conclusion

Based on this study, users of the pedestrian and bicycle facilities experience and will continue to experience acceptable Levels of Service and quality of life travel conditions along the site and at the adjacent Michigan Avenue/Irving Street intersection. The proposed development would not adversely affect the operational efficiency and comfort of pedestrian and bicycle traffic movements within the study area. The project would include special entranceway design treatments at both entrances and signalization (at the Irving Street entrance) to minimize impacts and enhance the quality of the walking and bicycling environment and experience along and into the site. Additionally, the site development plans support the continued comfortable use of the existing pedestrian and bicycle facilities, in keeping with the policies and recommendations of the District of Columbia Pedestrian and Bicycle Master Plans. This study projects that favorable pedestrian and bicyclist travel conditions would continue with the proposed development.

PARKING SUPPLY CONSIDERATIONS

This section responds to comments from DDCOT staff regarding the proposed parking supply. The site is currently occupied by a 400-space surface parking lot which is used by the Washington Hospital Center (WHC) employees. The parking lot is open only on weekdays and is fully (100%) used daily. Its occupancy pattern is associated with the WHC employee shift changes. As such, the facility is fully occupied by 7:15 AM and the greater proportion (85%) of vehicles leave before 4:00 PM. This situation is quite favorable since access to/from the facility does not coincide or impact the morning and afternoon peak hours of the adjacent roadway network (7:45-8:45 AM and 4:45-5:45 PM, respectively).

The Applicant plans to provide a total of 600 spaces in Phase 1 and 695 spaces in Phase 2 of the development, as shown in Table 4. Table 4 presents the proposed parking supply satisfying the practical demand of the proposed uses.

Table 4 – Proposed Parking Summary

Land Use	Required Parking		Proposed Parking Supply
	Practical Demand Parking Ratio	Demand	
Phase I			
- Hotel (314 Rooms)	0.6 per 1 room	189	
- Restaurant (5,000 SF)	6.0 per 1,000 s.f.	30	
- Retail (18,000 SF)	4.0 per 1,000 s.f.	72	
- WHC Satellite Parking	N/A	300	
Phase I Demand		591	
Phase I Supply			600*
Phase II			
- Hotel (200 Rooms)	0.6 per 1 room	120	
- Apartments (120 Units)	1.0 per 1 unit	120	
- WHC Satellite Parking Removal	N/A	-300	
Phase II Demand		-60	
Phase II Supply			95**
Total		531	695

* Includes 300 WHC replacement parking spaces.

** Phase I surface lot (200 spaces) replaced with a 295-space underground garage.

The Phase 1 parking facilities will consist of a 400-space garage and a 200-space surface parking lot. The garage will serve the hotel, restaurant and retail uses (300 spaces) and WHC employees (100 spaces). The surface lot will serve WHC employees, resulting in a total of 300 spaces for this user category. This plan reduces the number of spaces used by WHC from 400 to 300.

The Applicant proposes the build-out of Phase 2 by 2016. The 200-space surface lot will be replaced by a 295-space underground garage.

The proposed parking supply adequately serves the proposed demand in both Phases I and II. This would ensure that the future needs of the site are adequately met and there is no overspill of demand onto adjacent properties or public streets.

The submitted traffic impact study notes that the proposed development would increase local area traffic by approximately 1.5% during the morning and afternoon peak hours. The proposed parking would not result in greater impacts since its use would be tied to the operational characteristics of the proposed land uses. Based on the above factors, the proposed parking is reasonable given the planned program and the ability of the proposed development to be flexible for both phases of the development.