



TECHNICAL MEMORANDUM

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DATE: December 21, 2005

SUBJECT: Preliminary Traffic Impact Analysis

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INTRODUCTION

This memorandum summarizes the preliminary analysis of a traffic impact study for Sibley Memorial Hospital. This study is in conjunction with a Planned Unit Development (PUD) and Zoning Map Amendment (ZMAP) application. The Lucy Webb Hayes Training School for Deaconesses and Missionaries on behalf of Sibley Memorial Hospital (Sibley) is planning to construct a new medical office building and parking garage to upgrade/expand existing facilities. The proposed medical office building will be approximately 152,000 square feet and will include space dedicated to medical office use and outpatient services, as well as a 6,900 square foot auditorium. The plan also includes an approximately 600-space parking garage, however since there is a loss of parking spaces due to the new development, the parking garage will provide a net increase of approximately 233 spaces.

This preliminary assessment looks at the traffic impacts of the new medical office building on the surrounding road network and identifies possible mitigation measures; however a full traffic study to follow at a later date will substantiate the findings herein.

EXISTING CONDITIONS

Study Intersections

To determine the existing traffic conditions on the roadways near Sibley, turning movement counts were collected at the following six study intersections (as shown in Figure 1):

1. Little Falls Road and MacArthur Boulevard
2. Little Falls Road and Dalecarlia Parkway

3. Dalecarlia Parkway and Loughboro Road
4. Loughboro Road and Main Hospital Entrance
5. Loughboro Road and Grand Oaks Entrance
6. Loughboro Road/Norton Street and MacArthur Boulevard

All counts were conducted on Thursday, November 10 (an average weekday for area traffic, but an increased day for Hospital activity) from 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m. Other data collected at these intersections included signal timings, lane configurations, traffic control, and sight distances. From the data collected, the system peak hours were found to be from 7:30 a.m. to 8:30 a.m. and 5:00 p.m. to 6:00 p.m. and the existing volumes are shown in Figure 2.

Bus Ridership Analysis

On Thursday, November 17, bus stop use patterns along Loughboro Road were observed to determine the number of neighbor/Hospital riders. Observations of the number of riders who were dropped-off outside of Sibley were conducted from 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m. The peak bus hour ridership was found to be from 7:00 a.m. to 8:00 a.m. and 6:00 p.m. to 7:00 p.m. The discrepancy between the bus peak hour ridership and the traffic system peak hours around Sibley is more than likely because Hospital employee shift changes do not correlate with the peak hours of street traffic.

Table 1 shows the analysis results of the bus stop use patterns. According to the analysis, the majority of riders who use the bus are Hospital employees or patients.

Table 1 – Bus Ridership Analysis Results

Time Period	Ridership			
	Hospital Drop-offs	Non-Hospital Drop-offs	Total Dropped-off	Percentage
AM Ridership Peak 7:00 a.m. to 8:00 a.m.	43	3	46	93%
PM Ridership Peak 6:00 p.m. to 7:00 p.m.	17	4	21	81%

Existing Traffic Conditions

Roadway intersection capacity analyses and Levels of Service (LOS) determinations were made for the AM and PM peak hour scenarios using Synchro/SimTraffic software (version 6.0) and Highway Capacity Manual (HCM) methodology, existing traffic volumes (shown in Figure 2), and existing lane use and traffic controls (shown in Figure 3). A LOS grade is a letter grade based on the average delay experienced by motorists traveling through an intersection. LOS results range from LOS A being the best to LOS F being the worst. LOS D is typically used as the acceptable LOS threshold in the District: although LOS E and LOS F are sometimes accepted in certain highly urbanized areas.

The results of the existing capacity analysis are shown in Figure 4. Signalized intersections have a LOS for

each approach, as well as an overall LOS. Unsignalized intersections only have a LOS for the approach that would experience delay and not an overall LOS.

The preliminary capacity analysis shows that the intersections in the study area generally operate at overall acceptable conditions. The signalized intersection of Loughboro Road and Sibley's Main Hospital Entrance presently operate at LOS A for both the morning and afternoon peak hours; motorists experience nominal delay.

The Loughboro Road/MacArthur Boulevard signalized intersection operates at LOS D and LOS C during the AM and PM peak hours, respectively. It is important to note that the southbound approach experiences marginally unacceptable delays due to the southbound left-turn movements from MacArthur Boulevard onto Loughboro Road. The operations of this intersection could be improved if the southbound movement was given an advanced time with a left-turn arrow (i.e., ahead of the northbound movements). This would reduce blockage of the southbound shared lane and improve the overall operation of the intersection. Although this is recommended, proper analysis (including simulation) would have to be done to validate this change.

The capacity analysis shows that the STOP controlled left-turn movement from Dalecarlia Parkway onto Loughboro Road presently operates at a LOS F during the AM and PM peak hours. However, actual observations, as well as SIMTraffic simulations, suggest that the movement operation is acceptable, although some motorists may experience considerable delays in making left-turns onto Loughboro Road. The average queues were observed to be about eight vehicles.



Figure 1 – Site Map and Study Area Intersection Location

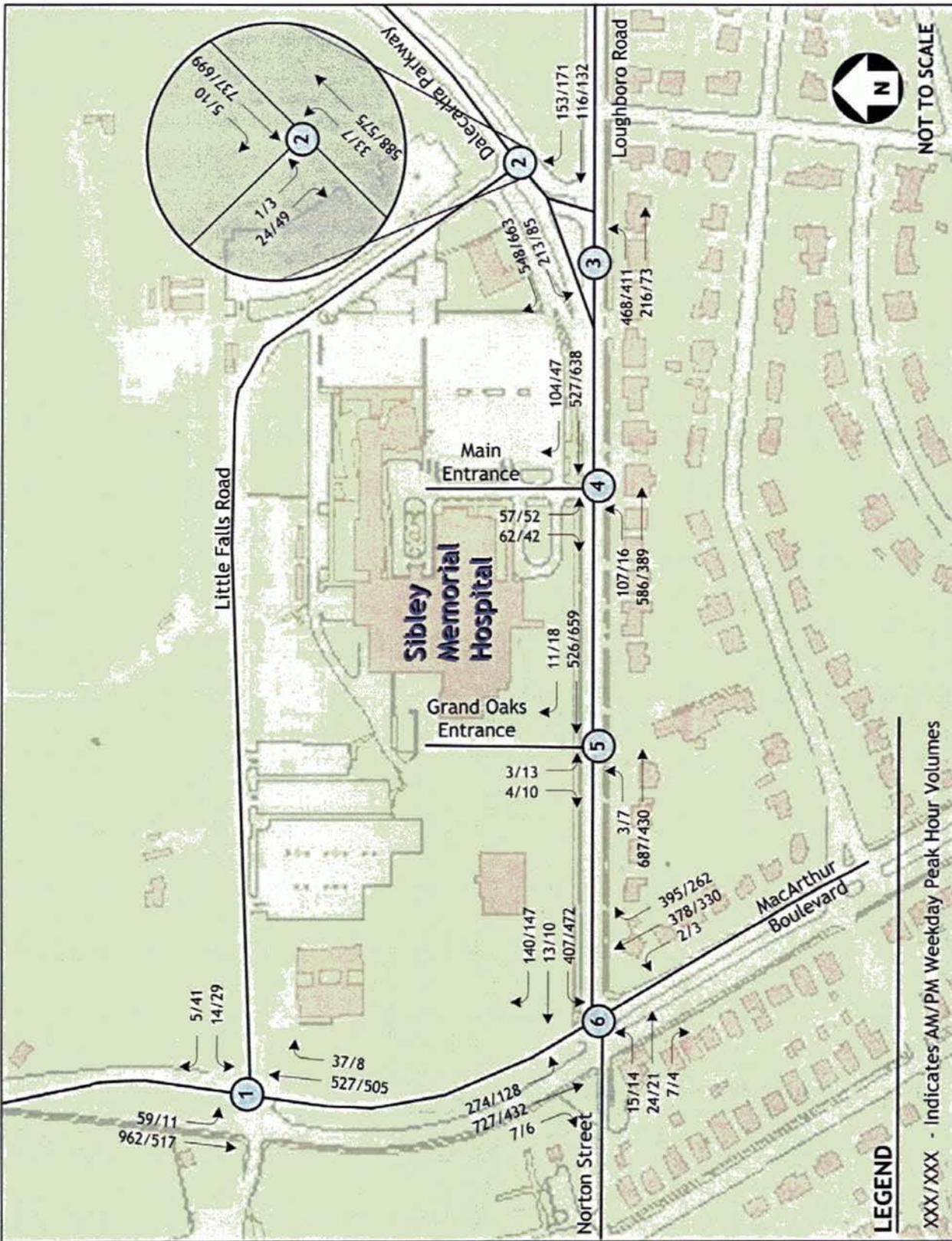


Figure 2 – Existing Peak Hour Traffic Volumes

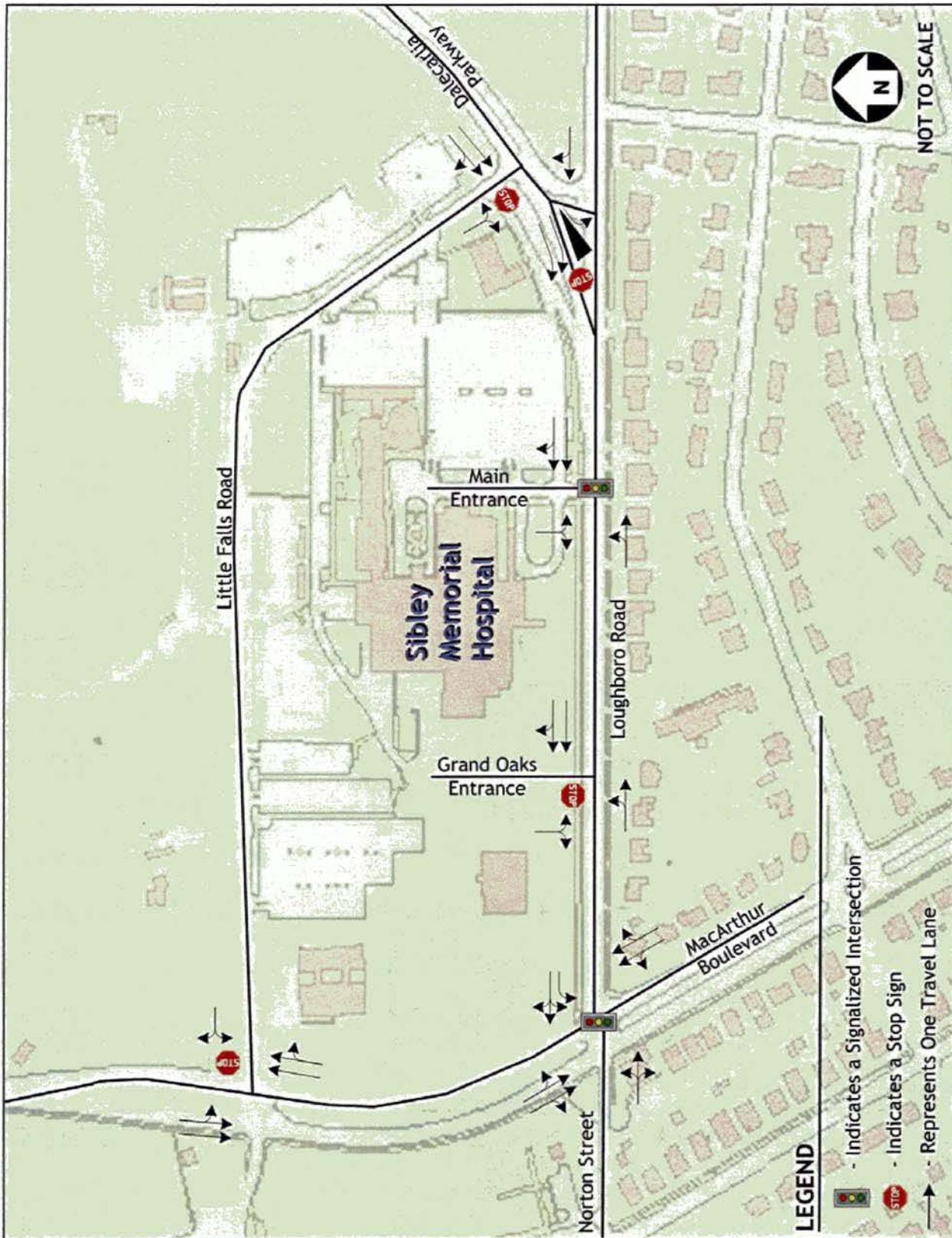
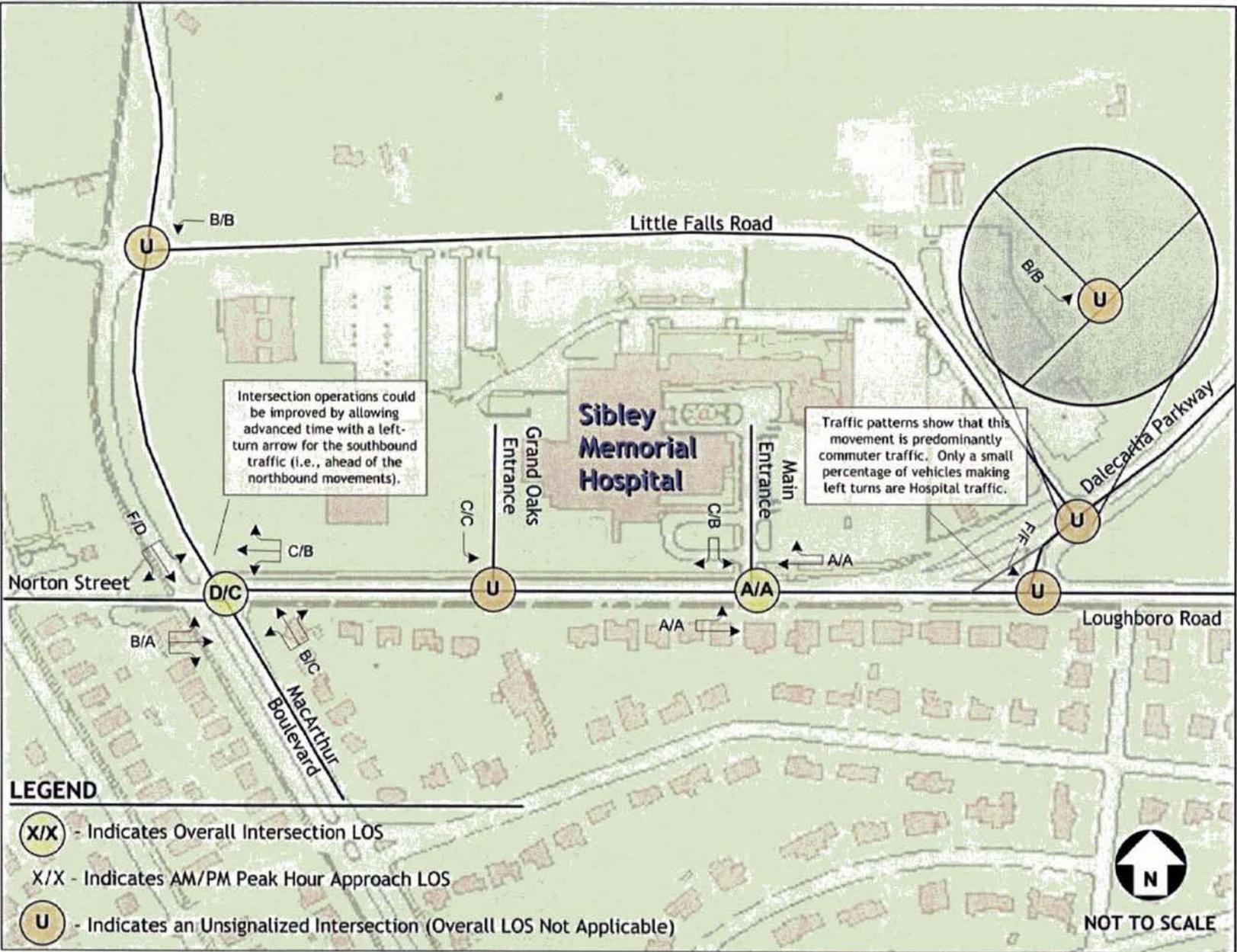


Figure 3 – Existing Lane Use and Traffic Controls



FUTURE CONDITIONS

Site Plan

The Lucy Webb Hayes Training School for Deaconesses and Missionaries on behalf of Sibley Memorial Hospital (Sibley) is planning to upgrade/expand existing Hospital facilities as shown in Figure 5. The proposed plan consists of building a new medical office and outpatient services building (approximately 152,000 square feet total) and an approximately 600-space parking garage.

The proposed Architectural plan also shows improvements to the existing Hospital entrance off Dalecarlia Parkway and a modified intersection at Dalecarlia Parkway and Loughboro Road. The improved Hospital entrance at Dalecarlia will continue to service emergency traffic, but may also provide relocated bus access (if deemed acceptable by the community) to the rear of the site. The modifications to the intersection at Dalecarlia Parkway and Loughboro Road would simplify this intersection and improve the intersection from a safety standpoint.

The proposed development is expected to be complete by mid-2008.

Parking Supply

The Sibley Memorial Hospital parking policy is based on the Hospital's mission as a major healthcare service provider, and its objective of being a good neighbor. This requires that the hospital always provide adequate parking because patients and their families require the comfort and convenience of driving to the Hospital, healthcare workers' shifts preclude staff from using public transportation, and doctors require a high level of mobility for emergencies.

The new medical office building project will increase the parking supply at Sibley from the current inventory of 1,503 spaces to a new total of approximately 1,736 spaces; a net increase of 233 spaces. This increase will develop in the form of a new parking garage with approximately 600 spaces and the elimination of approximately 367 existing surface parking spaces due to the construction of the new medical office building, the parking garage, and the potential relocation of the Metrobus turnaround on the Sibley campus.

The Hospital planning team developed the new parking plan to be consistent with the Hospital's parking policy. The new medical office building will generate the need for some additional parking for doctors. Most of the tenants at the new building will be doctors who already park at the hospital, but the new building may attract additional doctors, and there will be less turnover in doctor's parking since they will be able to serve their patients' hospital and office visit needs from this one location.

Doctors who lease office space at the new medical office building will bring an average of two employees to their office suite. This will generate a requirement of approximately 133 parking spaces (90 doctors yield

180 employees of which 90% or 162 arrive by automobile, typically with 1.1 persons per car and 10% absent = 133 cars).

Patients who visit the doctors in the new medical office building will be able to use the balance of the 100 new parking spaces (233-133 for employees) minus whatever spaces are ultimately set-aside for doctors. Of course, patients will also be able to park in the existing Sibley visitor parking lot. These parking provisions will be adequate to serve the practical needs of the public and employees and will ensure that the new medical office building doesn't cause parking encroachment on neighborhood streets.

The District of Columbia Zoning Regulations Requirements for Parking Spaces stipulates parking requirements for buildings by category of use. We have calculated that the Sibley development program is required to have a minimum of 167 parking spaces. Therefore, the proposed increase of 233 spaces exceeds the minimum by 66 spaces.

Trip Generation

It is not expected that all of the traffic generated by the new medical office building will be new traffic. It is likely that many of the doctors and patients, who currently use Sibley facilities, will continue to do so in this new location. Many of the trips are also expected to have a shared purpose, i.e. a doctor's appointment and a laboratory test conducted on the same visit.

The trip generation shown in Table 2 is a conservative estimate of the number of trips that will be generated by the new medical office building. The number of trips generated by the proposed development was based on the rates and equations published by the Institute of Transportation Engineers (ITE), *Trip Generation*, 7th edition. A transit reduction rate of 10% was applied to the trips assuming that some employees and patients may use Metrobus or other modes of transportation to the new building. With the reductions applied, a total of 339 AM peak hour trips (268 in and 71 out) and 419 PM peak hour trips (113 in and 306 out) are forecasted to be generated by this development. This represents approximately 6% and 9% of the total vehicular traffic on the surrounding roadway network, for the AM and PM peak hours, respectively.

Table 2 – Site Trip Generation

Land Use	ITE Land Use Code	Size	Trip Generation					
			AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Medical Office Building	720	152,000 SF	298	79	377	126	340	466
<i>Transit Reduction</i>		10%	(30)	(8)	(38)	(13)	(34)	(47)
Total Site Trip Generation			268	71	339	113	306	419

Trip Distribution

The site-generated traffic volumes were assigned to the roadway network based on existing travel patterns identified during data collection. Figure 6 shows the site-generated traffic volumes, as well as the directions of approach for vehicles accessing the surrounding roadway network and site access entrances.

Total Future Traffic Forecast

Future condition analyses include a comparison of the Future Background conditions (future conditions without traffic generated by the new development) and Total Future Conditions (background conditions with the addition of traffic generated by the new development). Future background conditions include a composite of traffic generated by any approved development within the study area, transportation improvements that may affect traffic patterns and operations, and any ambient growth in traffic.

Background conditions are affected by any approved transit, roadway, or development project within the site study area. According to the District Department of Transportation (DDOT), there are not any roadway improvement projects near the project. A Transit improvement project, "Little Falls Road Transportation Study" by DMJM Harris for DDOT, is in our study area; however elements of the transportation study are already proposed in the Architectural plans submitted for Sibley. Another development, the U.S. Army Corps of Engineers' "Proposed Water Treatment Residuals Management Process for the Washington Aqueduct, Washington, D.C." is adjacent to the Sibley property at the Dalecarlia Reservoir. Impacts from this development are expected to be minimal and would include an increase in truck traffic by 6 trucks per day.

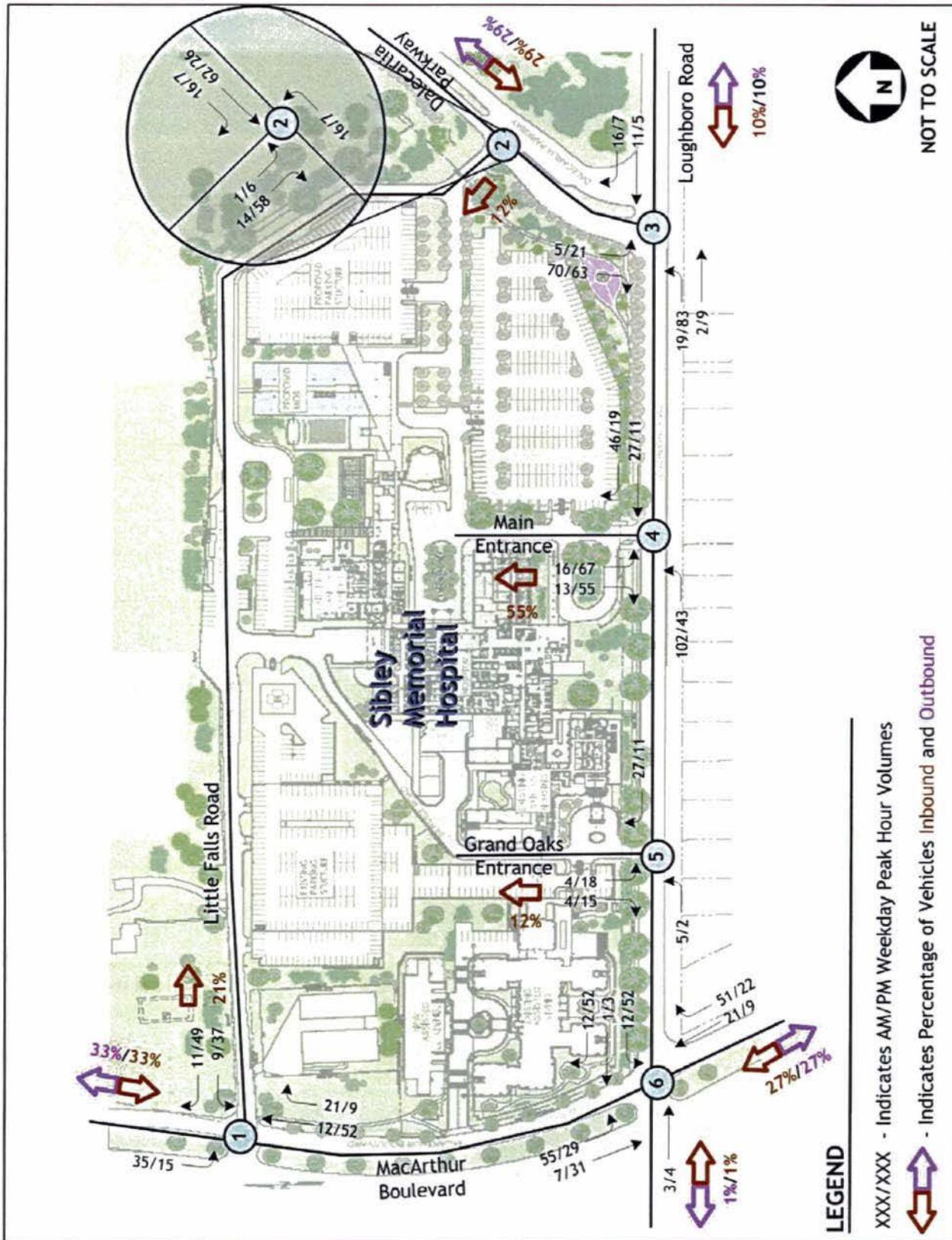


Figure 6 - Site-Generated Trips and Directions of Approach

For purposes of this preliminary analysis, we will assume a conservative 1% growth rate per year to account for any increase in traffic as a result of developments in this area that are not known at this time. Because background conditions are minimal, Total Future analysis results will only be presented.

The site-generated traffic assignments were combined with a composite of the existing traffic (with a 1% growth in trips applied) to yield the Total Future traffic forecasts associated with the complete build-out of new medical office building. Figure 7 shows the Total Future traffic for build-year 2008 with the development.

Total Future Capacity Analysis

Total Future peak hour levels of service (with the new medical office building) were calculated based on the existing lane use, traffic controls, and signal timings. The Total Future capacity analysis results are shown in Figure 8.

The capacity analyses show that the roadway network and the intersections of the study area will continue to operate at overall acceptable conditions with ambient growth in traffic, as well as with the addition of traffic forecasted for the Sibley improvements.

The signalized intersection at Loughboro Road and Sibley's Main Hospital Entrance will continue to operate at an acceptable level during both Existing and Total Future conditions, except for the eastbound approach on Loughboro Road that declines to a LOS E during the AM peak period. A possible mitigation measure could include adding a short left turn lane on the eastbound approach. Vehicles are already able to operate in two lanes at this location even though the street is not striped for two lanes. In other words, when there is a vehicle waiting to turn left, through traffic can negotiate past it because the street is wide enough, and there is no parking in the curb lane. Adding a left-turn lane, as well as other mitigation options, will be evaluated in the final analysis.

Similarly, the Loughboro Road and MacArthur Boulevard signalized intersection also experienced slight decline in overall Level of Service during the AM peak period when compared to existing conditions. However, the existing conditions were maintained for the PM peak period. The operation of this intersection would improve if the changes recommended for this intersection in the existing conditions were implemented. This includes giving the southbound movement an advanced time with a left-turn arrow (i.e., ahead of the northbound movements). This would reduce blockage of the southbound shared lane and improve the general operations of the intersection. Although recommended, a full analysis (including simulation) would have to be done to validate the change.

The capacity analysis shows that the proposed STOP control intersection at Dalecarlia Parkway and Loughboro Road would result in the southbound approach of the intersection operating at LOS F during the AM and PM peak hours. Since the movements along Loughboro Road are not stopped, there is no

delay report for these approaches. SimTraffic simulation suggests that the intersection would operate at acceptable levels, although some motorists may experience considerable delays in making the left-turn onto Loughboro Road. The queues are not expected to change significantly.

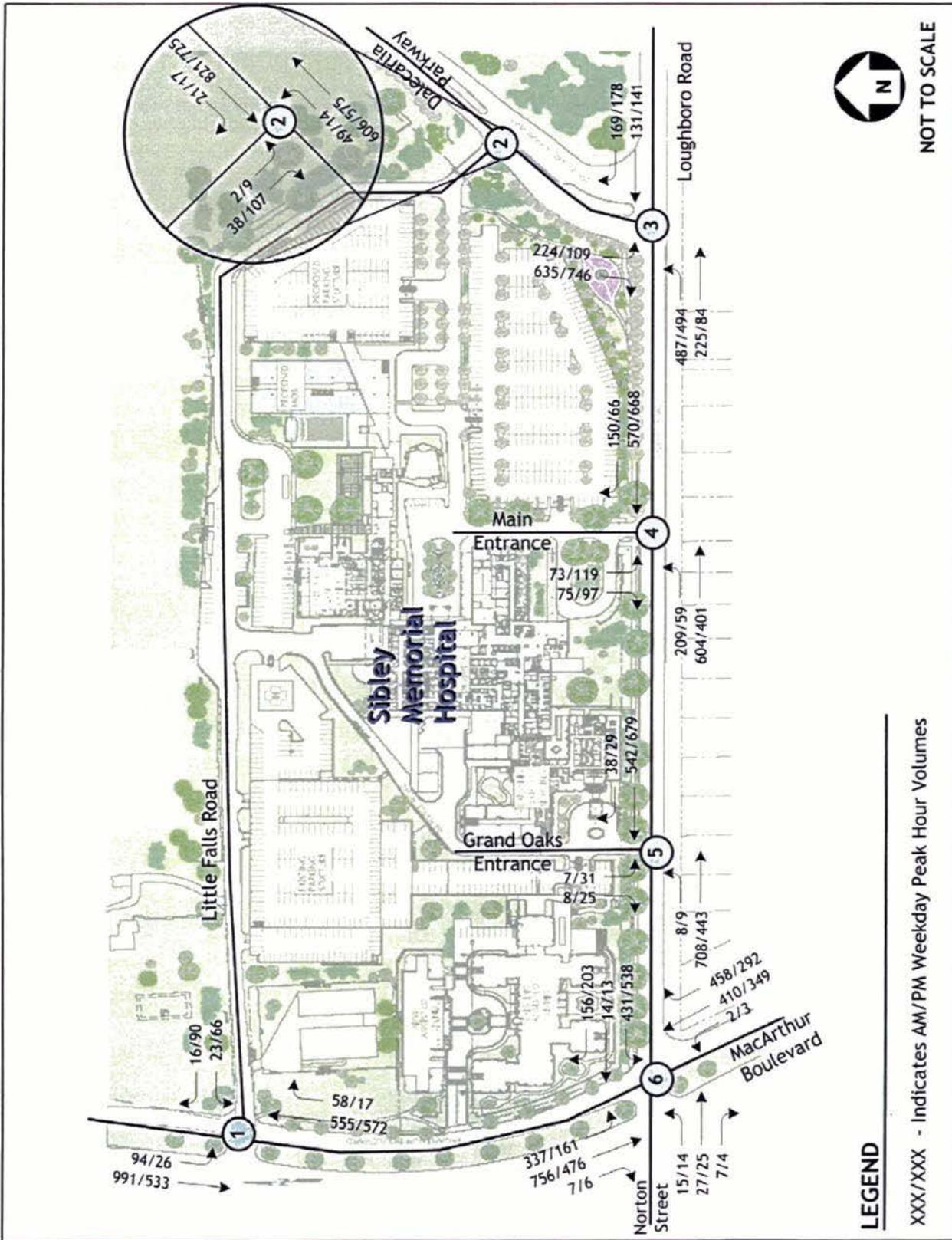


Figure 7 – Total Future Peak Hour Volumes

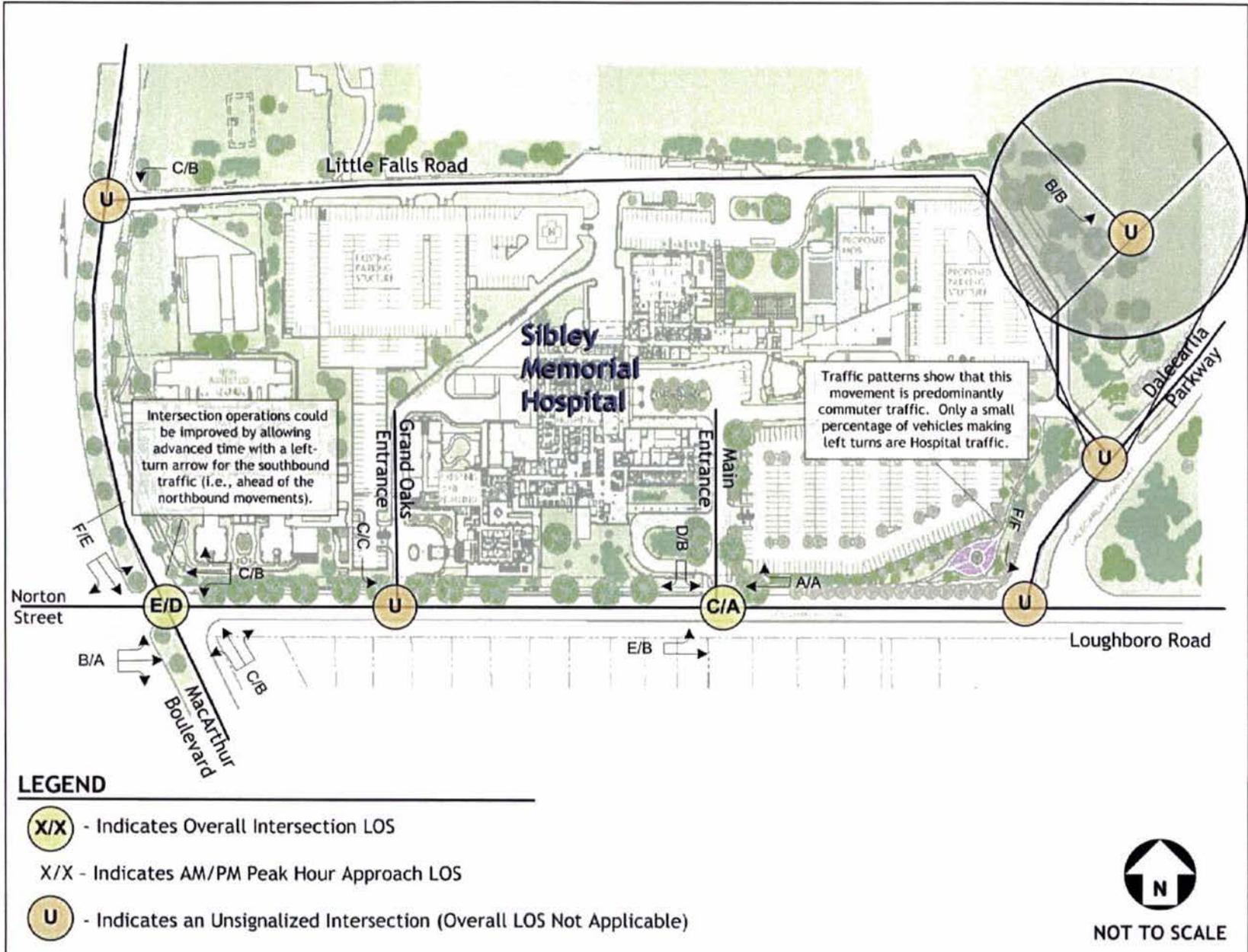


Figure 8 – Total Future LOS Capacity Analysis Results

CONCLUSION

The analysis contained in this memo provided the following results:

- *Existing Conditions*

Under existing conditions, the roadway network in the study area of Sibley generally operates at acceptable conditions for both the AM and PM peak periods.

The STOP control intersection on the southbound approach at Dalecarlia Parkway and Loughboro Road operates at LOS F during the AM and PM peak hours. However, actual observations as well as SIMTraffic simulations suggest that the movement operates acceptably, although some motorists may experience considerable delays in making left-turns onto Loughboro Road.

The Loughboro Road/MacArthur Boulevard signalized intersection operates at LOS D and LOS C during the AM and PM peak hours, respectively. The southbound approach experiences marginally unacceptable delays due to the southbound left-turn movements from MacArthur Boulevard onto Loughboro Road. The operations of this intersection could be improved with signal timing and phasing adjustments.

- *Total Future Conditions*

Under Total Future conditions, the roadway network would continue to operate acceptably for both the AM and PM peak hours.

Sibley site-generated trips would add a total of approximately 339 AM peak hour trips (268 in and 71 out) and 419 PM peak hour trips (113 in and 306 out). This represents approximately 6% and 9% of the total traffic on the surrounding roadway network, for the AM and PM peak hours, respectively.

With growth in traffic taken into account, and Sibley traffic added to the network, the STOP control intersection on the southbound approach at Dalecarlia Parkway and Loughboro Road would continue to operate at LOS F during the AM and PM peak hours. SimTraffic simulations suggest that the movement would operate acceptably as in existing conditions, although some motorists may experience considerable delays in making left-turns onto Loughboro Road.

The signalized intersection at Loughboro Road and Sibley's Main Hospital Entrance operates at an acceptable level during Total Future conditions, except for the eastbound approach on Loughboro Road that degrades to a LOS E during the AM peak period. This could be mitigated with a short eastbound left-turn lane to reduce blocking of through traffic. Vehicles are already able to operate in two lanes at this location even though the street is not striped for two lanes. In other words, when there is a vehicle waiting to turn left, through traffic can negotiate past it because the street is wide enough, and there is no parking in the curb lane. In reality, this approach operates at a better LOS.

The Loughboro Road and MacArthur Boulevard signalized intersection also experienced a slight decline in overall Level of Service during the AM peak period when compared to existing conditions. Existing conditions were maintained for the PM peak period. The southbound approach would continue to experience marginally unacceptable delays due to the southbound left-turn movements from MacArthur Boulevard onto Loughboro Road. The operations of this intersection could be improved with adjustments to the signal timing and phasing, however these would be fully evaluated in a final analysis.