SECTION III

AMENDMENTS and CLARIFICATIONS to the DEIS

This section of the FEIS contains amendments and clarifications to the DEIS.[1] As part of on-going design refinement and in response to comments received concerning the DEIS, the following amendments/revisions are provided. Where applicable, these revisions have been incorporated into this FEIS.

1. Alternatives Clarification

Based on comments received relative to the Draft *Campus Master Plan* and the DEIS, as well as more-recent campus population projections by the College and the State Board for Community and Technical Colleges, Shoreline Community College has refined its development plan to reflect a more modest rate of growth. In light of that, SCC has identified a *Preferred Alternative* for the *Concept Master Plan.* While similar to the earlier *Modified Design Alternative*, the *Preferred Alternative* in many respects is a hybrid. The environmental impacts associated with the *Preferred Alternative* fall within the range of environmental impacts identified for the alternatives that were analyzed in the DEIS. What was previously referred to as the *Proposed Action* in the DEIS is now called the *Expanded Development Alternative.* The other development alternative that is evaluated is the *Modified Design Alternative.* The Preferred Alternative and each of the other alternatives evaluated as part of this EIS are described in *Section II* of this FEIS.

2. Fact Sheet

The FEIS *Fact Sheet* -- "Required Permits and Approvals" -- has been amended to note that sanitary sewer connection permits, associated charges and inspections may be necessary from the Ronald Wastewater District.

The FEIS *Fact Sheet* -- "Required Permits and Approvals" – has also been amended to indicate that grading/clearing permit approval or reviews would be necessary from the City of Shoreline.

3. *Section II* -- Project Description and Alternatives

PUB Expansion Phasing – Since publication of the DEIS, Shoreline Community College has changed the proposed timing of the expansion of the College's existing Pagoda Union Building (PUB), which is identified as Building I and Building J in the DEIS. As noted in the DEIS, PUB expansion was planned to occur in *Phase II* (by 2012). SCC, however, decided to complete the PUB expansion earlier as part of *the Near-Term* planning period, which is described in this FEIS (2006 – 2009).

[1] The DEIS was issued in July 2003.

Information regarding proposed PUB expansion is presented in *Section II* of this FEIS. The PUB expansion project, now identified as Building D, would involve renovation and expansion of the PUB; changes include: partial demolition to allow for new construction; modification of the basement level to accommodate SCC's bookstore, meeting rooms and other ancillary facilities; and demolition of the main floor to provide for the addition of two new floors to provide additional meeting rooms, improved food services and to accommodate various student service programs. A 10,000 sq.ft. addition would be added to the existing 40,000 sq.ft. PUB. No expansion of the existing building footprint is anticipated.

4. *Section III* -- Earth

An additional mitigation measure relative to on-campus earthwork is proposed. Prior to the College undertaking grading or clearing activity that exceeds 500 cubic yards and is separate from a Building Permit, the College will submit an application for grading and clearing to the City of Shoreline for authorization.

5. *Section III* – Water

The storm drainage section of the *Concept Master Plan* presents a different approach to stormwater management than the Draft *Campus Master Plan* and the associated DEIS that was circulated to the to the City of Shoreline and other agencies, organizations and individuals.

The Draft *Campus Master Plan* presented a stormwater management approach that was based on campus-wide stormwater detention and water quality treatment systems and the application of low impact development. That plan provided for stormwater runoff control and water quality treatment for proposed development on the campus, as well as "retrofitting" to address stormwater management for the existing facilities.

The approach to stormwater management relative to the *Concept Master Plan* differs in that stormwater management would be applied to individual projects as they are developed in compliance with City of Shoreline codes and standards, as and applicable state and federal laws. An option is available for use of low impact development.

The *Concept Master Plan* provides for stormwater management in incremental steps as the campus develops. Stormwater management would be provided for the area being redeveloped. The option to provide more than the legal requirement or to implement low impact development is still available, but not mandated as part of an adopted plan.

The stormwater management master plan was revised to align with the City of Shoreline codes and standards.

6. *Section III* – Plants and Animals

Additional analyses have been performed relative to campus habitats (DEIS Figure 13) and significant trees on-campus (DEIS Figure 14). This updated information is presented in *Appendix B* of this FEIS.

7. *Section III* – Public Services and Utilities – Parks & Recreation

Page 155 of the DEIS, last paragraph – This paragraph describes Boeing Creek Park and notes that a "six-acre regional stormwater detention facility" is located within the park. The size of the stormwater detention facility should be revised to indicate 2.6 ac. rather than 6 ac.

8. *Section III* -- Transportation, Circulation and Parking

The *Transportation* section of the DEIS generated a substantial number of comments that identified issues related to the scope of the traffic analysis and subsequent conclusions. In order to effectively respond to the identified issues, Shoreline Community College determined that the *Transportation* section of the DEIS should be revised and expanded in scope. In addition, the College initiated a process of working more closely with the City, the School District, and the surrounding community to establish an Access Working Group (AWG) within the College's Community Task Force – to examine issues and alternatives for the problematic intersections at Innis Arden Way/ Greenwood Avenue N and N 160th Street/ Greenwood Avenue North. The AWG also assisted in developing a new expanded scope of work for this section of the FEIS.

This revised *Transportation* section is based on a comprehensive set of new traffic count data collected in March 2004 that includes week long mechanical tube counts at campus accesses and adjacent road segments to clearly identify and separate traffic volumes generated by the campus and adjacent community. AM peak hour, Midday peak hour, and PM peak hour turning movements were made at the five campus accesses to document campus generated traffic volumes and their direction of travel. AM, Midday, and PM peak hour counts were also made and traffic operations analyzed at 13 other intersections. In addition, parking supply and demand counts were made both on-campus and on nearby streets to identify current parking supply and demand characteristics.

The AWG primarily focused on developing an understanding of traffic operations at the intersections at Innis Arden Way/ Greenwood Avenue N and N 160th Street/ Greenwood Avenue North and evaluating a set of potential design alternatives that would improve existing conditions. This work included numerous meetings where design alternatives were discussed and evaluated against a set of criteria. As a result of these meetings and a series of public open houses, the AWG narrowed the alternatives to those they felt would be technically feasible and acceptable to the community. The recommendations of the AWG are summarized and analyzed in this section of the FEIS and a summary of their work effort is provided in the appendices.

This section examines existing transportation conditions (Affected Environment) as well as future conditions for the *Expanded Development*, *Modified Design,* and *No Action* alternatives. Transportation conditions for the alternatives are analyzed for 2015, when the full build out of the master plan is forecasted to be complete. Limited information is provided for the *Preferred Alternative.*

The *No Action* alternative establishes a baseline against which the *Expanded Development* and *Modified Design* alternatives can be evaluated. The *No Action* alternative incorporates growth in existing non-campus generated traffic volumes. It assumes that master plan projects would

not be built and that the student population would increase by 1,170 student full time equivalents (FTE's). This mandated growth in student population would be accommodated through expanded class schedules and increased use of off-campus facilities. The *Expanded Development Alternative* assumes that new facilities would be constructed and that class schedules to accommodate that growth would be similar to current campus schedules. The *Modified Design Alternative* is the same as the *Expanded Development Alternative* with the exception that new athletic facilities and an amphitheater would be constructed.

Affected Environment

This section describes existing on and off-campus transportation conditions. It includes a discussion of the existing road network and traffic volumes, analysis of intersection operations, parking supply and demand, transit service, as well as bicycle and pedestrian facilities. In addition, City of Shoreline planned transportation improvements are discussed.

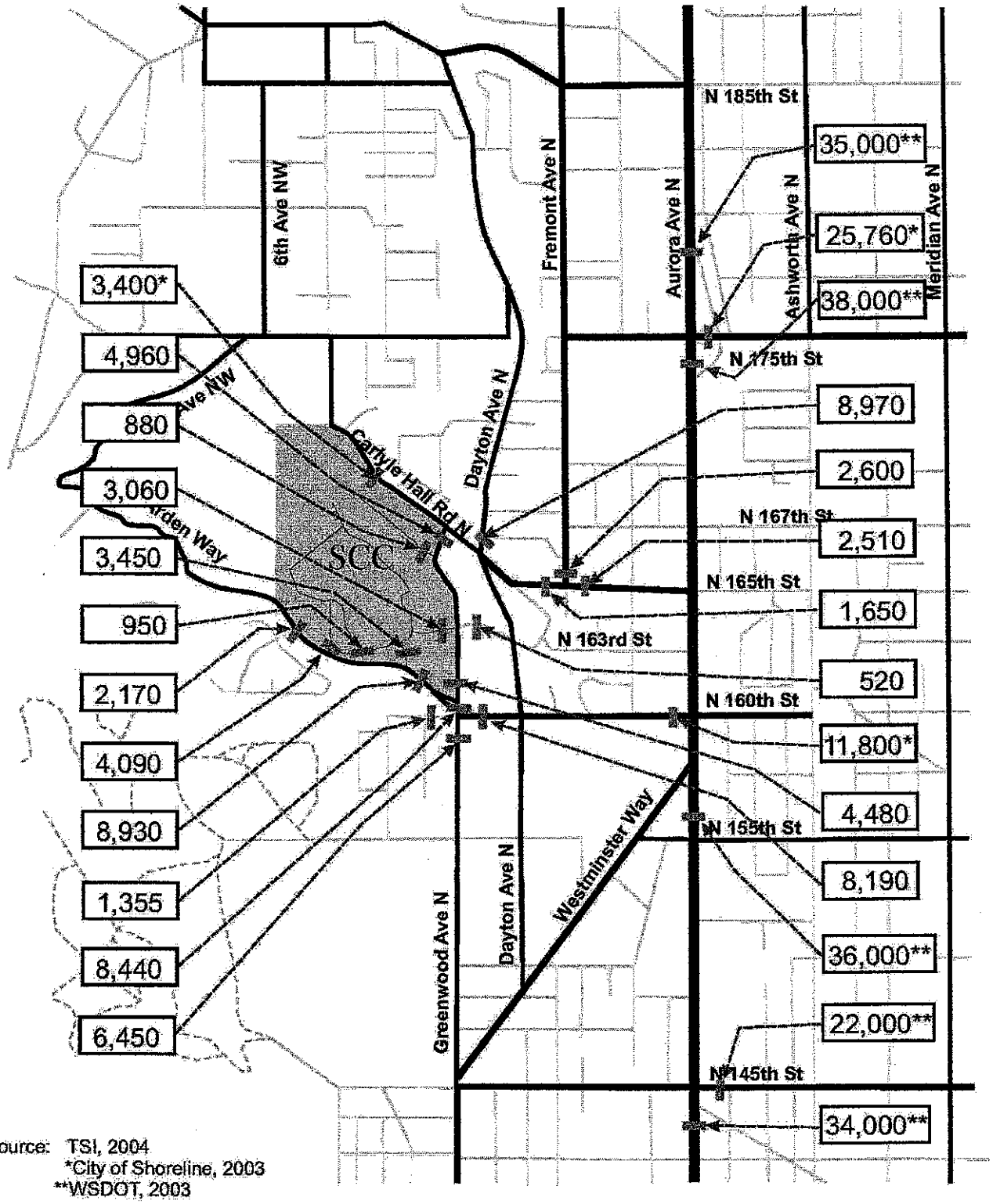
Existing Road Network

The existing road network is characterized by a north/south and east/west grid network with the principle arterials running in a north/south direction. Minor deviations from the grid pattern accommodate changes in grade and topography to the west and south of the campus. The SCC campus is surrounded by suburban residential land uses that are linked via the local road network to Aurora Avenue to the east. Aurora Avenue provides access to adjacent commercial land uses and is the major transportation corridor in the area. The local road network and daily traffic volumes are illustrated in Figure 16.

The primary facilities that make up the local street network include:

Aurora Avenue (SR 99) is a north-south, four-lane state route and principal urban arterial with a center, two way left-turning lane. Aurora Avenue links Shoreline to the cities of Seattle to the south and Lynwood, Edmonds, and Everett to the north. Travel lanes are generally 12 feet wide with 10-foot paved shoulders on both sides of the street. Curbs, gutters, and sidewalks are located along the more recently developed property frontages of Aurora Avenue. The speed limit is posted at 40 mph. Traffic volumes range from 36,300 daily vehicles north of N 155th Street to 40,700 daily vehicles south of N 175th Street.

Innis Arden Way is an east-west, two-lane collector arterial providing primary access to the campus and residential areas west of the study area. Travel lanes are roughly 11 feet wide with 5 to 7-foot paved shoulders. The speed limit is posted at 35 mph. On days of peak campus activity (Monday through Thursday), approximately 8,930 vehicles per day travel the segment of Innis Arden Way between Greenwood Avenue N and the main campus access. Daily traffic volumes drop to approximately 2,170 vehicles west of the western most campus access on Innis Arden Way. Parking is prohibited along this road.



Source: TSI, 2004
*City of Shoreline, 2003
**WSDOT, 2003

Source: TSI, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 16** **Road network and Existing Daily Traffic Volumes**

Greenwood Avenue is a north-south, two-lane roadway providing access to the Shoreline CC campus along its eastern edge. Travel lanes are approximately 11 feet in width. South of N 160th Street, the roadway has 3 to 4-foot paved shoulders and open ditches on both sides of the street with a 4-foot paved pathway on the east side of the street. North of N 160th Street, the shoulders diminish and there are open ditches on both sides of the street. North of Greenwood Drive, the roadway consists of 4 to 6-foot paved shoulders on both sides of the street with open ditches on the west side of the street. The posted speed limit is 35 mph south of N 160th Street and 30 mph north of N 160th Street. On days of peak campus activity (Monday through Thursday), this roadway averages approximately 4,480 vehicles per day north of Innis Arden Way, and approximately 4,950 daily vehicles south of Carlyle Hall Road. South of N 160th Street, traffic volumes on Greenwood Avenue increase to approximately 6,450 vehicles per day. South of NE 160th Street, Greenwood Ave N is identified as a collector arterial. North of N 160th Street, it is identified as a residential street.

Dayton Avenue is a north-south, two-lane minor arterial. The total pavement width is approximately 54 feet in the vicinity of N 160th Street. Travel lanes are approximately 11 feet wide. Parking is allowed on both sides of the street north of N 160th Street. The speed limit is posted at 35 mph. Daily traffic volumes average 8,970 vehicles north of Carlyle Hall Road N.

Carlyle Hall Road is an east-west, two-lane collector arterial that runs along the northern property line of the campus. Travel lanes are generally 11 feet wide. East of Greenwood Avenue, shoulders consist of pavement about 1 to 2 feet wide on both sides of the street, along with 4-foot gravel shoulders on the north side of the street and 12-foot gravel shoulders on the south side of the street. West of Greenwood Avenue, the roadway consists of 4-foot gravel shoulders on the north side of the street and 8-foot gravel shoulders on the south side of the street. The speed limit is posted at 25 mph. West of Dayton Avenue approximately 3,400 vehicles per day travel this roadway.

N 175th Street is an east-west, four-lane principal arterial that links Aurora Avenue N with I-5 to the east. Travel lanes are 11 to 12 feet wide. Curbs, gutters and sidewalks are located on both sides of the street. The posted speed limit is 35 mph. This roadway averages approximately 25,760 daily vehicles east of Aurora Avenue (SR 99).

N 160th Street is an east-west roadway that serves as a primary link between the campus and Aurora Avenue N to the east. It consists of 4 travel lanes east of Dayton Avenue and 2 travel lanes with parking on both sides of the roadway west of Dayton Avenue. The pavement width is approximately 44 feet east of Dayton Avenue and approximately 40 feet west of Dayton Avenue. Curbs, gutters and sidewalks are located on both sides of the street. West of Greenwood Avenue, the roadway is not channelized, consisting of 2 travel lanes and parking on both sides of the roadway. The total pavement width along this segment is approximately 35 feet with curbs, gutters and sidewalks on the north side of the street and 7 to 10-foot gravel shoulders on the south side of the street. The posted speed limit is 35 mph. Between Dayton Avenue and Greenwood Avenue, daily traffic volumes reach approximately 8,190 vehicles. West of Greenwood Avenue, where N 160th Street provides access to Highland Terrace Elementary School and nearby residences, traffic volumes drop to approximately 1,355 vehicles per day. It is identified as a minor arterial between Dayton Ave N and Aurora Ave N and is a collector arterial between Dayton Ave N and Greenwood Ave N.

NE 145th Street (SR 523) is classified by the WSDOT as an east-west urban principal arterial between Aurora Avenue N and Bothell Way NE to the east. West of Aurora Avenue N, it becomes a principal arterial. It provides access between commercial/retail districts and residential neighborhoods separating the cities of Shoreline and Seattle. There are four travel lanes, which are generally 11 to 12 feet in width. The total curb-to-curb pavement width is approximately 46 feet. Curbs, gutters and sidewalks are located on both sides of the street. The posted speed limit is 35 mph. East of Aurora Avenue (SR 99) approximately 22,000 vehicles utilize this roadway on an average day

Existing Traffic Volumes

As stated in the introduction, a comprehensive set of traffic counts were made to establish the basis for the FEIS traffic analysis. Daily counts for a one week period were made at campus accesses and primary travel routes to identify periods of peak volume and travel direction. Daily traffic volume information was supplemented with additional data from the City of Shoreline and Washington State Department of Transportation (WSDOT). Daily traffic volumes are summarized in Figure 16.

On a daily basis, SCC generates approximately 12,430 vehicle trips. These trips are distributed between the five campus accesses in the following manner.

- The main campus entrance on Innis Arden Way just west of Greenwood Avenue N serves approximately 3,450 daily vehicle trips or 28% of the daily campus volume.

- The central campus access on Innis Arden Way to the west is an exit only access that accommodates 950 daily vehicles or 8% of the daily campus volume.

- The west campus access on Innis Arden Way serves 4,090 daily vehicles or 33% of the daily campus volume. This access provides the most direct route to the campus parking supply and therefore carries the greatest percentage of campus-generated traffic. A close look at the daily traffic volumes in Figure 18 shows a daily traffic volume of 8,930 vehicles on Innis Arden Way between the main campus entrance and Greenwood Avenue N. However, daily vehicle volumes in Innis Arden Way drop to 2,170 vehicles west of the campus.

- The east campus access on Greenwood Avenue N accommodates 3,060 daily vehicle trips or 25% of campus generated daily trips. It should be noted that daily traffic volumes on Greenwood Drive (opposite this entrance) drop to 520 daily vehicles indicating that cut through traffic on Greenwood Drive between the campus and Aurora Avenue N is low.

- The remaining north access serves a gravel parking lot and accommodates 880 daily trips or 7% of the total daily campus trips.

Although daily traffic volumes serve as an indicator of primary travel routes, it is peak hour turning movement volumes at intersections along those primary routes that are analyzed to assess traffic operations and levels of congestion within the study area. In an urban environment, intersections by definition are the point where traffic streams converge and the potential for congestion and delay is at its greatest. Typically, it is the PM peak hour where the combination of commuter traffic traveling from work to home and general traffic volumes reach

the greatest volume and the potential for congestion peaks. However, given the nature of SCC class schedules and campus activity, it is also necessary to examine both the AM peak hour, when students are arriving, and the Midday peak hour when the volume of campus-generated traffic exiting the campus peaks. The intersections recommended for analysis and accepted by the AWG are listed in Table 13 below. All unsignalized intersections are two-way stop controlled except for the intersections of Greenwood Ave N/ N 160th St and Dayton Ave N/ Carlyle Hall Rd N, which are all-way stop controlled.

Table 13

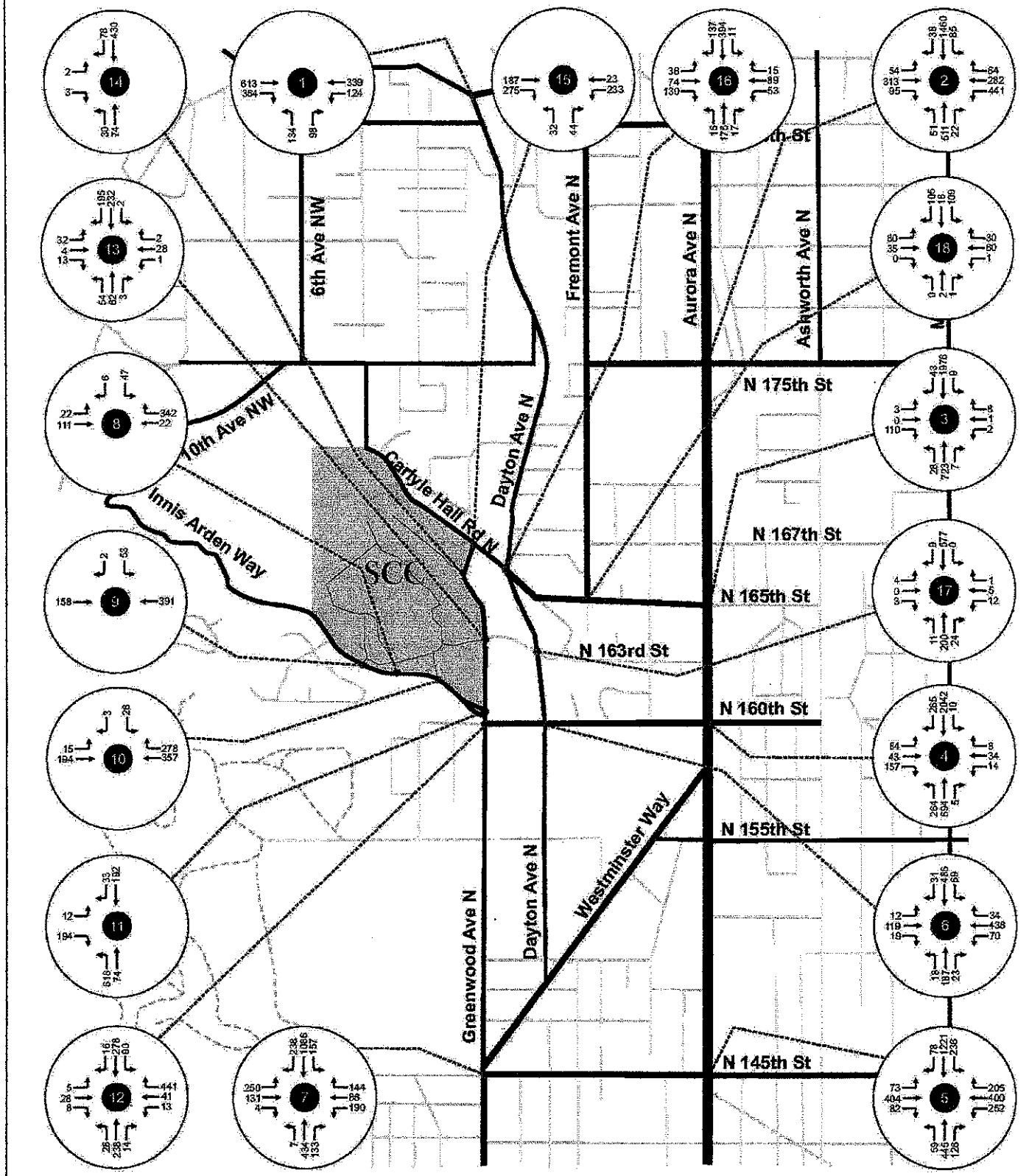
Analyzed Intersections and Time Periods

Intersection	AM Peak (7-9 AM)	Midday (11AM-1 PM)	PM Peak (4-6 PM)
Signalized			
1. Richmond Beach Road/ Dayton Ave N	√		√
2. Aurora Ave N/ N 175th St	√		√
4. Aurora Ave N/ N 160th St	√	√	√
5. Aurora Ave N/ N 145th St	√		√
6. Dayton Ave N/ N 160th St	√	√	√
7. Greenwood Ave N/ N 145th St	√	√	√
Unsignalized			
3. Aurora Ave N/ N 165th St	√	√	√
8. Innis Arden Way/ West Campus Access	√	√	√
9. Innis Arden Way/ Central Campus Access	√	√	√
10. Innis Arden Way/ Main Campus Entrance	√	√	√
11. Greenwood Ave N/ Innis Arden Way	√	√	√
12. Greenwood Ave N/ N 160th St	√	√	√
13. Greenwood Ave N/ East Campus Access	√	√	√
14. Greenwood Ave N/ SCC N Parking Lot	√	√	√
15. Greenwood Ave N/ Carlyle Hall Rd N	√	√	√
16. Dayton Ave N/ Carlyle Hall Rd N	√	√	√
17. Dayton Ave N/ N Greenwood Dr	√	√	√
18. Fremont Ave N/ N 165th St	√	√	√

Source: TSI

AM Peak Hour

The AM peak hour is defined as a one hour timeframe between 7 AM and 9 AM when traffic volumes at a specific intersection are at their peak. Figure 17 illustrates the AM peak hour turning movement volumes for the intersections listed in Table 13. During the AM peak hour the SCC campus generates approximately 1,142 trips per hour. It should be noted that this number is based on the average number of AM peak hour trips generated by the campus on a Monday through Thursday and is based on mechanical tube counts whereas the campus access turning movement volumes depicted in Figure 17 are based on the peak hour of a two-hour intersection count that occurred on one day of the four day period. The mechanical tube counts are the most accurate way to determine the volumes at campus access points while the intersection turning movement counts accurately depict the travel direction of those volumes. Approximately 85% of these trips are inbound to the campus and 15% are outbound from the campus.



Source: TSI, 2005

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Figure 17

AM Peak Hour Turning Movement Volumes (Existing)

Observations at campus load zones indicate that the relatively high outbound volume is likely attributable to carpool activity where staff and students are dropped off at the campus while the driver continues on to his or her final destination. Most of the AM peak hour campus generated traffic (34%) uses the west campus access on Innis Arden Way followed by the main campus access on Innis Arden Way and east campus access on Greenwood Ave N (both at 26%). The north parking lot access on Greenwood Ave N accommodates 9% of the AM peak hour volume followed by the central campus access (exit only) on Innis Arden Way which carries 4% of the peak hour volume.

Local circulation patterns on streets within the study area reflect the typical north to south morning commute as workers travel from home to work. The effects of inbound SCC students are also noticeable at N 160th St/ Greenwood Ave N. Turning movement volumes (Figure 17) at Aurora Ave N/ N 160th Street show significant volumes turning onto westbound N 160th St and then turning northbound on Greenwood Ave N and west onto Innis Arden Way to enter the campus. It should also be noted that during the AM peak hour only 48 campus generated trips (<4% of the total) are traveling on Innis Arden Way west of the west campus access.

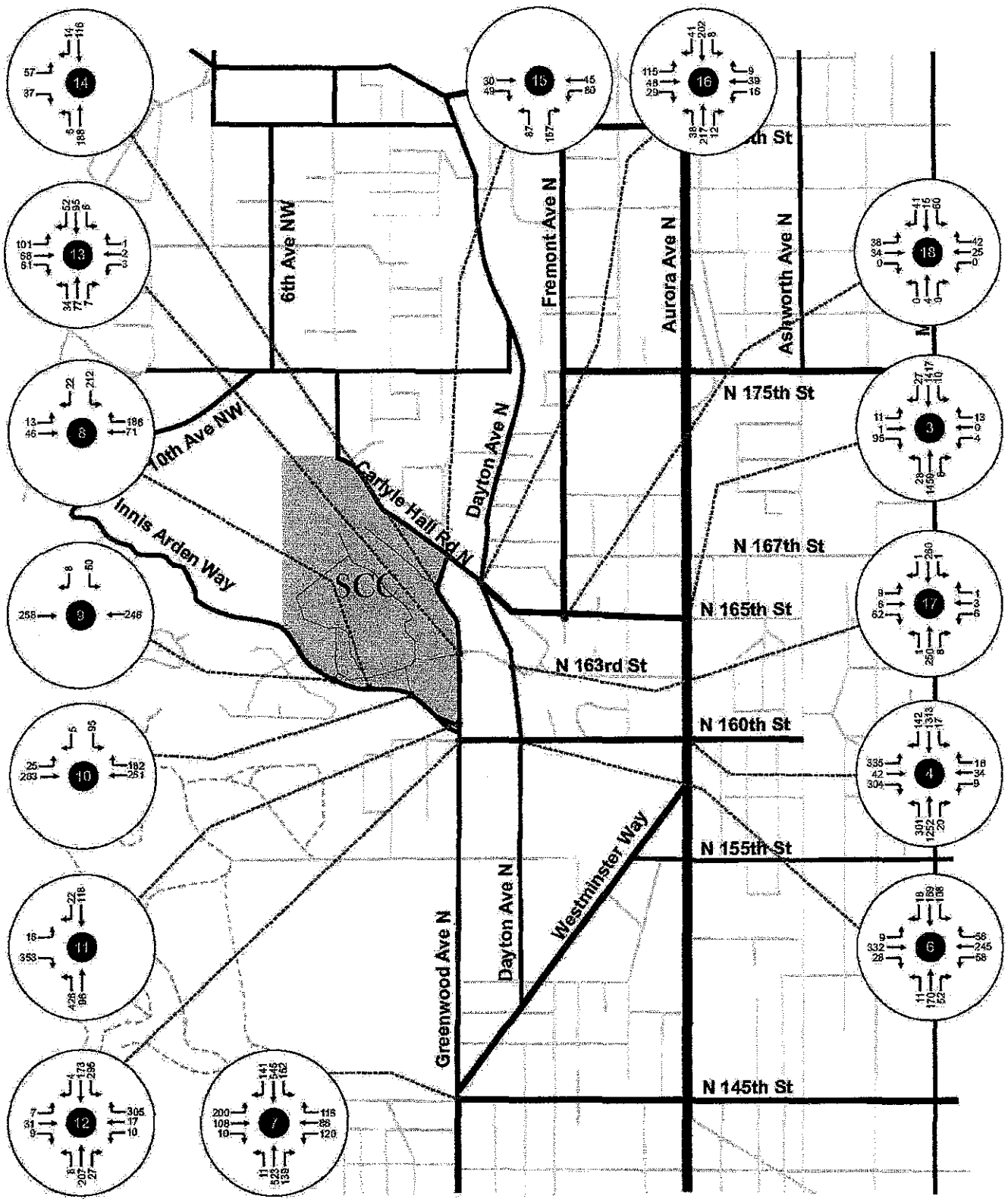
Midday Peak Hour

Figure 18 illustrates the Midday peak hour turning movement volumes for the intersections listed in Table 13. The Midday peak hour is defined as the one-hour period between 11 AM and 1 PM when traffic volumes at specific intersections are at their peak. The SCC campus generates on average approximately 1,257 vehicles trips during the Midday peak period. This is slightly more than the volume documented for the AM peak hour. In addition, the distribution of Midday volumes between campus accesses is also almost identical to the AM peak hour. The most significant difference between AM peak hour and Midday peak hour conditions is the direction of vehicle travel. During the Midday peak hour, 59% of the campus-generated traffic is outbound and 41% is inbound. This, more balanced, distribution of arriving and departing students is in contrast with the greater inbound volumes observed during the AM peak hour.

Traffic volumes at intersections surrounding the campus tend to be somewhat less than AM peak hour volumes. Traffic volumes at intersections more distant from the campus are lower at Midday than during the AM peak hour. The exception being traffic volumes on Aurora Ave N where there is little change between the AM and Midday peak hours. However, at Midday northbound and southbound traffic volumes on Aurora Ave N tend to be more evenly balanced when compared to AM peak hour volumes.

PM Peak Hour

Figure 19 illustrates the PM peak hour turning movement volumes for the intersections listed in Table 13. The PM peak hour is defined as the one-hour period between 4 PM and 6 PM when traffic volumes at an intersection are at their peak. It is during the PM peak hour that the combination of commuter traffic and general traffic volumes combine to create the greatest potential for congestion on the road network.



Source: TSI, 2005

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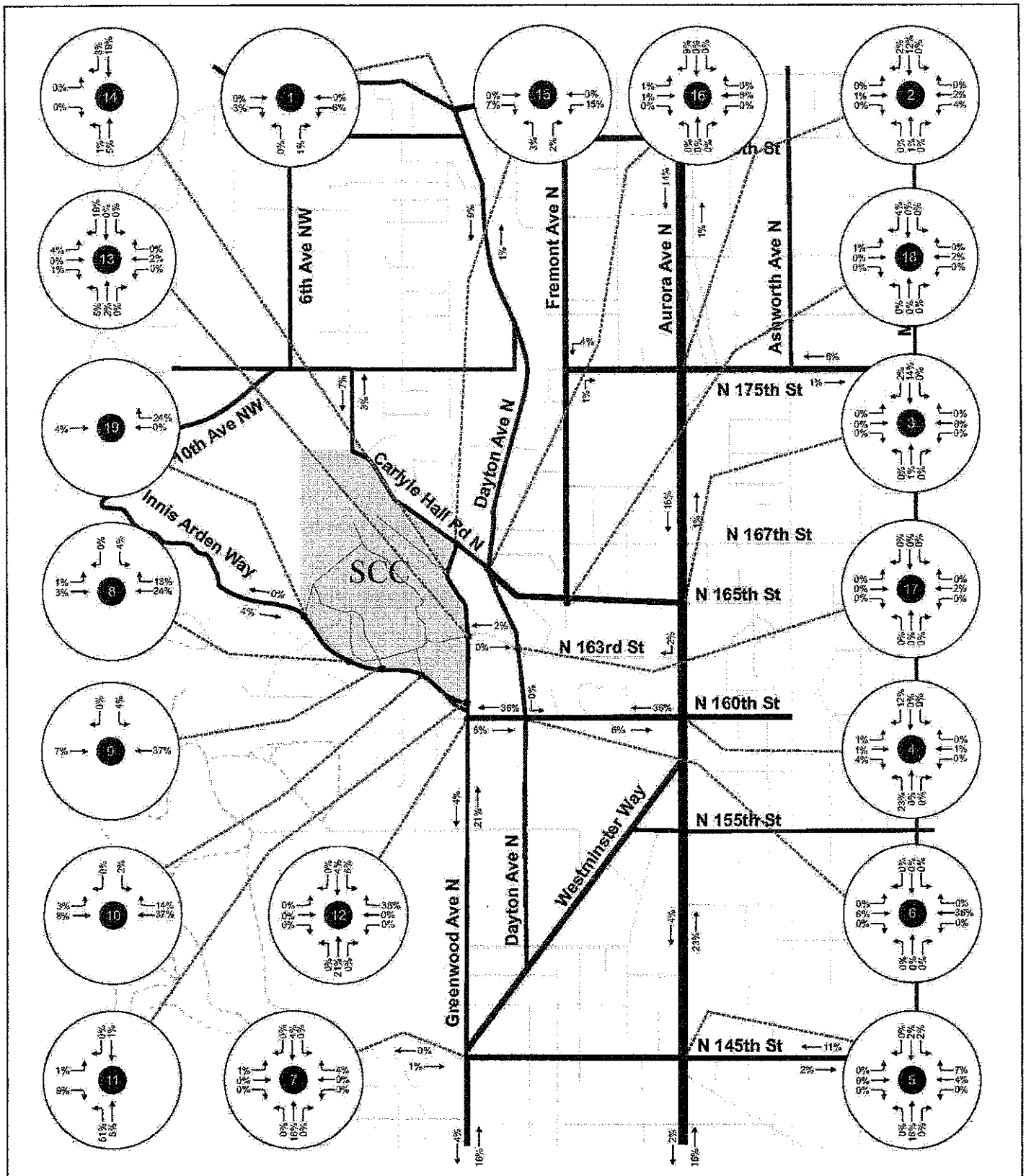
Figure 18

Midday Peak Hour Turning Movement Volumes (Existing)



Source: TSI, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 19** **PM Peak Hour Turning Movement Volumes (Existing)**

During the PM peak hour the SCC campus generates on average approximately 695 vehicle trips. This is 55% to 60% of the traffic generated during the AM and Midday peak hours. Approximately 51% of these trips are inbound and 49% outbound. This distribution of arrivals and departures reflects student arrivals for evening classes and the departure of daytime students and staff. The distribution of campus-generated traffic between the five campus accesses is approximately the same as that found during the AM and Midday peak hours. The only difference being that a lower percentage of students use the north parking lot access and a slightly higher percentage of campus generated traffic uses the main access during the PM peak hour.

Traffic volumes on streets adjacent to the campus tend to be about the same as during the Midday peak hour. The primary difference being that fewer vehicles are entering or leaving the campus and the largest part of the traffic volumes are generated by commuters traveling home. At intersections along Greenwood Ave N, Dayton Ave N, and Aurora Ave N the largest traffic volumes are traveling from south to north reflecting the work to home commute.

Campus Trip Generation Summary

Table 14 summarizes the daily and peak hourly trip generation characteristics for the SCC campus. The relationship between campus generated trips and campus population can be established by dividing the number of student FTE's enrolled during the time the counts were made into the number of trips generated during different time periods. This ratio will serve as a baseline for forecasting future campus trip generation with master plan development.

Table 14

SCC Trip Generation Summary (2003)

Time Period	Trips Generated	Student FTE's	Trips per Student FTE
AM Peak Hour	1,142	5,600	0.204
Midday Peak Hour	1,257		0.224
PM Peak Hour	695		0.124
Daily	12,430		2.220

Source: TSI

Existing Traffic Operations

The level of service at the selected intersections was analyzed for the AM, Midday, and PM peak hours. Level of service (LOS) is a measure of the ability of a given intersection to serve traffic traveling through it. The Transportation Research Board developed the LOS methodology, which is summarized in the *Highway Capacity Manual (HCM), 2000.* The methodology takes into account the geometry and channelization of the intersection, pedestrian activity, traffic controls, signal timing and phasing for signalized intersections, as well as turning movement volumes for each leg of the intersection. These factors are entered into a computer model to determine the LOS of an intersection.

Intersection LOS is defined in terms of seconds of average vehicle control delay. Control delay includes all the time a driver is delayed at an intersection. At signalized intersections, the majority of control delay is associated with waiting during a red light. At unsignalized intersections, the majority of control delay is associated with moving through the queue at a stop sign controlled approach. Control delay at both types of intersection also includes the time to decelerate while approaching an intersection and accelerate when leaving an intersection. Intersection level of service calculations were performed using the *Synchro* computer program, Version 6, which was developed by Trafficware to be consistent with the 2000 HCM methodology.

Seconds of control delay are divided into several categories ranging from LOS-A, which is very good, to LOS-F, which reflects a breakdown in traffic flow. Although these letter designations provide a simple basis for comparison, seconds of average vehicle delay should be used as the exact measure of comparison. Table 15 summarizes the breakdown of LOS categories by seconds of delay for both signalized and unsignalized intersections.

Table 15

Intersection Level of Service Criteria

LOS Category	Intersection Type and Delay Range (sec.)	
	Unsignalized LOS	Signalized
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

Source: Highway Capacity Manual, Special Report 209, 2000

The City of Shoreline has adopted LOS-D as a standard for Zone 1 (intersections west of Aurora Ave N) and LOS-E for Zone 4 (Aurora Avenue N corridor). This standard is applied to the average LOS at signalized intersections within a zone. The City of Shoreline Comprehensive Plan (adopted June, 2005) establishes a citywide standard of LOS-E for signalized arterial intersections. The new LOS standard is based on the *Transportation Research Board's* delay method described above. Excluded from this standard are state-operated facilities identified by WSDOT as *Highways of Statewide Significance*. Aurora Avenue N, Ballinger Way NE, and I-5 are *Highways of Statewide Significance* within the City of Shoreline. WSDOT is responsible for establishing and maintaining the LOS standard for such facilities.

AM Peak Hour

Table 16 summarizes existing LOS and average vehicle delay for the AM peak hour. One signalized intersection operates poorly (LOS-E or LOS-F) during the AM peak hour. Aurora Ave N/ N 175th St operates at LOS-E with the westbound approach operating at LOS-F. This poor operation is largely due to the high volume of southbound traffic combined with a relatively high volume of vehicles making westbound left turn movements and eastbound through movements.

The unique channelization and operating characteristics of the intersection of Greenwood Ave N with Innis Arden Way and N 160th St are discussed separately below.

All of the unsignalized intersections operate at LOS-C or better with the exception of Dayton Ave N/ Carlyle Hall Road N (LOS-F), which is controlled by an all-way stop. There are approximately 1,150 vehicles passing through this intersection during the AM peak hour. Almost 50% of these vehicles are southbound. The southbound approach experiences almost two minutes of average delay during the AM peak hour while the remaining three approaches each experience less than 30 seconds of average vehicle delay.

Table 16

AM Peak Hour Intersection Level of Service (Existing)

Intersection	LOS (sec.)[1]	
	Intersection	Worst Approach[2]
Signalized		
1. Richmond Beach Road/ Dayton Ave N	B (12)	EB - B (12)
2. Aurora Ave N/ N 175th St	E (61)	WB - F (129)
4. Aurora Ave N/ N 160th St	D (35)	EB - E (72)
5. Aurora Ave N/ N 145th St	D (44)	EB - E (67)
6. Dayton Ave N/ N 160th St	B (17)	WB - C (21)
7. Greenwood Ave N/ N 145th St	C (29)	EB - D (51)
Unsignalized		
3. Aurora Ave N/ N 165th St	A (3)	EB - F (53)
8. Innis Arden Way/ West Campus Access	A (2)	SB – B (12)
9. Innis Arden Way/ Central Campus Access	A (2)	SB – C (16)
10. Innis Arden Way/ Main Campus Entrance	A (1)	SB – C (20)
11. Greenwood Ave N/ Innis Arden Way	C (17)	SB - F (75)
12. Greenwood Ave N/ N 160th St	A (8)	NB – B (11)
13. Greenwood Ave N/ East Campus Access	A (4)	WB – C (18)
14. Greenwood Ave N/ SCC North Parking Lot	A (1)	EB – B (13)
15. Greenwood Ave N/ Carlyle Hall Rd N	A (6)	NB – D (29)
16. Dayton Ave N/ Carlyle Hall Rd N	F (60)	SB – F (112)
17. Dayton Ave N/ N Greenwood Dr	A (1)	WB – C (21)
18. Fremont Ave N/ N 165th St	B (10)	SB – C (17)

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

Since the remaining unsignalized intersections are two-way stop controlled, it is more appropriate to examine the LOS for the worst approach to the intersection rather than the entire intersection. This is because LOS or seconds of delay for the entire intersection incorporates the minimal delay experienced by high traffic volumes on the uncontrolled movements, which can mask poor operation on a controlled approach to an intersection. The intersection of Aurora Ave N/ N 165th St illustrates this effect. While the entire intersection operates at LOS-A, the eastbound approach operates at LOS-F. However, this poor LOS is perfectly acceptable when it is understood that the poor LOS is affecting only three westbound vehicles attempting to make a left turn onto northbound Aurora during the AM peak hour. When examining the LOS on a specific approach to an intersection it is important to know the number of vehicles affected before deciding if a poor LOS represents a deficiency or is an acceptable condition where

priority is given to the primary traffic flows. The worst approaches for the remaining two-way stop controlled intersections operate at an acceptable level of LOS-D or better.

AM Peak Hour Operation of Greenwood Ave N/ Innis Arden Way and Greenwood Ave N/ N 160th St

The adjacent intersections of Greenwood Ave N/ Innis Arden Way and Greenwood Ave N/ N 160th St are separated by approximately 50 feet. Given this proximity, their operation is interconnected and must be evaluated in this context. The *Syncho* software used in this analysis does not effectively model intersections in close proximity. However, *SimTraffic* (a module of *Synchro*) creates traffic simulations using data imported from *Synchro*. *SimTraffic* incorporates collision avoidance logic, which allows the simulation to depict real life driving conditions. *SimTraffic* also provides reports indicating the LOS for an intersection and individual approaches to the intersection. *SimTraffic* was used to analyze the intersections of Greenwood Ave N/ Innis Arden Way and Greenwood Ave N/ N 160th Street for all time periods and conditions included in this study.

During the AM peak hour, the intersection of Greenwood Ave N/ N 160th Street operates at LOS-A with the northbound approach operating at LOS-B. The highest turning movement volume during the AM peak hour at this intersection is the westbound right turn followed by the southbound and northbound movements.

The intersection of Greenwood Ave N/ Innis Arden Way operates at LOS-C with the southbound movement operating at LOS-F. The highest turning movement volume at this intersection is the northbound left turn followed by almost identical volumes for southbound through and eastbound right turning traffic.

AM peak hour operations for the two intersections are governed by the relatively high volume of inbound traffic to SCC that is either making a northbound through or westbound right turn movement at the intersection of Greenwood Ave N/ N 160th Street. This traffic then makes a northbound left turn at Greenwood Ave N/ Innis Arden Way to access the campus from Innis Arden Way. The relatively high volume of traffic making this series of movements results in excessive delay for the southbound through movement at Greenwood Ave N/ Innis Arden Way. Eastbound right-turning traffic entering Greenwood Avenue N from Innis Arden Way benefits from the relatively large volume of northbound traffic making a left turn. The northbound traffic impedes the southbound through volume resulting in increased opportunities for the eastbound volumes to make a right turn onto southbound Greenwood Avenue N.

Midday Peak Hour

Table 17 summarizes the Midday peak hour LOS for the analyzed intersections. The signalized intersection of Aurora Avenue N/ N 160th Street operates at LOS-F largely due to the relatively high northbound and southbound traffic volumes. The unsignalized intersections all operate at LOS-B or better with the worst approaches on these intersections operating at LOS-C or better with two exceptions. Both the eastbound and westbound approaches of the intersection of Aurora Avenue N/ N 165th Street operate at LOS-E. This poor LOS affects very few vehicles. The southbound approach to the intersection at Innis Arden Way/ Main Campus Entrance operates at LOS-E, which only affects traffic exiting from the campus.

Table 17

Midday Peak Hour Intersection Level of Service (Existing)

Intersection	LOS (sec.)[1]	
	Intersection	Worst Approach[2]
Signalized		
4. Aurora Ave N/ N 160th St	F (124)	NB – F (219)
6. Dayton Ave N/ N 160th St	B (12)	EB – B (16)
7. Greenwood Ave N/ N 145th St	C (23)	EB – C (33)
Unsignalized		
3. Aurora Ave N/ N 165th St	A (4)	EB - F (62)
8. Innis Arden Way/ West Campus Access	A (8)	SB – C (17)
9. Innis Arden Way/ Central Campus Access	A (2)	SB – C (17)
10. Innis Arden Way/ Main Campus Entrance	A (5)	SB – E (39)
11. Greenwood Ave N/ Innis Arden Way	A (6)	SB - C (18)
12. Greenwood Ave N/ N 160th St	A (6)	NB – A (9)
13. Greenwood Ave N/ East Campus Access	B (12)	EB – C (19)
14. Greenwood Ave N/ SCC North Parking Lot	A (4)	EB – B (14)
15. Greenwood Ave N/ Carlyle Hall Rd N	A (9)	NB – B (13)
16. Dayton Ave N/ Carlyle Hall Rd N	B (15)	EB – C (16)
17. Dayton Ave N/ N Greenwood Dr	A (3)	WB – C (17)
18. Fremont Ave N/ N 165th St	A (6)	NB/SB – B (11)

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

Midday Peak Hour Operation of Greenwood Ave N/ Innis Arden Way and Greenwood Ave N/ N 160th St

Traffic operations for the intersections of Greenwood Avenue N/ Innis Arden Way and Greenwood Avenue N/ N 160th Street are generally good during the Midday with both intersections operating at LOS-A. The circulation pattern between the two intersections is fairly well balanced with the inbound campus traffic on N 160th Street turning right onto northbound Greenwood Avenue N and then left onto Innis Arden Way. Conversely, traffic leaving the campus is turning right (southbound) onto Greenwood Avenue N and then left onto eastbound N 160th Street. The complementary arrival and departure traffic flows observed during the Midday peak hour result in a good LOS.

PM Peak Hour

Table 18 summarizes the Midday peak hour LOS for the analyzed intersections. All signalized intersections operate at LOS-D or better with three exceptions. The intersection of Aurora Avenue N/ N 160th Street operates at LOS-F largely due to the relatively high northbound traffic volume that largely consists of work to home trips and is typical of the PM peak hour. The relatively high volumes of northbound and eastbound left turning vehicles also contributes to the poor LOS experienced at this intersection. The signalized intersection of Aurora Avenue N/ N 145th Street operates at LOS-E during the PM peak hour. Poor operation of this intersection is largely due to the volume of vehicles making left turns combined with a relatively high volume of northbound vehicles. The signalized intersection of Greenwood Avenue N/ N 145th Street

operates at LOS-E during the PM peak hour. Poor operation of this intersection is also largely due to the volume of vehicles making a left turn combined with a relatively high volume of northbound vehicles.

Table 18

PM Peak Hour Intersection Level of Service (Existing)

Intersection	LOS (sec.)[1]	
	Intersection	Worst Approach[2]
Signalized		
1. Richmond Beach Road/ Dayton Ave N	B (13)	EB – B (15)
2. Aurora Ave N/ N 175th St	D (38)	EB – E (68)
4. Aurora Ave N/ N 160th St	F (103)	NB – F (173)
5. Aurora Ave N/ N 145th St	E (67)	WB – F (134)
6. Dayton Ave N/ N 160th St	B (13)	WB – B (18)
7. Greenwood Ave N/ N 145th St	E (60)	EB – F (90)
Unsignalized		
3. Aurora Ave N/ N 165th St	A (2)	EB – F (109)
8. Innis Arden Way/ West Campus Access	A (3)	SB – B (12)
9. Innis Arden Way/ Central Campus Access	A (1)	SB – B (13)
10. Innis Arden Way/ Main Campus Entrance	A (3)	SB – C (16)
11. Greenwood Ave N/ Innis Arden Way	A (5)	SB – B (14)
12. Greenwood Ave N/ N 160th St	A (9)	NB – B (14)
13. Greenwood Ave N/ East Campus Access	A (4)	WB – B (13)
14. Greenwood Ave N/ SCC North Parking Lot	A (1)	EB – A (9)
15. Greenwood Ave N/ Carlyle Hall Rd N	A (9)	NB – B (13)
16. Dayton Ave N/ Carlyle Hall Rd N	D (26)	NB – E (37)
17. Dayton Ave N/ N Greenwood Dr	A (1)	WB – C (17)
18. Fremont Ave N/ N 165th St	A (5)	NB/SB – B (11)

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

The unsignalized intersections all operate at LOS-A except for Dayton Avenue N/ Carlyle Hall Road N, which operates at LOS-D. The northbound approach to this intersection has the greatest volume of vehicles during the PM peak hour and operates at LOS-E. As in the AM and Midday conditions, the stop controlled approaches (eastbound/ westbound) to the intersection of Aurora Avenue N/ N 165th Street operate at LOS-F. This poor LOS affects a very low volume of vehicles and is acceptable sine there are nearby signalized intersections on Aurora Avenue N that provide protected turning movements for vehicles turning onto or crossing Aurora Avenue N.

PM Peak Hour Operation of Greenwood Ave N/ Innis Arden Way and Greenwood Ave N/ N 160th St

Traffic operations for the intersections of Greenwood Avenue N/ Innis Arden Way and Greenwood Avenue N/ N 160th Street are generally good during the PM peak hour with both intersections operating at LOS-A. Because campus generated trips are low during the PM peak hour, the circulation pattern between the two intersections is dominated by northbound traffic

making the work to home commute or traveling to the SCCC campus. At Greenwood Avenue N/ N 160th Street, the greatest traffic volumes are the northbound through and westbound right turn movements. As with the AM peak hour, the greatest vehicle delay is experienced by southbound vehicles that must stop and wait for a gap in the uncontrolled traffic making a northbound left turn onto Innis Arden Way.

Parking Supply and Demand

On-campus and on-street parking supply and demand characteristics were surveyed in January 2004 to document the existing on-campus and on-street parking supplies and the parking demand generated by SCC faculty, staff, and students as well as nearby residents and others parking on the street. The purpose of this survey was to establish the adequacy of existing parking supplies and establish a baseline for forecasting future parking demand characteristics and recommended parking supplies. There are three parking resources utilized by SCC: on-campus parking, satellite lot parking, and on-street parking in the adjacent neighborhood. A discussion of the supply and demand characteristics for each of these parking resources follows.

On-Campus Parking Supply and Demand

The available on-campus parking supply consists of approximately 2,150 stalls. This supply does not include open areas used for automotive department storage or other storage. In un-paved lots, vehicles were observed to park further apart than in paved lots where the stalls are marked. The parking supply in un-marked lots is based on the observed spacing of parked vehicles and is therefore lower than previous (DEIS) parking supply counts. The existing parking supply is summarized in Table 19.

Table 19

Existing On-Campus Parking Supply

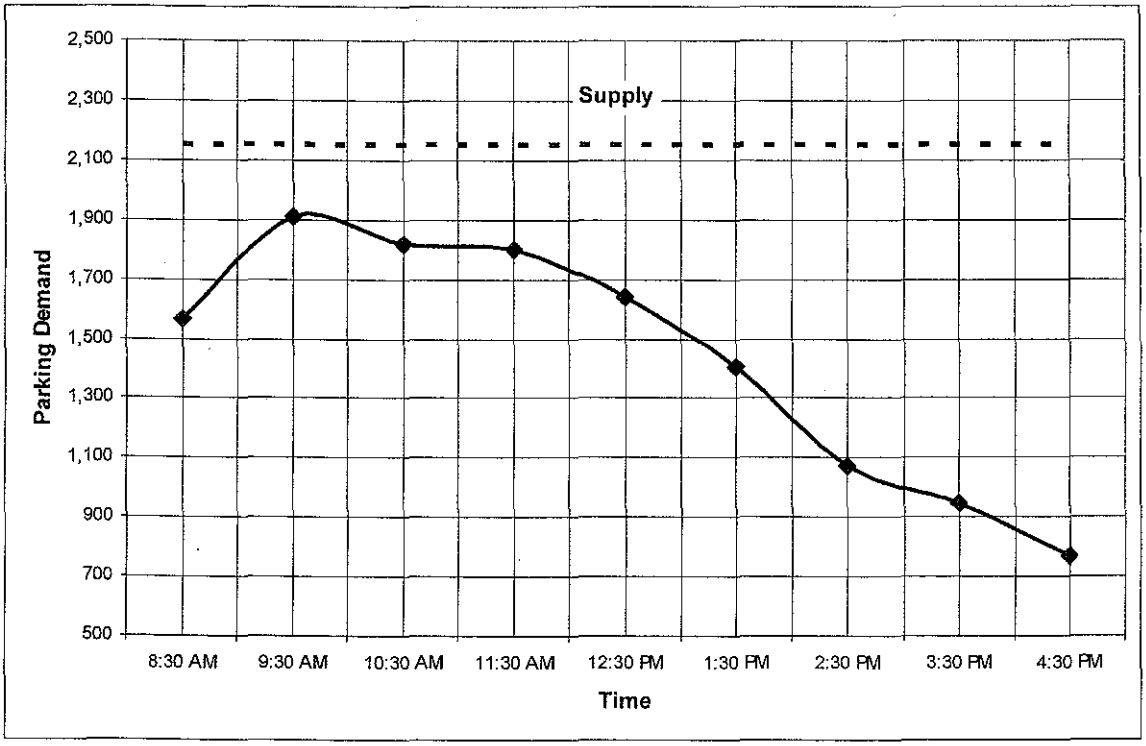
	Parking Zone	Supply
1	Visitor Lot	148
2	SW Lots	401
3	Central Core and Northwest Lots	1,150
4	East Lots	128
5	North Greenwood Lot	326
Total		2,153

Source: TSI

The hourly demand for on-campus parking is illustrated in Chart 1. Parking demand peaked at approximately 1,900 vehicles around 9:30 AM and then dropped slowly throughout the remainder of the day. Demand for parking in the lots close to the campus core was near or at capacity with the outlying north lot being at 75% of its capacity. Campus wide, 88% of the parking stalls were occupied at 9:30 AM. The effective parking supply is typically 90% of the total supply. It is necessary to provide this reserve capacity to reduce circulation and congestion within the parking lots, allow for parking maneuvers, and reduce delays in finding a parking stall. The existing on-campus parking demand is met by the existing supply, but there is very little capacity remaining to accommodate increased demand.

Chart 1

On-Campus Parking Demand

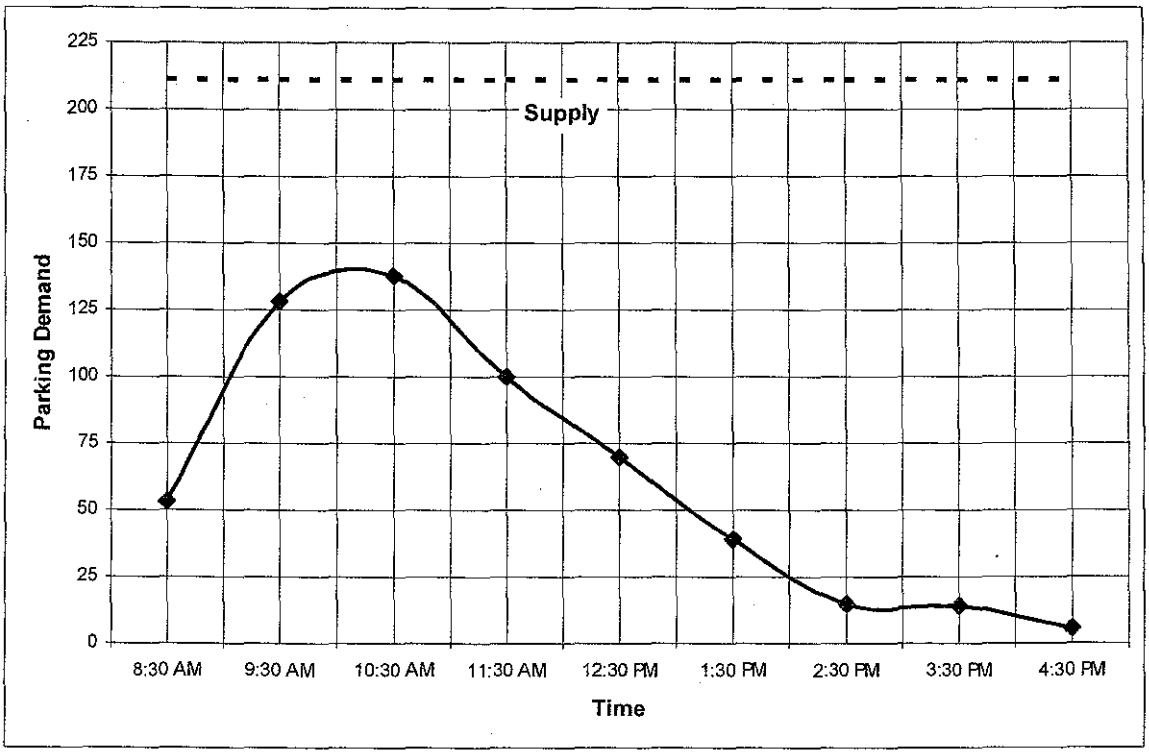


Source: TSI

Satellite Lot Parking Supply and Demand

SCC operates a satellite parking lot on the Sears property, southeast of the College campus. The lot is accessed from NE 160th Street and contains approximately 210 stalls. The hourly demand for parking at the satellite lot is illustrated in Chart 2. As shown, peak parking demand in this lot occurs at 10:30 AM when approximately 140 stalls are occupied. SCC operates a shuttle between the satellite lot and the campus from 7:45 AM to 4:30 PM each weekday. The shuttle makes approximately eight trips between the campus and the satellite lot per hour.

Chart 2
Satellite Lot Parking Demand



Source: TSI

On-Street Parking Supply and Demand

On-street parking conditions were assessed to establish the available parking supply, the demand for that supply, and the presence of parking restrictions intended to manage parking demand. On-street conditions were assessed within a study bounded by the area north of N 155th St, south of Carlyle Hall Road N, west of Dayton Ave N, and east of 3rd Avenue NW on the north side of the campus and east of NW 165th St on the south side of the campus. Within the study area, parking is prohibited on the following street segments:

- Innis Arden Way between Greenwood Ave N and NW 165th St;
- Carlyle Hall Road N between 3rd Ave NW and Dayton Ave N;
- Dayton Ave N between Carlyle Hall Road and N Greenwood Drive;
- On N 160th St west of its intersection with Greenwood Ave N and Dayton Ave N; and
- On both sides of N 160th St adjacent to Highland Terrace Elementary School.

Parking is also prohibited between 7:30 AM and 4:30 PM on the following street segments:

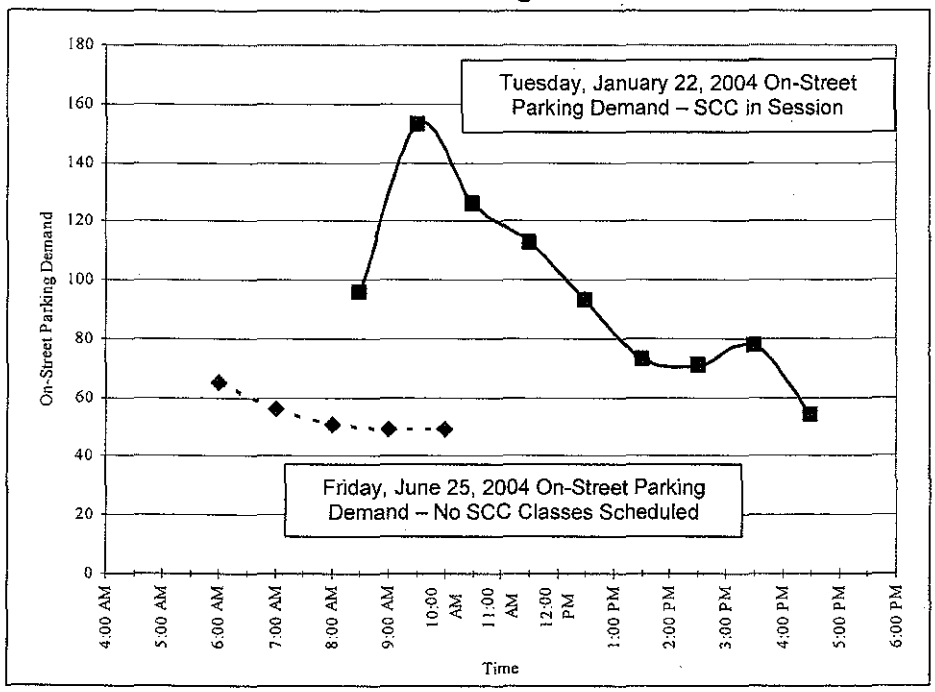
- East side of Greenwood Ave N between N 160th St and N 155th St;
- South side of N 160th St between Greenwood Ave N and Palatine Ave N;
- Both sides of N Greenwood Dr between Greenwood Ave N and Dayton Ave N; and
- Both sides of Dayton Ave N between N Greenwood Dr and N 160th St.

There are approximately 250 on-street parking spaces within the study area. Approximately 60 of these spaces are controlled with signs prohibiting parking between the hours of 7:30 AM and 4:30 PM, except holidays. Therefore, the effective on-street supply during the school day is approximately 190 stalls.

The demand for on-street parking demand was established by making hourly vehicle counts between 8 AM and 5 PM on a weekday when SCC was in session. In addition, counts were made between 6 AM and 10 AM on a day when SCC was not in session to determine the on-street parking demand generated by residents of the area. Chart 3 illustrates the on-street parking demand during a typical weekday when SCC is in session and when SCC is not in session. The 'not in session' demand counts were made on the morning of a typical workday and illustrates the drop in parking demand that occurs as residents leave for work.

Chart 3

On-Street Parking Demand



Source: TSI

The data show that on-street parking rapidly increases to approximately 155 vehicles in the morning followed by a gradual decline through the afternoon. There is a second, much smaller, peak around 3:30 PM when parking demand increases from 70 to approximately 80 vehicles. During the morning period of peak demand, approximately 82% of the parking supply is occupied.

On-street parking demand is much lower when SCC is not in session. The initial 6 AM count showed a parking demand of approximately 65 vehicles. Demand dropped during the morning to approximately 50 vehicles. It is assumed that residents within the study area generate an on-

street parking demand of approximately 50 vehicles during the day and that on-street residential demand is likely greater than 70 vehicles during the evening, night, and early morning when residents are not at work. In fact, the slight increase noted at 3:30 PM may reflect a combination of residents beginning to arrive home from work while some SCC students are still parked on neighborhood streets. The data indicate that during the period of peak demand (9:30 AM), on-street resident parking demand is approximately 50 vehicles and SCC on-street demand is approximately 105 vehicles for a total peak on-street parking demand of 155 vehicles.

It should be noted that the Highland Terrace neighborhood, given its proximity to the college, does experience a relatively high volume of student parking, as well as students driving through the neighborhood as they look for available parking. In addition, the homes in Highland Terrace have relatively narrow frontages, which increases the potential for parked vehicles to encroach upon driveways and other restricted parking areas.

Cumulative Parking Demand

The combination of campus, satellite lot, and on-street campus generate parking demand is summarized in Table 20. The campus generates a peak parking demand of approximately 2,145 vehicles at 9:30 AM.

Table 20

Parking Demand Summary

Parking Location	Peak Demand (9:30 AM)
Campus	1,900
Satellite Lot	140
On-Street	105
Total	2,145

Source: TSI

The relationship between SCC generated parking demand and the campus population may be made by dividing the number of student FTE's (full time equivalents) into the parking demand to establish the parking demand per student FTE. With an enrollment of approximately 5,600 student FTE's, the peak parking demand generated by SCC is 0.38 vehicles per student FTE.

Parking Management

Campus parking is managed through a fee based permit system that allocates the parking to different user groups. Daytime parking permits are $25 per quarter and are available at the Cashier's Office in the 5200 (FOSS) Building. Evening parking (after 4 p.m.) is $10 per quarter. A charge of $1 per day or evening may be paid at the entry gate by students who do not wish to purchase a parking permit. SCC encourages carpooling and offers free priority parking to students who carpool with two or more per vehicle.

Transit Service

A number of King County Metro Transit routes serve the SCC campus directly with a stop on-campus while other routes serve the campus from adjacent streets.

Transit Routes that Stop On-Campus

- Route 330 travels east west providing a connection between the primary campus loading area, North Seattle, and Lake City area.
- Route 331 also stops on-campus and provides service between the SCC campus and Kenmore area.
- Route 345 stops on the SCC campus and provides service between SCC, Northwest Hospital, North Seattle Community College, and the Northgate Transit Center.
- Route 355 and Route 5 provide service between the SCC campus and downtown Seattle during the morning and afternoon peak commuting periods with limited stops.

Transit Routes with Stops near Campus

- Route 304 provides morning express service between Richmond Beach and downtown Seattle and afternoon express service between downtown Seattle and Richmond Beach. The nearest stop to the SCC campus is on Dayton Ave N.

All routes provide service at 30-minute headways or less during peak commuting hours.

Pedestrian and Bicycle Activity and Facilities

The sidewalk system in the City of Shoreline proximate to the College is limited. In the vicinity of SCC there are sidewalks present on N 160th St from Aurora Ave N to just west of Greenwood Ave N and on both sides of Greenwood Ave N from N 160th St to N Greenwood Dr. There is also a sidewalk on the west side of Greenwood Ave N between N 160th St and N 155th St.

Pedestrian volumes were counted at the intersections of Greenwood Ave N/ N 160th St and Greenwood Ave N/ Innis Arden Way during the AM (7-9 AM), Midday (11 AM-1 PM), and PM (4-6 PM) peak hours. During the AM peak hour, there were 28 crossings at Greenwood Ave N/ N 160th St and 18 crossings at Greenwood Ave N/ Innis Arden Way. Approximately 82% of the crossings were either northbound or westbound towards the college. During the Midday peak hour, there were 33 crossings at Greenwood Ave N/ N 160th St and 10 crossings at Greenwood Ave N/ Innis Arden Way. Approximately 72% of the crossings were either southbound or eastbound away from the college. During the PM peak hour, there were 16 crossings at Greenwood Ave N/ N 160th St and 10 crossings at Greenwood Ave N/ Innis Arden Way. Approximately 71% of the crossings were either southbound or eastbound away from the College.

Observations indicate that the majority of pedestrians counted were walking to or from the College. AM peak hour counts were made between 7 and 9 AM and that peak hourly pedestrian volumes were occurred between 7 and 8 AM. This is before the beginning of classes at Highland Terrace Elementary School, which start at 9:15 AM. The pedestrian counts made between 8:45 and 9 AM were significantly lower and did not indicate the presence of many students crossing Greenwood Ave N to reach Highland Terrace. However, it should be

noted that elementary school-related pedestrian volumes may have peaked shortly after the counts ended at 9 AM.

Bicycle racks are located on the SCC campus outside of the 1000 Building, the Pagoda Union Building (900), the FOSS Building (5000) and the Gymnasium (3000). There are no marked bike routes or trails linking the campus with local or regional destinations.

Commute Trip Reduction

SCC is identified as an affected employer under the state's Commute Trip Reduction (CTR) ordinance. The CTR ordinance requires employers within King County that have 100 or more employees arriving to work before 9 AM on three or more days per week to offer a set of incentives and disincentives that are focused on reducing the number of single occupant vehicles traveling to the campus. SCC meets this requirement by offering a FlexPass to faculty and staff working at least 50% of the academic year. The FlexPass package can be used for King County Metro buses, Sound Transit buses and the Sounder Train. SCC also sells Metro bus passes at face value to students through the cashier's office.

Planned Road Improvements

Shoreline has recently updated their Comprehensive Plan. Part of this planning effort identifies and prioritizes near and long term transportation improvements. The near term projects (2004-2009) that are currently being recommended to the city council for funding approval and are near the SCC campus include:

- A preliminary study of intersection improvements at N 185th St and Aurora Ave N.
- The addition of business access and transit lanes, curbing, gutters, landscaping and sidewalks to the segment of Aurora Ave N between N 145th St to N 205th St. Improvements also include a landscaped median with provisions for left and U-turns. New shelters will be provided at transit stops.
- A pre-design study to improve operation and safety at the adjacent intersections of N 160th St/ Greenwood Ave N. and Innis Arden Way/ Greenwood Ave N. The results of the AWG recommendations (see appendices) for these problematic intersections are intended to serve as a basis for the city's pre-design study.

Impacts of the Alternatives

This section of the FEIS evaluates the effects and potential impacts of the proposed *Concept Master Plan* on the local transportation network and is followed with analysis of potential impacts of the alternatives relative to the local transportation network. Three future conditions are analyzed. As described in *Section II* of this FEIS, the *Preferred Alternative* comprises the *Concept Master Plan*, which includes a modest increase in building space, additional students, and infrastructure improvements. The EIS alternatives also include the *Expanded Development Alternative*, the *Modified Design Alternative* and the *No Action Alternative*.

As noted in *Section II*, the *Preferred Alternative* is a hybrid alternative that reflects recent downturns in community college enrollment. This alternative incorporates a modest growth rate in student FTE's of 5% to 10% over 2005 conditions and a limited program to add new buildings and infrastructure. While this specific alternative was not analyzed in the DEIS, other

alternatives with increased student enrollment were evaluated. Additional, limited transportation and parking analysis is provided in the following section. Because the *Preferred Alternative* represents less growth than the *Expanded Development Alternative*, potential traffic impacts would also be proportionally less. Therefore, the *Expanded Development Alternative* analysis represents the 'worst cast' scenario for potential development impacts and the analysis of the *Preferred Alternative* is limited to factors that depict its proportional relationship to the *Expanded Development Alternative*.

The *Expanded Development Alternative*, which was called the *Proposed Action* in the DEIS, incorporates a 20% growth in student FTE's over 2003 conditions, as well as an aggressive program to add new buildings and infrastructure improvements.

Under the *No Action Alternative*, no new building space or new facilities would be provided; however, the mandated increase in student FTE's would still occur. The *Modified Design Alternative* represents a modified master plan wherein additional building space (same as the *Expanded Development Alternative*) would be provided, however, no amphitheater, sports fields or ancillary facilities would be constructed.

Expanded Development Alternative

The *Expanded Development Alternative* includes a net increase of approximately 211,000 SF of on-campus building space and construction of a 600 to 750 stall parking structure. The number of students served would increase by approximately 1,170 student FTE's. Implementation of this alternative is anticipated to occur in three phases over the next 10 years. The year 2015 is selected as the analysis year for identifying any potential traffic related impacts that may result from implementation of the master plan. By 2015, all major master plan projects should be complete and the increase in student FTE's realized.

Projects or programmatic changes that affect the operation of the internal campus transportation system and parking supply as well as the external road network include the following:

- The effect of additional trips generated by 1,170 new student FTE's
- The effects of adding a 600-750 stall parking structure on the north side of the campus.
- The effect of campus infrastructure improvements that modify pedestrian and vehicular circulation patterns. These include:
  - realignment of the main entrance with Innis Arden Way;
  - improvements to the existing on-campus transit stop and addition of a north campus stop;
  - improvements to the internal roadway connecting the main entrance with the proposed parking structure;
  - improvements to the internal pedestrian circulation system;
  - reducing the number of parking stalls in the north parking lot accessed from Greenwood Ave N; and
  - improvements to an existing but currently closed connection with Innis Arden Way that would provide inbound access between Innis Arden Way, the improved internal roadway, and the proposed parking structure.

Trip Generation, Distribution, and Assignment

In order to accurately assess the potential impacts of the *Expanded Development Alternative* it is necessary to first determine the number of new trips that would be generated by the additional 1,170 student FTE's. Secondly, determine how those trips are distributed between the campus accesses and the public road network for the AM, Midday, and PM peak hours. And finally, assignment of those new trips to the analyzed intersections and evaluation their operational characteristics. With this approach, the incremental effects of the additional trips can be quantified and potential impacts identified.

Trip Generation

There are three elements of the *Expanded Development Alternative* that would change existing SCC trip generation characteristics. They are the proposed growth in student population, the addition of the sports fields, and the addition of an amphitheater.

This alternative is designed to provide the facilities necessary to accommodate an additional 1,170 student FTE's. The mandated increase in student FTE's is directed by the Legislature. Student FTE's are the marker used by the Legislature to forecast growth and budget community colleges and is an accurate indicator of changes in campus activity levels including trip generation and parking demand. The number of peak hour trips generated per student FTE was established in the *Existing Conditions* section by dividing the number of existing student FTE's into the documented number of existing trips generated during the AM, Midday, and PM peak hours. It should be emphasized that the relationship between student FTE's and vehicle trips incorporates all campus generated trips not just student trips. Student FTE's are simply the most accurate statistic available to use as a basis for establishing trip generation rates.

The calculation described above results in a trip generation factor of 0.204 trips per student FTE during the AM peak hour, 0.224 trips per student FTE during the Midday peak hour, and 0.124 trips per student FTE during the PM peak hour. On a daily basis, the campus generates 2.22 daily trips per student FTE. These factors are used to forecast the number of trips generated by the increase in student FTE's as summarized in Table 21 below. On a daily basis, the increase in students proposed under this alternative would generate an additional 2,600 daily trips, 235 AM peak hour trips, 263 Midday peak hour trips, and 161 PM peak hour trips. This represent an increase of approximately 21% over existing campus generated traffic volumes.

Table 21 summarizes the forecasted number of daily and peak hour trips generated by the *Expanded Development Alternative* in 2015 when the majority of the projects are complete and the forecasted increase in student FTE's has been realized.

Table 21

Trip Generation Summary (*Expanded Development Alternative*)

Generator	Unit	Time Period							
		Daily		AM Peak		Midday Peak		PM Peak	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT
		50%	50%	85%	15%	41%	59%	51%	49%
New Student FTE's	1,170	1,300	1,300	200	35	108	155	74	71
Total Trips		**2,600**		**235**		**263**		**161**	

Source: TSI

Trip Distribution

The directional distribution (inbound/outbound) of campus-generated trips is summarized in Table 21 (above). The distribution of campus generated trips between campus accesses and turning movements at analyzed intersections is based on existing distribution patterns. This distribution is illustrated as a percentage of total trips in Figure 20 (AM peak hour), Figure 21 (Midday peak hour), and Figure 22 (PM peak hour).

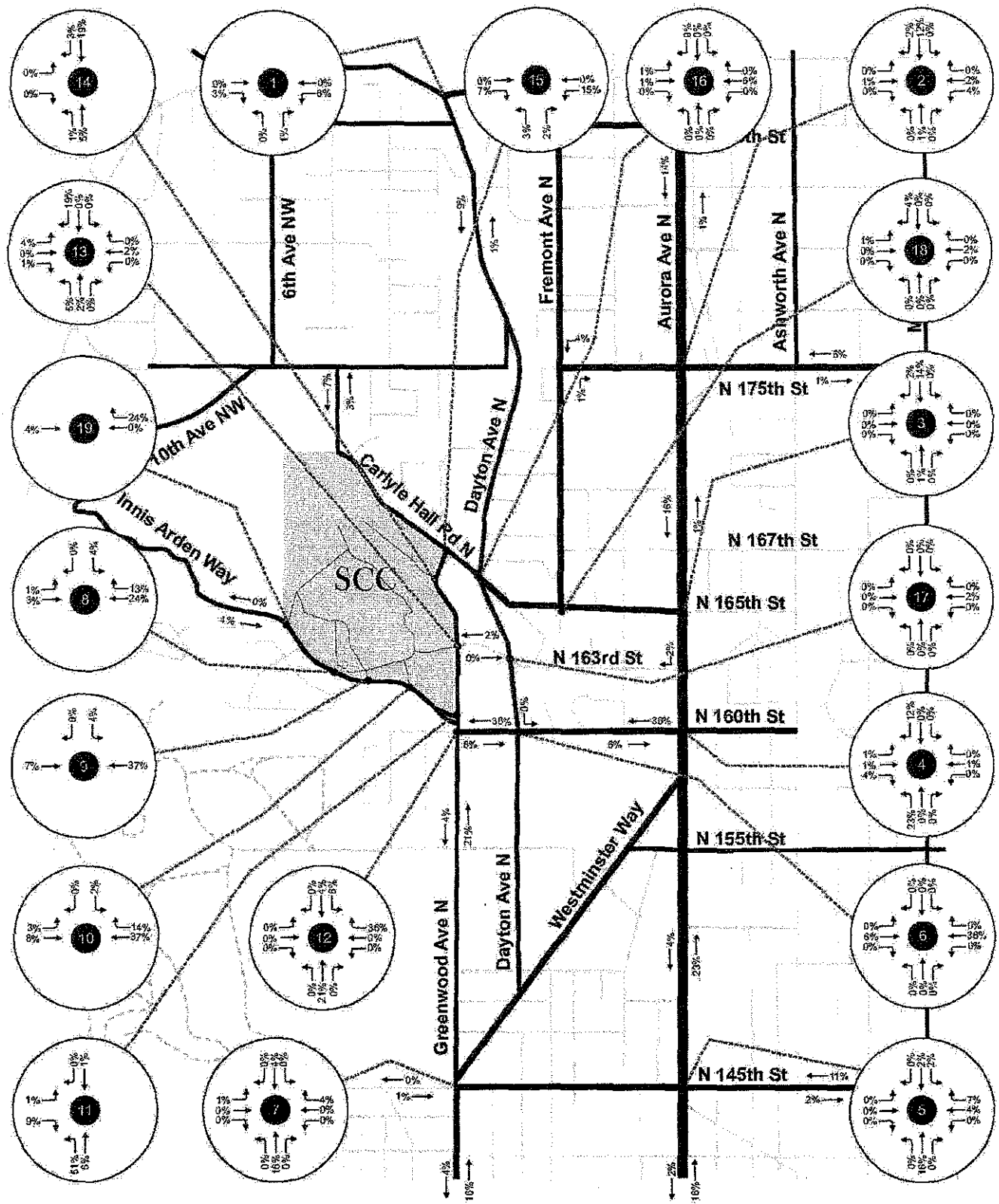
The distribution of trips between campus accesses is based upon the size of the parking supply and its proximity to each campus access. Significant changes to the existing distribution pattern are due to the reduction of the parking supply in the north lot accessed from Greenwood Ave N and the new access on Innis Arden Way, which would provide the most direct inbound access to the proposed parking structure. The distribution patterns depicted in the figures reflect the location and quantity of parking proposed in the alternative.

Trip Assignment

The distribution percentages presented in Figures 20, 21, and 22 are applied to the number of trips generated during the respective peak hours (Table 21) to establish the assignment of campus generated trips to analyzed intersections. This assignment is illustrated in Figure 23 (AM peak hour), Figure 24 (Midday peak hour), and Figure 25 (PM peak hour).

Traffic Operations

The SCC generated trips assigned to the analyzed intersections in Figures 23 through 25 are added to existing traffic volumes (Figures 17 through 19) to establish future traffic volumes at analyzed intersections when the projects are complete in 2015. In order to maintain a conservative analysis, existing traffic volumes were increased by 1% per year for all turning movements except those entering or leaving the SCC campus. The resulting turning movement volumes are illustrated in Figure 26 (AM peak hour), Figure 27 (Midday peak hour), and Figure 28 (PM peak hour).



Source: TSI, 2005

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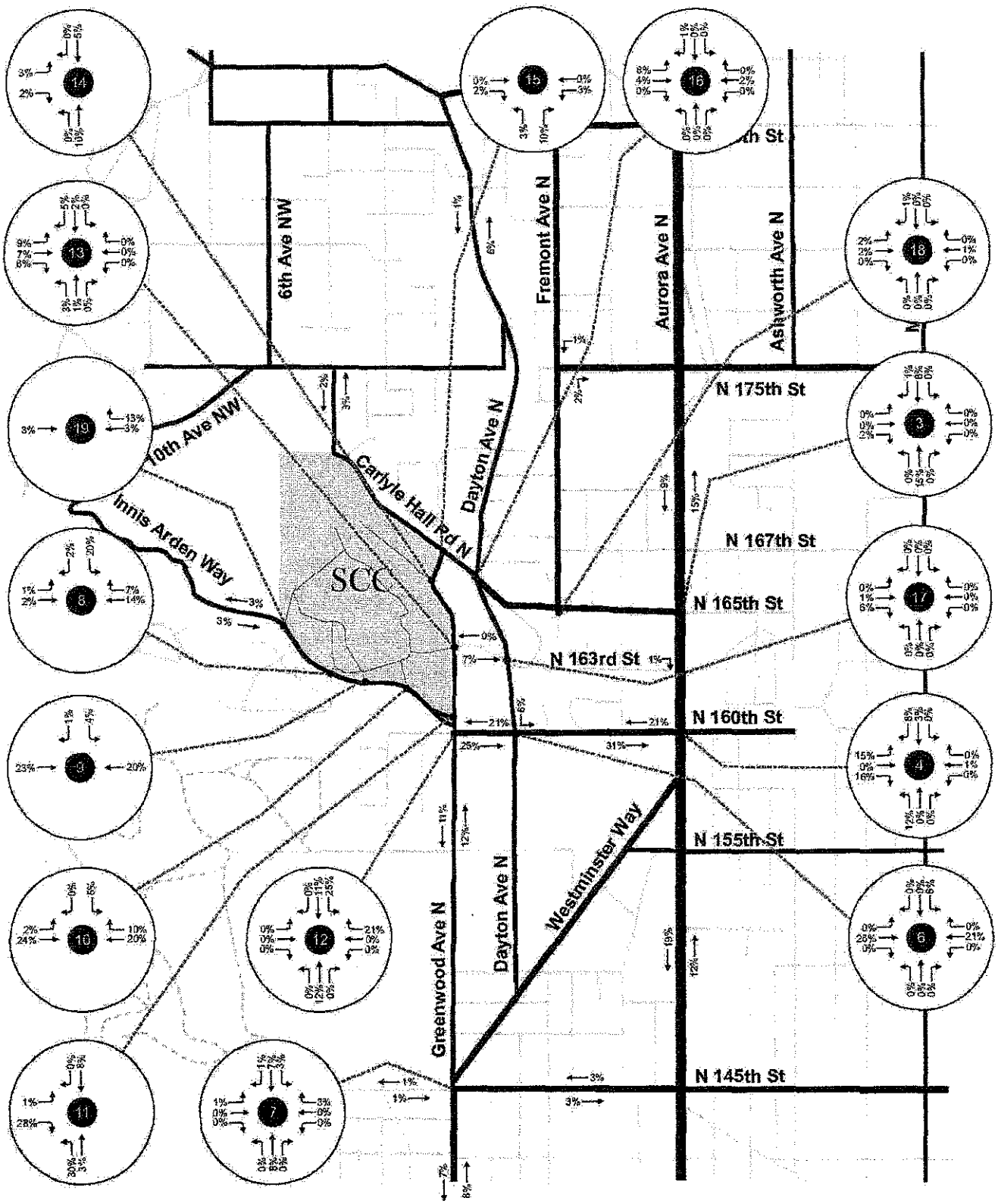
Figure 20

Distribution of AM Peak Hour Trips (Expanded Development Alternative)



Source: TSI, 2005

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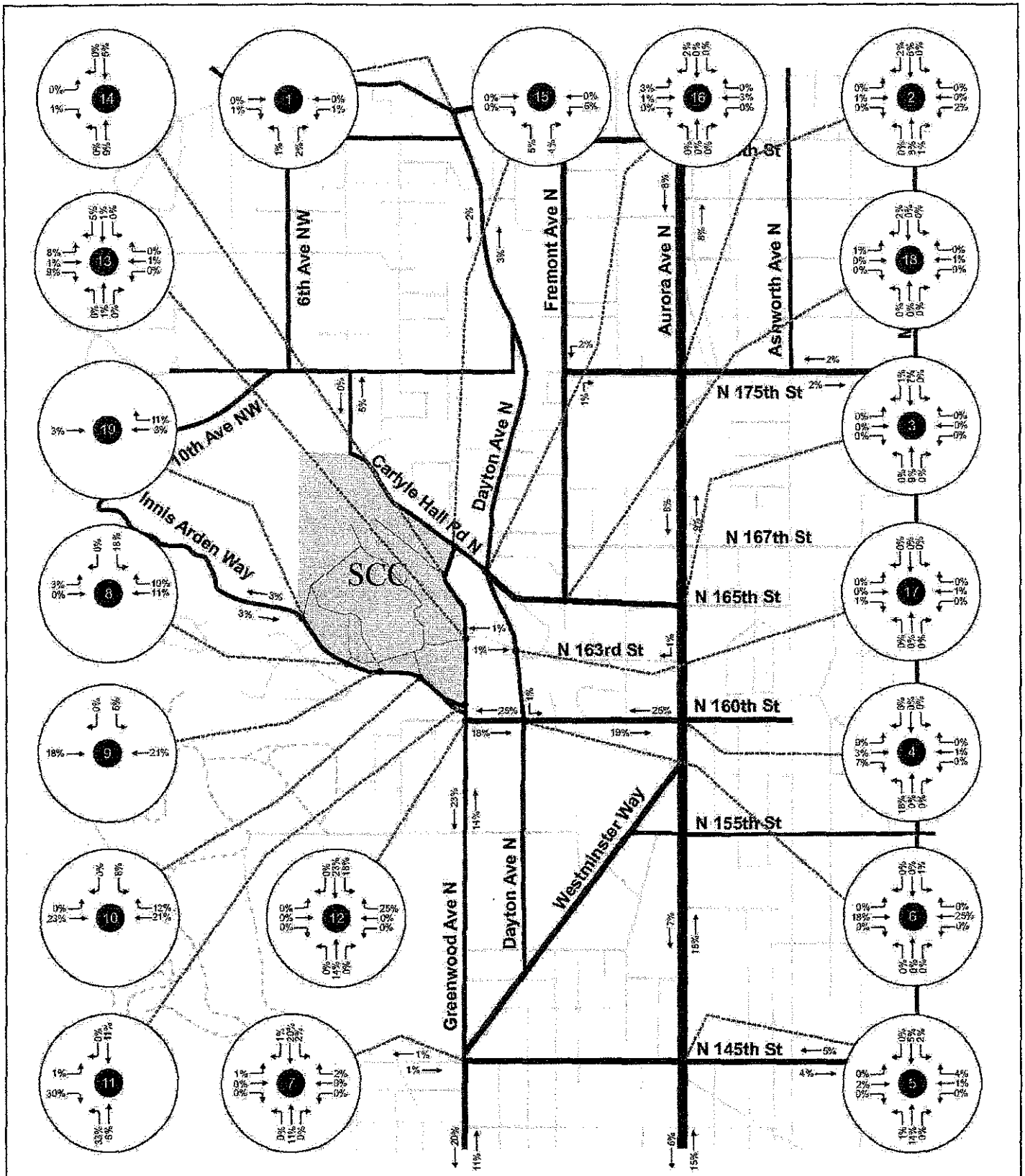
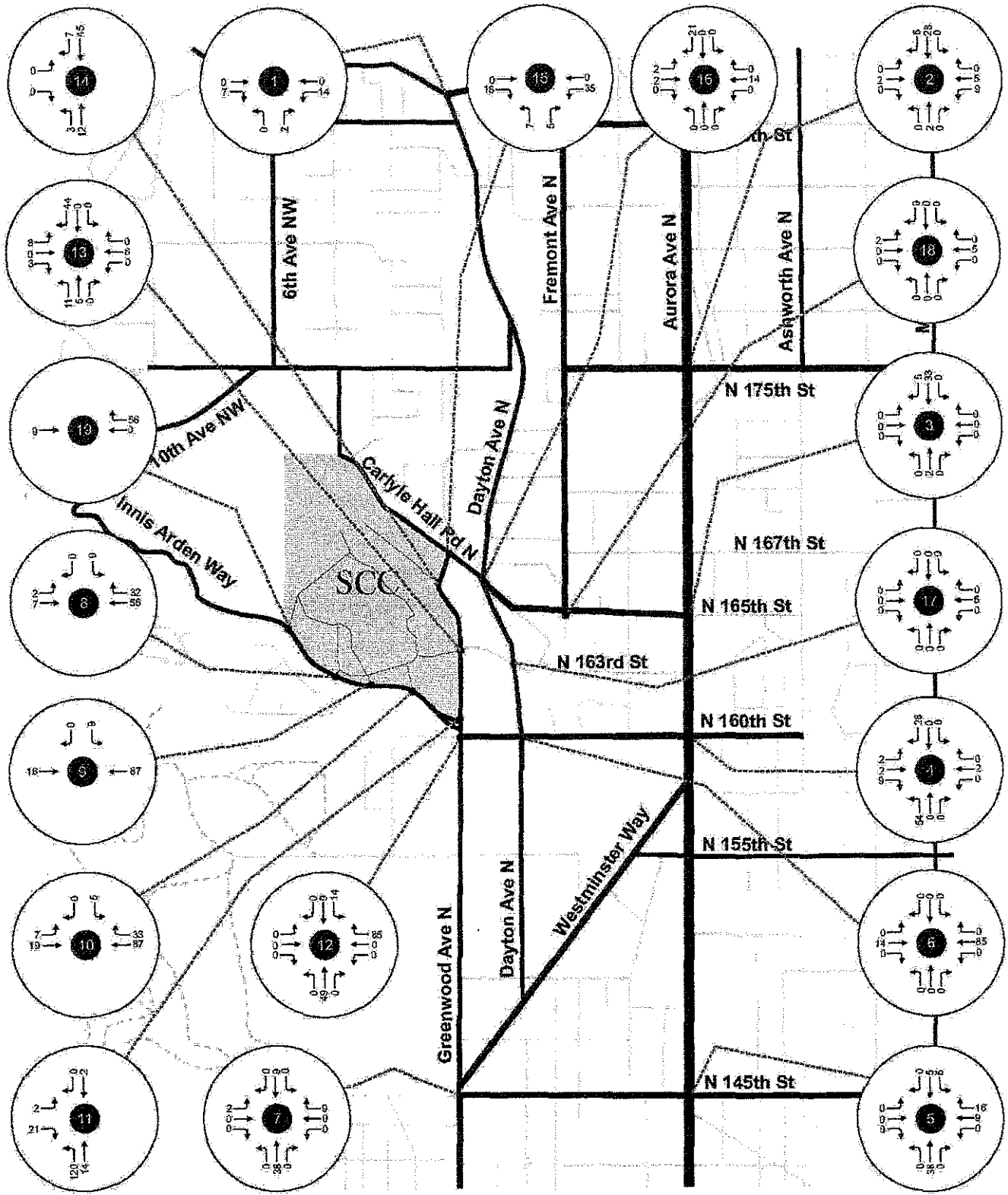
Figure 21

Distribution of Midday Peak Hour Trips (Expanded Development Alternative)



Source: TSI, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 22** **Distribution of PM Peak Hour Trips (Expanded Development Alternative)**



Source: TSI, 2005

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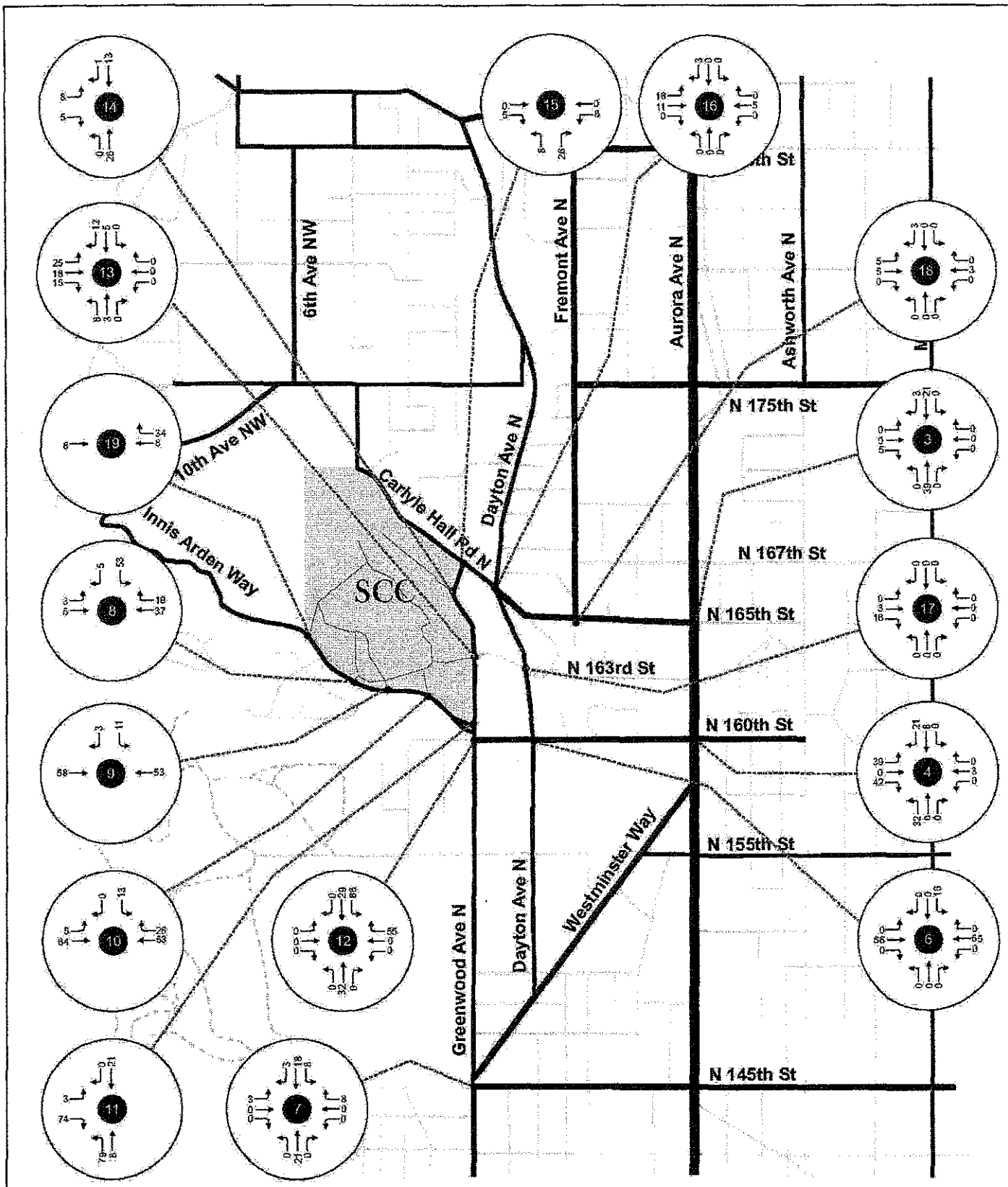
Figure 23

AM Peak Hour Trip Assignment (Expanded Development Alternative)



Source: TSI, 2005

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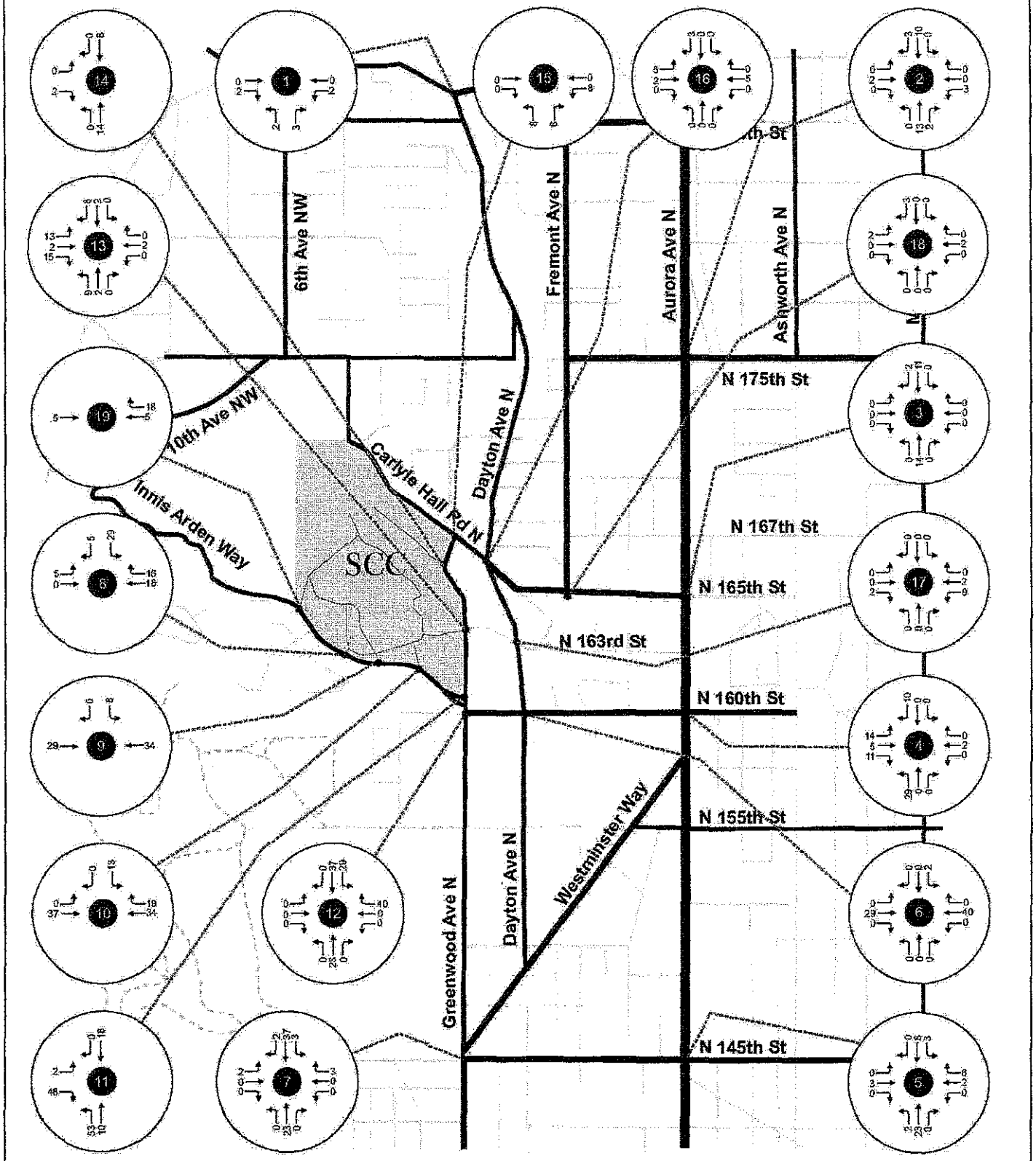
Figure 24

Midday Peak Hour Trip Assignment (Expanded Development Alternative)



Source: TSI, 2005

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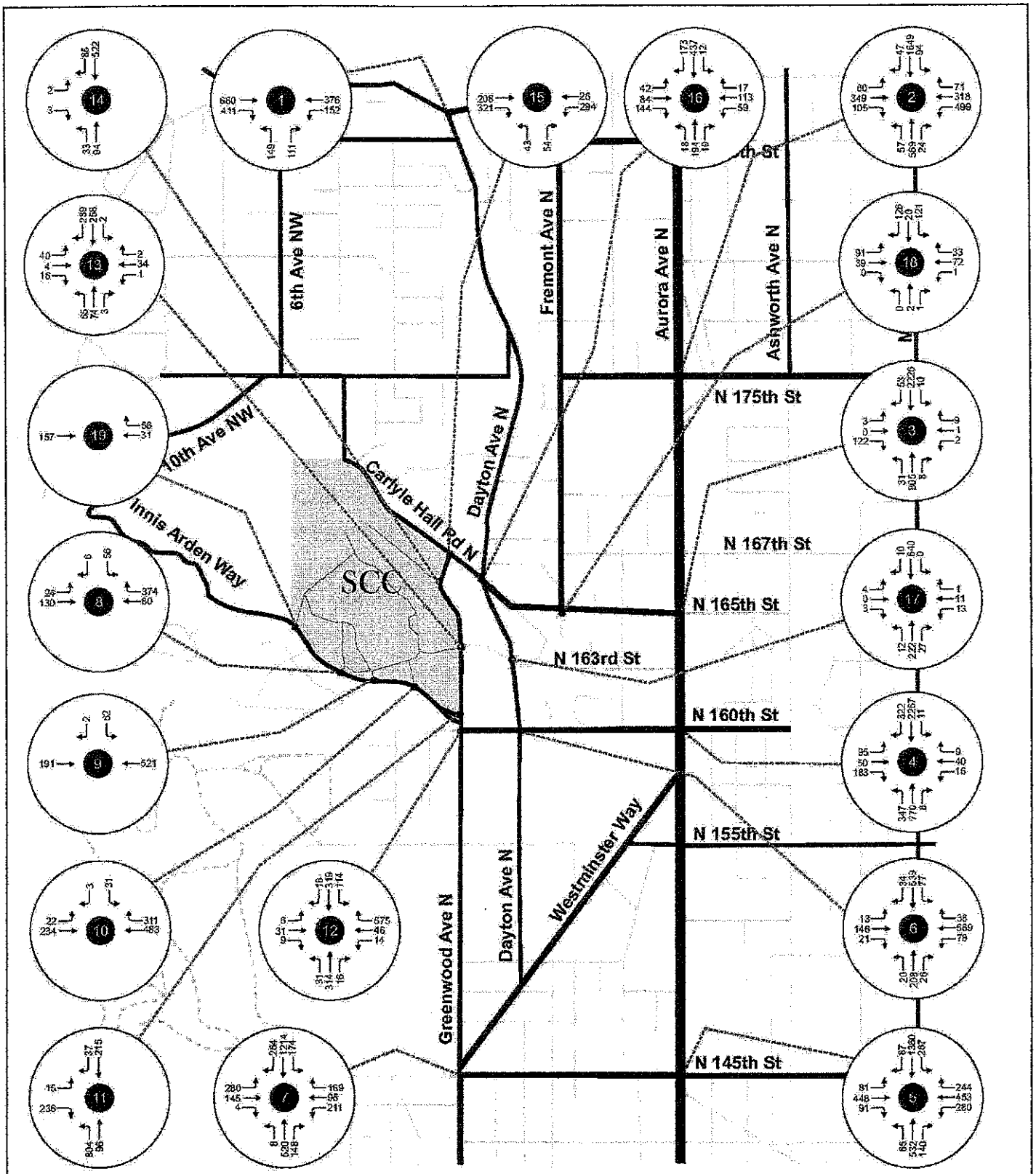
Figure 25

PM Peak Hour Trip Assignment (Expanded Development Alternative)



Source: TSI, 2005

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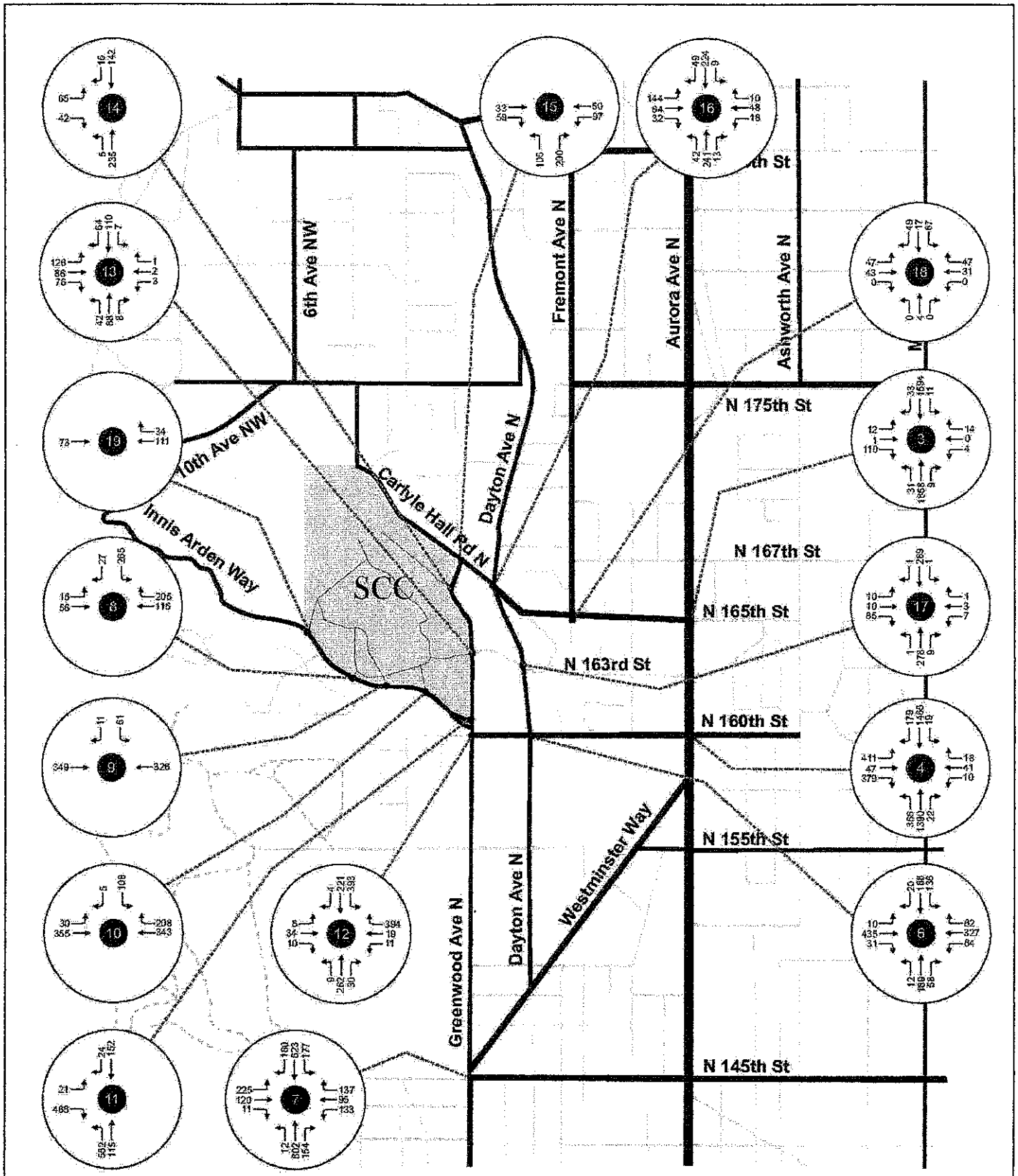
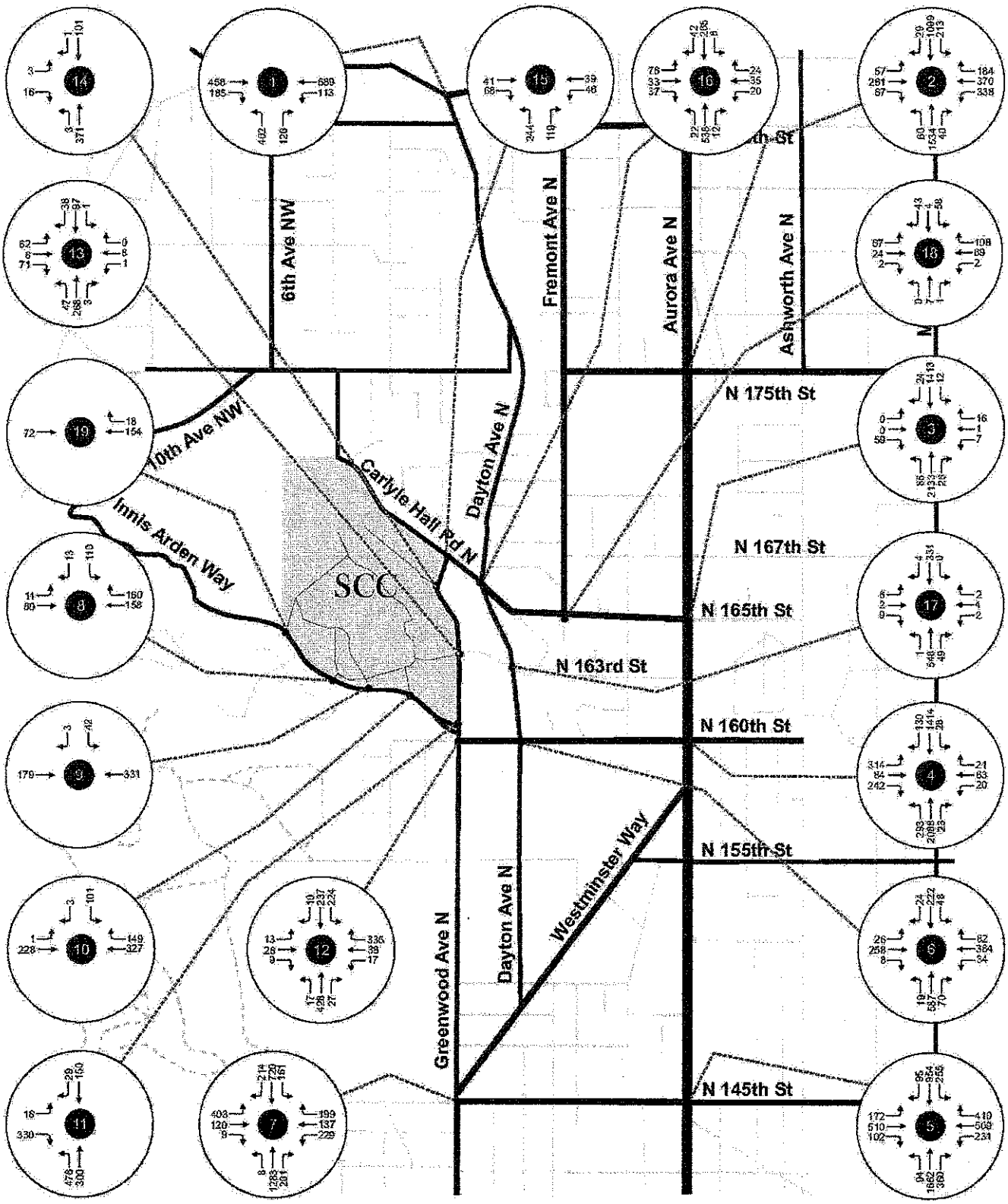
Figure 26

AM Peak Hour Turning Movement Volumes (Expanded Development Alternative)



Source: TSI, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 27** **Midday Peak Hour Turning Movement Volumes (Expanded Development Alternative)**



Source: Transportation Engineering Northwest, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 28** **PM Peak Hour Turning Movement Volumes (Expanded Development Alternative)**

AM Peak Hour

Table 22 summarizes LOS and average vehicle delay for the AM peak hour in 2015 with the this alternative's projects completed. Two signalized intersections operate poorly (LOS-E or LOS-F) during the AM peak hour. Aurora Ave N/ N 175th St operates at LOS-F with the westbound approach operating at LOS-F. This poor operation is largely due to the high volume of southbound traffic combined with a relatively high volume of vehicles making westbound left turn movements. The intersection of Aurora Ave N/ N 160th St operates at LOS-E with the eastbound approach operating at LOS-F. This poor LOS is due to the high volume of southbound vehicles combined with a relatively high volume of eastbound vehicles.

Table 22

AM Peak Hour Intersection Level of Service (*Expanded Development Alternative*)

Intersection	LOS (sec.)[1]	
	Intersection	Worst Approach [2]
Signalized		
1. Richmond Beach Road/ Dayton Ave N	B (12)	EB - B (13)
2. Aurora Ave N/ N 175th St	F (87)	WB - F (203)
4. Aurora Ave N/ N 160th St	E (73)	EB - F (100)
5. Aurora Ave N/ N 145th St	D (50)	EB - E (75)
6. Dayton Ave N/ N 160th St	C (26)	SB - C (31)
7. Greenwood Ave N/ N 145th St	D (442)	EB - E (59)
Unsignalized		
3. Aurora Ave N/ N 165th St	A (7)	WB - F (494)
8. Innis Arden Way/ West Campus Access	A (2)	SB - B (15)
9. Innis Arden Way/ Central Campus Access	A (2)	SB - C (22)
10. Innis Arden Way/ Main Campus Entrance	A (2)	SB - D (30)
11. Greenwood Ave N/ Innis Arden Way	E (43)	SB - F (283)
12. Greenwood Ave N/ N 160th St	B (14)	WB - E (18)
13. Greenwood Ave N/ East Campus Access	A (5)	WB - C (23)
14. Greenwood Ave N/ SCC North Parking Lot	A (1)	EB - B (14)
15. Greenwood Ave N/ Carlyle Hall Rd N	B (15)	NB - F (104)
16. Dayton Ave N/ Carlyle Hall Rd N	F (126)	SB - F (250)
17. Dayton Ave N/ N Greenwood Dr	A (1)	WB - C (24)
18. Fremont Ave N/ N 165th St	B (12)	SB - C (22)
19. Innis Arden Way/ Proposed Campus Access	A (<1)	N/A

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

A comparison of forecasted 2015 signalized intersection operations for the *Expanded Development Alternative* with existing (2004) conditions shows the following changes. The traffic volumes precipitating the described changes are separated into the percentage of total new trips at the intersection attributable to growth in background traffic volumes and growth in SCC generated trips.

- Aurora Ave N/ N 175th St would drop from LOS-E to LOS-F with an increase in average vehicle delay of 26 seconds. This drop in LOS is due to increases in existing traffic volumes (88%) and growth in SCC generated trips (12%).
- Aurora Ave N/ N 160th St would drop from LOS-D to LOS-E with an increase in average vehicle delay of 38 seconds. This drop in LOS is due to increases in existing traffic volumes (80%) and growth in SCC generated trips (20%).
- Dayton Ave N/ N 160th St would drop from LOS-B to LOS-C with an increase in average vehicle delay of 9 seconds. This drop in LOS is due to increases in existing traffic volumes (63%) and growth in SCC generated trips (37%).
- Greenwood Ave N/ N 145th St would drop from LOS-C to LOS-D with an increase in average vehicle delay of 15 seconds. This drop in LOS is due to increases in existing traffic volumes (84%) and growth in SCC generated trips (16%).

All unsignalized intersections would operate at LOS-A with the following exceptions:

- Greenwood Ave N/ Innis Arden Way would operate at LOS-E with the southbound approach also operating at LOS-F.
- Dayton Ave N/ Carlyle Hall Rd N would operate at LOS-F with the southbound approach also operating at LOS-F.

A comparison of forecasted 2015 unsignalized intersection operations for the *Expanded Development Alternative* with existing (2004) conditions shows the following changes:

- Greenwood Ave N/ Innis Arden Way drops from LOS-C to LOS-E with an increase in average vehicle delay of 26 seconds. This drop in LOS is due to increases in existing traffic volumes (43%) and growth in SCC generated trips (57%).
- Greenwood Ave N/ N 160th St drops from LOS-A to LOS-B with an increase in average vehicle delay of 6 seconds. This drop in LOS is due to increases in existing traffic volumes (46%) and growth in SCC generated trips (54%).
- Greenwood Ave N/ Carlyle Hall Road drops from LOS-A to LOS-B with an increase in average vehicle delay of 9 seconds. This drop in LOS is due to increases in existing traffic volumes (58%) and growth in SCC generated trips (42%).
- Dayton Ave N/ N Greenwood Drive drops from LOS-A to LOS-B with an increase in average vehicle delay of 11 seconds. This drop in LOS is due to increases in existing traffic volumes (95%) and growth in SCC generated trips (5%).

The proposed new access on Innis Arden Way that would serve the parking garage is defined in the alternative as an inbound only access with a prohibited eastbound left turn movement. It is forecasted, that this new access would serve 56 new eastbound trips during the AM peak hour and operate at LOS-A.

Midday Peak Hour

Table 23 summarizes LOS and average vehicle delay for the Midday peak hour in 2015 with the alternative's projects completed. One signalized intersection operates poorly during the Midday peak hour. Aurora Ave N/ N 160th St operates at LOS-F with the northbound approach also operating at LOS-F. This poor LOS is due to the high volume of northbound vehicles. This intersection also operates at LOS-F under existing Midday peak hour conditions.

Table 23

Midday Peak Hour Intersection Level of Service
(*Expanded Development Alternative*)

Intersection	LOS (sec.)[1]	
	Intersection	Worst Approach[2]
Signalized		
4. Aurora Ave N/ N 160th St	F (173)	EB - F (268)
6. Dayton Ave N/ N 160th St	B (12)	EB - B (14)
7. Greenwood Ave N/ N 145th St	C (26)	EB - D (36)
Unsignalized		
3. Aurora Ave N/ N 165th St	A (8)	EB - F (140)
8. Innis Arden Way/ West Campus Access	B (14)	SB - D (32)
9. Innis Arden Way/ Central Campus Access	A (3)	SB - D (27)
10. Innis Arden Way/ Main Campus Entrance	C (17)	SB -F (143)
11. Greenwood Ave N/ Innis Arden Way	E (41)	SB - F (94)
12. Greenwood Ave N/ N 160th St	A (9)	NB - B (12)
13. Greenwood Ave N/ East Campus Access	C (24)	EB - E (38)
14. Greenwood Ave N/ SCC North Parking Lot	A (5)	EB - C (17)
15. Greenwood Ave N/ Carlyle Hall Rd N	B (12)	NB - C (17)
16. Dayton Ave N/ Carlyle Hall Rd N	C (22)	EB - D (27)
17. Dayton Ave N/ N Greenwood Dr	A (4)	WB - C (21)
18. Fremont Ave N/ N 165th St	A (6)	NB/SB - B (11)
19. Innis Arden Way/ Proposed Campus Access	A (<1)	N/A

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

All unsignalized intersections would operate at LOS-C or better with the following exceptions:

- Greenwood Ave N/ Innis Arden Way would operate at LOS-F with the southbound approach also operating at LOS-F.

A comparison of forecasted 2015 unsignalized intersection operations for the *Expanded Development Alternative* with existing (2004) conditions shows the following changes:

- Innis Arden Way/ West Campus Access drops from LOS-A to LOS-B with an increase in average delay of 6 seconds. This drop in LOS is largely due to increased traffic volumes from the proposed parking structure that would enter Innis Arden Way

at this location. SCC generated traffic is responsible for 90% of the increase in traffic volumes while growth in background traffic is responsible for the remaining 10%.

- The main campus access on Innis Arden Way drops form LOS-A to LOS-C with an increase in average vehicle delay of 12 seconds. SCC generated traffic is responsible for 73% of the increase in traffic volumes at this intersection while growth in background traffic is responsible for the remaining 27%.
- Greenwood Ave N/ Innis Arden Way drops from LOS-A to LOS-E with an increase in vehicle delay of 35 seconds. This drop in LOS is due to increases in background traffic volumes (38%) and growth in SCC generated trips (62%).
- Greenwood Ave N/ East Campus Access drops from LOS-B to LOS-C with an increase in vehicle delay of 12 seconds. This drop in LOS is due to increases in background traffic volumes (19%) and growth in SCC generated trips (81%).
- Greenwood Ave N/ Carlyle Hall Road drops from LOS-B to LOS-C with an increase in vehicle delay of 3 seconds. This drop in LOS is due to increases in background traffic volumes (51%) and growth in SCC generated trips (49%).
- Dayton Ave N/ Carlyle Hall Road drops from LOS-B to LOS-C with an increase in vehicle delay of 7 seconds. This drop in LOS is due to increases in existing traffic volumes (71%) and growth in SCC generated trips (29%).

PM Peak Hour

Table 24 summarizes LOS and average vehicle delay for the PM peak hour in 2015 with the alternative's projects completed. Four of the six analyzed signalized intersections operate poorly during the PM peak hour. Aurora Ave N/ N 175th St operates at LOS-D with the eastbound approach operating at LOS-F. Aurora Ave N/ N 160th St operates at LOS-F with the northbound approach also operating at LOS-F. Aurora Ave N/ N 145th St also operates at LOS-F with the westbound approach also operating at LOS-F. Greenwood Ave N/ N 145th St also operates at LOS-F with the northbound approach also operating at LOS-F. This poor LOS at these intersections is due to the combination of a high volume of northbound westbound vehicles reflecting the PM peak hour work to home commute.

All unsignalized intersections would operate at LOS-C or better with the following exceptions:

- Dayton Ave N/ Carlyle Hall Rd would operate at LOS-E with the northbound approach operating at LOS-F.

A comparison of forecasted 2015 unsignalized intersection operations for the *Expanded Development Alternative* with existing (2004) conditions shows the following changes:

- Greenwood Ave N/ Innis Arden Way drops form LOS-A to LOS-C with an increase in vehicle delay of 12 seconds. This drop in LOS is due to increases in existing traffic volumes (47%) and growth in SCC generated trips (53%).
- Greenwood Ave N/ N 160th St drops form LOS-A to LOS-B with an increase in vehicle delay of 6 seconds. This drop in LOS is due to increases in existing traffic volumes (49%) and growth in SCC generated trips (51%).
- Greenwood Ave N/ Carlyle Hall Road drops form LOS-A to LOS-B with an increase in vehicle delay of only one second. This drop in LOS is due to increases in existing traffic volumes (70%) and growth in SCC generated trips (30%).

- Dayton Ave N/ Carlyle Hall Rd drops from LOS-D to LOS-E with an increase in vehicle delay of 20 seconds. This drop in LOS is due to increases in existing traffic volumes (88%) and growth in SCC generated trips (12%).

Table 24

PM Peak Hour Intersection Level of Service (*Expanded Development Alternative*)

Intersection	LOS (sec.)[1]	
	Intersection	Worst Approach[2]
Signalized		
1. Richmond Beach Road/ Dayton Ave N	B (13)	EB – B (14)
2. Aurora Ave N/ N 175th St	D (41)	WB – E (79)
4. Aurora Ave N/ N 160th St	F (138)	NB – F (236)
5. Aurora Ave N/ N 145th St	F (119)	WB – F (161)
6. Dayton Ave N/ N 160th St	B (16)	WB – C (22)
7. Greenwood Ave N/ N 145th St	F (100)	NB – F (160)
Unsignalized		
3. Aurora Ave N/ N 165th St	A (3)	WB – F (236)
8. Innis Arden Way/ West Campus Access	A (4)	SB – B (13)
9. Innis Arden Way/ Central Campus Access	A (1)	SB – B (14)
10. Innis Arden Way/ Main Campus Entrance	A (3)	SB – C (20)
11. Greenwood Ave N/ Innis Arden Way	C (17)	SB – E (49)
12. Greenwood Ave N/ N 160th St	B (15)	NB – D (29)
13. Greenwood Ave N/ East Campus Access	A (4)	WB – B (14)
14. Greenwood Ave N/ SCC North Parking Lot	A (1)	EB – A (10)
15. Greenwood Ave N/ Carlyle Hall Rd N	B (10)	NB – B (15)
16. Dayton Ave N/ Carlyle Hall Rd N	E (46)	NB – F (74)
17. Dayton Ave N/ N Greenwood Dr	A (1)	WB – C (20)
18. Fremont Ave N/ N 165th St	A (5)	NB/SB – B (12)
19. Innis Arden Way/ Proposed Campus Access	A (<1)	N/A

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

Campus Access and Circulation

Pedestrian Circulation – Pedestrian improvements are planned as part of changes to the existing main entry to the campus at Innis Arden Way and the proposed new parking structure (Building C). Improvements are also planned for the existing pathway that connects the College's Greenwood parking lot to the central campus. These improvements would provide better separation between vehicles and pedestrians and intra-campus pedestrian circulation improvements would provide improved connections between parking areas and campus buildings as well as adjacent streets. As shown in Figure 11 (*Section II* of this FEIS), a trail connection is proposed between the College's west parking lot and the city park. It is anticipated that this trail could be jointly developed by the College and the City.

Vehicular Circulation – Also shown in Figure 11, as part of the *Expanded Development Alternative*, is a new vehicular access that could be developed on Innis Arden Way to serve as a primary inbound access to the proposed parking structure associated with this alternative (described below). This access would re-open and improve an existing closed access to connect with a new driveway that would extend around the west-side of the campus and provide a more-direct route for vehicles traveling to and from the proposed new parking structure. The new campus drive would pass through existing parking lots, which would be modified to accommodate the new access road.

The existing main entry would be re-aligned to be perpendicular with Innis Arden Way. Landscaping would be provided along both sides of the driveway to visually strengthen the entrance. A bus pull-out would be added to provide improved separation between automobile traffic and buses.

Parking Supply and Demand

Parking – This alternative includes construction of a 1,200 to 1,500 stall parking garage in two phases at the north-end of campus. The existing visitor parking area would be re-configured to provide improved internal circulation. Improvements are planned for all of the College's existing parking lots to provide better lighting (improved on-site security and minimizing off-campus lighting effects) and improved storm water management. The on-campus parking supply under the *Expanded Development Alternative* is summarized in Table 25.

Table 25

Parking Supply (*Expanded Development Alternative*)

	Parking Zone	Existing Supply	Parking Removed	Parking Added	Future Supply
1	Visitor Lot	148	0	0	148
2	SW Lots	401	0	0	401
3	Central Core and Northwest Lots	1,150	-645	1,350	1,855
4	East Lots	128	0	0	128
5	North Greenwood Lot	326	0	0	326
Total		2,153	-645	1,350	2,858

Source: LMN Architects

Under this *Expanded Development Alternative*, the number of student FTE's would increase by 1,170 from 5,600 to 6,770. In the existing conditions section of this analysis a peak parking demand factor of 0.38 stalls per student FTE was established. Applying this factor to the 6,770 future student FTE's results in a peak parking demand of approximately 2,570 stalls. A parking supply of 2,830 stalls (10% greater than the forecasted demand) should adequately accommodate future demand associated with this alternative. The proposed supply should adequately accommodate the forecasted demand. It should be noted that the parking demand factor of 0.38 stalls per student FTE incorporates SCC generated on-campus demand, on-street demand, and demand for parking at the satellite lot. In addition, the period of peak parking demand occurs in the morning.

City of Shoreline parking codes establish minimum parking supplies for different land uses. The City's minimum off-street parking requirement must be provide within 500 feet of a building entrance. Provisions are made to reduce the minimum requirement through trip reduction measures or shared use of parking supplies. The proposed parking supply is greater than the minimum required by code (see Table 26).

Table 26

Minimum Parking Requirements (*Expanded Development Alternative*)

Land Use	Minimum Requirement	Units	Minimum Required Off-Street Supply
Vocational School	1 stall per classroom	156 classrooms	156
	1 per 5 students	6,760 students	1,352
Total			1,508

Source: LMN Architects, City of Shoreline Municipal Code, Title 20.50.390

Transit Service

The existing transit stop at the main entrance to the campus would be improved to provide a clearly defined transit only median, an improved shelter and additional landscaping. In addition, a second transit stop is proposed as part of this alternative for the north side of the campus. Providing a second stop would require close coordination with King County Metro Transit to ensure that the route between the stops meets Metro standards for safety, grade changes, sight lines, turning radii, road surface composition, and other factors that Metro may require. In addition, the benefit of the second stop should be evaluated against the time and cost required to service it.

Preferred Alternative

The *Preferred Alternative* represents significantly less growth and development than would occur under the *Expanded Development Alternative*. Under the *Preferred Alternative*, it is anticipated that student FTE's would increase by 5% to 10% over 2005 levels. Table 27 summarizes the FTE forecast and compares it with 2003 levels that were used to establish the baseline for the DEIS traffic analysis.

Table 27

Growth in Student FTE's for the Expanded Development and the Preferred Alternatives

	Existing 2003	Expanded Alternative	Preferred Alternative 5% growth	Preferred Alternative 10% growth
Student FTE's	5,600	6,770	6,134	6,426
Change from Existing	0	1,170	534	826

Trip Generation, Distribution, and Assignment

The trips generation characteristics of the *Preferred Alternative* are somewhat less than for the *Expanded Development Alternative* while the distribution and assignment of peak hour trips would be the same as the *Expanded Development Alternative.*

Table 28 summarizes the forecasted number of daily and peak hour trips generated by the *Preferred Alternative* in 2015 when the majority of the master plan projects are complete and the forecasted increase in student FTE's has been realized. This alternative would generate fewer peak hour and daily trips than the *Expanded Alternative.*

Table 28

Trip Generation Summary (*Preferred Alternative*)

Period	Existing 2003	Expanded Alternative	Preferred Alternative 5% growth	Preferred Alternative 10% growth
AM Peak Hour	1,142	1,381	1,251	1,310
Midday Peak Hour	1,257	1,520	1,377	1,442
PM Peak Hour	695	856	777	814
Daily	12,430	15,027	13,616	14,264

Source: TSI

During the AM peak hour the *Preferred Alternative* would generate approximately 110 to 170 more vehicle trips than existing conditions and 70 to 130 trips fewer vehicle trips than the *Expanded Development Alternative.* At midday, the *Preferred Alternative* would generate approximately 120 to 185 more trips than existing conditions and 80 to 140 trips less than the *Expanded Development Alternative.* During the PM peak hour the *Preferred Alternative* would generate approximately 80 to 120 more trips than existing conditions and 40 to 80 fewer trips than the *Expanded Development Alternative.* On a daily basis, the *Preferred Alternative* would generate would generate approximately 1,186 to 1,835 more trips than existing conditions and 765 to 1,410 fewer trips than the *Expanded Development Alternative.*

Traffic Operations

Traffic operations would be somewhat better than that described for the *Expanded Development Alternative.* Table 29 summarizes the LOS findings for the two problematic intersections of Greenwood/ NE 160th St and Greenwood/ Innis Arden Way and compares them against those of the *Expanded Development Alternative.* Operations at other intersections would be slightly better than described under the *Expanded Development Alternative.*

When compared against the *Expanded Development Alternative*, intersection operations at Greenwood Ave N/ Innis Arden Way under the *Preferred Alternative* would be somewhat better during the AM peak hour and approximately the same as the *Expanded Development Alternative* during the Midday and PM peak hours. At Greenwood Ave N/NE 160th St. intersection operations under the *Preferred Alternative* would be slightly better or approximately the same as the *Expanded Development Alternative* for all time periods.

Table 29

Level of Service and Delay[1] (*Preferred Alternative*)

Time Period / Intersection	Expanded Alternative		Preferred Alternative	
	Intersection Average	Worst Approach[2]	Intersection Average	Worst Approach[2]
AM Peak Hour				
11. Greenwood Ave N/ Innis Arden Way	E (43)	SB - F (283)	D (30)	SB - F (149)
12. Greenwood Ave N/ N 160th St	B (14)	WB - C (18)	B (12)	WB - C (17)
Midday Peak Hour				
11. Greenwood Ave N/ Innis Arden Way	E (41)	SB - F (94)	F (51)	EB - F (123)
12. Greenwood Ave N/ N 160th St	A (9)	NB - B (12)	A (10)	WB - C (16)
PM Peak Hour				
11. Greenwood Ave N/ Innis Arden Way	C (17)	SB – E (49)	C (21)	EB – F (51)
12. Greenwood Ave N/ N 160th St	B (15)	NB – D (29)	A (9)	WB – B (11)

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

Campus Access and Circulation

Campus access and circulation would be the same as for existing conditions.

Parking Supply and Demand

The parking demand generated under the *Preferred Alternative* is summarized in Table 30 below and compared with that for the *Expanded Development Alternative* and existing conditions. With the aggressive 10% forecasted in student FTE's the morning peak demand for parking would be approximately 315 more vehicles than existing conditions and 110 stalls less than the *Expanded Development Alternative*.

Table 30

Peak Parking Demand Forecast for the Expanded Development and Preferred Alternatives

	Existing 2003	Expanded Alternative	Preferred Alternative 5% growth	Preferred Alternative 10% growth
On-campus	1,900	2,570	2,150	2,261
Satellite Lot	140	0	200	200
On-Street	105	0	0	0
Total	**2,145**	**2,570**	**2,350**	**2,461**

Under the *Preferred Alternative* the on-campus parking supply would remain at approximately the same level as existing conditions and the satellite parking lot would be retained. On-street parking would not be allowed due to the presence of a Residential Parking Zone (RPZ). Table 31 summarizes the relationship between parking demand and parking supplies and compares existing conditions with those for the *Preferred and Expanded Development Alternatives.*

Table 31
Parking Supply and Demand Summary

	Existing 2003	Expanded Alternative	Preferred Alternative 5% growth	Preferred Alternative 10% growth
On-campus Supply	2,153	2,858	2,153	2,153
Satellite Lot Supply	200	0	200	200
On-Street Supply	116	0	0	0
Total	2,469	2,858	2,353	2,353
Effective Supply (90%)	*2,222*	*2,572*	*2,118*	*2,118*
Parking Demand	*2,145*	*2,570*	*2,350*	*2,461*
Parking Surplus/ Deficit	+77	+2	-232	-343
New Supplies Needed to Mitigate Deficit (+10%)	*0*	*0*	*255*	*377*

Under the *Preferred Alternative*, approximately 255 to 377 additional parking stalls would be needed to accommodate the forecasted demand for parking. These stalls could be provided in an expanded off-campus satellite lot, beneath new buildings that are near the perimeter road, or a combination of off and on-campus supplies.

Transit Service

Transit service and on-campus improvements would be the same as for existing conditions.

Pedestrian and Bicycle Facilities

Pedestrian circulation improvements and on-campus bicycle facilities would be the same as for existing conditions.

Modified Design Alternative

The *Modified Design Alternative* is similar to the *Expanded Development Alternative* except that no sports fields, the 500-seat amphitheater, or ancillary facilities would be built.

Trip Generation, Distribution, and Assignment

Trip generation characteristics of the *Modified Design Alternative* would be comparable to the *Preferred Alternative* and slightly less than that of the *Expanded Development Alternative,* while the distribution and assignment of peak hour trips would be comparable to the *Expanded Development Alternative.*

Table 32 summarizes the forecasted number of daily and peak hour trips generated by the *Modified Design Alternative* in 2015 when the majority of the master plan projects are completed and the forecasted increase in student FTE's has been realized. This alternative would generate slight more PM peak hour trips than the *Expanded Development Alternative.*

Table 32

Trip Generation Summary (Modified Design Alternative)

Generator	Unit	Time Period							
		Daily		AM Peak		Midday Peak		PM Peak	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT
		50%	50%	85%	15%	41%	59%	51%	49%
New Student FTE's	1,170	1,300	1,300	200	35	108	155	74	71
Totals		**1,300**	**1,300**	**200**	**35**	**108**	**155**	**74**	**87**
		2,600		**235**		**263**		**161**	

Source: TSI

Traffic Operations

Traffic operations would be the same as those associated with the *Expanded Development Alternative.*

Campus Access and Circulation

Campus access and circulation would be the same as for the *Expanded Development Alternative.*

Parking Supply and Demand

Parking supplies would be comparable to the *Preferred Alternative* and slightly less than the *Expanded Development Alternative* without the addition of the amphitheater parking lot. Parking demand also would be slightly less than the *Expanded Development Alternative* without the sports fields and the amphitheater.

Transit Service

Transit service and on-campus improvements would be the same as for the *Expanded Development Alternative.*

Pedestrian and Bicycle Facilities

Pedestrian circulation improvements and on-campus bicycle facilities would be the same as for the *Expanded Development Alternative.*

No Action Alternative

Under the *No Action Alternative*, proposed master plan projects would not be developed. However, SCC would still have to accommodate the projected growth in student FTE's. For purposes of analyzing the transportation related impacts of this alternative, it is assumed that

the student population would increase by the same amount as under the *Expanded Development Alternative* (1,170 student FTE's). However, since the demand for existing campus facilities is currently near capacity during the morning and afternoons, it is assumed that some of the increased demand would have to be accommodated in off-campus facilities during these time periods and that existing on-campus facilities would be used more fully during afternoon and evening hours.

Trip Generation, Distribution, and Assignment

As discussed above, the *No Action Alternative* would require increased use of off-campus facilities during the morning and midday and increased use of on-campus facilities during the afternoon and evening. While the total number of trips generated under this alternative would be the same as for the *Expanded Development Alternative*, many of these trips would not travel through analyzed intersections since they would have leased off-campus space as a destination. To reflect the increased use of off-campus leased space and a programmatic shift towards increased use of campus facilities during the afternoon and evening hours the trip generated under the *No Action Alternative* are based on the following adjustments to the trips generated under the *Expanded Development Alternative*:

- Daily, AM peak hour, and Midday peak hour trips are reduced by 25% to account for a shift towards increased use of off-campus leased facilities.
- AM peak hour trips are reduced by an additional 20% to account for the limited capacity of existing facilities to accommodate additional classes.
- Midday peak hour trips are reduced by an additional 10% to account for the limited capacity of existing facilities to accommodate additional classes.
- PM peak hour trips are increased by the difference between *Expanded Development Alternative* & *No Action* AM peak hour and Midday peak hour trips to account for a shift in programs to evening classes.

The *No Action Alternative* trip generation characteristics are summarized in Table 33 below. The *No Action Alternative* would produce 650 fewer daily, 106 fewer AM peak hour, 92 fewer Midday peak hour, and 198 more PM peak hour trips than the *Expanded Development Alternative*.

Table 33

Trip Generation Summary (*No Action Alt.*)

Condition	Daily	AM Peak	Midday Peak	PM Peak
Expanded Development Alternative	2601	235	263	145
Adjustments	*-25%*	*-45%*	*-35%*	*+198*
No Action	1951	129	171	343
Change	*-650*	*-106*	*-92*	*+198*

Source: TSI

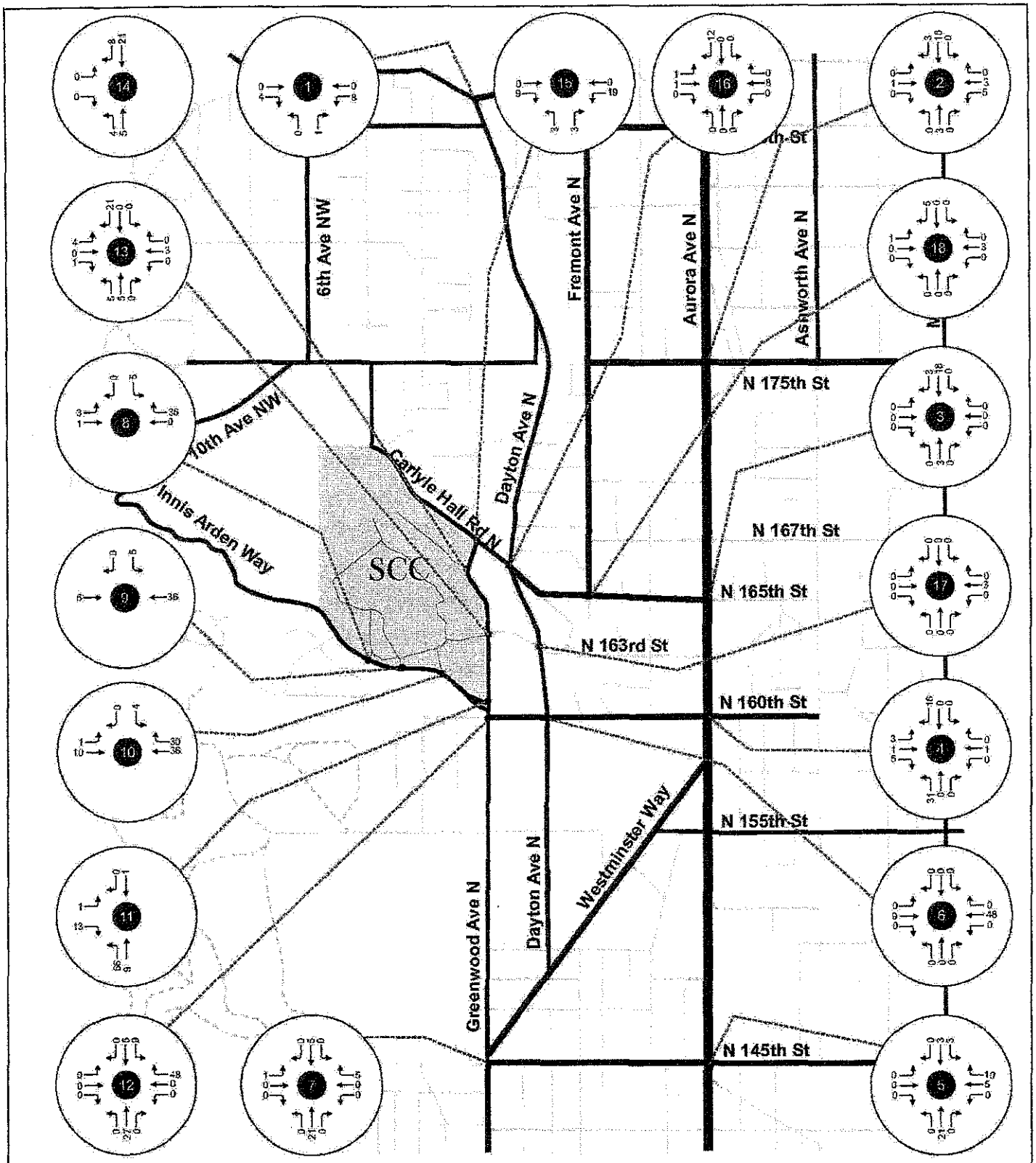
The distribution and assignment of peak hour trips would be the same as for the *Expanded Development Alternative* with the exception that trips assigned to the reopened access under the *Expanded Development Alternative* are shifted to adjacent accesses.

Traffic Operations

The SCC generated trips assigned to the analyzed intersections in Figures 29 through 31 are added to existing traffic volumes (Figures 17 through 19) to establish future traffic volumes at analyzed intersections when the master plan projects are complete in 2015. In order to maintain a conservative analysis, existing traffic volumes were increased by 1% per year for all turning movements except those entering or leaving the SCC campus. The resulting turning movement volumes are illustrated in Figure 32 (AM peak hour), Figure 33 (Midday peak hour), and Figure 34 (PM peak hour).

AM Peak Hour

Table 34 summarizes LOS and average vehicle delay for the AM peak hour in 2015 under the *No Action Alternative*. Two signalized intersections operate poorly during the AM peak hour. Aurora Ave N/ N 175th St operates at LOS-E with the westbound approach operating at LOS-F. This poor operation is largely due to the high volume of southbound traffic combined with a relatively high volume of vehicles making eastbound through movements. The intersection of Aurora Ave N/ N 160th St also operates at LOS-E with the eastbound approach operating at LOS-F. This poor LOS is due to the high volume of southbound vehicles combined with a relatively high volume of eastbound vehicles. Both of these intersections operate at LOS-E under the *Expanded Development Alternative* with slightly longer delays.



Source: TSI, 2005

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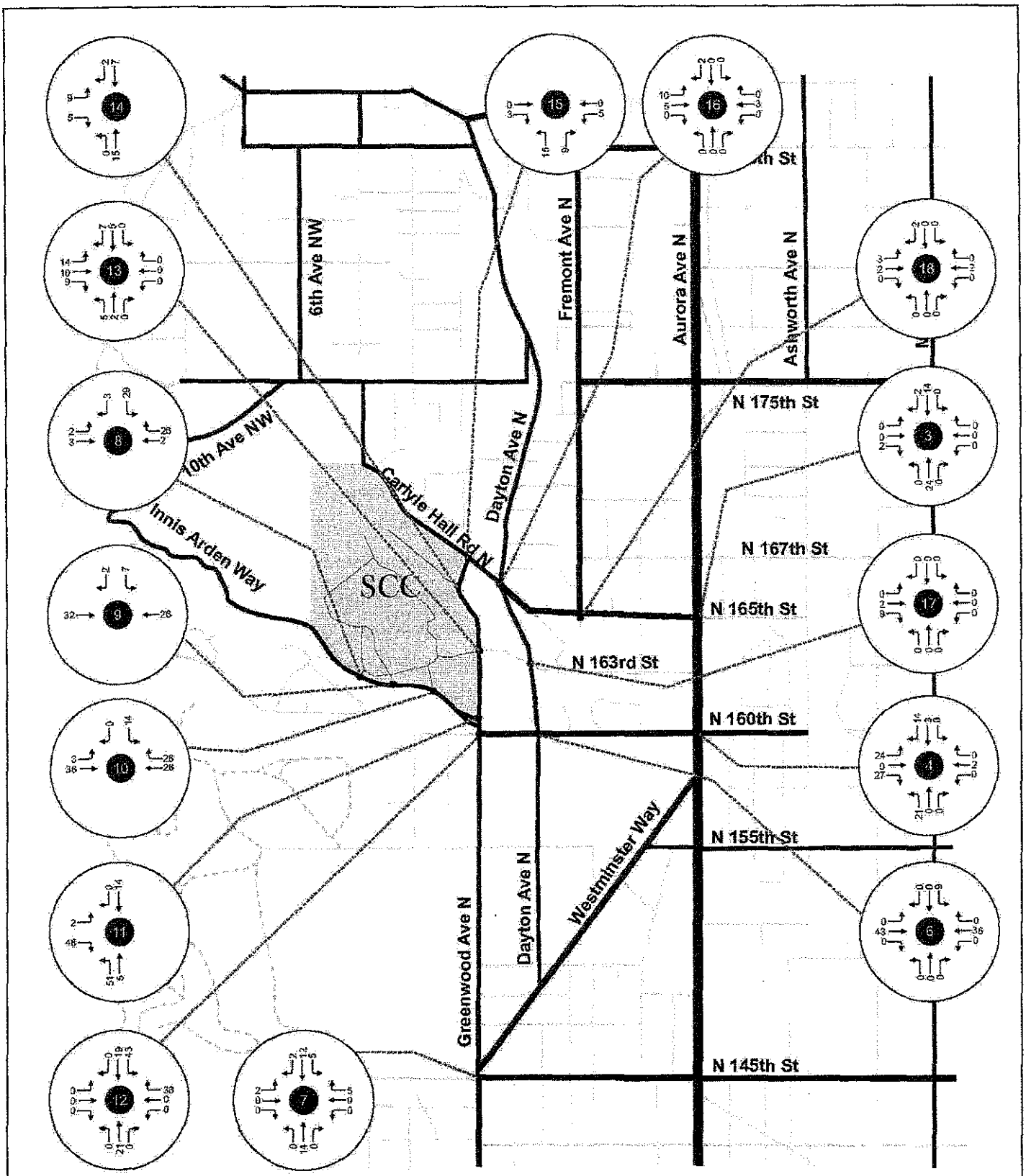
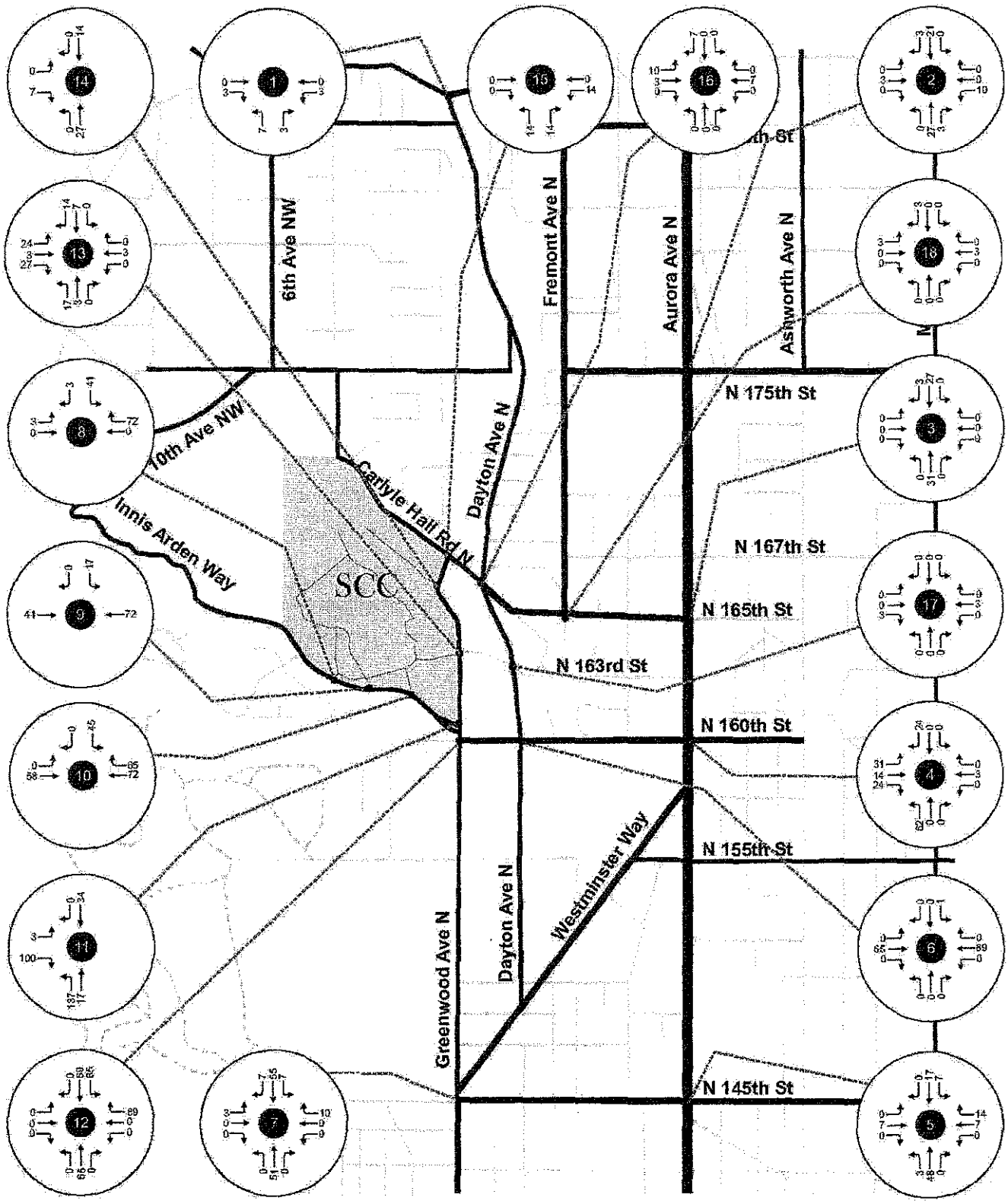
Figure 29

AM Peak Hour Trip Assignment (No Action)



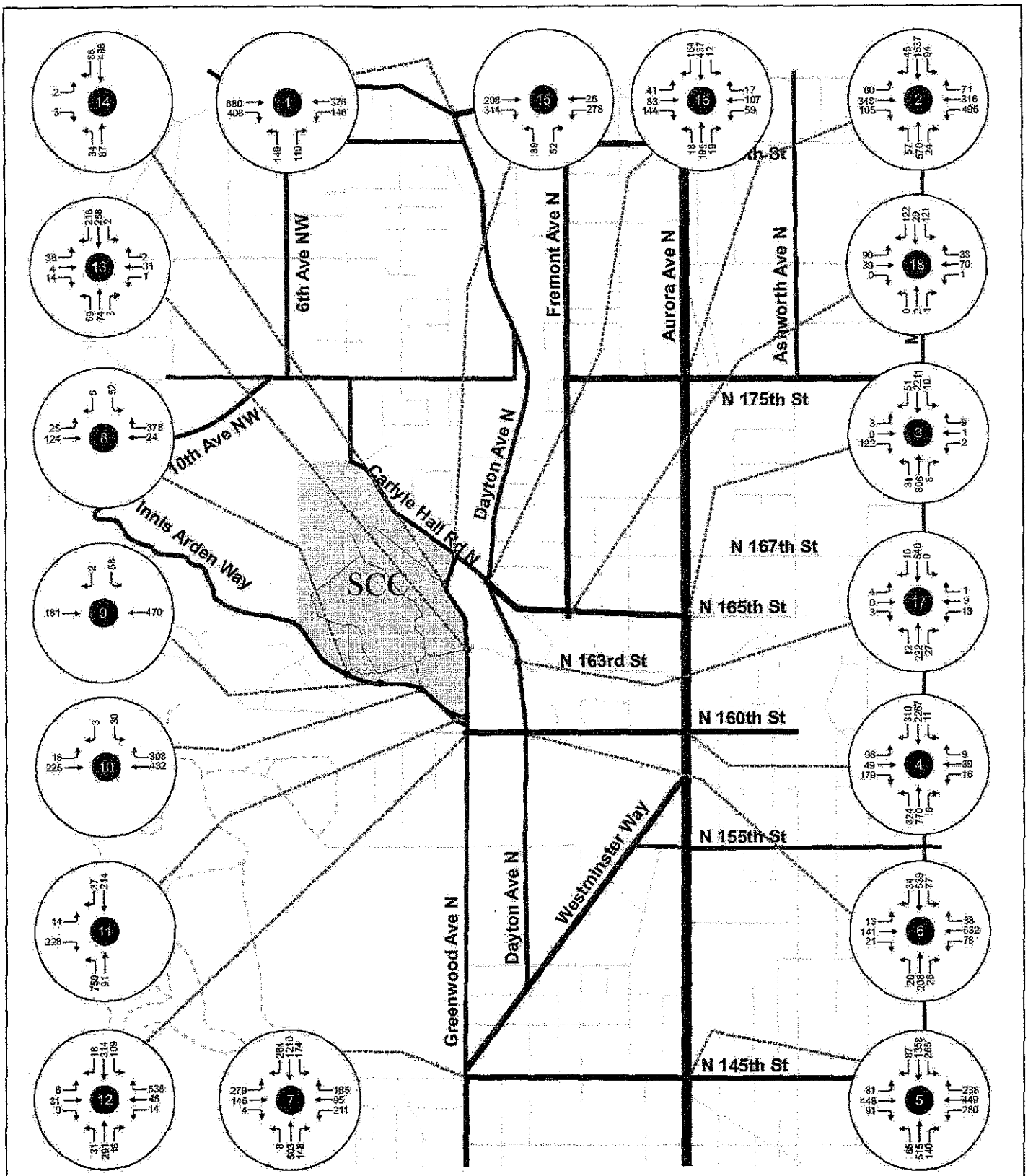
Source: TSI, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 30** **Midday Peak Hour Trip Assignment (No Action)**



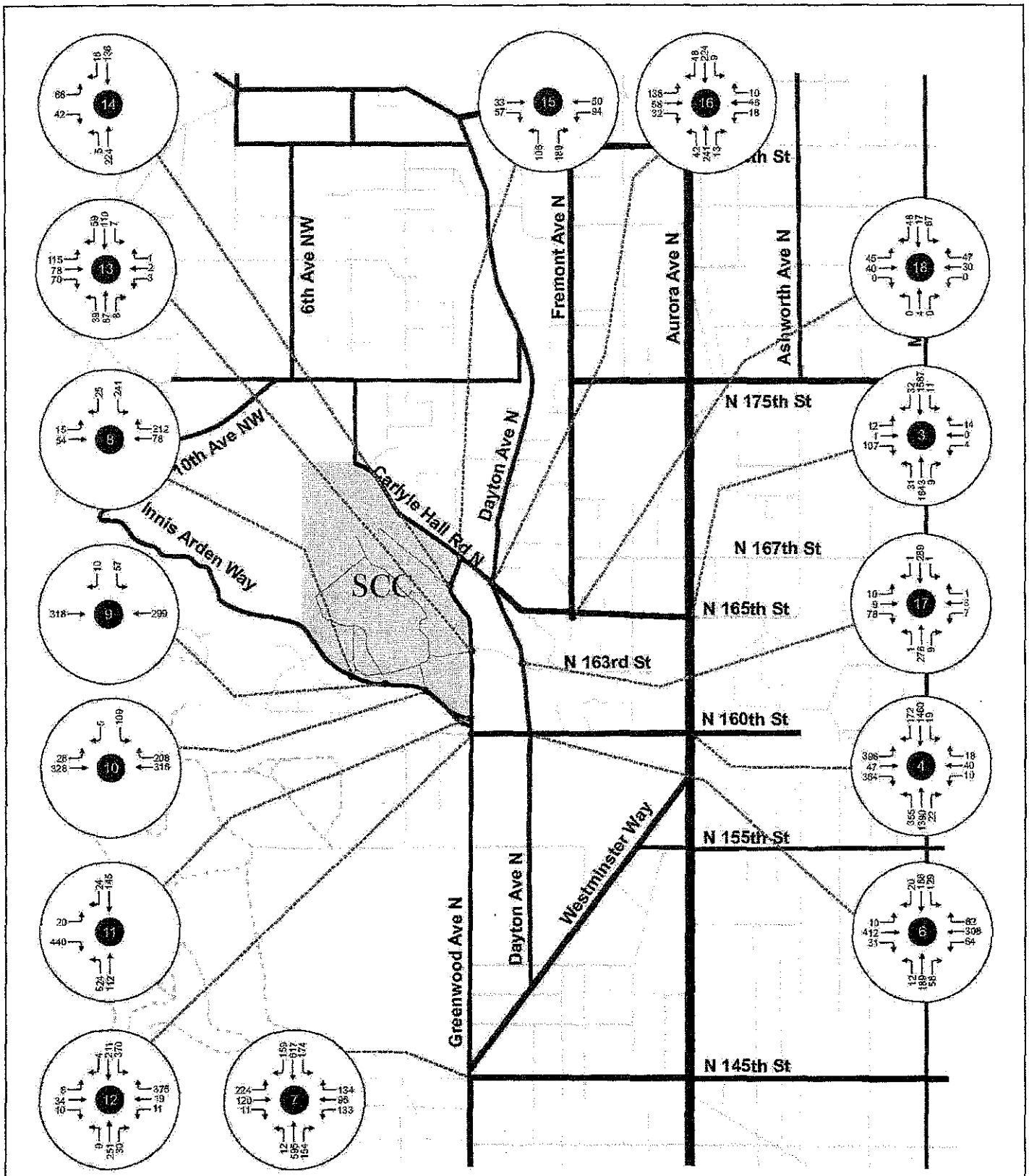
Source: TSI, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 31** **PM Peak Hour Trip Assignment (No Action)**



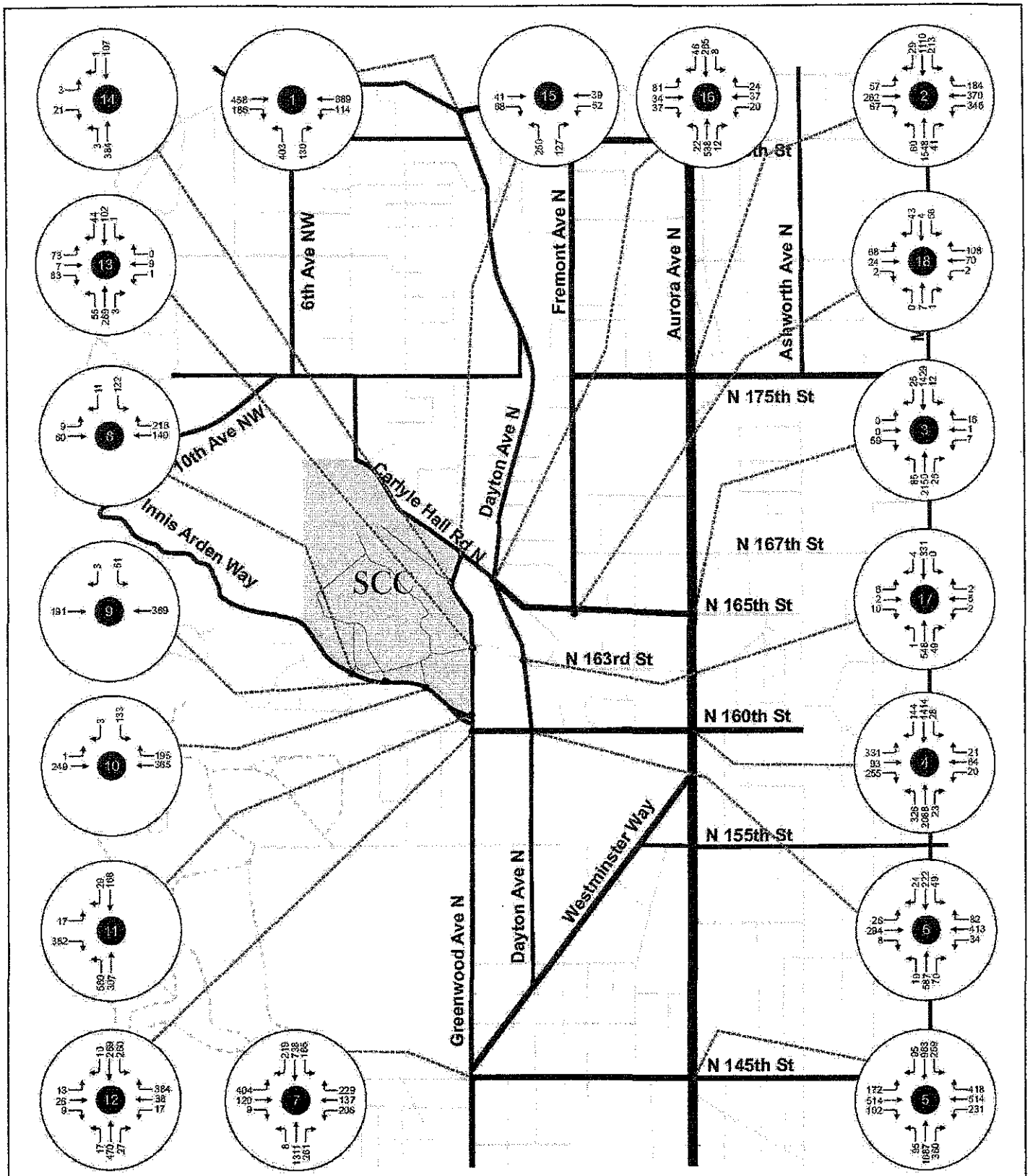
Source: TSI, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 32** **AM Peak Hour Turning Movement Volumes (No Action)**



Source: TSI, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 33** **Midday Peak Hour Turning Movement Volumes (No Action)**



Source: TSI, 2005

BLUMEN CONSULTING GROUP, INC	**Shoreline Community College Master Plan Final EIS**	**Figure 34** **PM Peak Hour Turning Movement Volumes (No Action)**

Table 34

AM Peak Hour Intersection Level of Service (*No Action Alt.*)

Intersection	LOS (sec.)[1]	
	Intersection	Worst Approach[2]
Signalized		
1. Richmond Beach Road/ Dayton Ave N	B (13)	EB - B (13)
2. Aurora Ave N/ N 175th St	F (85)	WB - F (200)
4. Aurora Ave N/ N 160th St	E (72)	EB - F (97)
5. Aurora Ave N/ N 145th St	D (53)	EB - E (75)
6. Dayton Ave N/ N 160th St	C (23)	WB - C (28)
7. Greenwood Ave N/ N 145th St	D (44)	EB - E (59)
Unsignalized		
3. Aurora Ave N/ N 165th St	A (6)	WB - F (306)
8. Innis Arden Way/ West Campus Access	A (2)	SB – B (13)
9. Innis Arden Way/ Central Campus Access	A (2)	SB – C (19)
10. Innis Arden Way/ Main Campus Entrance	A (1)	SB – D (25)
11. Greenwood Ave N/ Innis Arden Way	E (40)	SB - F (265)
12. Greenwood Ave N/ N 160th St	B (16)	WB – C (23)
13. Greenwood Ave N/ East Campus Access	A (4)	WB – C (21)
14. Greenwood Ave N/ SCC North Parking Lot	A (1)	EB – B (14)
15. Greenwood Ave N/ Carlyle Hall Rd N	B (11)	NB – F (67)
16. Dayton Ave N/ Carlyle Hall Rd N	F (118)	SB – F (234)
17. Dayton Ave N/ N Greenwood Dr	A (1)	WB – C (24)
18. Fremont Ave N/ N 165th St	B (12)	SB – C (22)

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

A comparison of forecasted 2015 signalized intersection operations for the *No Action Alternative* with existing (2004) conditions shows the following changes. The traffic volumes causing the changes in LOS are separated into the percentage of total new trips at the intersection attributable to growth in background traffic volumes and growth in SCC generated trips.

- Aurora Ave N/ N 175th St would drop from LOS-E to LOS-F with an increase in average vehicle delay of 24 seconds. This drop in LOS is due to increases in existing traffic volumes (93%) and growth in SCC generated trips (7%).
- Aurora Ave N/ N 160th St would drop from LOS-D to LOS-E with an increase in average vehicle delay of 37 seconds. This drop in LOS is due to increases in existing traffic volumes (88%) and growth in SCC generated trips (12%).
- Dayton Ave N/ N 160th St would drop from LOS-B to LOS-C with an increase in average vehicle delay of 6 seconds. This drop in LOS is due to increases in existing traffic volumes (74%) and growth in SCC generated trips (26%).
- Greenwood Ave N/ N 145th St would drop from LOS-C to LOS-D with an increase in average vehicle delay of 15 seconds. This drop in LOS is due to increases in existing traffic volumes (91%) and growth in SCC generated trips (9%).

All unsignalized intersections would operate at LOS-C or better with the following exceptions:

- Greenwood Ave N/ Innis Arden Way would operate at LOS-E with the southbound approach also operating at LOS-F.
- Dayton Ave N/ Carlyle Hall Rd N would operate at LOS-F with the southbound approach also operating at LOS-F.

A comparison of forecasted 2015 unsignalized intersection operations for the *Expanded Development Alternative* with existing (2004) conditions shows the following changes:

- Greenwood Ave N/ Innis Arden Way drops from LOS-C to LOS-E with an increase in average vehicle delay of 23 seconds. This drop in LOS is due to increases in existing traffic volumes (58%) and growth in SCC generated trips (42%)
- Greenwood Ave N/ N 160th St drops from LOS-A to LOS-C with an increase in average vehicle delay of 8 seconds. This drop in LOS is due to increases in existing traffic volumes (60%) and growth in SCC generated trips (40%).
- Greenwood Ave N/ Carlyle Hall Rd drops from LOS-A to LOS-B with an increase in average vehicle delay of 5 seconds. This drop in LOS is due to increases in existing traffic volumes (73%) and growth in SCC generated trips (27%).
- Fremont Ave N/ N 165th St drops from LOS-A to LOS-B with an increase in average vehicle delay of 2 seconds. This drop in LOS is due to increases in existing traffic volumes (84%) and growth in SCC generated trips (16%).

Midday Peak Hour

Table 35 summarizes LOS and average vehicle delay for the Midday peak hour in 2015 under the *No Action Alternative.* One signalized intersections operates poorly during the Midday peak hour. Aurora Ave N/ N 160th St operates at LOS-F with the northbound approach also operating at LOS-F. This poor LOS is due to the high volume of northbound vehicles. All signalized intersections operate at the same LOS under existing Midday peak hour conditions.

Table 35

Midday Peak Hour Intersection Level of Service (*No Action Alt.*)

Intersection	LOS (sec.)[1]	
	Intersection	Worst Approach[2]
Signalized		
4. Aurora Ave N/ N 160th St	F (165)	NB – F (260)
6. Dayton Ave N/ N 160th St	B (12)	EB – B (13)
7. Greenwood Ave N/ N 145th St	C (26)	EB – D (36)
Unsignalized		
3. Aurora Ave N/ N 165th St	A (8)	EB - F (134)
8. Innis Arden Way/ West Campus Access	B (10)	SB – C (22)
9. Innis Arden Way/ Central Campus Access	A (2)	SB – C (23)
10. Innis Arden Way/ Main Campus Entrance	B (12)	SB – F (96)
11. Greenwood Ave N/ Innis Arden Way	C (20)	SB - F (70)
12. Greenwood Ave N/ N 160th St	A (8)	NB – B (12)
13. Greenwood Ave N/ East Campus Access	B (17)	EB – D (28)
14. Greenwood Ave N/ SCC North Parking Lot	A (5)	EB – C (17)
15. Greenwood Ave N/ Carlyle Hall Rd N	B (11)	NB – C (16)
16. Dayton Ave N/ Carlyle Hall Rd N	C (20)	EB – C (24)
17. Dayton Ave N/ N Greenwood Dr	A (4)	WB – C (20)
18. Fremont Ave N/ N 165th St	A (6)	NB/SB – B (11)

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

All unsignalized intersections would operate at LOS-C or better.

A comparison of forecasted 2015 unsignalized intersection operations for the *No Action Alternative* with existing (2004) conditions shows the following changes:

- The main campus access on Innis Arden Way drops from LOS-A to LOS-B with an increase in average vehicle delay of 7 seconds. This drop in LOS is due to increases in background traffic volumes (36%) and growth in SCC generated trips (64%).
- Greenwood Ave N/ Innis Arden Way drops from LOS-A to LOS-C with an increase in average vehicle delay of 14 seconds. This drop in LOS is due to increases in background traffic volumes (49%) and growth in SCC generated trips (51%).
- The east campus access on Greenwood Ave N would drop from LOS-A to LOS-B with an increase in average vehicle delay of 5 seconds. The drop in LOS is due to increases in background traffic volumes (28%) and growth in SCC generated trips (72%).
- Greenwood Ave N/ Carlyle Hall Road drops from LOS-A to LOS-B with an increase in average vehicle delay of 2 seconds. This drop in LOS is due to increases in existing traffic volumes (60%) and growth in SCC generated trips (40%).

- Dayton Ave N/ Carlyle Hall Road drops from LOS-B to LOS-C with an increase in average vehicle delay of 5 seconds. This drop in LOS is due to increases in existing traffic volumes (79%) and growth in SCC generated trips (21%).

PM Peak Hour

Table 36 summarizes LOS and average vehicle delay for the PM peak hour in 2015 with the proposed master plan complete. Three of the six analyzed signalized intersections operate poorly during the PM peak hour. Aurora Ave N/ N 160th St operates at LOS-F with the northbound approach also operating at LOS-F. Aurora Ave N/ N 145th St also operates at LOS-F with the northbound approach also operating at LOS-F. Greenwood Ave N/ N 145th St also operates at LOS-F with the northbound approach also operating at LOS-F. This poor LOS at these intersections is due to the high volume of northbound vehicles combined with high volumes of westbound vehicles reflecting the PM peak hour work to home commute.

Table 36

PM Peak Hour Intersection Level of Service (*No Action Alt.*)

Intersection	LOS (sec.)[1]	
	Intersection	Worst Approach[2]
Signalized		
1. Richmond Beach Road/ Dayton Ave N	B (13)	EB – B (14)
2. Aurora Ave N/ N 175th St	D (43)	WB – E (80)
4. Aurora Ave N/ N 160th St	F (143)	NB – F (243)
5. Aurora Ave N/ N 145th St	F (123)	WB – F (165)
6. Dayton Ave N/ N 160th St	B (18)	WB – C (26)
7. Greenwood Ave N/ N 145th St	F (106)	NB – F (170)
Unsignalized		
3. Aurora Ave N/ N 165th St	A (3)	WB – F (248)
8. Innis Arden Way/ West Campus Access	A (4)	SB – B (14)
9. Innis Arden Way/ Central Campus Access	A (2)	SB – B (15)
10. Innis Arden Way/ Main Campus Entrance	A (5)	SB – D (30)
11. Greenwood Ave N/ Innis Arden Way	C (22)	SB – F (63)
12. Greenwood Ave N/ N 160th St	C (21)	NB – E (42)
13. Greenwood Ave N/ East Campus Access	A (5)	WB – B (14)
14. Greenwood Ave N/ SCC North Parking Lot	A (1)	EB – A (10)
15. Greenwood Ave N/ Carlyle Hall Rd N	B (11)	NB – C (15)
16. Dayton Ave N/ Carlyle Hall Rd N	E (48)	NB – F (78)
17. Dayton Ave N/ N Greenwood Dr	A (1)	WB – C (21)
18. Fremont Ave N/ N 165th St	A (5)	NB/SB – B (12)
19. Innis Arden Way/ Proposed Campus Access	A (<1)	N/A

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

A comparison of forecasted 2015 signalized intersection operations for the *No Action Alternative* with existing (2004) conditions shows the following changes. The traffic volumes causing the changes in LOS are separated into the percentage of total new trips at the intersection attributable to growth in background traffic volumes and growth in SCC generated trips.

- Aurora Ave N/ N 145th St would drop from LOS-E to LOS-F with an increase in average vehicle delay of 56 seconds. This drop in LOS is due to increases in existing traffic volumes (84%) and growth in SCC generated trips (16%).
- Greenwood Ave N/ N 145th St would drop from LOS-E to LOS-F with an increase in average vehicle delay of 46 seconds. This drop in LOS is due to increases in existing traffic volumes (73%) and growth in SCC generated trips (27%).

All unsignalized intersections would operate at LOS-C or better with the following exception:

- Dayton Ave N/ Carlyle Hall Rd would operate at LOS-E with the northbound approach operating at LOS-F.

A comparison of forecasted 2015 unsignalized intersection operations for the *Expanded Development Alternative* with existing (2004) conditions shows the following changes:

- Greenwood Ave N/ Innis Arden Way drops form LOS-A to LOS-C with an increase in average vehicle delay of 17 seconds. This drop in LOS is due to increases in existing traffic volumes (28%) and growth in SCC generated trips (72%).
- Greenwood Ave N/ N 160th St drops form LOS-A to LOS-C with an increase in average vehicle delay of 12 seconds. This drop in LOS is due to increases in existing traffic volumes (30%) and growth in SCC generated trips (70%).
- Greenwood Ave N/ Carlyle Hall Rd drops from LOS-A to LOS-B with an increase in average vehicle delay of 2 seconds. This drop in LOS is due to increases in existing traffic volumes (88%) and growth in SCC generated trips (12%).
- Dayton Ave N/ Carlyle Hall Rd drops from LOS-D to LOS-E with an increase in average vehicle delay of 22 seconds. This drop in LOS is due to increases in existing traffic volumes (80%) and growth in SCC generated trips (20%).

Campus Access and Circulation

Under the *No Action Alternative*, campus accesses and internal circulation routes would not change. When compared against the *Expanded Development Alternative*, SCC-generated traffic volumes at campus accesses would be lower during the AM and Midday peak hours and higher during the PM peak hour reflecting increased use of campus facilities during the afternoon and evening.

Parking Supply and Demand

Under the *No Action Alternative* the existing on-campus parking supply of 2,153 stalls would not change. In order to accommodate the anticipated 1,170 increase in student FTE's SCC would increase it's use of off-campus leased facilities and schedule more classes during afternoon and evening hours. It is assumed that these programmatic changes would reduce the number of new student FTE's requiring parking during the morning period of peak demand by 45% -- to approximately 645 new student FTE's. Applying the peak parking demand ratio of 0.38 stalls per student FTE (established in the *Existing Conditions* section of this analysis) would indicate

that morning peak parking demand would increase by 245 stalls and require an additional parking supply of approximately 270 stalls. Since the existing on-campus parking supply is fully utilized during the morning, the new demand generated by this alternative would likely have to be accommodated by new on-campus parking or off-campus in an expanded satellite lot. It is also likely that the limited on-campus supply and distance to the satellite could shift some of the new demand to adjacent streets.

Transit Service

Transit service to the campus and the location of the on-campus transit stop would remain the same as under *Existing Conditions*.

Pedestrian and Bicycle Facilities

Pedestrian and bicycle facilities would remain the same as under *Existing Conditions*.

Summary of Impacts and Mitigation Measures

Traffic Impacts

Tables 37 (AM Peak Hour), 38 Midday Peak Hour), and 39 (PM Peak Hour) summarize the LOS for Existing Conditions, the *Expanded Development Alternative*, and *No Action Alternative*. In general, traffic impacts resulting from the *Expanded Development Alternative* and the *No Action Alternative* would be similar for the AM and Midday peak hours. For the PM peak hour, impacts resulting from the *No Action Alternative* would be slightly greater than for the *Expanded Development Alternative*. Under the *No Action Alternative*, SCC would generate more PM peak hour trips than the *Expanded Development Alternative*. Under the *Preferred Alternative*, traffic impacts would be less than those forecasted for the *Expanded Development Alternative*.

The significant changes in LOS from Existing Conditions during the AM peak hour include:

- Aurora Ave N/ N 175th St drops from LOS-E to LOS-F for both *Expanded Development Alternative* and *No Action Alternative*. SCC generated traffic is responsible for 12% of this change under the *Expanded Development Alternative* and 7% of the change under the *No Action Alternative*.
- Aurora Ave N/ N 160th St drops from LOS-D to LOS-E for both *Expanded Development Alternative* and *No Action Alternative*. SCC generated traffic is responsible for 20% of this change under the *Expanded Development Alternative* and 12% of the change under the *No Action Alternative*.
- Greenwood Ave N/ Innis Arden Way drops from LOS-C to LOS-E for both *Expanded Development Alternative* and *No Action Alternative*. SCC generated traffic is responsible for 57% of this change under the *Expanded Development Alternative* and 42% of the change under the *No Action Alternative*.
- Dayton Ave N/ Carlyle Hall Rd N operates at LOS-F under all conditions with significant increases in delay under the *Expanded Development Alternative* and *No Action Alternative*. SCC generated traffic is responsible for 24% of this change under the *Expanded Development Alternative* and 15% of the change under the *No Action Alternative*.

Table 37

AM Peak Hour Intersection Level of Service Summary

Intersection	Existing	Expanded Dev. Alt.	No Action
Signalized			
1. Richmond Beach Road/ Dayton Ave N	B (12)	B (12)	B (13)
2. Aurora Ave N/ N 175th St	**E (61)**	**F (87)**	**F (85)**
4. Aurora Ave N/ N 160th St	**D (35)**	**E (73)**	**E (72)**
5. Aurora Ave N/ N 145th St	D (44)	D (50)	D (53)
6. Dayton Ave N/ N 160th St	B (17)	C (26)	C (23)
7. Greenwood Ave N/ N 145th St	C (29)	D (44)	D (44)
Unsignalized			
3. Aurora Ave N/ N 165th St	A (3)	A (7)	A (6)
8. Innis Arden Way/ West Campus Access	A (2)	A (2)	A (2)
9. Innis Arden Way/ Central Campus Access	A (2)	A (2)	A (2)
10. Innis Arden Way/ Main Campus Entrance	A (1)	A (2)	A (1)
11. Greenwood Ave N/ Innis Arden Way	**C (17)**	**E (43)**	**E (40)**
12. Greenwood Ave N/ N 160th St	A (8)	B (14)	C (16)
13. Greenwood Ave N/ East Campus Access	A (4)	A (5)	A (4)
14. Greenwood Ave N/ SCC N. Parking Lot	A (1)	A (1)	A (1)
15. Greenwood Ave N/ Carlyle Hall Rd N	A (6)	B (15)	B (11)
16. Dayton Ave N/ Carlyle Hall Rd N	**F (60)**	**F (126)**	**F (118)**
17. Dayton Ave N/ N Greenwood Dr	A (1)	A (1)	A (1)
18. Fremont Ave N/ N 165th St	A (10)	B (12)	B (12)
19. Innis Arden Way/ New Campus Access	N/A	A (<1)	N/A

Source: TSI
[1](sec.) = average vehicle delay in seconds.
[2]EB-eastbound, WB-westbound, NB-northbound, SB-southbound

The significant changes in LOS from Existing Conditions during the Midday peak hour (Table 38) include:

- Aurora Ave N/ N 160th St operates at LOS-F for all conditions with increases in delay under both the *Expanded Development Alternative* and No Action Alternative. SCC generated traffic is responsible for 26% of this change under the *Expanded Development Alternative* and 18% of the change under the No Action Alternative.
- Greenwood Ave N/ Innis Arden Way drops from LOS-A to LOS-E under the *Expanded Development Alternative* and LOS-C under the *No Action Alternative.* SCC generated traffic is responsible for 62% of this change under the *Expanded Development Alternative* and 51% of the change under the *No Action Alternative.*

Table 38

Midday Peak Hour Intersection Level of Service Summary

Intersection	Existing	Expanded Dev. Alt.	No Action
Signalized			
4. Aurora Ave N/ N 160th St	**F (124)**	**F (173)**	**F (165)**
6. Dayton Ave N/ N 160th St	B (12)	B (12)	B (12)
7. Greenwood Ave N/ N 145th St	C (23)	C (26)	C (26)
Unsignalized			
3. Aurora Ave N/ N 165th St	A (4)	A (8)	A (8)
8. Innis Arden Way/ West Campus Access	A (8)	B (14)	A (10)
9. Innis Arden Way/ Central Campus Access	A (2)	A (3)	A (2)
10. Innis Arden Way/ Main Campus Ent.	A (5)	C (17)	B (12)
11. Greenwood Ave N/ Innis Arden Way	**A (6)**	**E (41)**	**C (20)**
12. Greenwood Ave N/ N 160th St	A (6)	A (9)	A (8)
13. Greenwood Ave N/ E. Campus Access	B (12)	C (24)	C (17)
14. Greenwood Ave N/ SCC N. Parking Lot	A (4)	A (5)	A (5)
15. Greenwood Ave N/ Carlyle Hall Rd N	A (9)	B (12)	B (11)
16. Dayton Ave N/ Carlyle Hall Rd N	B (15)	C (22)	C (20)
17. Dayton Ave N/ N Greenwood Dr	A (3)	A (4)	A (4)
18. Fremont Ave N/ N 165th St	A (6)	A (6)	A (6)
19. Innis Arden Way/ New Campus Access	N/A	A (<1)	N/A

Source: TSI
[1]*(sec.) = average vehicle delay in seconds.*
[2]*EB-eastbound, WB-westbound, NB-northbound, SB-southbound*

The significant changes in LOS from *Existing Conditions* or ongoing poor LOS during the PM peak hour (Table 39) include:

- Aurora Ave N/ N 160th St operates at LOS-F with modest increases in delay under the *Expanded Development Alternative* and *No Action Alternative*. SCC generated traffic is responsible for 13% of this change under the *Expanded Development Alternative* and 26% of the change under the *No Action Alternative*.
- Aurora Ave N/ N 145th St drops from LOS-E to LOS-F for both *Expanded Development Alternative* and *No Action Alternative*. SCC generated traffic is responsible for 8% of this change under the *Expanded Development Alternative* and 16% of the change under the *No Action Alternative*.
- Greenwood Ave N/ N 145th St drops from LOS-E to LOS-F for both *Expanded Development Alternative* and *No Action Alternative*. SCC generated traffic is responsible for 16% of this change under the *Expanded Development Alternative* and 27% of the change under the *No Action Alternative*.
- Dayton Ave N/ Carlyle Hall Rd N drops from LOS-D to LOS-E under both the *Expanded Development Alternative* and *No Action Alternative*. SCC generated traffic is responsible for 12% of this change under the *Expanded Development Alternative* and 20% of the change under the *No Action Alternative*.

Table 39

PM Peak Hour Intersection Level of Service Summary

Intersection	Existing	Expanded Dev. Alt.	No Action
Signalized			
1. Richmond Beach Road/ Dayton Ave N	B (13)	B (13)	B (13)
2. Aurora Ave N/ N 175th St	D (38)	D (41)	D (43)
4. Aurora Ave N/ N 160th St	**F (103)**	**F (138)**	**F (143)**
5. Aurora Ave N/ N 145th St	**E (67)**	**F (119)**	**F (123)**
6. Dayton Ave N/ N 160th St	B (13)	B (16)	B (18)
7. Greenwood Ave N/ N 145th St	**E (60)**	**F (100)**	**F (106)**
Unsignalized			
3. Aurora Ave N/ N 165th St	A (2)	A (3)	A (3)
8. Innis Arden Way/ West Campus Access	A (3)	A (4)	A (4)
9. Innis Arden Way/ Central Campus Access	A (1)	A (1)	A (2)
10. Innis Arden Way/ Main Campus Entrance	A (3)	A (3)	A (5)
11. Greenwood Ave N/ Innis Arden Way	A (5)	C (17)	C (22)
12. Greenwood Ave N/ N 160th St	A (9)	B (15)	C (21)
13. Greenwood Ave N/ East Campus Access	A (4)	A (4)	A (5)
14. Greenwood Ave N/ SCC North Parking Lot	A (1)	A (1)	A (1)
15. Greenwood Ave N/ Carlyle Hall Rd N	A (9)	B (10)	B (11)
16. Dayton Ave N/ Carlyle Hall Rd N	**D (26)**	**E (46)**	**E (48)**
17. Dayton Ave N/ N Greenwood Dr	A (1)	A (1)	A (1)
18. Fremont Ave N/ N 165th St	A (5)	A (5)	A (5)
19. Innis Arden Way/ New Campus Access	N/A	A (<1)	N/A

Source: TSI
[1]*(sec.) = average vehicle delay in seconds.*
[2]*EB-eastbound, WB-westbound, NB-northbound, SB-southbound*

Conclusions and Potential Mitigation Measures

Traffic Impacts

The Aurora (SR99) corridor is designated by WSDOT as a *Highway of State Significance*. As such, WSDOT assumes responsibility for identifying future capacity constraints, planning, and initiating projects to maintain acceptable levels of service along this important regional corridor. Many of the analyzed intersections on the Aurora corridor currently operate at poor LOS or would drop to a poor LOS under the *Expanded Development Alternative, Modified Design,* or the *No Action Alternatives*. The forecasts and findings in this FEIS will assist the City and WSDOT as they identify additional corridor improvement projects that would improve forecasted intersection LOS.

It is also noted that this analysis incorporates a 1% per year increase in existing traffic volumes over 11 years, as well as the new trips generated by the SCC master plan in the 2015 forecasts. Actual growth in existing traffic volumes could be significantly less than the 1% per year, which would result in improved future intersection operations and reduce the need for intersection improvements on the Aurora corridor.

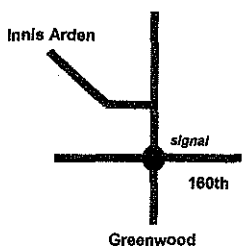
The future operation of intersections outside of the Aurora corridor are more dependent upon growth in local traffic volumes as opposed to regional influences. Intersections that currently or are forecasted to operate at a poor LOS that are impacted by SCC generated traffic are discussed below.

- **Greenwood Ave N/ N 145th Street** -- The intersection of Greenwood Ave N/ N 145th Street would have a good LOS during the AM and Midday peak hours but would operate at LOS-F during PM peak hour future conditions. The forecasted growth in existing traffic volumes would be largely responsible for future increased delays at this intersection. SCC generated traffic would be responsible for only 8% (*Expanded Development Alternative*) to 16% (*No Action*) of the increased delay. Intersection operations for the PM peak hour could be maintained at the current level (LOS-E) with the addition of right turn lanes on the northbound, southbound, and westbound approaches.

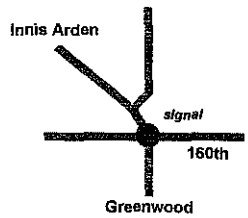
- **Dayton Ave N/ Carlyle Hall Road N** -- Dayton Ave N/ Carlyle Hall Road N is an all-way stop controlled intersection that operates at LOS-F under existing and forecasted conditions during the AM peak hour and LOS-E under future PM peak hour conditions. Existing and future intersection operations are largely driven by the high volumes of southbound traffic in the morning and the high volume of northbound traffic in the evening. These volumes are attributable to typical morning and evening commuting patterns. Future improvements to this intersection could include signalization. Signalization would allow the intersection to operate at LOS-A, but would also likely shift traffic from southbound Greenwood Avenue N to Dayton Ave N during the AM peak hour. As discussed below this may benefit intersection operations at the problematic N 160th St/ Greenwood Ave N/ Innis Arden Way intersections.

- **Greenwood Ave N/ Innis Arden Way** -- Greenwood Ave N/ Innis Arden Way and the adjacent intersection of Greenwood Ave N/ N 160th St function as a single intersection due to their proximity. LOS analysis shows that Greenwood Ave N/ Innis Arden Way is the controlling intersection, which operates poorly on controlled approaches during most conditions. These existing conditions would deteriorate significantly in the future under the *Expanded Development Alternative* and *No Action Alternative*.

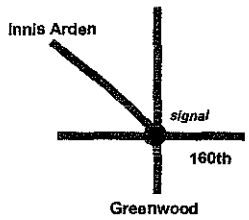
The Access Working Group (AWG), made up of community representatives, worked closely with the consultant team to develop and evaluate preferred solutions to these problematic intersections. This process of solution identification, evaluation, public review, and recommendation refinement is documented in the appendices. Four potential recommendations for intersection improvements evolved from this process. These include:



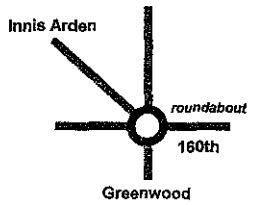
Alternative A-2 (modified) signalizes the intersection of Greenwood Ave N/ N 160th St and increases the separation of the two intersections by relocating the eastbound leg of Innis Arden Way north so it is adjacent to the westbound leg. Southbound and eastbound traffic at Greenwood Ave N/ Innis Arden Way would be controlled by stop signs. This alternative incorporates a southbound left turn lane at the signalized intersection.



Alternative C-2 reroutes Innis Arden Way so it becomes the north leg of a signalized intersection at Greenwood Ave N/ N 160th St. The north leg of Greenwood Ave N would be rerouted to the west to intersect with Innis Arden Way. Traffic on southbound Greenwood would be controlled by a stop sign at Innis Arden Way. This alternative also incorporates a southbound left turn lane at the signalized intersection.



Alternative B-1 reroutes Innis Arden Way to create a five legged signalized intersection at Greenwood Ave N/ N 160th St. Each approach to the intersection would have two lanes with the exception of eastbound traffic on N 160th St, which would have one lane. Because of the tight turning radius, it may be necessary to prohibit left turn from southbound Greenwood Ave N to westbound Innis Arden Way and left turns from eastbound N 160th St to westbound Innis Arden Way. However, for the purposes of this analysis it is assumed that eastbound left turns onto Innis Arden Way would be prohibited and southbound right turns onto Innis Arden Way would be allowed.



Alternative B-2 is the same as B-1 except that the intersection is controlled by a roundabout as opposed to a signal. Entering vehicles yield to vehicles circulating within the roundabout. The configuration of the roundabout is assumed to include a single 18 foot wide travel lane and an inner circle that is 60 feet in diameter. These are the minimum recommended dimensions. A greater diameter would improve traffic flow and a wider travel lane would provide improved clearance in case of vehicle breakdown.

Each of these alternatives were evaluated for intersection operations under *Expanded Development Alternative* conditions for the AM, Midday, and PM peak hours. Because the alternatives have different intersection controls and the fact that some alternatives A-2 and C-2 are actually two intersections, it is somewhat difficult to establish a uniform means of comparison given the analytical tools available. Alternatives A-2 and C-2 were analyzed using the *SimTraffic* module of the *Synchro* software. *SimTraffic* calculates average vehicle delay in seconds for all intersections in the network (i.e. Greenwood Ave N/ N 160th St and Greenwood Ave N/ Innis Arden Way) and is the most accurate tool for comparing the performance of these two alternatives. The volume to capacity ratio[2] (V/C) for the signalized intersection of Greenwood Ave N/ N 160th St is derived from *Synchro* for alternatives A-2, C-2, and B-1. Alternative B-1 was analyzed using *Synchro* while alternative B-2 was analyzed using *aaSIDRA*, which is specifically designed for roundabout analysis.

The output from these analytical tools includes seconds of average vehicle delay at the intersection as well as the V/C ratio. *SimTraffic* also identifies network delay (the number of seconds it takes a vehicle on average to pass through both intersections) for alternatives A-2 and C-2. The operation of each of the alternatives is summarized in Tables 40 (AM peak hour), 41 (midday peak hour, and 42 (PM peak hour). When comparing the seconds of delay displayed in the tables, it is appropriate to compare the network delay of alternatives A-2 and C-2 with the seconds of delay at Greenwood Ave N/ N 160th St for alternatives B-1 and B-2.

[2] The volume to capacity ratio (V/C) is the volume of vehicles entering the intersection in a one hour period divided by the capacity of the intersection.

During the AM peak hour, alternative B-2 has the least amount of delay while alternative A-2 shows the greatest delay. Alternatives C-2 and B-1 have approximately the same amount of delay. The V/C ratio of alternatives A-2, C-2, and B-2 is near capacity while alternative B-1 exceeds its capacity. In order to be a viable alternative the capacity of B-1 would have to be increased by adding additional turn lanes on the problematic approaches. A closer look at alternative B-2 shows that average vehicle delay on the southbound approach is 71 seconds. Still, alternative B-2 would provide the best overall performance during AM peak hour conditions.

Table 40

AM Peak Hour Comparison of Intersection Alternatives

Alternative	Seconds of Delay at Greenwood/ N 160th St	Seconds of Delay at Greenwood/ Innis Arden	Total Seconds of Network Delay	V/C at Greenwood/ N 160th St
A-2	28	156	167	0.85
C-2	29	87	106	0.85
B-1	104	N/A	N/A	1.11
B-2	23	N/A	N/A	0.97

Source: TSI

During the Midday peak hour, alternative B-2 has the least amount of delay while alternative A-2 shows the greatest delay. Alternatives C-2 and B-1 have approximately the same amount of delay. The V/C ratio of alternatives A-2 and C-2 are near capacity while alternative B-1 exceeds its capacity. A closer look at alternative B-2 shows that the approach with the worst delay would be the northbound approach with an average vehicle delay of 15 seconds. Alternative B-2 would provide the best overall performance during midday peak hour conditions followed by alternative C-2.

Table 41

Midday Peak Hour Comparison of Intersection Alternatives

Alternative	Seconds of Delay at Greenwood/ N 160th St	Seconds of Delay at Greenwood/ Innis Arden	Total Seconds of Network Delay	V/C at Greenwood/ N 160th St
A-2	15	277	259	0.86
C-2	15	26	39	0.86
B-1	91	N/A	N/A	1.07
B-2	9	N/A	N/A	0.59

Source: TSI

During the PM peak hour, alternative B-2 has the least amount of delay while alternative B-1 shows the greatest delay. The V/C ratio of alternatives A-2, C-2, and B-2 are well below capacity while alternative B-1 is at capacity. A closer look at alternative B-2 shows that the approach with the worst delay would be the southbound approach with an average vehicle delay

of 9 seconds. Alternative B-2 would provide the best overall performance during midday peak hour conditions followed by alternative C-2.

Table 42

PM Peak Hour Comparison of Intersection Alternatives

Alternative	Seconds of Delay at Greenwood/ N 160th St	Seconds of Delay at Greenwood/ Innis Arden	Total Seconds of Network Delay	V/C at Greenwood/ N 160th St
A-2	14	17	30	0.66
C-2	14	7	20	0.61
B-1	51	N/A	N/A	0.99
B-2	7	N/A	N/A	0.53

Source: TSI

A simple ranking of the forecasted delay and V/C ratios of each of the alternatives is summarized in Table 43.

Table 43

Summary of Alternatives Comparison

Alternative	AM Peak Hour		Midday Peak Hour		PM Peak Hour		Average Rank		
	Delay	V/C	Delay	V/C	Delay	V/C	Delay	V/C	Avg.
A-2	4	2.5	4	2.5	3	3	3.7	2.7	3.2
C-2	3	2.5	2	2.5	2	2	2.3	2.3	2.3
B-1	2	4	3	4	4	4	3.0	4.0	3.5
B-2	1	1	1	1	1	1	1.0	1.0	1.0

Source: TSI

From an intersection operations perspective, alternative B-2 would operate with the lowest amount of vehicle delay and the best V/C ratio. Alternative C-2 ranks slightly better than A-2 while alternative B-1 would not be viable unless additional turn lanes were added to increase its capacity. Under alternative B-2, southbound traffic on Greenwood would still experience delay of more than 60 seconds during the AM peak hour. It may be possible to reduce this delay by reducing southbound vehicle volumes. This could be accomplished by signalizing the intersection of Dayton Ave N/ Carlyle Hall Road as discussed above. This would likely shift traffic that is currently making a southbound right turn at Dayton Ave N/ Carlyle Hall Road and a westbound left turn at Greenwood Ave N/ Carlyle Hall Road to the southbound through movement at Dayton Ave N. This improvement would reduce existing delays and provide additional capacity for growth in existing traffic volumes and trips generated by the anticipated growth in student FTE's at SCC. The disadvantage of this would be an increase in southbound traffic volumes on Dayton during the AM peak hour.

From a technical intersection operations perspective, Alternative B-2 is the preferred option. There are many other factors, however -- such as overall cost, right of way requirements, and pedestrian safety, etc. -- that should be taken into account before making a final decision. A preliminary comparison of these factors is contained in the *Intersection Improvement Alternatives Study* that is available from Shoreline Community College.

The following recommendations would mitigate impacts related to growth in SCC generated traffic volumes:

1. Continue to work with the community and city to develop an acceptable solution to existing and forecasted deficiencies at the intersections of Greenwood Ave N/ N 160th and Greenwood Ave N/ Innis Arden Way. SCC's work to bring together a community based group to work on this problem is a first step in reaching a viable solution.

2. Proposed improvements to the main entrance would place the entrance perpendicular to Innis Arden Way and narrow the entrance so it is consistent with city standards. This improvement will more clearly delineate the entrance through curbing, incorporate sidewalks to provide separation between pedestrians and vehicles, and channelize the entering and exiting turning movements.

3. If required by city ordinance, provide a proportional share of the costs of improvements at the Greenwood Ave N/ N 160th St/ Innis Arden Way intersections and the intersection of Dayton Ave N/Carlyle Hall Road.

4. Provide frontage improvements as per city standards along Innis Arden Way and Greenwood Ave as part of master plan projects. Such improvements, at a minimum, should establish a continuous sidewalk connection between the campus and N 160th Street east of Greenwood Ave N and be coordinated with improvements to the main campus access and the intersections of Greenwood Ave N/ Innis Arden Way and Greenwood Ave N/ N 160th St.

Parking

Parking demand generated by SCC under the *Expanded Development Alternative* or *Modified Design Alternative* would be accommodated by the proposed on-campus parking supply. Under the *No Action Alternative* there would be an increase in student FTE's but no new parking supplies to accommodate their parking demand. Under this alternative, an additional 270 parking stalls would be needed. New on-campus supplies would have to be provided or the existing satellite lot expanded to accommodate this additional demand. Under the *Preferred Alternative,* 255 to 375 new parking stalls would need to be provided to accommodate forecasted demand.

The City of Shoreline has adopted a residential parking zone (RPZ) ordinance and a RPZ has been established in the neighborhood adjacent to the College.

Mitigation for parking impacts that may result with implementation of the master plan include:

1. As master plan projects are constructed, ensure that off-street parking supplies meet the city's code requirements and adequately accommodate the observed peak parking demand.

2. Continue to meet a portion of the parking demand off-site by providing a satellite parking area. Encourage use of this satellite parking area by setting parking fees somewhat lower than on-campus parking and provide regular shuttle service between the lot and the campus. This lot also has the benefit of reducing campus generated trips on streets adjacent to the campus.

3. Continue to support the community initiated residential parking zone.

4. To encourage off-street parking, consider incorporating a 'Transportation Fee' into the student fee schedule. Such a fee could be used to obtain a parking permit or transit pass and discourage on-street parking.

5. Provide preferential carpool parking at reduced rates for registered carpools.

6. Establish parking fees at a level that discourages use of single occupant vehicles and does not encourage students to park off campus.

Pedestrian Circulation and Safety

Community comments indicate that traffic safety is a significant concern. Pedestrian safety is compromised by the lack of sidewalks and traffic volumes generated by the SCC and local residents. There is also concern regarding students driving in excess of the posted speed. While these problems do not result in accident rates that stand out within the city, (see City of Shoreline Comprehensive Plan) these are valid concerns that could increase with the additional traffic generated under the proposed *Concept Master Plan*. There are a number of mitigating measures that would alleviate existing deficiencies and mitigate any impact resulting from increases in traffic volumes. These measures include:

1. Ensure that the redesign of internal parking lots separates pedestrian and vehicular circulation routes.

2. Establish primary internal vehicular circulation routes to the proposed parking garage and the proposed new access on Innis Arden Way to minimize crossings and conflicts with pedestrian routes.

3. Provide pedestrian facilities as part of access and intersection improvements.

Trip Reduction

The following mitigation measure would encourage trip reduction:

1. Continue to encourage participation in the required *Commute Trip Reduction* (CTR) program.

2. Provide bicycle racks at main buildings and at least one on-campus covered shelter.

3. Consider incorporating a 'Transportation Fee' into the student fee schedule. Such a fee could be used to obtain a parking permit or reduced cost transit pass and discourage on-street parking. The potential success of such a program would require careful evaluation of student demographics to ensure that transit use is a viable option. Many

students are part time and require mobility to reach off-campus jobs. Mobility requirements may preclude significant increases in transit rider ship.

4. Communicate trip reduction options through student publications and registration materials.

Consistency with City of Shoreline Planning Documents

The following documents were reviewed to establish consistency and relationship between City of Shoreline planning documents and the SCC Master Plan:

- City of Shoreline Transportation Master Plan-Planning Commission Recommended Draft (November, 2004);
- Comprehensive Plan, Transportation Element Goals & Policies (June, 2005); and
- Comprehensive Plan, Transportation Element Supporting Analysis (June, 2005).

The City's final Transportation Master Plan was not available at the time of this review.

The city's planning documents outline a set of transportation policies and recommended projects intended to provide a safe and efficient transportation system. The plans recognize that growth within the city is not anticipated to generate significant new congestion. However, growth in region traffic volumes has increased traffic volumes on city arterials. As a result, citizens are concerned about spillover traffic in neighborhoods as well as the lack of sidewalks and curbing that separate vehicular and pedestrian traffic.

Specific plan elements that affect SCC include the following.

- Reclassification of the segment of Greenwood Avenue North between North 160th Street and Carlyle Hall Road to a collector arterial. It is currently designated as a residential street.
- Adoption of level of service category LOS-E at signalized intersections for the purposes of evaluating concurrency and SEPA impacts. Corridors that are designated as highways of statewide significance by WSDOT are excluded. Aurora Avenue North and Ballinger Way NE are designated as highways of statewide significance.
- Neighborhood protection policy 'T42' states "Work with neighborhood residents to reduce speeds and cut-through traffic on non-arterial streets with education, enforcement, traffic calming, signing, or other techniques. Design new residential streets to discourage cut-through traffic while maintaining the connectivity of the transportation system".
- Neighborhood protection policy 'Ti' states: "Monitor traffic on collector arterials and neighborhood collectors and take measures to keep volumes within reasonable limits".

- Transportation demand management policy 'Tv' states: "Work with Shoreline Community College and King County Metro to reduce employee and student use of signal occupant vehicles and promote transit and carpooling".

- Funding policy 'T55' states: "Analyze and if feasible implement a City-wide development impact fee program which will include transportation system improvements, and where feasible, use SEPA to provide traffic mitigation for system-wide impacts.

- Transit and parking policy 'T76' states: "Support the creation of residential parking zones or other strategies to protect neighborhoods from spillover parking from major parking generators".

Potential transportation projects in the vicinity of the college include:

- Priority Level 1A
  - Pedestrian / Nonmotorized Projects
    - Sidewalks on NW 175th Street from 6th Avenue NW to Dayton Avenue north.
    - Sidewalks on Dayton Avenue North from North Carlyle Road to North 175th Street.
    - Sidewalks on Fremont Avenue North from North 165th Street to North 175th Street.

- Priority Level 1B
  - Safety/Operations Projects
    - Intersection improvements at Innis Arden Way/North 160th Street/Greenwood Avenue North.

- Priority Level 2
  - Pedestrian/ Nonmotorized Projects
    - Bike lanes on NW 175th from 6th Avenue NW to Dayton Avenue.
    - Sidewalks on NW Innis Arden Way from NW 167th Street to Greenwood Avenue North.
    - Sidewalks on Fremont Avenue North from North 175th Street to North 205th Street.
    - Sidewalks on remaining side of NW 175th Street from 6th Avenue NW to Dayton Avenue North.
  - Safety/Operations Projects
    - Improve geometry at the intersection of Carlyle Hall Road/ NW 165th Street.

- Priority Level 3
  - Pedestrian/ Nonmotorized Projects
    - Design study for Interurban Trail connection on North 160th Street from Dayton Avenue North to Aurora Avenue North/ Interurban Trail.
    - Sidewalks on Carlyle Hall Road NW from NW 175th to Dayton Avenue North.
    - Sidewalks on Greenwood Avenue North from North 160th Street to Carlyle Hall Road North.

In general, the policies and potential projects presented in the planning documents would support pedestrian improvements in the vicinity of the college and provide for improvements to the problematic Innis Arden/Greenwood N 160th Street intersection. Policies would also support establishment of residential parking zones, which could reduce the impact of students parking on residential streets near the college and potentially establish a system of assessing traffic impact fees for new development. If such fees were adopted, SCC could be assessed impact fees for each new project.

Unavoidable Adverse Impacts

All alternatives would result in increases in traffic volumes on nearby streets. Such increases are well within the capacity of existing facilities with the exception of the Innis Arden Way/ Greenwood Ave N/ N 160th St intersections. With implementation of the mitigation measures discussed above, no significant adverse impacts to the road system or intersection operations are anticipated.