Changing Our Travel Habits: Travel Demand Management at the University of Alberta

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Prepared For: The University of Alberta

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CORPORATE AUTHORIZATION

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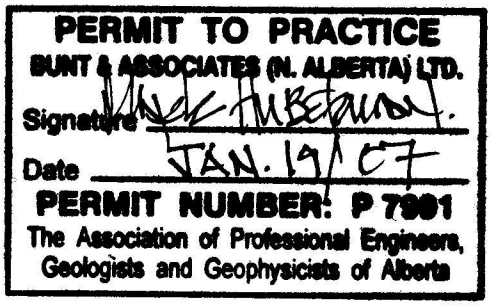

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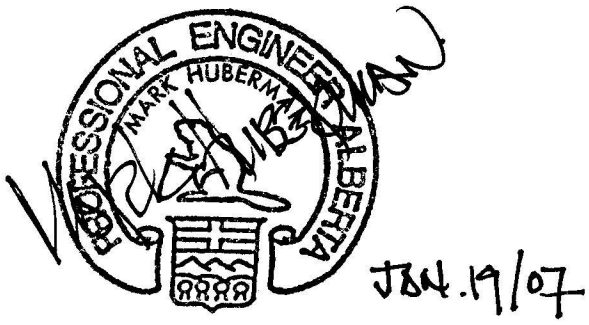

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1.0 INTRODUCTION

1.1 Problem Statement

The University of Alberta, with its multiple campus sites in the City of Edmonton, coupled with its partners located in the greater campus areas, represents a significant element of the City of Edmonton's urban landscape.

Like most Universities and colleges of similar size, continued planned growth represents a significant issue. As pressures build for the optimal use of lands to support facilities, as lands previously assigned to parking are developed for facilities, and as more people travel to and from the University, traffic and transportation stresses will continue to grow.

Travel Demand Management refers to various strategies that could change travel behavior in order to increase transportation system efficiency and achieve specific objectives, such as reduced traffic congestion, road and parking cost savings, increased safety, improved mobility for non-drivers, energy conservation and pollution emission reductions.

The continued use of the private auto as the primary means of commuting to and from the greater campus areas (for all campus land uses and all campus populations) will have significant effects on University land use planning, parking requirements, community relations and environmental quality. The continued increase in traffic activity will place a strain on the University and will require mitigation of the negative aspects of increased traffic demands on roadway infrastructure, parking accommodation, and community relations.

As redevelopment and new development occur in the greater North Campus area, and as the University embarks on development activity in the South Campus, existing surface parking facilities will be eliminated and displaced due to new building construction, at the same time as new traffic and parking demands will be generated by an increasing campus population. Increased traffic activity has put significant strains on cities, universities, colleges and other major activity centres, in dealing with roadway congestion issues while limited funds and limited space to accommodate expanded parking facilities are available. Many universities and colleges, like the University of Alberta, are attempting to determine whether parking expansions are the best use for land that could provide space for research and classroom facilities or campus green space. The development of additional parking facilities is often accompanied by increased traffic congestion and may in fact exacerbate campus parking problems rather than alleviate them.

Universities and colleges of similar size have initiated Transportation Demand Management (TDM) programs to assist in mitigating the effects of increased traffic pressures by providing options to single occupant vehicle travel through improved alternative transportation facilities. The majority of these programs have proven to be successful.

1.1.1 Significant Areas of the Study

The completion of this plan will facilitate the on-going task of managing campus parking in an orderly fashion to support both the Long Range Development Plan (LRDP) traffic and parking policies, and strategic implementation of complementary TDM measures. Although the primary area of assessment and analysis is the North Campus, development activity within the South Campus and Faculté Saint–Jean Campus areas are also included. **Exhibit 1-1** illustrates the location of the University campuses within Edmonton.

1.2 The Travel Demand Managemen67tytt Study Phase I

To assist the University in meeting a number of TDM oriented objectives identified in the Long Range Development Plan, the University of Alberta initiated the completion of a Transportation Demand Management Study for the University and its partners. This study, completed in the fall of 2004, generally presented an overview of the role of TDM in a university/hospital campus setting, reviewed a series of University/College/Hospital case studies where TDM strategies have been successfully implemented, identified “best practice” TDM measures and presented an initial TDM framework for the University of Alberta which could be pursued on the basis of the technical review.

Based upon the results of this preliminary study, it became evident that parking supply and demand management represents a critical lever in managing travel demand to achieve LRDP policies. It was also acknowledged that parking-generated revenues represent a significant revenue source for the University and that the provision of adequate parking represents an important element in the satisfactory functioning of academic and administrative services as well as hospital, residential, commercial and entertainment enterprises located within the North Campus area. Significant operational problems and complaints from staff and students can be anticipated if parking is significantly under-supplied.

In light of the above, and before an adequate TDM strategy could be created, it was imperative to complete a more comprehensive assessment of parking characteristics and needs of the future. The central challenge of this part of the exercise was to assist the University of Alberta and its campus partners in qualifying and quantifying overall campus parking needs and how parking patterns will change over time under existing enrollment projections. This evaluation, in turn, informed and provided direction in the development of an overall TDM program.

1.3 Relating TDM to the University of Alberta's Strategic Documents

The Long Range Development Plan provides the development framework required to support anticipated growth characteristics, through its nine strategic planning principles and thirteen plan elements. The LRDP indicates that the University will be required to develop new research, teaching, residence, students, and support facilities as well as upgrade or replace existing structures.

The University of Alberta has acknowledged the role and benefits that Travel Demand Management programs can play in promoting positive change in travel activity, particularly in reducing the number of single occupant vehicle trips. This recognition is embedded in the University's Long Range Development Plan which contains a series of policies and guidelines related to the implementation of travel demand strategies and measures to effect change in the travel characteristics of trips to, from and within the campus and mitigate the negative aspects of increased traffic demands.

At this time, the University of Alberta's Long Range Development Plan has identified that a parking ratio of one stall per four students be maintained. This parking index has been established as a placeholder and is subject to the outcome of a more detailed TDM and Parking Management Strategy.

The outcomes of this study will be driven by and will support the strategic documents of the University of Alberta including, the Academic Plan, Strategic Business Plan, and the LRDP.

The University's Academic Plan and Strategic Business Plan identify the need for and promote strategies that encourage growth in research, teaching and community service at the University. The key strategic goals are:

- Prepare our students for successful lives and careers as leaders of tomorrow,
- Lead in the creation, integration, dissemination and application of knowledge,
- Achieve institutional excellence, and,
- Contribute to the needs of our communities.

While the TDM plan is not directly related to these goals, its outcomes will support each one of them to varying degrees, and will assist in the University's successful realization of its goals.

The Capital Plan (CP) 2002-2007 is a supporting document that builds on the LRDP's vision. The CP identifies approved capital priorities that are required to accommodate the University's growth. It demonstrates a significant number of capital projects currently in the planning and development stages. As with the other strategic and tactical documents of the University, it provides valuable data on the future of the University, and key drivers for a TDM strategy.

As the TDM program is implemented, its initiatives will influence and may require modification to a series of planning exercises or documents including:

- The LRDP,
- Sector Plans,
- Capital Plan,
- Parking master plans, and potentially,
- City of Edmonton traffic and travel projections.

1.4 Study Objectives and Goals

This report builds on the findings and recommendations of the initial 2004 TDM Study. More specifically, the study includes a detailed review of the University's existing parking characteristics and future parking requirements and, uses this information to determine Travel Demand Management strategies for the University.

The University's objectives for this study included:

- Develop and maintain lands and facilities that are sustainable,
- Incorporate and be supported by TDM strategies and initiatives,
- Improve access, especially access times and convenience,
- Encourage multiple occupant vehicle use and discourage or limit single occupant vehicle use, and,
- Support multiple modes of travel equally.

In addition, as academic development priorities require the limited lands available:

- Reduce reliance on on-site parking,
- If at all feasible, reduce the amount of existing parking on-campus, and,

- Reduce the amount of new parking construction.

This resulted in three specific goals for the TDM study, Phase II:

- Develop a series of alternative TDM and Parking Strategy scenarios which incorporate different mixes of parking, transit and financial incentives, as well as promoting ridesharing, and non-motorized transportation. For each alternative, evaluate the parking supply impacts.

- Recommend a preferred TDM and parking management strategy and describe the key features of the plan including parking supply targets, policies for financing, management methods and schedule for construction of recommended public parking facilities.

- Prepare a recommended monitoring plan to track progress of parking inventories, the achievement of overall TDM objectives, on-going management and control of parking and other key features of the plan.

The study's process included:

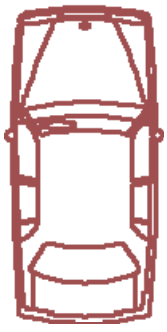
- Identification of existing faculty, staff, visitor and student populations, parking user groups.

- Confirmation of planning horizons and associated student, staff and faculty populations.

- Collection of available traffic flows and intersection turning movement count data.

- Review of available parking related information from Parking Services including: parking utilization characteristics, current parking management practices, permits issued, permit waiting lists, historical parking charges, enforcement practices and revenue information.

- Assessment of existing parking characteristics through the completion of:



  - parking accumulation surveys to determine peak usage patterns and parking demand profiles and characteristics on a typical weekday,

  - interview surveys to secure data about parking user groups including auto occupancy, and,

  - a comparison of supply vs. demand at peak time periods and the identification of parking shortfall/surplus by zone.

- Determination of the University's current parking demand index.

- Quantification of existing and future parking inventories and the amount of parking expected to be lost or gained as a result of campus construction during the planning period.

- Assessment of future forecast parking demand conditions based on student, staff and faculty population forecasts.

- Determination of existing baseline of mode share/split for trips to campus by user group.

- Develop projected transit utilization and quantify/qualify the projected reduction in parking demand associates with a U-Pass program.

- Review and assessment of potential parking demand reduction strategies including pricing strategies, shared parking, and parking permit strategies.

- Identification and evaluation of applicable non-motorized TDM strategies that could be employed to reduce parking demand and analyze ridesharing programs and incentives that could be employed to reduce parking demand.

- Consultation with the Resource Working Group, Advisory Group and Steering Committees throughout the project to ensure community and stakeholder perspectives are addressed and incorporated into the assessment.

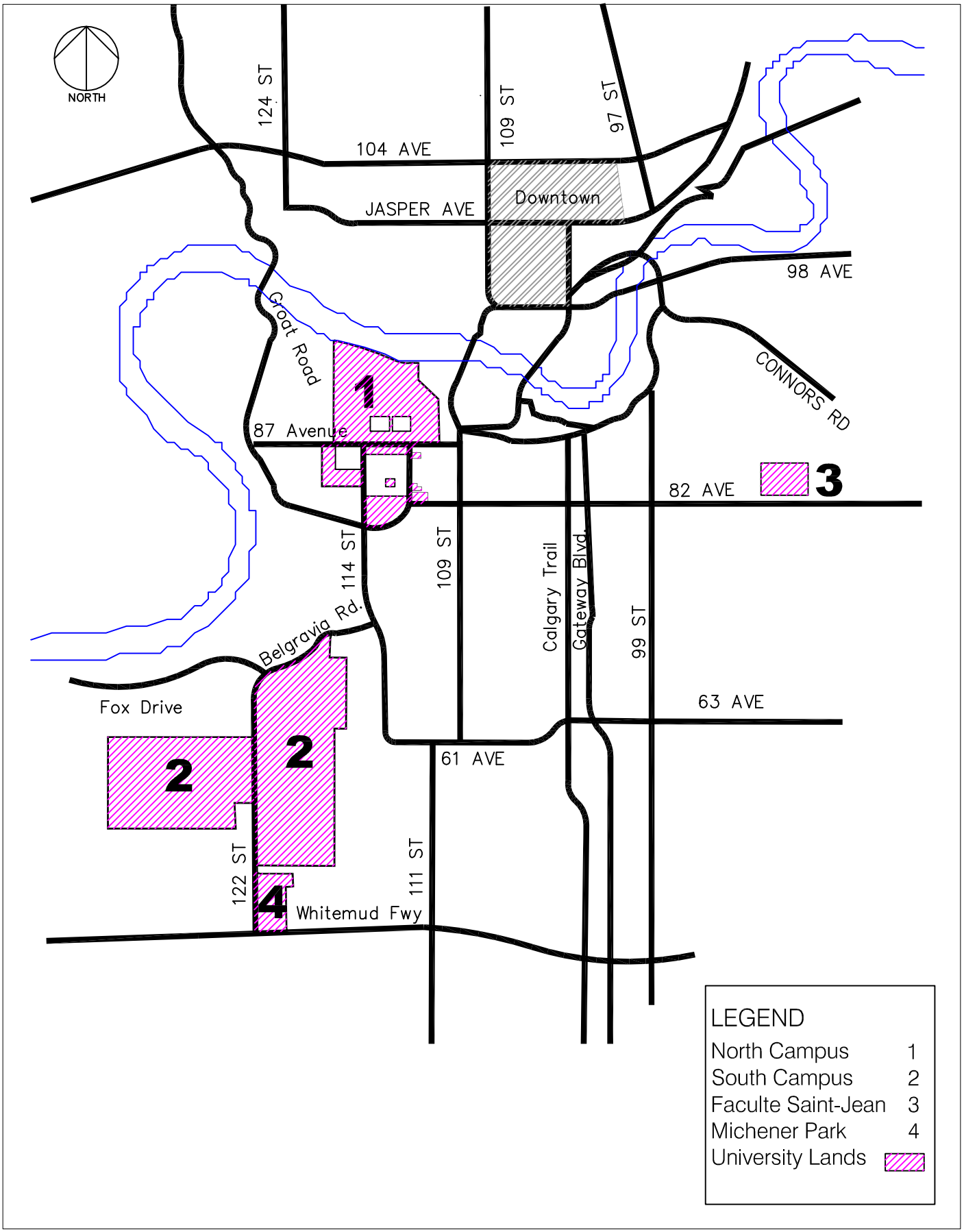


Exhibit 1-1

Campus Location Plan

2.0 EXISTING CONDITIONS ASSESSMENT

In Phase I of the TDM Study, an overview of existing conditions at the University of Alberta's North Campus was completed. This included a review of the campus' population profile, existing land use and development activity and a review of the existing parking supply. This Phase II study expands on this review, investigating, in more detail, existing and forecast campus' population characteristics, the various functional areas within the Edmonton campus sites and the most current parking inventory characteristics.

2.1 Campus Development

2.1.1 Campus Locations

The University of Alberta operates five campus sites within the greater Edmonton area, as well as the Augustana Campus in Camrose, and numerous research sites in Alberta. This study focuses on the Edmonton campus sites. The Edmonton campuses are typically referred to as the North Campus (NC), the South Campus (SC), Faculté Saint-Jean (FSJ), University Downtown (UDT), and Michener Park.

North Campus

The North Campus represents the current major academic centre of the University. Located within the central sector of the City of Edmonton, this development area accommodates instruction, research, health sciences, administration, entertainment, student housing, and services support facilities, as well as encompassing the major teaching hospital of the Capital Health Region, the Jubilee Auditorium and the Cross Cancer Institute.

The North Campus area is serviced by a series of local, collector and arterial roads. The roadways were originally developed on a grid network with the majority of roads running on north-south and east-west orientations. Over time, the grid network has been modified to accommodate development and improve traffic flows on the arterial road network. Given the location of residential development relative to employment nodes and the constraints associated with a limited number of river crossings, the arterial roads in the North Campus area also serve as major commuter routes to and from the downtown core.

The five arterials in the North Campus Area include 114 Street, 109 Street, Groat Road, 82/University Avenue, and 87 Avenue.

South Campus

The South Campus is located in a "close-in" central suburban area of the City approximately 3 km south of the North Campus. This area is predominantly used for agricultural research activities at this time, but is scheduled for major academic development over the next 25 years. This area also accommodates newly constructed recreational facilities including Foote Field and the Saville Sports Centre.

The South Campus is bounded by 4 arterial roadways; two of the corridors, Belgravia road and 113 Street are major commuter routes between the central business district and the south-central and south-west areas of the City. The other two major arterials are 112 Street and 51 Avenue.

Faculté Saint-Jean Campus

Faculté Saint-Jean is also located in a mature suburban sector of the City, approximately 4 km east of the North Campus. Activity at the Campus Saint-Jean is centered on the University's French Language Program. About 600 students are currently enrolled in programs at the Faculté Saint-Jean.

Like the North Campus, the Campus Saint-Jean is bounded by a grid network of collector and local roads. It is primary accessed via Rue Marie-Anne Gaboury which connects 82 Avenue to the south and Connors Road to the north.

Michener Park

Michener Park is located directly south of and adjacent to the South Campus. Michener Park is developed as a residential housing development for married and family student housing needs.

This development is directly adjacent to Whitemud Drive but is primarily accessed by two arterial roads, 122 Street and 51 Avenue.

University Downtown (UDT)

UDT is located in the central business core of the City of Edmonton, located directly on Jasper Avenue between 102 and 103 Streets, utilizing the former Bay Building. Under renovation currently, it will house the University's research transitions facilities and Tech Edmonton, as well as the existing media tenants. There is limited parking under the building, however the building is serviced by transit routes along Jasper Avenue, and a direct connection to the underground Bay Station of the LRT.

2.2 Campus Population

2.2.1 Overall Student Enrollment

According to the University's Data book, total student enrollment in the fall of 2004 was 34,617 students, including full-time and part-time undergraduate and graduate students. This population excludes student population figures for continuing education (Faculty of Extension), intersession, and summer session.

The University of Alberta currently operates at peak populations for an eight-month period of each year, still with significant (but not peak) populations during the spring and summer seasons. Similarly, its Faculty of Extension runs much of its academic programming in off-peak hours during the year, including evenings and weekends.

Undergraduate vs. Graduate Students

Undergraduate students made up approximately 83% of the total student population at the University in 2004. Of the 34,617 total students, 28,737 were undergraduate while 5,880 were graduate students. **Table 2-1** summarizes the student population summary in more detail.

Table 2-1: Student Enrollment (2004)

		Female	Male	Combined Total	% of Combined Total
Undergraduate	Full-time	15,089	11,452	26,541	92%
	Part-time	1,359	837	2,196	8%
	Total	16,448	12,289	28,737	100%
Graduate	Full-time	1,935	2,129	4,064	69%
	Part-time	1,070	746	1,816	31%
	Total	3,005	2,875	5,880	100%
All Students	Full-time	17,024	13,581	30,605	88%
	Part-time	2,429	1,583	4,012	12%
	Total	19,453	15,164	34,617	100%
		56%	44%		

Male vs. Female

The split between male and female students indicates that there are more female than male students at the university.

Full-Time vs. Part-Time

Part-time students represent a small portion (12%) of the campus' student population. The part-time student population is made up of both undergraduate and graduate students.

2.2.2 Staff and Faculty

According the 2004-2005 Data Book, there were 8,901.3 full-time equivalents (FTE) or 12,133 people (headcount) employed at the University of Alberta (excluding the Augustana Campus). **Table 2-2** summarizes staff and faculty populations.

Table 2-2: Staff Summary (2004-05)

	FTE	Head	Percent of Total Staff
Total Academic Staff	2,631	3,094	26%
Total Academic Assistants	563.3	2,155	18%
Total Support	3,003.3	3,511	29%
Total Trust Staff	2,703.7	3,942	32%
Total Staff	8,901.3	12,133	100%

For the purposes of analysis completed for this report, it was assumed that the Total Academic Staff represents "Faculty" and the remaining Total Staff represents "Regular Staff". Thus faculty makes up 26% of the total staff population and various types of regular staff make up the remaining 74%.

The total staff population (heads) and the total student population gives an overall population of approximately 46,750 people of which 74% are students, 7% are Faculty and 19% are Staff.

2.2.3 Campus Residents

A small portion of the campus' population resides in University-owned housing facilities. Approximately 4,000 residents (11.5% of current population) can be accommodated in the University's Residences of which, 88% are located on the North Campus, 10% at Michener Park and, 2% at the Faculté Saint-Jean. Currently, the vacancy rate is around 2.1% which means around 3,900 students live in the University's residential facilities.

In addition, the Garneau and Strathcona neighbourhoods have a significant amount of medium and high density residential development. Although specific statistics were not available, a portion of the student population resides in these neighbourhoods because they are in close proximity to the North Campus.

2.3 Parking Supply

2.3.1 North Campus Parking Supply

As of October 2005, there were 8,535 parking stalls at the North Campus; 82 of the stalls are loading zones stalls and the remaining 8,453 stalls are available for use by hourly or permit-holding parkers. These spaces are accommodated in five types of facilities including underground garages, above-grade

structures, permit surface lots, non-permit surface lots and on-street parking meters. **Exhibit 2-1** illustrates the parking locations at the North Campus while **Table 2-3** provides a summary of the North Campus' parking stalls by type of facility, not including loading zone stalls.

The parking stall summary presented in Table 2-3 includes parking facilities located at the North Campus that are under the jurisdiction and control of University of Alberta Parking Services with one exception. Although the Jubilee Lot is owned by the Provincial Government, it has been included in the inventory because, during normal daytime operations, the University operates this facility and issues a significant number of parking permits for use by University of Alberta students and staff. In addition, it is acknowledged that St. Stephen's College and St. Joseph's College have small surface parking facilities at the North Campus, accounting for approximately 90 parking stalls, or a minor amount of additional parking. It should be noted that Capital Health operates its own parking facilities and although the majority of parkers in Capital Health facilities are Capital Health patrons, synergies do exist that influence parking habits of University and Capital Health patrons, see 2.3.2

Table 2-3: Existing Parking Supply on North Campus by Facility (October 2005)

Facility	Number of Stalls	Type of Facility
ECERF	103	Underground
Timms	326	Underground
Southfield	769	Underground
Extension	256	Underground
Total Underground Stalls	**1,454**	
Windsor	1740	Structure
Stadium	959	Structure
Education	540	Structure
Total Structure Stalls	**3,239**	
Lot V	91	Surface Lot
Lot M	62	Surface Lot
Lot R	73	Surface Lot
Lot T	142	Surface Lot
Lot L	510	Surface Lot
Lot C	34	Surface Lot
Lot F	90	Surface Lot
Lot J	31	Surface Lot
Lot E	144	Surface Lot
Lot K	33	Surface Lot
Lot A	36	Surface Lot
Lot N	457	Surface Lot
Lot U	225	Surface Lot
Lot 700	21	Surface Lot
Lot 84	86	Surface Lot
Lot 85	47	Surface Lot
Lot 87	113	Surface Lot
Lot 88	59	Surface Lot
Lot 89	100	Surface Lot
EDC	77	Surface Lot
Clinical Sciences East	12	Surface Lot
St. Stephen's East	15	Surface Lot
Stadium East	15	Surface Lot
Stadium North	16	Surface Lot
Stadium South	11	Surface Lot
Phys Ed East	38	Surface Lot
Varsity	234	Surface Lot
Jubilee	913	Surface Lot
Total Surface Lot Stalls	**3,685**	
Meters	**75**	
Total Inventory	**8,453**	

Note: Southfield Parkade provides facilities for both the University and the Alberta Cancer Board. Of the total 769 stalls, about 480 have been assigned to Cross Cancer Institute

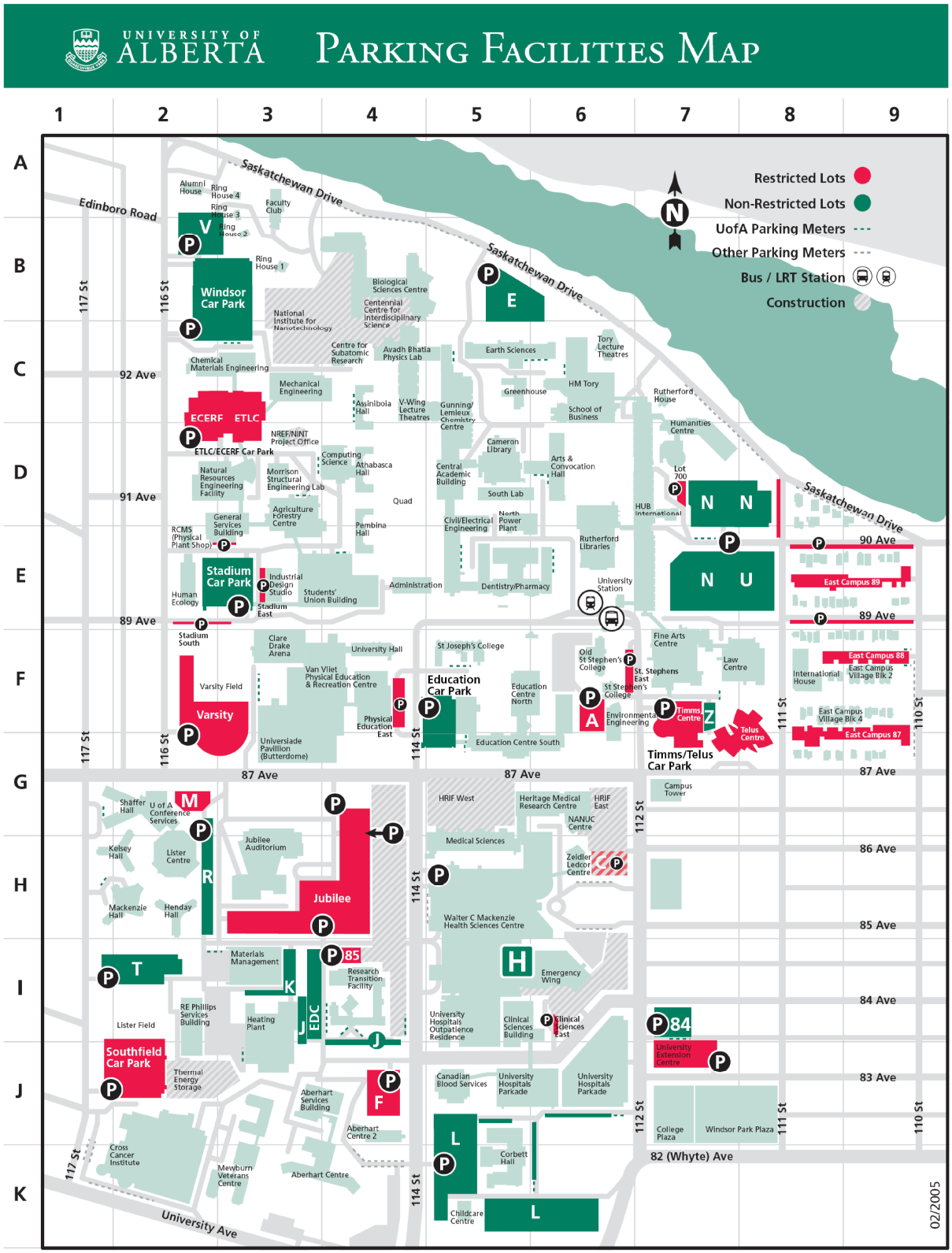


Exhibit 2-1

University of Alberta - North Campus Parking Facilities

2.3.2 Additional Parking Facilities in the Greater North Campus Area

The North Campus is in close proximity to a number of other facilities, including the University of Alberta and Stollery Children's Hospitals (UAH/Stollery), the Cross Cancer Institute (CCI), Northern Alberta Jubilee Auditorium, Canadian Blood Services (CBS) and College Plaza. In addition, although St Joseph's College and St. Stephen's College are located within the North Campus, associated parking facilities are not owned, operated or used by the University.

In conjunction with the parking counts completed at the University, information on the number of stalls in off-street parking facilities in the greater university area was also collected. There are approximately 13,300 parking stalls in the greater university area. **Exhibit 2-2** illustrates the distribution of parking stalls in the greater North Campus Area while **Exhibit 2-3** illustrates the location of non-University Parking Facilities. Please note that in Exhibit 2-2, the Jubilee Lot and University owned stalls that are leased to adjacent facilities (i.e. South Field Parkade and F Lot) have been included in the University's inventory. Although not illustrated in Exhibit 2-2 there is a limited supply of City of Edmonton on-street metered stalls along Saskatchewan Drive that are heavily used by the University's population.

Exhibit 2-2: North Campus Area Total Parking Supply by Owner

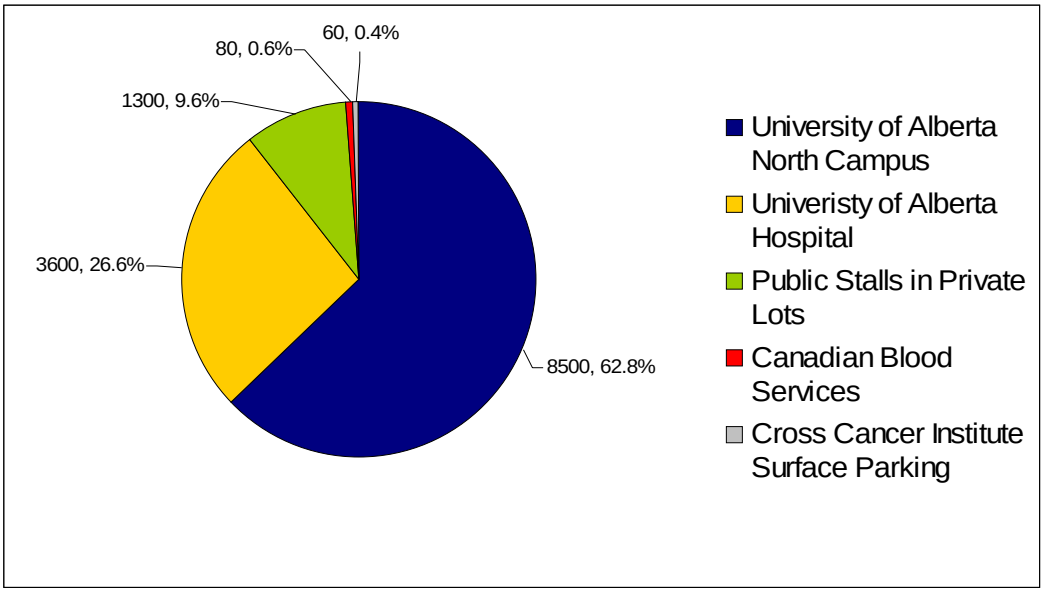


Exhibit 2-2 indicates that the majority of parking in the greater University area is operated by the University.

Capital Health Parking Facilities

The Capital Health owns and operates a number of parking facilities that support activity at the University of Alberta and Stollery Children's Hospitals. Capital Health provides parking for staff, medical students in their 3rd and 4th years, as well as hospital patrons and visitors. In addition, to accommodate on-going construction initiatives, Capital Health also supplies a limited number of parking stalls to on-site contractors. Capital Health leases stalls in the Garneau Parkade and the University's F Lot to accommodate some staff and temporary contractor parking needs. **Table 2-4** summarizes UAH/Stollery's parking inventory as of June 2005 (contractor stalls in F Lot are not included in Table 2-4).

Table 2-4: UAH/Stollery Parking Supply (June 2005)

Parking Facility	Staff Stalls	Public Stalls	Total Stalls	Type of Facility
East Parkade	1,039		1,039	Structure
West Parkade	546	515	1,061	Structure
P Level	590		590	Underground
Green Lot	87		87	Surface Lot
Beige Lot	110		110	Surface Lot
Brown Lot	175		175	Surface Lot
Garneau – Staff Permits	250		250	Structure
O Level		150	150	Underground
Emergency Lot		16	16	Surface Lot
Meters		63	63	Surface Meters
Total	**2,818**	**744**	**3,541**	

UAH/Stollery has two development initiatives that will increase the parking inventory in the University area. Expansion of the East Parkade is scheduled for 2006 and will add approximately 340 parking stalls to this facility. Preliminary plans for the joint HSALC indicate that it may include an underground parking garage. Although functional plans indicate that this facility could include 1,400 parking stalls, the actual number of stalls and the staff vs. visitor and Capital Health vs. University stall distribution has yet to be determined.

Cross Cancer Institute Parking

The Cross Cancer Institute (CCI) also provides parking facilities for staff and visitors. The CCI has a contract with the University of Alberta Parking Services for 483 staff parking stalls in the South Field parking facility. The CCI also has a 63 stall surface lot adjacent to the building that accommodates both public and visiting physician parking. The Southfield Parkade is the primary parking facility for visitors to the CCI and is connected to CCI via an underground pedway. The CCI is currently redeveloping and exploring expansion options, which may include an increase in surface stalls to 80, and possibly an expansion to the Southfield parkade.

Northern Alberta Jubilee Auditorium Parking

The Northern Alberta Jubilee Auditorium and the adjacent surface parking lot (Jubilee Lot) are owned by the Provincial Government. The at-grade Jubilee Lot is leased to the University. Although the Jubilee lot is subject to use restrictions, it is utilized by University and Hospital parkers on a regular basis and the use restrictions typically do not impact use of the facility during daytime operations.

Canadian Blood Services Parking

Canadian Blood Services (CBS) is located in the southwest corner of the Health Sciences Sector of the campus. CBS provides limited parking for staff and patrons. There are approximately 50 underground parking spaces for staff and 27 spaces for donors and service vehicles in a surface lot directly east of the building. In addition, CBS leases 102 stalls from the University of Alberta in the L Lot.

Privately Owned Parking Stalls

There are approximately 1,300 privately owned and operated parking stalls in the University area. The privately owned lots accommodate hourly, daily and monthly parkers. College Plaza has a 130 stall public parking facility, Impark has an estimated inventory of around 470 parking stalls in the University area, and the Garneau parkade can accommodate up to 663 parked vehicles at any one time. In addition, St. Stephen's College has a private parking lot that accommodates approximately 80 stalls and St. Joseph's College has 10 surface parking stalls. It is noted that the St. Joseph's College stalls are managed by the University's Parking Services; however, for the purposes of this assessment, these stalls were considered part of the Privately Owned inventory because they provide limited benefit to the University as a whole.

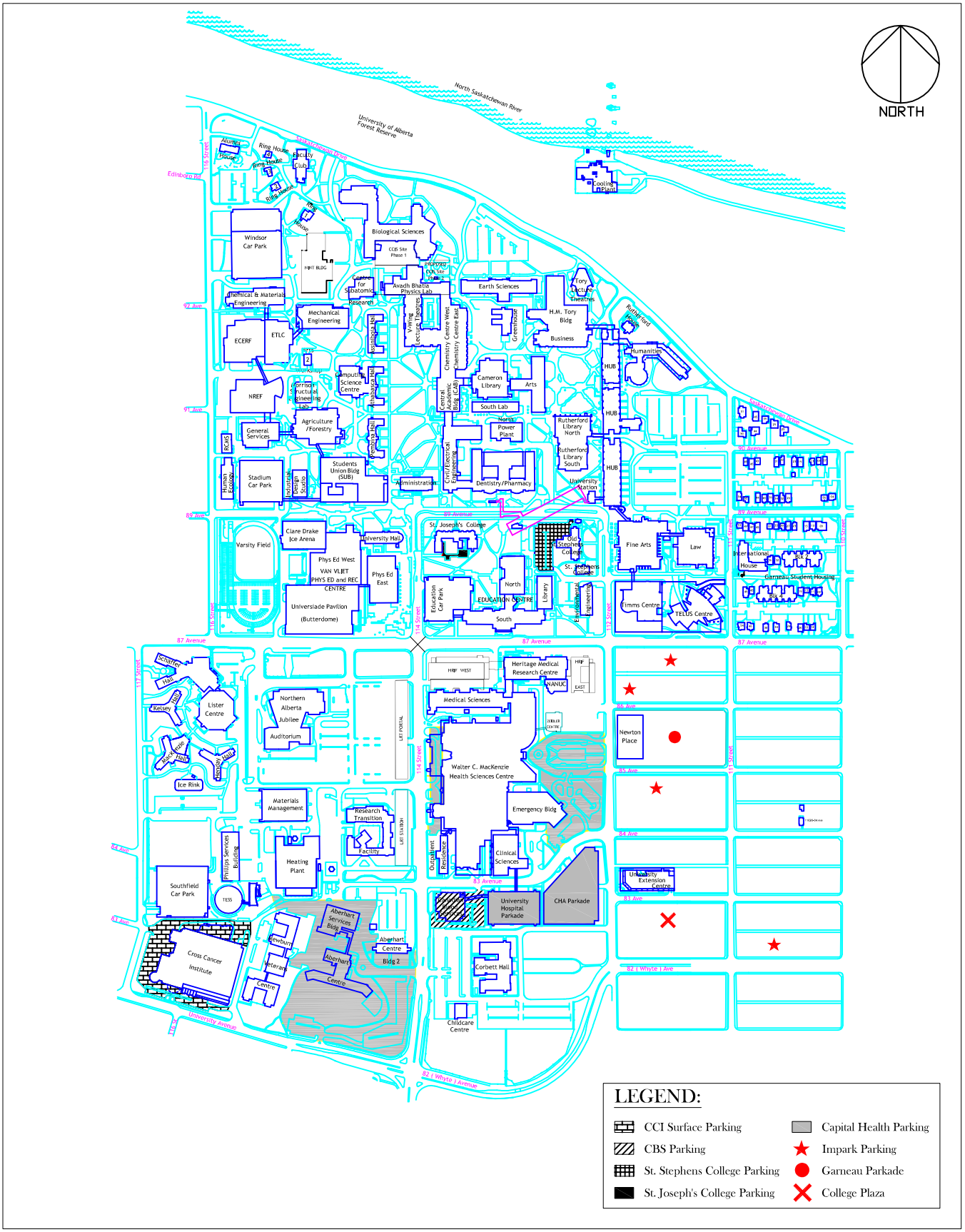


Exhibit 2-3

Non-University Parking - North Campus

2.3.3 Faculté Saint- Jean Parking Supply

The Faculté Saint-Jean Campus has a limited number of surface parking stalls. There are 21 stalls in a surface lot referred to as Lot 02 and 4 metered parking stalls. Lot 02 accommodates both permit and daily parking; however, only staff permits are issued in this lot. In addition, the University provides a free shuttle that runs between the Faculté and North Campus. Nevertheless, a significant number of staff, faculty and students park on-street within the adjacent residential community. With continuing growth of other public facilities in the neighbourhood, and the increasing burden on residential streets, it is anticipated that parking restrictions will be implemented if the community-wide area supports this and initiates the process.

2.3.4 South Campus Parking Supply

There are about 285 surface parking stalls at the South Campus, supporting the athletics and research facilities located there. 159 stalls are designated for use by the Saville Sports Centre and 126 are associated with Foote Field. There is a small housing precinct at the South Campus and there is surface parking associated with these units. Currently, University Parking Services does not operate or maintain the parking at South Campus.

At Michener Park, there is parking associated with the residential housing facilities.

2.3.5 On-Street Parking

The University of Alberta's North Campus is located adjacent to a number of residential neighbourhoods including Windsor Park, Belgravia, McKernan and Garneau. To alleviate on-street parking concerns and congestion, these neighbourhoods have worked with the City of Edmonton to develop Restricted Residential Parking Programs. These parking programs limit parking to residents with valid passes and/or limit the length of time a vehicle may remain parked on the street.

Although on-street parking in the North Campus area is well utilized, the parking restrictions are regularly enforced by bylaw officers and as a result, the parking restrictions are quite effective at alleviating unlimited on-street parking in the area.

In addition, the City of Edmonton operates a limited number of on-street metered parking stalls along Saskatchewan Drive and 110 Street.

2.4 Parking Management and Permits

Parking Services manages all aspects of the University's visitor and permit parking requirements including parking rates, parking permits and facilities. The University classifies its parking facilities as restricted and non-restricted parking facilities. Restricted lots are only for the use of parkers holding permits for the lot in which the permit was issued whereas, non-restricted lots can be utilized by all permit-holding parkers at the University subject to certain time restrictions. A permit for a Restricted Lot is valid 24 hours a day, 7 days a week in the lot for which it is issued and is also valid in non-restricted Lots from 4:30 p.m. to 7:00 a.m. on weekdays and all day on weekends and statutory holidays. Non-restricted lot permits are valid 24 hours a day 7 days a week in the lot for which it is issued. In addition, non-restricted permits are also valid in other non-restricted lots from 4:30 p.m. to 7:00 a.m. on weekdays and all day on weekends and statutory holidays.

All permits for parking on campus are issued by the Parking Services. Parking Permits are issued to the following user groups: Staff/Faculty, Emeritus Faculty, Commuting Students, Residence Students, Commercial Vehicles, Affiliated Agencies and those with Medical Need. The permits are divided into user groups because some of the parking facilities are only available to certain user-groups. The following **Table 2-5** summarizes the monthly permits issued by user group and facility as of October 2005.

The number of permits issued on campus is limited; however, the number of permits issued varies depending on the parking facility and what the demand for visitor parking is in the facility. At facilities where visitor and/or staff parking demands are high, the number of permits issued is lower to ensure optimal utilization of the parkade. Table 2-5 indicates that most of the permit-to-stall ratios are in the one-permit-to-stall range. The capacities illustrated in Table 2-5 do not match the inventory illustrated in Table 2-3, because Parking Services does not include handicap, service vehicle and private stalls in the permit ratio calculations.

Table 2-5: University of Alberta Parking Permits by Facility (October 2005)

LOCATION	CAPACITY	REGULAR STAFF	COMMUTING STUDENT	RESIDENCE STUDENT	MEDICAL NEED STUDENT	COMMERCIAL	AFFILIATED AGENCIES	TOTAL	PERMITS/STALL
ECERF	106	84			1	20		105	0.99
EDC PERMIT	77	41				27		68	0.88
EDUCATION	530	422			3	3		428	0.81
EXTENSION	251	159	67			29		255	1.02
LOT 89	100	2	80	9	1	5		97	0.97
SOUTHFIELD	759	116				8	651	775	1.02
STADIUM	944	834	4		3	55		896	0.95
TIMMS	318	276	3		2	16		297	0.93
WINDSOR	1,726	426	1,417	8	2	189		2,042	1.18
LOT E	111	100			4	1		105	0.95
LOT J	31	18				11		29	0.94
LOT K	33	29						29	0.88
LOT L	476	159	103		1	291		554	1.16
LOT N	454	357		54	14	44		469	1.03
LOT R	71	53		1		19		73	1.03
LOT T	142			141		1		142	1.00
LOT U	224	61			3	10		74	0.33
LOT V	90					1		1	0.01
VARSITY	234	17	222	1		10		250	1.07
LOT 84	83	2	58		1	1		62	0.75
LOT 87	96	6		80		2		88	0.92
LOT 88	55	3		47	1			51	0.93
LOT 02	22	9						9	0.41
JUBILEE	910	177	767		2	54		1,000	1.10
TOTALS	7,932	3,351	2,721	341	38	797	651	7,899	1.00

Student Permits

There are a limited number of parking permits available to students. Although Parking Services indicated that, as of December 2005, student parking permits were available in the Windsor Parkade and Jubilee Lot, students wishing to purchase permits during fall and winter session must do so through a reservation process. During intersession (May to August) permits can be purchased by students on a first-come-first-serve basis.

Faculty and Staff Permits

Faculty and staff permits are typically issued annually for the period between April 1 (or from time of purchase) and March 31 of the next year. Staff permits are purchased on a first-come-first-serve basis and are subject to availability. If there are no permits available in the requested facility, a permit will be issued in another facility and the staff member will be placed on a waiting list for the requested facility.

The Parking Services does have a so-called car pool permit. The car pool permits allow more than one vehicle to be registered to the permit; however, it does not require a minimum number of riders in the vehicle. It provides a means through which multiple vehicles can share the cost of driving to campus although there is no guarantee they are traveling together on a regular basis.

Non-University Parking Permits

With respect to parking permits at facilities in the North Campus area, Capital Health issues monthly permits to staff working greater than 50% of a full-time position as well as third and fourth year students enrolled in the Faculty of Medicine and Dentistry. Capital Health also issues visitor permits; however, the majority of these are used by patients and visitors to the hospital. Capital Health has indicated that in June 2005 the permit-to-stall ratio at the UAH was 1.7 permits per stall. The high ratio of permits to stall is believed to reflect the hospital's 24 hour operations.

It is uncertain how many monthly permits are issued in the privately owned parking lots in the greater university area; however, permits are available for those wishing to purchase parking in these facilities.

2.5 Parking Pricing

2.5.1 University of Alberta Parking Charges

Permit Charges

Parking Charges are set by Parking Services and are evaluated on a yearly basis. The cost of a permit is typically defined by the type of facility. **Table 2-6** summarizes the monthly permit rates. The majority of parking permits are issued as monthly permits; however, some permits are only available for

purchase on an annual basis. The permits issued on an annual basis include multi-lot permits, evening permits, graveyard permits, and motorcycle permits.

Table 2-6: Summary of Monthly Permit Charges (September 1, 2005 – August 31, 2006)

Type of Facility	Monthly Rate	Notes
Underground	$87.00	
Structure	$76.75	
Surface (energized)	$66.50	
Surface (non-energized)	$61.25	
Jubilee	$56.25	Usage restrictions apply

There are a limited number of parking stalls sold on a 24-hour reserved basis, the rates for which range, per month, between $81.75 for a non-energized surface lot to $107.25 for an underground, heated stall.

Hourly Charges

Short-term visitor parking at the University is charged on an hourly basis at most locations, the rate for which is $1.25 per half hour and $1.50 per hour at parking meters. At all facilities, the maximum daily charge is $10.00 and flat rates of between $3.75 and $4.00 are charged during the evening, overnight and weekend periods. In addition, a few of the facilities have mid-day rates of $5.00 for parking between 11:00 AM and 4:30 PM.

2.5.2 Non-University Parking Charges

Permit Charges

The monthly rates at non-university parking facilities in the greater North Campus area are different from those at the University. **Table 2-7** summarizes the parking charges at the non-university facilities.

Table 2-7: Summary of Monthly Permit Charges (Non-University Facilities June 2005)

Type of Facility	Monthly Rate	Notes
Capital Health Underground	$84.99	Based on $0.5916/h and 37.5 hr work week
Capital Health Structure	$51.91	Based on $0.3613/h and 37.5 hr work week
Capital Health Surface (energized)	$43.51	Based on $0.3028/h and 37.5 hr work week
Cross Cancer Institute	$87.00	Same as the University Rate
Canadian Blood Services Underground	$55.00	
Private Parking Facilities	$70.00-$100.00	Varies depending on the lot and location

Hourly Charges (June 2005)

Hourly parking charges at Capital Health's parking facilities follow the same rate structure as the University ($1.25 per half hour and a $10.00 per day maximum). Unlike the University, Capital Health collects its charges on exit rather than on entry.

The parking meter rate at the Cross Cancer Institute (CCI) is $1.25 per hour, which is lower than the other parking meter rates in the area. As indicated previously, the Southfield Parkade is the primary parking facility for visitors to the CCI and, as a result, they pay the University's visitor parking rates.

Canadian Blood Services Provides a limited number of free surface parking stalls for donors. Any visitors wishing to park in the University's L Lot or Capital Health's West parkade, the closest public parking facilities, would be subject to the respective hourly parking charges.

Most of the private parking lots in the area charge between $2.00 and $2.50 per hour; however, at these facilities the daily rates are lower than those at the University. At the privately-run parking facilities, daily rates range from $5.00 and $8.50 per day.

2.5.3 Central Business District Parking Charge Comparisons

A comparison of monthly rates at private parking facilities was completed to determine how University Area parking rates compare to other parking charges in the City. As noted previously, the rates vary depending on the location and type of facility as well as the facility operator.

Excluding the University's 24-hour reserved stalls, permit charges in the university area range from a low of $43.51 per month for surface parking at the UAH to $87.00 per month for an underground stall on the north campus. In Edmonton's central business district, the rates for monthly parking passes also vary greatly. Underground heated facilities in the core of the Central business district charge as much as $200 per month while there are some non-energized surface lots at the east end of downtown that charge as little as $25 per month. In general, most energized parkade stalls in Edmonton's downtown core cost between $90 and $130 per month. Parking charges in the university are lower than monthly parking charges in Edmonton's Central Business District.

2.6 Traffic Volumes

As indicated in the LRDP, traffic congestion is considered a significant issue in the University's campus areas, and one of the driving factors behind the initiation of the Travel Demand Management Study. Traffic volumes in the University area are high and the congestion experienced during the AM and PM

peak hours is similar to the congestion experienced in the Central Business District. Traffic counts completed by the City of Edmonton indicate that:

- 114 Street between Belgravia Road and University Avenue carries approximately 44,000 vehicles per day;
- University Avenue carries around 27,000 vehicles per day;
- 87 Avenue carries around 19,000 vehicles per day, and;
- 109 Street adjacent to the University carries around 30,000 vehicles per day.

Due to the grid road network and location of river crossings, traffic through the North Campus area includes both vehicles destined to the university area as well as to other locations, most notably the downtown core. Without specific traffic counts, it is hard to determine what proportion is destined for the University.

Peak hour traffic volumes usually correspond to around 10% of the daily traffic volumes and represent the critical time periods against which traffic congestion is measured. **Exhibit 2-4** illustrates the peak hour traffic volumes from the City's monitoring program for roadways in the University area.

The City of Edmonton monitors congested intersections and keeps track of intersections that have volume-to-capacity ratios (v/c) greater than 0.8. The volume-to-capacity ratio describes the extent to which the traffic volumes can be accommodated by the physical capacity of the road configuration and signal control. A value of less than 0.80 indicates that generally there is ample capacity and good traffic conditions exist. A value between 0.80 and 0.90 indicates that there may be occasions when the intersection experiences congested operations. A value between 0.90 and 1.0 suggests that unstable operations may occur and that the intersection is operating near capacity. **Table 2-8** summarizes the congested intersections in the North Campus area, as published by the City of Edmonton in 2003. The Transportation Department has indicated that there have been no major changes in the intersection status since the map was published in 2003.

Table 2-8: Congested Intersections Summary

Intersection	V/C Rating
Belgravia Road/Fox Drive	>0.90
Belgravia Road/114th Street	>0.90
76 Avenue/114th Street	>0.90
University Avenue/114th Street	>0.90
Whyte Avenue/112th Street	>0.90
87 Avenue/112th Street	0.80-0.89
Whyte Avenue/109th Street	>0.90
87 Avenue/ 109th Street	>0.90
Walterdale Hill/109th Street	0.80-0.89

Exhibit 2-5 illustrates the location of these intersections relative to the University campuses and verifies the well known fact that 114 Street is an extremely congested corridor in the City.

Traffic Generators

In addition to the residential and commercial development in the greater North Campus area, the three primary traffic generators are the University of Alberta, Capital Health and the Cross Cancer Institute.

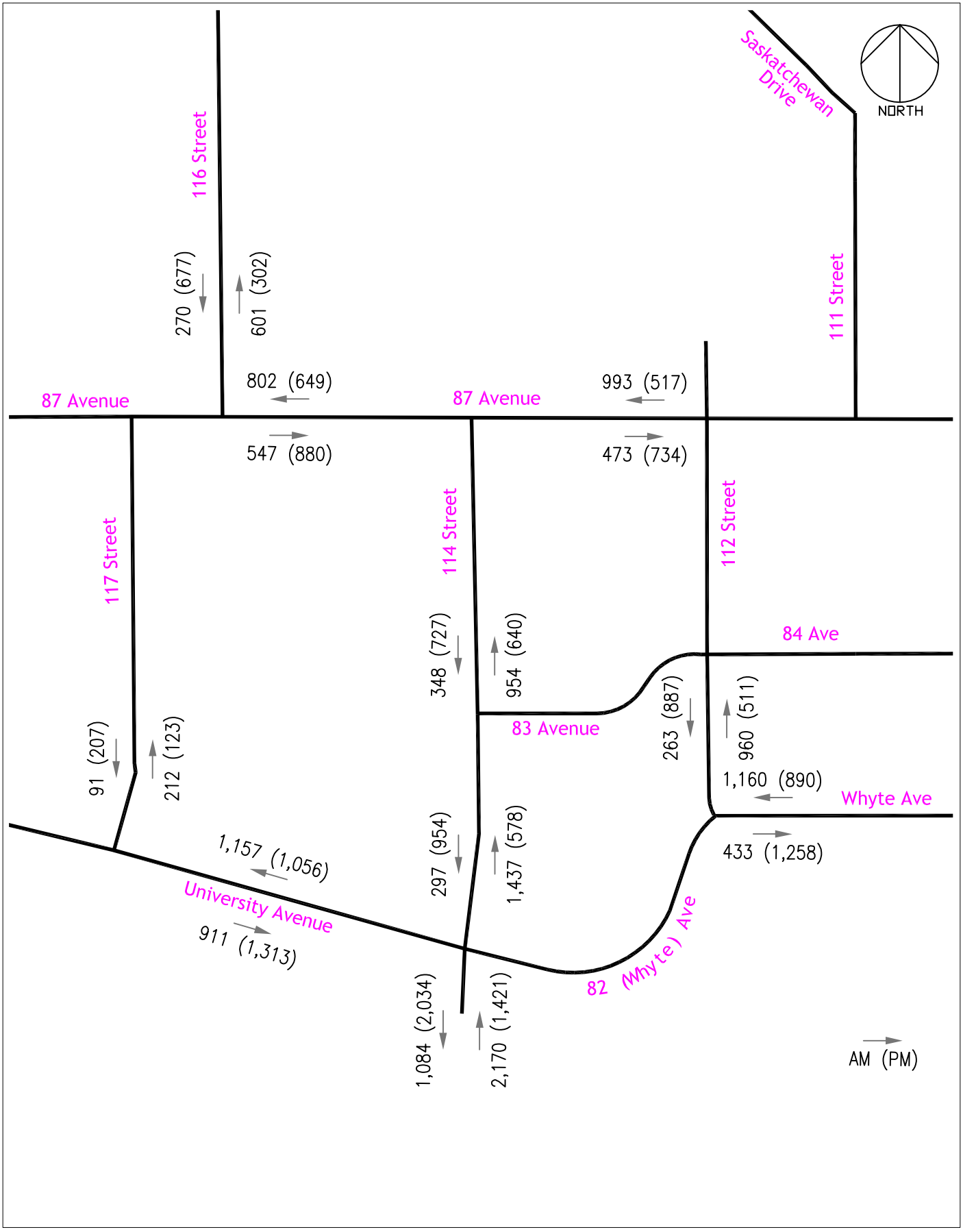


Exhibit 2-4

Existing Peak Hour Traffic Volumes

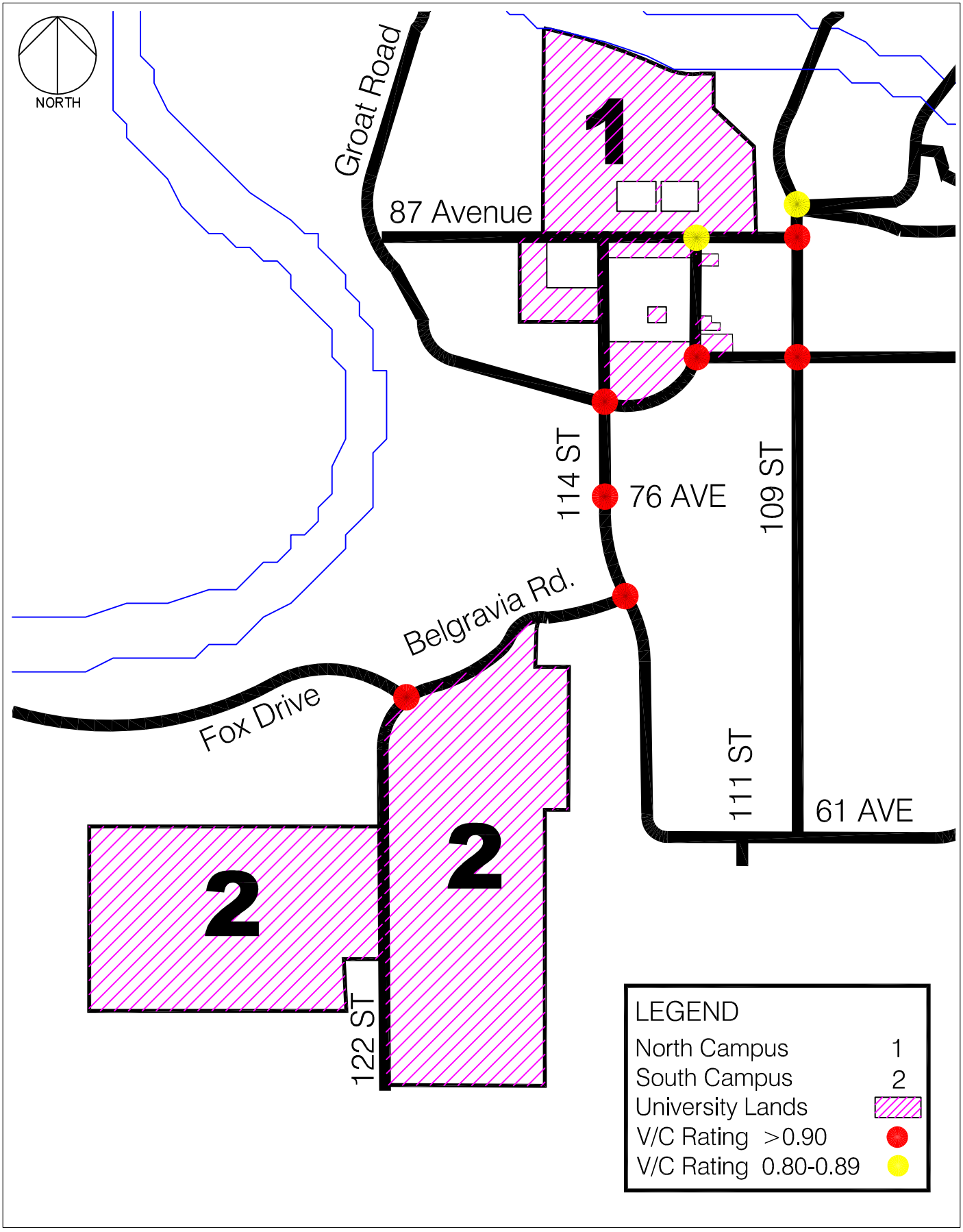


Exhibit 2-5

University Area V/C Ratios

2.7 Transit Activity

The North Campus is well served by Transit. The University Transit Station is one of the largest transit stations in the City and is serviced by both on-street and LRT transit services. During peak hours the University is served by 19 Edmonton Transit routes including LRT, and by St. Albert Transit and Strathcona County Transit. As LRT expands to South Campus, Southgate, and ultimately to Century Park, the bus service pressures at North Campus area expected to lessen, as new routes take buses into LRT stations further south.

South Campus will be well served by transit, within the next two years, with the completion of the LRT station and transit facility in 2008.

Michener Park is served by bus routes on 51 Avenue and 122 Street.

Faculté Saint-Jean is well-served by transit, with bus routes on Rue Marie Gaboury, and on the nearby Whyte Avenue. The University also operates a shuttle service between North Campus and FSJ.

University Downtown is served by its direct connection to the Bay LRT Station, as well as by many bus routes along Jasper Avenue.

2.7.1 Transit Fares

The transit authorities operate on pay-as-you-ride systems. Payments are typically made in the form of cash fares, bus tickets or daily/monthly passes. The three transit authorities serving the University's North Campus area establish their fares individually. With respect to evaluating the costs of commuter travel, the monthly pass charges are the most relevant. **Table 2-9** summarizes the monthly bus pass charges for the local transit authorities serving the University Area.

Table 2-9: Summary of Monthly Bus Pass Charges (March 2006)

Transit Authority	Type of Pass	Monthly Charges
Edmonton Transit	Adult Monthly Pass	$59
	Post Secondary Student Monthly Pass	$54
St. Albert Transit	Adult Commuter Monthly Pass	$72
	Post Secondary Student Bus Pass	$244 for four months ($61/month)
Strathcona County Transit	Adult Commuter Monthly Pass	$66
	Post Secondary Student Monthly Pass	$56

Comparing the monthly transit pass rates in Tables 2-9 to the monthly parking pass rates illustrated in Table 2-6 and 2-7, the only rates which are significantly

greater than a transit pass are those of the underground parking facilities and some of the private parking facilities. From a price perspective, there is not a lot of incentive to purchase a bus pass instead of a parking pass.

2.8 Pedestrian and Bicycle Activity

In addition to travel via vehicle and transit pedestrian and bicycle modes are well represented at the North Campus. There are a significant number of bicycle parking facilities on the north campus, and the large quantity of multi-family housing within walking distance to the North Campus promotes walking to and from the campus.

3.0 EXISTING PARKING AND TRAVEL CHARACTERISTICS ASSESSMENT

As indicated in Section 1.0, the University of Alberta is planning for a significant amount of growth. The University of Alberta's Long Range Development Plan (LRDP) was developed to assist in setting general development guidelines, building use, the location of roadways and pedestrian facilities and open space at the University Campuses. The LRDP segmented the campus sites into Sectors. The North Campus was divided into eleven sectors, the South Campus into five individual sectors, Faculté Saint-Jean into a single sector, and Michener Park was divided into two sectors. This section, specifically the analysis of existing parking demand has used the sectors identified in the LRDP as the basis for description.

3.1 Functional Parking Analysis

The primary focus of this functional parking analysis is the North Campus. As indicated in Section 2.0, the South Campus and the Faculté Saint-Jean have relatively small parking inventories at this time, and limited development when compared to the North Campus. It is anticipated that the results of the functional parking analysis completed will be applied to these campuses as they develop. Michener Park primarily operates as a residential development, with very different parking requirements, associated strictly with residential use. As a result, a detailed parking analysis was not completed for the Michener Park campus site.

The functional parking analysis divides the North Campus into 14 parking zones. The sector boundaries indicated in the LRDP were the basis for the parking zones with four exceptions:

- Since Sector 1 does not include any parking stalls, no parking zones were developed for this sector;
- The Jubilee parking lot is not included in any of the Sectors (because it is owned by the province), and therefore it was considered its own parking zone;
- Parking meters are located throughout the campus area and were considered their own zone, and;
- The health sciences sector was divided into two parking zones in recognition of the significant boundary in this Sector created by 114 Street and the SLRT.

Exhibit 3-1 illustrates the parking zones as they relate to North Campus Planning Sectors.

Parking Zone A (The Faculty Club)

Located in the northwest corner of the campus, this zone includes one surface parking facility (Lot V) and primarily services the Faculty Club. This lot is managed via a pay and display kiosk.

Parking Zone B (Engineering)

Located in the northwest quadrant of the campus, this parking zone includes the ECERF underground parking garage and the Windsor Parkade. The ECERF is a permit-only facility the primarily accommodates staff and faculty parking. The Windsor Parkade is the largest parking facility on campus and is used by both permit and hourly parkers. It is one of the primary student parking facilities; however, staff and faculty are also able to park in this facility.

Parking Zone C (Sciences)

Located in the north central area of campus, this zone includes one surface parking facility (E Lot). Both permit and hourly parking are permitted in E Lot although only staff and faculty are eligible for permits in this lot. The hourly parking at this facility is managed via a pay and display kiosk and is limited to a maximum of 4 hours.

Parking Zone D (Athletics)

Located in the west central area of campus, this zone includes the Stadium Parkade as well as the Varsity Lot and a number of short-term pay and display parking areas. The Stadium Parkade and Varsity Lot accommodate both permit and hourly parking. Stadium Parkade is one of the primary staff and faculty parking facilities while Varsity Lot mainly accommodates student parking demands.

Parking Zone E (Education)

Located in the central area of campus, this zone includes the Education Parkade as well as Lot A and the privately operated surface parking lot owned by St. Stephen's College. The Education parkade accommodates both permit and hourly parking although permits for this parkade are only available to staff and faculty. Due to its central location and accessibility the Education parkade is one of the primary visitor parking facilities.

Parking Zone F (Academic Centre)

Located in the east quadrant of the campus, this zone includes the Timms underground parking garage as well as the surface lots located east of HUB Mall. Both Permit and hourly parking is permitted in the Timms parking facility. It is primarily a staff and faculty parking facility however it also accommodates

visitor parking associated with events at the Timms Theatre and the Telus Centre for Professional Development.

Parking Zone G (NE Campus Housing)

Located on the east edge of the campus, there are three surface parking facilities in this zone (Lots 87, 88 and 89). These lots are only available to permit holders and primarily accommodate commuting and residential students.

Parking Zone H (Lister Hall)

Located in the south west area of campus, this zone includes the surface parking facilities surrounding Lister Hall and the Southfield underground parking garage. The surface parking lots accommodate student, staff and faculty and visitor parking. The Southfield parkade accommodates both permit and hourly parking, and given its location, it is the primary parking facility for visitors to the Cross Cancer Institute. The University also supplies the Cross with permits to accommodate the Cross' staff parking requirements. By agreement, Cross Cancer needs are accommodated in 483 of the 769 available stalls.

Parking Zone I (Health Sciences)

Located in the south central portion of campus, this zone includes three surface parking facilities. The Clinical Sciences East Lot and Lot C are visitor parking facilities managed via pay and display kiosks. L Lot is the primary parking facility for Corbett Hall and accommodates staff, faculty and student permits as well as hourly parking.

Parking Zone J (Health Sciences West)

Located in the south portion of campus directly west of 114th Street, this zone includes a number of surface parking lots. Currently and temporarily, Lot F is leased to Capital Health to accommodate their contractor parking requirements, while a new wing is under construction. The EDC Lot, Lot J and Lot K are only available to staff and faculty permit holders while Lot 85 is an hourly parking facility managed via a pay and display kiosk.

Parking Zone K (Newton Place/Extension)

Located in the southeast quadrant of campus, this zone includes one parking facility, the Extension Parkade. This parkade is an underground facility that accommodates hourly and permit parking. The majority of permit holders in this facility are staff and faculty although permits are also available to students.

Parking Zone L (Jubilee Lot)

The Jubilee Lot is centrally located on campus and although it is owned by the Province of Alberta, the University operates the parking lot during the day. As a result of an agreement between the Province and the University of Alberta, the Jubilee lot is subject to use restrictions; however, these do not often impact the

facility during daytime operations. The Jubilee Lot is one of the primary student parking facilities, and accommodates visitors to the hospital.

Parking Zone M (Meters)

The parking meters are distributed across campus. There are 75 parking meters on campus and around 82 loading zone stalls on campus. The loading zone stalls have 30 min time limits and have not been included in the detailed parking inventory summary.

Table 3-1 summarizes the North Campus parking inventory by Zone

Table 3-1: Parking Supply by Zone (October 2005)

Parking Zone	Planning Sector		Facility								Zone Totals
			U/G Garage	Structure	Surface						
A	2	Faculty Club			Lot V						
					91						91
B	3	Engineering	ECERF	Windsor							
			103	1,740							1,843
C	4	Sciences			Lot E						
					144						144
D	5	Athletics		Stadium	Varsity	Stadium East	Stadium North	Stadium South	Phys Ed East		
				959	234	15	16	11	38		1,273
E	6	Education		Education	Lot A	St. Stephen's East					
				540	36	15					591
F	7	Academic Centre	Timms		Lot N	Lot U	Lot 700				
			326		457	225	21				1,029
G	8	NE Campus Housing			Lot 87	Lot 88	Lot 89				
					113	59	100				272
H	9	Lister Hall	Southfield		Lot M	Lot R	Lot T				
			769		62	73	142				1,046
I	10	Health Sciences			Lot L	Clinical Sciences East	Lot C				
					510	12	34				556
J		Health Sciences West			EDC	Lot F	Lot J	Lot K	Lot 85		
					77	90	31	33	47		278
K	11	Newton Place/Extension	Extension		Lot 84						
			256		86						342
L		Jubilee			Jubilee						
					913						913
M		Meters								Meters	
										75	75
Totals			**1,454**	**3,239**	**3,685**					**75**	**8,453**

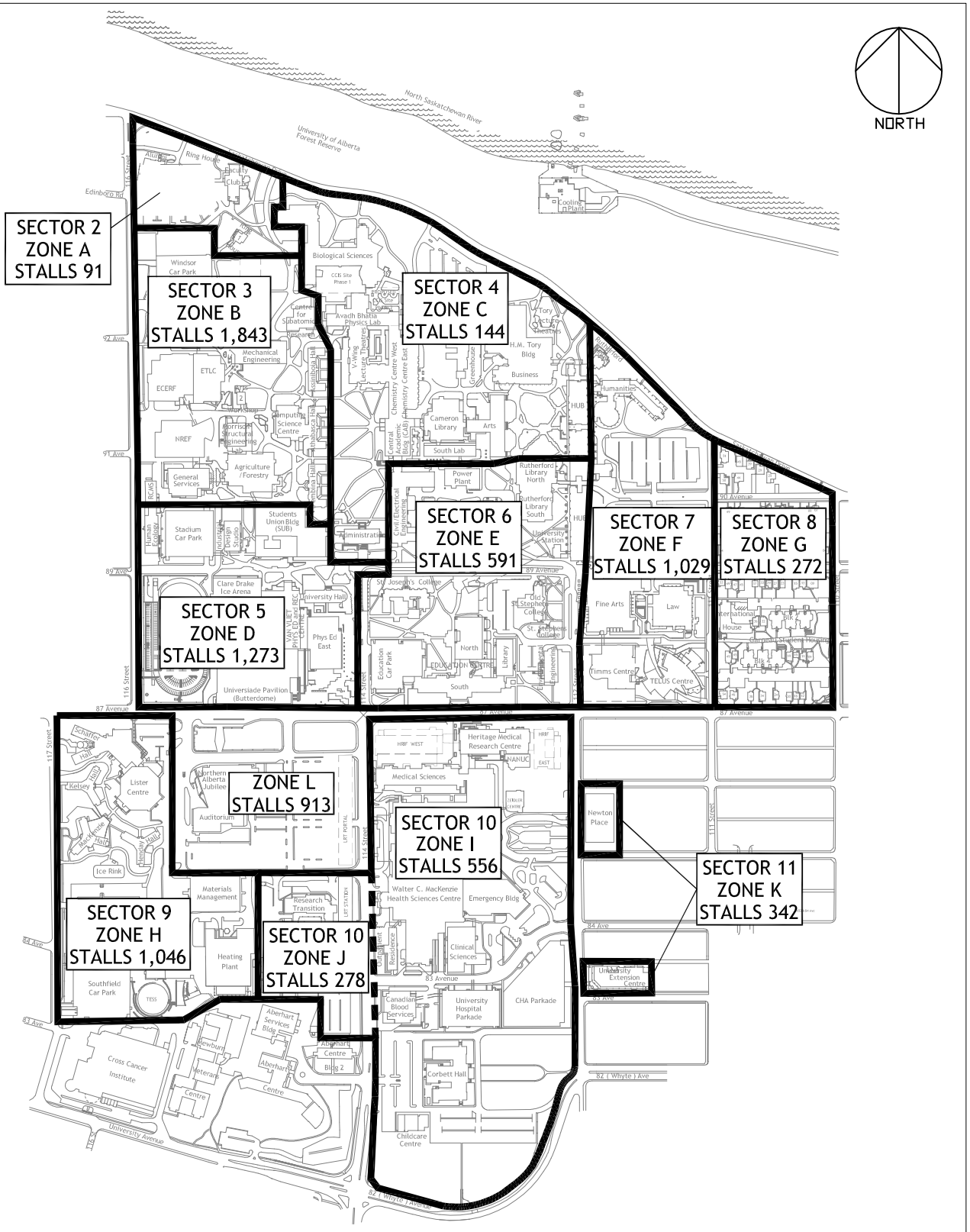


Exhibit 3-1

University of Alberta North Campus Parking Zones

3.2 Parking Surveys

The parking survey program involved collecting information on the parking characteristics of people traveling to and from the University area. Three different surveys were undertaken:

- Auto occupancy surveys;
- Intercept surveys, and;
- Parking accumulation surveys.

These surveys were completed over a two-week period between March 21 and April 2, 2005. The methods used in the surveys included observations, interviews and counts. Surveys were typically completed during AM and PM peak hours except for the accumulation surveys which were completed at strategic times throughout the day. The data gathered during the surveys included information on:

- Typical auto occupancy rates of vehicles travelling to and from campus;
- Parking accumulation and peak usage patterns of the parking facilities;
- Travel mode of people commuting to campus;
- Parking preferences including reasons for parking and locational preferences and;
- Destination on Campus.

3.2.1 Auto Occupancy Survey Summary

The auto occupancy surveys involved visual observations of the vehicles and number of occupants at parking lot/structure access points. Typically these surveys were completed during the PM peak hour however an AM peak, weekday evening and weekend afternoon surveys were also completed. The surveys were completed at Stadium, Windsor, and Education parkades as well as the Jubilee, L and N/U surface parking lots. The results of these surveys are summarized in the **Exhibit 3-2**.

Exhibit 3-2: Visual Auto Occupancy by Facility

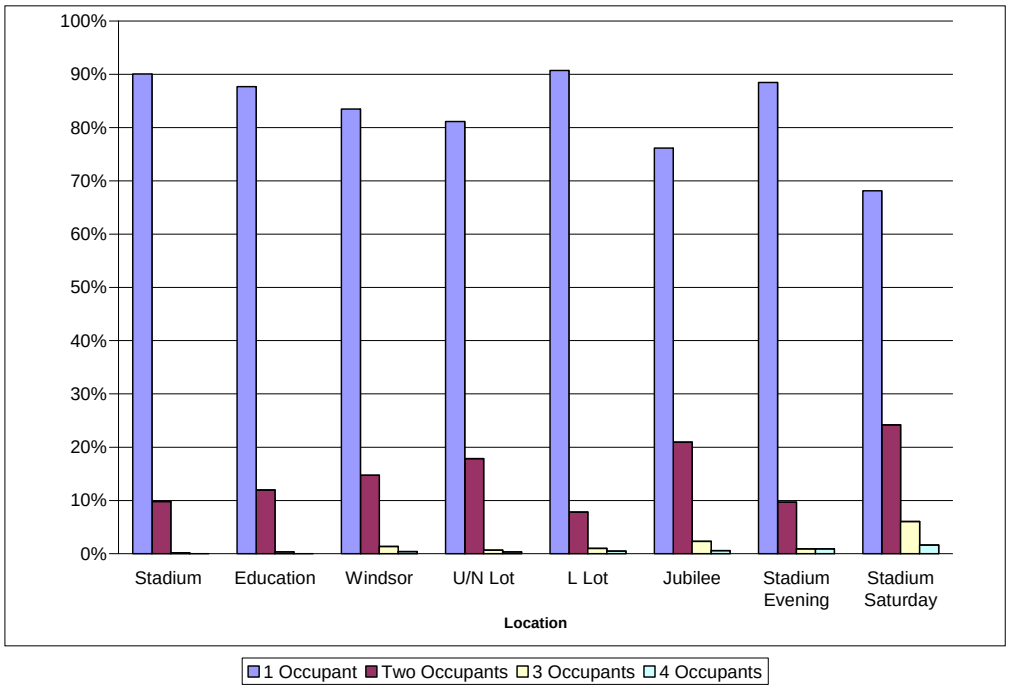


Exhibit 3-2 illustrates that the majority of vehicles accessing the University of Alberta's parking facilities are single occupant vehicles (SOV). It is also noted that the parking facilities experiencing the highest percentage of single occupant vehicles are mainly designated as staff/faculty/visitor parking facilities. At the facilities where students are permitted to purchase parking passes, higher percentages of multiple occupant vehicles were observed.

3.2.2 Intercept Survey Summary

The main focus of the survey program was the intercept surveys that were completed at various locations on North Campus. These were grouped into two main categories: a) those completed at parking facilities (Parking Facility Survey), that captured the travel characteristics of people traveling to and parking on campus, and b) those completed at various locations on campus (Campus Location Survey) that captured the travel mode of the interviewee and, if they were drivers, their parking characteristics. Between March 21, 2005 and March 31, 2005, approximately 450 Parking Facility Surveys and 300 Campus Location Surveys were completed. The Parking Facility surveys were typically completed between 7:00 AM and 9:30 AM and targeted people who had parked their vehicles and were heading onto campus. The Campus Location surveys were typically completed between 11:00 AM and 1:00 PM and targeted the general campus population walking through CAB, SUB and HUB during the survey times. Copies of the survey forms have been included in **Appendix A.**

The data collected during the intercept surveys included information on:

- Gender
- Destination and Purpose for being on Campus
- User Group (employee or student designation)
- Travel mode and/or auto occupancy
- Parking permit information
- Duration of stay on campus
- Reason for selecting parking location

Participation in the survey was entirely voluntary and the information collected was entirely anonymous. Postal code information was collected; however, only the first three digits of this information were used to help determine where parking facility users were traveling from.

Parking User Groups

Undergraduate and Graduate Students – Students make up the majority of the campus' population and were the largest user group survey. 55% of all survey respondents were students. In addition to being a student, they were asked to define whether they were undergraduate or graduate students and whether they were part-time or full-time students.

Staff and Faculty – Staff and Faculty were asked to define whether they were part-time or full-time employees of the University. Staff made up 30% and faculty made up 10% of the total survey population.

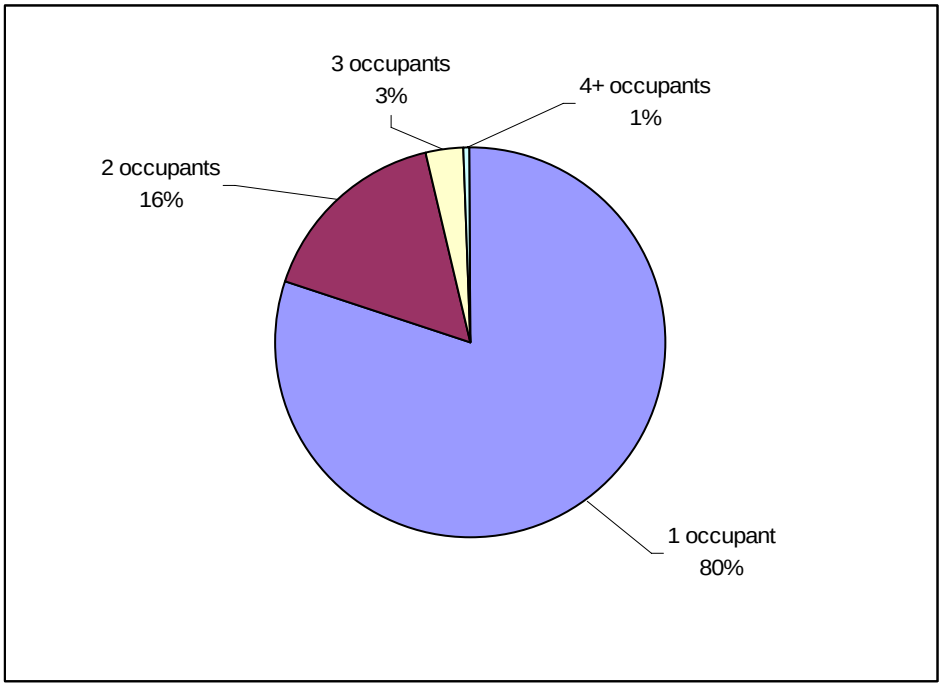
Visitors and Other – The number of visitors to campus changes regularly depending on the time of day, day of week and special events on campus. There are a number of events and attractions, including open houses, concerts and sporting events that attract visitors to campus. These events typically do not occur during the weekday peak period, when parking demands are at their peak and as a result parking demands associated with most extracurricular events do not impact the peak parking demand on campus. As the surveys were completed during typical weekdays the number of visitors surveyed was quite small at around 5% of the total survey population.

The Parking Facility survey included a higher proportion of staff, while the Campus Location Survey included a higher proportion of students. The variance is probably reflective of the specific locations and times of the day during which the surveys were completed. The Parking Facility and Campus Location Survey population breakdowns are included in Appendix A.

Auto Occupancy

The visual occupancy surveys revealed that approximately 84% of vehicle trips to and from campus are single occupant vehicle trips. The percentage of single occupant vehicles obtained from the intercept surveys was slightly lower than the visual occupancy surveys at 80% rather than 84%. Thus, it is reasonable to say that at least 80% of vehicles traveling to campus travel as single-occupant vehicles. **Exhibit 3-3** illustrates the intercept survey auto occupancy results.

Exhibit 3-3: Intercept Survey Auto Occupancy



In terms of auto occupancy, the results indicate that the University of Alberta has average auto occupancy of 1.2 people per vehicle. This auto occupancy is in line with typical auto occupancy assumptions for developments in urban settings.

According to University of Alberta statistics, the gender split on campus is 44% Male and 56% Female. **Table 3-2** summarizes the survey results by gender.

Table 3-2: Summary of Auto Occupancy by Gender

Number of Occupants	Male	Female	Total
1 occupant	34%	46%	80%
2 occupants	8%	8%	17%
3 occupants	1%	2%	3%
4+ occupants	1%	0%	1%

The results indicate that more females drive to campus. In addition, the results

indicate that more females drive single occupant vehicles, suggesting that female drivers may be more prepared to pay for the convenience of parking.

Evaluating the auto occupancy survey results against the overall campus population gives insight into how the results relate to the different user groups on campus. **Table 3-3** summarizes the survey results by user group.

Table 3-3: Auto Occupancy by User Group

	Students	Faculty	Staff	Other	Total
1 occupant	70%	92%	85%	76%	80%
2 occupants	23%	8%	12%	24%	16%
3 occupants	6%	0%	2%	0%	3%
4+ occupants	1%	0%	0%	0%	1%

The results indicate that the majority of staff and faculty travel to campus in single occupant vehicles, and that, students have higher rates of multiple occupant vehicles. There are no high occupancy vehicle incentives on campus, thus it is concluded that high occupancy vehicles choose to do so because they can reduce costs associated with traveling to and from campus by sharing the costs of parking permits and fuel.

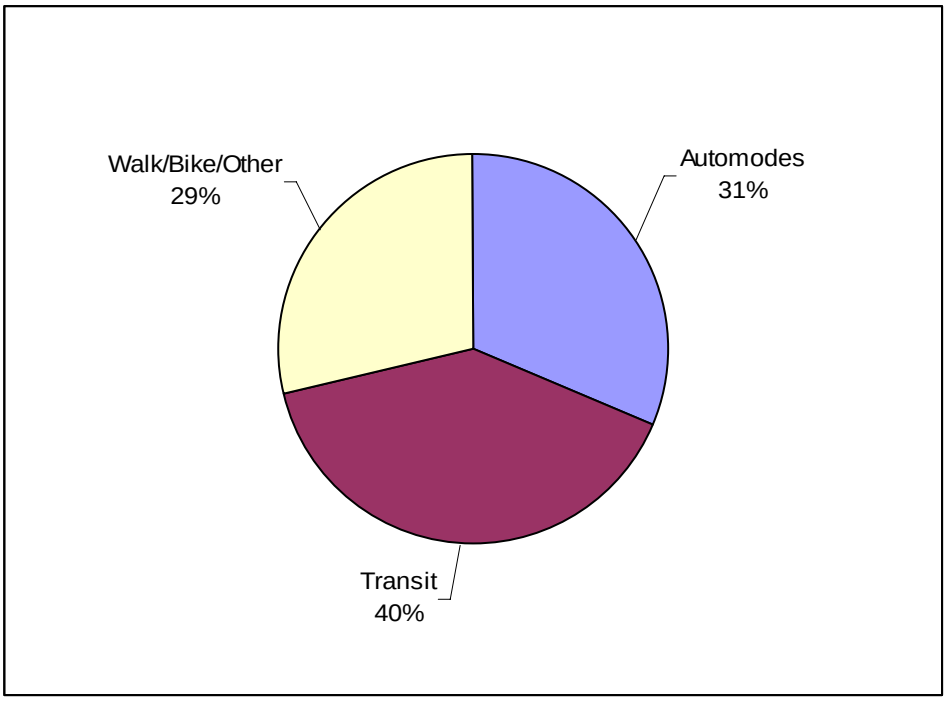
Mode-Split and Transit Ridership

There are many factors impacting mode split transit ridership at the University, some of them include:

- Cost of transit,
- Cost of parking,
- Supply of parking,
- Transit capacity and routing,
- Travel time,
- Duration of stay on campus, and
- Regularity of trip to campus.

Surveys conducted on campus in the spring of 2005 indicate that transit trips represent approximately 40% of all trips made to campus. **Exhibit 3-4** illustrates the overall mode split on campus as obtained from the March 2005 surveys. It should be noted that auto modes includes both people who are parking on campus as well as those who are being dropped off.

Exhibit 3-4: Summary of Mode Split



These results indicate that transit is a main mode of travel to and from the University. When compared to results from the City of Edmonton's Central Business District Cordon Study (2004) we see that transit ridership to the university area is slightly higher than transit ridership into City's central business district. The 2004 CBD Cordon Study indicated that approximately 34% of persons traveling to the downtown core did so via transit.

As with the auto occupancy information the mode-split information was analyzed against both the gender split and the user groups to determine the mode split by gender and user group.

Table 3-4 summarizes the mode split data weighted by gender.

Table 3-4: Summary of Mode Split by Gender (weighted)

Mode	Male	Female	Total
Auto Modes	11%	20%	31%
Transit	18%	22%	40%
Walk/Bike/Other	15%	14%	29%

The results indicate that a significantly higher percentage of females use auto modes and although the difference is less significant a higher proportion of females also use transit.

Table 3-5 summarizes the mode-split results by user group.

Table 3-5: Mode Split by User Group

Mode	Students	Faculty	Staff	Other	Total
Auto-Modes	26%	53%	54%	75%	31%
Transit	43%	7%	36%	25%	40%
Walk/Bike/Other	31%	40%	11%	0%	29%

Table 3-5 indicates that students represent the only campus user population within which the percentage of transit users is higher than the percentage of auto-modes. Faculty and staff represent a very small percentage of transit riders. The majority of visitors to campus travel by auto modes.

It is worth noting that the student mode split results (26% auto modes, 43% Transit and 31% Walk/Bike/Other) support the results of the Student's Union 2002 survey. The Student's Union survey indicated that approximately 24% of students surveyed used auto modes, 43% used transit and 32% percent used walk/bike/other modes.

Parkers

The auto-mode group includes both those people who drive to campus and park their vehicles and those people who are dropped off. The majority of the auto-mode groups drive to campus and park. Based on the weighted calculation, approximately 24% of the auto-mode group parks and 9% of the auto-mode is dropped off. Looking only at those who drive to campus, 27% drop people off, and 73% park.

Table 3-6 illustrates the parking demand as it relates to the different user groups on campus.

Table 3-6: Percentage of Parking

User Group	Students	Faculty	Staff	Other	Total
Percentage	46%	13%	40%	1%	100%

Although staff and faculty only represent 25% of the campus population, they create approximately 53% of the parking demand on campus. This is in line with the parking permit information from the University, which indicates that approximately 52% of all permits are issued to staff/faculty.

Other Intercept Survey Findings

In addition to the auto occupancy and mode split summaries the following information was also obtained from the surveys.

- The majority of parkers at the University use parking permits. Approximately 90% of survey participants indicated that they had a parking permit.

- On average, students make 4.3 trips per week to the University; Staff and Faculty make an average 4.5 trips per week to the University.

- "Close to destination" was the most common response (62%) when asked "why do you choose to park at this location?" "Lower price" and "other" were the next most common responses, with 14% stating "lower price" and 19% stating "other." Those respondents stating "other" indicated that they had no choice and took a parking permit wherever it was available, or wanted covered and/or energized parking. In addition, the female respondents chose "close to destination" more than males did and thus inferring that female parkers are more particular about where they park.

- The University was the most common destination for people parking on campus, although 4% of the survey respondents indicated that they were destined to the Hospital or Capital Health facilities.

- 47% of respondents lived in neighbourhoods on the south side of the City, 27% lived in neighbourhoods located north of the River, and 25% lived in communities outside of the City.

Capital Health Intercept Surveys

The University and Capital Health manage their parking facilities separately; however, given the integrated nature of the facilities, evaluating the parking characteristics of both facilities was considered an integral component of the TDM study. To accomplish this, a Parking Facility intercept survey was completed at Capital Health's West Parkade.

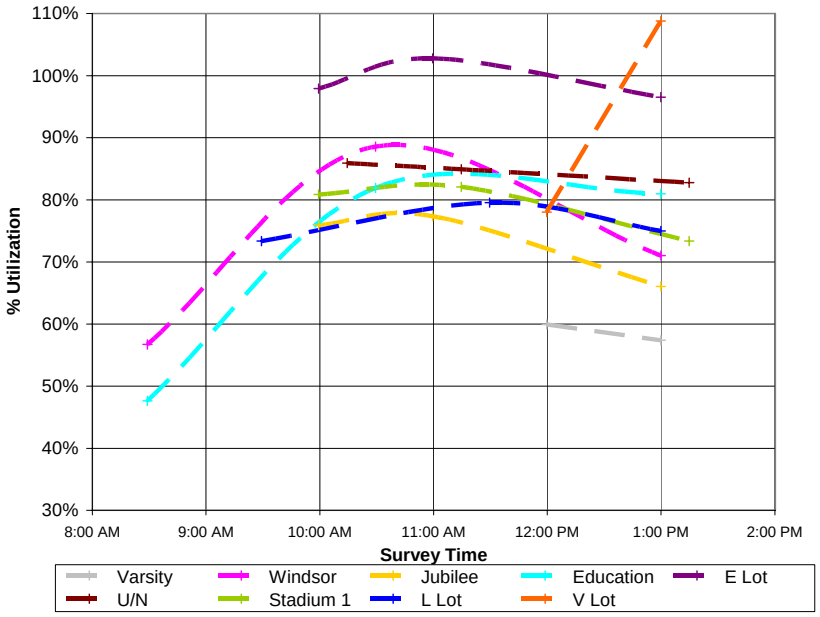
The intercept surveys indicated that the majority of people parking in the West Parkade were destined to Capital Health facilities. In addition, the survey results from this location had a higher percentage of single occupant vehicles with just over 90% of those interviewed traveling in single occupant vehicles.

3.2.3 Parking Accumulation Survey Summary

The parking accumulation surveys were completed between March 31st and April 7th 2005. Parking Services indicated that their accumulation surveys show that campus parking facilities typically achieve their maximum utilization between 10:30 and 11:30 AM. **Exhibit 3-5** on the following page illustrates the survey results.

Peak Utilization of the majority of parking facilities is between 80% to 90% utilization; however, as illustrated in Exhibit 3-7, there were three exceptions to this observation: a) Varsity Lot, located to the west of the Butterdome, b) V Lot, servicing the Faculty Club, and c) E Lot, located north of the Earth Sciences Building.

Exhibit 3-5: Accumulation Survey Results



The Varsity Lot survey indicated very low utilization in comparison to the other facilities. The reasons for this low utilization are not clear. In V Lot and E Lot, utilizations of over 100% were observed. This means that the number of vehicles parked in these lots exceeded the number of designated parking stalls in the lot. Reasons for this high utilization are most likely related to the location of the parking facility and the areas of campus serviced. E Lot is the only lot on the north side of the campus and it is fairly typical for parking facilities in under supplied areas experience high utilization. V Lot also experienced high utilization and reached its peak later in the day. Given the fact that this lot serves the Faculty Club which caters to numerous dining events, this observation is not unexpected.

Capital Health Accumulation Surveys

The accumulation surveys completed in Capital Health's East and West Parkades indicated that the peak accumulation in the Capital Health parking facilities occurs between 1:00 PM and 2:00 PM which is later than the peak accumulation at the University parking facilities.

The Capital Health Facilities experience higher utilization rates than the University's parking facilities. Parking accumulation surveys indicated that the peak utilization of the east parkade is around 84% and the peak utilization of the west parkade is around 94%. Capital Health completes daily vacancy counts in its facilities and these counts indicate that there are occasions when their parking facilities experience 100% utilization.

3.4 Peak Parking Demand Profile

Zonal Utilization

The number of utilized stalls in each zone was calculated based on the measured peak parking demands. For zones in which count information was not available, a utilization rate of 84% was assumed. In addition, it was assumed that the parking meters operate at around 95% utilization during the peak period. **Exhibit 3-6** illustrates the observed zonal utilization while **Table 3-7** summarizes the peak parking demands for each of the parking zones. The total number of occupied spaces during peak utilization corresponds to approximately 84% of the overall stall capacity on campus. From the profile, it was determined that peak parking demand on campus occurs around 11:00 AM.

Table 3-7: Utilization by Zone

Parking Zone	Planning Sector		Total Stall Inventory	Utilization	Utilized Stalls
A	2	Faculty Club	91	78%	71
b	3	Engineering	1,843	88%	1,629
c	4	Sciences	144	100%	144
d	5	Athletics	1,273	80%	1,012
e	6	Education	591	88%	518
f	7	Academic Centre	1,029	85%	874
g	8	NE Campus Housing	272	83%	226
h	9	Lister Hall	1,046	83%	868
i	10	Health Sciences	556	80%	442
j		HS West	278	83%	231
k	11	Newton Place/Extension	342	83%	284
l		Jubilee	913	77%	706
m		Meters	75	95%	71
		TOTAL	**8,453**	**84%**	**7,076**

As illustrated in Table 3-7 it is estimated that the peak parking demand on campus is around 7,100 stalls.

The parking demands illustrated in **Table 3-8** are calculated based on the overall populations and the measured parking demand on campus.

Table 3-8: Peak Campus Parking Demand

User Group	Population (2004)	Parking Demand Ratio
Undergraduate Students	28,737	0.24
Graduate Students	5,880	1.18
Total Students	34,617	0.20
Faculty (academic staff)	3,094	2.25
Staff	9,039	0.77
Total Faculty & Staff	12,133	0.57
Total Campus Population	46,750	0.15

Although some of the parking facilities are restricted to staff and faculty, most of the facilities accommodate a mix of users including staff, faculty students and visitors and as a result, it is difficult to determine the parking demand of the individual user groups.

The LRDP developed a placeholder (until verification by TDM) that parking should be supplied at a rate of 1 stall per 4 students; however, the observations indicate that the actual parking demand on campus is lower. Based on the Total Student Demand Ratio illustrated in Table 3-8, the campus' parking demand is actually around 1 stall per 5 students.

It is noted that the Southfield Parkade is primarily utilized by the Cross Cancer Institute. Through an agreement between the CCI and the University, the Cross issues approximately 650 staff parking permits in this facility. In addition, due to its location and the underground pedway, the Southfield parking lot also accommodates a large proportion of the Cross' visitor and patient parking needs. As a check, the parking demand ratios were calculated assuming the Southfield parkade was not part of the University's parking inventory. Under this assumption, the parking demand ratio (based on total students) changes from 0.20 to 0.19. This reduces the campus' parking demands by approximately 8%. However it was decided that, as a conservative measure, the larger demand ratio was more appropriate for use in this assessment.

Facility Utilization by Type of Facility

In addition to the zonal utilization analysis the utilization by facility type was also reviewed. As indicated in Table 3-7**,** the University's 8,453 parking stalls are located in a variety of facility types including, underground parkades, above grade structures and surface parking facilities. **Table 3-9**, summarizes the parking utilization by facility type.

Table 3-9: Utilization by Facility

Facility Type	Stall Inventory	Utilized Stalls	% Utilization by Facility Type
Underground	1,454	1,219	84%
Structure	3,239	2,775	86%
Surface	3,685	3,013	82%
Meters	75	71	95%
Total	**8,453**	**7,077**	**84%**

As indicated in Table 3-9, the underground parkades and structures have slightly higher utilization rates than the surface parking lots. The underground and structured parking facilities represent approximately 58% of the University's parking inventory, and in addition to providing heated and/or energized parking stalls, they offer protection from rain and snow and for the most part are easily accessed and well located on campus.

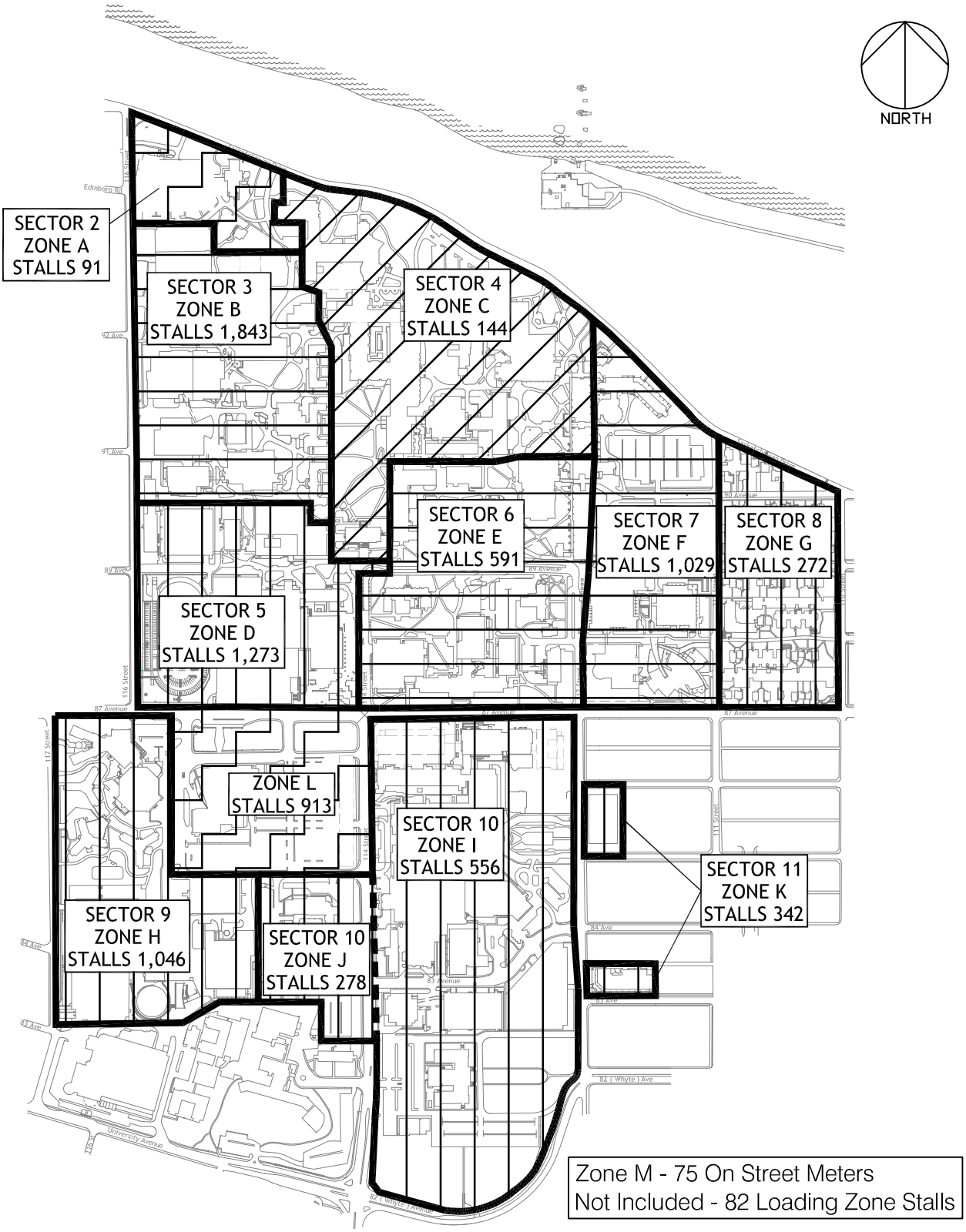


Exhibit 3-6

University of Alberta North Campus Parking Zones & Utilization

4.0 FUTURE GROWTH

The parking survey program and associated intercept surveys provided a solid understanding of the University's current parking and general travel characteristics; however, the effective determination of the transportation needs of the University requires an understanding of its anticipated population growth, development, and their implications on parking demand and supply, and on alternative modes of travel. Specifically, there will be factors that will affect parking supply; there will be factors that influence parking demand; and finally, the balance achieved between these two will influence the alternative travel demands.

4.1 Factors Affecting Growth in Parking Demand

Future parking requirements will depend on how the parking demand and the campus' population change with time. Growth in parking demand will arise from a number of different sources; however, in general, changes in parking demand are related to the population's desire and ability to park on-site, while changes to the campus population are related to the University's development and growth initiatives.

The key factors that will impact the growth of parking demand at the University can be itemized as follows:

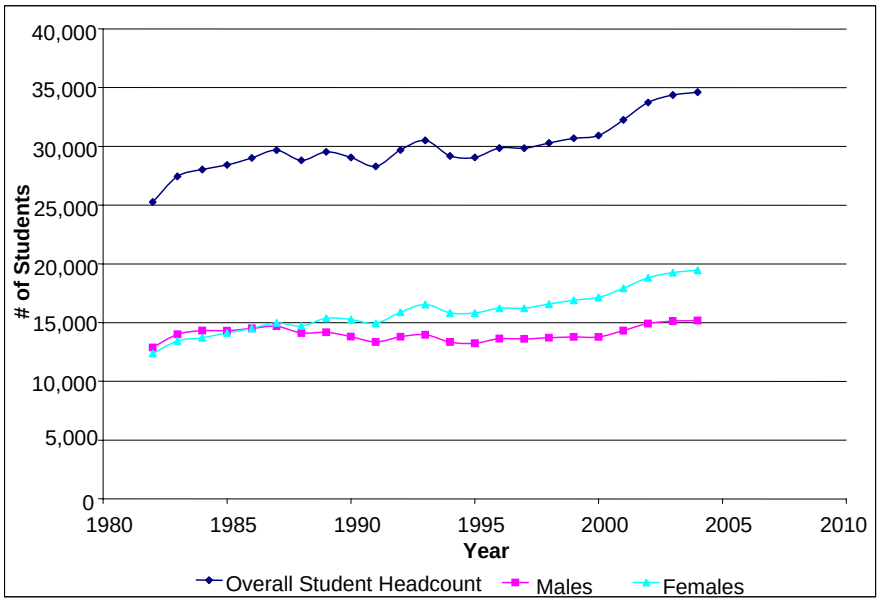
- Student enrolment growth and staff population growth, since the student, staff and faculty populations make up the majority of peak parking demand;
- The development of facilities, required to accommodate the increased population and activity on Campus;
- The extent to which TDM initiatives are implemented;
- The amount of on-campus housing developed, and;
- Although outside the University's jurisdiction, general improvements to city wide transit service.

Student Population Growth

In 2004, student population on campus approached 35,000 including undergraduate and graduate students. Historical data provided by the University indicates that the student population has grown by around 10,000 students in the past 20 years. **Exhibit 4-1** on the following page illustrates historical enrollment at the University. From Exhibit 4-1 it was determined that

on average, enrollment at the University has increased by approximately 2% per year since 1980.

Exhibit 4-1: Historical Student Enrollment



In addition to the historical data, the Academic Plan Task Force Report (2001) indicated that undergraduate growth of between 1% and 2% per year and graduate student growth of around 4% per year is anticipated through 2010.

For the purposes of this assessment, population growth was projected using a 2030 horizon as per the timelines laid out in the LRDP. To meet the population projections laid out in the LRDP and the Academic Plan Task Force Report, an undergraduate student growth rate of 1.5% (average annual) and a graduate student growth rate of 4% per year were assumed for the short term. This calculation estimates that by 2010 the total student population will be about 38,500.

In calculating the long term population, the LRDP indicated that, in the 30-year time frame, the University anticipates that total enrollment could reach 45,000 students, which implies slower growth beyond 2010. As a result, the population estimates for beyond the 5-year horizon were calculated assuming an undergraduate growth rate of 1% per year and a graduate student growth rate of 2% per year. The calculations estimate the total population will be approximately 45,200, which is in line with the LRDP estimates.

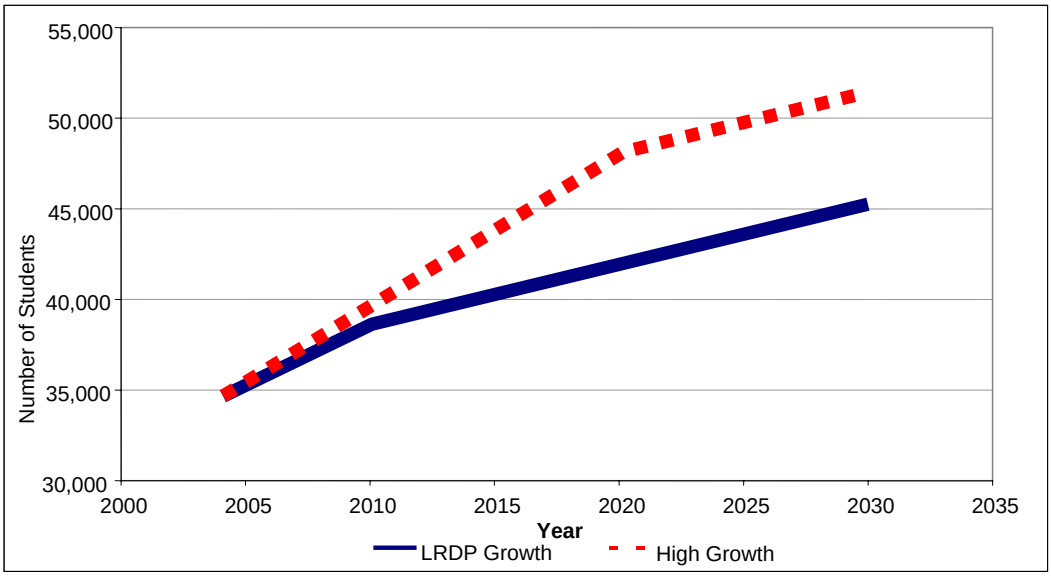
Notwithstanding the above, in the fall of 2005, the Provincial Government announced that they would like to see participation in post-secondary education increase by 60,000 places by the year 2020. Based on its existing share of the

province's post-secondary student population, the University estimates that its population could grow to 50,300 by 2020. With respect to population distribution, the Augustana Campus LRDP estimates a long-term population of around 2,000 students, and thus it is estimated that, under the high population growth scenario, the University of Alberta Edmonton campus populations could reach 48,000 students by about 2020. As per the existing LRDP, it is assumed that the South Campus could accommodate up to 12,000 students and the Faculté would grow to 1,000 students.

This high growth population assumption will require a significant infrastructure investment and to date, no commitments beyond what is identified in the current Capital Plan have been made. Due to the high degree of uncertainty associated with the high population scenario, the assessment presented in this study focuses on the growth assumptions as indicated in the LRDP. Where applicable, commentary on the impacts of the high growth scenario has been included. **Exhibit 4-2** illustrates the projected student populations.

It is recognized that these growth rates are highly dependent on demographic trends, funding availability and the ability for campus facilities to accommodate additional students and research. As a result, actual enrollment may be different from the projections.

Exhibit 4-2: Student Enrollment Projections



Faculty and Staff Population Growth

To accommodate the growth in research and teaching, the University anticipates Faculty and Staff populations will also increase. A review of historical information indicates that the overall staff population has, on average, grown at a rate of about 1% per year since 1991. It is also noted that the staff to

student ratio has remained relatively constant. The academic staff to student ratio is around 0.1 academic staff (head) to student and the non-academic staff (head) to student ratio is around 0.25. The staff population projections were calculated using these ratios and the aforementioned student population projections. **Table 4-1** and **Table 4-2** illustrated the faculty and staff populations for the LRDP and the High Growth assumptions from Figure 4-2 respectively.

Table 4-1: Faculty and Staff Projections (Heads) LRDP Growth

	2010	2020	2030
Total Students	38,500	41,900	45,200
Academic Staff	3,600	3,900	4,200
Non-Academic Staff	9,600	10,400	11,300
Total Staff	13,200	14,300	15,500

Table 4-2: Faculty and Staff Projections (Heads) High Growth

	2010	2020	2030
Total Students	39,600	48,000	51,400
Academic Staff	3,700	4,500	4,800
Non-Academic Staff	9,900	12,000	12,800
Total Staff	13,600	16,500	17,600

Tables 4-1 and 4-2 indicate that to accommodate the University's student population growth at existing ratios, the faculty and staff population would grow to between 15,500 and 17,600 heads by 2030. As a result, the University's long term total population would be between 60,700 and 69,000 heads.

Facility Development

Currently, the University is undertaking a significant building program, with eleven capital projects completed within the last five years, including research and teaching space, residences, utilities and parkade development, and another three facilities under construction. While these new facilities provide much needed space, they are accommodating past and current need rather than the 20- to 30-year future growth. The Capital Plan demonstrates that a significant amount of new and renovated space is required to meet the planned growth identified by the Academic Plan and LRDP. The need is identified at an additional 500,000 gross square metres.

It is clear that this growth will not occur exclusively on North Campus. The LRDP, and the recent University of Alberta document, *Access to the Future: The Investment*, propose the development of the South Campus for academic purposes, to accommodate an estimated 500,000 gross square metres of space, and some 10,000-12,000 students. Faculté Saint-Jean may develop a further 20,000 gross square metres, and North Campus may be able to

accommodate a further 4 building sites, although it is close now to the predicted population size of the LRDP.

Facility development can impact parking demand and supply in two ways:

- Growth in the number of people accessing the University, and therefore the number of trips per day;
- As facilities are developed on North Campus, parking lots will be supplanted.

Travel Demand Management Initiatives

It is anticipated that TDM measures will have a considerable impact on travel trends to the University and may significantly reduce the demand for campus parking. See Section 5.

The University of Alberta is currently working with the Students' Union and the local transit authorities to develop a Universal Transit Pass (U-Pass) for students at the University. Currently, the U-Pass is being explored for undergraduate students; however, the University has indicated that eventually they would like U-Pass to be available to all students, staff and faculty.

Other TDM measures that would affect parking demand on campus include implementation of carpool/vanpool and rideshare programs as well as other high occupancy vehicle parking programs. In addition, increasing the number of people traveling to campus via bicycle and foot would also decrease the demand for parking on campus.

As indicated in Section 2.6 the three main trip generators in the North Campus area are the University, the Hospital and the Cross Cancer Institute and, developing a TDM program for the greater North Campus area, in general, would be the most effective way to reduce single occupant vehicle travel to and from the area. Due to jurisdictional and administrative constraints, the primary focus of this study has been implementing TDM at the University of Alberta; however, this study does provide insight into potential initiatives that Capital Health and the Alberta Cancer Board could explore when developing TDM programs at their facilities.

Student Housing

The Task Force on Residential Capacity Report recommended that "the University expand its overall residential capacity to 13.5% of the student population as soon as this is economically feasible and that the University set a long-term target of housing 15% of its students." The LRDP reiterated this goal and recommended that student housing should accommodate a minimum of 15% of students in the plan horizon.

As indicated in Section 2.2.3, the University has a maximum occupancy of 4,012 units which means that around 11% of the total student population can be accommodated in University-owned housing. Thus, if the University is to adhere to the LRDP goal, it will continue to construct additional housing. Growth in on-campus housing has the potential to reduce the number of commuter trips to and from the campus, which will in turn reduce the demand for parking associated with these trips.

Not all of the University-owned housing is located within the North Campus. The location of campus housing and the transportation connectivity between campuses and housing nodes will have a significant impact on the extent to which the additional housing will reduce commuter trips and parking demand on campus. The impending connection of the North and South Campuses by SLRT by 2008 will enhance the connectivity of campus sites, and will expand potential desirable housing locations.

General Improvements in Transit Service

Typically as cities grow, development densities increase, transit systems expand and transit service levels improve. In addition, with growth, a greater number of vehicles travel during the peak hour and eventually, peak hour trips become longer and more arduous. Combine these factors with increasing fuel costs, and transit often becomes a more attractive and accessible mode of travel. As a result, most large cities see natural or organic shifts towards transit as they grow.

Statistics from the City of Edmonton indicate that transit usage in the City has been increasing. In 2004, the City published the LRT Summary Report and the Central Business District (CBD) Cordon Report. The LRT Summary Report describes trends in LRT ridership between 1998 and 2004. From the LRT Summary Report, it was estimated that the number of passengers on the City's LRT has been growing at an average rate of around 1.4% per year. The CBD Cordon Report summarizes auto and transit trips into the downtown core between 1998 and 2004. From this report it was determined that transit trips to and from the CBD have, on average increased by around 1.9% per year. It is inferred that these growth rates are associated with the City's growth and transit service improvements and are thus more organic in nature and will continue to occur as the City grows.

With respect to the University, it is anticipated that mode split to transit will also increase as the City at-large grows and transit service improvements are implemented. The University campuses have different mode split trends than the City's CBD and the University already experiences a high mode split to transit. Therefore, it is unlikely that mode split to transit will increase at rates as high as those observed in the City's Reports. For the purposes of this assessment, it was assumed that by 2030 the mode split to transit at the

University could increase by 5% due to service improvements on the network at large.

4.2 Key Factors Affecting Parking Supply

4.2.1 Development Impacts

Combining the stall inventories for the three Edmonton campuses described in Section 2.0, the University has a total inventory of 8,763 stalls. This inventory is not expected to remain constant. Continued development activity at the University will impact parking in various ways, the most obvious being that new building development will supplant existing parking areas. Currently the majority of development is expected to displace existing parking facilities at the North Campus. This is illustrated in both the LRDP, and its subsequent Sector Plans.

In addition to University projects, there are non-university and/or joint development initiatives at the North Campus area that will influence population and parking stall inventory. These include on-going development at the University of Alberta Hospital, redevelopment of the Cross Cancer Institute and development of the HSALC, a joint venture between the University of Alberta and Capital Health.

Table 4-3 summarizes the North Campus development initiatives and the potential impacts on the North Campus' parking inventory. It is noted that the Sector Plans do not specify time lines for development although it is anticipated that development will occur within the 30-year time frame laid out in the LRDP. As indicated in Table 4-3, the development initiatives have been assigned within short-term, medium-term and long-term time frames.

Table 4-3: Development Impacts on North Campus Parking Supply

Parking Zone	Planning Sector		Existing Supply	Development Initiative	Time Horizon	Impact	Stall Loss
a	2	Faculty Club	91				
b	3	Engineering	1,843				
c	4	Sciences	144				
d	5	Athletics	1,273	Varsity Field Redevelopment	Short Term	Lose Varsity Parking Lot	-234
e	6	Education	591				
f	7	Academic Centre	1,029	New Building Development	Medium Term	Lose Parking Lots U/N /700	-703
g	8	NE Campus Housing	272				
h	9	Lister Hall	1,046				
i	10	Health Sciences	556	SOD Development	Long Term	Lose Stalls in L lot	-250
j		HS West	278	SLRT Construction	Short Term	Lose part of F Lot	-90
				HSALC Construction	Short Term	Lose remaining stalls in this zone	-188
k	11	Newton Place/Extension	342				
l		Jubilee	913	HSALC Construction	Short Term	Lose a portion of Jubilee Lot	-500*
m		Meters	75				
		Total	8,453				1,965

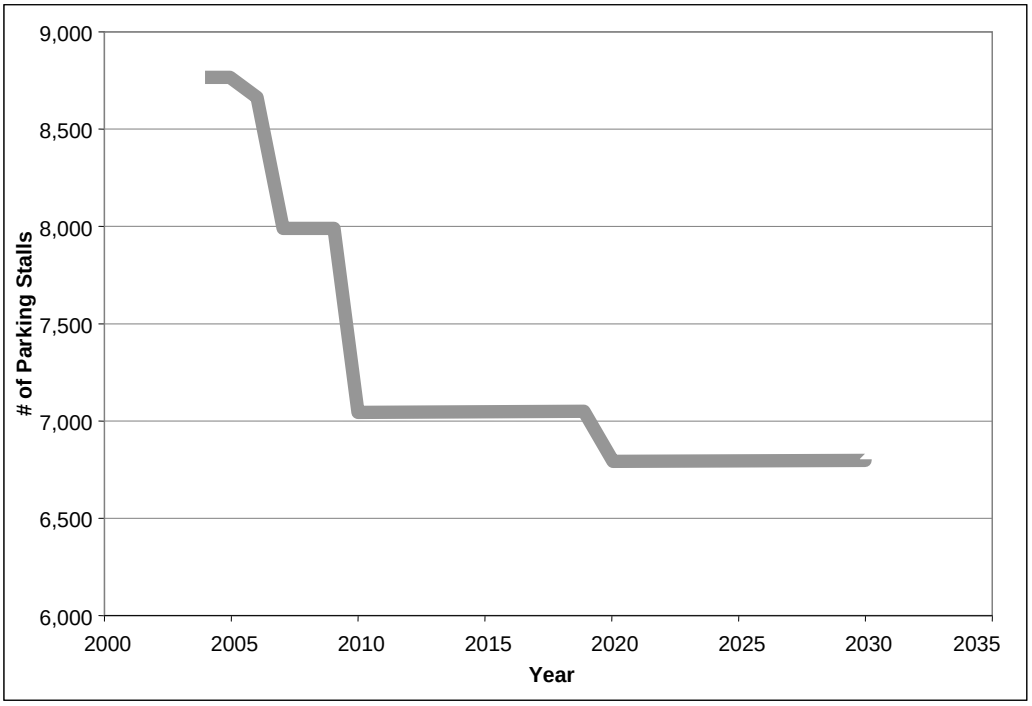
*Preliminary estimate of stall losses subject to HSALC plan revisions

The time frames associated with the short-term initiatives are well known and relate to approved development and construction initiatives. Stalls have been lost in Lot F with the SLRT construction and the redevelopment of Varsity Field will result in the loss of the existing 234 temporary stalls. HSALC may see construction as early as 2007, resulting in significant loss of supply in the area, including Jubilee Lot (zone L), zone J, and Capital Health's Surface parking adjacent to the Aberhart Centre. In the longer term, any building development in zone F will eliminate 3 surface parking lots east of Hub Mall. While initial planning suggests the replacement of a portion of these losses, it is useful to consider the overall anticipated parking loss, against anticipated demand of the University as a whole, before finalizing plans for additional or replacement parking.

As illustrated in Table 4-3, the University could lose almost 2,000 stalls in the 30-year time frame. This is a significant loss in parking stall inventory and has potential to impact parking facility operations. The degree to which the elimination of these spaces impact university operations is dependent on the location of future parking demand and how the University's parking demand ratio changes which, in turn, depends on the type of TDM program implemented.

Comparing the stall losses described in Table 4-3 to the University's total parking inventory (8,763 stalls) provides us with and understanding of future parking stall inventory. **Exhibit 4-3** illustrates the anticipated parking supply curve associated with the aforementioned stall losses.

Exhibit 4-3: Parking Supply Curve



Assuming development timelines described in Table 4-3 are adhered to University will lose a significant number of stalls by 2010. If the development timelines change, the parking supply curve illustrated in Exhibit 4-3 will change.

4.2.2 High Cost of Parking Structures

Removing surface parking and replacing it with underground or above-grade parking structures can be a very expensive undertaking. Current construction costs are in the range of $15,000 per stall in an above-grade parking structure and around $35,000 per stall in a below-grade parking structure.

For an example, it could cost close to $30,000,000 just to replace the parking lost in zones J and L to HSALC, without any increase in the number of stalls - a sizeable investment. A significant increase in revenues would be required to support such expenditures.

4.2.3 Disruptions Due to Construction

While a short-term and temporary condition, managing the parking demands during construction periods for the anticipated new facilities will be a critical element of the construction planning. In addition to managing the displacement of existing surface stalls, there is also a need to manage the parking demand generated by the construction workforce itself. An on-going construction parking management plan will be required to address both the University's and the construction activity's parking requirements.

5.0 PARKING DEMAND AND TDM ALTERNATIVES

Growth at the University has three significant implications to parking supply and demand:

- Displacement of existing supply to accommodate new buildings at North Campus;
- The need to develop a new South Campus with its attendant parking infrastructure, and to provide on-site parking at Faculté Saint-Jean;
- Increased demand for access to all campuses, as the population increases.

Future parking demand will be affected by the type of travel demand management initiatives that may be implemented. Before looking at the future demand for parking, then, this study has suggested four discrete TDM scenarios that will have widely varying impacts on the amount of parking required in the future.

5.1 Alternative Travel Demand Management Scenarios

While there are a varying number of alternative TDM strategies and scenarios, the following four scenarios have been chosen for discussion and analysis.

- A status quo scenario;
- A natural mode-split shift scenario;
- A moderate TDM scenario, and;
- A high TDM scenario.

These scenarios can be divided into two categories: a) the do-nothing category, which evaluates the impacts if the University does not implement any TDM initiatives; and b) the TDM category, which looks at the impact of implementing varying degrees of TDM strategies and tactics.

5.1.1 Do-Nothing Category

The status quo and natural mode-split shift scenarios represent two interpretations of a do-nothing approach to TDM and as indicated, these scenarios assume that the University does not implement any form of TDM.

Status Quo Scenario

The Status quo scenario assumes that the parking demand ratio on campus will not change over time and therefore assumes that, as population grows, so will the demand for parking. The likelihood of this occurring is slim, as there are non-university related factors that will impact parking demands on campus. This scenario assumes that on-campus parking demands remain at 0.2 stalls per student. This scenario estimates the highest potential parking demands, and is included because it represents a worst case scenario and benchmark against which to compare the effectiveness of the TDM alternatives.

Natural Mode-Split Shift Scenario

The natural mode-split shift assumes that parking demands on campus will decrease in time due to factors beyond the University's control, such as, general improvements in transit service across the City, rising fuel prices and increased traffic congestion. This scenario was analyzed because it represents a more realistic representation of how parking demands will change if the University does not implement any form of TDM.

As indicated in Section 4.1, even without implementation of U-Pass, transit trips to the University are expected to increase due to a natural shift towards increased transit use. This will be encouraged, naturally, by the completion of the expansion of the SLRT southward, linking North Campus, South Campus and UDT.

It is anticipated that by 2030, the percentage of trips made to the University by transit will increase by around 5%. Based on the existing mode split statistics, it is estimated that 4% of the future transit trips would come from existing auto trips and the other 1% would come from other modes. This equates to a 4% drop in the mode-split to auto or that the auto mode-split on campus will drop to 27% from the existing 31%. Relating the decrease in auto travel to parking demand, the 4% decrease in auto mode-split is expected to result in a 13% drop in parking demand in 30 years which, equates to a 0.43% drop in parking demand per year.

5.1.2 TDM Category

The moderate and high TDM scenarios attempt to evaluate the effects of implementing varying degrees of TDM. As their names indicate, the moderate scenario evaluates the impacts of introducing a less intense TDM program while the high TDM scenario evaluates the effects of a more intense TDM program.

Moderate TDM Scenario

The moderate TDM scenario assumes that the organic mode split to transit continues and the TDM initiatives implemented include a student U-Pass

program and minor changes to the University's parking management policies, as detailed in Section 6.0.

This scenario assumes that parking demands will drop at a rate of 0.43% per year as per the natural mode-split shift assumptions. With respect to TDM, the implementation time frame for TDM initiatives is somewhat uncertain. For analysis purposes, it was assumed that a student U-Pass program would be available in 2007 and that at this time, the University would implement additional TDM measures including preferential parking for high occupant vehicles (HOV) vehicles and implement changes in parking price structures.

To estimate the effect of TDM on parking demand, results from other TDM programs were reviewed. Information from the University of British Columbia and the University of Washington U-Pass programs indicated that when the U-Pass programs were implemented, parking demands on campus decreased significantly at first while over time, the parking demand continued to increase but at a slower rate. A similar pattern was assumed for the University of Alberta. Based upon the ETS estimate that, with U-Pass, student transit use would increase by around 30%, it was determined that upon implementation U-Pass could create an 8% decrease in parking demand while other parking management TDM measures could decrease parking demand by an additional 2%. Beyond the implementation year, these measures will continue to impact the parking demand ratio on campus by a less significant amount.

High TDM Scenario

The high TDM Scenario could include any number of TDM initiatives. For analysis purposes, this scenario assumes that the natural mode-split to transit continues to occur as indicated previously, that U-Pass is available to staff and students, and that the University expands the TDM program further, to decrease the auto-mode split and parking demand ratio on campus.

The high TDM calculations included in this study assume that the shift in parking demand due to the student U-pass program was the same as in the moderate TDM scenario and, that implementing more intense TDM measures will have a slightly greater impact on the parking demands. With respect to the staff and faculty U-Pass program, ETS indicated that the earliest logical timing for implementing an expanded U-Pass is 2009. By 2009, LRT will be expanded to Century Park (former Heritage Mall Shopping Centre) and ETS has indicated that this service improvement should be able to accommodate the increased demand associated with an expanded U-Pass program. Therefore in this scenario it was assumed that the staff and faculty U-Pass program would come on-line around 2010.

The mode-split by user group analysis indicated that only a small fraction of the transit users on campus are staff and faculty while at the same time, this user group generates around 50% of the campus' parking demands. In addition, this

user group typically has a significant amount of disposable income, is often willing to pay for parking and is accustomed to the convenience of driving to and from work. As a result, financial incentives such as U-Pass and increased parking prices are not necessarily the most effective way to encourage staff and faculty members to use transit. Thus, it was concluded that although they are a logical group to target when developing a TDM program, the impact of these initiatives is not expected to be very large. In this scenario it was assumed that implementing U-Pass for staff and faculty could decrease parking demands by an additional 3%.

A more radical version of the High TDM scenario could be developed; however, the impacts of this possible scenario are more difficult to estimate and would require significant stakeholder buy-in. A radical TDM scenario could include the following initiatives:

- Decrease the number of permits available on campus or remove the option of purchasing monthly parking permits. Result: Parkers would have to make the choice between paying for parking on a daily basis or making alternative travel mode choices.

- Ban or restrict first year students parking permits. Result: To encourage use of transit at the onset of a student's university career and help establish a life-long transportation preference.

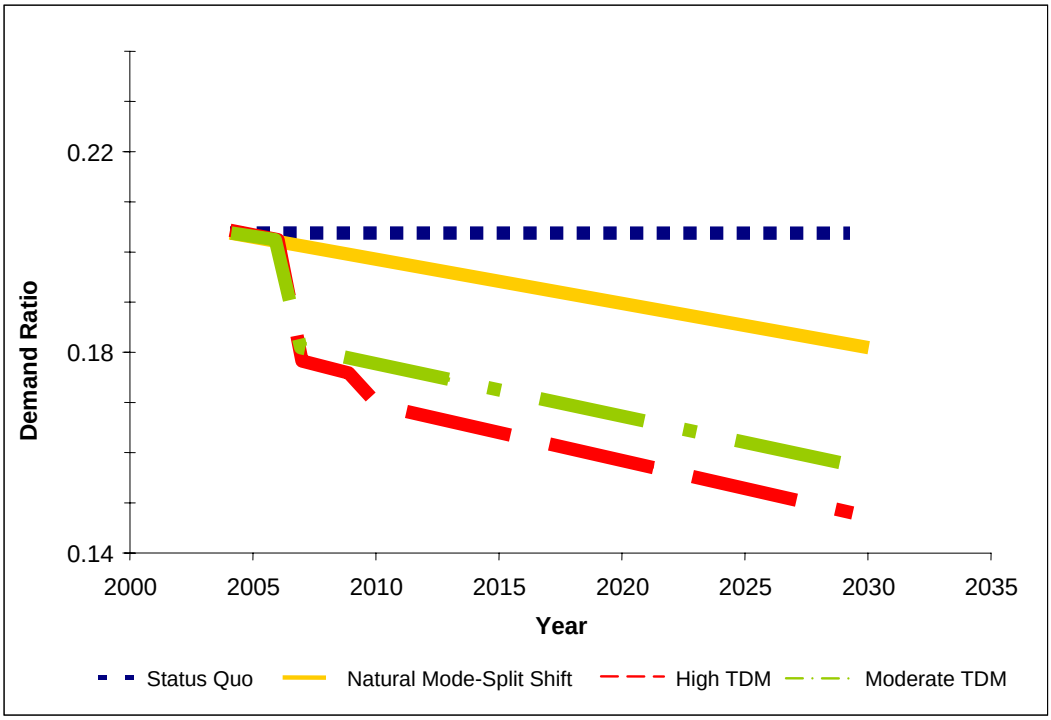
- Significantly increase the price of parking, especially monthly parking passes. Result: parking fees cover the construction, operating and land costs associated with providing on-site parking facilities; contribute to funding other TDM initiatives, and support general revenues.

- Allow significant parking deficits to develop on campus. This would require no new parking stalls and allow market forces to dictate the price of parking. Result: if parking is not readily available, people are forced to evaluate alternative travel choices.

A radical TDM program is not necessarily practical because it would likely result in a significant loss in parking revenues and the transit infrastructure investment required to support a large shift in mode-split to the University is significant. In addition, our society often views parking as a perk and as a result, it is often used as an incentive for attracting employees.

The following **Exhibit 5-1** illustrates parking demand ratios and how they are expected to change over time for the four TDM analysis scenarios.

Exhibit 5-1: Anticipated Changes in Parking Demand Rates



As can been seen in Exhibit 5-1, with the exception of the status quo scenario, the parking demand ratios are expected to decrease over time. It is anticipated that by 2030, the parking demand at the University will be between 0.15 and 0.18 stalls per student.

5.2 Future Parking Demands

Although the parking demand ratios illustrated in Exhibit 5-1 describe parking demand ratios for the entire campus, the ratios are defined in terms of the student population. Therefore, the future parking demands are determined by multiplying the future student population by the future parking demand ratios. **Exhibits 5-2** and **5-3** illustrates the parking demands calculated for the four TDM alternatives, using the LRDP and High Growth scenarios illustrated in Figure 4-2 respectively.

Exhibit 5-2: Future Parking Demands (LRDP Growth)

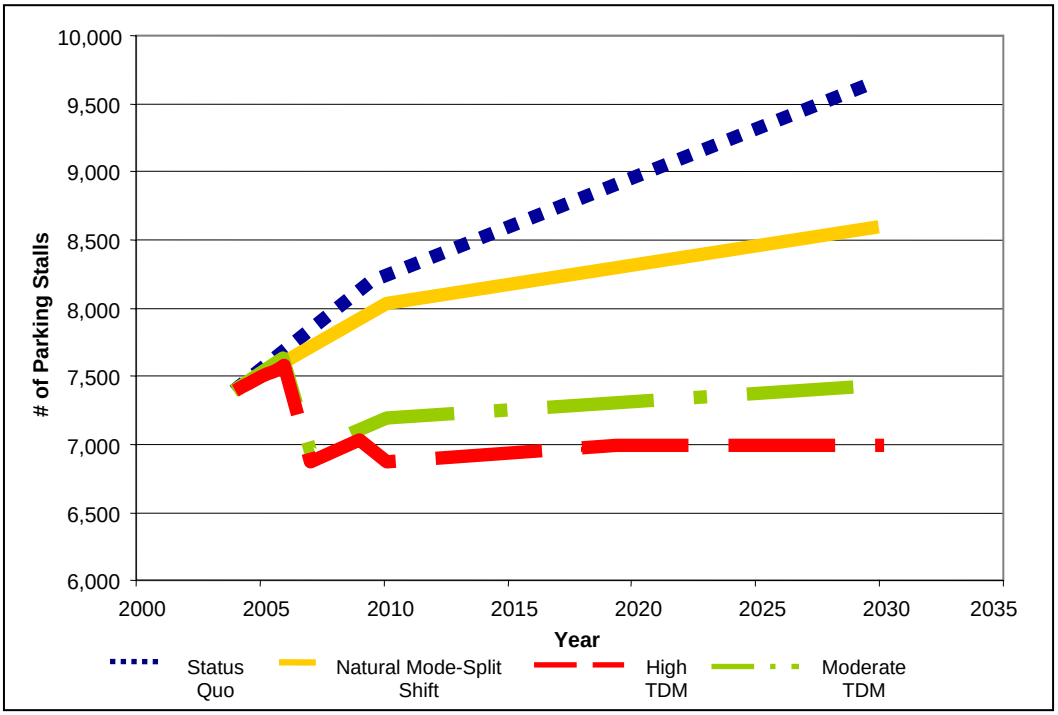
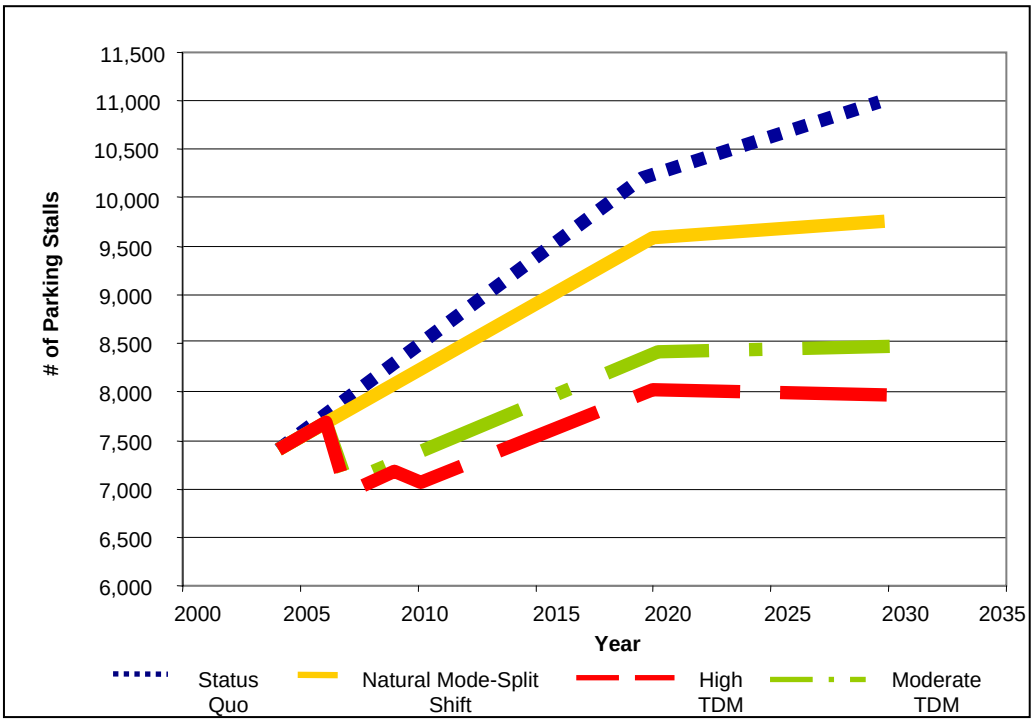


Exhibit 5-3: Future Parking Demands (High Growth)



The parking demands illustrated in Exhibits 5-2 and 5-3 indicate that with U-Pass and other TDM initiatives, the University of Alberta will see a significant

drop in parking demand especially upon program initiation. The exhibits also indicate that even with TDM, parking demands will increase over time; this is because the rate of population growth exceeds the rate at which parking demands are expected to decrease.

Table 5-1 summarizes parking demands from Exhibit 5-2 for the 2010, 2020 and 2030 time periods.

Table 5-1: Parking Stall Demands (LRDP Growth)

	2007	2010	2020	2030
Status Quo	7450	7,850	8,500	9,200
Organic Growth	7350	7,640	7,900	8,200
Moderate TDM	6610	6,850	7,000	7,100
High TDM	6540	6,550	6,600	6,700

Comparing the existing conditions parking demands determined in Section 4.0 to the future parking demand analysis we see that that the peak parking demand is expected to grow from around 7,050 stalls to somewhere between 6,700 and 9,200 stalls by 2030.

A brief review of the parking demands associated with the high growth scenario was also completed. **Table 5-2** indicates the anticipated parking demands associated with the high growth scenario.

Table 5-2: Parking Stall Demands (High Growth)

	2007	2010	2020	2030
Status Quo	7560	8,070	9,800	10,500
Organic Growth	7460	7,870	9,100	9,300
Moderate TDM	6710	7,040	8,000	8,100
High TDM	6640	6,740	7,600	7,600

The parking demands associated with the high population growth assumptions are significantly larger than the demands calculated previously. In the 2020 horizon, the parking demands are approximately 15% greater than the parking demands calculated based on the LRDP growth assumptions.

The parking demand calculations indicate that University can anticipate requiring a significant number of parking stalls if no TDM initiatives are implemented. To mitigate capital costs associated with accommodating the University's future parking demands, the increased congestion on roads to the University campus sites, and the use of too much land for parking, intervention in the form of TDM measures is required. The high demands associated with the high growth population analysis emphasize the importance of implementing travel demand management initiatives.

5.3 Analysis of the Four TDM Alternatives

Investigating the relationship between parking losses and anticipated parking demands associated with the four TDM scenarios provides additional insight into the strategies the University will need to incorporate into its TDM program. Comparing the parking demands of the University as a whole to the parking stall losses, illustrated in Exhibit 4-3, gives an indication of how the University's parking demands compare to the overall parking inventory. This comparison indicates when the University will need additional parking infrastructure but it does not indicate where additional parking infrastructure should be located.

The following **Exhibits 5-4** and **5-5** illustrate the comparison for the LRDP and High Growth assumptions respectively for the University as a whole. The distribution of demand and analysis of individual campuses is dealt with in Section 5.4. The parking demands illustrated in Exhibits 5-4 and 5-5 are 5% higher than the demands illustrated in Exhibits 5-2 and 5-3. This 5% increase represents a typical design criterion and is considered a reasonable estimate of the required peak parking supply for this comparison.

Exhibit 5-4: Parking Demand vs. Parking Inventory (LRDP Growth)

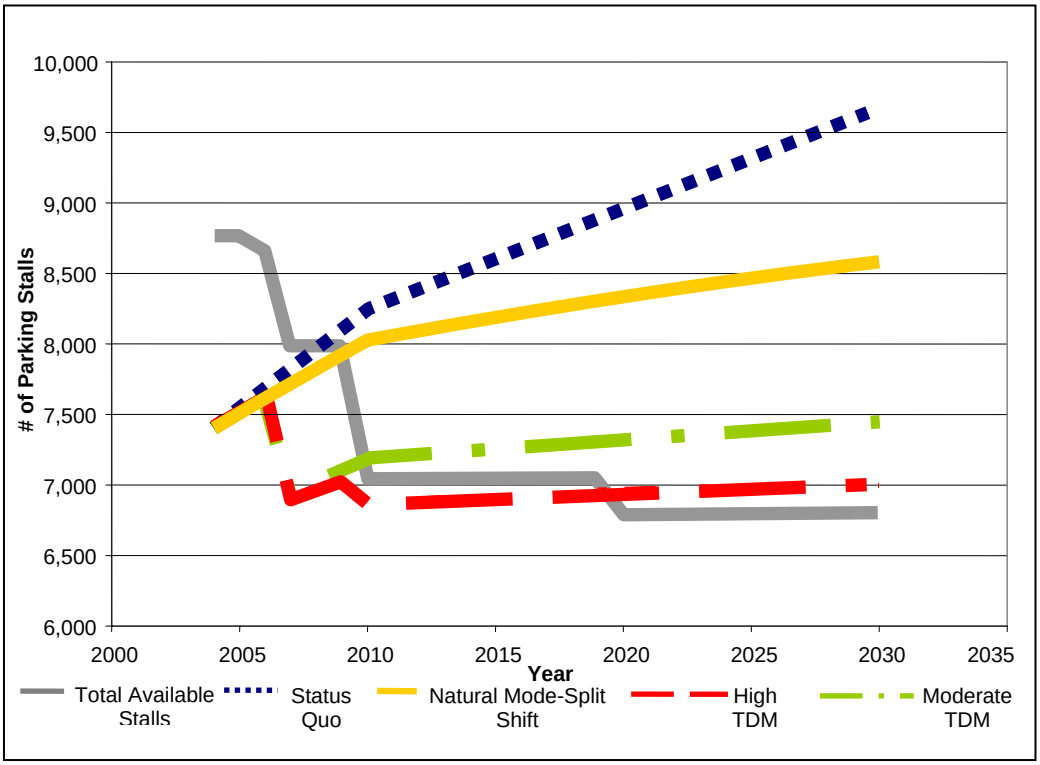
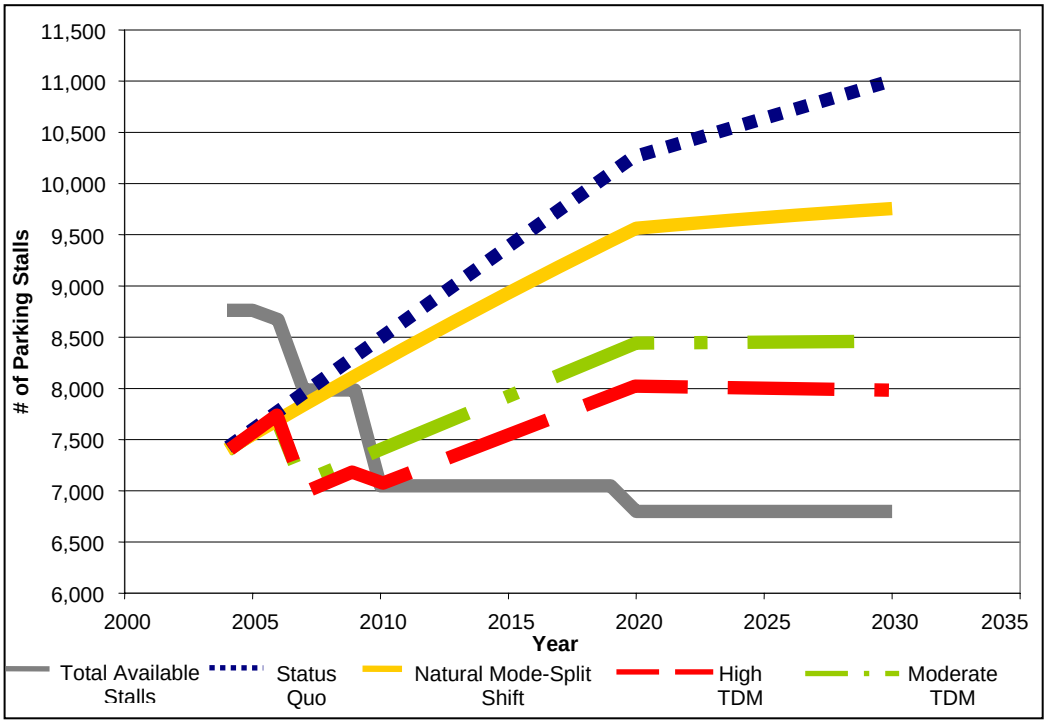


Exhibit 5-5: Parking Demand vs. Parking Inventory (High Growth)



Parking deficits will occur when the "Total Available Stalls" line drops below the "Parking Demand" lines illustrated in Exhibits 5-4 and 5-5. In general, the parking deficit is dependent on the amount of parking demand, which depends on population and the degree to which TDM reduces demand. The calculations indicate that the University can significantly reduce the number of parking stalls required with the implementation of TDM initiatives.

5.3.1 Status Quo

This scenario is considered the worst case scenario from a parking demand scenario and assumes that current parking characteristics generally remain unchanged. Although it is unlikely that parking demands will grow as assumed in this scenario, it does provide insight into how long the University could operate at the 0.2 stalls per student demand ratio, and is an indication of the upper limits of parking demand.

It is apparent that the status quo can be tolerated for a short period of time without impacting parking operations at the University. In the next four-year period, the parking shortage can be managed. The parking shortage is anticipated to occur during the mid-day period and will most likely impact those people traveling to the North Campus during this time period. If no additional parking stalls are supplied in the short term, the stall shortage may create a shift in arrival patterns and/or travel mode to the University.

In the long term the parking forecasts indicate that a sizeable parking stall deficit is anticipated with the total deficit approaching 3,000 stalls. A deficit of this size will create significant operational concerns for the University. In this time frame intervention in the form of additional supply or TDM measures is required to reduce parking demands. At $15,000 per stall (structured above-grade), 3,000 stalls would cost in the order of $45 million. Parking rates would need to be doubled to generate sufficient revenue to support the construction of 3,000 additional parking spaces.

5.3.2 Natural Mode-Split Shift

This scenario represents the realistic outcome of the do-nothing scenario and assumes that parking demand at the University will naturally decline due to factors beyond the University's influence, such as transit service improvements, high fuel costs and increasing traffic congestion.

As with the status quo scenario, parking demands associated with the natural mode-split shift scenario can be tolerated for a short period of time without impacting parking operations at the University. The analysis implies that, even with the loss of stalls at the North Campus, the University will be able to accommodate parking demands without implementing TDM in the short term.

The stall deficits associated with natural mode-split shift scenario follow the same pattern as the status quo scenario deficits; however, due to the natural shift towards higher transit usage, the stall deficits are smaller.

In the short term, during the peak periods, the University's parking facilities will operate at capacity. In the long term, the forecasts indicate a parking stall deficit will occur. Again, the capital costs associated with constructing new parking facilities are significant and it is highly unlikely that sufficient revenue could be generated from the new parking facilities to support their construction.

5.3.3 Moderate TDM

This scenario assumes that parking demands follow the natural mode-split shift until the TDM program is implemented. Upon implementation, parking demand is expected to drop and therefore, even with additional stall losses parking demands can be accommodated.

The analysis indicates that with implementation of TDM, the University can expect a parking surplus, until further stalls are lost. In the long term, even with a Moderate TDM program, the stall deficits are expected to be significant enough to require additional stall development.

As indicated, a TDM program is expected to delay the requirement for, and reduce the size and therefore the capital costs associated with new parking

facilities at the University. In addition, implementing TDM provides the University with time to explore parking facility locations and to include parking evaluations in future building plans.

5.3.4 High TDM

This scenario assumes that the University implements an aggressive TDM program which creates a significant drop in parking demands. Under this scenario it is assumed that the balance between parking supply and demand is accommodated through demand management initiatives including U-Pass for students, faculty and staff as well as parking management and rideshare/carpool programs.

The analysis indicates that parking could remain in a surplus state beyond 2010. The key factor in this is that the staff U-Pass program comes on-line. The drop in demand associated with the staff U-Pass is enough to keep the parking demands in line with the future stall inventory.

With no additional TDM initiatives beyond 2010, parking demands at the University will continue to increase in conjunction with population increases but the increase will be smaller than that anticipated under the moderate TDM program. Although the calculated deficit is much smaller than under the other scenarios, the University may still need to construct new parking facilities depending on the location of future development and demand. Ultimately, it is anticipated that the benefits of implementing a TDM program outweigh the operating losses and mitigate the need for capital expenditures associated with constructing a significant number of parking stalls.

5.3.5 Commentary on the Impacts of High Population Growth

Under the high population growth scenario the parking demands at the University increase significantly and the deficits occur earlier in the development timeline. In the high growth scenario, the stall deficits are significantly larger than the stall deficits estimated under the LRDP growth assumptions. The high population growth scenario reiterates the fact that the do nothing scenarios are not practical options for the University because they will require the construction of a significant number of parking stalls, and will encourage significant increase to traffic congestion in the area.

Although the decrease in demand will not be as significant under the high population growth assumptions the analysis indicates that TDM programs are still effective at reducing the stall deficits. The stall deficits anticipated under the High Growth scenarios are significant and imply that if the University's population grows significantly, the University will either need to implement a more aggressive TDM program or be prepared to construct a sizeable number of parking stalls.

5.4 Distribution of and Locations for New Parking Facilities

As discussed previously, the high costs associated with parking facility construction emphasize the importance of constructing new parking facilities when and where it is financially feasible. Locating parking facilities where the demand is high can provide increased revenues to help offset the costs associated with new facility construction. Typically, high demand locations are centrally located, are easily accessed from the arterial road network and serve a high proportion of short-term parkers.

Population distribution will affect the location of parking demand. Development plans for the University of Alberta spread growth over three campuses, the North Campus (NC), the South Campus (SC) and the Faculté Saint-Jean (FSJ). Distributing the parking demands based on the future population gives a better indication of where future demand for parking will occur.

The LRDP indicates that a built-out North Campus could accommodate 37,000 students, while the South Campus may accommodate up to 12,000 students. Although the LRDP does not indicate an ultimate student population for the Faculté, University representatives indicated that the Faculté could grow to 1,000 students. Under these assumptions, the 2030 student population distribution will be 75% North Campus, 23% South Campus and 2% Faculté. In theory, the North Campus is not expected to grow beyond 37,000 students and therefore as the University's population grows, population splits at the three campuses will change. The population splits used to distribute the parking demand across the three campuses is summarized in **Table 5-3**.

Table 5-3: Population Split Assumptions

	2007	2010	2020	2030
North Campus	95%	95%	85%	75%
South Campus	2%	3%	13%	23%
Faculté Saint-Jean	3%	2%	2%	2%

In general, Table 5-3 indicates that, from a population distribution perspective, the North Campus will continue to have the highest parking demands, however, as the South Campus grows, parking demand at this location will increase. The following **Exhibits 5-6** through **5-8** illustrate the distributed parking demands for the four TDM alternatives and the LRDP and high growth population assumptions.

The numbers of stalls illustrated on Exhibits 5-6 through 5-8 were calculated based on the demands illustrated in Tables 5-1 and 5-2 plus 5% higher. This 5% increase represents is a typical design criterion and is considered a reasonable estimate of the required peak parking supply for the purposes of this assessment.

Exhibit 5-6: North Campus Parking Demands

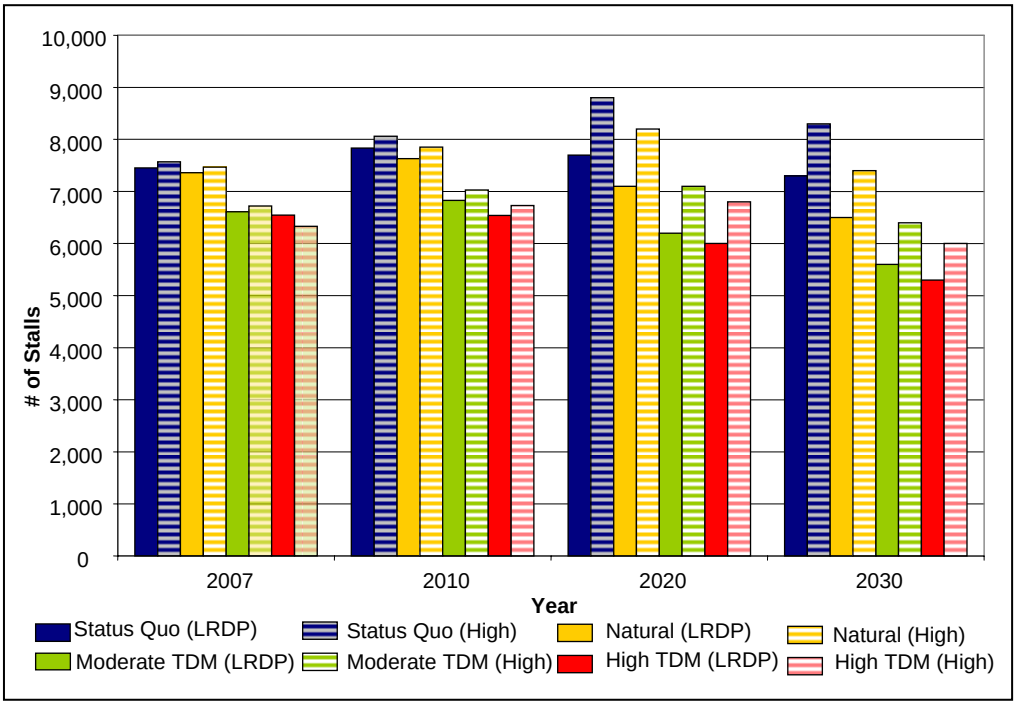


Exhibit 5-7: South Campus Parking Demands

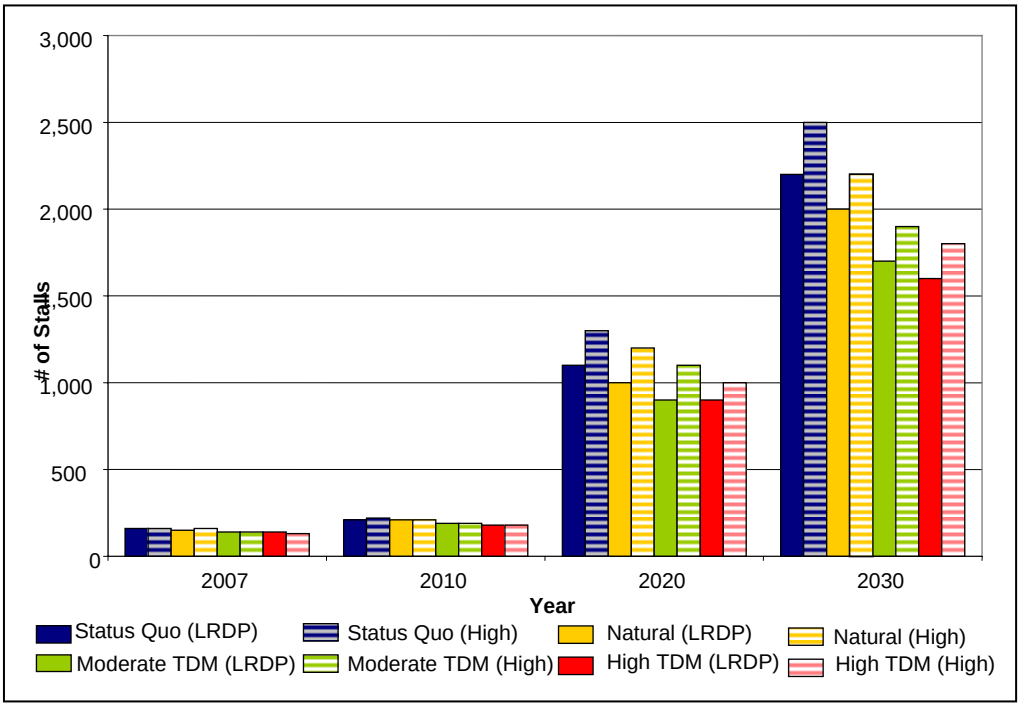
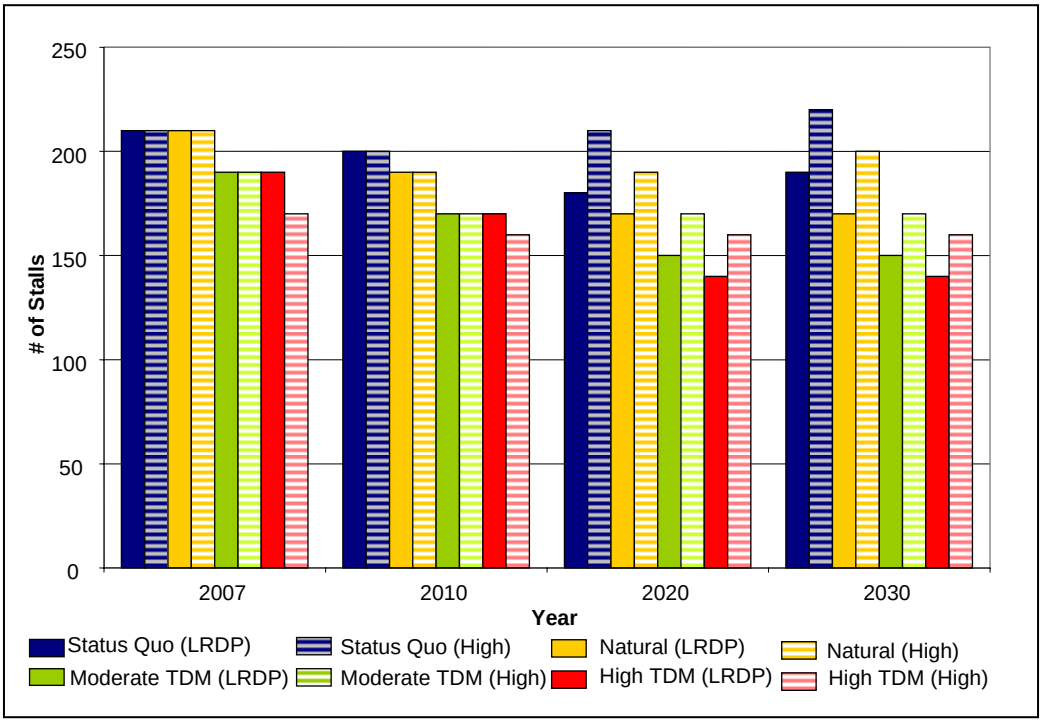


Exhibit 5-8: Faculté Saint-Jean Parking Demands



Exhibits 5-6 through 5-8 indicate that parking demand will shift, especially as the South Campus develops. In the 30 year time frame the North Campus parking demands could be between 5,300 and 8,300 stalls, while at South Campus parking demands could be between 1,600 and 2,500 stalls and the Faculté Saint-Jean's 2030 parking demands could be between 140 and 220 stalls

It is important to note that the population information does not take into account the synergies that occur between the campuses that reduce the need to supply parking stalls at all the campuses. The existing Faculté Saint-Jean is a primary example of campus synergies. People attending FSJ may also attend class or activities at the North Campus; however, the FSJ currently operates with limited parking supply and therefore vehicle travel between campuses is not ideal. Intercampus travel needs are accommodated via alternative means. In addition to public transit the University runs an hourly shuttle service between the North Campus and FSJ.

In addition to campus synergies, the amount of visitor/public activity anticipated on the campus will also impact the number and location of parking stalls. Although visitors did not represent a large proportion of the intercept survey population, the survey results indicate that most visitors to campus arrived by car and parked. This is typical of visitor parking activity and it is anticipated that in the future, most visitors to campus will continue to drive and park. As well, visitor activity that happens outside of the peak parking demand period will

result in increased utilization of parking facilities. Thus locating parking facilities in central locations that serve visitor or public attractions will result in higher utilization and increased revenues.

As for the University as a whole, comparing the parking demands of the individual campuses anticipated future stall inventories described in Section 4-2 gives an indication of how the parking demands compare to the parking inventory and for each individual campus. This comparison evaluates, in detail, the impact of shifting development to the South Campus.

5.4.1 North Campus

Table 5-4: North Campus Parking Demand Analysis

Status Quo					
Year	Available Stalls	LRDP Growth		High Growth	
		Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007*	7,675	7,450	225	7,570	105
2010**	6,740	7,830	-1090	8,060	-1320
2020***	6,500	7,700	-1200	8,800	-2300
2030	6,500	7,300	-800	8,300	-1800
Natural Mode-Split Shift					
Year	Available Stalls	LRDP Growth		High Growth	
		Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007*	7,675	7,360	315	7,470	205
2010**	6,740	7,630	-890	7,850	-1,110
2020***	6,500	7,100	-600	8,200	-1,700
2030	6,500	6,500	0	7,400	-900
Moderate TDM					
Year	Available Stalls	LRDP Growth		High Growth	
		Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007*	7,675	6,610	1,065	6,720	955
2010**	6,740	6,830	-90	7,030	-290
2020***	6,500	6,200	300	7,100	-600
2030	6,500	5,600	900	6,400	100
High TDM					
Year	Available Stalls	LRDP Growth		High Growth	
		Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007*	7,675	6,550	1,125	6,330	1,345
2010**	6,740	6,540	200	6,730	10
2020***	6,500	6,000	500	6,800	-300
2030	6,500	5,300	1,200	6,000	500

* 2007 Student U-Pass Lose Stalls due to HSALC Development
** 2010 Staff U-Pass Lose stalls due to Sector 7 Development
*** 2020 Lose stalls due to SOD Development

In the short term, the surpluses illustrated in Table 5-4 are as a result of reduced demand associated with TDM initiatives. In the long term, surpluses

illustrated in Table 5-4 are a result of increasing the South Campus population which shifts the demand for parking away from the North Campus. As a result, careful consideration must be given to the location of new and/or replacement parking facilities.

The Sector Plans indicate development of a new parking facility in the northeast corner of the campus and, the Sector 10 Plan indicates replacement of stalls in conjunction with SOD Development. The proposed facilities are not necessarily the most cost effective locations to construct parking because they are located on the periphery of campus and the demand at these locations is associated with specific building operations rather than University operations in general. Some stall replacement at these locations may be logical given that building development in these areas will create demand; however, a more centrally located facility would have higher utilization rates and therefore be more cost effective. Two primary locations for new parking facilities at the North Campus are:

- The intersection of 87 Avenue and 112 Street, and;
- The Jubilee Lot.

It is noted that the intersection of 87 Avenue and 112 Street is considered a “Campus Gateway” which may impact the desirability, size and type of parking facility that could be constructed at this location. The Jubilee Lot is under the Province’s jurisdiction and therefore construction of a parking facility at this location would require a joint-use agreement.

5.4.2 South Campus

Table 5-5: South Campus Parking Demands

Status Quo					
		LRDP Growth		High Growth	
	Available Stalls	Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007	285	160*	125	160	125
2010	285	210*	75	220	65
2020	285	1,100	-815	1,300	-1015
2030	285	2,200	-1915	2,500	-2215
Natural Mode-Split Shift					
		LRDP Growth		High Growth	
	Available Stalls	Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007	285	150*	135	160	125
2010	285	210*	75	210	75
2020	285	1,000	-715	1,200	-915
2030	285	2,000	-1715	2,200	-1915
Moderate TDM					
		LRDP Growth		High Growth	
	Available Stalls	Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007	285	140*	145	140	145
2010	285	190*	95	190	95
2020	285	900	-615	1,100	-815
2030	285	1,700	-1415	1,900	-1615
High TDM					
		LRDP Growth		High Growth	
	Available Stalls	Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007	285	140*	145	130	155
2010	285	180*	105	180	105
2020	285	900	-615	1,000	-715
2030	285	1,600	-1315	1,800	-1515

* The 2007 and 2010 demands are estimated based on population distribution and do not take into account current visitor parking activity. As the academic portion of the campus develops visitor parking demands will require further evaluation.

The deficit calculations for the South Campus indicate that this campus may require as few as 1,300 and as many as 2,200 additional parking stalls by 2030.

One of the key factors anticipated to impact the number of stalls required at the South Campus is the degree to which campus synergies will impact the parking demands at South Campus. The synergy between the SC and NC will be influenced by the amount of travel between campuses, whether or not U-Pass is in place and potentially the frequency of LRT service. An appropriately designed monitoring system will help the University determine when and better define how many parking stalls will be required at the South Campus.

The South Campus 30-Year Concept Plan provides a provision for parking on the periphery of the development area. The locations identified provide vehicles direct access to the adjacent arterial road network, provide pedestrians with good access to proposed building sites and reduce the interference between pedestrian and vehicle traffic. While these locations do not provide central parking facilities, they do support the notion of a pedestrian campus, and emphasize the importance of transit as a desirable mode of travel.

The provision of parking at the South Campus should recognize the off-peak utilization of centres like the “Village Centre”, Saville Sports Centre, and Foote Field, and the potential for increased parking utilization close to these locations. A detailed review of parking facility sites should be incorporated into the Sector Plans being developed for the South Campus.

5.4.3 Faculté Saint-Jean

Table 5-6: Faculté Saint-Jean Parking Demands

Status Quo					
Year	Available Stalls	LRDP Growth		High Growth	
		Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007	25	210	-185	210	-185
2010	25	210	-185	210	-185
2020	25	210	-185	210	-185
2030	25	210	-185	210	-185
Natural Mode-Split Shift					
Year	Available Stalls	LRDP Growth		High Growth	
		Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007	25	210	-185	210	-185
2010	25	190	-165	190	-165
2020	25	170	-145	190	-165
2030	25	170	-145	200	-175
Moderate TDM					
Year	Available Stalls	LRDP Growth		High Growth	
		Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007	25	190	-165	190	-165
2010	25	170	-145	170	-145
2020	25	150	-125	170	-145
2030	25	150	-125	170	-145
High TDM					
Year	Available Stalls	LRDP Growth		High Growth	
		Demand	Surplus/Deficit	Demand	Surplus/Deficit
2007	25	190	-165	170	-145
2010	25	170	-145	160	-135
2020	25	140	-115	160	-135
2030	25	140	-115	160	-135

The deficit calculations for the Faculté Saint-Jean indicate that this campus may require between 115 and 185 additional stalls to accommodate growth at this site. Given that the Faculté is not expected to experience as much benefit from the expansion of LRT and, that implementation of a residential street restricted parking program is likely in the foreseeable future, a parking facility that accommodates a larger number of stalls is recommended at this site.

The Sector 19 Plan provides a provision for surface parking in the northwest portion of the Faculté Saint-Jean. This location should adequately accommodate the aforementioned stalls; however, as with the South Campus, the degree of synergy between campuses will impact the number of stalls required at the Faculté.

In addition, the compact nature of the Faculté Saint-Jean means that the location of parking facilities is a less critical factor at this campus. The location indicated in the Sector 19 Plan is a logical location for additional parking stalls because it provides direct access to the Pavillion Central and also has direct access to 86 Avenue.

5.5 TDM and its Impacts on Traffic Congestion

As indicated in Section 2.6 traffic congestion in the University area is significant with most arterial road intersections in the University area operating near capacity with poor levels of service and high volume-to-capacity ratios.

Although the intent of the TDM program is to reduce single occupant vehicle travel to the University, it is anticipated that, even with TDM, arterial roadways in the University area will remain congested. In general, it is anticipated that any capacity created by TDM initiatives will be absorbed by new trips on the network, especially since the roadways in the University Area also act as commuter links to the downtown town core.

The key factor to recognize when evaluating TDM and its impact on traffic congestion is to note what would happen if the TDM initiatives are not implemented. The two most likely outcomes are:

- Peak hour spreading, and;
- Development of a secondary peak hour.

Peak hour spreading would result in longer periods of peak or congested traffic operations. Recent traffic counts indicate that traffic volumes in the University area peak between 7:20 and 8:20 AM and 16:40 and 17:40 PM. Although the volume-to-capacity ratios indicated on Figure 2-4 are high (>0.9), they are still below 1.0, which means that vehicles entering the University area arterial road network are able to travel through the system within the existing peak hour. If no mitigation measures are implemented and traffic volumes continue to grow, this will no longer be true and the peak volume periods will expand beyond the existing hour.

Peak hour spreading would directly impact travel times experienced by commuters traveling to the University. Recent travel time surveys completed by the City of Edmonton indicate that during the peak hours, it takes approximately 15 minutes to travel from the Fox Drive/Belgravia Road and the 87 Avenue/114 Street intersections during the AM peak hour. Without TDM initiatives in place, it is anticipated that this travel time would increase significantly. In addition to increased traffic congestion, peak hour spreading is anticipated to result in additional traffic noise, more air pollution and increased driver frustration.

Secondary peak hours typically develop when commuters are able to choose travel times that allow them to travel outside of the typical peak hour. While secondary peak hours do not necessarily result in increased travel times, they can result in increased traffic noise and air pollution, and will require improvements to traffic signal infrastructure to ensure that secondary peak cycle timings can be accommodated.

5.6 Recommended TDM Approach

The recommended approach for the University of Alberta is one that balances the need to provide additional parking facilities with reductions in single occupant vehicle travel. The goal of this approach is to reduce the University's overall parking demand and supply while maintaining appropriate levels of parking and traffic service. This will require phased implementation of extended TDM measures, including construction of new parking facilities only as may be required. A phased implementation allows for monitoring of parking supply and demand over time to ensure that parking demands are shifting as anticipated and ensuring that the University's parking needs continue to be adequately accommodated, without negating the successes achieved through other TDM measures. This is explored further in Section 6.0.

6.0 THE RECOMMENDED TDM PLAN

6.1 TDM Plan Framework

On-going growth at the University, especially surrounding the North Campus, will continue to put pressure on the existing transportation infrastructure. Increasing road congestion will negatively impact accessibility of the University campus sites. Continuing population growth at the University will place pressure on existing parking facilities, and as detailed previously, will require significant addition to the parking supply, if no other travel options are supported.

The key goal of any TDM program is to reduce single occupant vehicle travel. This is usually accomplished by encouraging commuters to travel to campus via alternative travel modes. TDM programs typically incorporate a mixture of incentives and disincentives to achieve this goal.

Based upon the detailed assessment summarized in this document, it is recommended that the University of Alberta implement a Moderate TDM program, which provides a balanced TDM approach. This moderate method recognizes the fact that academic development priorities require the limited lands available and facilitates a staged implementation of TDM initiatives while still allowing the moderate provision of parking facilities. Parking Management should be considered the cornerstone of the TDM Program, with the U-Pass Program as its key supplementary tactic.

The implementation of a moderate TDM Program will assist the University of Alberta and its neighbours in pursuing and achieving the following goals:

- Develop and maintain lands and facilities that are sustainable and that incorporate and be supported by TDM strategies and initiatives;
- Improve access to the campus sites, especially access times and convenience;
- Support multiple modes of travel equally;
- Reduce reliance on on-site parking;
- If at all feasible, reduce the amount of parking on-campus, otherwise, reduce the amount of new parking facility construction;
- Reduce the number of single occupant vehicles and encourage travel via multiple occupancy vehicles.

Using these objectives to direct TDM initiatives and completing regular audits of the TDM initiatives implemented by the University will help ensure continued success. Staging the TDM program will allow for monitoring and evaluation of

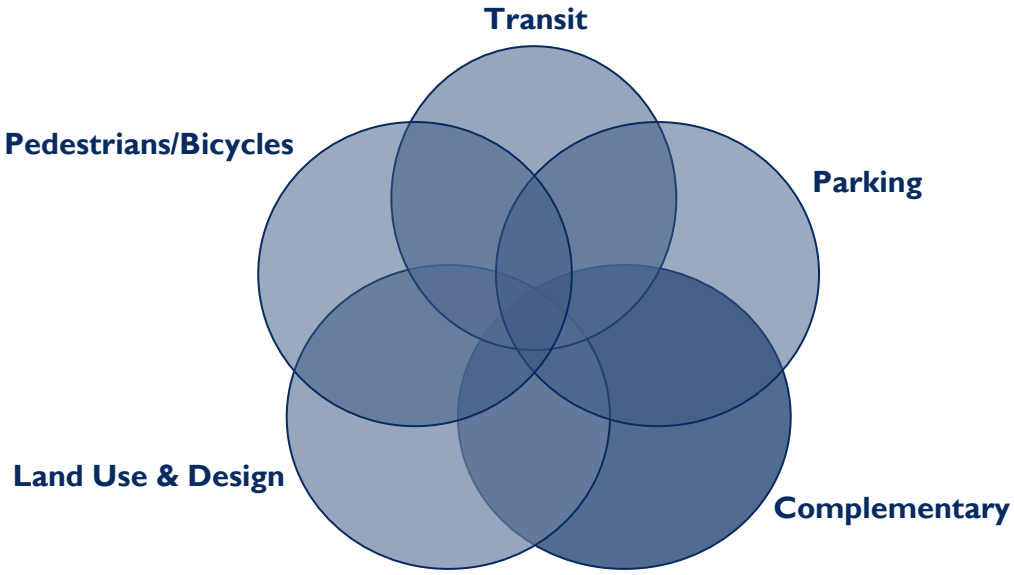
program effectiveness that, over the life of the program, will help create a better program. In addition, there is also value in co-operating with the City to ensure that campus agencies have a proactive role in City-sponsored activities to promote trip reduction.

This section of the report presents the development of the recommended University of Alberta Travel Demand Management Plan. The recommended combination of TDM strategies are anticipated to work well for the University of Alberta, as they represent the principal components of effective TDM programs.

6.2 Review of TDM Approaches

There are a variety of strategies and tactics that can be used to achieve TDM goals. Most of the tactics concentrate on parking supply, parking demand management and transit strategies. These strategies are often implemented in combination with other supporting TDM strategies as illustrated in Exhibit 6-1 below. A detailed catalogue of potential tactical applications for each of the five categories may be referenced in Appendix B.

Exhibit 6-1: Basic Travel Demand Management Strategies



6.3 Development of a Sustainable TDM Plan

Successful TDM programs typically focus on a few strategic initiatives, rather than applying all of the options presented in Appendix B. The following defines the recommended moderate TDM program and focuses upon the TDM initiatives recommended for the University of Alberta. For clarity, these have been presented organizationally in parallel with the 5 basic TDM strategies noted in Exhibit 6-1.

6.3.1 Parking Management and Operations

Parking provision, management and operations represents an essential link in the development of a blended and integrated travel demand management plan for the University. A Parking Management Program is basically any plan by which parking space is provided, controlled, regulated or restricted. The objective of a TDM-oriented parking management plan is to reduce single occupant vehicle travel through the use of strategic parking management initiatives. The parking management strategies typically involve:

- Pricing mechanisms,
- Use restrictions,
- Parking inventory reductions; and,
- Overall parking management policies.

6.3.1.1 Parking Policy

Key Issues

The current parking policy at the University does not incorporate any TDM initiatives. Its current structure, operational and management indicators do not support TDM.

Recommended Actions

1. Change the University's parking policies to allow greater flexibility in parking fee structures. Consider and identify how revenues are used.

2. Provide funding for alternative transportation services. The key element of this tactic is that parking revenues are supporting alternative travel modes.

3. New parking facilities should only be constructed if they are self-supporting. In other words, revenues generated by the facility must be able to cover the capital expenditure within a reasonable time frame. Use parking fees to pay for ongoing operating costs and land costs for each parking structure. This tactic involves strategic positioning of new parking facilities to ensure maximum utilization and may require adjustments to parking fee structures.

4. Ensure that Parking Services' enforcement program can accommodate the needs of the associated TDM initiatives. Enforcement is a necessary element of any parking management program and becomes critical for a parking management program that incorporates TDM elements such as preferential HOV parking or limited use passes. This tactic may require infrastructure investment to ensure efficient use of limited resources.

6.3.1.2 Parking Pricing

Key Issues

Cost is considered a significant motivator, especially for the student population, when considering alternative mode choices. The existing fee structure provides a financial incentive to long-term/permit holding parkers. Most commuters travel to and park on campus between 4 and 5 times a week. At 5 times per week or 20 times per month the monthly permit charges can be broken down as illustrated in Table 6-1.

Table 6-1: Daily Equivalent Parking Rates

Type of Facility	Monthly Rate	Daily Equivalent
Underground	$87.00	4.35
Structure	$76.75	3.83
Surface (energized)	$66.50	3.33
Surface (non-energized)	$61.25	3.06
Jubilee Lot	$56.25	2.81

Comparing the daily equivalents illustrated in Table 6-1 to the daily parking charge of $10.00 we see that daily parking is, on average, three times more expensive than long-term parking. As a result, it is economical to purchase a monthly parking permit even if it is only used a few times a month.

Secondly, the average cost of a parking permit (at $70) is not significantly higher than the price of an adult monthly bus pass (at $59). The difference is not significant enough to warrant an alternative mode choice, especially when convenience, the availability of parking and the daily travel costs are considered.

Recommended Actions

1. Adjust the parking fee structure at the University to facilitate the TDM objectives. The key element of this tactic is to raise monthly parking permit fees. Monthly parking permit fees should be raised such that they are in line with, although not as high as, daily parking rates. Increasing the financial burden associated with parking, shifts the ideology away from “parking is a right” and towards “parking is a choice” which in turn, will emphasize alternative travel mode choices.

2. Ensure that monthly permit fees are higher than the price of a monthly transit pass. Increasing the parking permit prices so that they are noticeably greater than the price of a monthly transit pass is a realistic incentive that makes transit a more affordable and attractive option.

3. Charge lower rates for car-pool parking permits. Combining lower rates for car pools with other car pool incentives such as preferential parking

location and car-pool support services will make high occupancy vehicle travel more attractive.

4. Set permit rates based on desirability and location of demand rather than by type of facility. Raising permit rates at high demand facilities will force some permit holders to move to lower rate facilities. This leaves more space for short term parkers that generate higher revenues.

5. Remove the monthly permit system. While this is extreme, under this version, everyone driving to campus would have to pay the daily rate. A rate increase of this size would have significant impact on the number of commuters that drive and park on campus; however, this option also has potential to significantly reduce parking revenues and would most likely be faced with significant opposition.

6.3.1.3 Parking Permits

Key Issues

The University currently balances the number of parking permits issued with hourly/daily parking demand and facility utilization. While this technique is useful for maximizing utilization and revenues, it does not support TDM.

Although an employee or student may not get a permit in their location of choice, parking permits are available for purchase on campus. The disincentive associated with being forced to park at alternative parking facility is not negative enough to impact travel mode choice.

Recommended Actions

1. Limit the number of parking permits available to faculty, staff and students.

2. Issue high occupancy vehicle parking permits

3. Implement car-pool or high occupancy vehicle permit systems. Provide distinct incentives such as preferential parking locations, reserved spaces or permit price reductions.

4. Assess and modify the existing visitor vs. permit parking stall mix, toward an increase in the number of daily permits sold.

5. Implement changes in stages to enable proper monitoring of the impacts. Implementing changes to both the permit and pricing systems will impact parking operations. Permit management techniques are closely linked to and inter-related with parking price tactics.

6.3.1.4 Parking Inventory Management

Key Issues

Excess supply of available, affordable and accessible parking stalls reduces the effectiveness of any TDM initiative, while considerable parking deficits have potential to create operational concerns for the University. TDM initiatives are used typically to reduce parking demands; however, limiting the parking inventory can be considered a TDM measure itself.

Inventory management issues revolve around managing inventory losses associated with development and balancing utilization and revenue in conjunction with implementing TDM strategies. The parking demand analysis revealed that the University can accommodate the anticipated stall losses, if TDM measures such as U-Pass are implemented. It also revealed that the University may experience a surplus parking inventory in the short term although; as the University's population continues to grow parking deficits are anticipated. As parking demands on campus change controlling parking supply to maximize utilization and revenues will become more important.

Recommended Actions

The recommended actions here are closely tied to the parking policy recommendations. Inventory management will be impacted by the type and effectiveness of TDM tactics such as the provision of preferential parking for car and van pools as well as the implementation of Intelligent Transportation Systems (ITS) and "High Tech" payment systems. ITS systems can facilitate improved utilization of parking facilities.

Key policies that will impact inventory management practices revolve around the ratio at which parking stalls are supplied and how many new parking stalls are constructed on campus. Therefore it is recommended that

1. In the short term, monitor parking stall utilization in combination with permit and pricing tactics to ensure stall inventories and TDM initiatives and revenues synchronize with one another.

2. In the long term, explore ITS as it relates to parking management to ensure maximum utilization of parking facilities.

6.3.1.5 Area-Wide Parking Management Coordination

Key Issues

The University has been the primary focus of this study; however, the analysis did include an evaluation of the parking operations and supply at the University of Alberta/Stollery Children's Hospitals as well as a review of the overall stall inventory in the greater University area. It was determined that there are around 13,000 off-street parking stalls in the area of North Campus. While some

natural synergies have developed among the parking facilities and the organizations in the North Campus area, parking management tends to be disjointed and un-connected. Given the preferences of parkers to be close to their workplaces, regardless of institutional control, it is important to ensure that parking management initiatives are coordinated on an area-wide basis. This will become especially important as the University expands its TDM initiatives and parking characteristics change.

Recommended Actions

1. Develop a joint parking strategy for the greater North Campus area. As the University implements TDM, additional pressure may be felt by the parking facilities of other organizations from those seeking the continued convenience of single-occupant vehicular travel. This could be further exacerbated by an uneven parking fee structure across area parking lots and authorities. An active process will ensure that parking remains in available supply for the casual visitor, while not under pressure from faculty and staff of any one organization.

2. Develop a joint parking strategy for the greater South Campus area, as construction plans evolve. The same arguments, as noted above, apply.

3. Ensure that a common vision is established of TDM goals and objectives. Ensure the effectiveness of the implemented TDM initiatives. To improve coordination between Planning and Infrastructure, and Parking Services, establish a TDM Services Group. The TDM Services Group would work towards implementing the TDM objectives in conjunction with the goals laid out in the LRDP. This group would be responsible for championing the University's TDM Program, coordinating implementation and monitoring TDM strategies, and working with University departments and stakeholder agencies.

4. Consider the establishment of a TDM Group for the North Campus University Area to include key stakeholders like Capital Health, Canadian Blood Services, the Cross Cancer Institute, Alberta Infrastructure and the City of Edmonton. This group would assist in coordinating area-wide TDM initiatives and Parking Management requirements. It is recommended that, as a first step, Capital Health and the Alberta Cancer Board commission the completion of a TDM Study for the University of Alberta/Stollery Children's Hospital and the Cross Cancer Institute to evaluate and determine applicable TDM initiatives for these facilities.

6.3.2 Transit

Key Issues

Transit represents an integral component of the overall transportation system in Edmonton. Increasing transit utilization to the University area is crucial to meeting the University's TDM goals. The North Campus area represents the second largest transit destination in the City next to the Central Business District. The most significant disadvantage of transit is that it does not provide the same level of comfort, convenience, and door-to-door service as the private auto. In order to convince people to switch to transit, there must be a clear advantage to using transit including time savings, cost savings and travel convenience.

Recommended Actions

1. Continue to work towards implementing the student U-Pass program.

2. In the longer term, expand the U-Pass program to faculty and staff. To ensure the success of the expanded U-Pass program, additional incentives may be required. Consider these two options:

    - Mandatory U-Pass for staff and faculty, and/or
    - Subsidize the staff U-Pass program.

3. Working with the local transit authorities, improve passenger amenities and information sources as well as maps and schedule information.

4. Establish an on-campus Transit User Group as part of the TDM Services Group to assist in promoting and marketing transit and determining areas for improvement.

5. Continue coordination among the University of Alberta and the local transit authorities (ETS, St. Albert Transit, and Strathcona County Transit). The University currently has an excellent working relationship with the local transit authorities and continued cooperation is an integral component to the success of the University's TDM program.

6.3.3 Pedestrian and Bicycle

Key Issues

The development of appropriate pedestrian and bicycle facilities can effect changes in pedestrian and bicycle utilization characteristics. Although Edmonton is considered a "winter city" and self-propelled modes are not as attractive or popular during winter months, pedestrian and bicycle TDM initiatives should be included in the University's TDM program. Self-propelled travel modes, such as walking, jogging, in-line skating and bicycling promote healthy lifestyle choices and are integral components of smart growth development.

Recommended Actions

1. Ensure that commuters interested in self-propelled travel modes are accommodated year round.

2. Ensure and support the LRDP Sector Plan compliance. The sector plans developed to date incorporate many of the pathway-related initiatives for safe, aesthetic and accessible pathways designed as multi-use trails. Sector Plans ensure that on-site vehicular paths recognize that pedestrians are the primary users. The University will need to ensure that these guidelines are incorporated into new building designs and campus redevelopment projects.

3. In addition to providing access to self-propelled pathways, install improved end-of-trip facilities, such as convenient shower and locker facilities, and secure bicycle storage in close proximity to commuter destinations.

4. Develop a bike-share program. Yearly, the University "adopts" a large number of bicycles that are deserted on campus. There is the opportunity to put these into service at strategic points on campus, for travel around and between campus sites. The Students' Union has just created their ECOS library, which attempts to initiate this activity.

5. To further the effectiveness of Pedestrian and Bike-related TDM initiatives develop promotional information, including maps of pedestrian routes to, from and through campus.

6. Develop pedestrian/bicycle education and safety programs to encourage use of pedestrian and bicycle modes. Work with advocacy groups in Edmonton and with the City to develop campus-relevant programs.

6.3.4 Land Use Planning Related TDM Options

Key Issues

The key issue as it relates to land use planning and development is to ensure that future developments incorporate and support the TDM initiatives adopted by the University. Including TDM initiatives in the design criteria for new development will emphasize TDM and will help facilitate program success.

Recommended Actions

1. New buildings should be designed to be more supportive of the recommended ridesharing, transit use, pedestrian and bicycle TDM initiatives:

- In general buildings and their entrances should be oriented to major pathways to provide convenient pedestrian connections;
- Buildings should support change and shower facilities;
- Medium and high-density developments should be located such that they provide access to transit service, and;
- Loading docks and drop-off areas should not interfere with pedestrian access and circulation.

2. The LRDP and the Sector plans include compliance check lists to ensure that all development proposals conform to the University's planning guidelines and development requirements. Expanding the compliance checklists to include TDM guidelines and objectives as they relate to building development would help ensure new developments support the University's TDM program.

3. Construct additional student residences on campus. Increasing the number of students living in close proximity to campus can reduce the number of commuter trips to and from campus.

4. If or as additional student residences are constructed at other campuses, such as the Faculté Saint-Jean or Michener Park, the University should expand its shuttle services to ensure that additional residential units do not promote additional single occupant vehicle trips to the North and South Campuses.

5. Consider residence locations close to the SLRT and transit facilities at South Campus. The implementation of the SLRT to the future Century Park development provides convenient transit linkage from South Campus, to North Campus, and to the UDT site.

6.3.5 Complementary and Supporting Related TDM Options

Key Issues

The recommended TDM options require a shift in attitudes towards travel. Complementary and supporting TDM strategies should be considered integral components of the University's TDM program. To make this shift as easily as possible, supporting strategies can be used to promote and endorse the TDM initiatives.

Recommended Action

1. Develop effective communications strategies.

   a. Create a marketing campaign and educational information packages to advance the TDM initiatives. Creating a distinct identity for the TDM program will help market initiatives and encourage buy-in from the campus community. In addition, providing information on the benefits

of TDM and how to utilize available initiatives will help achieve the goals and objects of the TDM program.

b. Establish ongoing communications on TDM with the University community including students, staff, faculty and senior administration.

c. Establish ongoing communications on TDM with adjacent institutions and organizations. Over time, develop plans that have mutual benefit. Ensure that any additional travel-related pressures experienced by any organization can be mitigated together.

d. Establish ongoing communications on TDM with neighbours. Work with them to mitigate any adverse effect from TDM initiatives.

e. The success of the TDM program requires senior management "buy-in". The imperatives of TDM can be demonstrated through their leadership-by-example.

2. In conjunction with implementing parking management techniques that support high occupancy vehicle travel, develop car-pool support programs. Bulletin boards or computerized ride-matching services are typically used to encourage the use of car-pools.

3. Co-operate with the City to ensure that campus agencies have a proactive role in City-sponsored activities to promote trip reduction measures.

4. As the University continues to grow, there may be a segment of the staff and faculty who require rapid and convenient transportation among campus sites. Should this become significant, the University should consider alternative forms of travel among campus sites, like shuttle services, or making casual-use fleet vehicles available for this use.

5. In the longer term, implement an alternative work-hour program to reduce University-generated trips without requiring significant capital expenditures. The class schedule at the University already supports staggered start times; however, administrative staff hours consistently coincide with AM and PM peak travel on the adjacent road network. Although unlikely to reduce single-occupant vehicle trips to the University, an alternative work-hour program will reduce trips generated during the peak hours, which will alleviate traffic congestion experienced in the University during the AM and PM rush hours.

6. Tele-commuting or work-at-home programs are complementary components that work well with alternative work-hour programs.

6.4 Synopsis of the Recommended TDM Program

Implementing the University of Alberta Travel Demand Management Program should allow the University of Alberta to construct new teaching, research and recreational facilities while limiting the amount of new parking facilities required on campus. The various tactics presented make single-occupant vehicle travel less attractive by introducing incentives and disincentives that make alternative travel modes such as transit, carpooling, walking and cycling more accessible and attractive.

Table 6-2 presents a summary of the recommended individual TDM tactics that should be considered by the University. The recommended tactics have been segmented into short term (0–2 years), medium term (2–5 years) and long term (5–10 years) initiatives.

Table 6-2: Recommended TDM Initiatives Summary

Parking Options	Transit Options	Pedestrian & Bicycle Options	Land-Use Options	Complementary & Supporting Options
Short Term				
• Develop TDM Relevant Parking Policy and Permitting System • Adjust Parking Fee Structure • Implement Monitoring Program • Refine Parking Enforcement Program • Develop joint fee strategy with neighbours	• Implement Student U-Pass • Establish a Transit User Group to address on-going transit service improvements • Implement a Onecard zone on LRT between UA campuses for staff/faculty	• Maintain pedestrian corridors year round • Develop Standards for trip-end facilities • Update campus maps to include Pedestrian Pathways to, from and through the University • Implement a bike-share program	• Develop guidelines and integrate TDM requirements into the Sector Plan Compliance Checklists to coordinate land use development activity and TDM strategies	• Develop a marketing campaign and communications plan • Initiate car-pool program in conjunction with revisions to parking policies • Establish TDM Services Group to Coordinate TDM initiatives
Medium Term				
• Implement South Campus Park'n'Ride • Develop Policy on new parking stall construction. • Coordinate Parking in the Greater Campus Areas	• Investigate the feasibility of extending U-Pass to staff and faculty	• Develop campus relevant educational and safety programs • Continue to improve walking and cycling facilities	• Incorporate TDM requirements into new developments on campus	• Evaluate inter-campus travel needs of staff and students
Long Term				
• Evaluate and Implement ITS and high-tech payment systems to promote efficient use of existing parking facilities	• Implement staff and faculty U-Pass program • Continue coordination between UA and local transit authorities	• Incorporate pedestrian pathways and end of trip facilities into all new developments	• Construct additional student residences	• Investigate Alternative Work Hours and tele-commuting programs • Implement inter-campus travel improvements

6.5 Implementing and Monitoring the TDM Program

As the Transportation Demand Management program for the University of Alberta is implemented, it will be essential to monitor key indicators to confirm the effectiveness of the Program. Monitoring will help determine the effectiveness of specific initiatives and help determine when and what type of modifications to the program are required. In order to do this, the University of Alberta should adopt measurable TDM objectives. For example, reducing the number of SOV trips entering University of Alberta operated parking facilities by 5% in the AM peak hour by 2010.

Prior to proceeding with the TDM program the University will need to confirm Board of Governors/Senior Administration support for the University of Alberta TDM Program, and most importantly, develop a 5 year business plan. The business plan should confirm the implementation strategy, establish the Program's budget and define TDM goals, objectives and benchmarks. It is anticipated that the business plan would guide the work of the proposed TDM Services Group and would be updated on a regular basis. It is noted that the detailed parking analysis indicated that the University's parking facilities are not currently operating at critical levels and therefore, from a parking perspective, the University can continue to operate under existing operating conditions while the business plan is being developed.

The business plan should also identify program monitoring requirements. The development of a thorough monitoring program including collecting and recording data on mode split characteristics will give insight into Program success and help target potential Program modifications. In general, the monitoring should focus on the following:

- Monitor parking activity including, utilization characteristics, SOV use, permit purchases and car-pool utilization characteristics;
- Monitor transit utilization and periodically review transit needs and requirements, and;
- Track changes in travel patterns and modal shift through formal intercept surveys for students, faculty and staff.

6.6 Pilot Project

Although the University is currently proceeding with the Student U-Pass program, implementation of additional TDM initiatives illustrated in Table 6-2 will require development of a strategic business plan to specify implementation procedures and identify funding sources for specific initiatives. Acknowledging that the approval process and developing the business plan will take time, it is recommended that the University consider developing a TDM Pilot Project that

could be implemented in the immediate future, and be expanded upon once the TDM business plan is in operation.

It is recommended that the University consider car-pooling (high-occupancy vehicle (HOV)) for its pilot project. It is anticipated that this pilot project can be incorporated into parking services' existing operations and would be relatively inexpensive to implement.

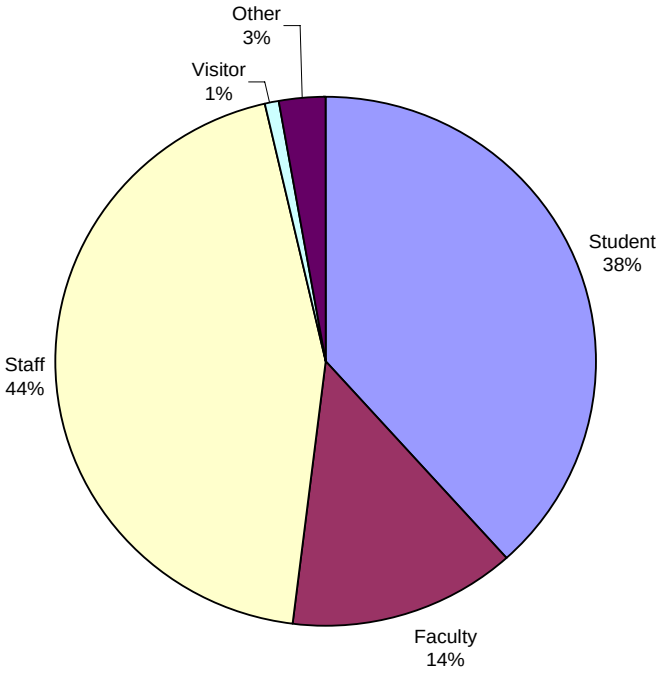
A basic car-pool parking program would require designation and/or reservation of appropriately located parking stalls, the definition of a HOV vehicle at the University and distribution of car-pool parking permits that identify a vehicle as an HOV. Given the high percentage of single occupant vehicles at the University it is recommended that the pilot project proceed under the assumption that 2 or more occupants is representative of an HOV. It is noted that additional enforcement may be required to ensure that only HOV vehicles are using the car-pool parking spaces. The type of enforcement is subject to the location and distribution of HOV parking stalls. Based on the detailed parking analysis it is recommended that the University initially consider designating a minimum of 100 stalls as car-pool stalls for this pilot project. This quantity of stalls represents approximately 1% of the University's total stall inventory and is equivalent to one half of the Varsity Lot or approximately one level of the Stadium Parkade.

APPENDIX A

APPENDIX A

Survey Population Data

Exhibit A-1: Parking Facility Survey Population Summary

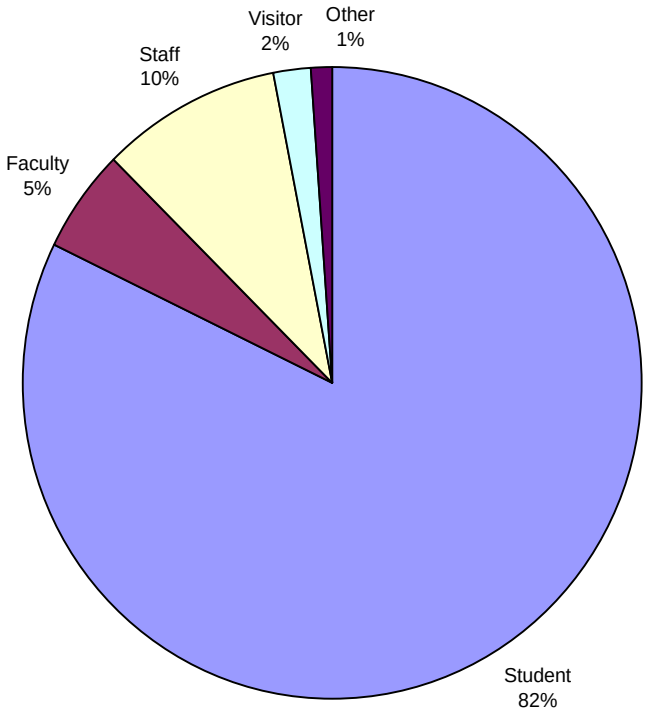


Total Surveys completed: 457

Survey Location Split
Lot N: 22%
Jubliee: 24%
Windsor: 29%
Education: 8%
Stadium: 17%

Population Split
Male 37%
Female 63%

Exhibit A-2: Campus Locations Survey Population Summary



Total surveys completed: 305

Survey Location Split
CAB: 33%
SUB: 32%
HUB: 35%

Population Split
Male 43%
Female 57%

APPENDIX B

APPENDIX B
Parking – The Essential Link

Parking Management and Operations

- Improve coordination of parking management related activities between stakeholders by establishing a common TDM or Transportation/Parking Management Office;
- Integrate TDM Goals into both the Parking Services Department and the Planning and Infrastructure Departments to ensure common TDM goals are achieved;
- Implement an active process for car and van pools;
- Provide preferential parking for car and van pools;
- Provide high priority parking for disabled users;
- Identify well used parking facilities, prioritize parking use of these spaces;
- Review allocation of staff, faculty and visitor parking spaces to maximize revenues and facility utilization;
- Maintain metered parking spaces;
- Encourage monthly or yearly permit holders to use less convenient parking spaces at nominally reduced costs;
- To increase parking facility utilization and efficiency using Intelligent Transportation Systems (ITS) to facilitate the parking seeking maneuver;
- Consider the use of "High Tech" payment systems, or smart card technology for parking, and other transportation services;
- Encourage staff and faculty to use alternative modes during the first few weeks of September and January when student travel and parking activity is typically at its peak, and;
- Maintain a strict enforcement program.

Parking Permitting:

- Do not allow 1st year students an opportunity to purchase a parking permit or, limit the number of 1st year student monthly parking permits and allow 1st year student to enter a lottery for the available spaces;
- Require full time faculty and staff who purchase a parking permit to also purchase a transit pass;
- Abandon the sale of monthly permits, and;
- Implement special permits, fees and incentives for car and van pools.

Parking Fee Structure:

- Change parking policies to allow greater flexibility in how parking fees are structured and how revenues are used;
- Allow parking fees to pay for construction, operating costs, land costs and funding for alternative transportation services that help achieve campus wide transportation objectives;
- Use progressive and/or variable rate price structures;
- Ensure that all monthly permit fees are higher than the price of a monthly transit pass;
- Increase the price of monthly and annual parking permits to remove discounts associated with purchase of monthly or yearly parking permits;
- Use parking fees to optimize parking facility utilization;
- Assign parking fees based on demand and location rather than facility type, and;
- Implement a fee structure to favour carpools and HOV travel.

Promoting Transit

- Establish targets for an increase in transit ridership to achieve a prescribed reduction in single occupant vehicle travel;
- Establish a Universal Transit Pass Program for students;
- Extend the U-Pass Program to University faculty and staff and to other staff and faculty associated with other campus agencies;
- Make the purchase of a U-Pass mandatory for staff and faculty;
- Offer a U-Pass as an employee benefit and subsidize the cost of U-Pass;
- Establish an on-campus Transit User Group to assist in promoting and marketing transit;
- Work with City Transit authorities to increase service where required including providing more frequent service and extended service hours;
- Identify and facilitate strategic opportunities to encourage LRT use;
- Improve passenger amenities and add new shelters where required;
- Review transit stop locations;
- Consider shuttles between the campus sites;
- Improve passenger access to schedule information, and integrate transit information with student and employee information packages, and;
- Work with city transit authorities to encourage the creation of more park and ride facilities throughout the municipality.

Pedestrian and Bicycle Improvements

- Consider pedestrian and bicycle requirements in new building designs;
- Improve building access, routing and roadway design to accommodate pedestrian and bike modes;
- Improve street and walkway illumination, signing and pavement markings;
- Install raised cross-walks and curb extensions;
- Integrate self propelled modes with other modes of transportation;
- Promote pedestrian/bicycle education safety programs;
- Support accessibility initiatives;
- Provide free campus bikes for on-campus use;
- Provide conveniently located end of trip facilities (showers, change and locker facilities), and;
- Provide covered and secure bicycle parking facilities.

Land Use Planning Integration

- Evaluate proposed developments and/or their location from a TDM perspective, using compliance checklists;
- Locate medium and high-density developments near roadways served by regular transit routes and in the immediate proximity of LRT stations;
- Cluster developments to encourage pedestrian movement between them;
- Construct additional campus student residences;
- Consider the development of staff / faculty residences;
- Orient buildings and their entrances towards major pathways to provide convenient pedestrian connections;
- Locate parking and service areas away from major pedestrian pathways, or where they must coincide, give the pedestrian priority, through design, and;
- Provide passenger loading and waiting areas for car pools, van pools and buses.

Complementary Strategies

Complementary and supporting TDM strategies should be considered in conjunction with the aforementioned parking management, transit and pedestrian/bicycle options. Complementary options that should be considered when developing a TDM program include.

- Promotional and educational information programs;
- Ridesharing;
- Car-sharing (car co-operatives);
- Guaranteed ride home;
- Alternative work hours;
- Staggered class times;
- Merchant discounts, and;
- Tele-commuting.