U14069: PARKING MASTER PLAN UPDATE

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Prepared for:

MR. LOWA MWILAMBWE
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UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN
121 SWANLUND ADMINISTRATION BUILDING
601 EAST JOHN STREET
CHAMPAIGN IL, 61820

AUGUST 17, 2018

WALKER
PARKING CONSULTANTS

WALKER PROJECT NO. 31-7750.00

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ILLINOIS
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EXECUTIVE SUMMARY

The University of Illinois Urbana-Champaign ("UIUC" or "University") engaged Walker Parking Consultants ("Walker" or "Consultant") to conduct a Parking Master Plan Update and analysis of the University parking system and facilities on the Urbana-Champaign campus. The objective of this engagement has been to develop an updated parking master plan for the University.

KEY FINDINGS

INVENTORY AND EFFECTIVE SUPPLY

The campus is divided into six zones, lettered A through F, as illustrated on the map on the following page.

There are a total of 15,602 parking spaces on campus. 2,472 are located in five parking structures (B4, C7, C10, D5, F29); 13,130 spaces are scattered among 166 surface parking lots.

The parking inventory by zone (see map on next page) is as follows:

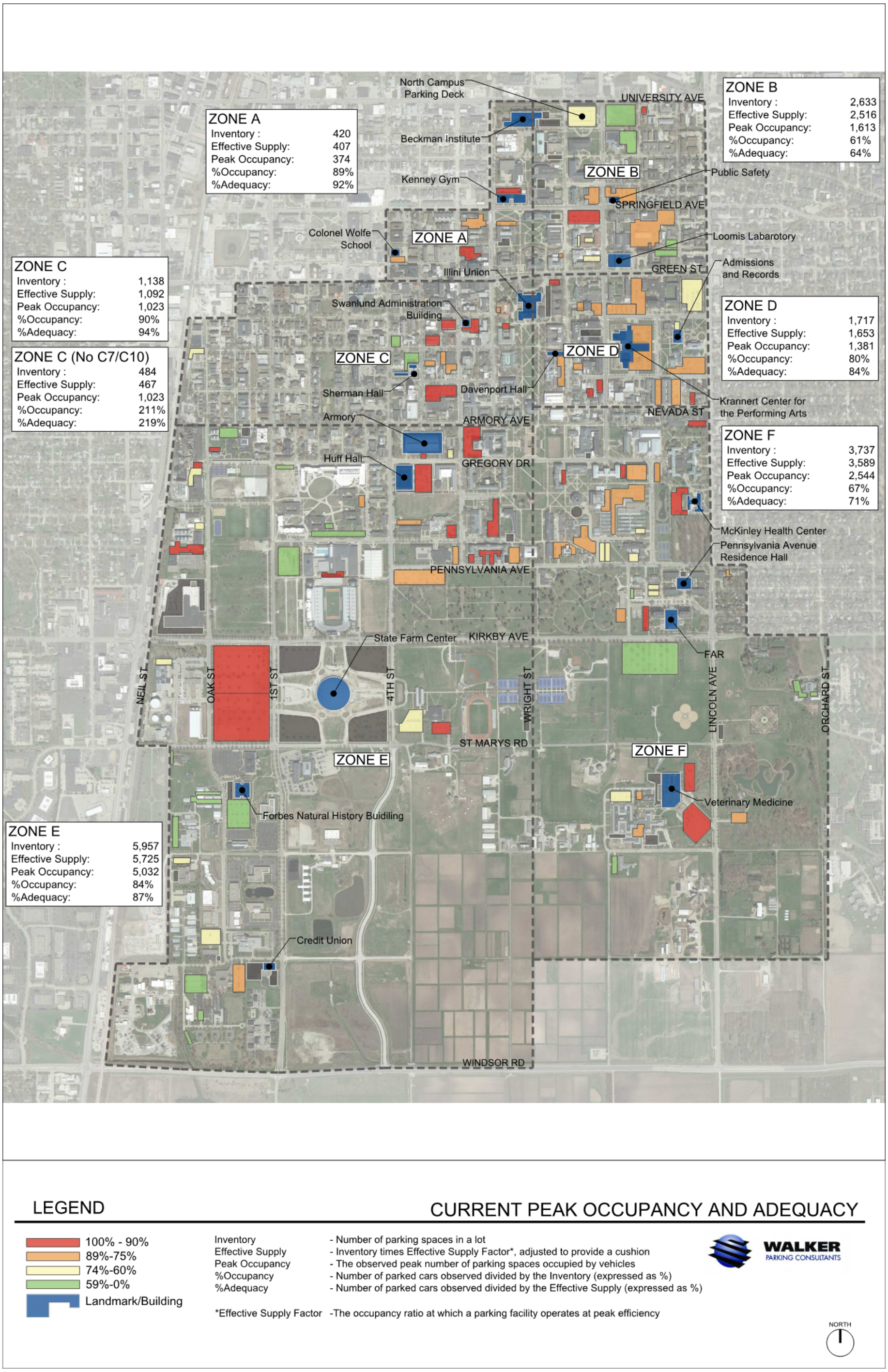
Figure 1: Current Parking Inventory

Zone	Faculty/ Staff	Student	Department	F & S	Disabled	Meters	Misc.	Total
A	264	0	30	7	15	90	14	420
B	1,897	453	71	17	41	134	20	2,633
C	827	83	60	8	16	144	0	1,138
D	1,145	147	59	11	31	246	78	1,717
E	3,490	1,152	104	18	97	1,037	59	5,957
F	1,786	1,268	63	29	32	514	45	3,737
Total	**9,409**	**3,103**	**387**	**90**	**232**	**2,165**	**216**	**15,602**

Source: Walker Parking Consultants

As illustrated within the full body of this document, the "effective supply" of parking is slightly lower than the total supply; this allows cushion that adjusts for misparked cars, parking restrictions, minor construction, and storage of materials or snow. The total effective supply is approximately 14,982 spaces.

Figure 2: Current Peak Occupancy and Adequacy



Source: Walker Parking Consultants

OCCUPANCY AND ADEQUACY

Occupancy

Parking occupancy counts taken by UIUC at agreed-upon peak times reflect the following:

Figure 3: Observed Peak Parking Occupancy (Spring 2015)

Zone	Faculty/ Staff	Student	Department	F & S	Disabled	Meters	Misc.	Total
A	227	0	30	7	15	81	14	374
B	1,081	293	71	17	41	90	20	1,613
C	786	24	60	8	16	129	0	1,023
D	895	126	59	11	31	181	78	1,381
E	2,853	1,144	104	18	97	757	59	5,032
F	1,410	614	63	29	32	351	45	2,544
Total	**7,252**	**2,201**	**387**	**90**	**232**	**1,589**	**216**	**11,967**

Source: Walker Parking Consultants

Adequacy

Parking adequacy is expressed in terms of space surpluses and deficits, and is calculated by subtracting "peak occupancy" from "effective supply." Which yields the following adequacy:

Figure 4: Current Parking Adequacy by Zone and Type

Zone	Faculty/ Staff	Student	Department	F & S	Disabled	Meters	Total
A	24	0	0	0	0	9	33
B	721	138	0	0	0	44	903
C	(1)	55	0	0	0	15	69
D	193	14	0	0	0	65	272
E	462	(49)	0	0	0	280	693
F	288	594	0	0	0	163	1,045
Total	**1,687**	**752**	**0**	**0**	**0**	**576**	**3,015**

Source: Walker Parking Consultants

The data above indicates that even on a typically busy day, there are as many as 3,015 spaces available overall. However, due to walking distances and user group requirements, surplus spaces in one zone may not be available to parkers in other zones.

Future Adequacy

Campuses are dynamic places—ever-changing, growing, densifying, and infilling. As this happens demand patterns shift and parking supply is lost to development. The historical compounded annual growth rate (CAGR) at UIUC has been 1.10%. Assuming the demolition of

structures C7 and C10 (which have reached the ends of their useful life or require major rehabilitation projects) and other minor development, Walker projects the following potential scenarios of parking adequacy under various CAGRs.

Figure 5: Sensitivity Analysis of Future Overall Adequacy

CAGR	1.10%	0.75%	0.50%	0.00%
Zone A	(10)	4	14	33
Zone B	687	748	791	873
Zone C (C7 & C10 Removed)	(674)	(635)	(608)	(556)
Zone D	106	159	195	266
Zone E	23	215	348	605
Zone F	739	836	903	1,033
Total	**871**	**1,327**	**1,643**	**2,254**

Source: Walker Parking Consultants

With the potential loss of C7 and C10, plus the other known project impacts (provided during project initiation), the only zone that projects a possible immediate need is Zone C. The data substantiates the need to replace C7/C10, if demolished. While it may not be necessary to replace the entire zone deficit, Walker does recommend that the University pursue the options and costs of replacing the 654 spaces lost at C7 and C10.

SUMMARY RECOMMENDATIONS

VISITOR PARKING

1. There are 2,165 metered transient spaces on campus. Make ~436 meters (i.e., 1:100 students) visitor-only.
2. Introduce more stringent time limits on non-visitor meters, to discourage re-parking.
3. Support, enhance and encourage transit or other alternatives, and price meters based on demand.
4. Phase in multi-space meters as single-space meters are retired. Include pay-by-plate and pay-by-phone to improve customer service and tie in with LPR system for enforcement.
5. Improve wayfinding—guiding visitors to metered parking and to the parking office.
6. Adjust special event lot rate for size of facility, time of day, and/or intensity of use.
7. Introduce online visitor permit sales/management. Can be T2 module or 3rd party. T2 currently provides the software backbone for the Parking Department, and can be expanded with this module, if desired. Other 3rd-party vendors could provide similar products that could be tied into current systems, however, upgrades by either party could generate the need to rewrite the connections.

MOTORCYCLES

1. Allow automobile permit holders to use their regular automobile permit privileges to park motorcycles in the spaces to which they are normally entitled.
2. Allow motorcycles to use ungated parking structures. Where possible and practical locate motorcycle-only parking spaces at the ground floor and close to an entrance.
3. Consider higher density striping schemes to fit bikes more efficiently.
4. Allow motorcycle-only permits to park only in designated motorcycle spaces.

ENFORCEMENT

1. Support continued "ambassador" approach to parking enforcement; establish benchmarks for customer service "touches," as well as tickets issued (see Appendix H). Walker does not recommend ticket quotas, however, benchmarking against historical ticket data can provide a general insight into productivity.
2. Offer services including greeting, directions, assistance parking legally, distributing maps/info, and a Motorist Assist Program.
3. Keep current ratio of parking enforcement personnel; reduce by attrition if LPR efficiencies dictate.

FINANCIAL

1. Establish a parking space replacement fee. Since most parking to be replaced/added will be structured parking, this fee should be based on the cost of a garage space

(approximately $21,200 per space, adjusted annually for inflation). Note that this reflects construction expenses and does not include "soft" costs, for campus project management, which could add as much as 45 percent to this amount. This protects against the incremental (and sometimes nearly hidden) loss of parking spaces over time. It is rare that a single project wipes out hundreds of spaces all at once, though of course this does happen. The more insidious changes are the loss of two spaces here, ten spaces, there, and five elsewhere, that can add up to substantial losses in the long term. The replacement fee treats all projects equivalently, creates a predictable expense, and allows Parking to be responsive when a project finally tips the balance for the need for additional inventory.

2. Parking fines are commensurate with violations and the local market. No changes are recommended.
3. Build a sinking fund to cover the average annual cost of long-term preventative maintenance of parking assets. Walker recommends $60 per year per surface space and $142 per year per structured space ($180 per year for structures over 20 years old). This amount is part of the gross expenses that generate the needs for appropriate parking fees in support of the programs.
4. Current pricing is cost recovery. UIUC will need to increase parking fees in order to generate sufficient revenues to support current and deferred maintenance, expand TDM programs, invest in additional transit, and undertake capital construction.
5. Current salary-based pricing models do not promote efficient use of the current parking inventory.
    - There is not adequate incentive to shift some parkers to areas in which space is abundant.
    - The model, as it stands it unsustainable, the "cap" on parking fees, ensures that the full cost of providing, administering, and maintaining parking cannot be adequately funded in the long term.
    - The current model contains serious risks and constraints. While the cost to provide and maintain parking continue to escalate, wage increases (and the attendant fee increases) may not be able to keep pace. If there is employment attrition, the revenue base declines, even as costs continue to escalate.
    - One way in which UIUC could continue to abide by salary-based pricing agreements with bargaining units would be continue to "discount" parking areas outside the campus core (e.g., more than 800 feet from the Main Quad), but charge full-price for all permits in the campus core. The spirit of the contract would continue to be honored by ensuring bargaining unit personnel will still have access to salary-based, reduced-price parking.
6. Current undervaluing of the highest demand parking sets unrealistic expectations regarding proximate parking on a developing, growing campus. These expectations create pressure to replace or repair C7/C10, instead of using existing parking capacity.

7. Student parking fees (proximal) are consistent with peer rates. No changes are recommended.
8. Considering the high demand for campus parking meters, UIUC should increase meter rates to increase turnover and enhance revenue. Because the demand patterns are different from those at the municipal level (Urbana and Champaign), it is reasonable that the rates should be similarly differentiated.
9. Higher event rates would be more commensurate with uses and could moderate the needed fee increases to faculty, staff, and student permits.
10. Given the true costs to provide parking (administration, operation, repair, maintenance, and capital expenditures), the expenses outstrip the revenue generated through parking fees. The salary-based pricing creates a parking subsidy for most permit holders. Because the Parking Department is an auxiliary business unit, UIUC should consider that parking budget deficits be covered by an increase to the University's benefits overhead rate.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

1. Continue to support transit and universal transit passes.
2. Cross-promote with F&S Sustainability to encourage use of TDM programs (reduced demand for parking can translate into reduced capital expenses for additional and replacement parking).
3. Encourage carpools and vanpools with preferential pricing (combine with otherwise undiscounted parking in campus core).
4. Support and promote carsharing and ride-hailing (Uber, Lyft, etc.), which reduce individuals' needs to bring single-occupancy vehicles (SOVs) to campus.
5. Collaborate to improve bike and pedestrian friendliness of campus.
6. Encourage cycling by offering adequate bike parking. This may include covered parking, secure bike lockers, and the addition of bike cages into new or existing parking garages.
7. Support bikeshare in principle (as it can grow a bike culture); low priority for Parking as bikesharing mostly replaces walking or transit trips.

COMMUNICATIONS

1. Increase frequency and transparency of communications to create an atmosphere of trust and reduced resistance to parking fees and fee increases. Clear communication can help dispel the myth that campus parking organizations are "cash cows."
2. Ensure the readability, clarity, consistency, and accuracy of published materials, particularly maps, which are always a challenge in dynamic, higher-education environments.
3. Develop "dashboards" illustrating sources and uses, services offered, and mode splits. Display prominently on website and in an annual report. At Walker's recommendation UIUC built such an annual report in 2015-2016 and posted a link on the Parking website. Walker would recommend using the infographics from that report on a dedicated page

on the Parking website, instead of having them available only by downloading a PDF of the full report. Other examples of annual report and associated graphics can be found at:
    - University of Texas at Austin
    - University of Maryland
    - Towson University
    - University of Colorado-Boulder
4. Continue efforts to increase the profile of Parking's website, reducing the number of clicks required to reach it from the University homepage.
5. Continue interaction with Parking Advisory Committee, provide members with materials they can share with their constituent assemblies.
6. Improve wayfinding generally, and particularly for visitors—guiding them to metered parking and to the parking office.

OPERATIONAL ASSESSMENT

1. Eliminate hand-numbered temporary permits in favor of preprinted and unique, sequentially numbered permits.
2. Ensure that Parking has a "seat at the table" for construction projects to ensure that parking needs/losses are accounted for—and construction parking is accommodated.
3. Parking facilities should be consolidated under the control of Parking. When parking is lost to construction, it is not a land loss to Parking, it is a land-use loss, and parking requires compensation in order to meet or mitigate the displaced demand and revenue.

PARKING STRUCTURES C7 & C10 REPLACEMENT ALTERNATIVES ANALYSIS

1. As parking structures C7 and C10 reach either the end of their useful lives or will require substantive repairs, Walker recommends that if capacity is lost (~654 parking spaces) inventory should be at least partially replaced in Zone C.
2. While overall campus parking adequacy is projected to remain at a surplus (in aggregate), campus preference and desire for institutional efficiency highlight the benefits of maintaining balance between proximate and remote parking.

PROJECT UNDERSTANDING AND BACKGROUND

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PROJECT UNDERSTANDING AND BACKGROUND

The purpose of the updated parking master plan has been to assist and guide UIUC in future decisions regarding facilities, operations, and the general business of parking.

The UIUC campus, located in central Illinois, includes approximately 43,600 graduate and undergraduate level students and 11,000 faculty and staff members. Among those who drive to campus, approximately 15,600 parking spaces must be shared. The UIUC parking system currently consists of five parking structures, over 166 surface parking lots and over 2,000 on-street, metered parking spaces.

One of the key items the updated parking master plan has addressed is prioritizing solutions that entail either renovating or removing central parking structures C7 and C10, which—unless substantially repaired—are nearing the end of their respective useful service lives.

Our scope of services also addressed the general UIUC parking system and operation. We have provided a review of the entire parking system including assessing and making enhancement recommendations regarding operations, financial performance, technology, maintenance, and repairs. Our team of parking consultants worked in conjunction with the UIUC parking staff to identify future parking system needs and provided the information necessary to plan for future implementation.

Throughout the project we worked closely with the UIUC Project Team and various stakeholders to ensure our study met the needs expressed by UIUC and ultimately provides a roadmap for the future planning and development of the UIUC parking system. We understand the parking master plan developed for this engagement will ultimately be included in an overall campus master plan document.

THE WALKER PROJECT TEAM

Walker was the prime professional services consultant for the project. In addition to the core team, Walker contracted with the following consultants to complete this engagement:

- Primera – Traffic and transportation consulting services
- Juneau Associates, Inc., P.C. – Civil and structural inspection services (VOSB/SDVOSB)

Reports from these sub-consultants have been provided under separate cover.

STAKEHOLDER COMMUNICATIONS

Input from administration, faculty and staff members, students, neighbors, and other parties was solicited to develop a plan that would achieve acceptance and support. These efforts included consensus building toward establishing study goals and objectives, study methodology, and data collection requirements. Toward this end, Walker engaged stakeholders on the parking and transportation issues at UIUC and elicited their opinions and thoughts through the following outreach program:

1. Met with the Parking Master Plan Study Steering Committee for the purposes of informing and advising the consultant on this project.
2. Developed an online questionnaire to elicit data regarding campus parking and transportation characteristics and provided UIUC with a web link for distribution. This survey helped UIUC widen its base of campus involvement, by targeting individuals that did not participate in in-person meetings.
3. Led focus group and stakeholder meetings and recorded feedback provided by attendees.
4. Met with stakeholders such as faculty, staff, and student governance organizations.
5. Delivered presentations of findings and progress at meetings hosted by UIUC.

DEFINITIONS OF PARKING TERMS

Several terms or jargon have unique meanings when used in the parking industry. To help clarify these terms and enhance understanding, the following definitions are presented.

- **Commuter Students** – Live off-campus, but not in student housing (either university- or privately-owned). They live farther than a reasonable walk or short bike ride, and must rely on driving, carpooling, or public transportation to arrive on campus. Compare to the definition of "Off-Campus Students," below.
- **Compounded Average Growth Rate (CAGR)** – The rate of growth needed to average over a number of years necessary assuming each year's growth is added to the base to result in the total increase in the amount over those years.
- **Demand** –The number of parking spaces required to satisfy parking needs on any given day. This is estimated by comparing the number of vehicles parked in the study area and the number of parkers in the study area.
- **Demand Generator** – Any building, structure, business, or attraction that brings individuals into the study area, thereby originating or increasing parking demand and occupancy.
- **Demand Ratio** - The ratio of the observed number of occupied parking spaces compared to a reference statistic. For example, if there are 1,000 employees and an observed peak of 400 occupied spaces in the employee lot, the demand ratio is 0.40 spaces (400/1000) per employee.
- **Design Day** - The day that represents the level of parking demand that the parking system is designed to accommodate. In most of the hundreds of parking studies that we have conducted, this level of activity is typically equal to the 85th to 95th percentile of absolute peak activity. Although we will occasionally design to a higher-than-typical design standard, such as one exceeded less than one day per month or even the absolute peak level of demand, we do not typically design to these extreme conditions because the result is an abundance of spaces that remain unused most of the time.
- **Drive Ratio** - The percentage of a particular user group that drives a vehicle to the study area and parks.
- **Effective Supply** - The total supply of parking spaces, adjusted to provide a cushion, as calculated as the parking supply times the effective supply factor.
- **Effective Supply Factor** – The occupancy ratio at which a parking facility operates at peak efficiency. This factor allows patrons to spend less time looking for the last available spaces and allows for the dynamics of vehicles moving in and out of spaces. It also allows for spaces lost to poor or improper parking, snow removal, retail, derelict vehicles, and

the like. The effective supply varies by user group and type of parking, but typically the effective supply is 85 percent to 95 percent of the total number of spaces provided.

- **Elasticity** – Price elasticity of demand is a term in economics often used when discussing price sensitivity. Price elasticity of demand is calculated by dividing the percent change in quantity demanded of a good by the percent change in its price. Firms collect data on price changes and how consumers respond to such changes and later calibrate their prices accordingly. (http://www.investopedia.com/terms/d/demand-elasticity.asp)

- **Event Rate** – due to the volume of traffic and the need for simplified management, a flat rate is typically charged for scheduled events.

- **Freestanding Parking Structure** – Any parking structure that is not physically integrated into any other structure and as its primary purpose accommodates the assembling or standing of vehicles for relatively temporary periods of time either with or without charge for such assembling or standing, but not for repair, sale, or commercial storage thereof.

- **Inventory** – This is the total number of marked parking spaces within a facility or study area.

- **Level of Service (LOS)** – The concept of levels of service uses qualitative measures that characterize operational conditions and their perception to parkers, motorists and passengers. The descriptions of individual levels of service characterize these conditions in terms of such factors as comfort and convenience, freedom to maneuver, speed and travel time, and traffic interruptions. Six levels of service are defined, and are given letter designations, from A to F, with level of service (LOS) A representing the best operating conditions. LOS F represents a level of service that is not acceptable.

  The volume of an activity that can be served under the inadequate conditions of LOS F is generally accepted as being lower than possible at LOS E; consequently, LOS E is the value that corresponds to the minimum acceptable service rate.

- **Mixed Use Facility** – A parking structure that is designed and constructed so as to include other complementary uses such as retail, office, services, restaurant, and others within the structure.

- **Occupancy** – The number of parking spaces occupied by vehicles. This information is gathered by performing occupancy counts in each parking facility located within the study area.

- **Off-Campus Students** – Live in student housing (either university- or privately-owned), adjacent to campus. They live within a reasonable walk or short bike ride. Although they may choose to rely on driving, carpooling, or public transportation to arrive on campus,

they live close enough to not require these modes. Compare to the definition of "Commuter Students," above.

- **Parking Adequacy** – The ability of the parking supply to accommodate peak parking demand is indicated by parking adequacy. Parking adequacy is calculated as the difference between the effective supply of parking spaces and the demand for those spaces, resulting in a surplus or deficit.
- **Parking Supply** – The total number of marked or defined parking spaces within the study area.
- **Patron or User** – Any individual parking in the study area, unless modified by attachment to a specific business or land use. (i.e., a *patron or user* is someone parking in the system, whereas any student may or may not be a *parking patron*.
- **Peak Hour** – The peak hour represents the busiest hour of the day for parking demand. On a university campus, this usually occurs between the hours of 9:00 a.m. and 11:00 a.m. on a weekday when class attendance is the highest.
- **Permit Holder** – A long-term parking patron, usually monthly or more.
- **Permit Rate** – The periodic charge for unrestricted daily parking privileges. Permit parking may conflict with special events, and may or may not include parking access during special events, weekends, or as specified in a parking agreement. Permit terms may be monthly, annual, by semester, or negotiated.
- **Presence Factor** – The portion of a user group present within the study area during the peak hour.
- **Transient (Daily) Parking Rates** – This parking rate schedule is typically comprised of an initial parking rate for the first increment of time. Additional fees are charged for additional increments of time. The maximum rate is typically stated in the rate schedule. A lost ticket typically is charged at the maximum rate.
- **User Group** – A specific group of parkers for whom the population can be determined and compared to a specific recorded parking occupancy. Patients, physicians, employees, and visitors are usually classified as medical user groups. Faculty/staff, employees, "commuter students" or "off-campus students," resident students, and visitors are typical university user groups.
- **Visitors** – Or "true visitors" are not currently affiliated with the University. These may be guest, lecturers, parents, prospective students, the media, alumni, or event attendees. Currently enrolled students, and active faculty and staff members are not "visitors" whether or not they have purchased a parking permit. This distinction is often employed

to limit the use (and maximize the availability and turnover) of specially marked parking spaces, lots, or meters.

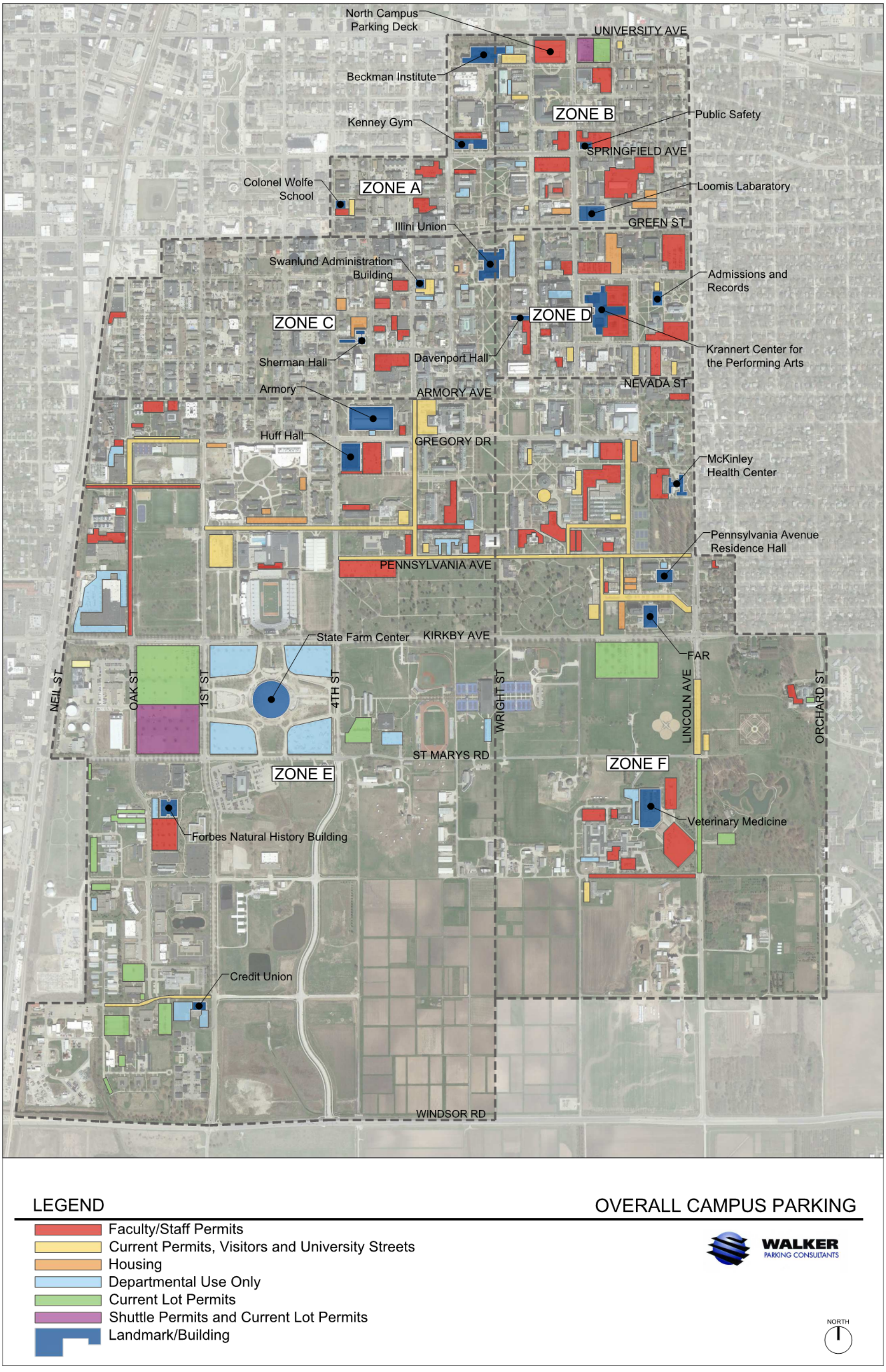
STUDY AREA

The study area is UIUC's main campus, comprised of 353 buildings on 1,738 acres. This includes 23 undergraduate residence halls, accommodating about 8,550 students. Additionally, 2,000 single graduate students or students with families live in two University-owned apartment complexes; and two residence halls are home to another 720 graduate students. About 6,000 undergraduate students live in 16 private certified housing units and 62 Greek houses.

The study area sits within the Cities of Champaign and Urbana. Examples of the local parking market, including information regarding recent residential zoning changes in Champaign, can be found in Appendix D. While it is of value to understand the local market, demand patterns and clientele are significantly different on campus versus in the municipal area—parking rates, parking policies, enforcement practices, and parking fines should be expected to differ.

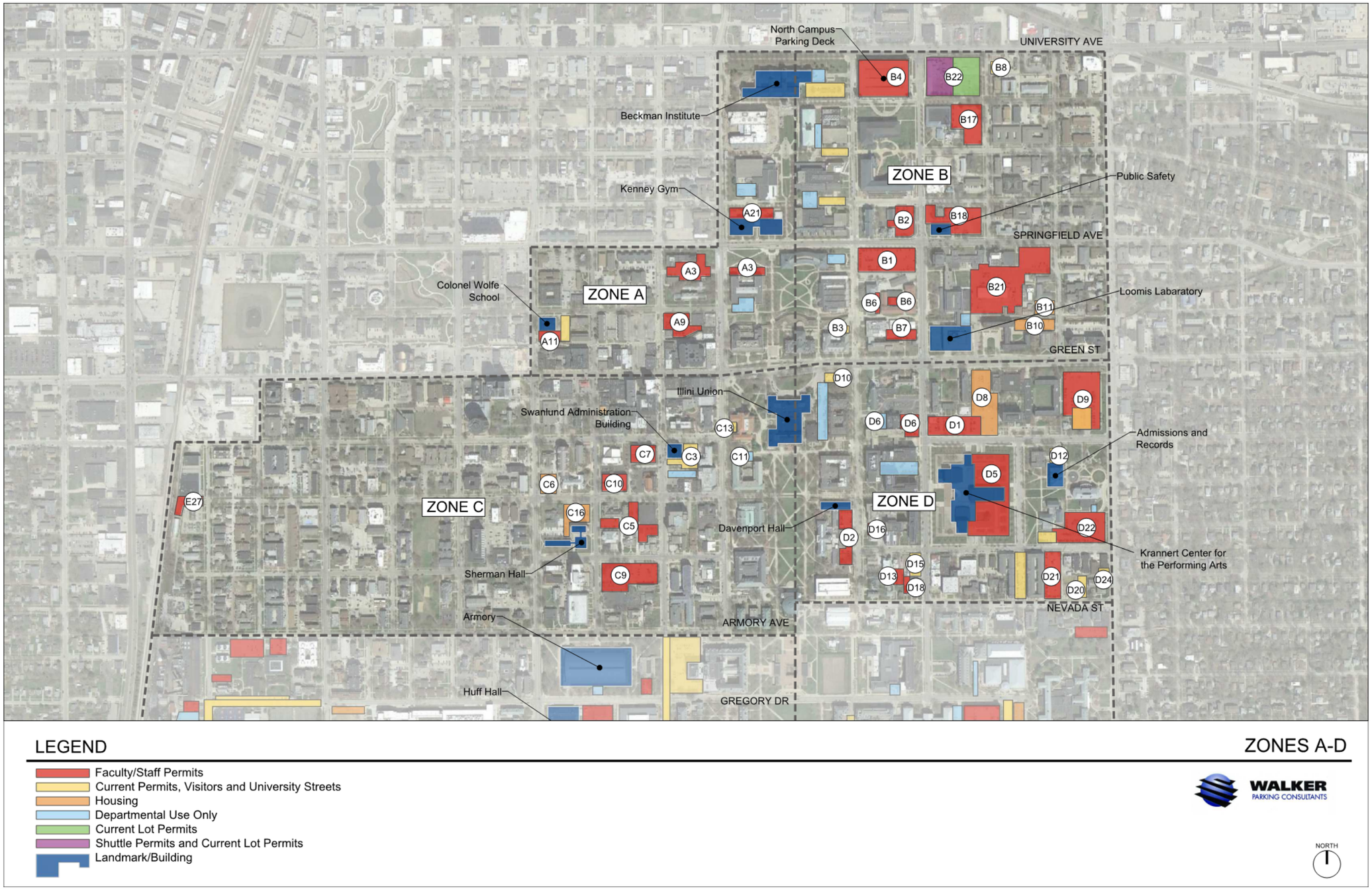
Campus maps showing the parking zones referred to throughout this report, appear on the following pages:

Figure 6: UIUC Parking Master Plan Study Area—All Zones



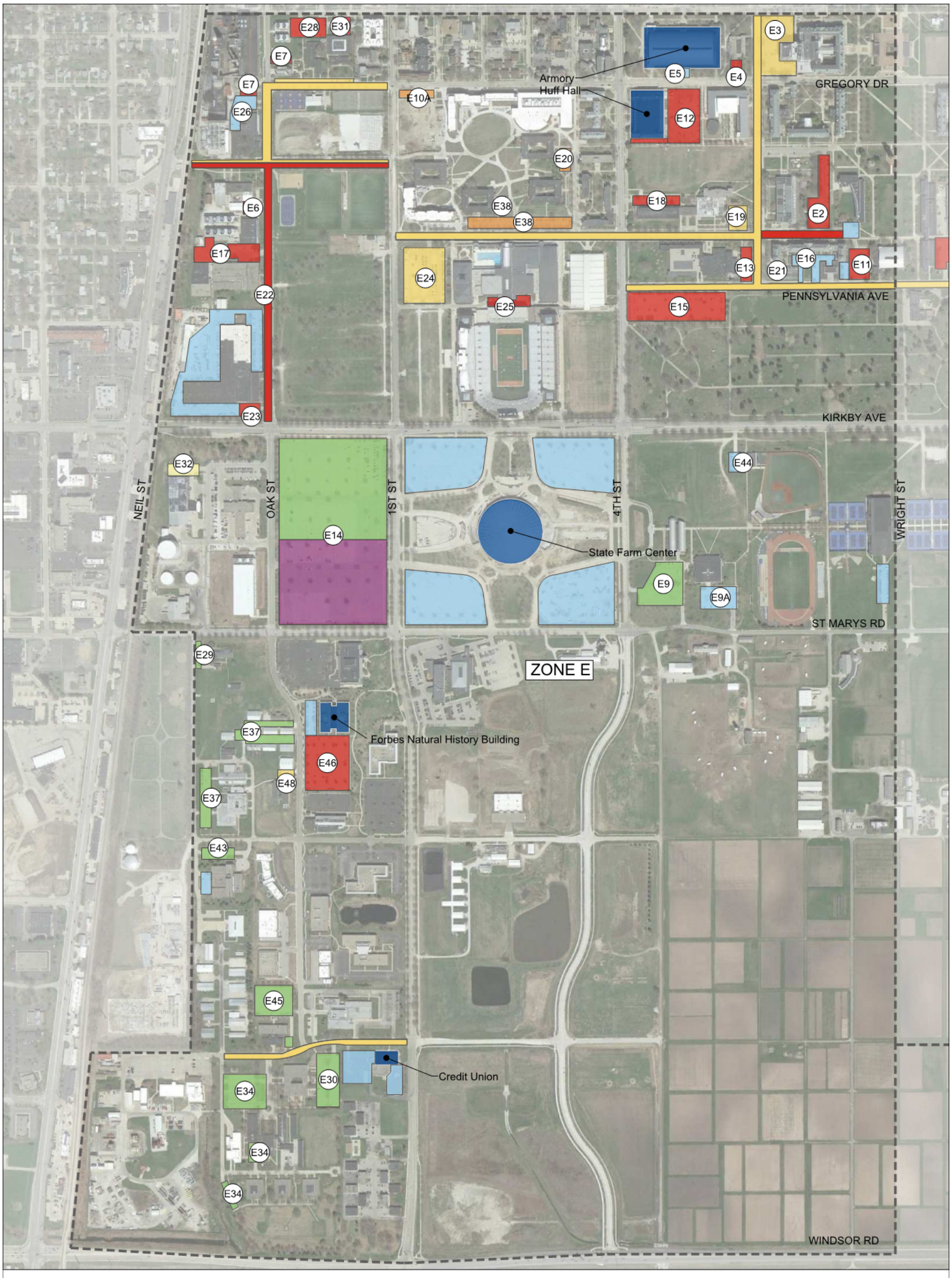
Source: Walker Parking Consultants

Figure 7: UIUC Parking Master Plan Study Area—Close-Up of Zones A – D



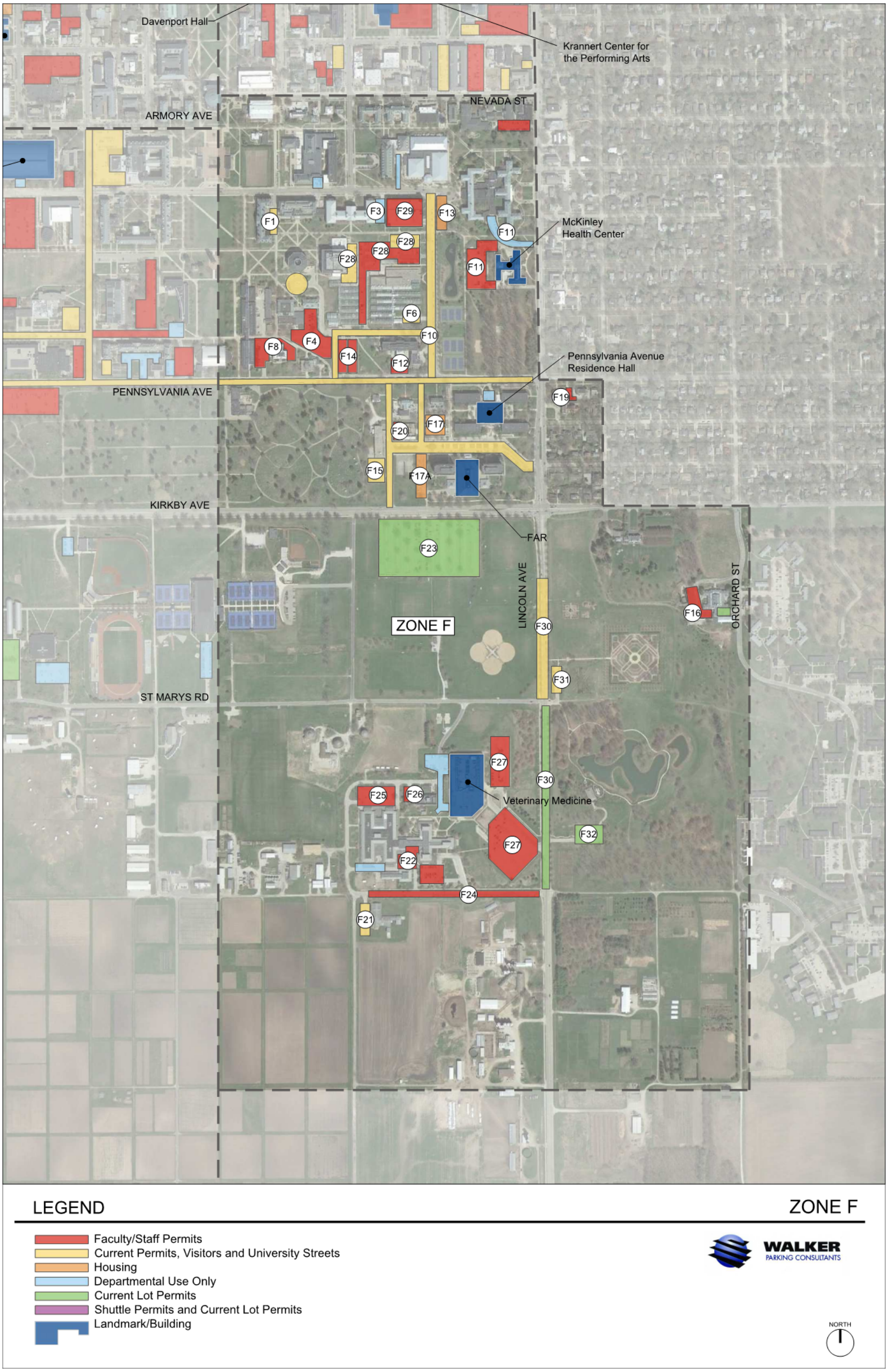
Source: Walker Parking Consultants

Figure 8: UIUC Parking Master Plan Study Area—Close-Up of Zone E



Source: Walker Parking Consultants

Figure 9: UIUC Parking Master Plan Study Area—Close-Up of Zone F



Source: Walker Parking Consultants

CAMPUS POPULATION AND USER GROUP STATISTICS

The total campus population in the Fall of 2014 was as follows:

Figure 10: Campus Population – Fall 2014 (FTE)

Faculty	**2,729**	1,903	Tenure/tenure track		
		826	Visiting faculty/instructional staff (headcount 1,071)		
Staff	**8,314**	3,982	Administrative/academic professional		
		4,332	Support		
				Subtotal faculty/staff	**11,043**
Students	**43,603**	32,579	Undergraduate students		
		11,024	Graduate/professional		
				Subtotal students	**43,603**
				TOTAL	**54,646**

Source: UIUC, http://illinois.edu/about/facts.html#facts-people

STUDENT POPULATION

Given the previous data, UIUC enrollment of 43,603 less current housing occupancy of 11,607 results in a projection of 31,996 commuter and off-campus students. Some students who live in private dwellings that are close to campus are considered to be "off-campus students," while those who live farther afield are referred to as "commuter students."

FACULTY/STAFF

Over time, the overall ratio of students to employees has maintained a narrow range. This is thought to represent the goal of management to maintain a consistent level of service to students. In general, growth in the number of employees will trend with enrollment.

Figure 11: Employee Permit Sales 2014 -2015

Permit Sales	
Faculty	1,687
Staff	6,602
Total F/S	8,289
Non-UIN	755
Total Sold	9,044
% Permitted	81.9%

**non-UIN refers to those who have no University ID number (e.g., contracted staff)*

Source: Parking Department

Thus, it is seen that about 82% of employees purchase parking permits through the Parking Department at the University of Illinois. The remainder pay meters, purchase temporary permits, park off-campus in municipal or private lots, or use alternative modes of transportation. This reflects and validates the self-reported ownership of parking permits indicated through survey results (reported later in this document).

POTENTIAL POPULATION GROWTH

The undergraduate compounded annual growth rate (CAGR) over the past 18 years has averaged approximately 1.14%, while the combination of graduate and professional students averaged 1.1%. Total campus enrollment averaged approximately 1.13% over the same period.

Figure 12: Enrollment CAGR

Student Enrollment	CAGR
Undergraduate	1.14%
Graduate + Professional	1.10%
Professional	0.21%
Total	1.13%
Rounded to	1.1%

Source: Walker Parking Consultants

Based on historical enrollment rates, the UIUC campus enrollment—accompanied by proportional increases in faculty and staff—is projected by Walker to increase at a 1.1% CAGR. This growth rate is subject to sensitivity analysis in the Zone Adequacy analysis later in this report. Campus parking is seen to have the capacity to absorb this rate of growth within the planning horizon of this assignment.

TASK 1: PARKING NEEDS ASSESSMENT

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TASK 1—PARKING NEEDS ASSESSMENT

PARKING SPACE INVENTORY

Walker subdivided UIUC parking by zone, for the purposes of this report. Large maps illustrating these zones can be found in the previous section.

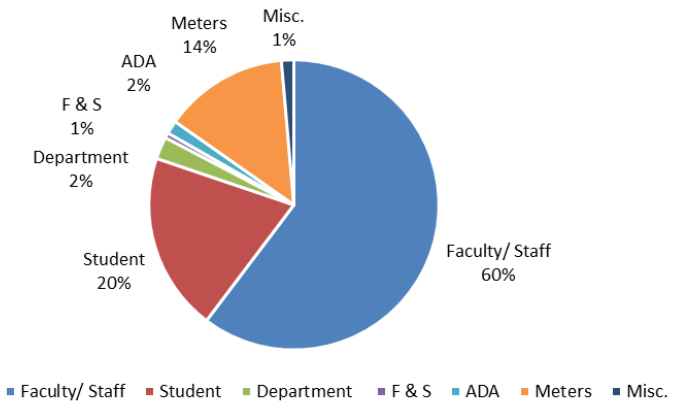
Figure 13: Parking Inventory by Zone

Zone	Faculty/ Staff	Student	Department	F & S	Disabled	Meters	Misc.	Total
A	264	0	30	7	15	90	14	420
B	1,897	453	71	17	41	134	20	2,633
C	827	83	60	8	16	144	0	1,138
D	1,145	147	59	11	31	246	78	1,717
E	3,490	1,152	104	18	97	1,037	59	5,957
F	1,786	1,268	63	29	32	514	45	3,737
Total	**9,409**	**3,103**	**387**	**90**	**232**	**2,165**	**216**	**15,602**

Source: Parking Department

The parking supply is depicted by type for all parking zones by the following graphic.

Figure 14: Breakdown of the Parking Supply



Source: Parking Department

The parking system facilities provide a total of 15,602 spaces. Of the total, 3,467 spaces are provided in the five parking structures on campus.

B4 at University and Goodwin Avenues	1,486 spaces
D5 at the Krannert Center for Performing Arts	585 spaces
F29 at Gregory and Dorner Drives	749 spaces
C7 at Fifth and John Streets	311 spaces
C10 at 812 South Fifth Street	336 spaces
Total	**3,467 spaces**

The remaining 12,135 spaces are surface parking. This is the physical distribution of supply. The allocation of parking is achieved through facility designations and pricing, which is a process that is appropriately managed by the Parking Department.

EFFECTIVE PARKING SUPPLY

Walker estimates the effective parking supply by applying an effective supply factor to the physical parking supply within each parking area in the parking system inventory. It is a generally accepted principle in parking supply/demand analyses that a supply of parking operates at optimum efficiency when occupancy is no more than 85% to 95% of the total supply. The unused stalls provide a "cushion" that allows for the dynamics of vehicles moving in and out of parking stalls and reduces the time required to search for the last few available spaces. This cushion also allows for daily, weekly, and seasonal variations as well as vacancies created by restricting facilities to certain users, miss-parked vehicles, material storage, snow, and minor construction.

When occupancy exceeds the optimum level, there may be delays and frustration in finding a space or the parker may be forced to use a less desirable space, such as one at a greater or uncomfortable walking distance. In these cases, the parking supply may be perceived to be inadequate even though vacant spaces are still available in the system. As a result, the effective parking supply is used for analysis of the adequacy of the parking system rather than the total supply.

In large systems, this cushion can vary between 0% and 10% of the parking capacity depending on the type of parking supply and type of user. In this analysis:

- Various forms of reserved parking and meters are not adjusted—100%
- Faculty/staff and student parking is adjusted to 95% of capacity

The effective supply is summarized by type, user group, and zone, in the following figure:

Figure 15: Effective Parking Supply

Effective Supply Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00			
Zone	**Faculty/ Staff**	**Student**	**Department**	**F & S**	**Disabled**	**Meters**	**Misc.**	**Total Eff. Supply**	**Total Inventory**	**Effective Supply Cushion**
A	251	0	30	7	15	90	14	407	420	13
B	1,802	431	71	17	41	134	20	2,516	2,633	117
C	785	79	60	8	16	144	0	1,092	1,138	46
D	1,088	140	59	11	31	246	78	1,653	1,717	64
E	3,315	1,095	104	18	97	1,037	59	5,725	5,957	232
F	1,698	1,208	63	29	32	514	45	3,589	3,737	148
Total	**8,939**	**2,953**	**387**	**90**	**232**	**2,165**	**216**	**14,982**	**15,602**	**620**

Source: Walker Parking Consultants

The effective supply cushion is 620± spaces. Even at less than four percent, this can help accommodate peak demand days and some temporary closures.

PARKING OCCUPANCY AND ADEQUACY

Parking occupancy levels at the UIUC campus demonstrate that the parking system is congested within some areas. The more peripheral facilities exhibit lower occupancies.

- Hourly counts were recorded by Parking Department staff between 8:00 a.m. and 4:00 p.m., and at 10:00 p.m. during peak periods in fall of 2014 and spring of 2015.
- For reserved parking spaces (departmental, F&S, disabled, and misc. reserved spaces), the space was recorded as occupied whether or not a vehicle was present, as these spaces are not available to other users.

The occupancy counts are summarized in the following figure:

Figure 16: Parking Occupancy Counts

Zone	Faculty/ Staff	Student	Department	F & S	Disabled	Meters	Misc.	Total
A	227	0	30	7	15	81	14	374
B	1,081	293	71	17	41	90	20	1,613
C	786	24	60	8	16	129	0	1,023
D	895	126	59	11	31	181	78	1,381
E	2,853	1,144	104	18	97	757	59	5,032
F	1,410	614	63	29	32	351	45	2,544
Total	**7,252**	**2,201**	**387**	**90**	**232**	**1,589**	**216**	**11,967**
Eff. Supply	8,939	2,953	387	90	232	2,165	216	14,982
Adequacy	**1,687**	**752**	**0**	**0**	**0**	**576**	**0**	**3,015**

Source: Walker Parking Consultants

These counts are judged to be reasonably representative of a typical busy day.

The occupancy counts demonstrate that the parking system has adequate parking under the observed conditions. However, parking staff and patrons report that the core area parking facilities fill on a frequent basis; and that parking patrons park and re-park at meters on street, in structured parking facilities, and at meters and designated on-street spaces in the Champaign and Urbana campus districts, even when non-core or designated permit parking is available on the campus. This is more of a function of time demands and convenience of employees who need to travel across campus to attend various meetings and functions, and students who face short-term parking needs for library visits and classes.

An alternate way to consider occupancy is as percentages of the inventory. The occupancy percentages are summarized in the following figure.

Figure 17: Parking Occupancy as a Percent of Inventory

Zone	Faculty/ Staff	Student	Department	F & S	Disabled	Meters	Misc.	Total
A	86%	0%	100%	100%	100%	90%	100%	89%
B	57%	65%	100%	100%	100%	67%	100%	61%
C	95%	29%	100%	100%	100%	90%	n/a	90%
D	78%	86%	100%	100%	100%	74%	100%	80%
E	82%	99%	100%	100%	100%	73%	100%	84%
F	79%	48%	100%	100%	100%	68%	100%	68%
Total	**77%**	**71%**	**100%**	**100%**	**100%**	**73%**	**100%**	**77%**

Source: Walker Parking Consultants

However, parking adequacy is expressed in terms of parking space surpluses and deficits in comparison to observed peak demand on a typical busy day and the effective parking supply (Effective Supply – Peak Occupancy = Adequacy). The following figure summarizes the parking adequacy observed during the spring 2015 counts.

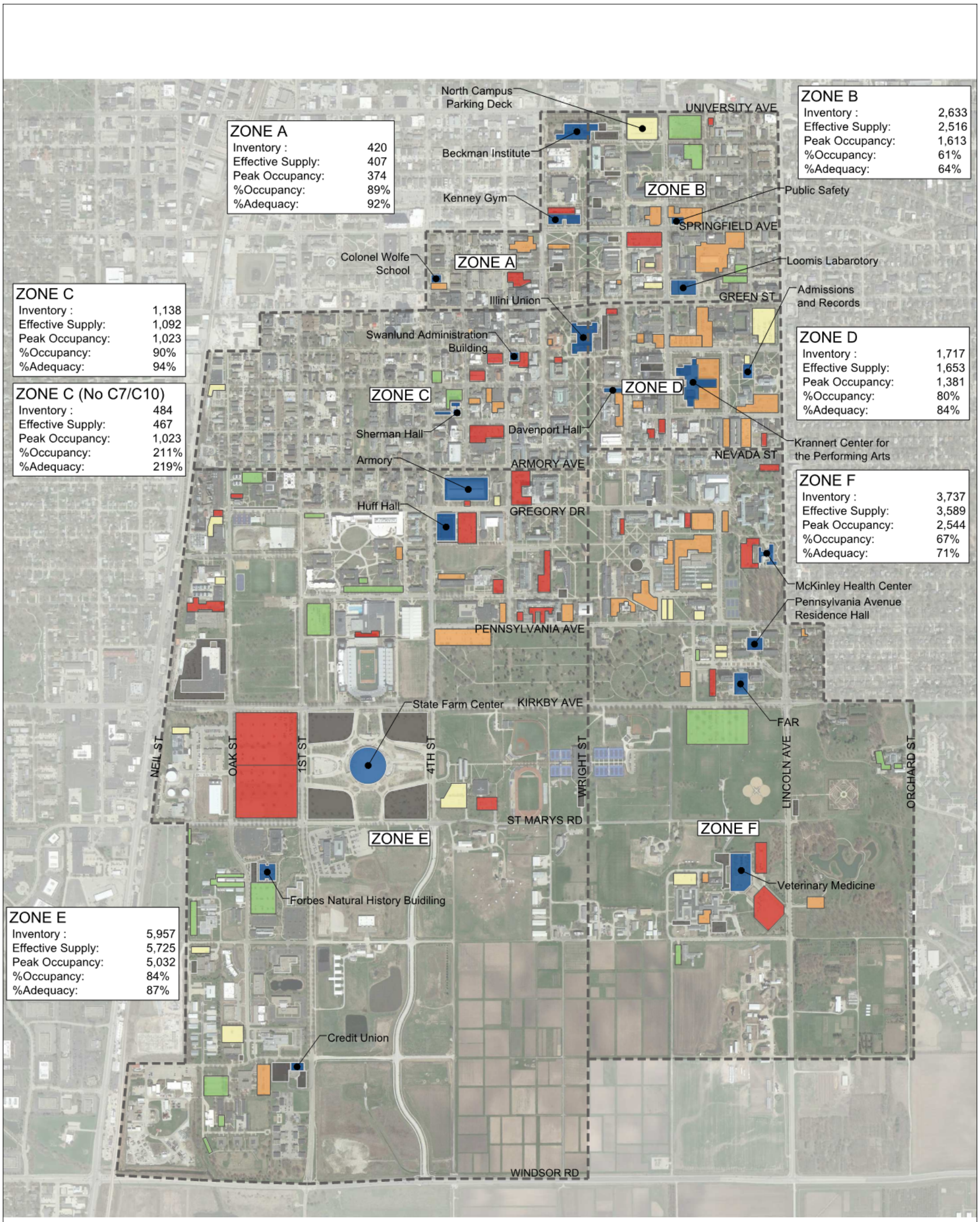
Figure 18: Current Parking Adequacy by Zone and Type

Zone	Faculty/ Staff	Student	Department	F & S	Disabled	Meters	Total
A	24	0	0	0	0	9	33
B	721	138	0	0	0	44	903
C	(1)	55	0	0	0	15	69
D	193	14	0	0	0	65	272
E	462	(49)	0	0	0	280	693
F	288	594	0	0	0	163	1,045
Total	**1,687**	**752**	**0**	**0**	**0**	**576**	**3,015**

Source: Walker Parking Consultants

The data above indicates that even on a typically busy day, there are as many as 3,015 spaces available overall. However, due to walking distances and user group requirements, surplus spaces in one zone may not be available to parkers in other zones.

Figure 19: Current Peak Occupancy and Adequacy



Source: Walker Parking Consultants

FUTURE DISPLACEMENTS

The C7 and C10 parking structures are nearing the end of their physical life without a large comprehensive rehabilitation project and, as a consequence, may be demolished in the near term future. A condition assessment report and Parking Facility Asset Management Plan is provided by Walker as a separate report. The removal of C7 would displace 314 spaces, and the removal of C10 would displace 340 spaces, or 654 spaces in total.

UIUC also provided Walker with a list of major projects, within the ten-year planning horizon covered by this Parking Master Plan—that also will impact parking in the near future is shown in the following figure.

Figure 20: Ten-Year Projected Parking Impacts

Zone	Displacements	Additions	Impact
B	(52)	22	(30)
D	(6)	0	(6)
E	(88)	0	(88)
F	(12)	0	(12)
Total	(158)	22	(136)

Source: UIUC

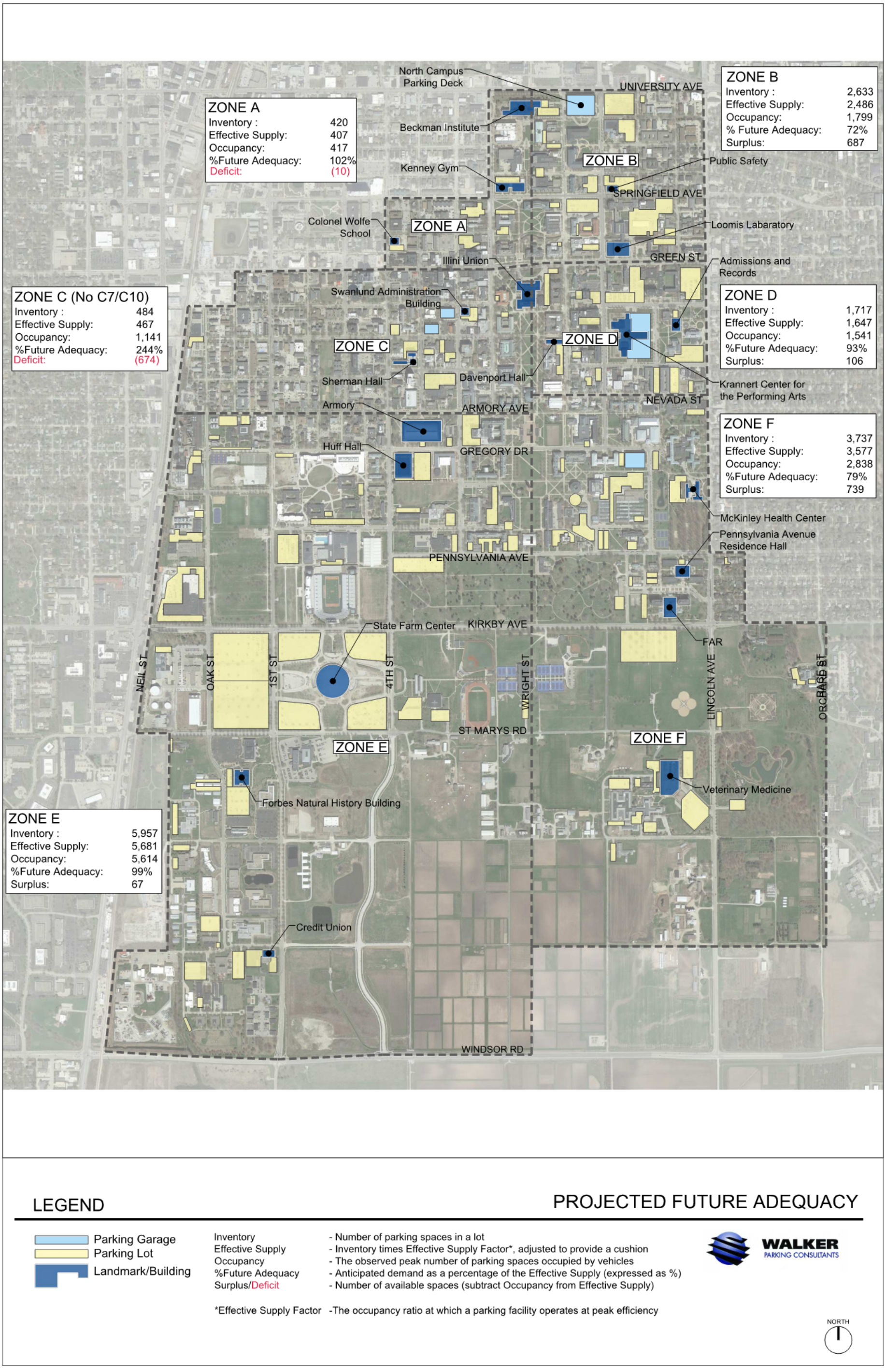
FUTURE ADEQUACY

Future parking adequacy is projected for the ten-year planning horizon, assuming the 1.10% compounded annual growth rate (CAGR), calculated earlier in this report—and assumed that the faculty and staff populations will grow proportionately with enrollment. The majority of spaces are designated for employee use. With additional investments in transportation demand management (TDM), per the campus' climate action plan, the demand for parking will not necessarily increase at the same rate as the campus population.

The projections below conservatively assume:

- Demand will grow in proportion to the population
- C7 and C10 are demolished and not replaced
- Planned major projects will proceed as expected over the next ten years

Figure 21: Projected Future Adequacy



Source: Walker Parking Consultants

Figure 22: Projected Future Adequacy by Zone

Planning Horizon 10 **Years** 1.10% **Compounded Annual Growth Rate (CAGR)**

Future Zone A	Faculty/ Staff	Student	Department	F & S	Accessible	Meters	Misc.	Total
Inventory	264	0	30	7	15	90	14	420
Eff. Supply	251	0	30	7	15	90	14	407
Occupancy	253	0	33	8	17	90	16	417
Surplus (Deficit)	(2)	0	(3)	(1)	(2)	0	(2)	(10)
Major Projects Net Displacement								0
Adequacy								**(10)**

Future Zone B	Faculty/ Staff	Student	Department	F & S	Accessible	Meters	Misc.	Total
Inventory	1,897	453	71	17	41	134	20	2,633
Eff. Supply	1,802	431	71	17	41	134	20	2,516
Occupancy	1,206	327	79	19	46	100	22	1,799
Surplus (Deficit)	596	104	(8)	(2)	(5)	34	(2)	717
Major Projects Net Displacement								(30)
Adequacy								**687**

Future Zone C - No C7-C10	Faculty/ Staff	Student	Department	F & S	Accessible	Meters	Misc.	Total
Inventory	246	83	46	8	12	89	0	484
Eff. Supply	233	79	46	8	12	89	0	467
Occupancy	877	27	67	9	18	144	0	1,141
Surplus (Deficit)	(644)	52	(21)	(1)	(6)	(55)	0	(674)
Major Projects Net Displacement								0
Adequacy								**(674)**

Future Zone D	Faculty/ Staff	Student	Department	F & S	Accessible	Meters	Misc.	Total
Inventory	1,145	147	59	11	31	246	78	1,717
Eff. Supply	1,088	140	59	11	31	246	78	1,653
Occupancy	998	141	66	12	35	202	87	1,541
Surplus (Deficit)	90	(1)	(7)	(1)	(4)	44	(9)	112
Major Projects Net Displacement								(6)
Adequacy								**106**

Future Zone E	Faculty/ Staff	Student	Department	F & S	Accessible	Meters	Misc.	Total
Inventory	3,490	1,152	104	18	97	1,037	59	5,957
Eff. Supply	3,315	1,095	104	18	97	1,037	59	5,725
Occupancy	3,183	1,276	116	20	108	845	66	5,614
Surplus (Deficit)	132	(181)	(12)	(2)	(11)	192	(7)	111
Major Projects Net Displacement								(44)
Adequacy								**67**

Future Zone F	Faculty/ Staff	Student	Department	F & S	Accessible	Meters	Misc.	Total
Inventory	1,786	1,268	63	29	32	514	45	3,737
Eff. Supply	1,698	1,208	63	29	32	514	45	3,589
Occupancy	1,573	685	70	32	36	392	50	2,838
Surplus (Deficit)	125	523	(7)	(3)	(4)	122	(5)	751
Major Projects Net Displacement								(12)
Adequacy								**739**

Future All Campus Zones - No C7-C10	Faculty/ Staff	Student	Department	F & S	Accessible	Meters	Misc.	Total
Inventory	8,828	3,103	373	90	228	2,110	216	14,948
Eff. Supply	8,387	2,953	373	90	228	2,110	216	14,357
Occupancy	8,090	2,455	432	100	259	1,773	241	13,350
Adequacy	297	498	(59)	(10)	(31)	337	(25)	1,007
Major Projects Net Displacements								(136)
Adequacy less Displacements								**871**

Source: Walker Parking Consultants

As campuses develop and change, demand patterns shift and parking supply is lost to development. The historical compounded annual growth rate (CAGR) at UIUC has been 1.10%. Reflecting the potential of the loss of structures C7 and C10 (which are facing possible major rehabilitation projects or removal) and other minor development, Walker projects the following potential ten-year scenarios of parking adequacy under various CAGRs.

Figure 23: Ten-Year Sensitivity Analysis of Future Overall Adequacy

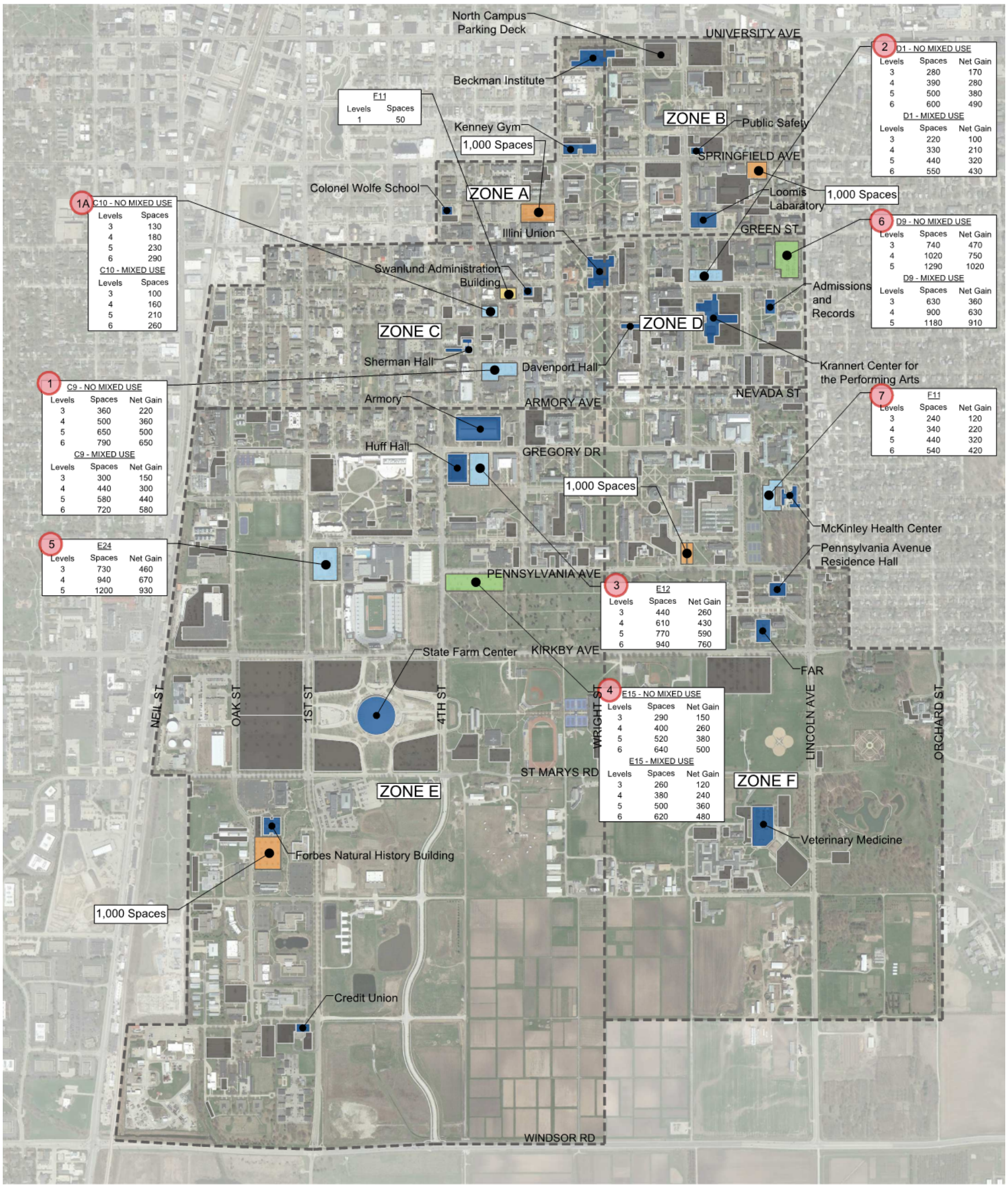
CAGR	1.10%	0.75%	0.50%	0.00%
Zone A	(10)	4	14	33
Zone B	687	748	791	873
Zone C (C7 & C10 Removed)	(674)	(635)	(608)	(556)
Zone D	106	159	195	266
Zone E	23	215	348	605
Zone F	739	836	903	1,033
Total	**871**	**1,327**	**1,643**	**2,254**

Source: Walker Parking Consultants

With the possible loss of C7 and C10, plus the other known project impacts, the only zone that projects an immediate need is Zone C. The data substantiates the need to replace C7/C10. While it may not be necessary to replace the entire zone deficit, Walker does recommend that the University research and consider the potential options and costs of replacing the 654 spaces at C7 and C10.

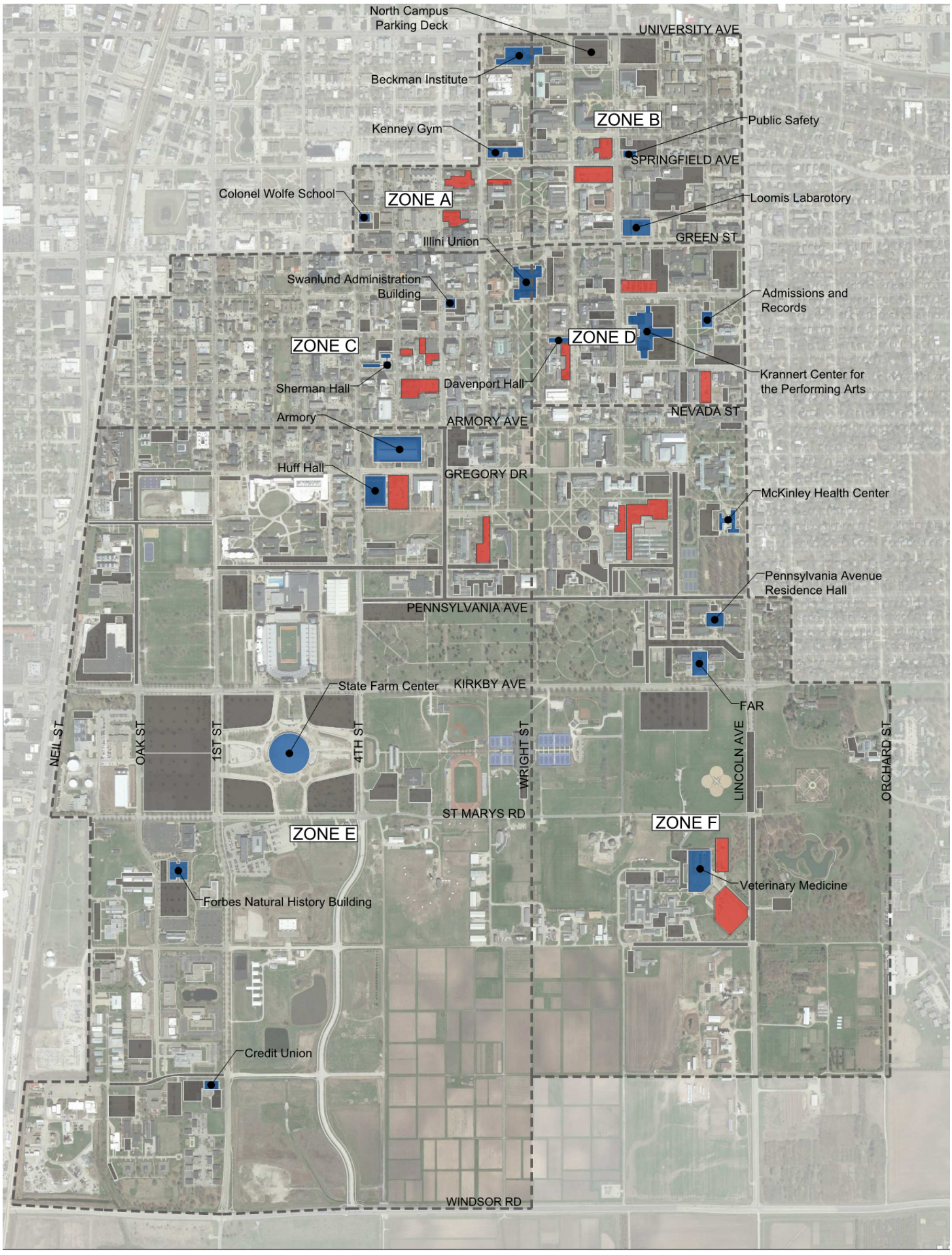
An overall assessment of priority locations for future structured and surface parking lots can be found in Figures 25 and 26, below. Figure 54, in Appendix E, illustrates all contemplated garage sites, including currently rejected locations.

Figure 24: Priority for Future Structured Parking Lots



Source: Walker Parking Consultants

Figure 25: Priority for Future Surface Parking Lots



Source: Walker Parking Consultants

TASK 2: PARKING ALTERNATIVES ANALYSIS

WALKER
PARKING CONSULTANTS

TASK 2—PARKING ALTERNATIVES ANALYSIS

CENTRAL CAMPUS STRUCTURES C7 AND C10: THE CHALLENGE

The C7 and C10 parking structures are nearing the end of their physical life, without a comprehensive rehabilitation project, and have been considered for potential demolition (as such, these two structures were not included in projected campus parking inventories). A condition assessment report and Parking Facility Asset Management Plan, excluding C7 and C10, is provided by Walker as a separate report. The removal of C7 would displace 314 spaces, and the removal of C10 would displace 340 spaces, or 654 spaces in total.

BALANCING PROXIMATE AND REMOTE PARKING

Both a current and a ten-year look indicate that the UIUC campus—as a whole—has, and will continue to have an adequate number of parking spaces. This assessment is based on current, historical, and predicted levels of demand. However, the campus is large, and has distinct areas of demand for access, and is divided into zones, to manage this varied demand.

While not everyone who drives a car to campus can park next to his or her destination, the campus strives to balance remote and proximate parking. According, each zone has some nearby parking, and other parking that is reached by walking, cycling, or using transit service.

Structures C7 and C10 are sited in campus Zone C, which is adjacent to and abuts the Main Quad, on the west side of the quad. These structures represent nearly 60 percent of the parking capacity in Zone C. Even without these structures, the campus in aggregate maintains sufficient total parking, but the balance between proximate and remote parking is disrupted, as shown in the following figure:

Figure 26: Ten-Year Parking Adequacy by Zone – Assumes Current Growth Rate of 1.1%/year

Zone A	(10)
Zone B	687
Zone C (C7 & C10 Removed)	(674)
Zone D	106
Zone E	23
Zone F	739
Total	871

Source: Walker Parking Consultants

If the university chooses to demolish C7 and C10, the data substantiates the need to replace the parking provided by those two garages, to maintain a balance of close and proximate parking. While it may not be necessary to replace the entire zone deficit, Walker does recommend that the University explore the options and costs of replacing the 654 spaces lost at C7 and C10. An alternative would be the pursuit of aggressive transportation demand management programs to reduce overall parking demand on campus.

IMPACT FROM THE COMMUNITY

Demand for parking in campus zone C may increase due to the City of Champaign's removal of minimum parking requirements for development in the Campustown area. This can be addressed with policy, enforcement, and permit-allocation practices.

CAMPUS SENTIMENT

During the survey work that was conducted early in the Parking Master Plan update process, campus community members weighed in on the issue of garage C7 and C10 demolition and potential replacement. Nearly 90% of respondents expressed a desire to have the structures replaced in kind and in situ. This information coincides with the feedback Walker received during focus groups: that convenience of covered parking and proximity to the campus core is important to those who park in these facilities. It is important to note, however, that respondents were not asked whether they would support substantially increasing the cost of all parking permits in order to fund this desired replacement parking.

C7 AND C10 REPLACEMENT OPTIONS

Walker has built six scenarios for the demolition and replacement of structures C7 and C10. The six scenarios represent three options for parking structures, each one with and without a mixed-use component—developed to evaluate the alternatives for replacing these parking structures.

In all cases, the demolition removes 650 parking spaces from UIUC campus Zone C. The options are listed in ranked order, based upon a matrix developed and agreed upon by UIUC and Walker.

Figure 27: Strategy Comparison

Criteria	**Option #1** A single parking structure at C9	**Option #2** A single parking structure at C10	**Option #3** A single parking structure at D1
Disruption to Parking Ops.	Low	Moderate	High
Future Development on C7/C10 Sites	Yes – Both	Yes – C7	Yes – Both
Future Development on C9 Site	Possibly	Yes	Yes
Employee Walking Distance vs. Current	Increased	Similar	Increased
Visitor walking distance to Union and Campustown	Increased	Similar	Reduced
Relative Cost to Implement	Moderate	High	Moderate

Source: Walker Parking Consultants

Areas above which remain undeveloped—along with rejected options at D9, E12, E15, E24, and F11—should be reserved for potential future parking structures in the longer range Campus Master Plan.

OPTION #1, NEW C9 PARKING STRUCTURE

Parking Structure Only

Net impact = 0 spaces lost/gained in Zone C

Under this scenario, a new 790-space, six-level structure is built on parking lot C9, displacing 140 current surface parking spaces. This yields a net gain of 650 spaces on-site, replacing the 650 spaces lost to demolition.

Parking Structure, with Mixed-Use Development

Net impact = (70) spaces lost in Zone C
14,000 sq. ft. of commercial space

In this scenario, a new 720-space, six-level structure is built on parking lot C9, displacing 140 current surface parking spaces, and adding ground floor commercial space. This yields a net gain of 580 spaces on-site, a loss of 70 spaces in Zone C.

OPTION #2, NEW C10 PARKING STRUCTURE

Parking Structure Only

Net impact = (360) spaces lost in Zone C

Under this scenario, a new structure is built on the site of existing garage C10. The new structure is assumed to be six levels containing 290 parking spaces. With 650 spaces demolished, the leaves a deficit of 360 spaces in Zone C.

*Note: although the existing C10 contains 340 spaces, the same footprint will yield only 290 due to more recent code requirements (a second stairwell, an elevator, and more generous geometrics).

Parking Structure with Mixed-Use Development

Net impact = (390) spaces lost in Zone C
10,000 sq. ft. of commercial space

This alternative to the option 2 scenario entails a new 260-space, six-level structure being built on the site of existing garage C10, with the addition of ground floor commercial space. With 650 spaces demolished, the leaves a deficit of 390 spaces in Zone C.

*Note: although the existing C10 contains 340 spaces, the same footprint will yield only 290 due to more recent code requirements (a second stairwell, an elevator, and more generous geometrics).

OPTION #3, NEW D1 PARKING STRUCTURE

Parking Structure Only

Net impact = (650) spaces lost in Zone C
490 spaces gained in Zone D
(160) space overall loss to inventory

Under this scenario, a new six-level, 600-space structure is built on parking lot D1, displacing 110 current surface parking spaces, for a net gain of 490 spaces in Zone D. Considering the 650-space demolition in Zone C, the campus experiences an overall loss of 160 spaces.

Parking Structure with Mixed-Use Development

Net impact = (650) spaces lost in Zone C
430 spaces gained in Zone D
(220) space overall loss to inventory
19,200 sq. ft. of commercial space

In this scenario, a new six-level, 540-space structure, with ground floor commercial space, is built on parking lot D1, displacing 110 current surface parking spaces, for a net gain of 430 spaces in Zone D. Considering the 650-space demolition in Zone C, the campus experiences an overall loss of 220 spaces.

In the following figures, the options are compared for their impacts on the overall parking inventory and for the annual associated costs.

Figure 28: Case Summary

	Location	Parking Spaces Constructed	Parking Spaces Demolished	Parking Spaces Displaced	Parking Space Reduction for Commercial	NET SPACE CHANGE
Option #1	C9	790	650	140	0	0
	C9, with mixed-use	790	650	140	70	(70)
Option #2	C10	290	650	0	0	(360)
	C10, with mixed-use	290	650	0	30	(390)
Option #3	D1	600	650	110	0	(160)
	D1, with mixed-use	600	650	110	60	(220)

Recommended

Parking spaces constructed = New garage spaces

Parking spaces demolished = C7 and C10

Parking spaces displaced = Existing surface spaces lost to new garage

Parking space reduction for commercial = based on square footage equivalent of parking spaces

Net space change = spaces constructed - demolished - displaced - reduction for commercial

Source: Walker Parking Consultants

Figure 29: Comparison of Conceptual Costs

	Location	Parking Spaces Constructed	Net Space Change	Commercial Space Gained (sf)	Total Conceptual Cost	Cost Per Year	Rental Income (Annual)	NET COST PER YEAR
Option #1	C9	790	0	0	$ 31,353,000	$ 2,307,009	$ -	**$ 2,307,009**
	C9, with mixed-use	790	(70)	14,000	$ 33,453,000	$ 2,461,530	$ 350,000	**$ 2,111,530**
Option #2	C10	290	(360)	0	$ 13,953,000	$ 1,026,686	$ -	**$ 1,026,686**
	C10, with mixed-use	290	(390)	10,000	$ 15,453,000	$ 1,137,059	$ 250,000	**$ 887,059**
Option #3	D1	600	(160)	0	$ 24,741,000	$ 1,820,486	$ -	**$ 1,820,486**
	D1, with mixed-use	600	(220)	19,200	$ 27,621,000	$ 2,032,402	$ 480,000	**$ 1,552,402**

Recommended

Total Cost = $24k/space + $150/sf premium for commercial + demolition (includes soft costs of 45%)

Cost per year = assumes 4% interest for 20 years

Rental income = $25/sf/yr initial rent

Source: Walker Parking Consultants

POTENTIAL FEE INCREASES TO COVER INCREASED DEBT

Demolishing structures C7 and C10 and constructing a new garage will increase the Parking Department's annual debt service between $1M and $2.5M per year depending up on which scenario is selected. All parking fees will need to increase in order to absorb this additional expense. The following figure represents increases over the course of the three first years that the debt service is incurred, and holds the parking fees stable in subsequent years. Year 1 is the base year (current fees). Annual additional debt service would be lower under a scenario in which C7 and C10 are rehabilitated.

Figure 30: Potential Parking Fee Percentage Increases to Cover New Annual Debt Service

	Location	Cost Per Year	Fee Increase Required in Year 2	Fee Increase Required in Year 3	Fee Increase Required in Year 4	Fee Increase Required in Years 5 - 10
Option #1	**C9**	$ 2,307,009	18%	18%	5%	0%
	C9, with mixed-use	$ 2,461,530	18%	18%	2%	0%
Option #2	**C10**	$ 1,026,686	14%	9%	4%	0%
	C10, with mixed-use	$ 1,137,059	14%	9%	2%	0%
Option #3	**D1**	$ 1,820,486	17%	16%	3%	0%
	D1, with mixed-use	$ 2,032,402	17%	12%	3%	0%

Source: Walker Parking Consultants

The following are illustrations of sample fees with these percentage increases applied over a ten-year period. In all cases, the fees presented are intended to cover all existing and recommended expenses, as well as new construction debt and debt service. The three examples reflect increases to:

- Maximum permit fee (currently $55 per month or $660 per year)
- Shuttle permit fee (currently ~$11 per month or $127 per year)
- Salary-based permit fee (current starting fee equals 0.8% of a $30,000 wage)

Figure 31: Sample Parking Fees With Required Increases

Maximum annual permit fee **$660**

		Scenario	Fee in Year 1	Fee in Year 2	Fee in Year 3	Fee in Year 4	Fee in Years 5-10
Option #1	**Garage only**	Annual	$660	$779	$919	$965	$965
		Monthly	$55	$65	$77	$80	$80
	Mixed-use	Annual	$660	$779	$919	$937	$937
		Monthly	$55	$65	$77	$78	$78
Option #2	**Garage only**	Annual	$660	$752	$820	$853	$853
		Monthly	$55	$63	$68	$71	$71
	Mixed-use	Annual	$660	$752	$820	$837	$837
		Monthly	$55	$63	$68	$70	$70
Option #3	**Garage only**	Annual	$660	$772	$896	$923	$923
		Monthly	$55	$64	$75	$77	$77
	Mixed-use	Annual	$660	$772	$865	$891	$891
		Monthly	$55	$64	$72	$74	$74

Shuttle permit fee **$127**

		Scenario	Fee in Year 1	Fee in Year 2	Fee in Year 3	Fee in Year 4	Fee in Years 5-10
Option #1	**Garage only**	Annual	$127	$150	$177	$186	$186
		Monthly	$11	$12	$15	$15	$15
	Mixed-use	Annual	$127	$150	$177	$180	$180
		Monthly	$11	$12	$15	$15	$15
Option #2	**Garage only**	Annual	$127	$145	$158	$164	$164
		Monthly	$11	$12	$13	$14	$14
	Mixed-use	Annual	$127	$145	$158	$161	$161
		Monthly	$11	$12	$13	$13	$13
Option #3	**Garage only**	Annual	$127	$149	$172	$178	$178
		Monthly	$11	$12	$14	$15	$15
	Mixed-use	Annual	$127	$149	$166	$171	$171
		Monthly	$11	$12	$14	$14	$14

Permit fee starts at 0.8% of salary **$30,000**

		Scenario	Fee in Year 1	Fee in Year 2	Fee in Year 3	Fee in Year 4	Fee in Years 5-10
Option #1	**Garage only**	Annual	$240	$283	$334	$351	$351
		Monthly	$20	$24	$28	$29	$29
	Mixed-use	Annual	$240	$283	$334	$341	$341
		Monthly	$20	$24	$28	$28	$28
Option #2	**Garage only**	Annual	$240	$274	$298	$310	$310
		Monthly	$20	$23	$25	$26	$26
	Mixed-use	Annual	$240	$274	$298	$304	$304
		Monthly	$20	$23	$25	$25	$25
Option #3	**Garage only**	Annual	$240	$281	$326	$335	$335
		Monthly	$20	$23	$27	$28	$28
	Mixed-use	Annual	$240	$281	$314	$324	$324
		Monthly	$20	$23	$26	$27	$27

Source: Walker Parking Consultants

Because the expenses associated with providing parking tend to increase every year, Walker strongly recommends that parking permit rates should be increased annually, if only by inflation or an indicator such as the consumer price index (CPI). If parking rates are not increased in any one year, it is more likely that future increases will create more friction. The fee increase models presented are front-loaded so as to balance the Parking budget more quickly. With annual increments the initial increases could be somewhat smaller, with stabilized lower increases in the out years.

STEERING COMMITTEE AND CAMPUS ADMINISTRATION RECOMMENDATIONS

The Parking Master Plan Steering Committee considered all information produced in the Parking Master Plan options analysis combined with inputs of the goals of UIUC Campus Administration to better serve the campus community. The steering committee recommends pursuing a conceptualization phase in the next capital project that will address a long term solution in the central campus parking zone. The three general options are as follows:

1) **NEW LARGE PARKING STRUCTURE AT LOT C9** – As a direct result of the parking master plan findings, a new large parking structure shall be considered for both parking alone and/or mixed use. Demolish C7 and C10 for conversion to surface lots or another future use after the new structure is complete.

2) **NEW MODERATELY SIZED PARKING STRUCTURE AT C9 WITH ANOTHER PARKING STRUCTURE AT C7 or C10** – A hybrid solution not directly analyzed in the Parking Master plan will consider a new more moderately sized parking structure built on existing lot C9. Demolish C7 and C10. Construct a second parking structure on either C7 or C10. The remaining location C7 or C10 shall be constructed as a surface lot or another future use after the new structure is complete.

3) **MAJOR REHABILITATION OF C7 and C10** – To see if the current locations can be salvaged for a more affordable initial capital cost, major rehabilitation of all systems in existing structures C7 and C10 to extend the life span an additional 15 to 20 years including prescribed maintenance shall be considered. Do not consider any new structures.

At the time this report was produced and finalized, the University had elected to pursue option 3, above.

CONCLUSIONS

If demolition, rather than rehabilitation, for C7 and C10 is chosen, it is Walker's conclusions that:

- The most satisfying solution (if C7 and C10 are demolished) is Option #1 (parking structure, with a mixed-use component). This option provides enough net spaces to provide parking for most C7 and C10 users. Although this option is expensive, the required revenue increases are moderated over Option #1 (parking structure only) by the internal subsidy generated by internal mixed-use development.
- The most cost efficient solution is Option #2 (parking structure only), but only replaces about half of the lost spaces, and allows more reasonable revenue increases. This will force reliance on bus transit options, such as E14 for many C7 and C10 users.
- The construction of a garage at the C9 site is Walker's recommended option—if a garage is to be constructed. See Figure 54 (C7/C10 Replacement Structured Parking Options Ranking [and Ten-Year Forecast for Structured Parking]) in Appendix E, for a map illustrating all contemplated garage sites, including currently rejected locations.
- Because the existing parking inventory (even in the absence of structures C7 and C10) is adequate to meet current demand, Walker recommends that UIUC consider the merits of balancing the use of its current parking supply, by using pricing and continuing to support excellent access to remote parking lots. Additionally, incremental investments in transportation demand management (TDM) may allow UIUC to defer the addition of structured parking, even as the university (and potential parking demand) grows.

TASK 3: VISITOR PARKING ASSESSMENT

WALKER
PARKING CONSULTANTS

TASK 3—VISITOR PARKING ASSESSMENT

VISITOR SERVICE RECOMMENDATIONS

The parking inventory includes 2,165 University metered spaces on campus. This number exceeds the typical ratio of approximately one visitor space per 100 students. This ratio would indicate that 436 spaces should be adequate for most visitor needs during class weekdays. However, most metered spaces are occupied by faculty/staff/employees and students who do not purchase a permit or hold a permit but re-park as they relocate on campus for meetings and other commitments.

1) The number of spaces marked "visitors only" should be increased to approximately 436 spaces, within a range of 425 to 450 metered spaces.

2) Campus community members should be excluded from occupying visitor-only spaces. This would require mandating that any vehicle, belonging to a campus community member that will ever be brought on campus, must have its plate registered in Parking's database. Faculty, staff, and students would be prohibited from parking in visitor spaces. Use LPR enforcement, link plates to people, and introduce specific policies (and violation codes) for misuse of visitor parking and failure to register plates with the University.

3) Re-parking should be discouraged by reducing the time allowed at meters, and encouraging transit or ride-hailing (e.g., Lyft, Uber) use and providing on-call vans (although this service could be coordinated by Parking, funding would have to be identified). Costs not borne by the visitors/users would likely need to be University investments; Parking could only fund if parking fees were increased for all users to absorb these expenses.

4) One price does not fit all meter locations. Meter parking rates should be increased and time limits decreased at metered spaces near high volume visitor locations, libraries during finals periods, and near athletic facilities to encourage turnover. Even increasing metered parking rates to $2.00 per hour rates for 2 to 4 hour meters may be inadequate to encourage turnover.

5) The University should install multi-space meters where practical as single-space meters are retired. Multi-space meters offer additional payment methods (coin, bills, credit cards) for improved service, can be integrated with Pay-by-Phone systems, and can be enforced through the integrated License Plate Recognition (LPR), which has recently been deployed.

6) Some Champaign university district parking blocks have a reduced number of metered spaces where on-street spaces are sold by permit. Discussions with Champaign should

be considered to review where visitor-oriented meters and time limits would be a better use of on-street spaces on a block-by-block basis.

7) The special event lot rate should be adjusted for size of facility reserved, time of day, special labor requirements, and number of cars parked.

ONLINE VISITOR PERMIT MANAGEMENT

At present, visitor permits are often issued by departments independently and without notification to the Parking Department; this is a major and recurring problem that inhibits Parking's ability to manage and enforce visitor permits. A number of commercial programs or parking management suite modules are available that create authorizations, establish records and automate the process online. These systems track and organize requests, authorizations, and fees.

Typical on-line permit issuance procedure:

- Employees or departments use these programs to request parking for their guests in advance.
- Parking departments usually require a minimum of 48 business hours' notice for authorization of permit requests.
- Departments/organizations requesting over five visitor permits would be directed to request a lot or meter reservation.
- Visitor permits are valid for one day only.
- Once a request is approved by the Parking Department, the department liaison is emailed a link. This link is valid for up to the number of requested permits.
- The guest uses the link to create an account with the Parking Department and claim the permit. The permit is issued online immediately; and the guest may print it him/herself.
- The invitee must bring the printed permit with them on the day of their visit.

Examples may be seen at the following links:

http://www.parkingboss.com/frontdesk

http://www.ohio.edu/compass/stories/13-14/7/visitor_parking.cfm

Costs for these systems are very affordable ($50 to $200 per month).

T2 Flex Event Parking has a module that can be used to manage small conferences to major sporting events. This is a module of the T2 Flex System, and can be more expensive. However, it will provide the desired seamless control, and can be integrated into the LPR system for permitless privileges and enforcement.

http://www.t2systems.com/who-we-serve/event-venue-parking-system-hardware-software.aspx

If the budget is available, Walker recommends tying the solution into T2 and LPR for improved customer service and for administrative efficiency.

TASK 4: OPERATIONAL AND ORGANIZATIONAL ASSESSMENT

WALKER
PARKING CONSULTANTS

TASK 4—OPERATIONAL AND ORGANIZATIONAL ASSESSMENT

GENERAL INFORMATION

The Parking Department is an auxiliary business service. As such, the department is a self-supporting service, responsible for the administration, maintenance, and improvement of parking facilities.

Although transportation services are supported by a student fee, parking operations receives no permanent funding from the State of Illinois, the University budget, or student fees. Income is derived from meters, permit fees, and parking fines.

Students, the campus administration, and Parking all contribute toward funding the MTD bus transit service. Parking supports the MTD services for faculty and staff to ride shuttles on campus; funding from the Provost allows faculty and staff unlimited ridership on the MTD system. Student transportation fees help fund "fare-free" access to the MTD bus system on campus and within Urbana and Champaign.

The Parking Department supports Zipcar, and other programs. Parking also supports the bike program and offers several EV spaces in parking structures and one dual charging station in lot D22.

The UIUC Parking Department organization chart is reproduced on the following page.

Parking Department
Mission/Vision Statement

Mission

Excellence, Quality & Innovation

The Parking Department is committed to being innovative, delivering high quality of services, and providing excellent customer service to all on the University of Illinois at Urbana-Champaign campus.

Vision

Enhance the parking experience.

Values

As a department, we value honesty, welcome diversity, and strive to be proactive. We pride ourselves in all the services we offer, while promoting safety and awareness. We will continue to collaborate with our campus leaders and students as well as our surrounding community.

Service

- Quality
- Efficiency
- Safety

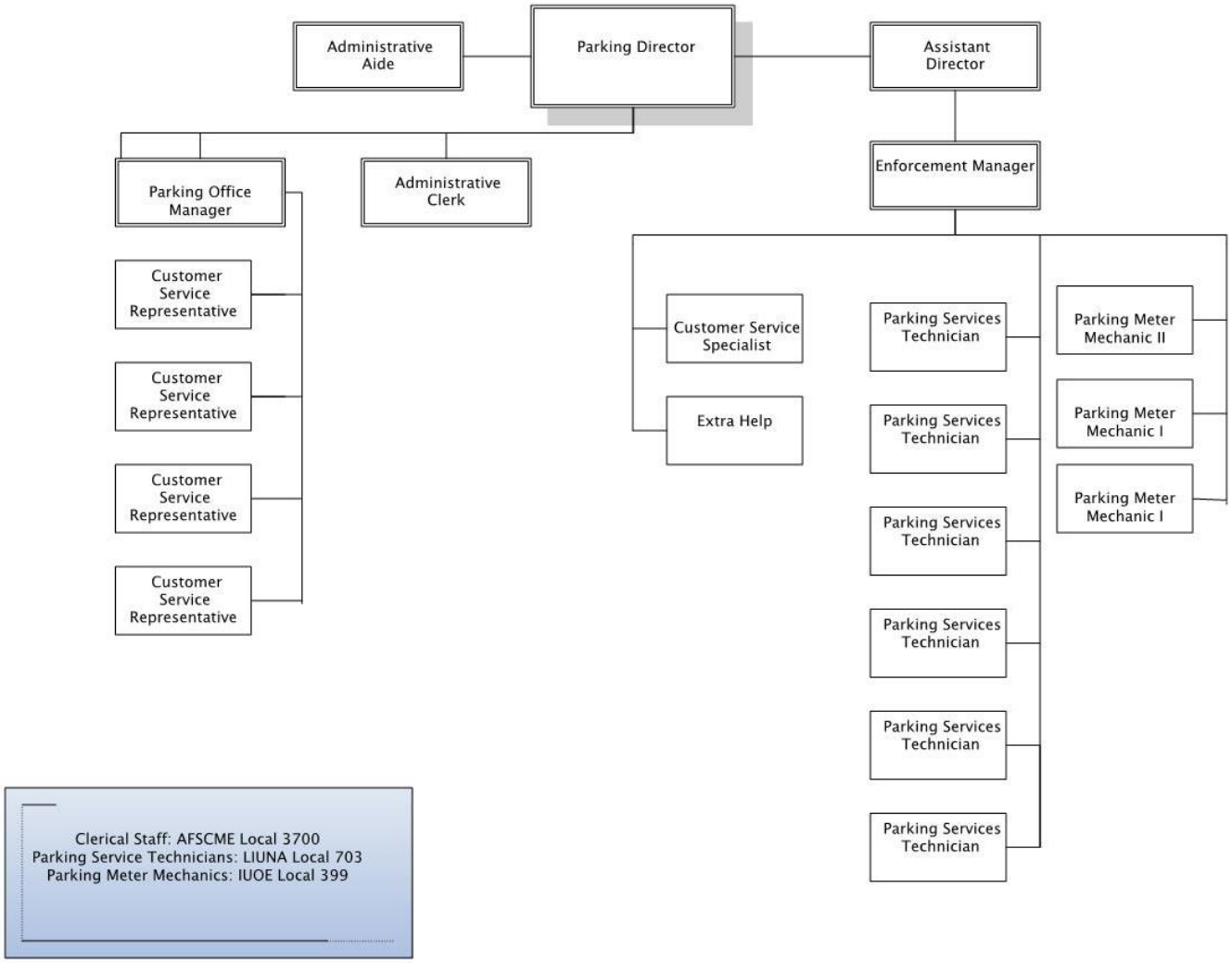
Integrity

- Accountability
- Consistency
- Accepting Individuality

Community Partnership

- Innovation
- Adaptable Convenience
- Collaboration

Figure 32: Parking Department Organizational Chart



Source: UIUC

Walker has used qualitative and quantitative data from the UIUC community to augment its professional observations of the Parking Department. Selected findings from focus group meetings and an online survey are summarized in Appendix J. What follows are Walker's conclusions and recommendations regarding the operations of the Parking Department; a full set of recommendations can be found in the Executive Summary and in the Summary Findings chapter of this report.

PROCEDURES REVIEW

Based on Walker's observations of Parking Department operations, Walker reports or recommends the following.

- Parking policy, procedures and general information regarding parking can be found at the www.Parking.Illinois.edu website. Information and policy/procedure changes are posted on-line and in department records. Parking information is easily accessed on-line by the parking public. However, an additional request by stakeholders was for more transparency on the website to include snapshots of waitlist lengths.

- Walker commends the department's participation with the Parking Steering Committee to increase communications between parking customers and parking staff to aid in identifying internal and external issues.

- Communication is judged to be good regarding timely responses to internal University requests, event parking and parking advisories. It is noted that Parking is very responsive via individual emails when the need arises, in person presence in the field, telephone contact when needed, presence at major orientation and recruiting events on campus, signs posted on campus, reminders left on windshields. Parking Department personnel are frustrated because the communication is put out, but customers do not pay attention. Walker's parking survey identified *email* as the preferred method of communication by faculty/staff and students for most notices. A recent article by Wired Magazine reveals that email is the superior method of making contact. But after all communication efforts are made, Walker recommends that enforcement must take its course.

- An important issue is that students want a greater voice. It is noted that student organizations are included in the decision-making process regarding such items as parking fees, transit, and the placement of future parking facilities. Communications between Parking and the student groups/student organizations (or the perception thereof) is not judged by some students to be consistent. Parking needs to continue to take the department's active role in informing academic and student groups and organizations of parking issues.

- Parking is proficient in dealing with issues such as weather closings, arranging special event parking, and construction closures. The department works well with Public Safety to manage detours/closings. No changes are recommended.

BEST PRACTICES FOR OPERATIONS AND CUSTOMER RELATIONS

The following "best practices" and standard operating practices tend to improve customer service and protect Parking Department revenue.

1. Parking management is separated from police or public safety as the goals and procedures of these disciplines are significantly different. This is preferred as police enforcement procedures are oriented to controlling or prosecuting criminal behavior. While some scofflaw parkers may view some parking procedures as punitive, parking is best managed as a service provider, and treats parkers as "customers," which it does. As such, the primary goals of the Parking Department is to manage and preserve parking assets, generate revenue for parking needs, and maintain the practice that parking is putting its revenue back into parking. the Parking Department properly advocates that parking enforcement protects the parking rights of those individuals who paid for the privilege and comply with the policy and procedures. No changes are recommended.

2. The Parking Department manager's duties include the following: general oversight, public relations, coordination, hiring, reprimands, firing, establishing policies, monitoring enforcement, and review of monthly and audit reports, scheduling, training, uniforms, monitoring cashier performance for personnel and revenue control issues, reviews daily/weekly/monthly reports, and monitors and analyzes cashier and revenue trends. No changes are recommended.

3. Parking Department staff report that their duties sometimes include some minor lot and equipment maintenance, and other duties as needed, such as event management. The Parking Department is responsible for identifying and coordinating with the F&S for major lot maintenance; equipment maintenance; electrical, and custodial maintenance; materials and supplies purchases; and contracting for services such as snow removal; sweeping, large restriping projects, power washing, etc. No changes are recommended.

4. The Parking Department manager attends performance and review meetings to more effectively represent the Parking Department to the University administration. In that way, the parking manager can stay informed as to employee issues, effectively present parking staff issues to the administration, and to better understand issues that need to be addressed by the Parking Department. No changes are recommended.

5. Citations are used to enforce parking rules. Parking citation fines are a source of revenue. However, it is Walker's opinion that parking enforcement should not be viewed as a primary revenue generator, although citation revenue cannot be forgone. The goal of issuing citations is to enforce parking rules in order to allow the parking system to better allocate a scarce resource. Enforcement protects the parking rights of those individuals who paid for the privilege and comply with policy and procedures. Parking permit revenues should be able to pay for required the Parking Department. It is disingenuous

to underprice parking and expect citations to make up the difference. Some additional communication is recommended to help to avoid some negative public relations related to enforcement. This includes the use of an annual report (as described in the "parking communication program," later in this section) and an ambassadorial approach to field services (see, Appendix H).

6. Parking staff must be adequately trained to perform job duties effectively, including such items as preventative maintenance, troubleshooting, and some minor equipment repairs. It is recommended that the manager require a signed form from each new employee within a reasonable time after date of hire indicating that the employee has received the following:
    a. Specific job training.
    b. Manuals, SOP, and policies for each position in written form and carefully reviewed.
    c. Training on all necessary equipment.
    d. Training on basic troubleshooting for all necessary equipment.
    e. A copy of the personnel manual.
    f. Personnel policies in written form and carefully reviewed.
    g. Uniforms, equipment, or distinctive items of identification.

7. Staff appearance must be professional, clean, neat, and orderly.
    a. Staff should wear distinctive uniforms or other distinctive items of identification of a style and type approved by the Parking Department and the University.
    b. Staff should wear name identification badges. No changes are recommended.

8. The Parking Department should respond within 72 hours to all claims of problems or claims of loss of or damage to vehicles, and to all complaints about service within the department or on University parking facilities. A response time should be formalized.

9. Emergency service or emergency access to vehicles of parking patrons is provided. This is part of the Department mission as an element of good customer service, and also improves the efficiency of parking lot operations and space turnover. This service includes allowing or providing assistance with changing and inflating flat tires, starting vehicles with dead batteries, opening locked car doors, and/or furnishing a small amount of gasoline. Direct assistance by staff personnel is limited so as not to incur unintended liability. No changes are recommended.

OFFICE PROCEDURES: CASH AND PERMIT/DECAL MANAGEMENT

Enforcement officers report that parking decals were issued and renewed each year, but are now issued to staff on a two-year schedule. Traditionally, numbering and annual changes of color, shape, pattern, and/or expiration date assist enforcement efforts with visual cues. However, the shift to License Plate Recognition may make this practice obsolete. No additional changes are needed.

Walker observed UIUC complying with the following best-practice cash handling procedures:

- Parking permits and tickets are the equivalent of cash and are treated as such.
- Only one person should be responsible for permits, tickets or cash at any one time. This person must document cash custody, bank deposits, cash transfers, etc. as each occurs.
- Two persons must be present when permits, tickets or cash custody changes and parking receipts are collected or cash is conveyed in any way.
- Any transfer of cash, receipts, deposits, tickets, counts, etc., including start money in lock bags, between cashier shifts, between cashier and manager, or between managers, must be fully reconciled and acknowledged in writing by both parties.
- No cash should be allowed to be held overnight in a booth or by a cashier.
- Cashiers should receive individual recorded distributions of sequential permits or tickets in small amounts, and must make frequent drops of excess cash collections (amounts over a specified threshold) to the office or into a drop safe.
- Safes and access to inventory storage of permits and decals must require dual access unless one person is solely responsible. Logs must be maintained of access to each, and inventories should be reconciled at least monthly.
- Cashiers must not have uncontrolled access to the permit or decal inventory.
- A permit and ticket inventory log must be maintained with a record of each purchase/issuance with serial ticket numbers.
- Permits and decals must be logged and signed in and out (numbers, date, name) as each are disbursed from inventory as though cash.
- Permits and tickets should be preprinted with sequential unique numbers. This policy should be applied to all permits and decals, including Daily Temporary Permits. Hand numbered daily temporary permits should be discontinued.

FINANCIAL AUDITING

The scope of this engagement did **not** include a financial audit of parking operations. The following office procedures are recommended Best Practices.

- Largest revenue loss exposure is from poor permit management. Consecutively numbered permits/decals should be replaced regularly and such change should be indicated by an obvious change of color, shape, pattern, and/or expiration date.
- Each day, each shift must match and reconcile:
  - The number of permits/decals sold and tickets issued and collected,
  - To the number of transactions as processed by a kiosk, register or fee computer,
  - To the number of transaction counts.
- Cash and credit card slips must reconcile to the register or fee computer revenue totals. Cash on the Daily Report should reconcile to the bank deposit cash amount. Credit card sales (when used) should be reconciled to the daily bank report or clearinghouse report.
- Number of active permits in the system must equal the number of invoiced permits plus the number of free permits. The Parking Department should review and reconcile the permit list monthly.

FRONT LINE

The front office is budgeted for four front line staff members and a front line manager. Front line duties include customer relations, sales of permits, billing, collections, accounts receivable, accounts payable, special events, traffic complaints, etc. Front line staff report typically working a regular 40 hours/week, and staff the office from 8:30 am until 5:00 pm closing.

In interviews, the front line staff report that the department is a pleasant place to work, but can be hectic at times, especially in the beginning of the Fall semester. Staff most enjoy the University setting and diversity of job tasks. Cash is kept in the safe and in locked cash drawers. Decals are kept in a secure cabinet. Permits are logged by staff as sold. A security service picks up locked deposit bags and delivers to the bank. Records are reconciled with the T2 parking management system. Areas of concern mentioned in interviews are (1) planning for parking as part of new buildings and construction projects, and (2) University departments holding events and issuing guest parking permits independently could better inform the Parking Department. Most procedures are summarized in written descriptions in binders, but a formal manual is a "work in progress."

Staff report that complaints are heard from faculty and staff regarding contractor parking, from students regarding space availability, and from staff who re-locate from one parking area to another and are unable to find a space in their new destination. Exceptional programs include the Motorist Assistance program, which assists parkers who are locked out, have lost keys, have run out of fuel, or have flat tires. The front line pace is reported to be difficult at times, but some periods of lighter activity were observed by Walker during visits. Thus, no additional front line staff is recommended.

Front Line Operations Advantages

- Front line is regularly staffed.
- Cash, deposits, permits and decals are judged to be secure.
- T2 Systems provides adequate revenue and permit control.
- The department is a pleasant place to work.
- Diverse work tasks.
- Enjoy the University setting.

Front Line Operations Disadvantages

- Office can be hectic at times, especially in the beginning of the Fall semester.
- A formal manual is a "work in progress".
- No written required response time for messages and appeals, Walker recommends developing a policy if needed for certain functions.
- Wait lists are difficult to maintain.

ENFORCEMENT

Parking enforcement is reported to typically have six full-time staff members, and three meter mechanics. Duties include customer relations, enforcement, events, and some light maintenance. In interviews, the enforcement staff mentioned that an official job and route manual is not complete; most procedures were written, but not all; most job procedures were learned through experience; and that Rules and Regulations were online. Enforcement staff reported that the enforcement equipment and storage room is secure, handheld ticketwriters required passwords to log on, and there was no access to modify citations or the T2 system. Each handheld ticketwriter session is reconciled.

Some parkers get upset about getting a ticket and try to argue. Enforcement staff mentioned that the Parking Department office is easily available and responsive to the customers, practices fair enforcement, and provides the Motorist Assistance tasks. Officers are empowered to choose to engage a customer, issue a warning, or issue a citation. No citation quotas were reported.

Enforcement staff appreciate that this is a respectful office with a family feel. Staff mentioned that they most like the student environment, and are comfortable on the campus. Enforcement staff did mention that they could use better communication in the field with the front office, as email is not received when in the field. Staff would like to let people know more about how the Parking Department contributes to the general welfare and functionality of the campus, and would like the Motorist Assistance Program to be publicized more.

Current enforcement staff report having sufficient time to check all lots several times each day, with sufficient time for light maintenance when needed, and to perform public service tasks. Again, the current enforcement staffing is judged to be adequate, but future employment of for enforcement staffing might be reduced due to the efficiencies introduced by LPR.

Enforcement Operations Advantages

- Current enforcement staffing is judged to be adequate. Vacant position should not be filled.
- Diverse work tasks, enjoy working outdoors, experienced team.
- T2 Systems provides adequate citation accounting.
- The University is a respectful place to work.
- Enforcement equipment and storage room is secure.
- Employees feel empowered to practice fair enforcement.
- Provides the Motorist Assistance program services.
- Citation volume is not burdensome.

Enforcement Operations Disadvantages

- An official job and enforcement route manual is not complete.
- Customer interaction can be contentious.
- Maps, Rules & Regulations, and other materials not usually provided in hard copy format or carried into the field.
- Field communications are difficult.

ITEMS THE UNIVERSITY COULD IMPROVE (BEYOND PARKING'S CONTROL)

- Walker recommends that Parking be given a "seat at the table" for campus master planning, project planning, and with contractors early in construction projects, relating to both temporary and permanent loss of parking spaces and/or concurrent increases in parking demand.
- On a University level, parking is not planned well for new buildings and construction projects. Projects that permanently displace parking and/or increase parking

demand are not consistently held accountable. The parking-space replacement fee, discussed throughout this report, can help address some of these shortcomings.

- Contractor parking may displace faculty and staff from time to time.
- Parking should continue to push for a higher profile on University web pages. Parking link should be located on the UIUC homepage.
- University should publicize how the Parking Department contributes to the general welfare of the campus.

PARKING COMMUNICATION PROGRAM

A proactive public relations and communications plan would provide information on key events impacting campus parking access issues, and should be responsible for increasing public awareness of campus parking through events, activities, publications, press releases, maps and other literature.

The Parking Department Communication program should, and in most cases, continue to:

1) Build on the existing comprehensive Parking Department web pages.
2) Establish and promote the Mission Statement.
3) Monitor and respond in a timely manner to questions and requests from the general public for locations of parking facilities, pricing, and availability.
4) Maintain the integrity of campus parking informational materials, and provide parking maps, campus information packets, and fact sheets.
5) Generate press releases as needed. However, direct communication with media or responses to interrogatories may need to be coordinated with other University officials.
6) Provide parking information and assistance to campus events as needed.

Parking information should be disseminated by the following proactive means:

1) Improve the presence and impact of the already comprehensive Parking Department web site by requesting a link to the Parking Department prominently on the opening University web page. Parking is the "front door" to the campus, and frequently forms the first impressions of parents and visitors.
2) Improve the effectiveness of parking maps by adding section maps or zone maps in addition to the perspective map, always maintaining map north in the "up" direction whenever possible.
3) In order to hear concerns and share information, participate in campus meetings and presentations during the day and/or in the evening at Student Senate meetings, faculty meetings, international groups, and living units.
4) Issue periodic surveys to measure satisfaction with program offerings and customer service interactions.

5) Publish an annual report for the campus parking community with news of economic developments in parking, development and construction projects, upcoming campus events, and descriptions of campus parking events.
6) Publish newspaper items or articles and media releases.
7) Distribute and post brochures and parking maps on campus. More "green" alternatives include distribution by smart phone and internet apps, and perhaps by advertising on digital boards.
8) Conduct direct mailings and emails when needed.
9) Request to participate in downtown meetings and presentations about campus parking and University District parking to city business and civic groups, and be available to participate upon request.

In support of this public relations and communications plan, Walker recommends the University considers these initiatives and continues and formalizes an "Ambassador Program" as a model of positive customer and visitor contact—this will give form and structure to many of the initiatives already pursued by Parking. The ambassador program is discussed in greater detail in Appendix H.

PARKING ENFORCEMENT OFFICER RATIOS

The ratio of enforcement personnel can vary significantly with the goals of the University and the responsibilities of the personnel. Walker recommends assigning approximately one Parking Service Agent (PSA) per 3,000± parking spaces. Approximately 16,000± parking spaces are under management at UIUC. By this standard, a minimum of approximately five full-time equivalent PSAs are needed to enforce parking, which confirms current staffing. Parking enforcement is supplemented occasionally by police officers when the Parking Department is closed.

Walker recommends keeping current ratio of parking enforcement personnel, and reducing by attrition if LPR efficiencies dictate.

PARKING SPACE REPLACEMENT POLICY

Consistent with keeping parking sustainable and self-financing, when existing parking is removed to accommodate new campus developments, the best practice is that the cost of constructing replacement parking should be included in and charged to the cost of the new development project.

New construction typically generates a need for a net increase in the amount of parking available in order to ensure that both pre-existing and new parking needs are met.

Unfortunately, construction projects often displace existing parking spaces and may even result in a net decrease to the total number of spaces available on a campus.

Walker's recommended policy is that, to the greatest extent possible, the full current cost of replacement parking should be incorporated into the cost of new construction, regardless of how the project is funded.

Walker recommends the following parking policy language:

- "Whenever a new campus building displaces existing parking facilities, the Parking Department enterprise fund shall be reimbursed the cost of providing replacement parking."
- "Whenever a new campus building generates the need for additional parking, the cost of developing those additional parking spaces will be included in the capital construction cost of the new development, or the Parking Department enterprise fund will be reimbursed the cost of providing replacement parking."

Many universities now have similar policies; however, the cost of the replacement parking can vary considerably. Typically, the dollar amount represents the cost of a structured parking space. Walker recommends a current cost of at least $21,200 per space (the cost of a structured space), not including campus construction soft costs. Note that construction costs have been calculated using 2016 dollars. $21,200 has been calculated using RS Means as a reference, with a local price modifier (also RS Means) applied for the Urbana-Champaign areas. NOTE: if soft costs and enhanced building envelopes are calculated in, the cost per space could exceed $30,000 (campus soft costs are estimated by UIUC at 45 percent).

This replacement cost should increase annually to keep pace with inflation. When the cost of replacement parking would make it impossible for a campus to undertake a project deemed crucial to its academic mission, the campus administration should be able to propose an exception.

None of this is intended to imply that Parking "owns" any particular facility and merits reimbursement for lost spaces. Parking is a steward of University resources—therefore, the fee is intended not as payment for what was lost, but as funding to allow Parking to be responsive to the campus' continually evolving needs.

These funds should be placed in a reserve account for Parking and should be expended to address parking demand, either through demand management expenditures or the construction of additional parking facilities.

SINKING FUND

At the end of the ten-year period covered by the Parking Facility Condition and Ten-Year Plan provided by Walker for all existing parking assets (Task 6, found in Appendix B), Walker recommends that a fund should be established for parking maintenance for all facilities—and immediately for any facilities constructed within the next ten years. Walker recommends that such funds be accumulated in a reserve for repairs and replacements (sinking fund) for the new assets. Maintenance budgets include items from three general categories: structural, operational, and aesthetic. Maintenance typically includes the following:

1. Cost of periodic repairs and or routine corrective actions that are necessary to maintain serviceability and facility operations (this includes daily and routine maintenance, but not operating expenses such as: utilities, snow removal, or landscaping);

2. Cost of preventive maintenance actions to extend the life of a paved lot or the parking structure (includes crack sealing, sealcoating, striping, potholing, and periodic resurfacing);

3. The replacement costs for a facility, or for structural repairs and operational elements at the end of the estimated service life. Major structural repairs and replacements can distort an annual maintenance budget predicated on historical annual expenses. It is more appropriate that such items be budgeted separately and expensed through a reserve sinking fund account.

Anticipated regular periodic maintenance and repair expenses fall into categories #1 & #2 and are usually included in the annual operating budget. Sinking funds are intended to provide at least a cushion toward structural repairs (#3), which includes major expenses that exceed annual maintenance type items, such as expansion joint replacements, major structural repairs to T-s, columns and beams, elevator replacement, equipment replacement, lighting replacement, lot resurfacing, etc., which can amount to millions of dollars. It is impossible to determine in advance when such major repairs will be necessary, the cost of the repair, or if enough time has transpired to reserve sufficient funding to cover the expense. Many owners do not reserve any funds, and are blind-sided.

Contributions to a sinking fund for the new assets can be accumulated over time and are available to cover structural maintenance and structural repairs when scheduled. Walker recommends that $142 per structured space (under 20 years old, and $180 for structures spaces over 20 years old) and $60 per surface space, be set-aside annually to cover structural repairs and major maintenance costs and help fund future parking expansions. All amounts are expressed in 2016 dollars, and should be increased each year consistent with a selected reference; the CPI for the previous year is a commonly used index.

CLASS LEVELING

The current pattern of class scheduling results in uneven parking demand across the hourly and daily demand spectrum. This is the result of scheduling most classes during mid-day on Monday-Wednesday or Tuesday-Thursday. A pragmatic recommendation is that the University schedule classes on a more level basis across the day and by day of the week. The current trends are to avoid scheduling classes early in the day (before 8:30 am) or late in the day (after 3:30 pm), and on Fridays.

While it is acknowledged that this recommendation may be difficult to implement, it is consistent with the Campus Master Plan. Leveling the class schedule more equally across the time spectrum has the potential to reduce peak parking demand and parking conflicts, allowing the existing parking space supply to be used more efficiently, reducing the required future allocation of capital to parking, and promoting a more efficient use of all campus infrastructure, not just parking.

2015-16 PARKING PERMITS & PRICING

The UIUC parking fees offered for FY2016 are summarized as follows.

Students:	$660/yr. (August 1 to July 31)
	$127/yr. shuttle lot
	$68/yr. motorcycle
Faculty/Staff:	0.8% of salary up to a maximum of $660/yr. ($55/mo.)
	$93/yr. shuttle lot
	$34/yr. motorcycle

At UIUC, the maximum annual permit fee is the same as the student permit fee. Employees earning less than $82,500 ($660/0.008) pay less than the full fee. The salary-based permit formula significantly reduces permit revenue. The impact of this policy is estimated by an analysis of annual staff permit sales charges provided by the department. The annual average permit fee yield is summarized as follows:

FY12 Annual Average Permit Charge = $405
FY13 Annual Average Permit Charge = $430
FY14 -15 Average of the Two-Yr. Permit Charge = $418

The $418 average permit yield is 63% of the $660 full-rate permit. 2014-15 permit sales by lot is shown in the figure in Appendix I.

An analysis was conducted by Walker Parking Consultants to examine how UIUC fees differ from the medians of comparable peer institutions. This survey reveals that the average UIUC permit yield is below the peer median (Figure 33).

Benchmarking using peer fees can provide some value. However, there are drawbacks as well. Comparison institutions may operate their own transit systems or may have more or fewer (or no) parking structures. Some of the fees are difficult to compare, because tiers may include a range of fees. In instances which there were multiple prices in a particular category, Walker took a simple average of the several prices; the purpose of this benchmarking is to provide a ballpark indication as to whether UIUC is high or low compared to its peer institutions. It is helpful to have a sense of perspective regarding other operations, and an organization can benefit from introspection, to determine whether it is achieving efficiencies.

To that end, it can be more important to ensure parking revenues are meeting all expenses (including operations, ongoing maintenance, deferred maintenance, and, as applicable, debt service). Meeting these obligations is a more important indication of appropriate parking fees than a comparison to peer institutions' rates. Relying on peer parking rates risks mimicking the potential that other Parking and Transportation operations may be underfunding these expenses—particularly deferred maintenance.

Figure 33: Permit Rate Peer Comparison

			Faculty/Staff (annual)				Student (annual)			Visitor Rates		
Campus	City	State	Reserved	High	Medium	Low	High	Medium	Low	Daily	Hourly	Event
University of Illinois	**Urbana-Champaign**	**IL**	**1,980**	**418**	**127**	**93**	**660**	**127**	**127**	**8.00**	**1.00**	**20.00**
Indiana University	Bloomington	IN	1,668	454	158	24	-	122	67	11.00	2.00	10.00
Michigan State University	East Lansing	MI	-	486	252	98	292	195	98	6.00	1.60	10.00
Pennsylvania State University	University Park	PA	1,056	768	444	120	640	288	90	6.00	1.00	3.00
University of Iowa	Iowa City	IA	1,248	696	540	300	621	351	0	4.50	1.20	20.00
University of Michigan	Ann Arbor	MI	1,648	684	153	76	684	153	76	20.00	1.40	2.00
University of Nebraska	Lincoln	NE	1,044	636	564	276	636	528	276	5.00	0.50	6.00
Southern Illinois University	Carbondale	IL	n/a	250	200	125	290	110	40	3.00	0.50	3.00
Illinois State University	Normal	IL	419	369	317	108	369	284	87	8.00	1.00	10.00
University of Florida	Gainsville	FL	1,140	1,020	426	162	154	154	154	5.00	2.00	5.00
University of South Florida	Tampa	FL	1,076	494	305	132	1,076	226	156	5.00	1.50	5.00
University of Georgia	Athens	GA	720	480	360	240	720	360	240	10.00	2.00	5.00
University of Kansas	Lawrence	KS	n/a	405	300	225	261	225	225	12.00	1.75	6.00
		Mean	$1,200	$551	$319	$152	$534	$240	$126	$7.96	$1.34	$8.08
		Median	$1,108	$486	$305	$125	$629	$225	$98	$6.00	$1.40	$6.00
		UIUC Deviation from Median	$872	($68)	($178)	($32)	$32	($98)	$29	$2.00	($0.40)	$14.00

Source: Walker Parking Consultant

ZONE PRICING

The current parking permit fees at UIUC are below the medians of the comparables. The union contract rates pose a threat to long-term sustainable funding for the Parking Department. Core parking areas exhibit high occupancy and extensive searching can be observed at peak conditions.

UIUC provides a very high level of service to parkers, is constrained by land-locked conditions near the Quad, and has high demand on the core of campus, but remote parking is under-utilized. This suggests that parking is not appropriately priced. Core parking prices should be increased, and/or alternative remote parking should be offered at a lower price.

Walker observes that UIUC does present parking fees in a manner that is as transparent as possible to all constituent user groups (faculty, staff, employees, and students). It is also necessary that parking fees support the revenue requirements of the Parking Department in a self-sustaining manner.

A key aspect of charging a fee for parking is to efficiently allocate a scarce resource. Without demand-based pricing, there is less incentive to park in a less convenient location. Charging appropriate parking fees allows the market participants to properly value each parking option, and should reflect the relative value of parking to users so as to achieve this goal. This market-based approach is undercut by variable pricing, predicated on individual wages.

At UIUC, the most valuable parking is undervalued. The current price of permits is too low to motivate residents to park remotely or to motivate faculty, staff and most off-campus students to walk more than short distances or use transit. The prime motivating factor to accept remote parking at this time is the core area congestion.

In most zone parking schemes, a zone permit price is usually based on location, distance, or proximity to a destination, quality of the parking facilities, and the demand for parking in the zone. Students, faculty and staff typically purchase permits for specific zones based on proximity to offices, residence halls, classrooms, libraries, conference or athletic facilities. Parking facilities are usually identified by a color and/or number schemes. The permit is linked by these identifiers to a specific zone where the permit is valid. Once sales goals are reached, parkers may only purchase perimeter or remote parking. The number of permits sold in each zone should be limited (with an oversell allowance) and priced in such a way as to reduce competition for the spaces, and thus provide a greater likelihood of a permit holder finding a parking space.

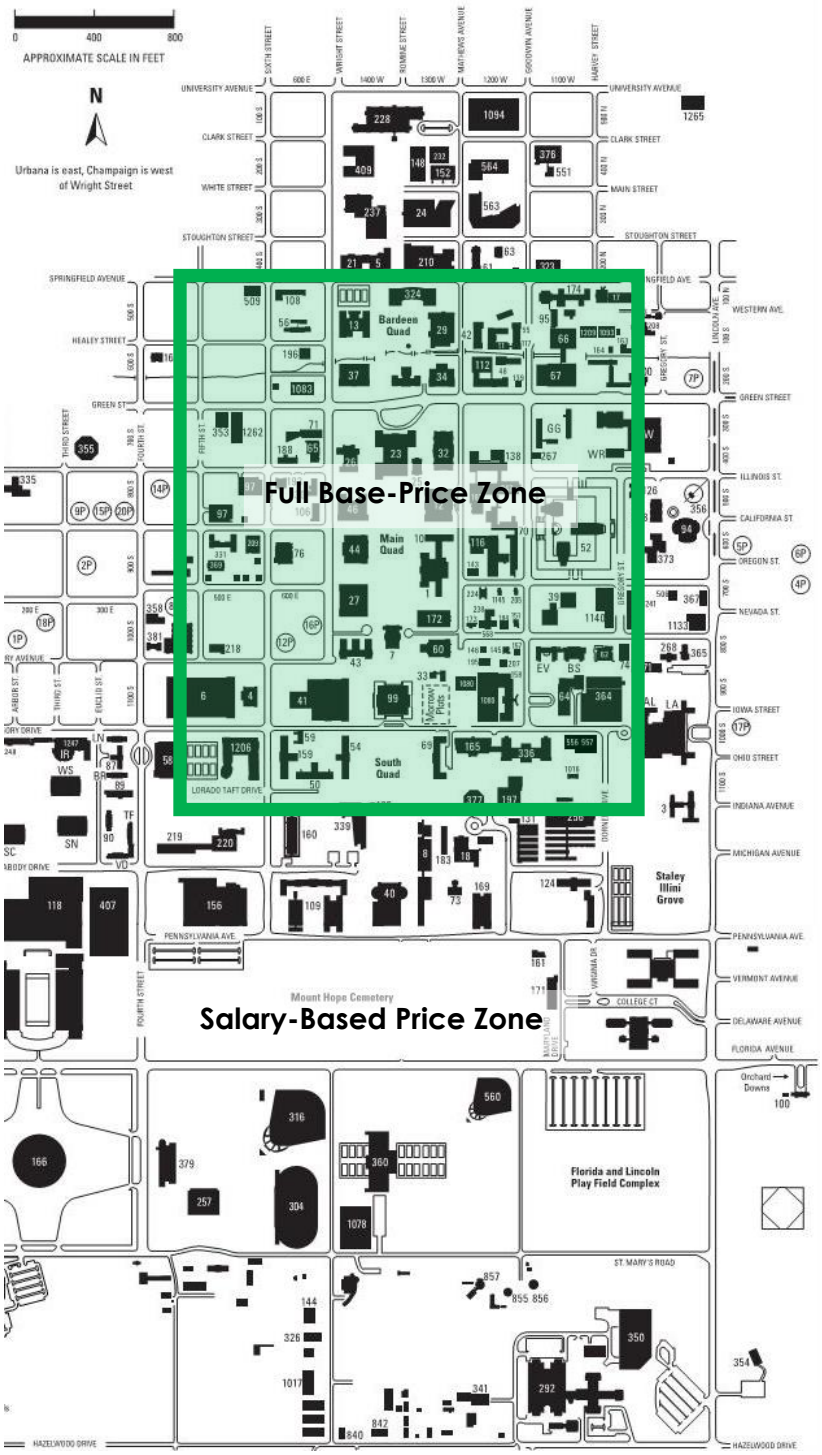
ZONE PRICE RECOMMENDATION

In recognition of high peak demand in the core parking area, and to more efficiently allocate relatively scarce parking resources, Walker recommends that UIUC charge the staff permit at the full base price at those parking facilities that lie within a defined area surrounding the core campus, while continuing to provide salary-capped permit rates at the remaining parking facilities. A suggested full-price zone, within about 800 feet of the Quad, is delineated in very general terms in the following figure.

The zone boundary should be determined relative to levels of demand for certain parking areas. The shape of the zone would not be rectangular, but would recognize existing infrastructure, natural boundaries, use patterns, and constituencies being served. Altering prices will, to some degree, impact current demand patterns, and the designation of lots that are considered central or perimeter may need to be adjusted from year to year to accommodate physical or behavioral changes on campus.

It is acknowledged that a zone pricing program may run counter to the union labor agreement; but, the subject should be raised.

Figure 34: Zone Parking Option



Source: UIUC

The impact of Zone permit pricing policy would be seen in the elasticity of demand for parking; this is because full base-price permit revenue would not be fully realized as more staff parkers within this area will choose to park in less expensive locations or drop out of UIUC parking entirely by parking off-campus or riding transit. Zone pricing better informs the parking purchase decision.

Parked vehicles do not contribute as significantly to the University's carbon footprint as cars in motion do. Thus, the second goal is to reduce the number and frequency of cars in motion. Transportation Demand Management (TDM) and transportation alternatives provide additional tools that encourage more sustainable behavior. Reparking can be discouraged by improving access to or level of service of alternatives such as shuttles, biking, and carsharing.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

UIUC has already implemented a number of transportation demand mitigation measures. The TDM program is currently managed by Facilities and Services. This program is charged with supporting and promoting safe, inexpensive transportation options to encourage a more advantageous distribution of parking demand, to help mitigate parking demand growth generated by campus employees, students, and visitors, and to allow the parking system to better operate within its current parking capacity.

Walker recommends that parking administrators and sustainability professionals continue to work closely, and collaborate on the development of additional measures to maximize the efficiency of the parking and transportation infrastructure investment on campus.

While zone pricing and other supply management strategies will help UIUC efficiently use the existing parking supply, demand management efforts can help delay or avoid the need to build additional parking structures.

Some recommendations for expanded support services, which enable more people to avail themselves of TDM programming:

- **Guaranteed Ride Home (GRH)** – This support service will provide a ride home (taxi, Lyft, Uber, carshare vehicle, etc.) to resolve an unanticipated situation (e.g., sick child at school or daycare), should a commuter choose a transportation mode other than driving alone to campus. The GRH will help support commute behavioral change, as the employee is not "stuck at work" when an emergency arises.

- **Discounted Parking for Ridesharing** – Ridesharing can save a significant number of parking spaces depending on the number of individuals traveling in the same vehicle to campus. In a zone parking system, discounted pricing rewards this ridesharing behavior by allowing rideshare groups to share the discounted price of premium parking.

- **One-day Parking Passes** – Parking should offer a limited number of one-day parking passes for alternative transportation users. This addresses individuals' infrequent needs to drive to campus alone, although they use carpooling or transit most days. UIUC offers a privilege similar to what is described here—one-day meter passes.

  If a small supply one-day permits is issued as a support service, these permits should be valid in underutilized facilities, so as not to cause a domino effect of displaced parkers in areas that are typically full.

- **Carshare** – Market and encourage the use of existing Zipcars, and generate demand that will encourage Zipcar to add more vehicles to campus. Midday mobility can encourage commuters to leave their cars at home. Carshare vehicles can also be used by departments to reduce the liability associated with employees using personal vehicles for business errands. The Parking Department's support of Zipcar could take the form of including information through existing marketing and communications channels, and providing dedicated parking spaces.

- **BikeShare** – Investigate the deployment of bikesharing on campus. This provides extra mobility to commuters who leave their cars at home, and may avoid some instances of re-parking among those who do bring their car to campus.

In order to accommodate the cost of providing these programs, the campus should consider future avoided expense (i.e., additional parking structures) as current savings. Walker also encourages UIUC to specify that replacement parking funds can be used to replace demand—that is to say either through reducing demand (TDM) or adding parking supply, as situations dictate. It is possible to get more value from each dollar invested in TDM versus the financial and land-use costs associated with structured parking.

See Appendix K for more information on bikesharing, carsharing, and ride-hailing (Lyft, Uber).

TRANSIT ANALYSIS

TRANSIT SERVICE ON THE UIUC CAMPUS

UIUC uses the local public transit provider, the Champaign-Urbana Mass Transit District (MTD) for commuter transit and campus shuttle services. A total of 14 MTD routes come to or through the campus, with four routes providing service every ten minutes. All four of these routes serve the shuttle lot (E-14), with three of them running year-round.

By industry standards and benchmarks, this is an excellent level of service.

COST OF TRANSIT SERVICE

The University paid MTD a total of $5.75M in FY2016. Most of this is amount ($4.95M) was paid through a student transportation fee, which was voted in by student governance. Of the balance, $523K came from the Parking Department, and $280K from general fund sources.

Figure 35: Zone Parking Option

Stdt. Transp. Fee	Shuttle Svce. Fee (faculty/staff)	Raven Svce. Fee	Faculty/Staff (access other rtes.)	TOTAL
$4,951,860	$522,925	$149,760	$132,458	**$5,757,003**

Source: UIUC

Through terms of the agreement with MTD, it is not specified whether UIUC is being charged for ridership privileges, MTD's provision of additional service (either routes or frequency), or a combination of both.

Either of these values can be approximated.

- Transit systems have set charges per hour of service (usually about $70 - $75 per hour for a transit-style bus). Example:
  - MTD runs a bus route every 20 minutes, 10 hours per day, with one bus
  - UIUC wants 10-minute service
  - This requires a second bus for 10 hours per day at $75 per hour, or $750 per day
  - Over 250 working days per year, this amounts to a predictable $187,500 per year
- MTD charges $1 per ride, $20 for a monthly pass, and $84 per year for an unlimited use transit pass. Example:

- UIUC could choose to purchase transit privileges for faculty, staff, and students on an "opt-in" basis at $84 per head (or a negotiated amount).
- UIUC could continue to offer transit privileges to all iCard holders, and negotiate an amount with MTD for each annualized, active card. This amount would usually be substantially less than the full cost of an $84 pass—recognizing that not all pass holders will actually use the transit provided to them.

VALUE OF TRANSIT SERVICE

UIUC has raised two questions regarding their payments to MTD:

1. Is the overall contracted cost commensurate with the services being delivered?
2. Is the Parking Department portion of $523K, related to the cost of services being delivered?

Addressing question #1, above, UIUC currently averages 96,000 active iCards during peak periods of the year. In general terms, if the annual payment of $5.75M is divided by the number of active cards, UIUC is paying $60 per year per iCard holder. This is less than the $84 annual pass sold by MTD.

It is also likely that there is additional service being bought up in association with MTD's service on the UIUC campus.

Walker recommends that future contracts with MTD separate ridership privileges from the buy-up of additional service—that is to say: The University should pay $X per year per eligible rider, and $Y per additional service hour.

Following this recommendation would permit question #2 to be answered. Specifically, UIUC could calculate how many faculty/staff shuttle permit holders have transit privileges (at $X per head per year) and how many extra service hours is MTD providing to meet UIUC service demands (at $Y per hour).

While the overall amount of funding that MTD requires is unlikely to change (i.e., a drop in University funding would likely result in service reductions), future years of the contract would be more transparent and predictable. In external negotiations, the campus population, the annual fare per person, the number of service hours, and the cost per service hour will all be known quantities to both MTD and UIUC—with the latter three being negotiable values. In internal discussions, it will be easier to parse how much of the payment should come from student fees, from the Parking Department, and from other campus sources.

STUDENT TRANSPORTATION FEE

The transportation fee per enrolled student at UIUC is $59 per semester, or $118 annually. For comparison, the following student transit fees are summarized. The median transportation fee at these comparable institutions is $109.50 annually. Also, note that MTD charges $84 per year for unlimited use transit privileges, less than UIUC students are currently paying through their transportation fee.

Figure 36: Comparable Tuition Transit Fees at Other Institutions

Peer Institution	Fee Description	Annual	Semester
University of Minnesota	U-PASS Fee	$194.00	$97.00
University of Michigan - Flint	Student Transit Fee	$66.00	$33.00
Iowa State University	Transit and U-PASS Fee	$125.20	$62.60
University of Kansas	Transit Fee	$174.00	$87.00
University of Missouri - Kansas City	Transit Fee	$28.48	$14.24
University of Missouri - St. Louis	Metro Pass Program Fee	$48.00	$24.00
University of Nebraska–Lincoln	Transit Fee	$90.00	$45.00
University of Virginia	Transit Fee	$168.00	$84.00
Northern Arizona University	Transit Fee	$100.00	$50.00
UNC Chapel Hill	Transportation Services Fee	$30.00	$15.00
Miami University of Ohio	Metro Bus Fee	$132.00	$66.00
Clemson University	Transit Fee	$66.00	$33.00
Marquette University	U-PASS Fee	$90.00	$45.00
University of Connecticut	Transit Fee	$110.00	$55.00
University of Georgia	Transportation Fee	$109.00	$54.50
University of New Hampshire	Transportation Fee	$119.00	$59.50
Virginia Tech	Bus Fee	$123.00	$61.50
Old Dominion	Transportation Fee	$100.00	$50.00
LSU	Transportation Fee	$132.40	$66.20
Kennesaw University	Transportation Fee	$120.00	$60.00
	Minimum	$28.48	$14.24
	Maximum	$194.00	$97.00
	Median	$109.50	$54.75
	Mean	$107.65	$53.82

Source: Walker Parking Consulting

TASK 5: CURRENT PARKING TECHNOLOGY ASSESSMENT

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TASK 5—CURRENT PARKING TECHNOLOGY ASSESSMENT

TECHNOLOGY

1) Web-based on-line access is typical of many university the Parking Department units. It is Walker's recommendation that a link to parking information should be easily located from the University's home page by being included prominently with other "quick links" to University offices and major web pages. The ease of locating a link on a web page is very important to customer-oriented communication and provides an effective aid to campus visitors by identifying where they should or should not park. Despite rejections in the past, this should be reviewed.

2) Generally speaking, maps are confusing to a large number of users. Perspective maps are never recommended. North should always be at the top of a map. The UIUC parking map avoids these pitfalls, and must (and doe)s prominently display the address and location of the Parking Department office. In terms of general readability and clarity, the maps are adequate. However, Parking is working to improve its maps to make them more consistent with other University published items—with similar general references to landmarks, roadways, routes, etc.

3) Online payment is available through the website. An on-line ticket appeal form and general information regarding the process to appeal a citation did not appear to be easily available through the Parking Department website. The process for tracking appeals and transactions of fine payments after an appeal is adjudicated is known within the department and is available to all parkers. No changes are recommended.

4) There are programs in place that accommodate special requests for services such as event parking, emergency vehicle service, and construction projects. Access to these services is promoted on the Parking Department web site. These services are available by contacting Public Safety or Parking. These functions appear to be well planned and are consistent with contemporary university parking practices. For safety reasons, enforcement staff no longer provide escort service. No changes are recommended.

5) The Parking Department indicates that a new wayfinding improvement program is a work in progress. Wayfinding signs should follow a scheme that is consistently continued throughout the campus. Signs should follow a plan of consistent design and high visibility. Wayfinding should be improved to direct a visitor to metered space and to the Parking Office. In order to reduce traffic congestion and unnecessary circulation, wayfinding can be enhanced by automated parking guidance systems (APGS), which can direct parkers

to the facilities that have current capacity. Improved signage is recommended; this recommendation will likely require coordination with the larger Facilities and Services Division.

6) The Parking Department uses an automated and efficient computerized system with handheld ticketwriters to track its citations for time, location, and generate daily activity logs of enforcement personnel. Automated ticket-writer hardware and software is the preferred system for writing citations by enforcement personnel. Security and enforcement personnel are judged to be efficient and effective in the enforcement of parking regulations. Supervisors routinely check on subordinates and change assignments to meet the enforcement needs of the University. No changes are recommended.

7) The Parking Department has installed an LPR system of cameras and accompanying software, which will allow equipped Parking Department vehicles to scan license plates. When a scanned license plate number is not associated with a valid permit, a paid meter, or is not being used correctly, enforcement is prompted to investigate further and potentially issue a citation. The Parking Department projects it will save an estimated $40,000/year in materials, personnel, and postage. It is anticipated this alone will offset LPR expenses. As stated on the website, secondary financial impacts will likely prove to be the most significant outcome – increased enforcement efficiency provides incentive for compliance (everyone pays their fair share). Because the Parking Department is 100% funded by permit, meter, and fine payment, increased efficiency and savings directly benefits parking customers. No changes are recommended.

TASK 6: PARKING FACILITY CONDITION ASSESSMENT AND TEN-YEAR PLAN

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TASK 6—TEN-YEAR PARKING FACILITY ASSET MANAGEMENT PLAN

This was produced as a separate deliverable by Walker and appears, in its entirety, in Appendix K.

TASK 7: REVISED FINANCIAL PROJECTIONS

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TASK 7—REVISED FINANCIAL PROJECTIONS

The steering committee has requested revised financial projections based on the results of the U16133 Central Campus Structure(s) project, which will be conducted throughout the spring semester of 2017. The revised financial projections will consider the three options outlined in the U16133 scope of services including the following:

1. Repair of the existing C7 and C10 parking structures to extend the useful life a minimum of an additional 20 years.
2. A new large parking structure at lot C9 to replace demolished parking structures C7 and C10.
3. Two new moderately-sized structures, one at lot C9 and one at lot C10, to replace demolished parking structures C7 and C10.

This deliverable was supplied under separate cover.

SUMMARY RECOMMENDATIONS

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SUMMARY RECOMMENDATIONS

VISITOR PARKING

1. There are 2,165 metered transient spaces on campus. Make ~436 meters (i.e., 1:100 students) visitor-only.
2. Introduce more stringent time limits on non-visitor meters, to discourage re-parking.
3. Support, enhance and encourage transit or other alternatives, and price meters based on demand.
4. Phase in multi-space meters as single-space meters are retired. Include pay-by-plate and pay-by-phone to improve customer service and tie in with LPR system for enforcement.
5. Improve wayfinding—guiding visitors to metered parking and to the parking office.
6. Adjust special event lot rate for size of facility, time of day, and/or intensity of use.
7. Introduce online visitor permit sales/management. Can be T2 module or 3rd party. T2 currently provides the software backbone for the Parking Department, and can be expanded with this module, if desired. Other 3rd-party vendors could provide similar products that could be tied into current systems, however, upgrades by either party could generate the need to rewrite the connections.

MOTORCYCLES

1. Allow automobile permit holders to use their regular automobile permit privileges to park motorcycles in the spaces to which they are normally entitled.
2. Allow motorcycles to use ungated parking structures. Where possible and practical locate motorcycle-only parking spaces at the ground floor and close to an entrance.
3. Consider higher density striping schemes to fit bikes more efficiently.
4. Allow motorcycle-only permits to park only in designated motorcycle spaces.

ENFORCEMENT

1. Introduce ambassador approach to parking enforcement; establish benchmarks for customer service "touches," as well as for tickets issued (see Appendix H). Walker does not recommend ticket quotas, however, benchmarking against historical ticket data can provide a general insight into productivity.
2. Offer services including greeting, directions, assistance parking legally, distributing maps/info, and offering a Motorist Assist Program.
3. Keep current ratio of parking enforcement personnel; reduce by attrition if LPR efficiencies dictate.

FINANCIAL

1. Establish a parking space replacement fee. Since most parking to be replaced/added will be structured parking, this fee should be based on the cost of a garage space (approximately $21,200 per space, adjusted annually for inflation). Note that this reflects construction expenses and does not include "soft" costs, for campus project management, which could add as much as 45 percent to this amount. This protects against the incremental (and sometimes nearly hidden) loss of parking spaces over time. It is rare that a single project wipes out hundreds of spaces all at once, though of course this does happen. The more insidious changes are the loss of two spaces here, ten spaces, there, and five elsewhere, that can add up to substantial losses in the long term. The replacement fee treats all projects equivalently, creates a predictable expense, and allows Parking to be responsive when a project finally tips the balance for the need for additional inventory.
2. Parking fines are commensurate with violations and the local market. No changes are recommended.
3. Build a sinking fund to cover the average annual cost of long-term preventative maintenance of parking assets. Walker recommends $60 per year per surface space and $142 per year per structured space ($180 per year for structures over 20 years old). This amount is part of the gross expenses that generate the needs for appropriate parking fees in support of the programs.
4. Current pricing is cost recovery. UIUC will need to increase parking fees in order to generate sufficient revenues to support current and deferred maintenance, expand TDM programs, invest in additional transit, and undertake capital construction.
5. Current salary-based pricing models do not promote efficient use of the current parking inventory.
    - There is not adequate incentive to shift some parkers to areas in which space is abundant.
    - The model, as it stands it unsustainable, the "cap" on parking fees, ensures that the full cost of providing, administering, and maintain parking cannot be adequately funded in the long term.
    - The current model contains serious risks and constraints. While the cost to provide and maintain parking continue to escalate, wage increases (and the attendant fee increases) may not be able to keep pace. If there is employment attrition, the revenue base declines, even as costs continue to escalate.
    - One way in which UIUC could continue to abide by salary-based pricing agreements with bargaining units would be continue to "discount" parking areas outside the campus core (e.g., more than 800 feet from the Main Quad), but charge full-price for all permits in the campus core. The spirit of the contract would

continue to be honored by ensuring bargaining unit personnel will still have access to salary-based, reduced-price parking.

6. Current undervaluing of the highest demand parking sets unrealistic expectations regarding proximate parking on a developing, growing campus. These expectations create pressure to replace or repair C7/C10, instead of using existing parking capacity.
7. Student parking fees (proximal) are consistent with peer rates.
8. Considering the high demand for campus parking meters, UIUC should increase meter rates to increase turnover and enhance revenue. Because the demand patterns are different from those at municipal (Urbana and Champaign), it is reasonable that the rates should be similarly differentiated.
9. Higher event rates would be more commensurate with uses and could moderate the needed fee increases to faculty, staff, and student permits.
10. Given the true costs to provide parking (administration, operation, repair, maintenance, and capital expenditures), the expenses outstrip the revenue generated through parking fees. The salary-based pricing creates a parking subsidy for most permit holders. Because the Parking Department is an auxiliary business unit, UIUC should consider that budget deficits be covered by an increase to the University's benefits overhead rate.[1]

TRANSPORTATION DEMAND MANAGEMENT (TDM)

1. Continue to support transit and universal transit passes
2. Cross-promote with F&S Sustainability to encourage use of TDM programs (reduced demand for parking can translate into reduced capital expenses for additional and replacement parking)
3. Encourage carpools and vanpools with preferential parking pricing (combine with otherwise undiscounted parking in campus core).
4. Support and promote carsharing and ride-hailing (Uber, Lyft, etc.), which reduce individuals' needs to bring single-occupancy vehicles (SOVs) to campus.
5. Collaborate to improve bike and pedestrian friendliness of campus.
6. Encourage cycling by offering adequate bike parking. This may include covered parking, secure bike lockers, and the addition of bike cages into new or existing parking garages.
7. Support bikeshare in principle (as it can grow a bike culture); low priority for Parking as bikesharing mostly replaces walking or transit trips.

[1] Some institutions choose to frame some of their TDM efforts as employee benefits, and share the funding of these TDM programs between parking revenues and a contribution from the benefits overhead. This is not a required funding stream, but it can help stabilize programs that demonstrably yield financial, stress-reduction, and wellness benefits to TDM participants.

COMMUNICATIONS

1. Generally parking organizations are misunderstood—viewed as "cash cows." Transparency can create an atmosphere of trust and reduced resistance to parking fees and fee increases.
2. Ensure the readability, clarity, consistency, and accuracy of published materials, particularly maps, which are always a challenge in dynamic, higher-education environments.
3. Develop "dashboards" illustrating sources and uses, services offered, and mode splits. Display prominently on website and in an annual report. At Walker's recommendation UIUC built such an annual report in 2015-2016 and posted a link on the Parking website. Walker would recommend using the infographics from that report on a dedicated page on the Parking website, instead of having them available only by downloading a PDF of the full report. Other examples of annual report and associated graphics can be found at:
    - University of Texas at Austin
    - University of Maryland
    - Towson University
    - University of Colorado-Boulder
4. Continue efforts to increase the profile of Parking's website, reducing the number of clicks required to reach it from the University homepage.
5. Continue interaction with Parking Advisory Committee, provide members with materials they can share with their constituent assemblies.
6. Improve wayfinding, particularly for visitors—guiding them to metered parking and to the parking office.

OPERATIONAL ASSESSMENT

1. Eliminate hand-numbered temporary permits in favor of preprinted and unique, sequentially numbered permits.
2. Ensure that Parking has a "seat at the table" for construction projects to ensure that parking needs/losses are accounted for—and construction parking is accommodated.
3. Parking facilities should be consolidated under the control of Parking. When parking is lost to construction, it is not a land loss to Parking, it is a land-use loss, and parking requires compensation in order to meet or mitigate the displaced demand and revenue

GARAGE ALTERNATIVES

1. As parking structures C7 and C10 reach either the end of their useful lives or will require substantive repairs, Walker recommends that if capacity is lost (~654 parking spaces) inventory should be at least partially replaced in Zone C.
2. While overall campus parking adequacy is projected to remain at a surplus (in aggregate), campus preference and desire for institutional efficiency highlight the benefits of maintaining balance between proximate and remote parking.

STATEMENT OF LIMITING CONDITIONS

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STATEMENT OF LIMITING CONDITIONS

This report and conclusions are subject to the following limiting conditions:

1. This report is based on some assumptions that are outside the control of Walker Parking Consultants/Engineers, Inc. ("Walker") and/or our client. Therefore, Walker does not guarantee the results.
2. The results and conclusions presented in this report may be dependent on future assumptions regarding the local, national, or international economy. These assumptions and resultant conclusions may be invalid in the event of war, terrorism, economic recession, rationing, or other events that may cause a significant change in economic conditions.
3. Walker assumes no responsibility for any events or circumstances that take place or change subsequent to the date of our field inspections.
4. All information, estimates, and opinions obtained from parties not employed by Walker, are assumed to be accurate. We assume no liability resulting from information presented by the client or client's representatives, or received from third-party sources.
5. This report is to be used in whole and not in part. None of the contents of this report may be reproduced or disseminated in any form for external use by anyone other than our client without our written permission.
6. The projections presented in the analysis assume responsible ownership and competent management. Any departure from this assumption may have a negative impact on the conclusions.
7. Computer models that use and generate precise numbers generate some of the figures and conclusions presented in this report. The use of seemingly exact numbers is not intended to suggest a level of accuracy that may not exist. A reasonable margin of error may be assumed regarding most numerical conclusions. Conversely, some numbers are rounded and as a result some conclusions may be subject to small rounding errors.
8. This report was prepared by Walker Parking Consultants/Engineers, Inc. All opinions, recommendations, and conclusions expressed during the course of this assignment are rendered by the staff of Walker Parking Consultants as employees, rather than as individuals.
9. This report presents some conceptual financial information that is intended to provide an order-of-magnitude assessment of parking expenses and relative costs.

APPENDIX A: OPPORTUNITIES, TRENDS, AND SOURCES OF RISK

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OPPORTUNITIES, TRENDS, AND SOURCES OF RISK |

Parking is a $30 billion industry. Parking is all about mobility and connectivity, and innovations are occurring rapidly. The parking market is undergoing a variety of changes that make it easier for people to find and pay for parking, and for parking authorities to better manage it. Among them are cashless, electronic, and automatic payment systems; real-time information about parking rates and availability via mobile apps; and wireless sensing devices for improved traffic management. Universities, cities, hospitals, airports, and developers are leading in parking innovation. Parking matters to the design of more walkable, livable communities and to broader transportation issues.

It is estimated that about 30 percent of the cars circling a city at any given time are doing so as drivers look for parking. Aside from the frustration factor, those cars are creating traffic congestion. From an environmental standpoint, that translates to significant amounts of wasted fuel and carbon emissions.

REAL-TIME COMMUNICATION

Parking technology is becoming mainstream and is changing the industry. The most prominent trend in the parking industry is the move toward emerging technologies to improve parking access control and payment automation. Another top trend is "real-time communication of pricing and availability to mobile/smart phones."

Both trends are seen in the federally-funded San Francisco SF*park* pilot project, which supplies real-time information to parkers on the availability and cost of on-street and off-street parking, drastically reducing hunting for open spaces, congestion, and double-parking. According to San Francisco County Transportation Authority, the city also may be the first in the U.S. to be able to quantify and provide the number of available parking spaces in public lots, garages, and city blocks on a real-time basis. Similarly, Seattle's new electronic parking guidance system uses dynamic real-time message signs and web information to direct people to available off-street parking at six downtown garages.

PAYMENT OPTIONS CONTINUE TO EXPAND

The second leading trend is the "development of electronic (cashless) payment options, such as pay-by-phone programs installed in cities such as Washington, D.C., Pittsburgh, Houston, and Miami, among others. Acclaimed as the world's most successful of its type, the D.C. program has earned 550,000 customers and accounts for 40 percent of the city's parking revenues. About 80 percent of the seven million transactions to date employ smart phones, with payment options that include credit cards, online and mobile money management solutions, and PayPal. Miami and Pittsburgh are among the cities pioneering license-plate recognition (LPR) technology as another means of quick and efficient payment and enforcement.

GREEN SOLUTIONS

The demand for green or sustainable solutions is a top trend affecting the parking profession. Among the technology considered to have the greatest potential in improving sustainability are (1) guidance systems to enable drivers to find parking faster (and reduce carbon emissions); (2) energy-efficient lighting, (3) encouraging alternative travel by providing bike storage, car/bike share, access to transit, etc.; (4) accommodating electric-vehicle charging stations; (5) renewable-energy installations such as solar panels and wind power; and (6) innovative water and storm water management systems.

For example, the City of Tampa cut its energy costs in half by upgrading lighting in its parking facilities, joining Miami, Denver, and other cities in offering citywide electric-vehicle charging stations. Miami was among the first U.S. cities to partner with a car-share program, which has since taken root in a number of other cities across the country.

Other notable trends are increased collaboration between parking, transportation, and decision makers, the need for improved customer service, and demand for green/sustainable solutions.

SOCIETY'S EFFECT ON PARKING

The societal changes are having significant effects on parking. The parking industry has expanded to serve cyclists, those who car-share, those en route to shuttle buses or light rail, and even pedestrians who benefit from parking facilities that serve as mobility connectors.

Other societal changes having significant effects on parking include increased traffic congestion, along with higher gasoline prices, the desire for more livable, walkable communities, and the aging population.

Decision makers need to consider parking issues earlier in the planning process to prevent design problems and other complications later on. The most common avoidable mistakes include such issues as the lack of vision to invest in mass transit systems to handle large movements of people, inefficient layout and poor aesthetics, failure to think about parking in the planning stages, and overlooking important issues such as water and power sources, snow removal, entry/exit functionality, and how and by whom the facility will be used.

Some suggest that parking would fit as a course of study at an academic institution, or that parking should become part of the curriculum at schools for urban planners or schools where business and public policy is taught.

An increased focus on customer value-added service is another significant trend noted in the industry.

NAMING RIGHTS

Significant fees in the millions of dollars have been paid by national brands and companies to the owners of high profile buildings and sports facilities to secure "naming rights." While parking facilities are not typically thought of as high profile, the proximity of parking facilities to various generators and venues could provide a lower cost alternate naming option for appropriate marketing programs.

Walker believes that at appropriate price points, destination parking facilities could provide a local impact as part of a marketing campaign. For example, it may be worth considering acquiring the naming rights to a highly visible parking facility (i.e., the "Ford F150 Garage," or the "Lilly Garage") located in proximity to a high value destination, such as a particular building, theater, hospital, stadium, arena, etc.

TOYOTA GARAGE AT THE FEDEXFORUM IN MEMPHIS

The naming rights to the main parking garage connected to the FedExForum were sold to Toyota and the Memphis Area Toyota Dealers in 2010 to replace Ford as the previous garage sponsor (2004), according to a published report. The arena is home to the National Basketball

Association's Memphis Grizzlies. Grizzlies President of Business Operations Greg Campbell said that terms of the garage naming-rights deal are "similar to the $700,000 per year paid by Ford." The garage has 1,500 parking spaces over five levels.

FORD AND LINCOLN MERCURY PARKING DECK AT THE PRUDENTIAL CENTER IN NEWARK

Prudential Center is an 18,000-seat, multi-purpose indoor arena in the central business district of Newark, New Jersey. Prudential Financial purchased the naming rights to the arena in January 2007 for $105.3 million over 20 years. Prudential Center offers premium seat guests and suite holder access to the Ford and Lincoln Mercury Parking Deck located on the corner of Broad Street and Lafayette Avenue. Terms with Ford were not disclosed.

Prudential Center and the Tri-State Ford and Lincoln Mercury Dealers have a deal naming Ford Lincoln Mercury as the exclusive automotive partner of Prudential Center. As part of the deal, Ford Lincoln Mercury receives entitlement rights to the on-site parking deck and interior luxury suite levels, as well as signage for all Prudential Center sports and entertainment events and use of team marks and logos for the New Jersey Devils and New Jersey Ironmen.

The long-term partnership, supported locally by the Tri-State Ford and Lincoln Mercury dealers, includes opportunities to display Ford Lincoln Mercury products in the arena, parking areas and on the arena floor. In addition, Ford Lincoln Mercury engages customers at the community level, with promotions at local dealerships on an ongoing basis, including ticket giveaways, vehicle giveaways at games and vehicle launches.

SOURCES OF INCREASED MARKET RISK

There are a number of sources of increased risk to University parking operations. The following articles and studies are presented to speak to opportunities and potential sources of risks that may impact parking at UIUC.

HIGHER EDUCATION ENROLLMENT DROPS ACROSS ALL SECTORS ON AVERAGE

Published by the National Student Clearinghouse (NSC) on May 17, 2013

> The National Student Clearinghouse (NSC) released a sobering report on higher education enrollment trends covering three years. Fall 2012 enrollment was down 1.8

percent from the year before and spring 2013 enrollment fell 2.3 percent from the prior year for all sectors of higher education.

Enrollment data from spring 2013 was analyzed by institutional characteristics such as region and sector as well as student characteristics such as part-time or full-time status of students, age, and gender. Analysis of percent change of enrollment from fall to spring over the last three years shows that the fall attrition rate (including attrition related to graduation, stop-out, drop out, and new spring enrollment) has been growing for the past three years. The change in enrollment from fall 2010 to spring 2011 was -4.4 percent, and grew to -5.4 percent from fall 2012 to spring 2013.

Enrollment in postsecondary education by region (Midwest, Northeast, South, and West) shows falling enrollment from spring 2013 to spring 2012 in every region of the country. The largest one-year loss of 2.6 percent was in the Midwest; the second largest was in the South at 2.2 percent. The Northeast represents the smallest loss in 2013 at -0.9 percent, but is the only region with three consecutive years of lost enrollment.

Enrollment changes are impacting every sector of higher education. The one-year change in enrollment from Spring 2012 to Spring 2013 shows that two year-public institutions lost 3.6 percent of students, and four-year public institutions lost 1.1 percent. The for-profit sector saw the steepest declines at -8.7 percent while four-year, private, nonprofit institutions were the only sector to have flat enrollments at 0.5 percent. Both full-time and part-time students have falling enrollments across all sectors from 2012 to 2013 (-2.7 percent and -1.6 percent, respectively). These losses are not exclusive to just 2012-2013. Two different age groups in the study – those traditionally aged 24 and under and those over 24 - are both on the decline. In 2013 there were 3.6 percent fewer students over age 24, and 1.4 percent fewer traditionally aged students than the year before.

UIUC administration currently targets enrollment growth in the near term. These projections are moderated in this report by Walker in comparison to recent trends in enrollment growth over the historical record since the 2008 recession. Failure to meet the projected enrollment will tend to result in lesser or declining campus parking utilization, which has the potential to negatively impact future revenue growth.

ATTITUDES ON DRIVING ARE CHANGING

The following article was published as an editorial by George Will in the Indianapolis Star and other newspapers on Saturday, March 26, 2016.

CAN AUTOMAKERS REDEFINE MOBILITY?

By George Will, Columnist | georgewill@washpost.com.

> If Mark Fields' theory is correct, his industry faces novel challenges. His theory of the changing role of driving in Americans' lives is one reason Ford Motor Co. now describes itself as an "automotive and mobility company."
>
> Fields, Ford's CEO, remembers a time when teenager made an early-morning beeline to get their driver's licenses. Many still do, but increasing numbers are less ardent about the machine that made modern America. In 2014, only 76.7 percent of people 20 to 24 years old had driver's licenses, down from 91.8 percent in 1983.
>
> Until recently, Fields said, driving meant the freedom to go out and connect with friends. Now, texting teens "don't have to move to stay connected." And given car use entities like Zipcar and ride-booking services like Uber, young people do not have to drive in order to move.
>
> American automakers sold a record 17.5 million vehicles last year, assisted by low gas prices, low interest rates and a record high average age (11.4 years) of the vehicles on America's roads. Although interest rates will not be so low forever, Fields sees a $3.1 trillion opportunity. The world's core vehicle business is a $2.3 trillion industry. But there is a $5.4 trillion sector of emerging opportunities for automakers to meld their businesses with other businesses. Automakers can, he thinks, prosper, perhaps even selling fewer cars, while providing what Fields describes as "mobility beyond our traditional definition."
>
> Car ownership among young adults is declining and vehicle miles driven per American in 2012 were 6.4 percent lower than in 2004. Children raced on their balloon- tire bikes to car dealerships to experience the excitement of new models. It may someday be that way in emerging markets such as India, where Ford has 2.6 percent of the automobile market. Ford's latest entry in the luxury field, the redesigned Lincoln Continental, was built with an eye to China, where Beijing now has more billionaires than does New York.

> Fields - whose company's bestselling product is the F-Series pickup truck - believes that an automobile is "still an emotional purchase." But purchasers who once cared about chrome are now more emotional about technology add-ons that maintain drivers' connectivity with their homes, offices and friends.
>
> Automakers' coming technological wizardry will not have such sweeping effects on how life is lived. But like the smartphone in your pocket or purse, future automotive and other mobility innovations will, in the modern manner, quickly change from unanticipated to indispensable.

Americans are waiting longer to get licensed, driving less and increasingly turning to alternatives such as mass transit or car-sharing programs, according to a study by the U.S. Public Research Interest Group, or PIRG.

This report says that "the time has come for America to hit the reset button on transportation policy – replacing the policy infrastructure of the driving boom years with a more efficient, flexible and nimble system that is better able to meet the transportation needs of the 21st century."

'Millennials' (those born between 1980 and 2000) are having a significant impact on transportation and parking these days because their attitudes toward driving are different than the historical norm. Recent studies of this group's behavior suggest that the "driving boom may be over." After decades of adding more cars to the household fleet while moving further and further out into the suburbs,

The changes are apparent among virtually all demographic groups, but especially so with Millennials. Millennials are showing an increased desire to move back into urban centers where cars are often a hindrance, and they are increasingly receptive to mass transit – a factor that can be seen in a steady growth in ridership on both city bus and rail systems

According to a recent study conducted by the University of Michigan Transportation Institute:

- The percent of 19 year olds who held a driver's license decreased from 87% in 1983 to 75% by 2010.
- The percent of 18 year olds who held a driver's license decreased from 80% in 1983 to 75% by 2010.
- The percent of 17 year olds who held a driver's license decreased from 69% in 1983 to 46% by 2010.

According to an article reported at www.Businessweek.Bloomberg.com, in a recent study university students rated the following as "most important."

Friends	52%
Studying	29%
Mobile Phones	**24%**
Games	**13%**
Facebook	**11%**
Sex	9%

One conclusion is that as automobile mobility is being redefined, and electronic communications are reducing the need for face to face personal interaction, the necessity of driving is declining within the populations that form the majority of the University population. The obvious risk to the UIUC parking system is that fewer drivers will result in fewer parking, which could have a negative impact on future parking utilization and revenue.

PARKING PERMIT SALES ARE DOWN 23 PERCENT AT GRAND VALLEY STATE UNIVERSITY AS MORE STUDENTS USE PUBLIC TRANSPORTATION

By Brian McVicar | bmcvicar@mlive.com

> ALLENDALE, MI - Fewer Grand Valley State University students are purchasing campus parking permits, and instead are opting to hitch a ride to class by bus. The trend was evident last month when university administrators told the board of trustees that fewer permits were sold during the 2012-13 school year than expected, leaving the school's parking budget short $105,727.
>
> And it's not necessarily a loss the university is disappointed to see. Mark Rambo, manager of operations at GVSU's Pew Campus in downtown Grand Rapids, said increased use of public transportation is good for the environment, saves students money and reduces traffic congestion on the school's Allendale campus. It lessens the parking demand on the university and the neighboring communities, especially," Rambo said on Thursday.
>
> Data for the last several years show parking permit sales have fell steadily since the 2005-06 academic year, despite growing enrollment. For example, 9,725 permits were sold during the 2012-13 school year, according to the university. That's down 23 percent from the 2005-06 school year, when 12,648 passes were sold. At the same time, the number of times GVSU students used public transportation grew.
>
> The university's bus system provided 2.8 million rides for students during the 2011-12 school year, up from 1.2 million in 2005-06, according to the school. Rambo also said fewer students may be opting to purchase parking permits because it saves money. An annual permit costs $340 -- up from $300 several years ago. Revenue from permit sales is used to maintain parking lots and debt service.
>
> "I also believe it's generational," he said. "Digital natives hold a preference for public transportation because it allows them to stay connected during the 20 minute trip from GVSU to Allendale." He added: "Texting and riding is legal."

The trend for traffic on the UIUC campus has moderated in recent years as evidenced by growth in the local transit ridership. The source of risk for UIUC is that increased use of bus transit has the potential to reduce vehicle trips and resulting parking demand. Even a modest reduction in vehicle ownership could result in a reduction in parking space utilization and parking revenue generation. The future effect of this shift in transit mode cannot be determined at this time but transit use can be anticipated to increase.

MOOCS REDUCE THE NEED FOR A PHYSICAL PRESENCE ON CAMPUS

Summary of an article published at Big Think Edge, by Scott McLeod, on January 28, 2013; based in turn on ***The Inevitable Coming Impact of Online Education on State Universities and Rational Response to What is Coming,*** *Stephen B. Vardeman and Max D. Morris*

The recent appearance and publicity of "massively open online courses" (MOOCs) is a revolutionary development in higher education and an emerging source of risk for campus transportation and parking. The free-for-anyone web-based courses offered by professors at select universities, and produced by Coursera, EdEX, and Udacity, were initially offered without traditional college credit. But this is already changing. Participating universities are already offering credit for courses delivered through these outlets at prices (split between the university and the MOOC provider) well below standard tuition levels. Georgia Tech recently announced plans to offer a master's degree program in Computer Science through Udacity for $7,000.

It seems clear that in relatively short order, there will be MOOC versions of many of the large-enrollment freshman- and sophomore-level courses taught at most major universities, and that students may be able to acquire transferable credits for these courses at the accredited schools for substantially less money than the tuition now charged for similar on-campus courses. In 21st century America, where many new college students reach graduation only by acquiring a mountain of personal debt, this can be regarded as welcome news. But for the nation's educational institutions, the changes (which we believe will unfold very quickly) will present massive challenges. The fate of some state universities is that more and more of their future graduates will be taking fewer courses at their physical campus.

Consequences may evolve more quickly than most people expect. Tuition income may drop. It will be increasingly hard to maintain the faculty and physical plants of most state universities. In the worst case, measures may be necessary to reduce faculty head counts; and fewer university assets may no longer be needed to physically educate as many on-campus students. Large-enrollment service courses will be under pressure to justify their budgets.

There are choices that can be made. These may include:

- Hiring freezes.

- Changed building plans. In place of big lecture halls, testing centers could be built. Physical inefficiencies should be addressed, and the overall strategy of physical plant development should be reoriented toward the idea that less, rather than more, facilities will be needed.
- Some institutions may be able to shift from "education" to "research."
- Offering the kind of assistance that can only be provided personally (e.g. tutoring), and testing/providing credit for what is learned from externally provided course material. It is likely that courses that contain hands-on experience in laboratory facilities (e.g. chemistry), require one-on-one interaction (e.g. music), or rely on group experiences (e.g. engineering design) will be difficult to adapt to the MOOC model.
- All units, both administrative and academic, need to immediately focus on efficiency and activities that deliver unique value to the institution and students.

The advent of large-enrollment, on-line college courses will change the manner in which education is delivered. The options required to balance educational supply and demand have significant implications and risks for transportation and parking.

Figure 37: Georgia Tech Offering

The Indianapolis Star Indianapolis Star 05/16/2013 A: Main (2-inibrd_star_05-16-2013_b_a_007.pdf.0) Page A07

Georgia Tech offers online master's

Students can take $7,000 computer science program

By Justin Pope
Associated Press

The blurring between traditional universities and the new "Massive Open Online Courses," or MOOCs, has reached new levels with Georgia Tech announcing it will offer what it termed as a first-of-its-kind computer science degree entirely over an open online platform.

Georgia Tech will charge about $7,000 for the master's program, even though the courses that lead to the degree are available to anyone for free through Udacity, a MOOC platform currently offering 26 courses taught by partners including Georgia Tech.

But while students can take MOOCs for free, only accredited universities like Georgia Tech can award credit and degrees for such coursework. Georgia Tech is betting students will happily pay $7,000 for such a credential, given that the cost of the on-campus experience, or even the online degree it currently offers, runs about three times higher than that for Georgia students, and almost 10 times higher for out-of-state and international students.

Leading colleges have offered their coursework through MOOCs, but so far, virtually all of Georgia Tech's caliber have been reluctant to award credit, out of concern over standards, the credibility of assessments and potentially diluting the value of degrees they award through more traditional means.

Notably, the university said it hoped to admit anyone who meets its admissions requirement, which it emphasized remain stringent.

It estimated it could eventually enroll 10,000 students in the program, in a field facing a shortage of workers.

That's nearly half the size of the whole student body on Georgia Tech's Atlanta campus.

"We're turning down people that are probably capable. We just can't handle them," said Rafael Bras, Georgia Tech's provost and executive vice president for academic affairs, who said current demand for the program outstrips supply by 10 to 1.

The question is whether the university really can maintain quality on that scale.

Benjamin Flowers, an architecture professor who is chairman of the graduate curriculum committee, said faculty had expressed concern.

"One of the key attributes of educational distinction has always been that you control the number of people that have degrees from your institution," Flowers said.

Distance learning is a source of risk for UIUC as the trend reduces the need for some trips to campus. A reduction in vehicle trips could result in a reduction in permit demand and an increase in short-term/transient parking demand.

VEHICLE SHARING AND DRIVERLESS VEHICLES MAY REDUCE PARKING DEMAND

There is significant buzz in transportation circles that car manufacturers are doing dramatic things with "telematics." The following vehicle functions are currently being promoted.

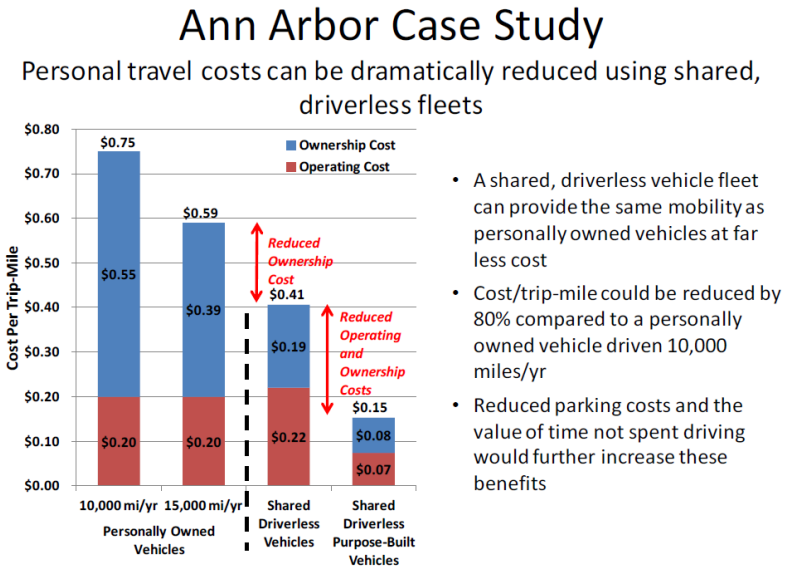
- Parallel parking
- Synchronous cruise control
- Crash avoidance
- Lane departure warning
- Blind spot detection that alerts drivers to cars

Ford expects to sell "traffic jam assist" "self-driving" vehicles by 2017 using current technologies capable of facilitating platoon-driving on freeways on limited access freeways and well-marked lanes. Ford's CEO predicts fully driverless autonomous cars by 2025.

Autonomous vehicles could contribute to a significant redefinition in vehicle ownership and expand opportunities for vehicle sharing (imagine Zipcar on steroids). Autonomous vehicles may provide better mobility for lower cost than owning a car. If vehicles can drive themselves, they can be summoned when needed and returned to other duty when the trip is over. Thus, travelers would no longer need to own their own vehicles and could instead purchase mobility services on demand. Through a subscription service, 100 private vehicles that require parking can be replaced by 15 shared cars that park only infrequently.

The reason autonomous vehicles could be a major game changer is that it is cost effective.

Figure 38: Case Study



Source: Transforming Personal Mobility, the Earth Institute, Columbia University, January 27, 2013

Even when vehicle usage is at its peak, near 5:00 p.m. in most U.S. cities, fewer than 12 percent of all personal vehicles are on the road, which means that 88 percent are not in use. (Not all of those vehicles would be available for sharing at any given time; the composition of the 12 percent changes as trips begin and end, and vehicles would need time to travel from the end of one trip to the beginning of the next.) Self-driving vehicles could be used more efficiently throughout the day instead of being parked most of the day and night.

At the same time, the ratio of vehicles per person would inevitably decline. Vehicle sharing could keep vehicles in more constant use, serving more people and reducing demand for parking infrastructure.

The source of risk for UIUC is that the anticipated development of vehicle sharing of driverless vehicles has the potential to reduce campus parking demand. Even a modest reduction in vehicle ownership could result in a reduction in parking space utilization and parking revenue generation. The impact of this innovation cannot be determined at this time and driverless vehicles are not yet fully developed nor marketable at this time.

APPENDIX B: THE ADJOINING MUNICIPAL MARKET

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The City of Champaign, The University of Illinois, and The City of Urbana all offer on and off-street parking and issue citations around the Campus area depending on area boundaries.

CITY OF CHAMPAIGN UNIVERSITY DISTRICT

Champaign municipal parking is managed by the Public Works Department, 702 Edgebrook Drive, Champaign, IL. The city offers metered and Academic Year, Summer, and Short-Term/Temporary parking permits within the University District.

Metered Parking – Metered parking is available on-street within the University District in both the commercial and residential areas. Color coded meter labels help you determine where to park depending on your length of stay:

- Red = 30 minutes or less
- Blue = 2-hour maximum
- Orange = 3 or 4-hour maximum
- Green = 10-hour maximum

Meter Rates – Meter parking is $0.75 per hour or $1.00 per hour at meters displaying a blue label affixed to the post. The maximum time limit for metered parking in the commercial area is two hours. Ten-hour meters are available in the residential area on every block that contains on-street permit parking spaces at a rate of $0.75 per hour. There are also 10-hour meters located in the residential area. These meters are identified by the Green meter label affixed to the post.

Payment is required Monday – Saturday, 7:00 a.m. to 9:00 p.m. Coins and CashKey (cashless way to pay at a meter) are accepted. CashKeys can be used at any City of Champaign, University of Illinois, or City of Urbana meter as long as value has been purchased for that particular meter provider.

Parking is free all day on Sundays, and on ten City Holidays from 9:00 p.m. to 3:00 a.m. (New Year's Day, Dr. Martin Luther King, Jr Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the day after Thanksgiving, Christmas Eve and Christmas Day). Parking is not allowed at on-street metered spaces or in City hourly parking lots overnight for street and lot cleaning.

Academic Year Permit – Area residency is required to purchase a 2015-2016 Academic Year Permit on-street in Areas 1 or 2. A parker must show proof of residency in the University District Area with a lease for the school year prior to Labor Day. Permits are sold for the entire academic year and payment in full is required at the time of purchase. Champaign does not offer fall or spring semester only permits; however, permits may be returned for a refund of the unused portion minus a 10% administrative fee. Permits cannot be returned within 30 days of expiration.

Permit fees per academic year are:

- Area 1 (Green) $540
- Area 2 (Red) $675
- Area 3 (Yellow) $360
- Area 4 (Blue) $495

Summer Permit – Summer 2015 parking permits went on sale in May 2015. Summer Permits have NO residency requirement. All on-street and parking lot spaces are available on a first-come, first-served basis. Summer permits are $105 for any location.

Short Term/Temporary Permits – Short term/temporary permits allow parking at designated 10 hour meters located in the residential area of the University District. Permit holders are exempt from the "no parking 3 a.m. to 5 a.m. restriction." Short Term/Temporary permits are available at the following rates:

- 1 to 4-day permit is $7.50 per day (10-hour meter in residential permit area).
- 5 to 30-day permit is $35.00 (permit parking for 5-30 days is only available in the Boneyard Parking area between First Street and Second Street or Parking Lot S, near Third and Stoughton).

The City of Champaign does not offer any covered parking in the University District. However, JSM Management operates the Campus Center Public Parking Deck at 509 E Healey Street. Hourly parking is available at the following rates:

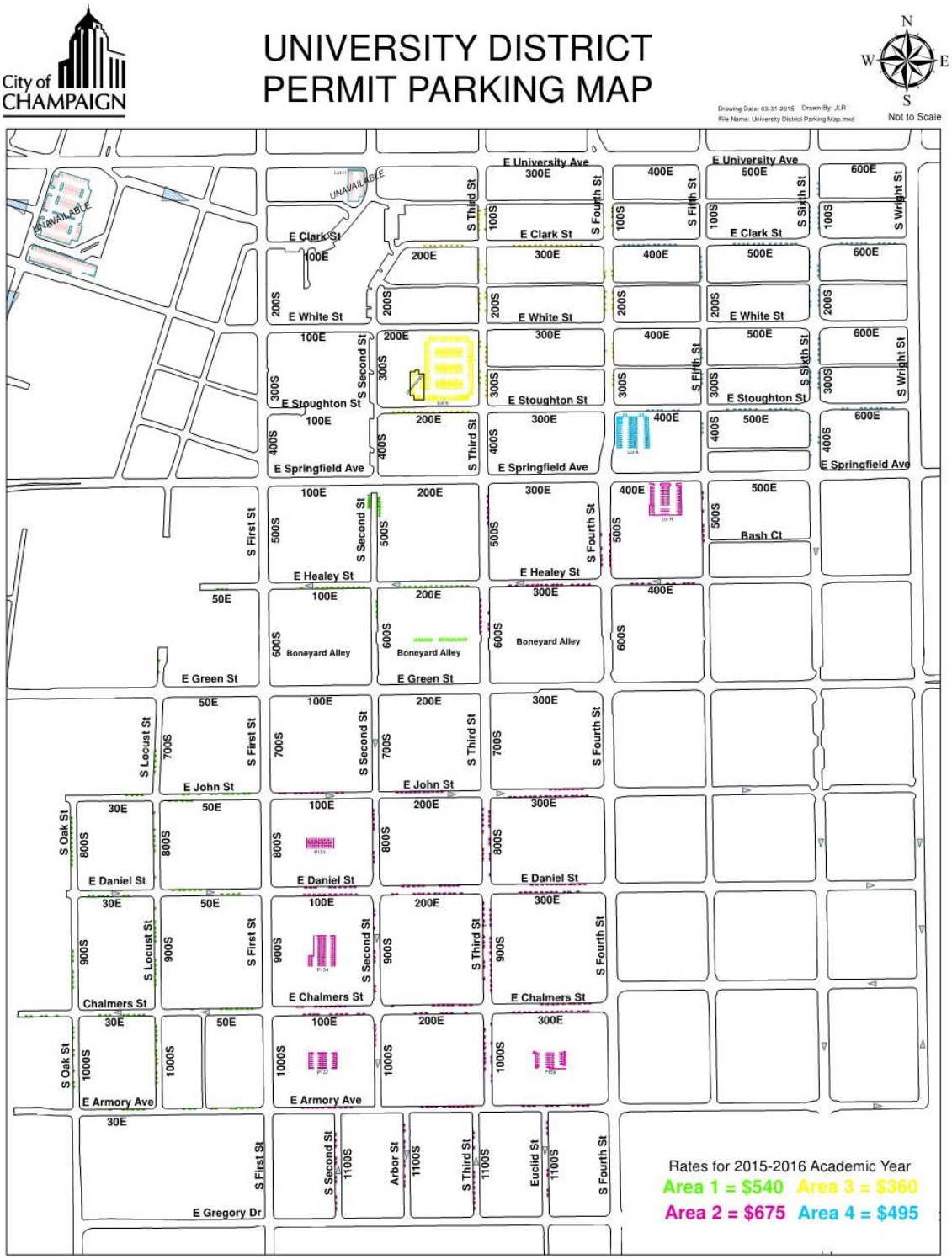
- 1 – 7 hours @ $1.00 per hour
- 8 – 12 hours @ $8.00 flat rate
- 12 – 24 hours @ $10.00 flat rate

The City will place covers on parking meters for the purpose of temporarily reserving these spaces as a convenience during periods of unusual loading/unloading activities, repairs, remodeling and other activities. The Meter Bag Application and the rental fee is $10 per day per meter head.

Car sharing is an option for people who live or work in the University District. In January 2009, Zipcar introduced a car-sharing program to Champaign-Urbana. Car sharing is a way for people to rent cars by the hour or by the day and avoid the hassles or cost associated with car ownership. Members have access to any of the Zipcars in Champaign, Urbana or on the University of Illinois campus. Reservations can be made online for as little as one hour up to three days. The $8.00 hourly fee includes gas, maintenance and insurance.

The Champaign University District map is reproduced on the following page.

Figure 39: City of Champaign University District Permit Parking Rate Map



Source: City of Champaign

RECENT CHAMPAIGN RESIDENTIAL ZONING CHANGES

Bruce Knight, planning and development director for the city of Champaign, submitted a report to the Plan Commission dated July 1, 2015, regarding an evaluation of requirements for parking and open space ratio in the University District. This report explored text amendment to eliminate parking and open space requirements for multifamily dwellings within the University District.

This report advanced justifications for eliminating parking requirements within the University District based on negative impacts on building design, sustainability, excess public and private capacity, and developers' ability to respond if demand surges. The elimination of open space requirements was based on assumptions that they generally do not produce high quality usable open space, restrict developers' flexibility to meet tenants needs, and reduce building density. Revising these regulations would allow projects currently under design to progress in the current development cycle.

City planners contend that the outdated parking requirement for residential buildings actually creates an "induced demand" for cars on campus because the large, unnecessary supply of spaces makes it cheaper and easier for students to keep their vehicles close.

As reported by the News-Gazette on August 21, 2015, local architect Tim Kirkby, with Myefski Architects, testified to the Planning Commission that the average rent is likely increased by the old parking requirement because the cost to install parking was transferred to tenants. Kirkby gave an example of how the parking and open space requirements would increase rent by as much as $190 a month in one proposed building, but such an apartment building development would not have been allowed because of the burden of Champaign's parking and open space requirements. City planners proposed that changes in the ordinance will make it cheaper for students to live on campus. According to the city, increasingly fewer students are keeping their cars on campus. City permit lots that had waiting lists 10 years ago are now 60 percent or 70 percent full, despite lowered prices, and apartment buildings that once had to limit the number of cars have empty lots.

As reported by the News-Gazette, UIUC officials stated that the campus master parking planning effort is impacted by city zoning, and requested Champaign delay the ordinance to help work with UI on the current master plan effort and requested more time to meet with city officials to discuss alternatives. Bruce Knight said the university has largely ignored city zoning when constructing its buildings in the past.

Champaign chose to "fix" the problem by approving an amendment to the zoning ordinance that removed the requirement that residential buildings in the University District provide parking

and open space. The zoning ordinance amendment removing parking and open space requirements within the University District was passed by the Plan Commission on October 21, 2015. The City Council finalized the decision on September 1, 2015. On-campus apartment buildings will no longer be required to provide parking, which the Champaign City Council hopes will discourage students from bringing cars to the University of Illinois.

UIUC and Champaign officials agree that reducing the environmental impact of cars on campus and within the University District is desirable. However, UIUC is concerned that the recent removal of the parking and open space requirements within the district will shift the burden from developers to university parking facilities, and will impact the university in a variety of ways, including but not limited to the following.

- As residential building parking requirements have been eliminated, there may be a greater parking demand for university facilities. Such a change will shift the cost and management burden of providing parking from developers to the university, and will generate a property tax windfall for the city.
- Reduced zoning and open space requirements will not accrue to student tenants, but instead have increased land values and will increase taxes for properties in the University District, thereby increasing the overall cost of new residential projects. The net gain would tend to accrue to the development site landowners, not tenants.
- The university designed its parking infrastructure based on the zoning parking regulations, and changes impact that planning. If, as the City planning and development experts contend, fewer cars are brought to campus, the resulting under-utilization of expanded university infrastructure will increase parking costs for the entire university community of students, employees, and neighbors.
- Eliminating these requirements have put a number of properties "in play" as landowners with cash flow problems seek development deals. This could include local non-profits and several fraternity/sorority houses with occupancy problems.
- The elimination of parking and open space requirements encourages the construction of taller buildings with fewer amenities. The city contends that the change to remove ground floor parking would encourage more ground-floor apartments, but it also opens opportunities for large multi-story buildings with, for example, the first one or two floors for retail, multiple levels for hotel or offices, the next 10 to 15 floors for student apartments, and perhaps a restaurant on the top floor, all with no residential parking or open space requirements.
- Ultimately, the free market will determine whether or not students bring cars to campus. If new apartment residents continue to bring vehicles anyway, the lack of parking will force the University to become the parking supplier of last resort, which effectively puts the burden of supplying all new parking within the University District directly on the University.

Simultaneous with the zoning amendment approval, the six-story, 63-unit Suites at Third, a new apartment complex in Campustown, was approved by City Council. The building developers contend that the lack of vehicle parking spaces will be replaced with planned spaces for bicycles (not required by Champaign), which is in line with what the city hopes the new ordinance will accomplish.

Property owners that might be motivated to seek development offers for their property in the area of Champaign closest to campus include a variety of fraternities and sororities. If these parcels are redeveloped without onsite parking, the potential exists for the vehicles occupying these spaces to be pushed onto the university parking system.

Recently, Champaign city officials proposed an additional zoning change meant to encourage more development on Green Street in Campustown. The recent construction of tall buildings and the new street and sidewalk design along Green Street favors walking and biking over driving. To accomplish an extension of new development similar to the existing improvements on the blocks to the east, city planners seek to create a zoning overlay on Green Street extending from 3rd Street west to the railroad tracks. The zoning change would allow for taller buildings, require them to be placed closer to the sidewalk without parking in the front, and reduce commercial parking requirements.

CITY OF URBANA PARKING ENFORCEMENT

Urbana offers metered parking within proximity to the campus. The city's downtown off-street parking is not included in this discussion as it is not convenient to the campus. Urbana municipal parking is managed by the City of Urbana Finance Departmentt, 400 S. Vine Street, Urbana, IL.

Mission Statement:
We pledge to serve our citizens by enforcing the law, promoting neighborhood harmony, and responding to residents' needs. We pledge to help create a safer environment by promoting voluntary compliance with parking ordinances. We pledge to continually strive for excellence in the performance of our duties.

We believe City of Urbana employees should be customer-focused in their interactions with citizens; that enforcement can be effective by reasonably supplementing written tickets with warnings, when appropriate; and that our greatest obligation to all citizens lies in performing our duty impartially and with integrity.

We believe in and support the laws of the State of Illinois, as well as the ordinances of the City of Urbana.

Major Activities of Parking Enforcement:

- Enforce prohibited and restricted parking regulations
- Enforce nuisance vehicle regulations
- Follow-up on citizen complaints in regards to parking regulations

Metered Parking – Metered parking is available on-street within the University area. Except for official City holidays, meters located in the campus and hospital areas are enforced Monday through Saturday from 7:00 a.m. to 6:00 p.m. There are never "free" unmetered parking spaces in areas where meters are located. If a space does not have a meter or a post with no meter, it is not a valid parking space and parking in the space is illegal and could result in a ticket.

Each meter displays the hours of enforcement inside the dome of the meter. To aid in the determination of which meter belongs to a space, double-headed meters have an arrow on the meter that points toward the corresponding parking space. For single spaces the meter is located at the front of the space. Parking meters are not enforced on ten official City holidays.

Meters in the campus area are color-coded by length of time available on the meter.

Red is 30 minutes or less,
Blue is 2 hours, and

Gray is 10 hours.

Short-term meters (15 or 30 minutes) are installed in certain high-traffic areas, such as the U.S. Post Office and in front of coffee shops and bakeries.

Meter Rate – Meters in the area have a rate of $1.00 an hour.

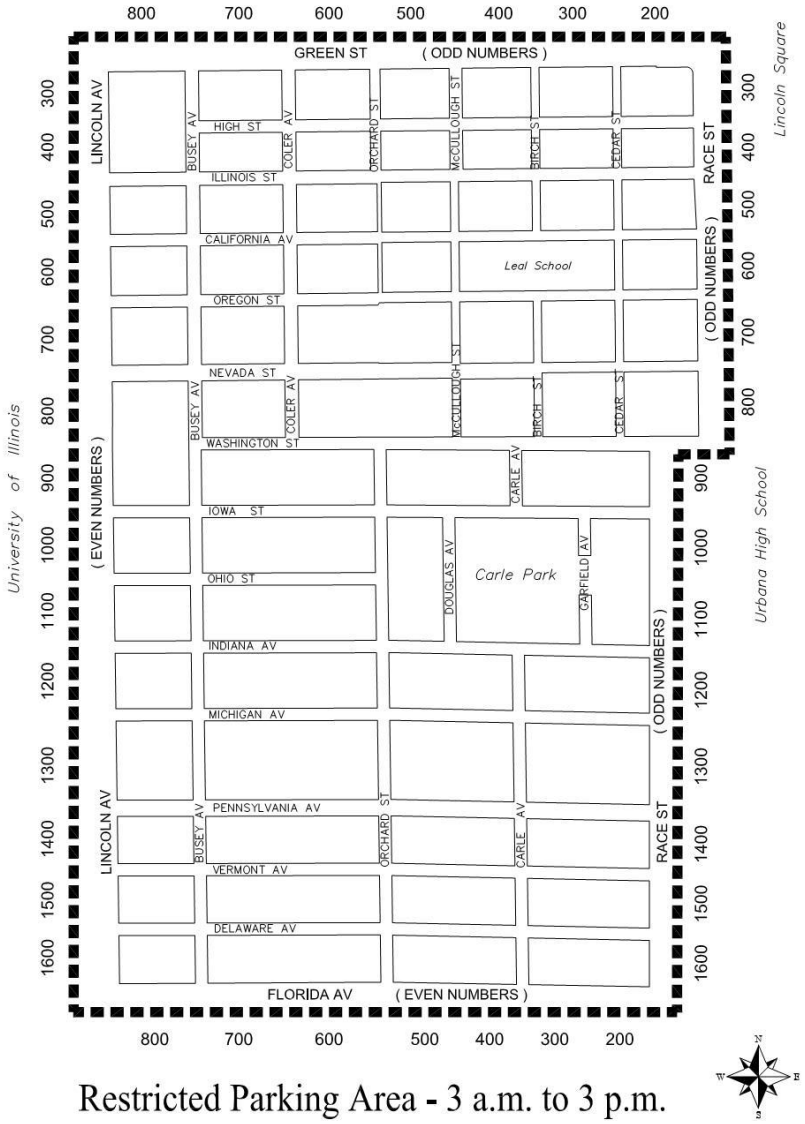
Meter Bagging – Meters covered with a "bag" are marked restricted parking and are not available for general public parking. Unauthorized vehicles in bagged meter spaces are ticketed and towed. Reserving a metered space near campus costs $22.00 per meter for the first day and $17.00 per meter for each additional day. Meters bagged through a weekend are charged for Saturday. Specific Sunday rentals are also charged for Saturday. **Advanced payment is required.**

Campus and Hospital District Multiple Ticket Policy – One ticket in the period 12:00 AM to noon and one ticket in the period 12:01 PM to midnight, with a minimum of two hours between the time of the first ticket and the second ticket.
Any vehicle with five (5) or more unpaid parking violations thirty (30) days or older will be subject to vehicle immobilization, also referred to as "booting." A vehicle with ten or more unpaid parking fines sixty days or older is subject to impoundment. Any vehicle not displaying current registration tags, parked over 72 hours on the street, flat tires, etc., is considered abandoned and/or inoperable, and is subject to ticketing and/or towing.

West Urbana Neighborhood Residential Parking Zone – The zone was established by city ordinance in 1975 to deter commuter parking on residential streets near the University of Illinois campus. Restricting parking helps residents who have difficulty parking near their own residences in areas where off-street parking is not adequate. Parking in the zone is restricted to residents, or their guests, between the hours of 3:00 am and 3:00 pm, Monday through Friday. Restrictions do not apply on Saturday and Sunday. The annual parking permit year is August 1st of the current year to August 14th of the following year.

The zone is bounded by Green Street, Race Street, Florida Avenue and Lincoln Avenue and a resident must live within those boundaries to apply for permits. A map of the zone is reproduced on the following page.

Figure 40: West Urbana Neighborhood Residential Parking Zone



Source: Urbana Parking Operations

APPENDIX C: C7 AND C10 REPLACEMENT STRATEGY

WALKER
PARKING CONSULTANTS

The C7 and C10 Replacement Strategy comes directly from the preceding analysis, preferences revealed by the online survey, and the following considerations.

1) Absent substantial rehabilitation, C7 and C10 are nearing the end of their service life.
2) There will be a loss of 654 parking stalls in the near future.
3) There is a need for 674 spaces within Zone C with ten-year growth projections.
4) The solution most desired by most parkers is the replacement of the C7 and C10 parking supply in close proximity to their current locations.
5) This solution is based on Task #1 Results, and confirmed by parking survey results and stakeholder input.
6) Walking distance studies confirm the current and future level of service.
7) Economic considerations may make the full replacement of the entire displaced parking supply problematic.

The goal would be to "Right Size" the C7 and C10 solution.

Walking Distance Studies—C7 and C10

The walking distance study conducted in spring 2015 by Walker demonstrate that most of the existing parkers at the C7 and C10 structures work within Level of Service D walking circles.

Figure 41: Walking Distance Level of Service Chart

Generally Accepted Walking Distances and Times				
Level of Service	**A**	**B**	**C**	**D**
Outdoor Uncovered (Feet)	400	800	1,200	1,600
Travel Time (Minutes)[1]	1.5	3.0	4.5	6.0

The current walking distances studies of parkers at the C7 and C10 parking structures is shown in the following exhibits.

Figure 42: C7 Walking Level of Service Study—Distance Between Parking and Campus Address

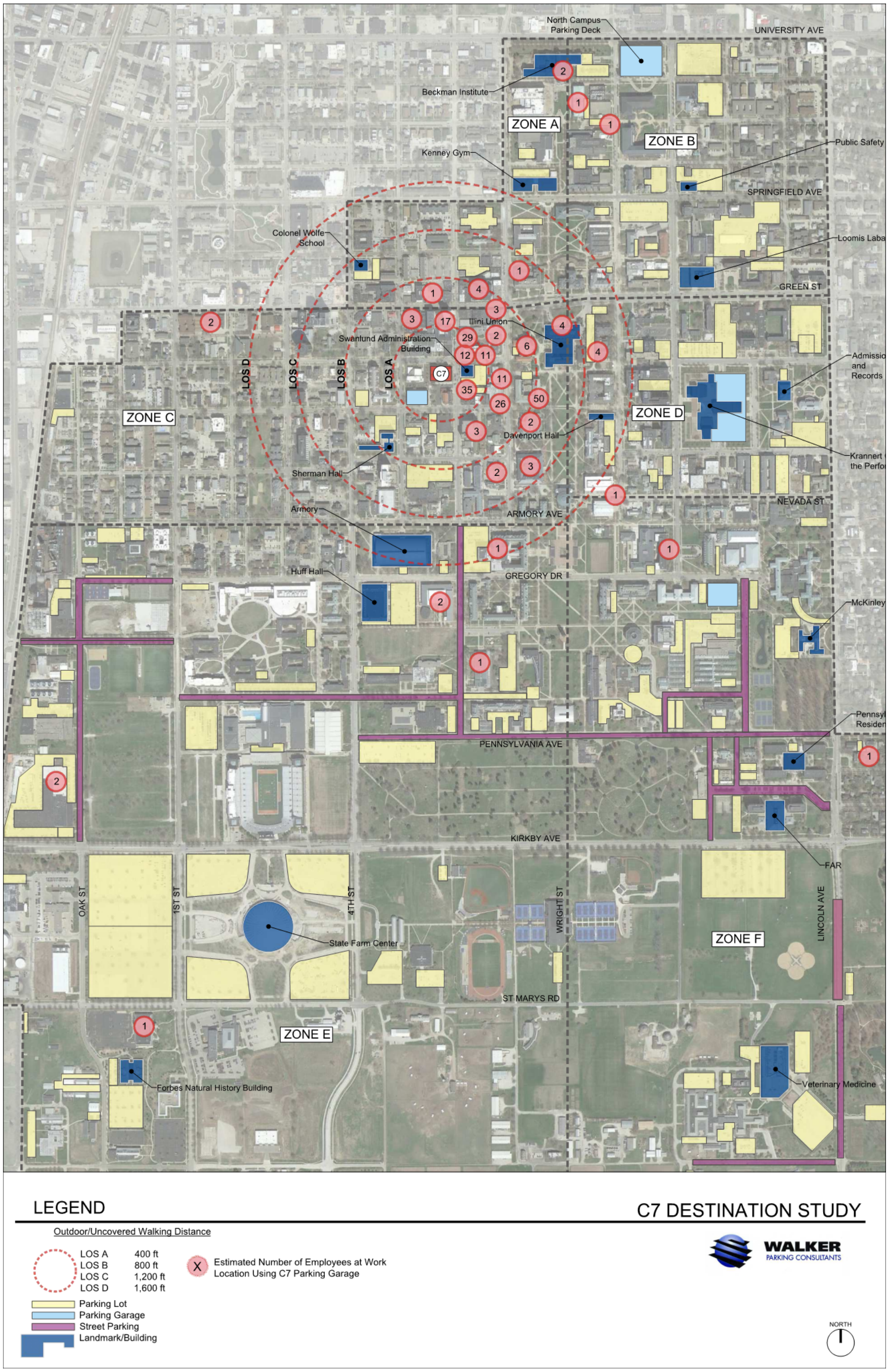


Figure 43: C10 Walking Level of Service Study—Distance Between Parking and Campus Address

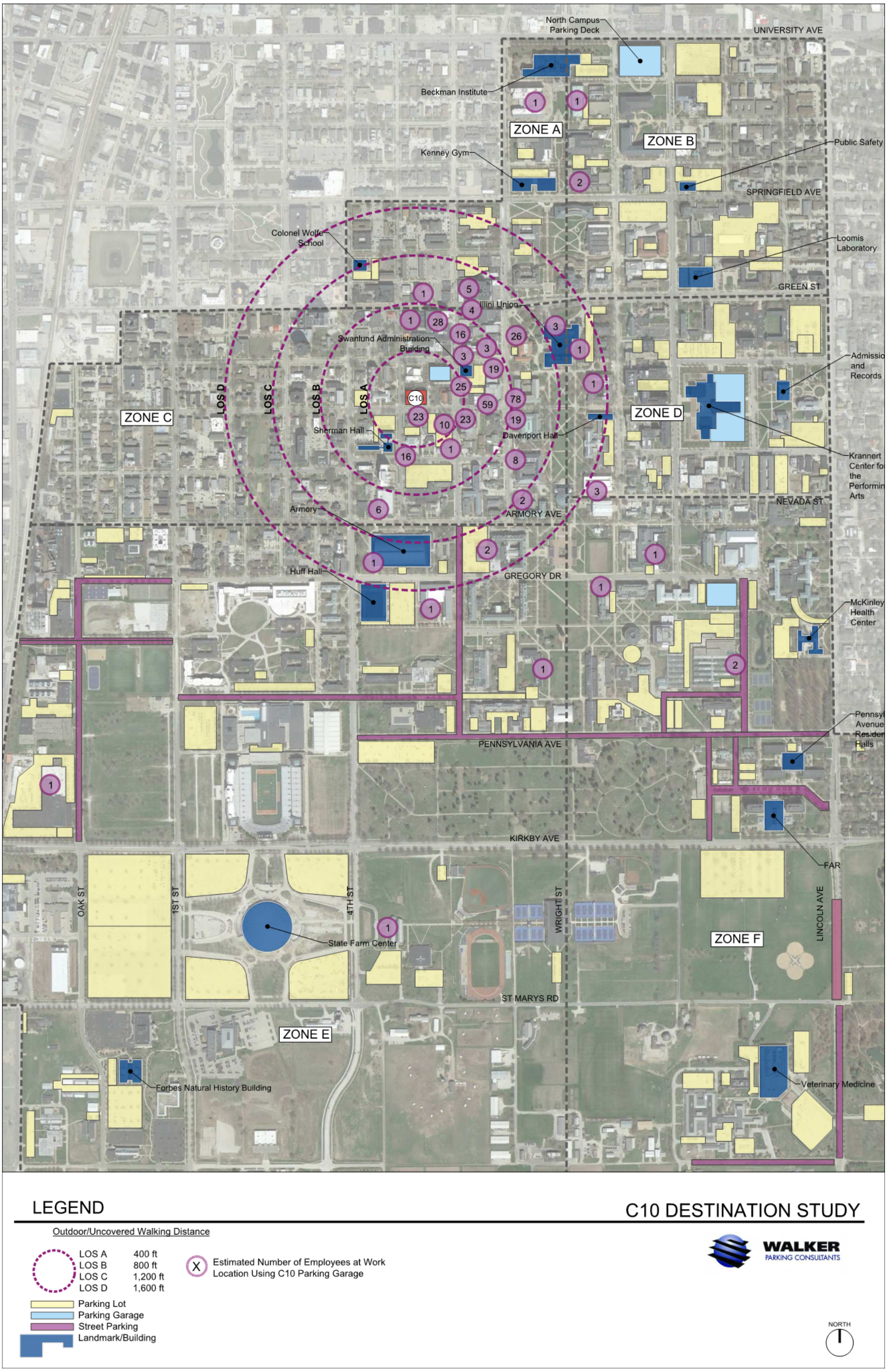


Figure 44: C9 Walking Level of Service Study—Distance Between Parking and Campus Address for Current C7 and C10 Parkers

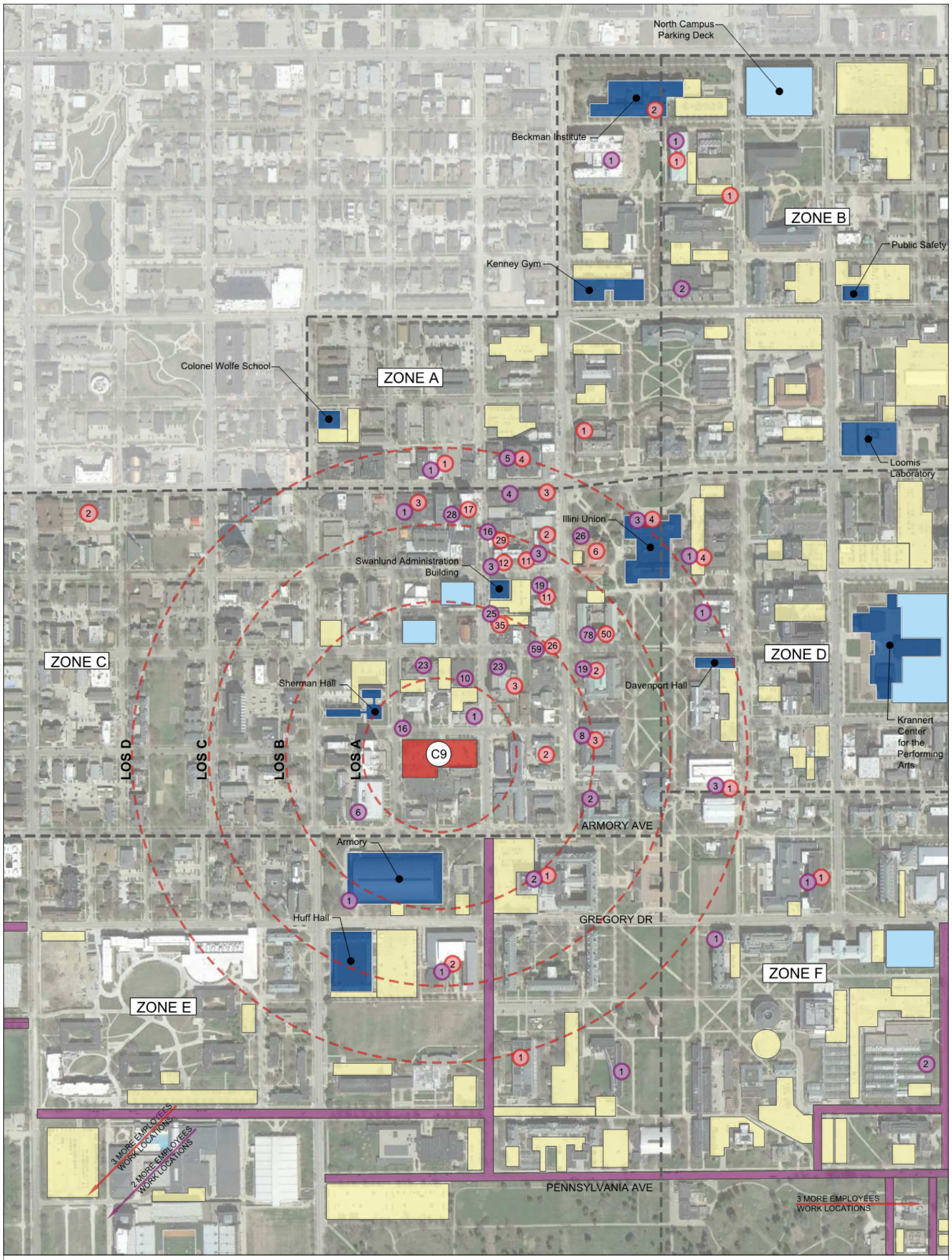


Figure 45: Walking Distance Summary

C7 User Walking Distance LOS			
Level of Service (LOS)	Walking Time	# Users	%
LOS A	1.5 Minutes	76	31%
LOS B	3.0 Minutes	139	57%
LOS C	4.5 Minutes	14	6%
LOS D	6.0 Minutes	2	1%
> LOS D	> 6 Minutes	14	6%
Total		245	100%

C7 Users Relocated to C9 Walking Distance LOS			
Level of Service (LOS)	Walking Time	# Users	%
LOS A	1.5 Minutes	0	0%
LOS B	3.0 Minutes	5	2%
LOS C	4.5 Minutes	182	74%
LOS D	6.0 Minutes	46	19%
> LOS D	> 6 Minutes	12	5%
Total		245	100%

C10 User Walking Disrtance LOS			
Level of Service (LOS)	Walking Time	# Users	%
LOS A	1.5 Minutes	58	15%
LOS B	3.0 Minutes	173	43%
LOS C	4.5 Minutes	146	37%
LOS D	6.0 Minutes	10	3%
> LOS D	> 6 Minutes	13	3%
Total		400	100%

C10 Users Relocated to C9 Walking Distance LOS			
Level of Service (LOS)	Walking Time	# Users	%
LOS A	1.5 Minutes	56	14%
LOS B	3.0 Minutes	118	30%
LOS C	4.5 Minutes	141	35%
LOS D	6.0 Minutes	73	18%
> LOS D	> 6 Minutes	12	3%
Total		400	100%

C7 & C10 User Combined Analysis			
Level of Service (LOS)	Walking Time	# Users	%
LOS A	1.5 Minutes	134	21%
LOS B	3.0 Minutes	312	48%
LOS C	4.5 Minutes	160	25%
LOS D	6.0 Minutes	12	2%
> LOS D	> 6 Minutes	27	4%
Total		645	100%

C7 & C10 Users Relocated to C9 Combined Analysis			
Level of Service (LOS)	Walking Time	# Users	%
LOS A	1.5 Minutes	56	9%
LOS B	3.0 Minutes	123	19%
LOS C	4.5 Minutes	323	50%
LOS D	6.0 Minutes	119	18%
> LOS D	> 6 Minutes	24	4%
Total		645	100%

WALKING DISTANCE COMPARISON CONCLUSIONS:

Today, 94% of C7/C10 users park within a 4 ½ minute walk to their destination.

With all users relocated to C9, 78% park within 4 ½ minute walk to destination.

With all users relocated to C9, 94% within six-minute walk to destination.

Future Walking Distance will be improved with any parking replaced at either the existing C7 or C10 sites.

In order to simplify the choices at this point, the analysis is reduced to three primary options:

1) Full Replacement of the Lost Capacity with Two New Structures on C7 and C10
2) Replacement of C7 and C10 with One C9 Structure and Surface Parking on C7 and C10
3) Replacement of C7 and C10 with Surface Parking and increased reliance on Remote Parking for the unsatisfied demand.

Other options for the replacement of C7/C10 could be developed based on such considerations as:

- Inclusion of mixed uses (such as retail, office, services, restaurant, etc.) within the structure,
- Alternative siting and capacity options at C10 and/or C9,
- Consideration of Lot D1
- Local development possibilities,
- Community expectations. and
- University budget constraints.

These or other options were explored in order to manage the replacement of C7/C10.[2]

Other potential parking structure sites and development options were discovered and discussed in detail with parking master plan committee members. The following options are ranked in subjective order based on space capacity, walking distance, user preferences, opportunities for mixed use, site constraints, pedestrian and traffic conflicts, and cost.

Figure 46: C7/C10 Replacement Structured Parking Options Ranking

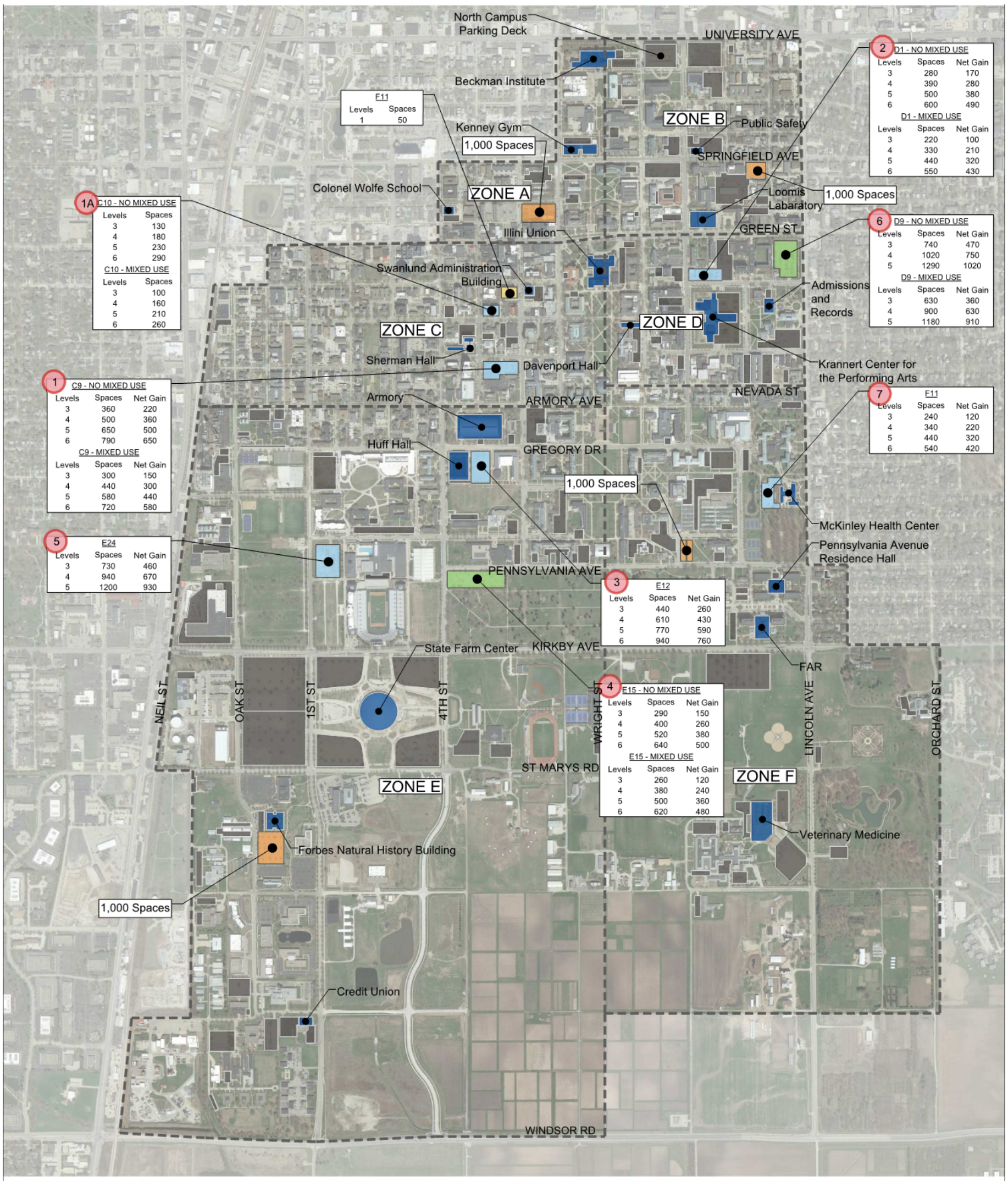
Map #	Location	Net Gain w/o Mixed Use	Net Gain w/ Mixed Use	Notes
1	C9	650	580	#1 Rank
1A	C10	290	260	#2 Rank
2	D1	490	430	#3 Rank
3	E12	760	n/a	Judged not appropriate for mixed use
4	E15	500	480	
5	E24	930	n/a	Judged not appropriate for mixed use
6	D9	1,020	910	
7	F11	420	n/a	Judged not appropriate for mixed use

Note: Each undeveloped parking location noted above should be reserved for future parking structures in the longer range Campus Master Plan.

These options are depicted in the figure on the following page. Each ranked option is described in greater detail, thereafter.

[2] The top three options (1, 1A, and 2) have been renumbered 1, 2, and 3 in the main body of the document.

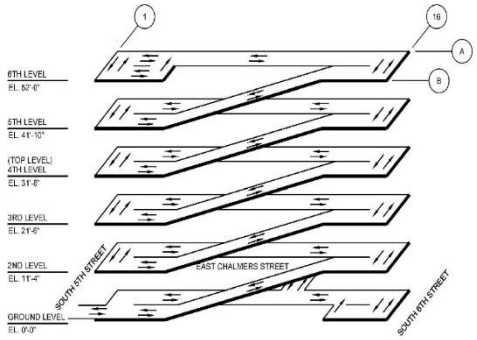
Figure 47: C7/C10 Replacement Structured Parking Options Ranking (and Ten-Year Forecast for Structured Parking)



Source: Walker Parking Consultants

Figure 48: Replacement Option #1 at C9

Replace C7 and C10 with a single parking structure on C9, No Parking on C7 and C10 sites.



Lot C9 Six-Level Isometric

Phase I
- Relocate all C9 users
- Build new C9 parking structure to meet lost C7 and C10 capacity and lot displacement.

Phase II
- Relocate all displaced users to new C9 parking structure

Phase III
- Demolish C7 and C10
- C7 and C10 become program space (green space, developer, University function, etc.)

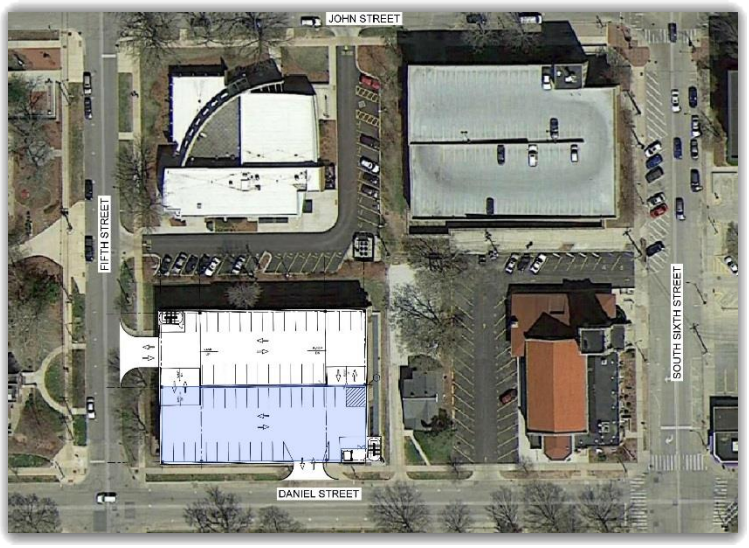
Design Capacity - 790 spaces
Existing C9 Spaces Displaced - 140 spaces
Net New Spaces - 650 spaces

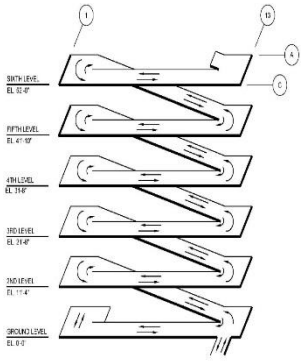
With Mixed-Use Component
Retail Displacement - 70 spaces (at 330 SF/Space = 23,100± SF)
Net New Spaces - 580 spaces

Pros:	Cons
• Single construction site less disruptive and more economical to parking operations.	• LOS Walking distances slightly increased for some C7 and C10 users (2-3 minutes).
• Retains flexibility for future development on C7 and C10.	• Pushes visitor parking further from Green Street/Campustown and Illini Union.
• Provides additional parking proximate to Zone E.	
• Fewer traffic issues.	

Figure 49: Replacement Option #1A at C10

Replace C7 and C10 with a new parking structure on C10





Lot C10 Six-Level Isometric

Phase I
- Relocate C10 users
- Demolish existing C10 parking structure

Phase II
- Build new C10 parking structure

Phase III
- Relocate users back to New C10 parking structure

Phase IV
- Demolish remaining C7

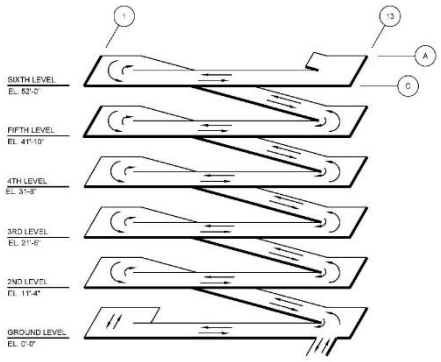
Design Capacity - 290 spaces
Net New Spaces - 290 spaces

With Mixed-Use Component
Retail Displacement - 30 spaces (9,900± SF)
Net New Spaces - 260 spaces

Pros:	Cons
• Single construction site less disruptive and more economical to parking operations.	• Site is relatively inefficient.
• Requires construction of fewer structured parking spaces.	• LOS Walking distances slightly increased for some C7 users.
• Retains flexibility for future development on C7.	• Pushes visitor parking further from Green Street/Campustown and Illini Union.

Figure 50: Replacement Option #2 at D1

Replace C7 and C10 with parking structures on D1



Lot D1 Six-Level Isometric

Phase I
- Relocate D1 users
- Build new D1 parking structure

Phase II
- Relocate C7 and C10 users to New D1 parking structure
- Relocate D1 users back to New D1 parking structure

Phase III
- Demolish C7 and C10

Design Capacity - 600 spaces
Existing D1 Spaces Displaced - 110 spaces
Net New Spaces - 490 spaces

With Mixed-Use Component
Retail Displacement - 60 spaces (21,000± SF)
Net New Spaces - 430 spaces

Pros:	Cons
• Single construction site less disruptive and more economical to parking operations.	• Lower walking distance LOS for existing C7 and C10 users
• Structure at D1 would better serve Illini Union and Zone D demand.	• Pushes visitor parking further from Green Street/Campustown and Illini Union.
• Retains flexibility for future development on C7 and C10.	

Figure 51: Strategy Comparison

Criteria	**Option #1** A single parking structure at C9	**Option #2** A single parking structure at C10	**Option #3** A single parking structure at D1
Disruption to Parking Ops.	Low	Moderate	High
Future Development on C7/C10 Sites	Yes – Both	Yes – C7	Yes – Both
Future Development on C9 Site	Possibly	Yes	Yes
Employee Walking Distance vs. Current	Increased	Similar	Increased
Visitor walking distance to Union and Campustown	Increased	Similar	Reduced
Relative Cost to Implement	Moderate	High	Moderate

Source: Walker Parking Consultants

The C9 option is the preferred alternative.

APPENDIX D: ADA

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PARKING CONSULTANTS

According to ADA Accessibility Guidelines for Buildings and Facilities (ADAAG), accessible spaces complying with the specific requirements of this legislation must be provided in each such parking area in conformance with the figure below.

Figure 52: ADA Accessible Space Requirements

Total Parking in Facility	Required Minimum Number of Accessible Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1,000	2 percent of total
1,001 and over	20 plus 1 for each 100, or fraction thereof, over 1,000

Source: http://www.ada.gov/regs2010/2010ADAStandards/2010ADAstandards.htm#pgfId-1010282

The following specific provisions are relevant to University parking requirements.

ADA 208.2 Minimum Number states "The number of parking spaces required to be accessible is to be calculated separately for each parking facility; the required number is not to be based on the total number of parking spaces provided in all of the parking facilities provided on the site." The term "parking facility" is used instead of the term "parking lot" so that it is clear that both parking lots and parking structures are required to comply with this section.

208.2.4 Van Parking Spaces states that for every six or fraction of six ADA accessible parking spaces, at least one must be a van accessible parking space.

208.3 Location Exceptions states that (1) all van parking spaces are permitted to be grouped on one level within a multi-story parking facility; and (2) ADA accessible parking spaces also are permitted to be located in different parking facilities if substantially equivalent or greater

accessibility is provided in terms of distance from an accessible entrance or entrances, parking fee, and user convenience. Thus, spaces required in the previous figure need not be provided in the particular lot, and may be provided as best needed or requested throughout the combined campus if equivalent or greater accessibility, cost and convenience is ensured. For example, all such spaces may be grouped on one level of a parking structure or in a specific lot, if this best meets the needs of the parkers.

ADA space requirements may be refined further for a number of reasons. For example, the number of spaces used exclusively for buses, trucks, other delivery vehicles, law enforcement vehicles, or vehicular impound might reduce a facility's parking space capacity to the next lower category. The accessible space requirement is higher for some medical uses. Some of these determinations can be very subjective.

Accessibility law is very complicated. The standards for compliance with the law can be low and are sometimes ambiguous, such as the "undue burden" standard, or the Grandfathered approach to employee ADA compliance. Some specific situations may require determination through a judicial review. The University strives to comply with current accessibility guidelines, making facility modifications when issues are brought to their attention.

A specific audit of the accessible parking on campus is not within the scope of this assignment, and therefore, is not included in this report. However, it appears that every effort is made by UIUC to meet or exceed the legally required capacity, and appropriate additional accommodations are made as needed. Based on the 15,602 spaces in the system, the formula indicates that, subject to a lot by lot analysis, approximately 167 ADA spaces would be required if the campus can be considered as a whole, and is exceeded by the 232 ADA parking spaces in the current parking inventory.

It is noted that some lots are not accessible to any U of I building, and thus may not require ADA spaces in the facilities. Some facilities also can't be used for ADA parking do to the grade of the area to get to accessible sidewalks and access ways and the composition (structure type, tar and chip, gravel) of the lot. The Parking Department and F&S work together with ODEA and DRES to accommodate anyone with the need for accessibility that choose to drive to campus.

APPENDIX E: MOTORCYCLE PARKING

WALKER
PARKING CONSULTANTS

Motorcycle parking is only permitted in designated areas displaying a "Motorcycle Parking" sign. Motorcycles may park at metered spaces as long as the meter is paid. Motorcycles, when parking in a campus motorcycle parking area, are required to have a current permit. There are motorcycle facilities throughout campus.

Specific locations are noted on the campus parking map. However, motorcycle spaces were not differentiated in the parking space inventory and occupancy counts conducted by the Parking Department.

Figure 53: Motorcycle Permit

Source: Parking Department

For safety reasons, motorcycle parking is not available in UIUC parking structures. This is the common practice at many parking structures. The safety reasons most commonly cited for excluding motorcycles from parking structures are visibility, and that motorcycles may not trigger loops and gates, which can result in injuries. However, as the sound of most motorcycles announces their presence and the campus parking structures are open and ungated, it is Walker's opinion that these are not fully justifiable reasons to exclude motorcycles from UIUC parking structures.

The motorcycle parking permit is $68 for most customers, but is sold at only $34 for a few specific unions. The Parking Department provided a limited analysis of MC permits sold for FY15 to current (FY16 11-15). As reported, of the approximately 1,096 permits sold, only 88 were for $34. The remaining 1,008 permits (92%) were sold for $68.

Figure 54: Motorcycle Analysis

			Motorcycle / Scooter	
Comparable Schools	Campus	State	Student	Faculty
University of Illinois	**Urbana-Champaign**	**IL**	**$68**	**$68**
University of Alabama at Birmingham	Birmingham	AL	Same as vehicle	Same as vehicle
University of Arkansas	Fayetteville	AR	$57	$57
Auburn University	Auburn	AL	$15	$15
University of Connecticut	Storrs	CT	$20	$20
University of Massachusetts	Amherst	MA	$118	$80
University of Minnesota	Twin Cities	MN	$112	$112
University of New Mexico	Albuquerque	NM	Same as vehicle	Same as vehicle
University of South Florida	Tampa	FL	$62	$62
Texas A&M University	College Station	TX	$88	$88
University of Alabama	Tuscaloosa	AL	$75	$75
Florida State University	Tallahassee	FL	$267	$59
University of Georgia	Athens	GA	$120	$120
Louisiana State University	Baton Rouge	LA	$40	$40
Virginia Polytechnic Inst. & State Univ.	Blacksburg	VA	$115-$143	$124
	Maximum		$267	$124
	Minimum		$15	$15
	Mean		$87	$71
	Median		$72	$68
	Deviation from Median		($4)	$0

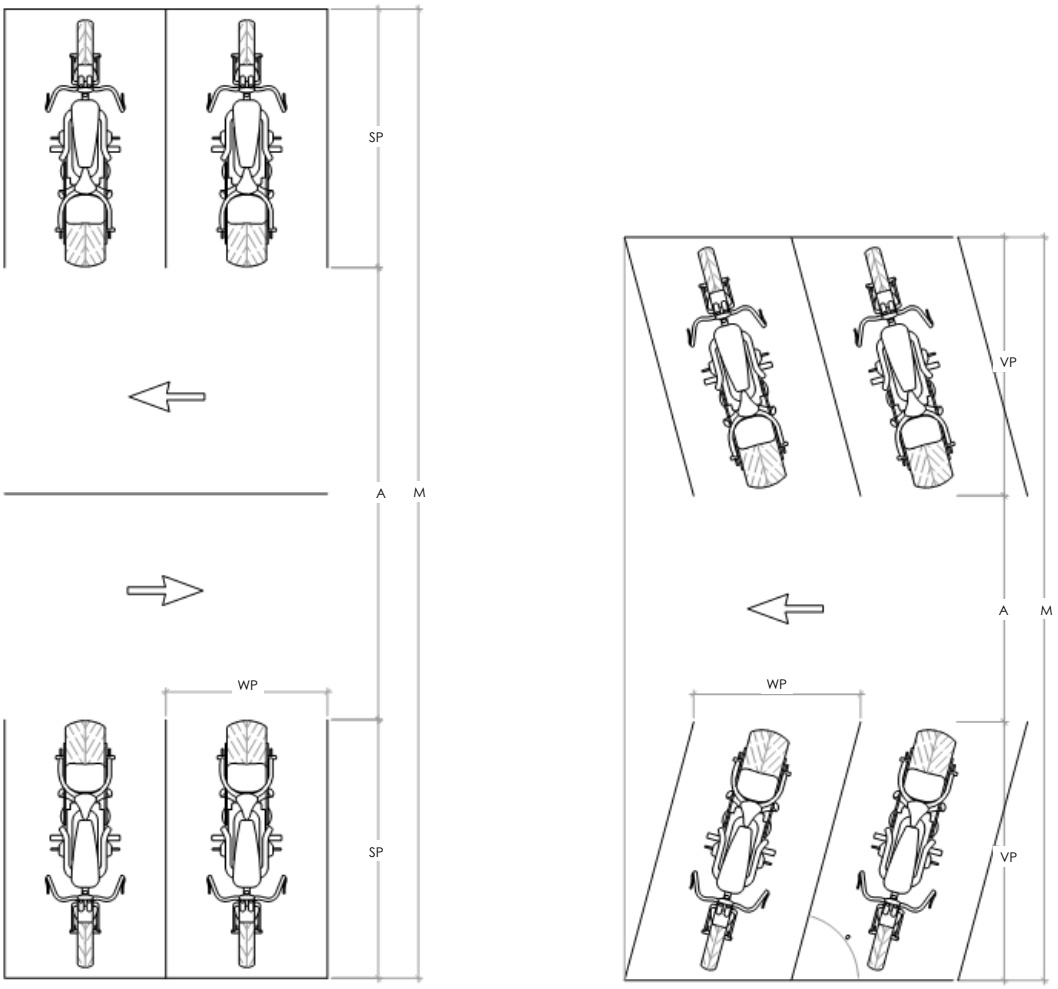
Source: Walker Parking Consultants

As the UIUC Motorcycle permit fee is judged to be affordable and is seen to be reasonably close to the medians of the comparables, an immediate adjustment is not warranted.

Other models are in use at some institutions. As an example, LSU offers the MC permit for no charge if a four-wheel vehicle is registered. In FY2014, the University of Florida registered 4,100± MC permits at the full vehicle permit price. It is noted that as motor scooters and mopeds are surging in popularity, an emerging trend is to price motorcycle permits the same as four-wheeled vehicles.

Walker typically recommends the following common striping schemes and standard dimensions for Motorcycle space plans.

Figure 55: Common Motorcycle Space Plans



Motorcycle					
Angle	WP	SP	VP	A	M
90	5	8	7.9	14.2	30
75	5.16	8	7.75	7.5	23
70	5.25	8	7.5	7	22
65	5.5	8	7.33	6.34	21
60	5.75	8	7.08	5.84	20
55	6	8	6.75	5.5	19
50	6.5	8	6.5	5	18
45	7	8	6	5	17

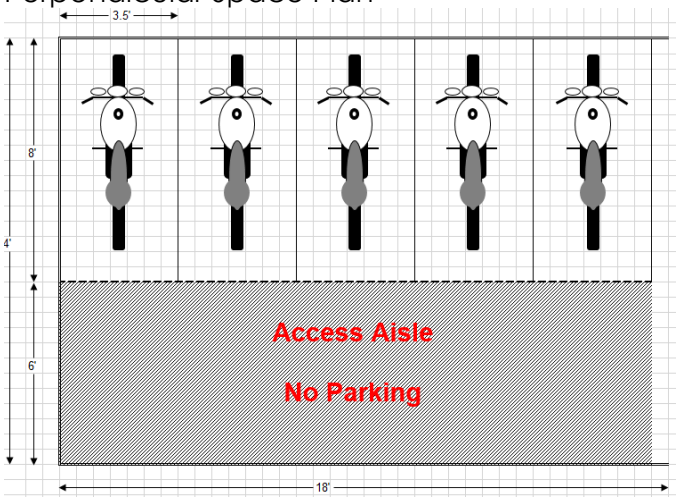
Note: Units in feet.
WP: Width Projection
SP: Stripe Projection
VP: Vehicle Projection
A: Aisle
M: Module

Source: Walker Parking Consultants

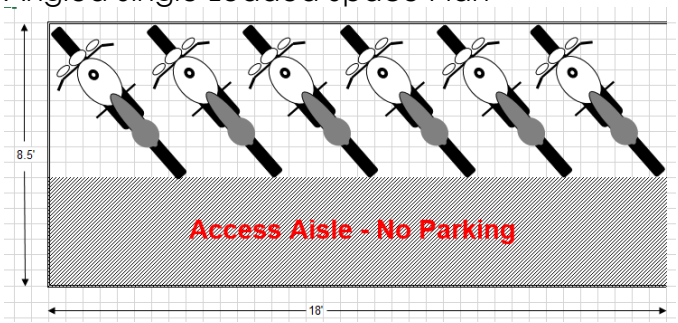
Some higher density space conversion layouts are in use at other institutions, as shown.

Figure 56: Higher Density Motorcycle Space Plans

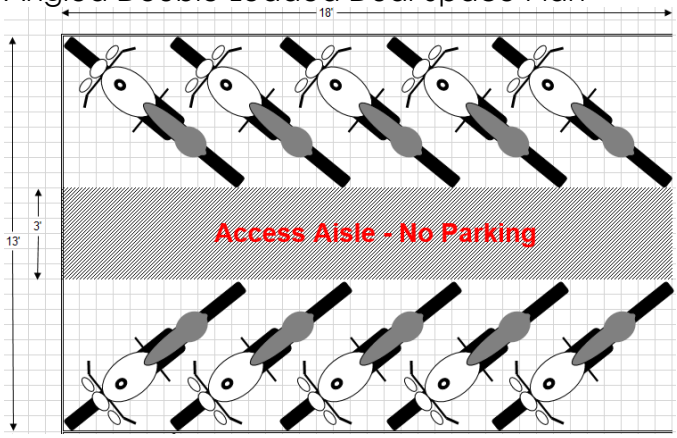
Perpendicular Space Plan



Angled Single Loaded Space Plan



Angled Double Loaded Dual-Space Plan



Motorcycle/scooter spaces can be located in corners of parking areas or in spaces that are not wide enough for full size vehicles or otherwise unusable.

The safety reasons most commonly cited for excluding motorcycles from parking structures are visibility, and that motorcycles may not trigger loops and gates, which can result in injuries. However, as the sound of most motorcycles announces their presence and the campus parking structures are open and ungated, it is

Source: Walker Parking Consultants

APPENDIX F: AMBASSADOR APPROACH

WALKER
PARKING CONSULTANTS

Walker recommends that the UIUC Parking Department adopt the "Ambassador" program model or approach to parking enforcement. This model emphasizes some significant differences between customer service and parking enforcement. The program model is based on positive customer and visitor contact. The perception of parking enforcement is often negative. Enforcement is seen as punitive, which in many cases it is. However, the manner in which enforcement is presented to the parker is variable.

The primary goals of an Ambassador program would be to promote the goals of the University, resolve concerns, provide information, and deter criminal activity, and help make the campus a better, safer and friendlier place to live, work and visit. The mission of a Parking Ambassador would be to provide hospitality, information and public safety services to students, faculty/staff and visitors, in addition to enforcing campus parking regulations. This program also focuses on responding to calls for service, providing escorts, in addition to enhancing public safety. Ambassadors would be required to complete a multi-faceted training in hospitality and customer service, emergency response and first aid, wayfinding, transportation and campus services.

Ambassadors would work directly with internal and external clients of the University. They should initiate personal contacts with the parking system users (known as "touches"), issue more warnings and slightly fewer citations, and interact with students, faculty/staff and visitors in a positive manner. The vision of the program is to help promote a more constructive, dynamic experience by extending this service beyond parking lot enforcement. The enforcement officers, as ambassadors, may accomplish these goals while providing parking management by monitoring public safety, extending a helping hand in emergency situations, and interacting with parkers on a regular basis.

Beyond enforcing parking regulations, examples of appropriate behaviors of Ambassadors would be:

- To greet visitors and offer customer service as a positive face to many people's first contact with the University.
- To provide information and explain local traffic and parking regulations to seek voluntary compliance.
- To give accurate directions to visitors and direct visitors to local destinations and attractions.
- To distribute brochures and maps.
- To offer an emergency response and first aid, battery boosts, lockouts, or emergency gasoline.
- To deter criminal activity by their presence.

As parking is self-funded by parking fees, the Ambassador program should be self-funded by citation fee.

APPENDIX G: PERMIT SALES BY LOT

WALKER
PARKING CONSULTANTS

AUGUST 17, 2018 WALKER PROJECT #31-7750.00

Lot	#	Total	Mean	>=660	Subtotal	Mean	<660	Subtotal	Mean
A03	101	$45,315	$449	32	$21,360	$667	69	$23,955	$347
A09	42	$20,412	$486	15	$11,411	$761	27	$9,001	$333
A11	35	$13,592	$388	6	$4,665	$777	29	$8,927	$308
A21	58	$31,940	$551	26	$17,160	$660	32	$14,780	$462
AS03	1	$660	$660	1	$660	$660	0	$0	
AS04	1	$352	$352	0	$0		1	$352	$352
B01	271	$124,572	$460	75	$49,654	$662	196	$74,918	$382
B02	79	$38,275	$484	20	$13,200	$660	59	$25,075	$425
B04	208	$126,195	$607	165	$108,900	$660	43	$17,295	$402
B04E	877	$408,702	$466	265	$175,205	$661	612	$233,497	$382
B06	9	$4,863	$540	5	$3,300	$660	4	$1,563	$391
B07	32	$16,932	$529	17	$11,220	$660	15	$5,712	$381
B10	22	$14,025	$638	20	$13,200	$660	2	$825	$413
B10E	221	$62,775	$284	1	$660	$660	220	$62,115	$282
B11	5	$2,805	$561	4	$2,640	$660	1	$165	$165
B17	47	$21,293	$453	9	$5,940	$660	38	$15,353	$404
B18	73	$26,460	$362	5	$3,300	$660	68	$23,160	$341
B21	241	$112,291	$466	73	$48,180	$660	168	$64,111	$382
B22	26	$13,739	$528	16	$10,560	$660	10	$3,179	$318
B22S	58	$6,897	$119	0	$0		58	$6,897	$119
C03	10	$3,415	$341	2	$1,320	$660	8	$2,095	$262
C05	56	$28,322	$506	20	$13,200	$660	36	$15,122	$420
C06	5	$1,923	$385	1	$660	$660	4	$1,263	$316
C07B	311	$153,672	$494	115	$77,076	$670	196	$76,596	$391
C09	204	$88,697	$435	54	$35,640	$660	150	$53,057	$354
C10B	432	$190,597	$441	115	$79,914	$695	317	$110,682	$349
C13	1	$404	$404	0	$0		1	$404	$404
C16	36	$21,548	$599	23	$15,180	$660	13	$6,368	$490
C16E	219	$62,117	$284	1	$660	$660	218	$61,457	$282
C18	4	$1,736	$434	0	$0		4	$1,736	$434
CS01	2	$732	$366	0	$0		2	$732	$366
D01	124	$48,253	$389	17	$13,466	$792	107	$34,786	$325
D02	40	$24,246	$606	22	$15,345	$698	18	$8,901	$495
D05	672	$302,843	$451	170	$120,307	$708	502	$182,535	$364
D06	23	$11,147	$485	10	$6,600	$660	13	$4,547	$350
D08	53	$32,175	$607	45	$29,700	$660	8	$2,475	$309
D08E	252	$70,477	$280	2	$1,320	$660	250	$69,157	$277
D09	164	$60,167	$367	20	$13,200	$660	144	$46,967	$326
D13	14	$7,598	$543	6	$3,960	$660	8	$3,638	$455
D15	1	$238	$238	0	$0		1	$238	$238
D16	3	$1,540	$513	2	$1,320	$660	1	$220	$220
D21	53	$23,529	$444	14	$9,240	$660	39	$14,289	$366
D22	132	$54,912	$416	19	$15,864	$835	113	$39,047	$346
E02	157	$87,529	$558	82	$54,120	$660	75	$33,409	$445
E03	10	$3,013	$301	0	$0		10	$3,013	$301
E04	18	$8,166	$454	5	$3,300	$660	13	$4,866	$374
E06	19	$9,678	$509	5	$3,461	$692	14	$6,216	$444
E07	47	$22,935	$488	4	$2,640	$660	43	$20,295	$472
E08	68	$27,643	$407	6	$3,960	$660	62	$23,683	$382
E09	85	$33,676	$396	16	$10,560	$660	69	$23,116	$335
E11	89	$40,843	$459	20	$13,200	$660	69	$27,643	$401
E12	237	$128,166	$541	118	$77,935	$660	119	$50,231	$422
E13	46	$23,945	$521	20	$13,200	$660	26	$10,745	$413
E14	477	$227,775	$478	147	$97,020	$660	330	$130,755	$396
E14S	673	$82,878	$123	0	$0		673	$82,878	$123
E15	285	$122,597	$430	64	$42,240	$660	221	$80,357	$364
E17	68	$26,327	$387	2	$1,320	$660	66	$25,007	$379
E18	50	$22,654	$453	13	$8,580	$660	37	$14,074	$380
E20	17	$9,860	$580	10	$6,600	$660	7	$3,260	$466
E22	66	$33,409	$506	10	$6,600	$660	56	$26,809	$479
E23	20	$11,751	$588	10	$6,600	$660	10	$5,151	$515
E24	98	$41,350	$422	21	$13,860	$660	77	$27,490	$357
E25	7	$2,754	$393	0	$0		7	$2,754	$393
E27	10	$3,727	$373	1	$660	$660	9	$3,067	$341
E28	71	$26,648	$375	7	$4,620	$660	64	$22,028	$344
E30	20	$7,484	$374	2	$1,320	$660	18	$6,164	$342
E31	13	$4,431	$341	0	$0		13	$4,431	$341
E32	47	$18,701	$398	0	$0		47	$18,701	$398
E34	60	$23,189	$386	6	$3,960	$660	54	$19,229	$356
E35	19	$6,207	$327	2	$1,320	$660	17	$4,887	$287
E36	10	$5,959	$596	7	$4,620	$660	3	$1,339	$446
E37	4	$919	$230	0	$0		4	$919	$230
E38	333	$99,859	$300	4	$2,640	$660	329	$97,219	$295
E43	20	$8,608	$430	4	$2,640	$660	16	$5,968	$373
E45	63	$35,642	$566	31	$20,460	$660	32	$15,182	$474
E46	58	$23,873	$412	4	$2,640	$660	54	$21,233	$393
ES16	1	$377	$377	0	$0		1	$377	$377
ES21	1	$605	$605	0	$0		1	$605	$605
ES26	1	$286	$286	0	$0		1	$286	$286
F01	1	$325	$325	0	$0		1	$325	$325
F04	113	$58,288	$516	41	$27,060	$660	72	$31,228	$434
F06	16	$5,951	$372	4	$2,640	$660	12	$3,311	$276
F08	33	$16,590	$503	14	$9,240	$660	19	$7,350	$387
F09	20	$6,457	$323	4	$2,640	$660	16	$3,817	$239
F10	8	$4,418	$552	5	$3,300	$660	3	$1,118	$373
F11	103	$42,375	$411	16	$10,560	$660	87	$31,815	$366
F12	24	$11,207	$467	6	$3,960	$660	18	$7,247	$403
F13	245	$72,296	$295	1	$660	$660	244	$71,636	$294
F14	82	$40,278	$491	36	$23,760	$660	46	$16,518	$359
F15	31	$15,456	$499	12	$7,920	$660	19	$7,536	$397
F16	2	$655	$328	0	$0		2	$655	$328
F17	237	$68,316	$288	2	$1,320	$660	235	$66,996	$285
F17A	14	$4,229	$302	0	$0		14	$4,229	$302
F19	6	$2,569	$428	1	$660	$660	5	$1,909	$382
F20	5	$2,746	$549	2	$1,320	$660	3	$1,426	$475
F21	9	$4,210	$468	3	$1,980	$660	6	$2,230	$372
F22	59	$24,001	$407	12	$7,920	$660	47	$16,081	$342
F23	130	$73,723	$567	94	$62,040	$660	36	$11,683	$325
F24	57	$26,625	$467	21	$13,860	$660	36	$12,765	$355
F25	54	$21,869	$405	15	$9,900	$660	39	$11,969	$307
F26	12	$4,115	$343	2	$1,320	$660	10	$2,795	$280
F27	419	$206,833	$494	207	$136,620	$660	212	$70,213	$331
F28	112	$51,914	$464	33	$21,780	$660	79	$30,134	$381
F29	44	$28,325	$644	42	$27,720	$660	2	$605	$303
F29E	737	$302,469	$410	133	$87,780	$660	604	$214,689	$355
F30	49	$30,842	$629	42	$27,720	$660	7	$3,122	$446
F32	31	$18,273	$589	23	$15,180	$660	8	$3,093	$387
FS05	1	$377	$377	0	$0		1	$377	$377
Totals	11,140	$4,661,581	$418	2,805	$1,874,124	$668.14	8,335	$2,787,458	$334

APPENDIX H: FOCUS GROUP AND SURVEY FINDINGS

WALKER
PARKING CONSULTANTS

A series of nearly 30 meetings were held with a variety of university and non-university stakeholders. Participants included campus departments, the Parking Advisory Committee, campus governance groups, campus event venues, Parking Department staff, and municipal leaders and planners. Each focus group meeting was limited to approximately 15 participants.

Positive Perceptions

- Communication has improved in recent years
- The Parking Department provides good customer service
- Enforcement is fair and professional
- Permit and on-street pricing is fair
- General understanding that the Parking Department must maintain financial solvency

Opportunities for Improvement

- Communication – permit allocation process (waitlist)
- Communication – policy changes
- Management and maximization of existing supply
- Provide more permit choices and flexibility
- Provide more visitor parking
- Better wayfinding and signage

Parking Supply Issues

- Most felt that the overall campus parking supply is adequate, but, localized parking challenges exist
- Better access to parking spaces is important
- Maximize the use of existing resources – by allowing greater oversell of permit parking in lots/structures
- Consider adding parking near areas of high demand

Parking Communications

- Improve on-line communications (web, text, email)
- Provide more information on parking options
- Clarify the permit allocation process
- Increase frequency of communication with customer service representatives and enforcement staff
- Equip all parking enforcement staff to communicate with patrons
- Continue to value the importance of maintaining the current level of excellent customer service to all customers
- Continue to collaborate with university departments on local parking solutions

Parking Enforcement

- Recently installed LPR system has redefined the parking enforcement routes and is increasing enforcement efficiency
- The hand-held enforcement equipment/software has been effectively replaced by the new LPR system
- Continue to promote a campus ambassador approach by enforcement staff
- Parking enforcement is needed to ensure access to campus facilities
- Overall – Focus groups recognized the need for enforcement

Parking Pricing

- Parking prices are perceived to be fair
- Faculty and staff are generally pleased with permit pricing policy
- Market-based parking pricing would be difficult to implement

Parking Products and Services

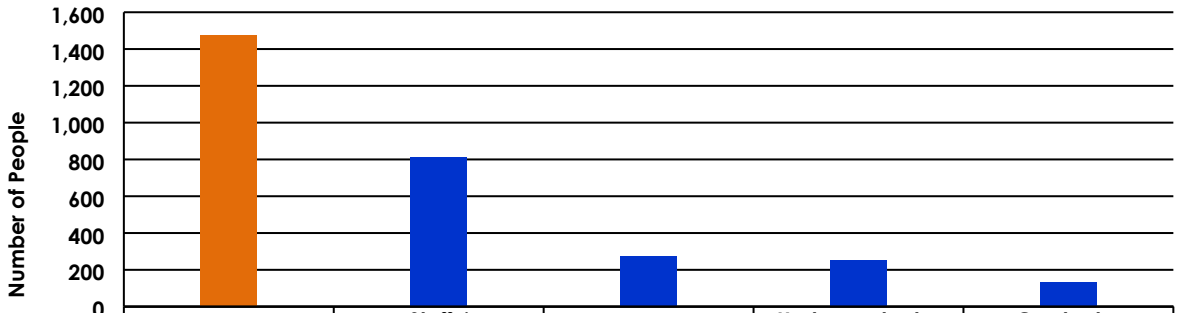
- Offer more off-street and on-street parking permit options/choices
- Support use of public transit

CAMPUS PARKING SURVEY FINDINGS

The survey, designed by Walker and distributed by the University, was intended to provide qualitative and quantitative information about the parking customer base, and to indicate general behaviors and attitudes related to parking and transportation on campus.

Note: Walker's characterization of responses is subjective, based on interactions with multiple other institutions and research.

Figure 57: Survey Participants



	Total	Staff / Employee	Faculty	Undergraduate Student	Graduate Student
Survey Sample	1,477	814	277	255	131
Percent of Total	100%	55%	19%	17%	9%

Source: Walker Parking Consultants

The distribution of respondents was judged to be generally representative of the parking customer base.

- 19% Faculty
- 55% Staff / Employee
- 26% Undergraduate and Graduate Students

The survey results are analyzed by user group, and the results were used to help inform the campus parking master plan. The survey results provide an understanding of user characteristics, parking preferences, and opportunities for improving the parking system.

Current system data shows:

- 85% of parkers are faculty/staff
- 15% of parkers are students

SELECTED SURVEY RESULTS

Figure 58: Comparative data

	Faculty	Staff	Students
Live on or <1 mile from campus	4.1%	2.0%	57.7%
Live 1-3 miles from campus	28.0%	16.9%	25.7%
Live 3-5 miles from campus	19.6%	18.8%	6.1%
Live 5-7 miles from campus	19.9%	13.7%	3.2%
Live >7 miles from campus	28.4%	48.6%	7.4%
	100%	100%	100%
Own a car	97.0%	96.5%	70.2%
Have a UIUC parking permit	75.6%	81.5%	29.3%
Drive alone	70.4%	78.0%	26.0%
Carpool	10.9%	9.1%	3.2%
Bike	10.1%	3.9%	8.4%
Transit	4.1%	6.7%	21.7%
Walk	3.4%	1.5%	38.7%
Motorcycle/scooter	0.4%	0.3%	1.2%
	100%	100%	100%

Source: Walker Parking Consultants

Commute distance impacts driving and parking alternatives and preferences. Those who live less than five miles from campus have more commuting options, including transit which operates within approximately this radius of campus. Among survey respondents, 32.1% of faculty, 18.9% of staff, and 83.4% of students report living within five miles.

Survey recipients were asked how many minutes it takes from arrival on campus to arrival at their final destinations (including searching for parking, parking, and walking or shuttling).

- 87% of faculty/staff report a total time of less than 10 minutes
- 98% of faculty/staff report a total time of less than 20 minutes
- 64% of students report a total time of less than 10 minutes
- 93% of students report a total time of less than 20 minutes

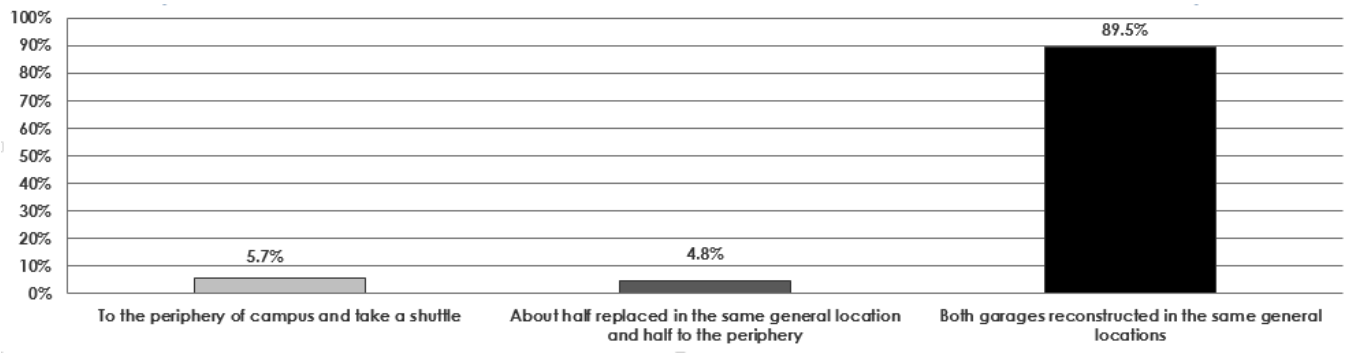
As most student parking areas are further from the center of campus, and many park at on-street meters, it is understandable that their average travel time is longer. For the vast majority of respondents, Walker would deem these travel times to be acceptable to moderate. A majority (75% of students and over 80% of f0aculty and staff) also report almost always finding a parking space in their assigned area.

Other findings include:

- Faculty/Staff
  - Most live 3 + miles from campus with limited quality alternatives to driving
  - Proximity to destination is important (time/physical/personal considerations)
- Faculty/Staff/Students
  - Perception that parking is expensive
  - Financial transparency should be Increased
  - Increase flexibility and economic choice
  - Additional permit options might be offered
  - Improved access to parking supply would improve perceptions
- Students
  - More likely to use alternative modes of transportation
  - The most adaptable user group
- Transit/Bike Options
  - Parking planning should coordinate with transit and bike initiatives

C7/C10 FUTURE PARKING PLANNING CONSIDERATIONS FROM THE SURVEY

Figure 59: Many of our Parking Department customers are aware that C7 and C10 structures are nearing the end of their physical life and will need to be removed. Would you prefer to replace these spaces:



Only current C7/C10 parkers were asked this survey question.

89.5% Think C7/C10 should be replaced in the same general location, in order to mitigate disruption to faculty and staff.

The majority of those responding to this question support replacing (in whole or part) C7/C10 parking in the same general location. This information coincides with the feedback we received

during our focus groups that convenience of covered parking and proximity to the Quad (campus core) is important to those who park in these facilities. Any radical change in location, or removal of supply, could disadvantage the faculty and staff working nearby.

APPENDIX I: BIKESHARE AND CARSHARE

WALKER
PARKING CONSULTANTS

BIKESHARE

Bike-sharing has caught on in a big way on university campuses and in metro areas. For example, the Indianapolis Bikeshare program (known as the Pacers Bikeshare), rents 250 bikes scattered among 26 stations along the Cultural Trail in Downtown Indianapolis. The program just celebrated 100,000 rides on its one-year anniversary in April 2015.

In May, Carmel, Indiana launched its own program. The Carmel program is run by Philadelphia-based Zagster, one of the first bike-share companies. This is not a cost recovery model, as Zagster is a for-profit venture. Zagster is a venture-funded startup company based in Cambridge, Massachusetts that designs, builds and operates bike sharing programs for cities, universities, corporate campuses, hotels, and residential communities across the United States. Zagster currently operates over 100 bike sharing programs including systems for Yale University, Cleveland, Ohio, Quicken Loans, Hyatt, General Motors, The Related Companies, Irvine Company and Four Seasons Hotels and Resorts.

The Carmel stations offer two types of bikes—adult cruisers and tricycles—equipped with baskets, adjustable seating and lights. Typical programs allow anyone the option to rent a bike for hours at a time. Rentals cost $3.00 per hour, with daily, monthly and annual rates available. Riders can rent the bikes by downloading the Zagster app on their smartphones and paying with a credit card. Once connected, riders are given a code to unlock a bike from a dock.

Carmel pays Zagster $1,320 per bike per year through a contract while keeping 93 percent of net revenues collected from rentals. Zagster also pays a local mechanic to maintain the bikes, the city created stations in convenient locations, as a way of introducing the program to the community before expanding it as demand grows. What started as two stations with 22 bikes has expanded to seven stations with 57 bikes.

According to the alternative transportation coordinator for Carmel, the program, which tallied 860 rides in its first three months, jumped to more than 500 rides in July. More bikesharing stations will be added as other companies and organizations opt to sign contracts with the city.

EXAMPLE: HAMLINE UNIVERSITY

(Article published by Hamline University News, July 6, 2015)

Students don't need their own car in order to get off campus and enjoy the many excellent cultural, educational, and recreational opportunities across the Twin Cities. Not only do MetoTransit buses stop right in front of campus, St. Paul, Minn.-based Hamline University is home to a fleet of Nice Ride bike-sharing bicycles and an HOURCAR car sharing service.

"The HOURCAR was an idea from Hamline Undergraduate Student Council (HUSC) with the intent of providing alternative transportation for the entire campus community," Dean of Students Alan Sickbert said. "Departments and organizations are encouraged to set up

accounts so that students, staff, and faculty do not have to use personal vehicles when attending programs in the Twin Cities that are related to Hamline."

The HOURCAR is a nonprofit program that provides members with hourly access to a fleet of fuel-efficient vehicles. Once you become a member, you reserve any car you like in advance and drive it for as long as your reservation. The service may be an even more valuable resource now that the Associated Colleges of the Twin Cities (ACTC) has ended shuttle service between Macalester College, St. Thomas, St. Kate's, Augsburg, and Hamline's campuses.

The process of using the HOURCAR is simple. Users choose a plan based on how much they think they'll use the car, fill out a short application, and choose a payment option. There are several different plans to choose from, including discounted college student rates. The undergraduate student plan is a $35 annual membership that costs $6 per hour, or 25¢ per mile. Alternatively, it can cost $3 per hour between 11 p.m. and 7 a.m. HOURCAR members can make reservations for the car by phone 24 hours a day, seven days a week. For the duration of the reservation, the HOURCAR is solely for that member's use and the costs cover both gas and insurance.

Hamline's HOURCAR is located outside the Anderson Center on Englewood Avenue, making for a convenient location for students, faculty, and staff. For those looking to travel via pedal power, Hamline is home to a fleet of the green Nice Ride bicycles that are part of the nonprofit bike-sharing system. Anyone is eligible to become a member or a pass holder of the Nice Ride organization and, like the HOURCAR, different packages and memberships are available based on the preferred usage.

"Nice Ride is a system that supports the Green Line Light Rail and all public transportation. It is environmentally-friendly and cheap," Sickbert said. "Nice Ride makes decisions about where stations are located based on usage, so keeping the bikes on campus is dependent on our students, faculty, staff, and other community members riding those bikes. So get some friends and try it out." Memberships can be obtained online and allow for unlimited 60-minute rentals. This option is great for frequent riders, affordable at pennies per day, and comes with a Nice Ride key that allows members to access to the bikes in seconds. Student discount rates for this option cost $55 for an entire year. Non-members can purchase passes at any station for unlimited amounts of 30-minute rentals.

EXAMPLE: PURDUE UNIVERSITY

A reproduction of a newspaper article describing the new bike-share program at Purdue University is shown on the following page.

Figure 60: Purdue Bike-Share

Bike shares 'somewhat of an expectation'

Purdue program starts in fall semester with 50 bikes at 13 stations

Joseph Paul
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WEST LAFAYETE — Bike shares are booming: 22,390 bikes are wheeling around 54 U.S. cities. Now, add Purdue University to that list.

The program — offered through a service called Zagster — is set to launch by Aug. 24, the first day of fall semester, with 50 bicycles at 13 stations on campus. Users can text or punch in a code on a mobile app to check out bikes at one location and check them in at another.

Yearly memberships — which are open to the community, not only those affiliated with Purdue — begin in August and cost $25.

Bike stations will be placed across campus based on their proximity to residence halls, offices, bus stops, parking garages, bike lanes and parking lots, including the ones at Ross-Ade Stadium and Discovery Park, which are popular among commuter students.

"Where are the big buildings? Where are the classes?" said Michael Gulich, director of Purdue's Office of University Sustainability. "So basically, where are people trying to get from A to B?"

Planning began about a year ago as feedback from another project — Purdue's bike and pedestrian master plan — indicated students would use a bike-share program if brought to campus, Gulich said. About 1,200 students use bicycles during peak class hours in the spring, according to bike counts by Purdue's physical facilities office.

"We heard over and over again ... 'We ought to have a bike share,' or 'Why don't we have a bike share?' " he said.

Mitch Nettesheim, a Purdue staff member who served on the master planning committee, said he's a cycling advocate and he "lived on a bike" as a college student. By sharing bikes, he said, fewer will be abandoned on campus and fewer out-of-state students will worry about having to bring one from home.

"It's by far the easiest way to get around campus," he said, "so I would think if the program is well-run with good bikes, I think it could explode."

More and more communities are coming along for the ride, including 14 U.S. cities in 2014 alone, according to the Bike-sharing Blog, operated by the Washington, D.C.-based consultancy MetroBike LLC. Indianapolis was one of them, launching the Indiana Pacers Bikeshare in April 2014 with 250 bikes in 25 Downtown locations.

Zagster could be one of the fastest growing services, increasing its fleet by 300 percent last year, according to a company press release. The service will launch this fall at Ohio State University with 115 bikes, according to an OSU press release.

Indiana University last summer launched a smaller bike share, consisting of 15 refurbished bikes that had been left on campus, said Kristin Brethova, assistant director of IU's Office of Sustainability. IU is looking this fall to revamp its program, called Crimson Cruisers, she noted.

As alternative transportation gains traction, Gulich said, bike shares are becoming an important recruiting tool.

"As these types of programs pop up more in different municipalities and different campuses around the country," he said, "it's almost become — I'd say especially with the incoming class — somewhat of an expectation."

The bike and pedestrian master plan will complement the service with the infrastructure, signs, safety and education. "Basically, it's promoting a bicycle-friendly culture on campus," Gulich said.

JOSEPH PAUL/JOURNAL & COURIER

This bicycle is similar to 50 that will be offered at Purdue University through Zagster, a bike-sharing service set to launch in West Lafayette in August.

Aaron Madrid, president of Bicycle Lafayette, said the bike-share program could help increase visibility and awareness. "At the end of the day, the best thing for the cycling community is to get more people riding bikes," he said. "Because the more people riding bikes, the more visible they are on the road to people."

The program is designed mainly for short rides and to work in tandem with other environmentally friendly transportation, such as Zipcar or Citybus. It will launch with help from a $75,000 grant from Alcoa Foundation, which invests in sustainability initiatives.

"It is clear that bike-share programs are increasing in popularity for their environmental and health benefits," said Alice Pak Truscott, Alcoa Foundation's program manager. "We are proud to work with Purdue University — a longtime partner — to help incentivize their students, faculty and staff to travel in a human-powered, environmentally friendly means across their campus."

★ Call Journal & Courier reporter Joseph Paul at (765) 420-5339. Follow him on Twitter: @JosephPaulJC.

ZIPCAR AND UBER

Both Zipcar and Uber would improve campus mobility and decrease the need for re-parking for minor trips.

CARSHARE: ZIPCAR ON CAMPUS

UIUC supports Zipcar on campus. Walker recommends expanding the Zipcar program. There are a limited number of Zipcars located around the campus. Based on utilization, negotiations should be held between Zipcar and the Dean of Students, who administers this program, to determine if the number of cars stationed on campus and locations can be increased.

It is noted that at the Indiana University Purdue University Indianapolis campus (IUPUI), Zipcars are used to supplement and for some uses replace fleet vehicles on campus. The vehicles are located in campus structures.

UBER ON CAMPUS

The Uber model may have the potential to provide fast point to point transportation at a reasonable cost to students and staff. Uber is reaching out to universities, and have some different schemes that are working at a few schools.

The **University of Florida** has a partnership with Uber that provides discounted rides at certain times. Beginning June 26, 2015 the school and student government pays half of the students' fare for Uber rides that begin and end within the campus zone and within specified times for UF students who use the promotion code provided by UF's Student Government.

The **University of Southern California** (USC) also has an Uber partnership that has integrated Uber into the campus transit system. For the fall 2015 semester, USC extended its program with Uber as part of the Campus Cruiser program in the University Park neighborhood nightly, from 7:00 PM until 2:00 AM, or whenever wait periods for a Campus Cruiser exceed 15 minutes. This is designed to supplement the popular Campus Cruiser service and help reduce wait times for transportation during these peak periods.

The USC dispatcher will invite you to request a free Uber ride via the USC button on the Uber app. During these hours, rides that stay entirely within Campus Cruiser boundaries will be paid for automatically by USC, but only if requested via the USC button. There are set Uber routes and Uber pick-up spots on the university campus. The program also will be available on football game days. All rides requested via the USC button will be uberPOOL trips. uberPOOL is a carpooling option that matches riders heading in the same direction.

APPENDIX J: INFLATION AND ELASTICITY

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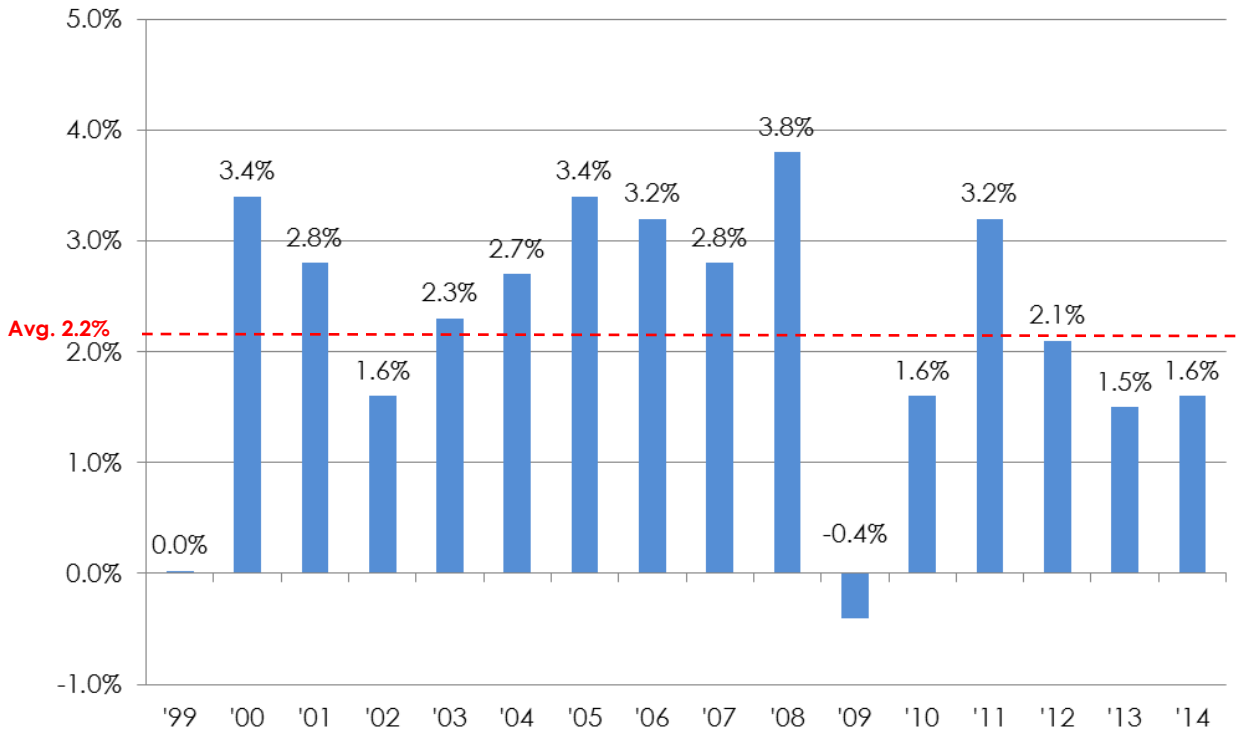
INFLATION

Operating expenses are trended for inflation at 2.0% per year. It is noted that the Federal Reserve's Livingston Survey (based on 29 forecasters) supports 10-year median and mean CPI projections of 2.2% each; however, the IHS Global Insight 30-year forecast is 2% compounded annually.

CPI data is summarized in the following graphic.

Figure 61: Inflation as Represented by the CPI from 1999 to 2015 (YTD)



Source: Inflation rate is represented by the Consumer Price Index published by the Bureau of Labor Statistics (BLS).

This data shows the unadjusted annual inflation rate in the U.S. from 1999 to 2014, as represented by the Consumer Price Index, which is the percentage rate of change in price level over time. The rate of decrease in the purchasing power of money is approximately equal. The mean value, represented by the trend line (red) is approximately 2.2% over the prices went up by period shown. In 2012, prices went up by 2.1 percent compared to the previous year. In 2013, 1.5% percent, followed by a 1.6% increase in 2014. The 2015 avowed inflation target of the Federal Reserve is 2.0%.

Thus, the initial inflation value is projected by Walker at 2.0% per year. However, this value may be adjusted within the model to test other scenarios.

ELASTICITY

Some University parking permits appear to currently be priced below market. Below market rates could be allowed to increase to market levels in accord with a pre-defined rate schedule, and as such, where rates are moved toward market rates, the trend is to require constrained percentage rate increases. Therefore, over the first years of the projection (before parity is achieved), rates would tend to remain below market, which may limit potential substitutes. Given this unique situation, Walker developed elasticity assumptions for the University.

Demand for the Parking Department is correlated with a number of macroeconomic indicators, such as population growth, fuel costs, cost of parking relative to income, employment, and local variables, such as the supply of alternative public transportation, the level of parking enforcement and the purpose of one's trip. Holding all other economic and local variables constant, a change in the real price of the Parking Department may be met with a decrease in utilization. The degree to which this relationship holds true is dependent on the elasticity of demand for the Parking Department at each campus, garage, lot, and/or on-street location.

$$\textit{Price Elasticity of Demand} = \frac{\textit{Percentage Change in Quantity Demanded}}{\textit{Percentage Change in Price}}$$

This formula calculates the expected ratio of incremental loss or gain in revenue due to a percentage increase in the price of a product or service. Statisticians try to calculate price elasticities by observing the real-life decrease in demand due to a price increase over a defined time period, while controlling for the effects of seasonality and other economic and local variables. Unfortunately, limited public data is available in this area; however, a number of global research studies indicate that price elasticities for parking range from -0.1 to -0.4. These values suggest that a 1.0% increase in parking prices will decrease demand by 0.1% to 0.4%, indicating that usually parking demand is relatively inelastic to reasonable changes in price.

In addition, elasticity of demand in an equilibrium market is different than elasticity of demand for a sub-sector of a market that a) represents a significant share of the market, and b) is priced significantly below the market. One can make the argument that the historical parking rates in areas surrounding a campus may be dampened by the University's facilities, given the University's facilities' relatively moderate rates and large market share.

In order to derive our elasticity range, we considered findings from the following reports:

1. Kuzmyak, Weinberger and Levinson (2003)[3]
    - This study indicated that the elasticity of vehicle trips with regard to parking prices is typically in the -0.1 to -0.3 ranges, with significant variation depending on demographic, geographic, travel choice and trip characteristics.

[3]Online TDM Encyclopedia - Transportation Elasticity, Parking Price, http://www.vtpi.org/tdm/tdm11.htm

- The study was designed to describe how parking supply affects parking and travel demand. We believe the results can be extrapolated to reflect price impacts (i.e. reduced parking supply increases prices).

2. Trace (1999)[4]
   - This study utilized econometric modeling (not *ex ante* and *ex post* parking data) to provide detailed estimates of the elasticity of various types of travel (car-trips, car-kilometers, transit travel, walking/cycling, commuting, business trips, etc.) with respect to parking price under various conditions (i.e. level of vehicle ownership and transit use, type of trip, etc.).
   - The results indicated a weighted average elasticity of -0.16 and notes that elasticities vary significantly (between -0.02 to -0.3) by purpose.
     Results from the Trace study are summarized as:

Purpose	Vehicles	Passengers	Public Transportation	Walk/Cycle
Commuting	-0.08	+0.02	+0.02	+0.02
Business	-0.02	+0.01	+0.01	+0.01
Education	-0.1	+0.0	+0.0	+0.0
Other	-0.3	+0.04	+0.04	+0.05
Weighted Average	-0.16	+0.03	+0.02	+0.03

3. Clinch and Kelly (2003)[5]
   - This study analyzed *ex ante* and *ex post* parking data during the summers of 2000 and 2001 when the price of parking increased by 50% over a year.
   - Researchers found a -0.29 average elasticity during the analysis time-frame.

In addition to the studies noted above, other researchers have analyzed specific parking segments and determined that elasticities may have the ability to fluctuate by close to 0.5 for central business district ("CBD") parking (Hensher and King, 2001) and 1.0 for commercial parkers (Pratt 1999), as commercial customers often park with the same frequency but for shorter periods of time after a price increase.

[4] Ibid.
[5] Kelly, Andrew and Clinch, Peter, "Temporal Variance of Related Preference On-street Parking Price Elasticity", http://www.webmeets.com/files/papers/EAERE/2005/113/Temporal%20Variance%20of%20Parking%20Pricing%20Elasticity%20for%20EAERE%20Revised%20by%20Kelly.pdf

Similar elasticity studies were conducted in the 70s and 80s (following); however, consumer preferences for driving and paid parking have shifted over recent years.

Figure 62: Summary of Parking Elasticity Studies

Study	*Location*	*Description*	*Elasticity*
Gillen (1977)	Not stated	Weighted parking price elasticity of the probability of car use	–0.31
Bajic (1984)	Toronto	Excess time elasticity of transport demand	–0.30 to –0.35
Ergun (1971)	Chicago	Arc price elasticity of demand for parking location	–0.43
Gillen (1978)	Toronto	Point elasticity, with respect to daily parking charges, of demand for parking location	–0.33
Kulash (1974)	San Francisco	Overall price elasticity of demand for parking	–0.25
Kunze et al (1980)	Chicago	Linear arc elasticity of demand for long term parking	–1.2
Haworth & Hilton (1980)	London	Elasticity of demand for long term parking	–0.74
Suber et al (1984)	Los Angeles	Arc price elasticity of demand for car traffic wrt parking charges	–0.1
Pickerell & Shoup (1980)	Los Angeles	Linear arc parking price elasticity of demand for car traffic	–0.2
Pickerell & Shoup (1980)	Los Angeles	Price elasticity with regard to work trips by car	–0.29
Miller & Everett (1982)	Washington DC	Linear arc price elasticity of demand for car use	–0.32 (or less)

Source: Bureau of Transport Economics, Feeney, 1989

A more recent publication issued by Moody's in regard to the bond offering for Chicago Parking Meters, LLC[6] stated the following: "despite significant scheduled rate increases, limited elasticity of demand is expected."

The article further stated that meter rates in Chicago increased from 150% to 300% initially, followed by another 25% average rate increase. Following the February 2010 increase (25%), revenue increased by another 20% in the period from February to April 2010 relative to the last quarter of 2009; implying that demand declined by just 4%. This is slightly better than the base forecast, which assumed the project would realize an increase in revenues of $0.75 for every $1.00 increase in rates.

The opportunity to invest in this System provides the following unique strategic benefits that were not considered in the elasticity findings of the some of the earlier research:

1. *Market Pricing:* On average the University parking options are priced competitively with the market comparables;

[6] Moody's Investors Service, Chicago Parking Meters, LLC

2. *High Occupancy:* Most University locations, as well as many of the market comparables, are at or near full occupancy on a consistent basis on weekdays;

3. *Geographic Barriers*: The campus is well defined by developed boundaries, which leave few convenient parking alternatives and limits prospects for future parking development;

4. *Limited Number of Substitutes:* 1) The city has an established public transportation system and public transit fares are expected to increase due to budget constraints, and 2) local competing facilities are priced competitively with the University facilities, and 3) the inconveniences associated with some alternatives, such as transit and carpooling, limit some customer's willingness to participate over the long-term.

In practice, it is difficult to use University permit sales data and pricing to isolate price elasticity as the system is large and complex, with many underlying factors influencing change other than just price, which cannot be isolated.

As discussed, in order to account for these unique variables and other characteristics, we analyzed the campus on a stand-alone basis and assigned elasticity values to each revenue source. We believe our model accurately reflects the projected elasticity for the parking system given its position within the local competitive environment.

Finally, elasticity can vary from predicted values when prices increase substantially in a short period of time; moreover, given the limited number of available options and the high probability that a lost parker will likely re-locate internally to another University facility, we do not believe it necessary to assume a significantly larger elasticity assumption or to adjust the elasticity assumption based upon the percentage of the increase.

After analyzing the studies and information noted above, Walker estimates that elasticity of **-0.2** most reasonably reflects the expected elasticity in future parking demand throughout the multi-year revenue projection (e.g. decrease in demand of **2.0%** for every 10% increase in rates). We recognize that some historical studies indicate higher and lower elasticity.

Example:

Case	Current	Future w/o Elasticity	Future w/Elasticity
Price	$100	$110	$110
Elasticity		0.0%	2.0%
Permits Sold	100	100	98
Revenue	$10,000	$11,000	$10,780

APPENDIX K: TEN-YEAR PARKING FACILITY ASSET MANAGEMENT PLAN

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U14069: PARKING MASTER PLAN UPDATE

10-YEAR PARKING FACILITY ASSET MANAGEMENT PLAN

Prepared for:
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

AUGUST 31, 2016

WRC 31-7750.00

WALKER
RESTORATION CONSULTANTS

PROJECT NO. 31-7750.00

10-YEAR ASSET MANAGEMENT PLAN

UIUC PARKING FACILITIES

CHAMPAIGN-URBANA, ILLINOIS

Prepared for:
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

MARCH 2016

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INTRODUCTION

University of Illinois at Urbana-Champaign (UIUC) is in the middle of a parking master study, evaluating current and future parking needs on campus. As part of this evaluation, UIUC requested a review of the maintenance requirements for the current parking assets for the next 10 years.

OBJECTIVE

The objective of this asset management study is to quantify the expected capital expenditures on repairs and capital maintenance for the existing parking infrastructure for the next 10 years. The 10-year asset maintenance plan includes cash flow for each parking structure, as well as the surface lots.

BACKGROUND INFORMATION

There are two types of parking assets maintained by UIUC on campus – the parking structures and the surface lots. Although there is street parking on and adjacent to the campus, they are not maintained by the University, and thus were not included in the study.

There are five parking structures on the UIUC campus:

1. B4 at University and Goodwin Avenues
2. D5 at the Krannert Center for Performing Arts
3. F29 at Gregory and Dorner Drives
4. C7 at Fifth and John Streets
5. C10 at 812 South Fifth Street

The C7 and C10 Parking Structures are scheduled to be demolished in the near future and were not included in the asset management program. For the remaining three parking structures, Walker Restoration Consultants was provided a previous assessment report and 10-year plan prepared by Carl Walker, Inc. (CWI) dated 2010. The CWI documents were provided to serve as the basis of our asset management plan, supplemented by a brief 1-day walk through and visual observation of the three parking structures. As this is an initial study to supplement the Parking Master Plan, this is only a preliminary assessment of each parking structure. A more in-depth condition assessment (possibly including additional assessment techniques such as chain dragging, hammer sounding, concrete test excavations, material testing, etc.) of each of the parking structures is recommended prior to proceeding with the design and implementation of repairs.

There are a total of 12,289 parking spaces provided in surface lots on the UIUC campus. Of these, 28 lots totaling 6,671 spaces were evaluated using the PASER rating system developed at the University of Wisconsin-Madison. The parking lots were selected by UIUC personnel as a representative sample of the parking lots. The evaluations were performed by Juneau

Associates, Inc. (Juneau), and their report is attached with detailed information relative to the rating system. The results obtained from the Juneau evaluation were used to project expected capital expenditure costs over the 10 year study period and over the entire surface parking lot system.

The objective of this study is to report on capital expenditure costs. As such, it does not include routine or operational maintenance. Examples of these items include routine cleaning or changing lights. Also not included are indirect costs that may be associated with the repairs. Such costs would include overhead costs, financing costs, or costs of supplying alternative parking for users, for example.

Attached in Appendix D are guidelines for ongoing maintenance including recommended implementation intervals.

PARKING STRUCTURES

1. B4 PARKING STRUCTURE

Address:	University and Goodwin Avenues		
Spaces:	1,426	**# Levels:**	6
Year Constructed:	2003	**Construction:**	Cast-in-Place, Post-tensioned Concrete

Short-term Repair Recommendations:

1. The bi-level drains above the occupied space are leaking and were reportedly not properly waterproofed. These should be addressed.
2. The canopies around the outside perimeter are not properly flashed and are resulting in leaks into the occupied space.

2. D5 PARKING STRUCTURE

Address:	500 South Goodwin		
Spaces:	575	**# Levels:**	2
Year Constructed:	1966	**Construction:**	Cast-in-place, Conventional Concrete

Short-term Repair Recommendations:

1. Recoat traffic topping.

3. F29 PARKING STRUCTURE

Address:	Gregory and Corner Drives		
Spaces:	765	**# Levels:**	6
Year Constructed:	2000	**Construction:**	Cast-in-Place, Post-tensioned Concrete

Substantial and Short-Term Repair Recommendations:

1. Routine capital maintenance repairs.

A detailed breakdown of the anticipated work for each of the parking structures is provided in Appendix C. The yearly recommended budgets for each parking structure and as a total are shown in Table 1 below. Budgets are shown in 2016 dollars and do not include the effects of inflation.

Table 1. Projected Parking Structure Recommended Budgets.

Year	B4	D5	F29	TOTAL
2016	$ 105,000	$ 1,513,000	$ 47,000	$ 1,665,000
2017	$ 24,000	$ -	$ -	$ 24,000
2018	$ -	$ -	$ 105,000	$ 105,000
2019	$ -	$ 61,000	$ -	$ 61,000
2020	$ 530,000	$ -	$ 103,000	$ 633,000
2021	$ -	$ -	$ -	$ -
2022	$ -	$ -	$ -	$ -
2023	$ 24,000	$ 781,000	$ 57,000	$ 862,000
2024	$ -	$ -	$ -	$ -
2025	$ 150,000	$ -	$ 47,000	$ 197,000

For the purposes of this exercise, no attempt was made to manage budget impacts by attempting to equalize yearly costs. This approach could be taken during the more detailed assessment phase which is required prior to implementing the recommended repairs.

SURFACE PARKING

A total of 6,671 spaces of the 12,289 total surface parking spaces were evaluated by Juneau and given a PASER rating. Of these spaces 6,342 were asphalt spaces and 329 were concrete spaces. The number of asphalt and concrete spaces for the entire inventory was provided by UIUC; 10,478 asphalt spaces and 1,811 concrete spaces. Once inventory was subdivided by lot type (asphalt or concrete), the recommended budgets for maintaining the examined lots were projected over the entire inventory.

To provide a recommended budget over 10 years, a typical expected expenditures for each PASER rating level was developed, with costs on a per space basis. The number of spaces projected to be currently at that PASER level was then used to project the costs over the 10 year period. The recommended budgets for the asphalt and concrete lots are shown in Table 2. A more detail projection is included in Appendix C. Budgets are shown in 2016 dollars and do not include the effects of inflation.

Table 2. Projected Surface Parking Recommended Budgets.

Year	Asphalt Lots	Concrete Lots	TOTAL
2016	$ 862,000	$ 14,000	$ 876,000
2017	$ 157,000	$ 327,000	$ 484,000
2018	$ 569,000	$ 14,000	$ 583,000
2019	$ 2,302,000	$ 28,000	$ 2,330,000
2020	$ 302,000	$ 14,000	$ 316,000
2021	$ 1,628,000	$ 28,000	$ 1,656,000
2022	$ 280,000	$ 422,000	$ 702,000
2023	$ 1,452,000	$ 28,000	$ 1,480,000
2024	$ 143,000	$ 14,000	$ 157,000
2025	$ 1,986,000	$ 28,000	$ 2,014,000

For the purposes of this exercise, no attempt was made to equalize the yearly costs. However, this can be implemented to a certain extent when an inventory management system is developed.

LIMITATIONS

This report contains the professional opinions of Walker Restoration Consultants based on the conditions observed as of the date of our site visit and documents made available to us by University of Illinois at Urbana-Champaign. This report is believed to be accurate within the limitations of the stated methods for obtaining information.

We have provided our opinion of probable costs from visual observations, limited testing, and field survey work. The opinion of probable repair costs is based on available information at the time of our assessment and from our experience with similar projects. There is no warranty to the accuracy of such cost opinions as compared to bids or actual costs. This condition appraisal and the recommendations therein are to be used by University of Illinois at Urbana-Champaign with additional fiscal and technical judgment.

It should be noted that our renovation recommendations are conceptual in nature and do not represent changes to the original design intent of the structure. As a result, this report does not provide specific repair details or methods, construction contract documents, material specifications, or details to develop the construction cost from a contractor.

Based on the agreed scope of services, the assessment was based on certain assumptions made on the existing conditions. Some of these assumptions cannot be verified without expanding the scope of services or performing more invasive procedures on the structure. More detailed and invasive testing may be provided by Walker Restoration Consultants as an additional service upon written request from University of Illinois at Urbana-Champaign.

The recommended repair concepts outlined represents current generally accepted technology. This report does not provide any kind of guarantee or warranty on our findings and recommendations. Our assessment was based on and limited to the agreed scope of work. We do not intend to suggest or imply that our observation has discovered or disclosed latent conditions or has considered all possible improvement or repair concepts.

A review of the facility for Building Code compliance and compliance with the Americans with Disabilities Act (ADA) requirements was not part of the scope of this project. However, it should be noted that whenever significant repair, rehabilitation or restoration is undertaken in an existing structure, ADA design requirements may become applicable if there are currently unmet ADA requirements.

Similarly, we have not reviewed or evaluated the presence of, or the subsequent mitigation of, hazardous materials including, but not limited to, asbestos and PCB.

This report was created for the use of University of Illinois at Urbana-Champaign and may not be assigned without written consent from Walker Restoration Consultants. Use of this report by others is at their own risk. Failure to make repairs recommended in this report in a timely manner using appropriate measures for safety of workers and persons using the facility could increase the risks to users of the facility. University of Illinois at Urbana-Champaign assumes all liability for personal injury and property damage caused by current conditions in the facility or by

construction, means, methods and safety measures implemented during facility repairs. University of Illinois at Urbana-Champaign shall indemnify or hold Walker Restoration Consultants harmless from liability and expense including reasonable attorney's fees, incurred by Walker Restoration Consultants as a result of University of Illinois at Urbana-Champaign's failure to implement repairs or to conduct repairs in a safe and prudent manner.

APPENDIX A
REPRESENTATIVE PHOTOGRAPHS

APPENDIX A: REPRESENTATIVE PHOTOGRAPHS
MARCH 31, 2016 WRC PROJECT NO. 31-7750.00

Photo 1. B4 Parking Structure.

Photo 2. B4 Parking Structure – Failed Stairtower Expansion Joints.

Photo 3. D5 Parking Structure

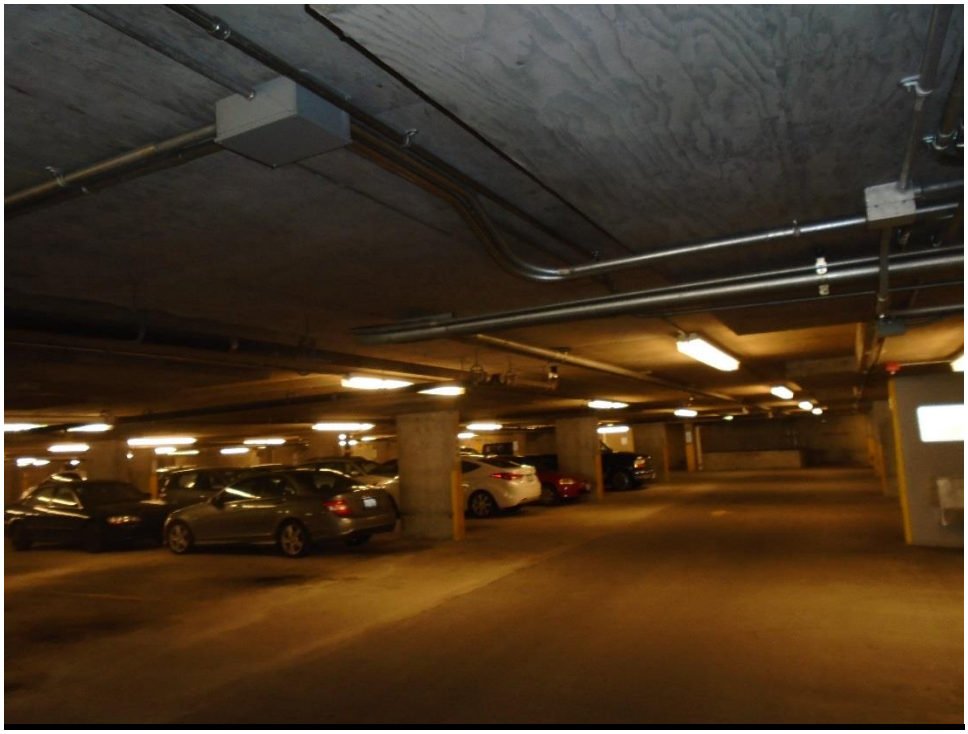


Photo 4. D5 Parking Structure.

Photo 5. D5 Parking Structure – worn traffic topping.

Photo 6. D5 Parking Structure – unpainted locations of previous repairs.

Photo 7. F29 parking structure.

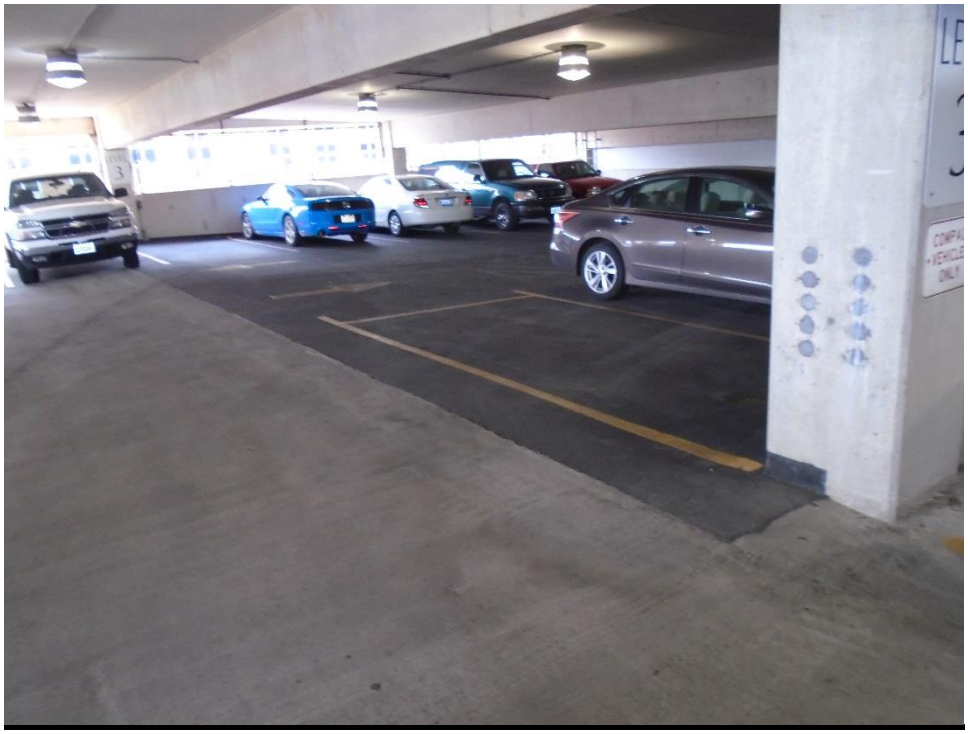


Photo 8. F29 Parking Structure – Asphalt-protected buried waterproofing membrane over occupied space.

Photo 9. F29 parking structure – failed vertical sealant.

APPENDIX B
SURFACE PARKING ASSESSMENT
BY JUNEAU ASSOCIATES

APPENDIX C
10-YEAR ASSET MANAGEMENT PLANS

PARKING STRUCTURES

PROJECTED COST: B4 PARKING STRUCTURE

WORK DESCRIPTION	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
General Conditions	$ 7,000	$ 2,000	$ -	$ -	$ 37,000	$ -	$ -	$ 2,000	$ -	$ 10,000
Concrete Repair	$ 10,000	$ -	$ -	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ 20,000
Expansion Joint - Stairtower	$ 7,000	$ -	$ -	$ -	$ 67,000	$ -	$ -	$ -	$ -	$ 67,000
Expansion Joint - Main	$ -	$ -	$ -	$ -	$ 188,000	$ -	$ -	$ -	$ -	$ -
Masonry Repairs	$ -	$ -	$ -	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ -
Seal Cracks and Joints	$ -	$ -	$ -	$ -	$ 64,000	$ -	$ -	$ -	$ -	$ -
Waterproof Bilevel Drains	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Flashing	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Miscellaneous Painting	$ -	$ 5,000	$ -	$ -	$ 5,000	$ -	$ -	$ 5,000	$ -	$ 5,000
Signagne Repalcement	$ -	$ -	$ -	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ -
Paint Traffic Markings	$ -	$ 11,000	$ -	$ -	$ 11,000	$ -	$ -	$ 11,000	$ -	$ 11,000
SUBTOTAL	$ 79,000	$ 18,000	$ -	$ -	$ 402,000	$ -	$ -	$ 18,000	$ -	$ 113,000
Contingency	$ 16,000	$ 4,000	$ -	$ -	$ 80,000	$ -	$ -	$ 4,000	$ -	$ 23,000
CONSTRUCTION SUBTOTAL	$ 95,000	$ 22,000	$ -	$ -	$ 482,000	$ -	$ -	$ 22,000	$ -	$ 136,000
Estimated Engineering and Testing	$ 10,000	$ 2,000	$ -	$ -	$ 48,000	$ -	$ -	$ 2,000	$ -	$ 14,000
TOTAL	$ 105,000	$ 24,000	$ -	$ -	$ 530,000	$ -	$ -	$ 24,000	$ -	$ 150,000

APPENDIX C: 10-YEAR ASSET MANAGEMENT PLANS

MARCH 31, 2016

WRC PROJECT NO. 31-7750.00

PROJECTED COST: D5 PARKING STRUCTURE

WORK DESCRIPTION	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
General Conditions	$ 7,000	$ 2,000	$ -	$ -	$ 37,000	$ -	$ -	$ 2,000	$ -	$ 10,000
Concrete Repair	$ 10,000	$ -	$ -	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ 20,000
Expansion Joint - Stairtower	$ 7,000	$ -	$ -	$ -	$ 67,000	$ -	$ -	$ -	$ -	$ 67,000
Expansion Joint - Main	$ -	$ -	$ -	$ -	$ 188,000	$ -	$ -	$ -	$ -	$ -
Masonry Repairs	$ -	$ -	$ -	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ -
Seal Cracks and Joints	$ -	$ -	$ -	$ -	$ 64,000	$ -	$ -	$ -	$ -	$ -
Waterproof Bilevel Drains	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Flashing	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Miscellaneous Painting	$ -	$ 5,000	$ -	$ -	$ 5,000	$ -	$ -	$ 5,000	$ -	$ 5,000
Signagne Repalcement	$ -	$ -	$ -	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ -
Paint Traffic Markings	$ -	$ 11,000	$ -	$ -	$ 11,000	$ -	$ -	$ 11,000	$ -	$ 11,000
SUBTOTAL	$ 79,000	$ 18,000	$ -	$ -	$ 402,000	$ -	$ -	$ 18,000	$ -	$ 113,000
Contingency	$ 16,000	$ 4,000	$ -	$ -	$ 80,000	$ -	$ -	$ 4,000	$ -	$ 23,000
CONSTRUCTION SUBTOTAL	$ 95,000	$ 22,000	$ -	$ -	$ 482,000	$ -	$ -	$ 22,000	$ -	$ 136,000
Estimated Engineering and Testing (10 %)	$ 10,000	$ 2,000	$ -	$ -	$ 48,000	$ -	$ -	$ 2,000	$ -	$ 14,000
TOTAL	$ 105,000	$ 24,000	$ -	$ -	$ 530,000	$ -	$ -	$ 24,000	$ -	$ 150,000

APPENDIX C: 10-YEAR ASSET MANAGEMENT PLANS

MARCH 31, 2016

WRC PROJECT NO. 31-7750.00

PROJECTED COST: F29 PARKING STRUCTURE

WORK DESCRIPTION	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
General Conditions	$ 3,000	$ -	$ 7,000	$ -	$ 7,000	$ -	$ -	$ 4,000	$ -	3000
Concrete Repair	$ -	$ -	$ 15,000	$ -		$ -	$ -	$ 20,000	$ -	
Expansion Joint - Stairtower	$ -	$ -	$ 48,000	$ -	$ -	$ -	$ -	$ -	$ -	0
Seal Cracks and Joints	$ -	$ -	$ -	$ -	$ 13,000	$ -	$ -	$ -	$ -	0
Façade Sealant	$ 14,000	$ -	$ -	$ -	$ 14,000	$ -	$ -	$ -	$ -	14000
Miscellaneous Painting	$ 10,000	$ -	$ -	$ -	$ 10,000	$ -	$ -	$ 10,000	$ -	10000
Paint Traffic Markings	$ 9,000	$ -	$ 9,000	$ -	$ 9,000	$ -	$ -	$ 9,000	$ -	9000
Signage Repalcement	$ -	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ -	0
SUBTOTAL	$ 36,000	$ -	$ 79,000	$ -	$ 78,000	$ -	$ -	$ 43,000	$ -	36000
Contingency	$ 7,000	$ -	$ 16,000	$ -	$ 16,000	$ -	$ -	$ 9,000	$ -	7000
CONSTRUCTION SUBTOTAL	$ 43,000	$ -	$ 95,000	$ -	$ 94,000	$ -	$ -	$ 52,000	$ -	43000
Estimated Engineering and Testing	$ 4,000	$ -	$ 10,000	$ -	$ 9,000	$ -	$ -	$ 5,000	$ -	4000
TOTAL	$ 47,000	$ -	$ 105,000	$ -	$ 103,000	$ -	$ -	$ 57,000	$ -	$ 47,000

PROJECTED COST: ASPHALT PARKING LOTS

WORK DESCRIPTION	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Crack Sealant	$ 81,000	$ -	$ 46,000	$ 24,000	$ 37,000	$ 39,000	$ 16,000	$ 57,000	$ 8,000	$ 94,000
Sealcoat	$ 36,000	$ -	$ 11,000	$ 30,000	$ 17,000	$ -	$ 4,000	$ 52,000	$ 5,000	$ 7,000
Patching	$ 219,000	$ -	$ 282,000	$ -	$ 79,000	$ 591,000	$ 99,000	$ -	$ -	$ 1,034,000
Replacement	$ 289,000	$ -	$ -	$ 2,068,000	$ -	$ 652,000	$ -	$ 1,142,000	$ -	$ 370,000
Traffic Markings	$ 54,000	$ 32,000	$ 30,000	$ 55,000	$ 23,000	$ 63,000	$ 10,000	$ 76,000	$ 5,000	$ 80,000
Curb Repair	$ 58,000	$ -	$ 75,000	$ -	$ 21,000	$ 158,000	$ 26,000	$ -	$ -	$ 276,000
Civil/Storm Repair	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000
Lighting Replacement	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000
TOTAL	$ 862,000	$ 157,000	$ 569,000	$ 2,302,000	$ 302,000	$1,628,000	$ 280,000	$ 1,452,000	$143,000	$ 1,986,000

- Projected over 10,478 spaces

PROJECTED COST: CONCRETE PARKING LOTS

WORK DESCRIPTION	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Concrete Patching	$ -	$ 163,000	$ -	$ -	$ -	$ -	$ 272,000	$ -	$ -	$ -
Sealant	$ -	$ 136,000	$ -	$ -	$ -	$ -	$ 136,000	$ -	$ -	$ -
Traffic Markings	$ -	$ 14,000	$ -	$ 14,000	$ -	$ 14,000	$ -	$ 14,000	$ -	$ 14,000
Lighting Replacement	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000
TOTAL	$ 14,000	$ 327,000	$ 14,000	$ 28,000	$ 14,000	$ 28,000	$ 422,000	$ 28,000	$ 14,000	$ 28,000

- Projected over 1,811 spaces

APPENDIX C: 10-YEAR ASSET MANAGEMENT PLANS
SEPTEMBER 8, 2015 WRC PROJECT NO. 31-7750.00

Notes:

1. Conceptual capital expenditure plans based on walk-through cursory visual observations of existing conditions, limited chain dragging, provided plans and reports (where available) and our experience with similar parking structures.
2. Cost opinions are based on historical data and experience with similar types of work.
3. Actual costs may vary due to time of year, local economy, or other factors. Cost opinions do not include costs for phasing, financing or other owner requirements, or bidding conditions.
4. Cost opinions do not include upgrades if it becomes necessary to bring the structure up to current building code requirements, seismic upgrades, or for ADA or similar items.
5. Costs are shown in 2015 dollars and do not include the effect of inflation.

APPENDIX D
ONGOING MAINTENANCE RECOMMENDATIONS

APPENDIX D: ONGOING MAINTENANCE RECMMENDATIONS

MARCH 31, 2016 WRC PROJECT NO. 31-7750.00

Item	Description	Action	Frequency
1	Floor Slab	Apply Penetrating Sealer	5-7 Years
		Apply Traffic Topping	As Required
		Replace Joint Sealants	3-5 Years
2	Electrical System	Inspect/Service	Monthly
3	Elevators	Inspect/Service	Monthly
4	Parking Equipment	Inspect/Service	Weekly
5	Fire Protection Equipment	Inspect/Service	Monthly
6	Fans and Ventilation	Inspect	Monthly/Daily
7	Triple Basin	Inspect/Service	Monthly
8	Dock Levelers	Inspect/Service	Monthly
9	Sump Pumps	Inspect/Service	Monthly/Daily
10	Maintenance of Graphics	Inspect	Semi-Annual
11	Facility Cleaning	Sweep/Washdown	Weekly/Semi-Annually
12	Winterization	Service	Annually
13	Ice Control	Apply	As Required
14	Qualified Inspections	Walk-through	Annually

Note: Qualified inspections should include a visual examination of all readily visible structural elements for evidence of deterioration. A formal condition assessment report should be included identifying recommended repairs and budget costs.

APPENDIX L: TRAFFIC EVALUATION STUDY

WALKER
PARKING CONSULTANTS

Primera

Exceptional Expertise. Superb Service.

Traffic Evaluation Study

University of Illinois Urbana-Champaign
Champaign, Illinois
Date: March 31, 2016

Prepared for:

Walker Parking Consultants
Attn: David W. Ryan, P.E.
Vice President
505 Davis Road
Elgin, Illinois 60123
Phone: 847.697.2640

Prepared by:

Primera Engineers, Ltd.
100 South Wacker Drive
Suite 700
Chicago, Illinois 60606
Tel: 312.606.0910
Fax: 312.606.0415

PrimeraEng.com

TO: Mr. Dave Ryan, PE
Vice President
Walker Parking Consultants

FROM: Chad Dillavou, PE, PTOE
Transportation and Traffic Engineer
Primera Engineers, Ltd.

SUBJECT: Traffic Evaluation Study
UIUC Parking Structures and Parking Lot
University of Illinois Campus
Champaign, Illinois

DATE: 3/31/16

This memorandum summarizes the findings of a traffic evaluation of existing conditions performed by Primera Engineers, Inc., in anticipation of the proposed development of new parking structures for the University of Illinois Urbana-Champaign (UIUC) Campus, located in the City of Champaign in Champaign County, Illinois. Originally, the purpose of this study was to evaluate potential traffic impacts resulting from the removal of existing parking structures, and construction of new multi-level parking structures located on the west side of the UIUC campus. Recent direction from UIUC has changed the scope of this study, limiting the analysis to existing traffic conditions only and suspending evaluation of any proposed traffic conditions and impacts. The existing parking structures under investigation that formed the basis of the study area are located at the following intersections:

- E. John Street and 6th Street (southwest corner)
- E. Daniel Street and 5th Street (northeast corner)
- E. Chalmers Street and 5th Street (southeast corner)

No significant traffic issues were found at any of the six intersections where traffic was counted and observed. The stop-controlled intersections that were studied allow existing traffic volumes to operate at Levels of Service (LOS) above the minimum acceptable standards. Due to the nature of the existing conditions, there is no immediate need to improve vehicle operations. The following are improvements that may increase pedestrian safety at the intersections that were studied:

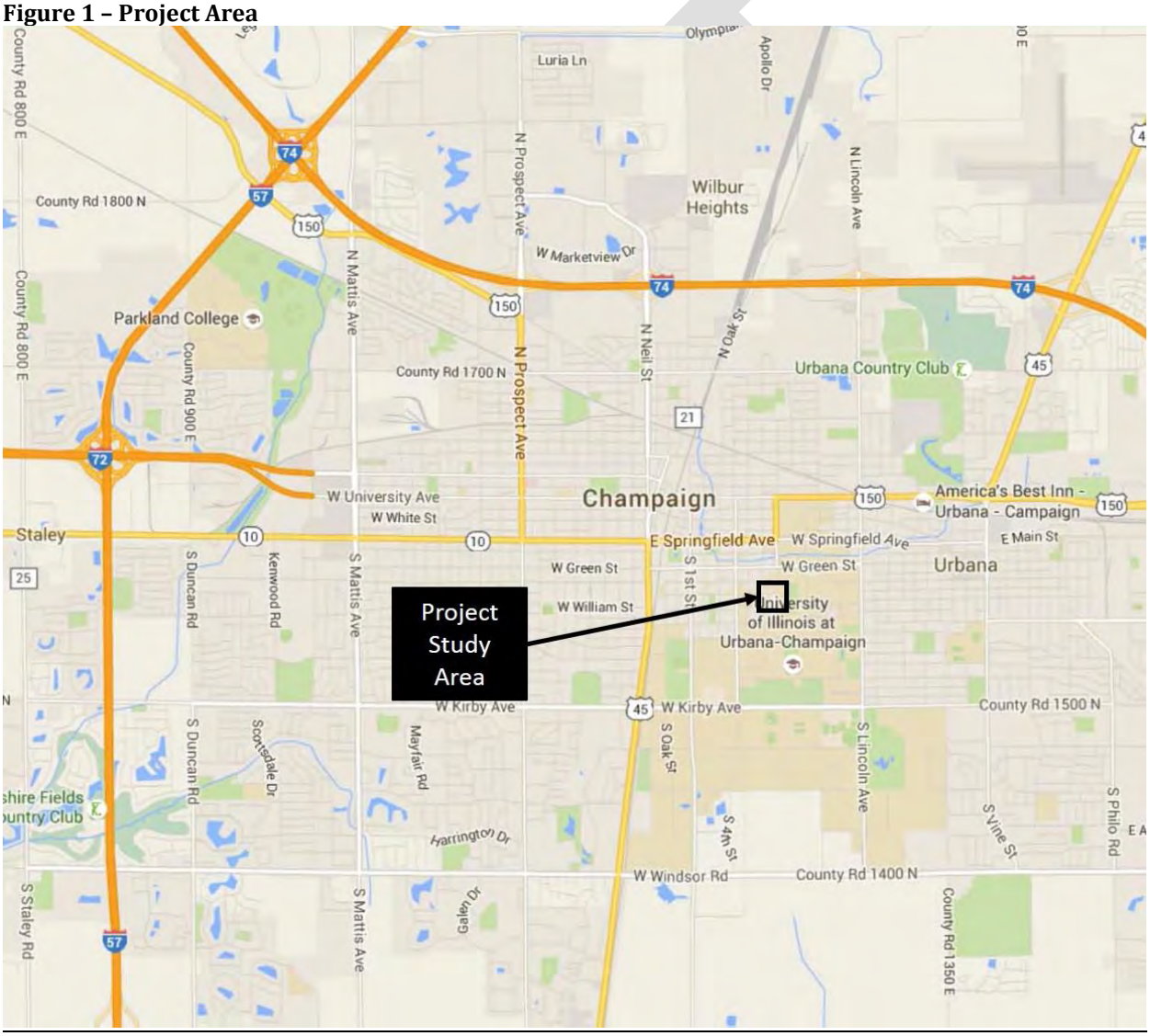
- Add curb bump outs at intersections to shorten pedestrian walking distance.
- Add crosswalk striping at the following intersections:
  - E. John Street and 5th Street
  - E. Daniel Street and 5th Street
  - E. Chalmers Street and 5th Street
- Restripe the crosswalk at the following intersections:
  - E. Daniel Street and 6th Street

    - E. Chalmers Street and 6th Street
    - E. Armory Avenue and 5th Street
- Add Americans with Disabilities Act (ADA) compliant detectable warning plates for sidewalk ramps at the following intersections:
    - E. John Street and 5th Street (northwest corner)
    - E. Daniel Street and 5th Street (northeast and southeast corners)
    - E. Daniel Street and 6th Street (all corners)
    - E. Chalmers Street and 5th Street (southwest corner)
    - E. Chalmers Street and 6th Street (northwest, northeast, and southwest corners)
    - E. Armory Avenue and 5th Street (northwest and northeast corners)

I. Existing Conditions

An analysis of the existing traffic conditions was performed to assess the presence of any safety and operational concerns, and identify potential traffic impacts resulting from the proposed parking structure development. Since the removal of proposed conditions from the project, only the existing conditions were analyzed. Data was collected through site visits by Primera Engineers, Inc. in the project study area. Information recorded included roadway characteristics, existing peak hour traffic volumes (vehicular, pedestrian, and bicycle), signal timing at intersections adjacent to the project area, and any safety concerns present to both pedestrian and vehicular traffic. **Figure 1** provides the location of the project area in respect to the UIUC campus.

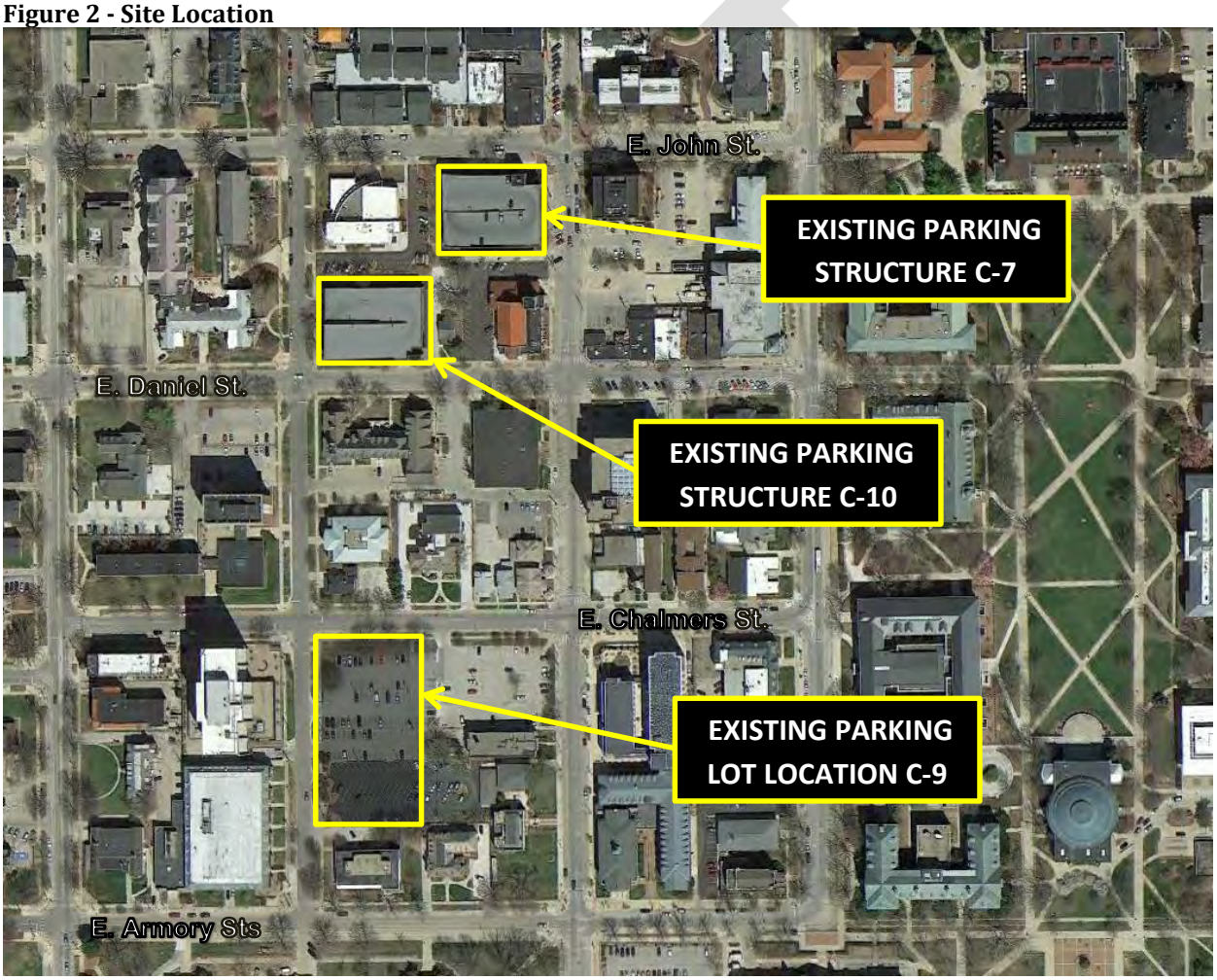
Figure 1 – Project Area



- **General Background and Location**

The proposed project site is located on the west side of UIUC's campus. The study limits are defined by Green Street to the north, Wright Street to the east, E. Armory Avenue to the south, and 4th Street to the west. Proposed parking structures were originally scoped to replace the existing parking structures C-7 and C-10, and existing parking lot C-9. These locations are shown in **Figure 2**. Land use in the area is almost entirely dedicated to educational and university purposes. There are some small commercial and recreational buildings that may not be affiliated with the university. All streets within the study limits are classified as local roads with the exceptions of Green Street and 4th Street. Green Street is classified as a minor arterial and 4th Street is a major collector.

Figure 2 - Site Location



- **Existing Roadway Facilities**

An inventory of roadway characteristics for the study area can be found in **Figure 3** of the Appendix.

5th Street

5th Street between Green Street and E. Armory Avenue is a two-way local road under the jurisdiction of the City of Champaign. The roadway cross-section is generally 27 feet, consisting of two 10-foot travel lanes and one 7-foot parking lane (permitted and marked on the west side). The intersections at E. John Street, E. Daniel Street, and E. Chalmers Street are all-way stop controlled. The intersection at E. Armory Avenue is stop-controlled for 5th Street while Armory Avenue is free flow.

6th Street

6th Street between Green Street and E. Armory Avenue is a southbound one-way local road under the jurisdiction of the City of Champaign. The roadway cross-section is generally 42 feet, consisting of one 15-foot travel lane that develops a channelized turn lane at most intersections. Parking is permitted and marked on both sides of the roadway with one 8-foot parking lane on the east side of the street. The west side transitions between parallel and angled street parking with 8-foot and 14-foot widths respectively. The intersection at E. Daniel Street and E. Chalmers Street are all-way stop controlled. The intersections at E. John Street, and E. Armory Avenue are signalized.

East John Street

East John Street between 4th Street and Wright Street is an eastbound one-way local road to 6th Street and westbound one-way local road from Wright Street to 6th street. East John Street is under the jurisdiction of the City of Champaign. The roadway cross-section is generally 35 feet, consisting of one 20-foot travel lane and two 7.5-foot parking lanes (permitted and marked on both sides). Between Wright Street and 6th Street, East John Street has angled parking on the north side that is approximately 17 feet wide with one 15-foot wide travel lane. The intersections at 4th Street and Wright Street are two-way stop controlled, the intersection at 5th Street is all-way stop controlled, and the intersection at 6th Street is signalized.

East Daniel Street

East Daniel Street between 4th Street and Wright Street is a two-way local road under the jurisdiction of the City of Champaign that becomes an eastbound one-way street east of 6th Street. The roadway cross-section is generally 37 feet, consisting of two 11.5-foot travel lanes. Parking is permitted and marked on both sides of the roadway with one 7-foot parking lane on the north side of the street. The south side of the street has parallel parking with a 7-foot width between Green Street and 6th Street, and angled parking with a 17-foot width with one 12-foot travel lane between Wright Street and 6th Street. The intersections at 5th Street, 6th Street, and Wright Street are all-way stop controlled and the intersection at 4th Street is signalized.

East Chalmers Street

East Chalmers Street between 4th Street and Wright Street is a two-way local road under the jurisdiction of the City of Champaign that becomes a westbound one-way street east of 6th Street. The roadway cross-section is generally 36 feet, consisting of two 11-foot travel lanes and two 7-foot parking lanes (permitted

and marked on both sides). The intersections at 5th Street, 6th Street, and Wright Street are all-way stop controlled, and the intersection at 4th Street is two-way stop controlled along E. Chalmers Street and free flow along 4th Street.

East Armory Avenue

East Armory Avenue between 4th Street and Wright Street is a two-way local road under the jurisdiction of the UIUC that becomes an eastbound one-way street east of 6th Street. The roadway cross-section is generally 30 feet, consisting of two 11.5-foot travel lanes and one 7-foot parking lane (permitted and marked on the north side). The intersection at 4th Street and Wright Street are stop controlled, and the intersection at 6th Street is signalized. Southbound 5th Street is stop controlled at the intersection with East Armory Avenue.

Pedestrian, Bicycle, and Transit Facilities

Sidewalks are located on each side of the roadway along all of the study area streets. Depressed curb ramps are present at every intersection, but a portion are not compliant with the most recent ADA standards. Crosswalks were marked at half of all the intersections that were studied. Bicycle travel is permitted, but dedicated bike lanes are not present within the study area.

• Existing Peak Hour Traffic

Peak period traffic counts were performed by Primera Engineers, Inc. to establish existing traffic volumes and patterns in the study area. Counts were taken at the following six intersections to capture vehicle, pedestrian, and bicyclist travel as a part of this study:

- E. John Street and 5th Street
- E. Daniel Street and 5th Street
- E. Daniel Street and 6th Street
- E. Chalmers Street and 5th Street
- E. Chalmers Street and 6th Street
- E. Armory Avenue and 5th Street

Before beginning the traffic counts, a review of prior traffic counts near the study area revealed that there were three peak hour periods in which traffic data should be captured. The morning peak hour traffic was counted between the hours of 7-9 A.M., midday between 11:30 A.M. and 1:30 P.M., and evening between 4-6 P.M. The traffic counts were performed over two days utilizing three Primera staff members, and were performed on Tuesday October 27 and Wednesday October 28, 2015. The peak hour for the morning was determined to be 8:00 to 9:00 A.M., the peak hour for midday was determined to be 12:00 P.M. to 1:00 P.M., and the peak hour for the evening was determined to be 4:45 to 5:45 P.M. A summary of the peak hour vehicle volumes can be found in **Figure 4**, pedestrian volumes in **Figure 5**, and bicycle volumes in **Figure 6,** in the Appendix. The volumes recorded in the traffic counts are consistent with the Annual Average Daily Traffic (AADT) reported by the Illinois Department of Transportation (IDOT) for roadways within the study area

II. Traffic Analysis

Analysis of the existing traffic was performed for the six study area intersections where counts were performed. Capacity and delay were determined to assess the ability of the existing roadway system to handle the existing traffic volumes.

Capacity analysis was performed using Synchro 8 computer software which is based on methodologies developed in the Transportation Research Board's *Highway Capacity Manual (2010).* The results of the intersection analysis shows that all six intersections currently operate with a Level of Service of A. A breakdown of each intersection can be found in **Table 1**.

Table 1 - Existing Level of Service

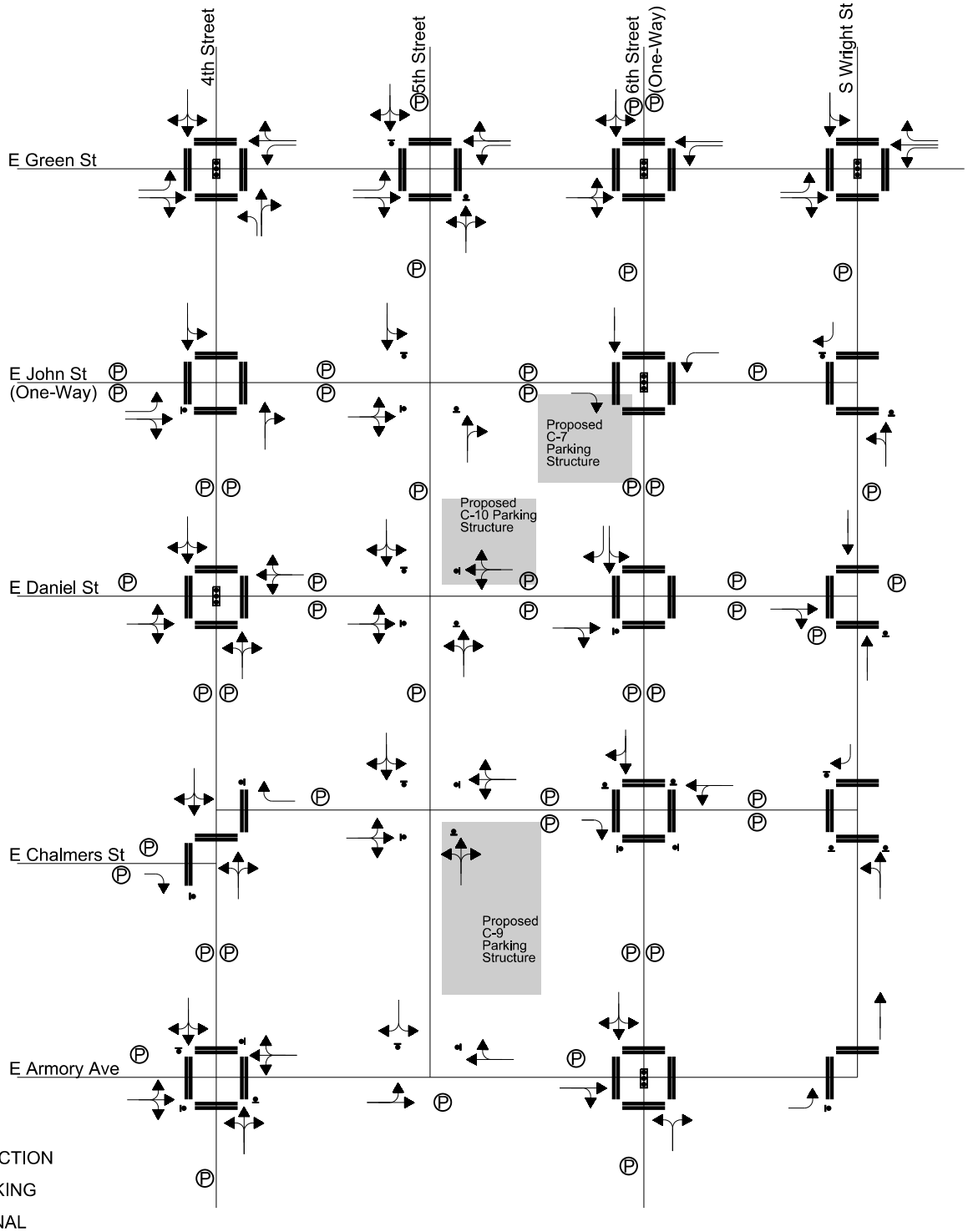
Intersection	AM Peak Hour		Afternoon Peak Hour		PM Peak Hour	
	LOS	Delay	LOS	Delay	LOS	Delay
E. John and 5th	A	8.7	A	7.8	A	7.7
E. Daniel and 5th	A	7.9	A	8.3	A	9.5
E. Daniel and 6th	A	7.8	A	8.0	A	8.3
E. Chalmers and 5th	A	7.3	A	7.9	A	8.3
E. Chalmers and 6th	A	7.8	A	8.6	A	9.3
E. Armory and 5th	A	3.2	A	3.9	A	5.4
LOS = Level of Service						
Delay in seconds						

Based on an analysis of the existing roadway network, and its ability to handle current traffic volumes, the proposed parking structure reconfigurations under consideration by UIUC should not cause significant traffic impacts. The signalized and stop-controlled intersections that were studied currently handle existing traffic volumes at a high Level of Service. These intersections are anticipated to adequately handle shifts in traffic volumes within the study area as a result of the proposed parking structure reconfigurations.

APPENDIX

Primera

NOT TO SCALE



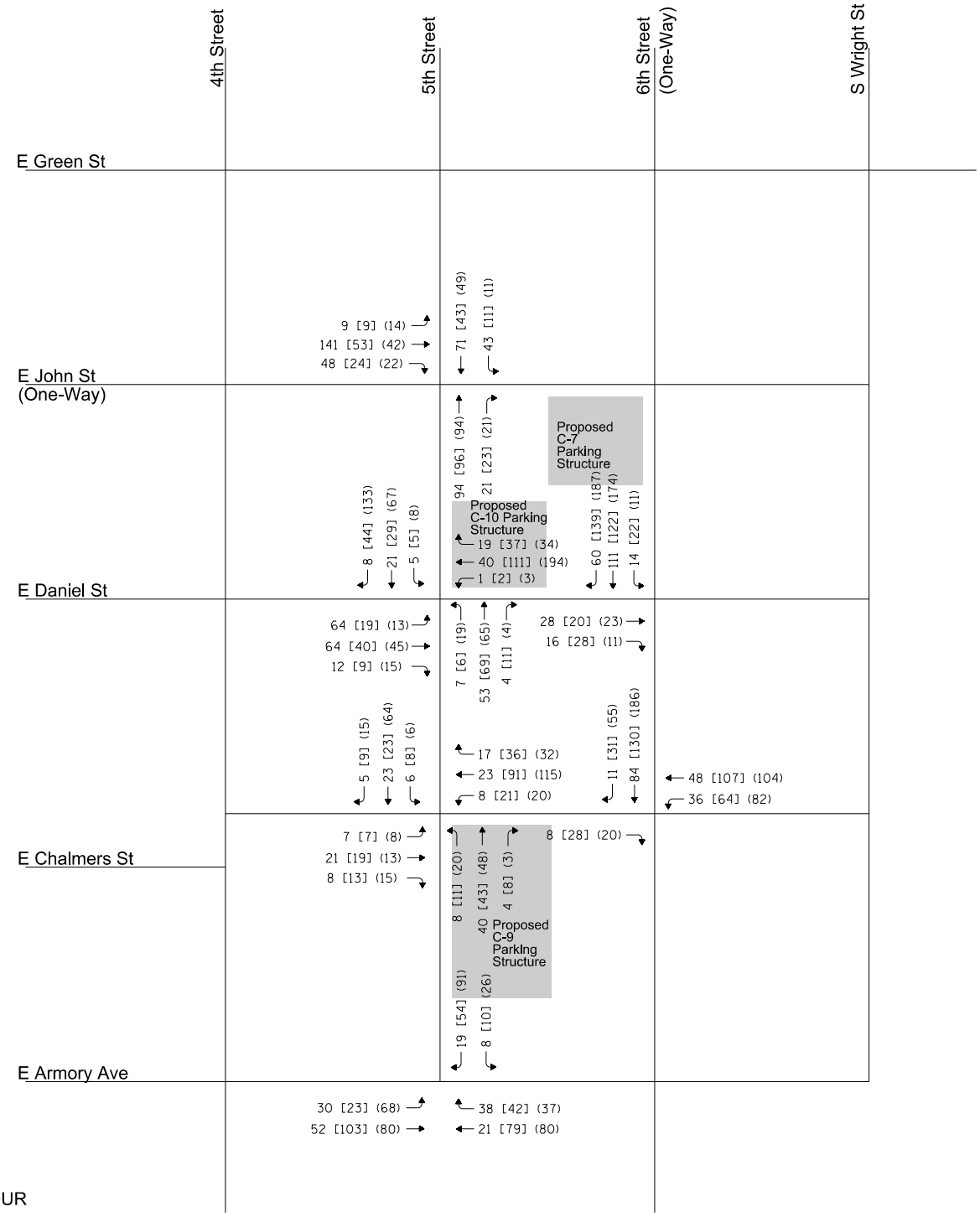
Site Location:

Parking Structures C-7 & C-10
Parking Lot C-9
U of I Urbana-Champaign
Champaign, Illinois

Title:

Existing Roadway Characteristics
Figure 3

Primera



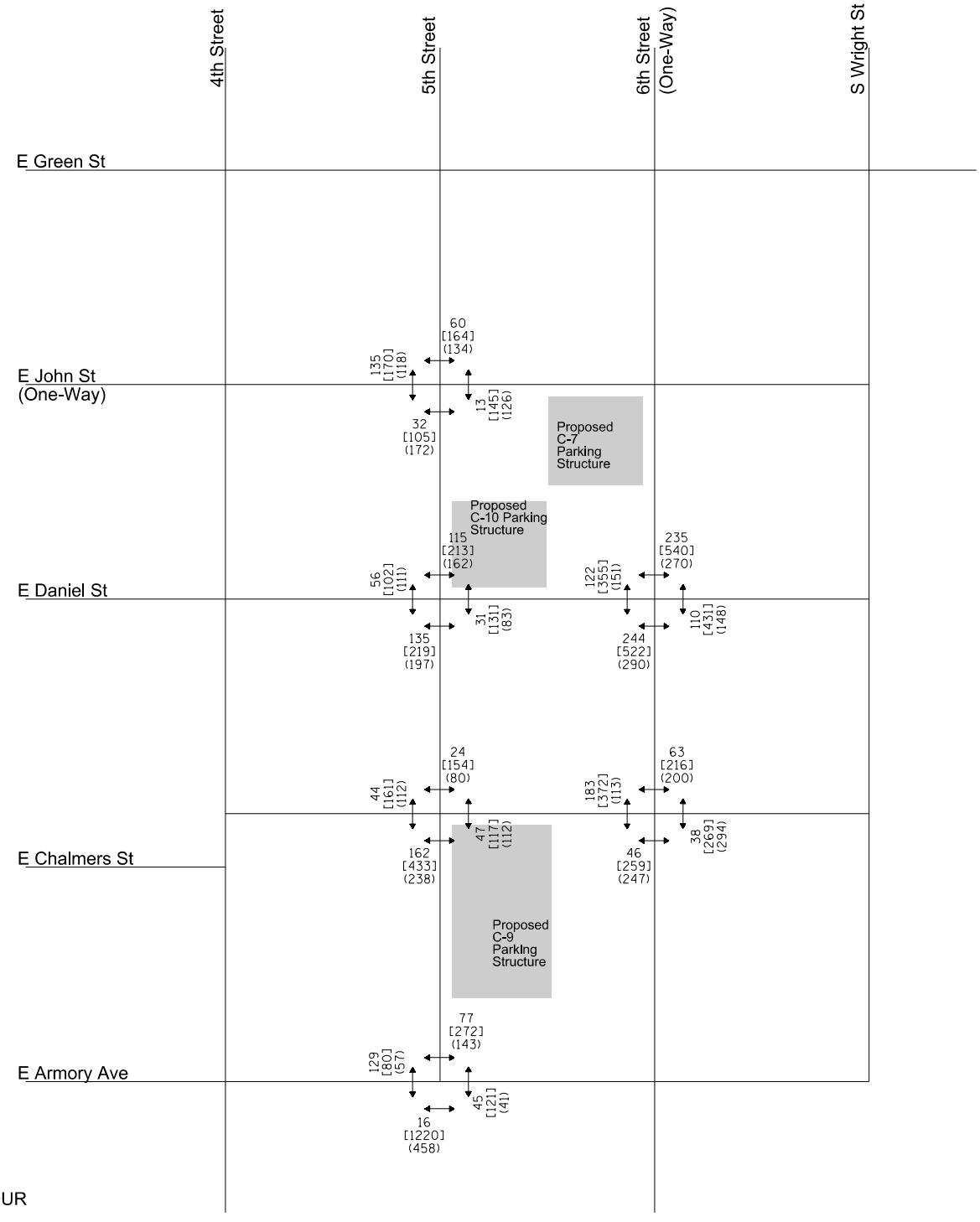
LEGEND

00 - AM PEAK HOUR
[00] - NOON PEAK HOUR
(00) - PM PEAK HOUR

Site Location:	Title:
Parking Structures C-7 & C-10 Parking Lot C-9 U of I Urbana-Champaign Champaign, Illinois	Existing Vehicle Volumes Figure 4

Primera

NOT TO SCALE



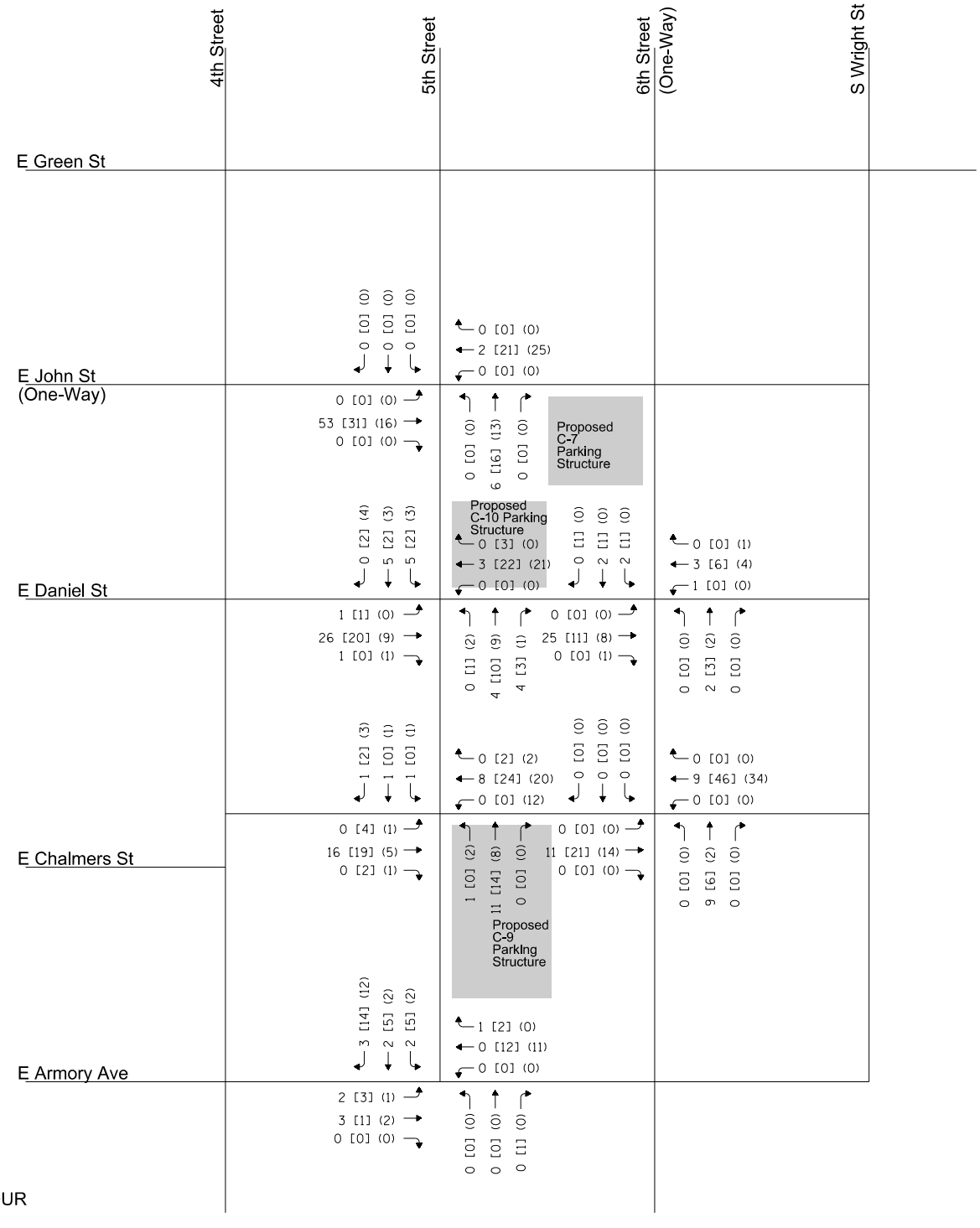
LEGEND

00 - AM PEAK HOUR
[00] - NOON PEAK HOUR
(00) - PM PEAK HOUR

Site Location:	Title:
Parking Structures C-7 & C-10 Parking Lot C-9 U of I Urbana-Champaign Champaign, Illinois	Existing Pedestrian Volumes Figure 5

Primera

NOT TO SCALE



LEGEND

00 - AM PEAK HOUR
[00] - NOON PEAK HOUR
(00) - PM PEAK HOUR

Site Location:

Parking Structures C-7 & C-10
Parking Lot C-9
U of I Urbana-Champaign
Champaign, Illinois

Title:

Existing Bicycle Volumes
Figure 6

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	9	141	48	0	0	0	0	0	0	94	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	10	153	52	0	0	0	0	0	0	102	23
Number of Lanes	0	0	1	0	0	0	0	0	0	0	1	0

Approach	EB	NB
Opposing Approach		SB
Opposing Lanes	0	1
Conflicting Approach Left	SB	EB
Conflicting Lanes Left	1	1
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	8.9	8.3
HCM LOS	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	5%	38%
Vol Thru, %	82%	71%	62%
Vol Right, %	18%	24%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	115	198	114
LT Vol	94	141	71
Through Vol	21	48	0
RT Vol	0	9	43
Lane Flow Rate	125	215	124
Geometry Grp	1	1	1
Degree of Util (X)	0.155	0.261	0.16
Departure Headway (Hd)	4.466	4.373	4.647
Convergence, Y/N	Yes	Yes	Yes
Cap	804	822	772
Service Time	2.49	2.395	2.671
HCM Lane V/C Ratio	0.155	0.262	0.161
HCM Control Delay	8.3	8.9	8.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.5	1	0.6

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	43	71	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	47	77	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.6
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	64	64	12	0	1	40	19	0	7	53	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	70	70	13	0	1	43	21	0	8	58	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.2	7.5	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	46%	2%	15%
Vol Thru, %	83%	46%	67%	62%
Vol Right, %	6%	9%	32%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	64	140	60	34
LT Vol	53	64	40	21
Through Vol	4	12	19	8
RT Vol	7	64	1	5
Lane Flow Rate	70	152	65	37
Geometry Grp	1	1	1	1
Degree of Util (X)	0.086	0.178	0.075	0.045
Departure Headway (Hd)	4.443	4.21	4.154	4.385
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	810	840	866	820
Service Time	2.448	2.295	2.16	2.391
HCM Lane V/C Ratio	0.086	0.181	0.075	0.045
HCM Control Delay	7.9	8.2	7.5	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.6	0.2	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	5	21	8
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	5	23	9
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.6
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	28	16	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	30	17	0	0	0	0	0	0	0	0
Number of Lanes	0	0	1	0	0	0	0	0	0	0	0	0

Approach	EB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	SB
Conflicting Lanes Left	2
Conflicting Approach Right	
Conflicting Lanes Right	0
HCM Control Delay	7.4
HCM LOS	A

Lane	EBLn1	SBLn1	SBLn2
Vol Left, %	0%	11%	0%
Vol Thru, %	64%	89%	0%
Vol Right, %	36%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	44	125	60
LT Vol	28	111	0
Through Vol	16	0	60
RT Vol	0	14	0
Lane Flow Rate	48	136	65
Geometry Grp	2	7	7
Degree of Util (X)	0.055	0.176	0.071
Departure Headway (Hd)	4.17	4.675	3.918
Convergence, Y/N	Yes	Yes	Yes
Cap	864	768	914
Service Time	2.17	2.399	1.642
HCM Lane V/C Ratio	0.056	0.177	0.071
HCM Control Delay	7.4	8.4	6.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.6	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	14	111	60
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	15	121	65
Number of Lanes	0	0	1	1

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.9
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	7	21	8	0	8	23	17	0	8	40	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	23	9	0	9	25	18	0	9	43	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.3	7.2	7.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	19%	17%	18%
Vol Thru, %	77%	58%	48%	68%
Vol Right, %	8%	22%	35%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	52	36	48	34
LT Vol	40	21	23	23
Through Vol	4	8	17	5
RT Vol	8	7	8	6
Lane Flow Rate	57	39	52	37
Geometry Grp	1	1	1	1
Degree of Util (X)	0.064	0.044	0.057	0.042
Departure Headway (Hd)	4.105	4.041	3.947	4.082
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	868	880	901	871
Service Time	2.152	2.096	1.999	2.133
HCM Lane V/C Ratio	0.066	0.044	0.058	0.042
HCM Control Delay	7.4	7.3	7.2	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.2	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	6	23	5
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	7	25	5
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.3
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	0	8	0	36	48	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	9	0	39	52	0	0	0	0	0
Number of Lanes	0	0	0	1	0	1	1	0	0	0	0	0

Approach	EB	WB
Opposing Approach	WB	EB
Opposing Lanes	2	1
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		SB
Conflicting Lanes Right	0	1
HCM Control Delay	6.8	8
HCM LOS	A	A

Lane	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	0%
Vol Thru, %	0%	0%	100%	88%
Vol Right, %	100%	0%	0%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	36	48	95
LT Vol	0	0	48	84
Through Vol	8	0	0	11
RT Vol	0	36	0	0
Lane Flow Rate	9	39	52	103
Geometry Grp	5	7	7	2
Degree of Util (X)	0.009	0.057	0.068	0.116
Departure Headway (Hd)	3.684	5.222	4.721	4.033
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	956	684	755	877
Service Time	1.768	2.971	2.47	2.115
HCM Lane V/C Ratio	0.009	0.057	0.069	0.117
HCM Control Delay	6.8	8.3	7.8	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.2	0.2	0.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	84	11
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	91	12
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.7
HCM LOS	A

Lane

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	30	52	21	38	8	19
Conflicting Peds, #/hr	77	0	0	77	45	129
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	57	23	41	9	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	193	0	-	0	294	249
Stage 1	-	-	-	-	172	-
Stage 2	-	-	-	-	122	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1380	-	-	-	697	790
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	903	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1291	-	-	-	541	660
Mov Cap-2 Maneuver	-	-	-	-	541	-
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	785	-

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	11.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1291	-	-	-	620
HCM Lane V/C Ratio	0.025	-	-	-	0.047
HCM Control Delay (s)	7.9	0	-	-	11.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	9	53	24	0	0	0	0	0	0	96	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	10	58	26	0	0	0	0	0	0	104	25
Number of Lanes	0	0	1	0	0	0	0	0	0	0	1	0

Approach	EB	NB
Opposing Approach		SB
Opposing Lanes	0	1
Conflicting Approach Left	SB	EB
Conflicting Lanes Left	1	1
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	7.7	7.8
HCM LOS	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	10%	20%
Vol Thru, %	81%	62%	80%
Vol Right, %	19%	28%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	119	86	54
LT Vol	96	53	43
Through Vol	23	24	0
RT Vol	0	9	11
Lane Flow Rate	129	93	59
Geometry Grp	1	1	1
Degree of Util (X)	0.145	0.107	0.069
Departure Headway (Hd)	4.027	4.109	4.238
Convergence, Y/N	Yes	Yes	Yes
Cap	882	859	836
Service Time	2.089	2.198	2.313
HCM Lane V/C Ratio	0.146	0.108	0.071
HCM Control Delay	7.8	7.7	7.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.5	0.4	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	11	43	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	12	47	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.6
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	19	40	9	0	2	111	37	0	6	69	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	21	43	10	0	2	121	40	0	7	75	12
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8	8.3	8.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	28%	1%	6%
Vol Thru, %	80%	59%	74%	37%
Vol Right, %	13%	13%	25%	56%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	86	68	150	78
LT Vol	69	40	111	29
Through Vol	11	9	37	44
RT Vol	6	19	2	5
Lane Flow Rate	93	74	163	85
Geometry Grp	1	1	1	1
Degree of Util (X)	0.117	0.092	0.194	0.1
Departure Headway (Hd)	4.495	4.488	4.273	4.248
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	798	799	841	844
Service Time	2.517	2.51	2.292	2.269
HCM Lane V/C Ratio	0.117	0.093	0.194	0.101
HCM Control Delay	8.1	8	8.3	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.3	0.7	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	5	29	44
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	5	32	48
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.7
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	20	28	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	22	30	0	0	0	0	0	0	0	0
Number of Lanes	0	0	1	0	0	0	0	0	0	0	0	0

Approach	EB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	SB
Conflicting Lanes Left	2
Conflicting Approach Right	
Conflicting Lanes Right	0
HCM Control Delay	7.5
HCM LOS	A

Lane	EBLn1	SBLn1	SBLn2
Vol Left, %	0%	15%	0%
Vol Thru, %	42%	85%	0%
Vol Right, %	58%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	48	144	139
LT Vol	20	122	0
Through Vol	28	0	139
RT Vol	0	22	0
Lane Flow Rate	52	157	151
Geometry Grp	2	7	7
Degree of Util (X)	0.061	0.204	0.165
Departure Headway (Hd)	4.233	4.701	3.924
Convergence, Y/N	Yes	Yes	Yes
Cap	851	764	913
Service Time	2.233	2.431	1.654
HCM Lane V/C Ratio	0.061	0.205	0.165
HCM Control Delay	7.5	8.6	7.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.8	0.6

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	22	122	139
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	24	133	151
Number of Lanes	0	0	1	1

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	7	19	13	0	21	91	36	0	11	43	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	21	14	0	23	99	39	0	12	47	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.4	8	7.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	18%	14%	20%
Vol Thru, %	69%	49%	61%	57%
Vol Right, %	13%	33%	24%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	62	39	148	40
LT Vol	43	19	91	23
Through Vol	8	13	36	9
RT Vol	11	7	21	8
Lane Flow Rate	67	42	161	43
Geometry Grp	1	1	1	1
Degree of Util (X)	0.082	0.048	0.181	0.053
Departure Headway (Hd)	4.383	4.193	4.042	4.357
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	822	859	877	827
Service Time	2.385	2.193	2.121	2.359
HCM Lane V/C Ratio	0.082	0.049	0.184	0.052
HCM Control Delay	7.8	7.4	8	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.7	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	8	23	9
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	9	25	10
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.6
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	0	28	0	64	107	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	30	0	70	116	0	0	0	0	0
Number of Lanes	0	0	0	1	0	1	1	0	0	0	0	0

Approach	EB	WB
Opposing Approach	WB	EB
Opposing Lanes	2	1
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		SB
Conflicting Lanes Right	0	1
HCM Control Delay	7.2	8.7
HCM LOS	A	A

Lane	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	0%
Vol Thru, %	0%	0%	100%	81%
Vol Right, %	100%	0%	0%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	64	107	161
LT Vol	0	0	107	130
Through Vol	28	0	0	31
RT Vol	0	64	0	0
Lane Flow Rate	30	70	116	175
Geometry Grp	5	7	7	2
Degree of Util (X)	0.034	0.104	0.157	0.211
Departure Headway (Hd)	4.057	5.478	4.976	4.349
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	884	658	726	829
Service Time	2.073	3.178	2.676	2.35
HCM Lane V/C Ratio	0.034	0.106	0.16	0.211
HCM Control Delay	7.2	8.8	8.6	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.6	0.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	130	31
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	141	34
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.5
HCM LOS	A

Lane

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	23	103	79	42	10	54
Conflicting Peds, #/hr	77	0	0	77	45	129
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	112	86	46	11	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	261	0	-	0	400	315
Stage 1	-	-	-	-	238	-
Stage 2	-	-	-	-	162	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1303	-	-	-	606	725
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	867	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1219	-	-	-	472	606
Mov Cap-2 Maneuver	-	-	-	-	472	-
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	757	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1219	-	-	-	580
HCM Lane V/C Ratio	0.021	-	-	-	0.12
HCM Control Delay (s)	8	0	-	-	12.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	14	42	22	0	0	0	0	0	0	94	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	15	46	24	0	0	0	0	0	0	102	23
Number of Lanes	0	0	1	0	0	0	0	0	0	0	1	0

Approach	EB	NB
Opposing Approach		SB
Opposing Lanes	0	1
Conflicting Approach Left	SB	EB
Conflicting Lanes Left	1	1
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	7.7	7.7
HCM LOS	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	18%	18%
Vol Thru, %	82%	54%	82%
Vol Right, %	18%	28%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	115	78	60
LT Vol	94	42	49
Through Vol	21	22	0
RT Vol	0	14	11
Lane Flow Rate	125	85	65
Geometry Grp	1	1	1
Degree of Util (X)	0.14	0.097	0.076
Departure Headway (Hd)	4.022	4.126	4.215
Convergence, Y/N	Yes	Yes	Yes
Cap	884	855	841
Service Time	2.082	2.215	2.285
HCM Lane V/C Ratio	0.141	0.099	0.077
HCM Control Delay	7.7	7.7	7.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.5	0.3	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	11	49	0
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	12	53	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.6
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	13	45	15	0	3	194	34	0	19	65	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	14	49	16	0	3	211	37	0	21	71	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.6	10	8.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	18%	1%	4%
Vol Thru, %	74%	62%	84%	32%
Vol Right, %	5%	21%	15%	64%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	73	231	208
LT Vol	65	45	194	67
Through Vol	4	15	34	133
RT Vol	19	13	3	8
Lane Flow Rate	96	79	251	226
Geometry Grp	1	1	1	1
Degree of Util (X)	0.133	0.108	0.327	0.281
Departure Headway (Hd)	5.013	4.907	4.693	4.473
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	711	725	763	798
Service Time	3.075	2.974	2.747	2.524
HCM Lane V/C Ratio	0.135	0.109	0.329	0.283
HCM Control Delay	8.9	8.6	10	9.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	1.4	1.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	8	67	133
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	9	73	145
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.3
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	23	11	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	25	12	0	0	0	0	0	0	0	0
Number of Lanes	0	0	1	0	0	0	0	0	0	0	0	0

Approach	EB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	SB
Conflicting Lanes Left	2
Conflicting Approach Right	
Conflicting Lanes Right	0
HCM Control Delay	7.8
HCM LOS	A

Lane	EBLn1	SBLn1	SBLn2
Vol Left, %	0%	6%	0%
Vol Thru, %	68%	94%	0%
Vol Right, %	32%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	34	185	187
LT Vol	23	174	0
Through Vol	11	0	187
RT Vol	0	11	0
Lane Flow Rate	37	201	203
Geometry Grp	2	7	7
Degree of Util (X)	0.047	0.259	0.22
Departure Headway (Hd)	4.558	4.629	3.899
Convergence, Y/N	Yes	Yes	Yes
Cap	791	776	921
Service Time	2.558	2.357	1.626
HCM Lane V/C Ratio	0.047	0.259	0.22
HCM Control Delay	7.8	9	7.7
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.1	1	0.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	11	174	187
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	12	189	203
Number of Lanes	0	0	1	1

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.3
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	8	13	15	0	20	115	32	0	20	48	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	9	14	16	0	22	125	35	0	22	52	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	8.5	8.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	28%	22%	12%	7%
Vol Thru, %	68%	36%	69%	75%
Vol Right, %	4%	42%	19%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	71	36	167	85
LT Vol	48	13	115	64
Through Vol	3	15	32	15
RT Vol	20	8	20	6
Lane Flow Rate	77	39	182	92
Geometry Grp	1	1	1	1
Degree of Util (X)	0.098	0.047	0.216	0.114
Departure Headway (Hd)	4.563	4.318	4.279	4.426
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	786	831	840	811
Service Time	2.583	2.337	2.295	2.444
HCM Lane V/C Ratio	0.098	0.047	0.217	0.113
HCM Control Delay	8.1	7.6	8.5	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.1	0.8	0.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	6	64	15
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	7	70	16
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	0	20	0	82	104	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	22	0	89	113	0	0	0	0	0
Number of Lanes	0	0	0	1	0	1	1	0	0	0	0	0

Approach	EB	WB
Opposing Approach	WB	EB
Opposing Lanes	2	1
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		SB
Conflicting Lanes Right	0	1
HCM Control Delay	7.4	9.1
HCM LOS	A	A

Lane	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	0%
Vol Thru, %	0%	0%	100%	77%
Vol Right, %	100%	0%	0%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	82	104	241
LT Vol	0	0	104	186
Through Vol	20	0	0	55
RT Vol	0	82	0	0
Lane Flow Rate	22	89	113	262
Geometry Grp	5	7	7	2
Degree of Util (X)	0.026	0.14	0.162	0.317
Departure Headway (Hd)	4.291	5.656	5.153	4.363
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	832	635	696	825
Service Time	2.327	3.386	2.883	2.381
HCM Lane V/C Ratio	0.026	0.14	0.162	0.318
HCM Control Delay	7.4	9.3	8.9	9.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.5	0.6	1.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	186	55
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	202	60
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.4
HCM LOS	A

Lane

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	68	80	80	37	26	91
Conflicting Peds, #/hr	77	0	0	77	45	129
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	87	87	40	28	99

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	256	0	-	0	471	313
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	235	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1309	-	-	-	551	727
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	804	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1225	-	-	-	411	607
Mov Cap-2 Maneuver	-	-	-	-	411	-
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	672	-

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	13.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1225	-	-	-	549
HCM Lane V/C Ratio	0.06	-	-	-	0.232
HCM Control Delay (s)	8.1	0	-	-	13.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9

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