

CAMPUS PARKING AND TRANSPORTATION STUDY

Introduction

Parking and transit will become important and interconnected issues as Kansas State University implements its master plan. The amount of parking available today in the core campus is limited during peak times. According to the master plan, many new facilities are to be constructed on the site of existing surface parking lots. Some of these projects are currently underway or are planned to begin in the upcoming years. These facilities reduce available parking and increase demand for parking in and near the core campus.

To address campus growth and loss of existing parking lots, the University must have a strategy to address future parking needs of the campus. Minimal space is available for parking in the core campus, so new parking will be farther from the core. As a result, a robust transit system will be needed to connect new parking on the periphery to the center of campus.

Study Purpose

The purpose of this study is to evaluate existing parking and transit at Kansas State University and develop recommendations that can be implemented over the course of the next several years. These recommendations will address campus growth and the specific projects that are either underway or are being planned. The study also includes comparison to peer institutions. This study was completed in conjunction with development of the North Campus Corridor Master Plan.

Existing Conditions

Parking Supply

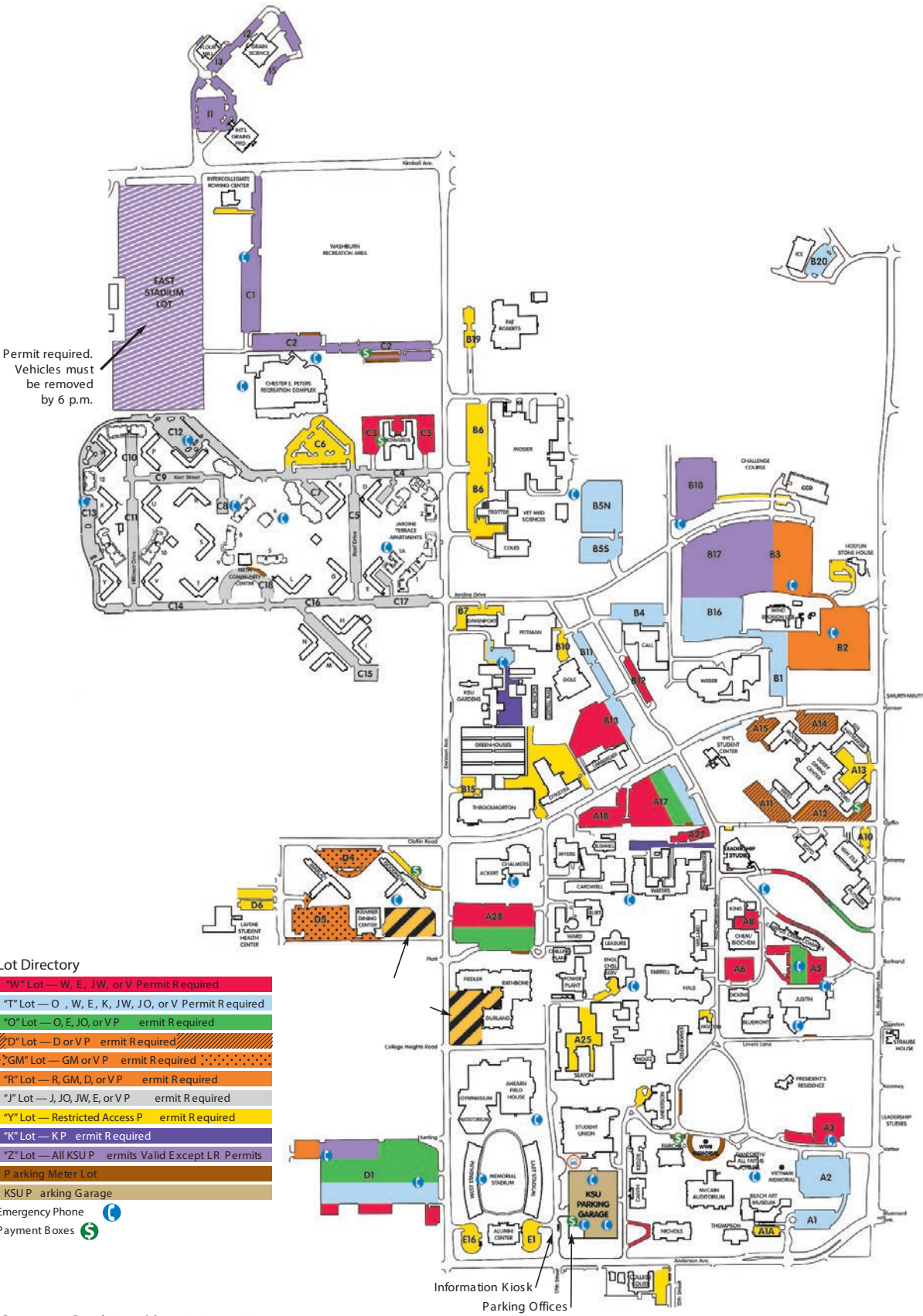
The campus parking supply and permit sales are administered by KSU Parking Services. Inventory data provided by Parking Services identified the location and type of permit required for roughly 11,250 campus parking spaces. There are an additional 4,400 parking spaces on the east and west sides of Bill Snyder Family Stadium which are not included in this inventory. The campus parking inventory is shown in Table 1 by type of permit designated for the spaces.

Several projects in progress affected the total number of spaces in the inventory at the time of this study. Lot D2 is closed for the construction of Wefald Hall. The off-street portion of A26 is closed for the expansion to the Engineering complex. A portion of lot A3 is closed for the construction of the new business building. Parking for KSU facilities that are not adjacent to the campus, such as the KSU Foundation building on Anderson Avenue and the forestry site on Claflin Road are not included in this inventory.

Table 1: Parking Space Inventory

Parking Lot Type	Designation	Number of Spaces*
O	Off Campus Students	619
W	Faculty/ Staff	1,370
K	Faculty/ Staff	84
T	O, W, K Permits Valid	1,736
D	Derby Complex Residents	345
GM	Kramer Complex Residents	318
R	Dormitory Residents	1,127
J	Jardine Apartment Residents	1,326
Y	Restricted Access	1,127
Z	All Permits Valid	1,737
Parking Garage	Faculty/ Staff Students and Metered	1,367
Other	Miscellaneous	97
Total		11,253

*Does not include motorcycle parking spaces



Campus Parking Map 2014-2015

The inventory includes nearly 1,400 spaces in the parking garage located in the northeast corner of Anderson Avenue and 17th Street, on the south side of the Student Union. The garage includes 500 student spaces, 400 preferred spaces, 130 reserved spaces, and 270 metered spaces. Drivers with permits allowing garage access are issued an RFID tag that operates the entry and exit gates. All other drivers take a ticket upon entry to the garage. Ticketholders can pay at the garage exit or at pay stations in the garage stairwell. Construction of the garage was completed during the 2009 - 2010 school year. At the current rate of payment for the garage, the debt will not be retired until around 2040.

Parking Permits

The types of parking permits correspond to the different categories of parking needs for the campus. The type of permit fees, number of permits sold, and revenue is shown in Table 2.

The majority of parking on campus is for faculty, staff, and off-campus students who commute to campus primarily during business hours on weekdays. There are different types of permits available for commuters. The cost of a staff parking permit varies by salary level. A small number of permits for reserved parking can also be purchased in many of the surface parking lots and in the parking garage.

Many on-campus residents have a vehicle parked on campus throughout each day of the week, including weekends. Residence Hall students can purchase a D, R, or GM permit. Jardine Apartment residents can purchase either a J permit, or a JO permit for an additional \$10. The JO permit allows them to park in both J and O lots.

The on-campus population in dormitories and apartments is roughly 5,200, and there were 3,877 on-campus resident parking permits sold during the 2014 - 2015 school year. This corresponds to approximately 75 percent of on-campus residents

purchasing parking permits, which is a higher percentage than are purchased by the off-campus student population. This is due in part to many off-campus students living close enough to campus that they can bike or walk. There are also a number of off-campus students who park on the streets in the neighborhoods surrounding the campus.

The total number of permits sold in 2014 – 2015 exceeds the inventory for an oversell ratio of 1.2 permits per parking space. Off-campus commuter parking is typically oversold on campuses because the demand for commuter parking varies by day of week and time of day. This is especially true of students who do not attend classes all day every day. Parking for on-campus residents cannot be oversold because essentially all residents with a vehicle need parking available overnight and during much of the weekday.

Parking fees will increase for each type of permit by approximately 5 percent for the 2015 – 2016 school year. With the fee increase, the average student permit (without parking garage access) will cost \$180 per year and the average employee permit will cost \$185 per year. If the same number of permits is sold in 2015 – 2016 with the new fee structure, the total revenue will be approximately \$2,860,000.

Parking Data Collection

To determine how the existing parking supply is utilized, parking occupancy data was collected during typical weekdays when regular classes were in session. The number of parked vehicles was manually inventoried on Tuesday, December 9, 2014, and Wednesday, December 10, 2014. During these days, temperatures were close to the averages, skies were clear, and there was no precipitation. Inventories were conducted at each parking area every two hours during one of the days between 7:00 a.m. and 5:00 p.m. Parking occupancy data for the garage was derived from the count of entering and exiting vehicles, which was provided by Parking Services staff. The peak occupancy of each lot was generally

Table 2: 2014-2015 Annual Parking Permit Fees and Revenue

Parking Permit Type	Designation	Permit Cost	Number of Permits Sold*	Permit Revenue
O	Off-Campus Student	\$170	2,109	\$358,530
O (with garage access)	Off-Campus Student	\$180	4,007	\$721,260
R, D, GM	Residence Hall	\$170	2,991	\$508,470
J	Jardine Apartment Residents	\$170	133	\$22,6101
JO	Jardine Resident Commuter	\$180	753	\$135,540
W, K, Y	Faculty Staff (FT1)	\$150	437	\$65,550
	Faculty Staff (FT2)	\$175	1,315	\$203,125
	Faculty Staff (FT3)	\$190	1,502	\$285,380
	12-Hour Reserved	\$900	89	\$80,100
	24-Hour Reserved	\$1,300	14	\$18,200
Garage Preferred	Faculty Staff	\$410	294	\$120,540
Garage Reserved	Faculty Staff	\$610	119	\$72,590
Total			13,247	2,591,895

*Through April 10, 2015

Table 3: Peak Parking Occupancy

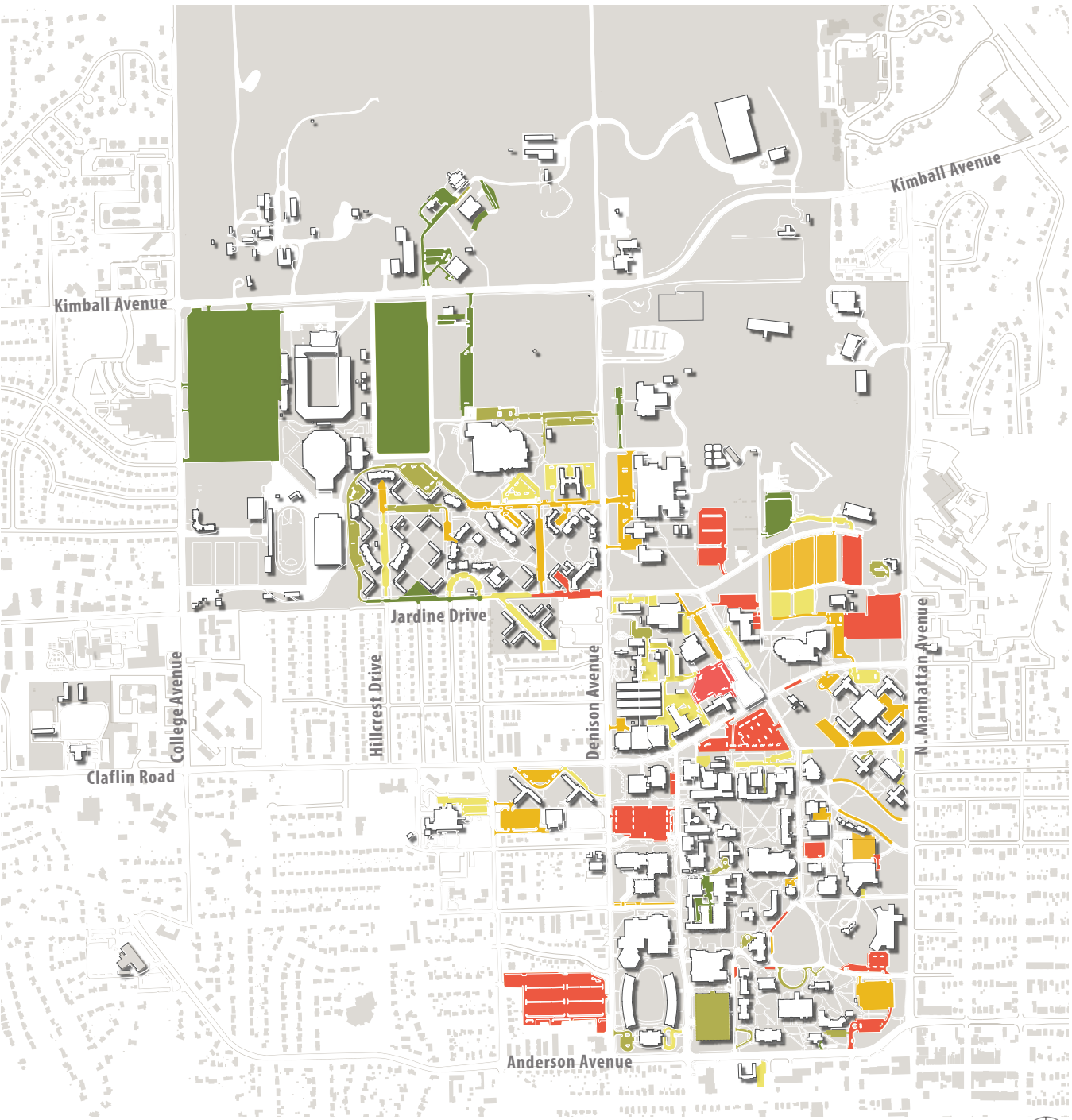
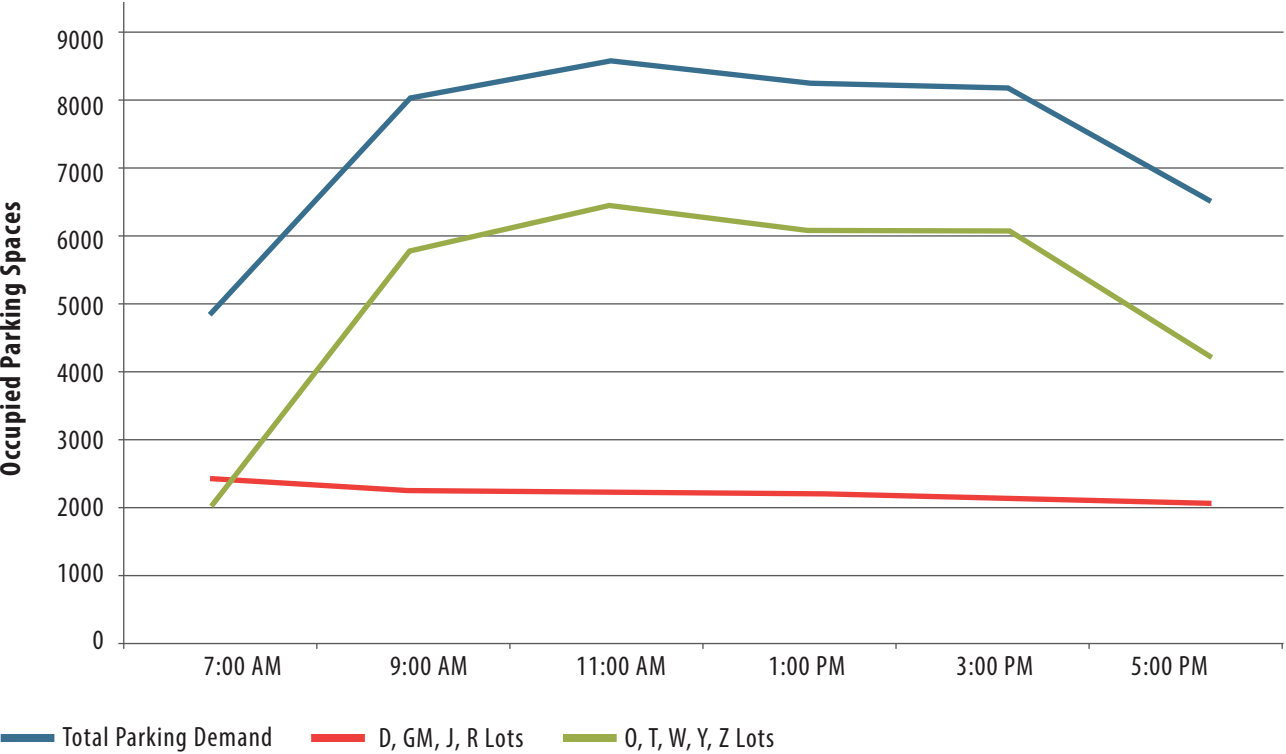
Parking Lot Type	Designation	Number of Spaces	Peak Occupancy	Percent Occupied
O	Off-Campus Students	619	609	98%
W	Faculty/ Staff	1,370	1,263	92%
K	Faculty/ Staff	84	64	76%
T	O, W, K Permits Valid	1,736	1,612	93%
D	Derby Complex Residents	345	304	88%
GM	Kramer Complex Residents	318	291	92%
R	Residence Halls	1,127	1,132	100%
J	Jardine Apartment Residents	1,326	959	72%
Y	Restricted Access	1,127	875	78%
Z	All Permits Valid	1,737	1,080	62%
Parking Garage	Faculty/ Staff Students and Metered	1,367	864	63%
Other	Miscellaneous	97	78	80%
Total		11,253	9,131	81%

found to occur between 9:00 a.m. and 1:00 p.m. The results of the parking occupancy data collection is shown in Table 3.

The data collected indicates that most of the surface parking areas south of Claflin Road are essentially full at peak times on a typical weekday. The available parking remaining consists of reserved, metered, or handicapped spaces. Parking occupancy begins to decrease north of Claflin Road, but remains at 70 percent or more in most areas. The only sizable parking areas with low occupancy percentage are north of Jardine Drive. The exception to this is the parking garage at the Student Union. It has a low parking occupancy rate due to low usage of reserved, preferred, and metered parking at the time of the data collection.

The graph illustrates the demand for parking over the course of a typical weekday. The peak demand for parking on campus occurs at 11:00 a.m., then slowly declines throughout the afternoon. One trend to note is demonstrated when the parking demand for on-campus residents and commuters is separated. The demand for on-campus residents is essentially unchanged throughout the course of a typical weekday, while the commuter demand fluctuates. This indicates that on-campus residents generally do not use their vehicles over the course of a typical weekday. Many on-campus residents park in Z lot as well (lot D1 and B17) because R lots are at capacity during all time periods.

Parking Occupancy During a Typical Weekday



Existing Peak Parking Occupancy

- < 50% Peak Occupancy
- 50%-70% Peak Occupancy
- 71%-85% Peak Occupancy
- 86%-95% Peak Occupancy
- > 95% Peak Occupancy

Transit Routes

The Flint Hills Area Transportation Agency (ATA) currently operates two fixed routes on campus and four city-wide fixed routes. These routes are illustrated on the existing transit service figure. The fleet is composed of ADA-accessible, 20-passenger cutaway vehicles equipped with bicycle racks. Detailed information for the existing routes, is included in the appendix and is based on FY 2014 from July 1, 2013 to June 30, 2014 (with the exception of the Park and Ride route that is based on estimates from the Fall 2014 semester). In FY 2014, ATA provided 248,868 total trips.

Jardine Shuttle

The Jardine Shuttle serves approximately 600 students with residence hall contracts that reside in the Jardine Apartments due to housing shortages at the residence halls on campus. These 600 students require transportation to the Derby Dining Center for meals. The Derby Dining Center is more than one-half mile away from the Jardine Apartments and nearby parking is limited. The few parking spaces that may be available are largely reserved or metered spaces. To accommodate these students, ATA operates the Jardine Shuttle directly between the apartments and the Derby Dining Center throughout the day with a service frequency of 10 minutes. In FY 2014, the Jardine Shuttle provided 156,976 trips – an increase in ridership of nearly 50 percent from the previous year. It is the highest ridership route provided by ATA.

Campus Park and Ride

The Park and Ride, which first began operating in Fall 2014, shuttles commuters from the B17 parking lot north of Weber Hall to stops along Mid-Campus Drive before looping back at McCain Auditorium. Because the Park and Ride has only been in operation for one year, there is limited ridership information available. The latest data reports that 4,071 trips were provided during the Fall 2014 semester from late August through mid-December.

Citywide Routes

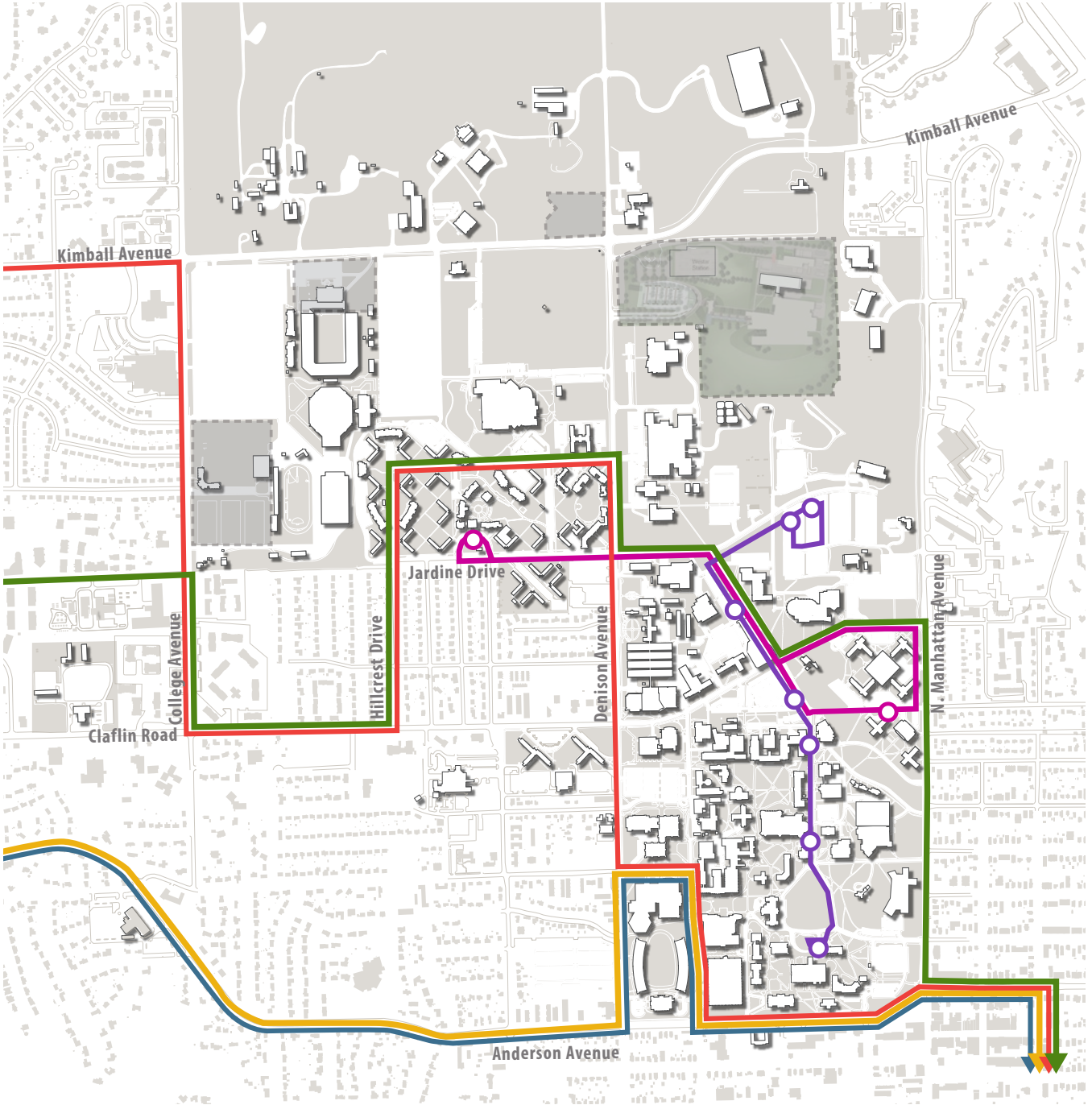
The four city-wide fixed routes travel through campus. The routes are named Orange (Fremont/ Osage), Green (Dickens), Blue (Bluemont), and Red (Candlewood). In FY 2014, ATA provided 49,956 trips on city-wide routes – a decrease in ridership of approximately 8 percent from the previous year. The Red (Candlewood) route is the highest ridership route followed by the Blue (Bluemont) route. The Kansas State University Student Union is the highest ridership bus stop for all four city-wide routes. According to the 2014 ATA Annual Report, 75 percent of off-campus students and 35 percent of employees live within five minutes of the ATA city-wide routes.

University Crossing Route

In addition to the city-wide and campus routes, ATA operates an additional route for the privately-owned, 700-tenant University Crossing Apartments. The University Crossing shuttle is funded as a public deviated route through state and federal funding with the local match by the University Crossing Apartments. The apartment complex is located northwest of Kimball Avenue and College Avenue. The shuttle stops at the University Crossing Apartments and the Kansas State University Student Union, but will deviate up to 3/4-mile to pick up riders who have requested a ride with at least 24-hour notice. Service is free for apartment residents and \$2.00 for the general public. In FY 2014, ATA provided 25,914 trips on the University Crossing route – an increase in ridership of about 30 percent from the previous year. This route is largely a duplication of the Red (Candlewood) route.

SafeRide

In addition, ATA also offers three campus routes as part of the SafeRide shuttle service. The SafeRide program offers students and their guests a safe ride home on Thursday through Saturday nights. In FY 2014, the three SafeRide routes provided 16,022 trips.



Existing Transit Service

- | | | |
|----------------------|---|---|
| Jardine Shuttle | Freemont/ Osage Bus Route (Kansas State in session) | Dickens Bus Route (University in session) |
| Campus Park and Ride | Bluemont Bus Route (all year) | Candlewood Bus Route (all year) |
| Park and Ride Stops | | |

Transit Revenue and Operating Costs

In FY 2014, ATA had a total revenue of \$1,831,410 (including demand response service). Federal grants provided \$1,142,829 while service contracts generated \$550,975. Farebox recovery generated an additional \$130,982. Excluding federal funding, the largest source of funds is the service contract with Kansas State University for \$289,750 – approximately 16 percent of the total revenue. The University contract covers the operating cost for the campus routes in addition to subsidizing a portion of the city-wide routes. Because the Park and Ride shuttle was not in operation during FY 2014, the referenced contract information does not include the Park and Ride route (estimate provided by ATA for the Park and Ride route for the Fall 2014 semester is approximately \$37,000).

Campus routes are currently funded by six different funding sources: four KSU departments, one private entity, and general ATA funding through state and federal funds. There is no student fee dedicated to transit service at this time and service on the campus routes is provided at no charge to students, faculty, and staff with valid KSU identification. Students, faculty, and staff are also eligible for free point-to-point service on the city-wide routes only from the Kansas State University Foundation, the Student Union, or Edwards Hall. Full fare for the general public on city-wide and campus routes is \$1.00 (with the exception of SafeRide routes for \$2.00 for the general public).

The total operating budget for FY 2014 was \$562,316. Of that budget, the Jardine shuttle has an annual operating cost of \$114,417, which converts to an hourly operating cost of \$23.38 per hour. Annual operating cost of the campus Park and Ride route is not included in the budget as it was not in operation during FY 2014. The operating cost for the Park and Ride route is estimated to be \$74,000, or an hourly operating cost of roughly \$38.50 per hour.

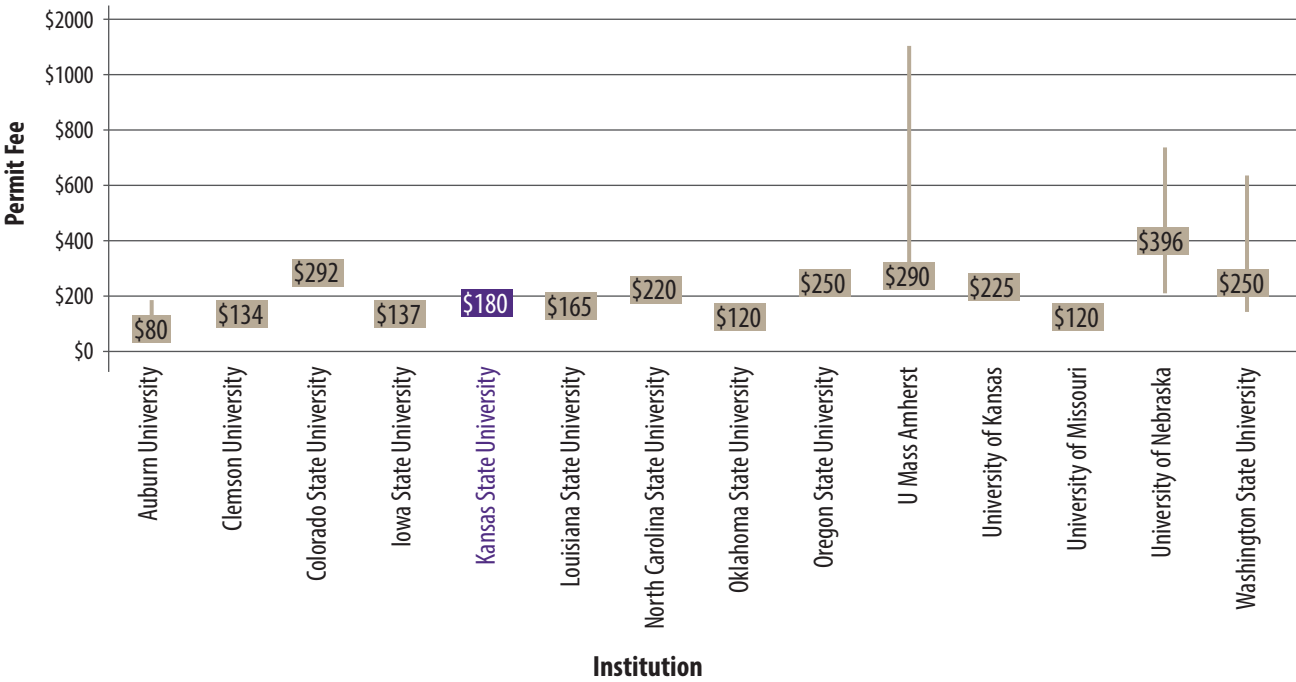
Peer Comparisons

Parking and transit information was collected from thirteen peer institutions. The peer institutions were identified by the University and include ten land grant institutions with similar enrollment and academic programs that represent a broad geographic distribution. Three other institutions were included that are within close proximity to Kansas State University for local comparison as well. The peer data was analyzed to compare practices and to provide context for recommendations that were developed for Kansas State University. Key findings from the peer institutions comparisons are provided below:

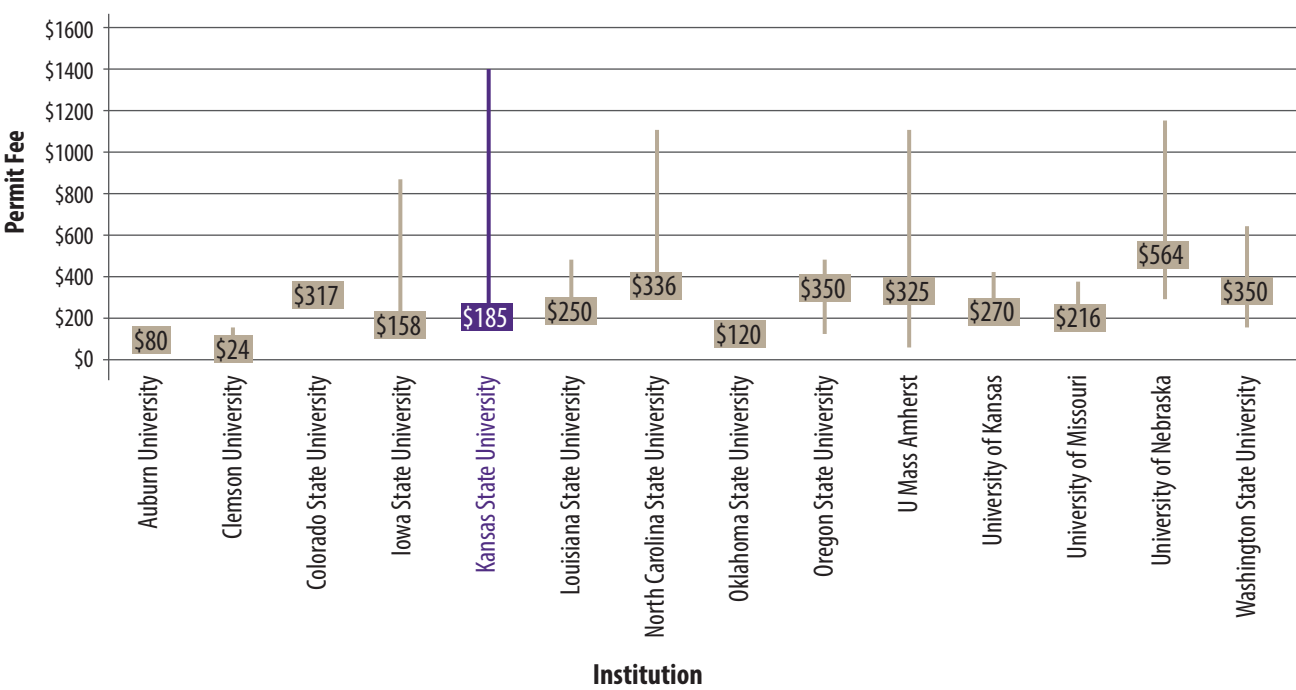
Key Parking Findings

- **Parking Permit Fees:** Parking permit fees at Kansas State University for the 2015 – 2016 school year are below the average prices from peer institutions as indicated in the graphs. The graphs show the range of permit fees and identify the average permit fee for each institution. The average student parking permit among the peer institutions is \$206 and the average faculty/staff permit is \$258.
- **Zoned Parking:** Almost all peer institutions vary parking permit fees to some degree based on the location of parking lots relative to the areas of highest demand. Several universities have implemented a zoned parking system. The zones provide a range of pricing options for students, faculty, and staff, rewarding those who are willing to park in less convenient locations.
- **Commuter Parking:** Many peer institutions provide commuter parking on the perimeter of the campus and utilize the campus transit system to shuttle commuters to the core of campus. These commuter parking lots typically have a reduced permit fee, or do not require a parking permit. Stadium parking lots are frequently used as commuter parking.
- **Parking Ratio:** One method to quantify campus parking is to compare the ratio of parking spaces to the number of students enrolled on the campus. The ratios of the peer institutions vary as shown in graph. Each university has unique characteristics that affect the ratios. For instance, at Iowa State University, the commuters park off campus. The average ratio of the peers is about 0.50 students per space, which is not uncommon for a walkable urban campus well

Student Parking Permit Fees



Faculty/ Staff Parking Permit Fees



served by transit. Kansas State University has a ratio that is slightly higher than the average.

Key Transit Findings

- **Transit Operating Structure:** The peer institutions utilize a range of transit operating models. Some transit systems only serve the university campus while others serve both the campus and city-wide to provide service to residential and commercial hotspots. In the case of campus and city coordinated systems, the lead agency can be the university (i.e. Oklahoma State University) or the city agency (i.e. Washington State University). In cases where the university financially supports the city-wide transit system, students can typically travel system-wide at no charge.
- **Campus Vehicle Restrictions:** All peer institutions allow buses to utilize the internal campus streets for transit service. Eleven of the thirteen universities also have some form of campus vehicle restriction to reinforce a pedestrian-friendly environment. Common vehicle restriction types include an identified campus core area, along designated corridors, or pedestrian malls. However, the majority of the transit services authorize buses to use the restricted areas in order to improve on-time performance and customer service in the campus core.
- **Days and Hours of Service:** Campus transit systems typically operate Monday through Friday from 7:00 AM - 6:00 PM with a service frequency of ten minutes or less to meet peak demand. Reduced service is often available during the evening or weekends. Systems also operate at reduced service during university holidays and breaks. The University of Nebraska utilizes on-call service for some perimeter parking lots and after peak operating hours.
- **Technology:** Nearly all universities utilize GPS tracking available via mobile devices or the internet to provide real-time transit service information to improve customer service and reliability.
- **Student Transit Fee:** Most universities charge a student transit fee per semester as shown in the graph. As a result, students, faculty, and staff can utilize the transit service at no additional cost. Fees range from as low as \$15.00 per semester up to \$131.00 per semester. Of the universities that charge a student transit fee, the average fee is about \$50.00 per semester. Establishing a relationship between enrollment and revenue also allows the transit system to expand service as needed to accommodate future growth and demand.

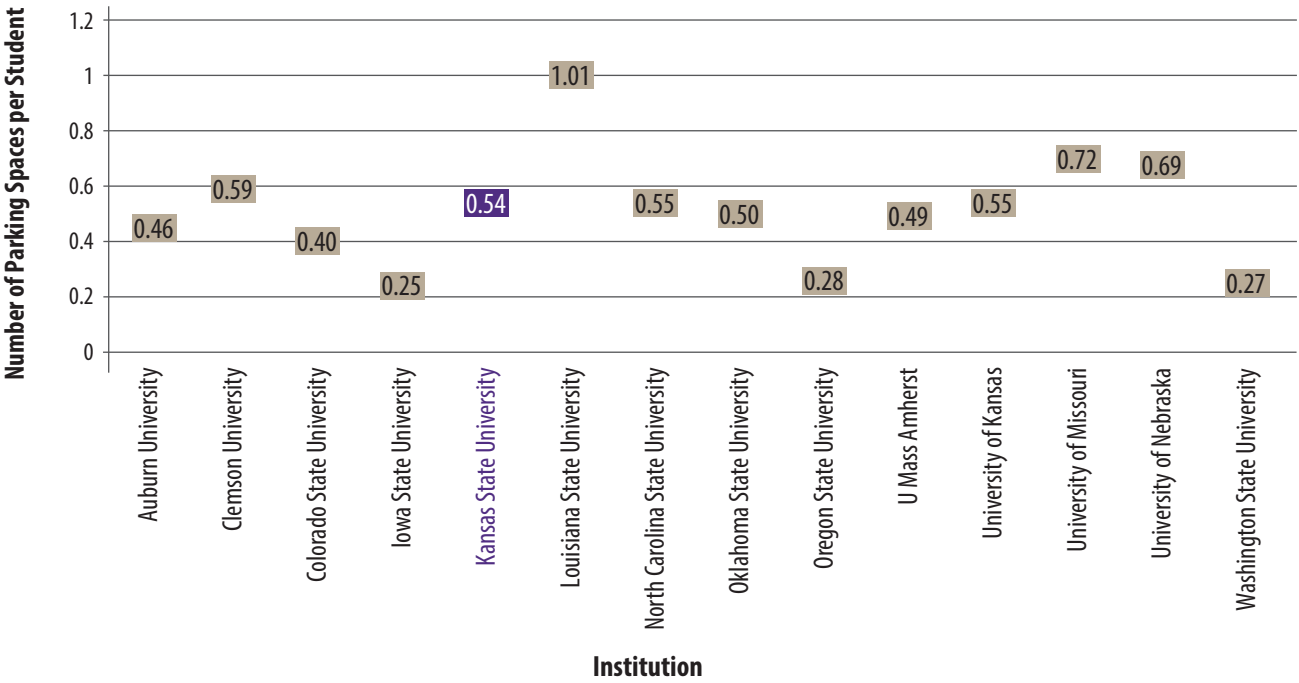
- **Transit Revenue Sources:** Typically, the revenue generated by student fees does not entirely cover the operating cost of the transit system. Universities range in their approaches to providing additional revenue. Approaches include utilizing university parking revenue, farebox revenue from the general public, state and federal transit funds, local utility or transportation taxes, or other university funds to subsidize the system. The operation model of the transit system (campus vs. campus and city-wide) affects the sources available for funding.
- **Innovative Operating Methods:** The University of Massachusetts - Amherst has found success in employing students as staff in order to keep operating costs low. About 95 percent of the 180 staff members are students. As a result, the transit system operates at \$50.00 per hour compared to regional peers, which operate near \$85.00 per hour.

Master Plan Impacts

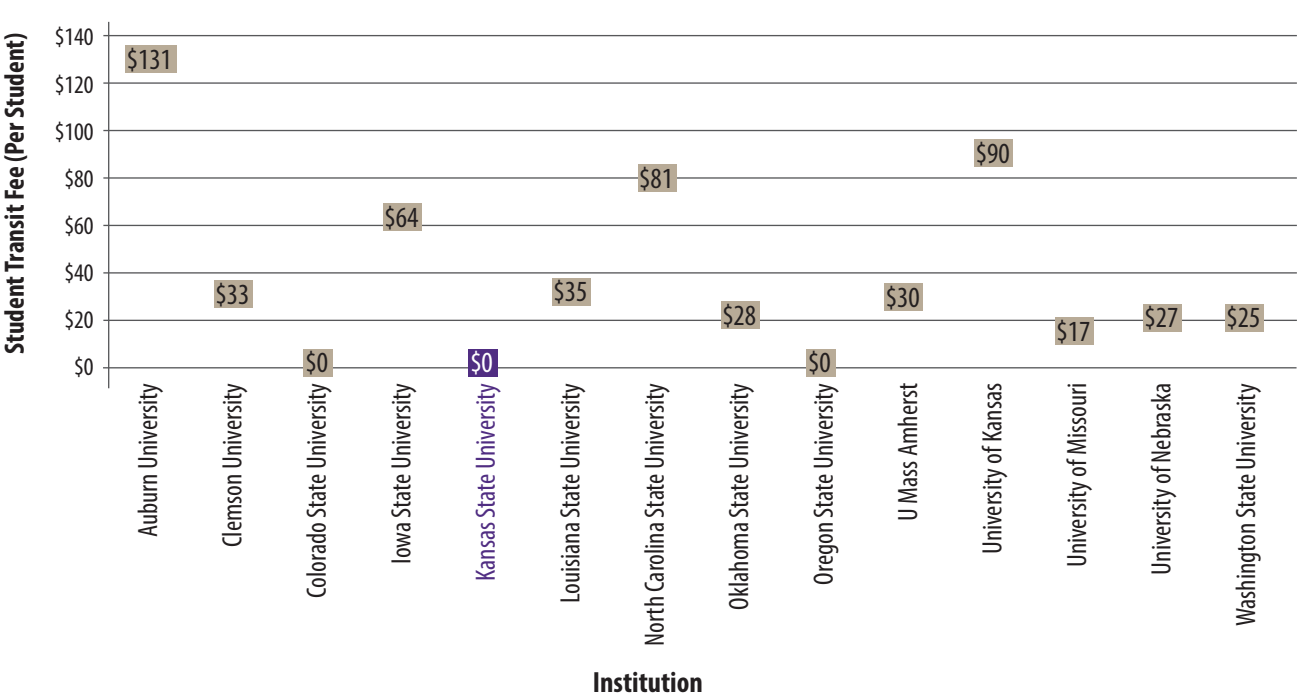
The campus master plan includes several items that will significantly affect parking on campus. The most significant impact is that several new facilities are to be constructed on the site of existing parking lots in the core campus area. The parking removed is to be replaced in a new parking garage in the northwest corner of North Manhattan Avenue and Claflin Road, and at the existing parking lot on the east side of Bill Snyder Family Stadium. A new transit route is to be established that will connect the core campus to these parking areas on the periphery.

It will take time to implement the parking changes recommended in the master plan; however, several projects that will impact the parking supply will be constructed in the next few years. Parking and transit recommendations are needed for the short term and that are consistent with the long term plan. The following sections describe the timing of specific recommendations for the next several years.

Campus Parking Ratios



Student Transit Fees



2015 – 2016 School Year Impacts

Construction of a new chiller plant began in the spring of 2015. During construction, 200 parking spaces north of Weber Hall in lot B16 will be used for construction vehicles for the school year. At the time of data collection, lot B16 had a capacity of 271 spaces, with a peak occupancy of 215 (79%). Based on the data collected, there will be capacity in nearby lots B17 and B18 to accommodate the loss of parking in B16; however all three of these lots will be near capacity at peak times. During parking data collection, equipment and trailers were observed parking in lot B18. To maximize the capacity of the lot, these vehicles should be moved out of the lot.

To increase availability of parking in “O” lots, the “JO” permit should be discontinued. Jardine Apartment residents already have parking spaces allotted for them on campus in J lots. As such, it is not necessary to allow them access to the “O” lots as well. This will be a major change for Jardine Apartments residents, however they do have options to travel to destinations on campus. They can walk, bicycle, or ride transit.

In conjunction with the chiller plan project, Mid-Campus Drive will be reconstructed as a pedestrian mall between Lovers Lane and Old Claflin Road. The pedestrian mall will be constructed as a 26-foot wide concrete corridor. The pedestrian mall will be closed to public travel, however emergency and service vehicles will be able to travel on the corridor. This change will impact the Park and Ride route, as it travels primarily on Mid-Campus Drive.

The Park and Ride should be able to continue operating on Mid-Campus Drive after it is converted to a pedestrian mall. Since the pedestrian mall has been designed to accommodate emergency and service vehicle traffic, the 20-passenger cutaway buses should not have any difficulty traveling

through the corridor. It should be noted that other peer institutions permit buses to operate on designated corridors where vehicle use is typically restricted.

Allowing transit to operate along the pedestrian mall is a safety concern since pedestrians may not anticipate vehicle traffic on Mid-Campus Drive. Travel speeds of buses on the corridor will be slow, allowing ample time for bus drivers and pedestrians to observe and react to conditions. Currently, the Park and Ride route is not significantly hindered by pedestrian traffic on Mid-Campus Drive. Nonetheless, the current Park and Ride schedule can shift approximately five minutes in an effort to avoid class change times and reduce pedestrian conflicts during peak times. This is most significant near Hale Library and Willard Hall. The operation of the Park and Ride on the pedestrian mall can also serve as a trial to assess the safety and operational impacts of transit on the pedestrian mall. The outcome of the trial will have implications on future route options as the campus transit service expands.

2015 – 2016 Recommendations

- **Move all equipment and trailers out of Lot B18**
- **Discontinue sale of “JO” parking permits**
- **Operate Park and Ride route on the Mid-Campus Drive pedestrian mall**
- **Adjust Park and Ride schedule to avoid peak pedestrian conflicts during class change times**

2016 – 2017 School Year Impacts

Two large projects will be complete for the 2016–2017 school year. The new College of Business Administration (CBA) building and Wefald Hall will open. Both buildings will have a nominal effect on the parking supply, as few spaces will be added. The parking data collected already accounts for parking displaced by the two buildings, because those areas were closed when the parking supply and occupancy data was collected.

The demand for on-campus resident parking will increase for the 2016 – 2017 school year. Wefald Hall will add 540 beds for on-campus residents. The initial occupancy of Wefald Hall is not known but, there will be no more residence hall contract students living at the Jardine Apartments when Wefald hall opens. Based on current parking permit sales, 75 percent of on-campus residents purchase a parking permit. Therefore, at least 400 parking spaces are needed for Wefald Hall at full occupancy. The CBA building will have a minimal effect on parking demand in the short term, as the college is already on campus and will grow into the new space over time.

There is no parking available adjacent to Wefald Hall that can accommodate the new demand. Residents of the Kramer complex (residence halls adjacent to Wefald Hall) currently park in lots D1, B2, B3, and B17. These lots are between 1/3 and 2/3 of a mile from the Kramer complex. This distance is an existing concern of these residents since they must walk to get to and from their vehicles. There is no capacity available in lots D1, B2, or B3. Chiller plant construction will be complete in 2016, restoring the capacity of lot B16 to 200 spaces, which will increase availability in the adjacent lots B17 and B18. Even so, there will only be about 200 spaces available in those lots. The result is between 200 and 400 additional parking spaces will need to be provided for Wefald Hall residents.

The only area on campus with significant available parking will be near Bill Snyder Family Stadium. The condition of the pavement at the stadium will not support everyday vehicle traffic and will need to be reconstructed before it is used on a daily basis. Parking at the east stadium lot is not a desirable option for residence hall students, as the lot must be vacated before men’s and women’s basketball games and football games. Therefore, the east stadium lot is only an option for commuter parking. Coordination with the Athletics department will be essential to make sure that the commuters have exited the lot in time for game traffic to arrive. Commuter parking could be consolidated to the east stadium lot, allowing lot B18 and a portion of lot B17 to be designated for residence hall parking. Residents would then be able to ride campus transit to and from their vehicles parking in these lots. Another option would be to designate more space in the D1 lot for residents, however it would not be served by transit. Commuters currently parking in the D1 lot could be relocated to the east stadium lot and/or the parking garage. Allotting more spaces in the garage to commuters would require a policy change.

Ongoing coordination with the Athletics Department will be essential to ensure that parking is provided for commuters and for basketball operations. The parking lot is used on a daily basis for the Basketball Training Facility. On basketball game days, a portion of the lot is needed for Athletics staff, media, and special guests.

Zoned Parking

Relocating commuter parking to the east stadium lot will be a significant change for many Kansas State University students, faculty, and staff. For a remote parking strategy to be successful, there should be some benefit for drivers who choose to park in the commuter lots. The benefit must offset the additional time and inconvenience that will be created.

A zoned parking system of varying fees based on proximity to the campus core will provide a financial benefit to commuters who park in the east stadium lot. The zoned system would involve dividing the campus into areas or zones of several parking lots. Permits for each zone would have a price that is based on how desirable it is to park in the zone. The zones closest to the campus core would be most desirable, and therefore have the highest permit fees. The remote commuter parking permit would have the lowest price in order to provide a financial benefit to those who park in the remote lots. The zoned parking figure illustrates how this system could apply to Kansas State University.

The zoned system will do away with the current system of parking permits. Students, faculty, and staff will generally be able to purchase the permit for the zone that meets their needs. Not every zone will need to be made available for purchase to all customers. For example, permits for certain zones may only be sold to on-campus residents, such as the Jardine Apartments area. The proper ratio of employee and student parking in a zone can be controlled through the number of permits sold to each group.

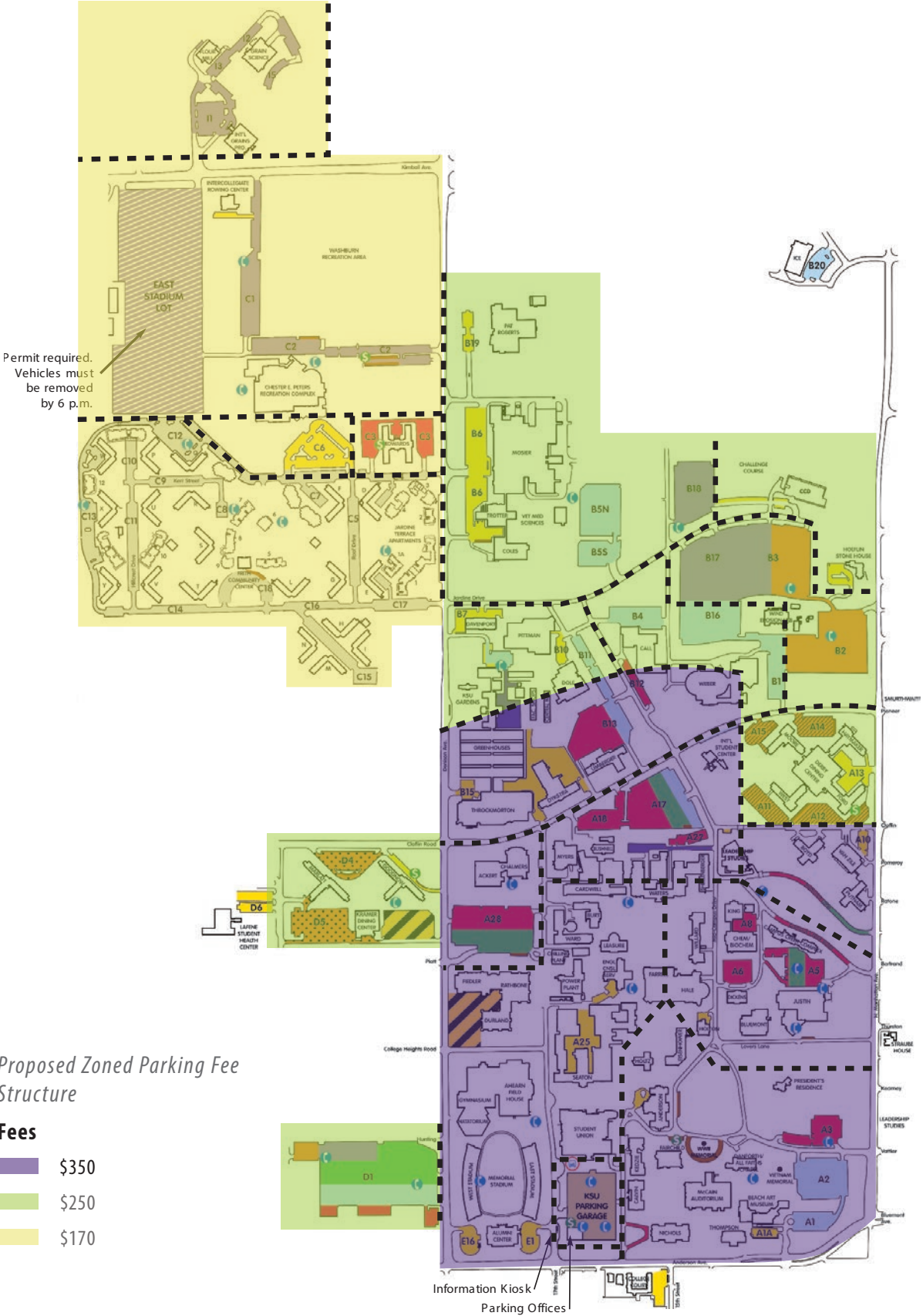
To make the higher priced zones in the campus core desirable, these zones cannot be oversold as they are currently. Drivers who hold these permits must be able to find a space in the zone they purchase. The larger commuter lots can be because the demand does fluctuate over the course of the day, since not all commuters are on campus at the same time each day.

Customers will benefit from a zoned parking system in several ways. First, they will have the choice to buy the permit that meets their needs. Next, reducing the oversell ratio in the core campus will increase the probability of finding a parking space in those lots at peak times. Lastly, since zoned parking will make it easier to find an available parking space, vehicle circulation through parking areas will be reduced. Time required and stress experienced while searching for a parking space will be reduced as well.

The University will need to monitor zoned parking regularly to maintain a proper balance between the number of available parking spaces and number of permits sold. The price of permits will also need to be evaluated annually to establish the permit fee for each zone. The permit fee can also affect the balance of permits sold in each zone.

2016 – 2017 Parking Recommendations

- Allocate 400 spaces in lots B17 and B18 for Wefald Hall residents
- Reconstruct pavement at the east parking lot of Bill Snyder Family Stadium for use as a commuter parking lot
- Implement a zoned parking system



Campus Transit

The stadium is a significant distance from the core campus and will require transit service to connect commuter parking to the core campus. The existing Park and Ride shuttle route will not be convenient to the commuters parking in the east stadium lot. Since there will be no more residence hall contract students living in Jardine Apartments, there will be no need for the Jardine shuttle service to continue. This will be an opportune time to make changes to the campus transit system.

A comprehensive transit route that connects the campus should be established. Such a route is referred to in this study as the campus circulator. Dependent upon the outcome of the trial of transit operation on the pedestrian mall, two options are available for the campus circulator. Option 1 utilizes perimeter streets to circulate around campus. In contrast, Option 2 utilizes internal campus streets, including the Mid-Campus Drive pedestrian mall. The internal streets route for the circulator may no longer be an option when bus headways cannot be scheduled to avoid class change times on Mid-Campus Drive. A description of each option is provided in the following paragraphs.

2016 – 2017 Transit Recommendations

- Discontinue Jardine shuttle and current Park and Ride service
- Begin Campus Circulator and Union Express routes
- Construct transit shelters at all stops
- Construct bus turn-outs on Denison Avenue at the Kramer Complex stop

Campus Circulator Option 1 (Perimeter Streets)

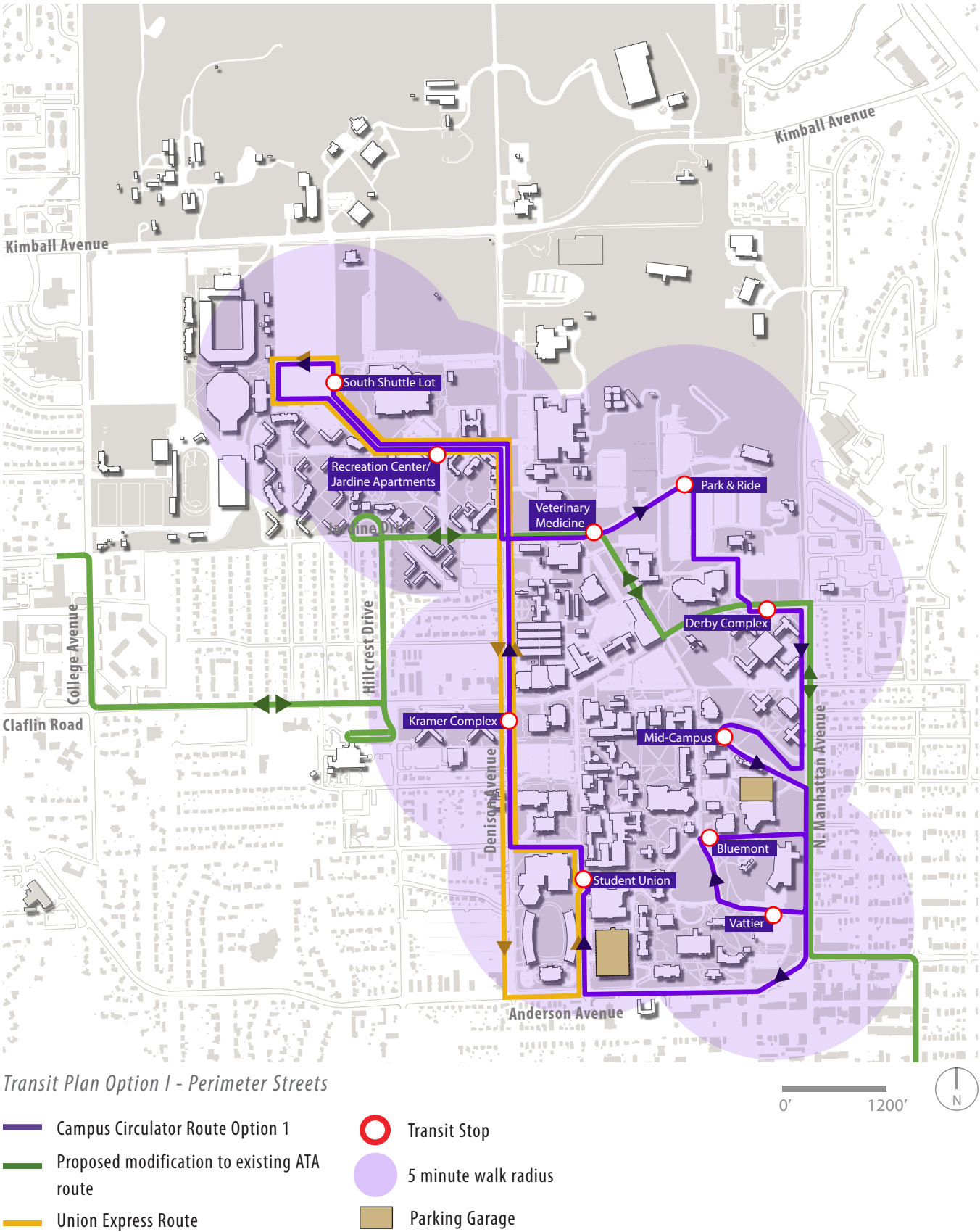
Option 1 is a 4.7-mile route with ten transit stops. The clockwise route, uses perimeter streets to serve the east stadium parking lot and several locations within the campus core. This route uses ten transit stops that are situated to provide convenient service to major campus destinations within a five-minute walking distance. Option 1 travels on several of the access roads around the campus in order to serve stops internal to the campus. Four 20-passenger cutaway vehicles will be sufficient to meet the projected transit demand during peak times.

The route for Option 1 includes some duplication along North Manhattan Avenue to account for one-way eastbound traffic flow on Lovers Lane. If the traffic flow on Lovers Lane were reversed to be in the westbound direction, the route length and running time could be reduced. This could reduce the operating cost of the route, as three cutaway vehicles would be sufficient. Reversing the direction of travel will also affect which side of the street the transit stop is on.

One-way flow in the westbound direction may be advantageous on Lovers Lane if a raised median is constructed on North Manhattan Avenue at the Vattier Street intersection. This raised median has been considered before and would improve traffic and pedestrian safety at the intersection. If constructed, the median would eliminate northbound left-turn movements into campus from North Manhattan Avenue. The northbound left turns would then be able to be accommodated at Lovers Lane.

Campus Circulator Option 2 (Internal Streets)

Option 2 is a 4.1-mile route with nine transit stops. The clockwise route, uses internal campus streets, including the Mid-Campus Drive pedestrian mall, to serve the east stadium parking lot and several locations within the campus core. Nine transit stops



are situated to provide convenient service to major campus destinations within a five-minute walking distance. Although Option 2 provides the same level of service in terms of campus coverage as Option 1, the route headway is shorter due to the shorter travel distance and one less stop. Therefore, the operating cost of Option 1 is slightly higher than for Option 2. Three 20-passenger cutaway vehicles will be sufficient to meet the projected transit demand.

Either option for the campus circulator begins to elevate the University to the level of service provided by many of the peer institutions. Connecting campus destinations reduces dependence on personal vehicles for intra campus trips. This will create a more pedestrian and bicycle friendly environment and enhance mobility for all users across campus. The circulator system will also better connect the Kramer Complex with parking in lots B17 and B18.

Union Express Route

The Union Express route is a 3.0-mile route with three transit stops, and is intended to provide additional capacity for passengers during peak times when commuters are arriving at or leaving campus. This route provides direct service for commuters rather than circulating around the entire campus. The route travels primarily along Denison Avenue to serve the east stadium parking lot, the Kramer Complex, and the Student Union. Two 20-passenger cutaway vehicles will be sufficient to meet the projected transit demand.

Transit Shelters

Transit shelters should be provided at each stop to protect riders from the wind and precipitation while they wait for buses to arrive. Shelters will enhance the comfort of transit passengers in all weather conditions. The average three- or four-sided transit shelter costs about \$9,000. It should be noted that the costs of shelters can vary significantly depending on the types of materials and features that are included in the transit shelters.

Transit shelters also offer an opportunity to coordinate shelter design with campus branding,

wayfinding, signage, and architecture. Transit shelters can easily incorporate sculptural art and lighting effects to reflect campus pride while also being highly visible, informative, and accessible to riders. Security features that should be included in the design of the shelters are lighting, emergency phones, and security cameras. Technology features such as electronic message boards can also be included. Message boards can be used to display a variety of information to transit riders including real-time bus arrival information.

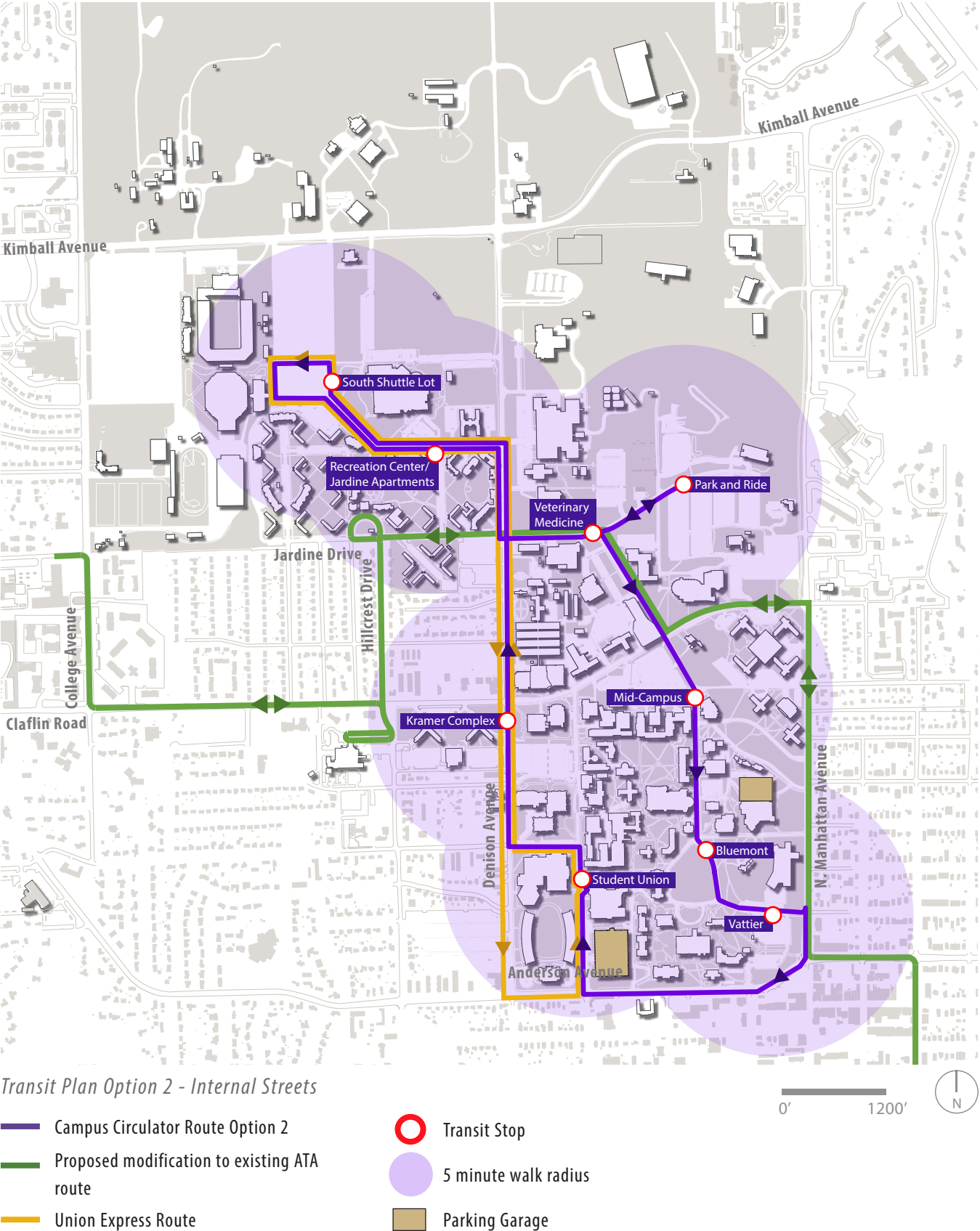
The transit stop at the east stadium lot will need to accommodate a large number of commuters during peak times in the morning. A simple three- or four-sided shelter will not provide enough space. A larger shelter should be considered. The cost of a larger transit shelter will vary significantly depending upon desired capacity and design. A design that is expandable in the future should be considered to allow the shelter to be appropriately sized for the ultimate ridership at the stop.

Bus Turn-Outs

Bus turn-outs should be considered on each side of Denison Avenue at the Kramer Complex stop. The turn-outs will allow traffic to bypass buses that are stopped along this heavily traveled corridor. An average cost for a turn-out varies significantly based on many factors, but \$40,000 per location is a sufficient estimate of the pavement and sidewalk construction that is needed.

Technology

Technology can play an important role in the reliability of transit service. Providing accurate arrival time information can minimize wait times for passengers, which leads to a more convenient and pleasant transit experience that can increase ridership. Buses should be equipped with GPS tracking features that enable automatic vehicle location (AVL). AVL systems can be used to allow transit riders to track buses in real time online or on their phone and mobile devices. Nearly all peer universities use a form of real-time technology to enhance transit service.



Other Improvements

Justin Hall Parking Garage

The amount of parking removed by the master plan requires more than the east stadium parking lot to replace what will eventually be removed. More than one parking garage will be needed on campus. Most of the land available for construction of new parking garages is located in the north campus area. With a zoned parking system, the zone for the north campus area will have a lower cost for parking permit fees, as it will have a lower demand for parking than in the core of campus. The lower parking permit fees combined with the high construction cost of a parking garage makes it difficult to fund garage construction with parking permit revenues.

An alternative location that should be considered for a parking garage is on the site of lot A5, north of Justin Hall. This garage could be constructed with four levels accommodating 800 cars. The garage would replace the existing 200 car parking lot, for a net gain of 600 parking spaces.

There are several advantages to a garage on this site. The location is within 500 feet of nine academic buildings in the core of campus. Those who park at this garage will have a short walk to destinations in the core campus. A garage at this location would also be screened in nearly all directions by adjacent buildings or foliage. Access to the garage can be provided from North Manhattan Avenue. The topography of the site will also allow for another access point on the second level of the garage from Campus Creek Drive.

To accommodate traffic flow in and out of the garage, Campus Creek Drive will need to be realigned to intersect North Manhattan Avenue at the Bertrand Street intersection. The intersection will be a good candidate for traffic signal installation for several reasons. First, it is the intersection of two collector

streets. Second, projected traffic volumes exiting the garage are likely to satisfy the warrants for a traffic signal installation. A traffic signal will enhance safety for pedestrians crossing North Manhattan Avenue. Lastly, the intersection provides good spacing from the adjacent signalized intersections on North Manhattan Avenue (roughly 1,500 feet). A signal at the Bertrand intersection should be coordinated with the adjacent signals to provide progression for through traffic on North Manhattan Avenue.

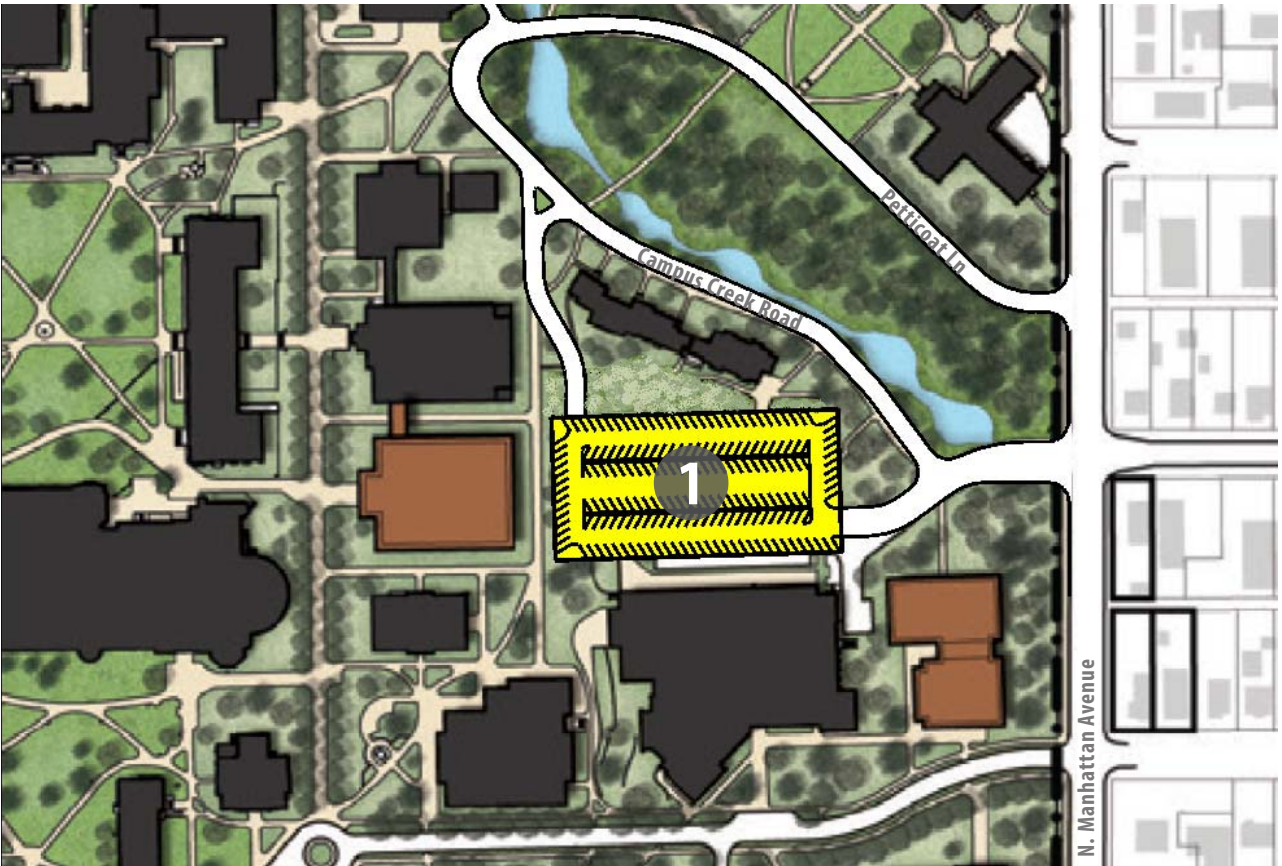
Parking Lot Expansion near Rowing Center

An alternative to using the east stadium parking lot for remote parking would be to expand existing parking lot C1 in the area just south of the rowing center along Kimball Avenue. The C1 lot can be expanded to the west to create approximately 500 new parking spaces. This location is currently has a gravel and turf surface that is used for football game day parking only. Therefore, parked vehicles would need to be removed from this lot before home football games, but parking in this lot would not be in conflict with basketball games. New pavement for a parking lot on this site would require stormwater detention for the new impervious surface. The most likely solution would be in cisterns under the lot.

Expanding lot C1 would be an interim step in providing ample parking for the campus. Eventually the demand for commuter parking will require that the east stadium parking lot is used. However, the C1 lot expansion would allow the University to delay reconstruction of the east stadium lot, and provide more flexibility for parking in the area since the C1 lot is not needed for basketball games.

Potential Modifications to City-Wide Fixed Transit Routes

Increasing ridership on the city-wide fixed routes could decrease parking demand and traffic on campus. Each of the routes passes large existing parking lots throughout the city. There may be opportunities to create park and ride service from



1 Alternative Garage Location: North of Justin Hall (shown over 2012 Master Plan)

these lots. For example the Red (Candlewood) and Green (Dickens) routes pass by CiCo Park, Manhattan Town Center, and Dillon's East. The Blue (Bluemont) and Orange (Fremont/Osage) routes pass by Target, the Westloop Shopping Center, Kansas State University Foundation, HyVee, and Walmart.

Modifications to the ATA's Green route should also be considered. Currently the green route travels between Downtown and the Manhattan Area Technical College. The route travels through campus, with stops at the Derby complex, Call Hall, and Edwards Hall. The route also stops just west of campus at the Riley County Health Department. The Red route makes this same stop. If the Green Route was modified to stop at Lafene Health Center instead, it would be convenient to Kramer complex.

This would provide an east/west transit connection across campus, linking the residence hall complexes and Lafene Health Center. It would also be beneficial for the Green route to stop in Aggieville, as it passes through the commercial district.

Neighborhood Parking Recommendations

There will be drivers who seek out other opportunities to find convenient parking as the supply decreases in the core of campus and the price of parking permits increases. To deter students, faculty, and staff from parking on the street in the neighborhoods adjacent to campus, the City should consider increased fines for illegal parking in the surrounding residential parking zones. Fines could be escalated for repeat offenders if the officers issuing tickets had prompt access to a database of previous violations.

Cost of Improvements

East Stadium Parking Lot

The reconstruction of the east parking lot of Bill Snyder Family Stadium will be a significant parking expense. The level of reconstruction needed is assumed to be a full depth reconstruction of the pavement, which is estimated to cost \$2,000 per space. The lot has approximately 1,750 spaces for a total cost estimate of \$3,500,000. This cost does not include any storm water management solutions for this existing parking lot.

In the short term, reconstruction of only a portion of the lot would be possible, as the entire lot will not be needed as a commuter lot until closer to the estimated build out of the master plan. If that is the case, the southern portion of the lot adjacent to the transit stop should be constructed first. Another alternative would be to expand lot C1 as mentioned previously. The cost to expand lot C1 is estimated to be \$1,100,000. This estimate includes stormwater detention in cisterns below the lot.

Justin Hall Parking Garage

Construction of a parking garage at Justin Hall itself is estimated to cost as much as \$20,000,000 based on estimates of \$20,000 to \$25,000 per parking space. Roadway improvements would be required in conjunction with the garage. Campus Creek Drive would need to be widened and realigned. A traffic signal installation and associated interconnection would also be required. While this garage is not needed in the next few years, it should be programmed as funds become available.

Transit Service

A number of capacity assumptions were utilized when developing estimates for the operating and capital costs for transit service. Transit service is expected to be offered during the fall and spring semesters, equating to 160 weekdays when school is in session. To accommodate the morning and evening peak of commuters, two hours of peak

service is expected from 7:30 AM - 9:30 AM with an additional two hours of peak service from 4:00 PM - 6:00 PM. During peak service, service frequency is about 10 minutes. Eleven hours of non-peak service would also be offered, establishing transit service hours from 6:00 AM to 9:00 PM. Non-peak service frequency is about 15 to 20 minutes.

Based on the capacity assumptions and desired service levels, estimates for the transit operating and capital costs are outlined in the appendix. Capital costs do not include estimates for transit storage, and maintenance facilities. These costs will be dependent upon KSU’s decision to operate the transit service in-house or through a contracted operation.

Summary of Short Term Improvement Costs

The cost of the short-term improvements identified in this study are summarized in Table 4. As mentioned in the other improvements section, there are alternatives to reconstructing the entire east stadium parking lot in 2016. A portion could be reconstructed in the short term, and the remainder of the lot can be deferred. Parking lot C1 can also be expanded to provide the commuter parking needed in the short term.

Funding Opportunities

Parking Revenue

The zoned parking recommendations would be expected to increase parking revenue. Table 5 illustrates the revenue that would be projected from a zoned parking system. The proposed permit fees shown in the table are estimated to be lower than that of many peer institutions. Based on the limited sale of preferred and reserved spaces it is not known if higher price points can be supported. The price of the reserved spaces was held constant in the table below for comparison purposes. It is assumed that reserved spaces would continue to be sold with the zoned parking system. The inventory includes the east stadium parking lot in the yellow zone, and a slight increase in parking permit sales to account for campus growth.

Table 4: Short Term Parking and Transit Improvement Costs

Improvement	Estimated Cost		
	2015-2016	2016-2017	Beyond 2017
East Stadium Parking Lot Reconstruction		\$3,500,000	
Justin Hall Parking Garage Construction			\$13,000,000
Parking Lot C1 Expansion			\$1,100,000
Annual Transit Operating Costs	\$188,400	\$281,700	Ongoing
Annual Transit Capital Costs		\$86,500	Ongoing
Total	\$188,400	\$3,868,200	\$14,100,000

Table 5: Zoned Parking Revenue Projections

Permit Type	Parking Inventory by Zone	Permits to be Sold for 2016-2017	Proposed Permit Fee	Proposed Permit Revenue
Purple Zone	3,420	3,420	\$350	\$1,197,400
Green Zone	5,044	5,044	\$250	\$1,261,000
Yellow Zone	4,028	4,772	\$170	\$811,240
Reserved	511	511	\$400- \$1,300	\$291,400
Total	13,359	13,747		\$3,560,640

The zoned parking fee projections could provide an additional \$700,000 annually. This increased revenue will be necessary to fund the short term and long term parking improvements needed to support the changes proposed in the master plan. It is not likely that parking revenue can fund transit improvements as well, unless the permit fees are higher than indicated in Table 5. Other funding sources must be considered to fund transit.

Student Transit Fee

As discussed in the Peer Institution section, most universities charge a student transit fee to cover a portion of transit operating costs. Student transit fees ranged from as low as \$15.00 per semester up to \$131.00 per semester. Based on the estimated annual operating and capital costs, a student transit fee of less than \$10.00 per semester would fully fund the campus circulator and union express service during the 2016 – 2017 school year. Transit operating costs will increase as the number of commuters parking in the east stadium area increases, which should be taken into account if such a fee is considered.

Faculty/Staff Contribution

A significant portion of the transit ridership is expected to be faculty and staff that park at the east stadium commuter lot. Therefore, the University could consider some type of faculty/staff contribution to the transit system. This could be in the form of a small payroll deduction (rather than purchasing a campus parking permit) or included in the cost of a parking permit for the commuter lots. The tax benefits available for commuters should be considered. Federal tax law stipulates that employers can allow employees to use pretax dollars to pay for transit passes or subsidize employees transit passes.

At many of the peer institutions, fee-paying students and faculty/staff are eligible to ride city-wide systems at no additional charge, another potential benefit for both the University and the city’s transit system as it continues to grow. This type of partnership should be established as student and/or faculty/staff fees are considered.

Other Funding Sources

Transit Grant Programs

The U.S. Department of Transportation currently administers grant programs for transit related capital improvements. These funds can be used for transit shelters and stops, bus turn-outs, and buses. The federal contribution can be as high as 80 percent of the cost because Manhattan is classified as an urbanized area.

Naming Rights / Advertising

Revenue from naming rights or advertisements is another possible source of revenue. Recognition plaques or advertising space can be integrated into vehicles, transit shelters, benches, and other transit amenities such as trash cans. Advertising is a common source of additional revenue for many campus and municipal transit systems.

Farebox Recovery

While revenue from the public could be a relatively small portion of revenue, farebox recovery offers another potential funding source. With the University supporting the campus transit system, it is not uncommon to charge the public a small fare for use of the service.

Private Partnerships

In addition to the existing city-wide and campus routes, ATA operates an additional route for the University Crossing Apartments that shuttles students from the apartments to the Student Union. The route is funded as a public deviated route through state and federal funding with the local match by the University Crossing Apartments. University Crossing Apartments funds the route because the service is marketing tool and amenity for residents. As demonstrated by the University Crossing route, there is an opportunity to collaborate with other apartment complexes to enhance transit service with high frequency fixed routes between the city’s residential hotspots and the University campus.

Other Innovative Methods

As discussed in the comparison of peer institutions, another approach to reducing operating costs is to employ part-time staff. The University of Massachusetts - Amherst has had success in employing students as staff to keep operating costs lows. About 95 percent of the 180 staff members are students. As a result, the transit system operates at \$50.00 per hour compared to regional peers that operate near \$85.00 per hour.

Transit Appendix Tables

Peer Transit Comparison								
University	Structure	Routes	Frequency (minutes)	Annual & Daily Trips ¹	Student Fee per Semester	Annual Student Fee Revenue	Annual Operating Budget	Cost Per Hour
Kansas State University	University contracts with ATA for campus service	10 routes; 5 campus-only routes	10 - 60	181,140 ² 1,132 daily	\$0.00	No dedicated student fee ⁴	\$240,916 ²	\$24.51 ²
				257,010 ³			\$636,316 ³	
Auburn University	University contracts with First Transit for campus service	19 routes; 5 campus-only routes	10 - 30	2.8 million 17,500 daily	\$131.00	\$7.0 million	\$7.0 million	Unavailable
Clemson University	University is operator of campus service	4 campus-only routes	10 - 30	Unavailable	\$33.00	\$1.4 million	Unavailable	Unavailable
Colorado State University	University contracts with City of Fort Collins for campus service	24 routes; 5 campus-only routes	10 - 60	900,000 (student trips) 5,625 daily	Unavailable	Unavailable	\$14.2 million	Unavailable
Iowa State University	University contracts with City of Ames for campus service	12 routes; 3 campus-only routes	15 - 60	6.6 million 38,000 daily	\$64.11	\$4.0 million	\$8.9 million	\$74.19
Louisiana State University	University contracts with First Transit for campus service	8 routes; 2 campus-only	10 - 30	Unavailable	\$35.00	\$2.1 million	Unavailable	Unavailable
North Carolina State University	University contracts with First Transit for campus service	11 routes; 8 campus-only routes	7 - 50	3.0 million 18,750 daily	\$81.00	\$5.5 million	\$5 million	Unavailable
Oklahoma State University	University is operator of city-wide and campus service	8 routes; 3 campus-only routes	10 - 20	700,000 4,375 daily	\$27.60 ⁵	\$1.3 million	\$3.6 million	\$72.00
Oregon State University	University is operator of campus service	3 campus-only routes	5 - 15	Unavailable	\$0.00	No dedicated student fee	\$200,000	Unavailable
University of Kansas	University contracts with Lawrence Transit for city-wide and campus service	19 routes; 3 campus-only routes	5 - 30 campus-only routes	2.9 million 18,125 daily	\$89.80	\$3.2 million	\$5.7 million	\$64.00
University of Massachusetts - Amherst	University is contractor for city-wide and campus service	10 routes; 2 campus-only routes	15 - 30	3.0 million 18,750 daily	\$30.00 ⁶	\$1.4 million	\$3.9 million	\$50.00
University of Missouri	University contracts with City of Columbia for campus service	6 campus-only routes	10 - 30	800,000 5,000 daily	\$16.85	\$1.2 million	\$1.2 million	Unavailable
University of Nebraska	University contracts with StarTran for campus service	3 campus-only routes	10 on-call service	750,000 4,645 daily	\$26.66	\$1.3 million	\$2.0 million	Unavailable
Washington State University	University contracts with Pullman Transit for city-wide and campus service	9 routes; 2 campus-only routes	8 campus-only routes	1.5 million 9,375 daily	\$25.00	\$1.7 million	\$2.9 million	\$110.00

¹ Daily trips are estimated trips based on total trips divided by 160 academic days unless specific data provided by university
² Campus-only routes for FY 2014 including annual estimate for Park and Ride route 2014-2015 school year
³ All ATA fixed routes for FY 2014 including annual estimate for Park and Ride route 2014-2015 school year
⁴ Service contract of \$289,750 is provided by Kansas State University in lieu of dedicated student transit fee
⁵ Estimate based on \$2.30 per credit hour for full-time student with twelve credits
⁶ Equivalent revenue is provided through state salaries based on 2005 student population of approximately 22,500

FY 2014 Transit Routes						
Route		Service Hours	Service Frequency	Annual Trips	Annual Operating Budget	Operating Cost Per Hour
City	Orange	Monday - Friday 7:00 AM - 9:00 PM	60 minutes ¹	49,956	\$357,627	\$31.23
	Green		60 minutes ¹			
	Blue	Saturday 8:00 AM - 7:00 PM	60 minutes ¹			
	Red		60 minutes ¹			
Campus	Jardine Shuttle	Monday - Friday 7:00 AM - 9:00 PM	10 minutes	156,976	\$114,417	\$23.38
		Saturday 7:00 AM - 9:30 AM 11:00 AM - 1:30 PM				
		Sunday 11:00 AM - 1:30 PM				
	Park and Ride ²	Monday - Friday 6:30 AM - 6:30 PM	15 minutes	8,142 ²	\$74,000 ²	\$38.54 ³
	SafeRide (East)	Thursday - Saturday 11:00 PM - 3:00 AM	20 minutes	16,022	\$52,499	\$28.41
	SafeRide (West)		15 minutes			
	SafeRide (Northwest)		60 minutes			
Other	University Crossing	Monday - Friday 7:00 AM - 5:00 PM	30-60 minutes	25,914	\$37,773	\$25.63

¹ Given the overlap on routes, headways are effectively every 30 minutes for some locations
² Information available from the Fall 2014 semester is doubled to estimate annual trips and annual operating budget
³ Estimate based on 12 hours of service Monday through Friday for 160 academic days

Campus Circulator - Option 1 (Perimeter Streets) and Union Express Routes			
Capacity Assumptions		Operating Costs	
160	Operating days per year	\$30.88	Cost per hour per vehicle ⁴
4	Hours of peak service	\$118,579	Annual peak service cost
11	Hours of non-peak service	\$163,046	Annual off-peak service cost
500	Expected number of commuters ¹	\$281,626	Total annual operating cost
Capital Costs			
50%	Percent of commuters using Campus Circulator route	\$75,000	Cutaway bus (7-year life span) ⁵
50%	Percent of commuters using Union Express route	\$9,000	Transit Shelters (20-year life span) ⁶
50%	Percent of commuters during peak period ²	\$60,000	Large transit shelter at commuter lot ⁷
125	Passengers using Campus Circulator route in peak period	\$40,000	Bus turn-out
125	Passengers using Union Express route in peak period	7	Number of buses (includes spare)
20	Passengers per cutaway bus	10	Transit shelters
4.7 miles	Campus Circulator - Option 2 route	1	Large transit shelter at commuter lot
5-25	Bus speed (mph)	2	Bus turn-outs
32	Minutes per bus route ³	\$525,000	Total bus cost
1.8	Trips per hour per bus	\$230,000	Total transit stop cost
7	Trips per peak hour	\$75,000	Pro-rated annual bus cost
4	Buses per peak hour	\$11,500	Pro-rated annual transit stop cost
10	Service frequency in peak hour (minutes)	\$86,500	Total annual capital cost
3	Trips per off-peak hour	Revenue Options	
2	Buses per off-peak hour	\$368,126	Annual operating and capital cost
20	Service frequency in off-peak hour (minutes)	21,000	Student population
3.0 miles	Union Express route	\$8.76	"Break-Even" student transit fee per semester
5-25	Bus speed (mph)		
17	Minutes per bus route ³		
3.5	Trips per hour per bus		
6	Trips per peak hour		
2	Buses per peak hour		
10	Service frequency in peak hour (minutes)		
3	Trips per off-peak hour		
1	Buses per off-peak hour		
20	Service frequency in off-peak hour (minutes)		

¹ Based on campus parking projections (see Parking section)
² Based on projections from Student Union garage arrivals and departures
³ Includes 15 percent recovery time at end of route
⁴ Reported to the National Transportation Database by ATA
⁵ Volpe National Transportation Systems Center bus lifecycle cost model
⁶ Assumes small transit shelter
⁷ Order of magnitude estimate of a large transit shelter

Campus Circulator - Option 2 (Internal Streets) and Union Express Routes			
Capacity Assumptions		Operating Costs	
160	Operating days per year	\$30.88	Cost per hour per vehicle ⁴
4	Hours of peak service	\$98,816	Annual peak service cost
11	Hours of non-peak service	\$163,046	Annual off-peak service cost
500	Expected number of commuters ¹	\$261,862	Total annual operating cost
Capital Costs			
50%	Percent of commuters using Campus Circulator route	\$75,000	Cutaway bus (7-year life span) ⁵
50%	Percent of commuters using Union Express route	\$9,000	Transit Shelters (20-year life span) ⁶
50%	Percent of commuters during peak period ²	\$60,000	Large transit shelter at commuter lot ⁷
125	Passengers using Campus Circulator route in peak period	\$40,000	Bus turn-out
125	Passengers using Union Express route in peak period	7	Number of buses (includes spare)
20	Passengers per cutaway bus	10	Transit shelters
4.1 miles	Campus Circulator - Option 1 route	1	Large transit shelter at commuter lot
5-25	Bus speed (mph)	2	Bus turn-outs
25	Minutes per bus route ³	\$450,000	Total bus cost
2.4	Trips per hour per bus	\$230,000	Total transit stop cost
6	Trips per peak hour	\$64,286	Pro-rated annual bus cost
3	Buses per peak hour	\$11,500	Pro-rated annual transit stop cost
10	Service frequency in peak hour (minutes)	\$75,786	Total annual capital cost
3	Trips per off-peak hour	Revenue Options	
2	Buses per off-peak hour	\$337,648	Annual operating and capital cost
15	Service frequency in off-peak hour (minutes)	21,000	Student population
3.0 miles	Union Express route	\$8.04	"Break-Even" student transit fee per semester
5-25	Bus speed (mph)		
17	Minutes per bus route ³		
3.5	Trips per hour per bus		
6	Trips per peak hour		
2	Buses per peak hour		
10	Service frequency in peak hour (minutes)		
3	Trips per off-peak hour		
1	Buses per off-peak hour		
20	Service frequency in off-peak hour (minutes)		

¹ Based on campus parking projections (see Parking section)
² Based on projections from Student Union garage arrivals and departures
³ Includes 15 percent recovery time at end of route
⁴ Reported to the National Transportation Database by ATA
⁵ Volpe National Transportation Systems Center bus lifecycle cost model
⁶ Assumes small transit shelter
⁷ Order of magnitude estimate of a large transit shelter

Parking Data Collection Table

Kansas State University Parking Data																	
Tuesday, December 9, 2014 and Wednesday, December 10, 2014																	
Parking Lot	Permit Type	Description	Capacity	Beginning at 7:00 a.m.		Beginning at 9:00 a.m.		Beginning at 11:00 a.m.		Beginning at 1:00 p.m.		Beginning at 3:00 p.m.		Beginning at 5:00 p.m.		Peak	
				Occ.	%	Occ.	%	Occ.	%	Occ.	%	Occ.	%	Occ.	%	Occ.	%
I1	Z	Grain Science	58	4	7%	23	40%	21	36%	16	28%	24	41%	17	29%	24	41%
I3	Z	Flour Mill	25	1	4%	3	12%	5	20%	7	28%	8	32%	5	20%	8	32%
I2	Z	Feed Mill	30	0	0%	6	20%	17	57%	11	37%	19	63%	13	43%	19	63%
I6	Z	Kansas Wheat Innovation Center	40	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
I5	Z	Grain Science	21	0	0%	6	29%	7	33%	4	19%	10	48%	9	43%	10	48%
S1		East of Football Stadium	1750	24	1%	35	2%	52	3%	59	3%	70	4%	138	8%	138	8%
S2		West of Football Stadium	2700	55	2%	179	7%	181	7%	178	7%	226	8%	177	7%	226	8%
C1	Z	west of Rec fields	270	0	0%	0	0%	0	0%	1	0%	2	1%	42	16%	42	16%
C2	Z	north of rec center	273	56	21%	72	26%	110	40%	90	33%	144	53%	180	66%	180	66%
C3	W	Edwards Hall	127	46	36%	90	71%	93	73%	99	78%	97	76%	59	46%	99	78%
C6	Y	south of Rec center	108	21	19%	29	27%	51	47%	52	48%	89	82%	89	82%	89	82%
C13	J	west edge of Jardine area	193	114	59%	73	38%	62	32%	60	31%	59	31%	71	37%	114	59%
C11	J	On-Street Parking, Hillcrest Drive	103	87	84%	63	61%	48	47%	51	50%	38	37%	43	42%	87	84%
C10	J	west of Jardine "P" Building	28	25	89%	18	64%	17	61%	16	57%	14	50%	20	71%	25	89%
C12	J	north of Jardine "Q" Building	260	133	51%	85	33%	109	42%	114	44%	92	35%	90	35%	133	51%
C9	J	north of Jardine "R" Building	88	48	55%	31	35%	25	28%	24	27%	24	27%	29	33%	48	55%
C8	J	east of Jardine "R" Building	25	20	80%	22	88%	17	68%	19	76%	20	80%	20	80%	22	88%
C7	J	south side of Kerr Drive	111	103	93%	89	80%	91	82%	88	79%	85	77%	86	77%	103	93%
C14	J	Jardine Drive, south of "L" Bldg.	24	10	42%	5	21%	5	21%	6	25%	6	25%	6	25%	10	42%
C18	J	Jardine Community Center	94	70	74%	69	73%	53	56%	53	56%	57	61%	60	64%	70	74%
C16	J	On-Street Parking, Jardine Drive	34	25	74%	25	74%	21	62%	21	62%	21	62%	17	50%	25	74%
C15	J	south of Jardine Dr. near "N" bldg.	117	89	76%	89	76%	75	64%	76	65%	74	63%	67	57%	89	76%
C17	J	Jardine Drive, south of "E" bldg	65	62	95%	63	97%	62	95%	61	94%	59	91%	62	95%	63	97%
C4	J	On-Street Parking, Kerr Drive	77	65	84%	58	75%	64	83%	63	82%	67	87%	71	92%	71	92%
C5	J	On-Street Parking, Roof Drive	107	99	93%	84	79%	80	75%	76	71%	73	68%	55	51%	99	93%
B19	Y	West of Pat Roberts Hall	41	3	7%	13	32%	15	37%	15	37%	18	44%	3	7%	18	44%
B6	Y	West of Moser Hall	261	98	38%	235	90%	223	85%	236	90%	225	86%	103	39%	236	90%
B5	T	North of Jardine Drive	379	87	23%	373	98%	346	91%	256	68%	268	71%	122	32%	373	98%
B21	Y	Child Development Center	50	7	14%	23	46%	22	44%	19	38%	21	42%	36	72%	36	72%
B18	Z	North of Jardine Drive	206	20	10%	42	20%	76	37%	55	27%	43	21%	24	12%	76	37%
B17	Z	North of Weber Hall	503	352	70%	374	74%	408	81%	410	82%	360	72%	278	55%	410	82%
B3	R	South of Jardine Dr	530	527	99%	529	100%	527	99%	529	100%	515	97%	496	94%	529	100%
F10	Y	Hoefflin Stone House	40	7	18%	24	60%	23	58%	28	70%	27	68%	15	38%	28	70%
B2	R	North of Claflin Ave	537	536	100%	533	99%	532	99%	531	99%	534	99%	531	99%	536	100%
B16	T	North of Weber Hall	271	3	1%	110	41%	215	79%	211	78%	204	75%	69	25%	215	79%
B1	T	East of Weber Hall	120	27	23%	114	95%	110	92%	105	88%	110	92%	92	77%	114	95%
B7	Y	Davenport Hall	39	32	82%	32	82%	28	72%	31	79%	32	82%	2	5%	32	82%
B10	Y	East of Pittman Hall	43	5	12%	29	67%	30	70%	19	44%	32	74%	25	58%	32	74%
B11	T	East of Dole Hall	88	5	6%	74	84%	80	91%	71	81%	74	84%	26	30%	80	91%
B4	T	North of Call Hall	110	8	7%	98	89%	110	100%	95	86%	95	86%	46	42%	110	100%
B13	W	North of Umberger Hall	206	4	2%	202	98%	199	97%	180	87%	191	93%	58	28%	202	98%
B13	T	North of Umberger Hall	30	13	43%	30	100%	28	93%	27	90%	30	100%	15	50%	30	100%
B15	Y	North of Throckmorthon Hall	18	9	50%	16	89%	16	89%	14	78%	17	94%	15	83%	17	94%

Parking Lot	Permit Type	Description	Capacity	Beginning at 7:00 a.m.		Beginning at 9:00 a.m.		Beginning at 11:00 a.m.		Beginning at 1:00 p.m.		Beginning at 3:00 p.m.		Beginning at 5:00 p.m.		Peak	
				Occ.	%	Occ.	%	Occ.	%	Occ.	%	Occ.	%	Occ.	%	Occ.	%
B14	Y	Dykstra Hall	36	24	67%	23	64%	28	78%	20	56%	22	61%	26	72%	28	78%
B8	T	KSU Gardens	51	19	37%	32	63%	31	61%	32	63%	22	43%	8	16%	32	63%
B9	K	behind KSU Gardens	53	36	68%	38	72%	33	62%	35	66%	35	66%	39	74%	39	74%
B12	W	West of Call Hall	40	4	10%	29	73%	30	75%	30	75%	28	70%	10	25%	30	75%
F7		Behind Call Hall	5	3	60%	3	60%	4	80%	5	100%	5	100%	2	40%	5	100%
A16	T	On-Street Parking, Claflin Road	26	1	4%	25	96%	25	96%	23	88%	24	92%	17	65%	25	96%
A14	D	Between Haymaker and Moore	89	69	78%	72	81%	72	81%	74	83%	72	81%	69	78%	74	83%
A15	D	NW of Moore Hall	47	39	83%	42	89%	37	79%	40	85%	38	81%	35	74%	42	89%
A12	D	Between West and Ford Hall	121	92	76%	103	85%	109	90%	104	86%	96	79%	95	79%	109	90%
A11	D	SW of West Hall	88	75	85%	78	89%	79	90%	75	85%	73	83%	63	72%	79	90%
A13	Y	Between Ford and Haymaker	58	30	52%	40	69%	44	76%	55	95%	47	81%	25	43%	55	95%
A23	Y	On-Street, Leadship Studies	4	0	0%	3	75%	3	75%	3	75%	3	75%	3	75%	3	75%
F6		north of Boyd Hall	17	7	41%	6	35%	11	65%	6	35%	6	35%	5	29%	11	65%
A10	Y	North of Van Zile Hall	25	11	44%	14	56%	17	68%	18	72%	17	68%	14	56%	18	72%
A9	Y	Between Putnam and Van Zile Hall	7	3	43%	5	71%	4	57%	5	71%	5	71%	3	43%	5	71%
F5	O	On-Street, Petticoat Lane	17	2	12%	15	88%	14	82%	13	76%	12	71%	12	71%	15	88%
F4	W	On-Street, Campus Creek Drive	23	1	4%	18	78%	21	91%	20	87%	20	87%	17	74%	21	91%
F3	Y	NE corner of Justin Hall	11	7	64%	10	91%	11	100%	7	64%	9	82%	3	27%	11	100%
A8	W	East of King Hall	18	2	11%	13	72%	17	94%	9	50%	13	72%	11	61%	17	94%
A6	W	North of Dickens Hall	72	43	60%	68	94%	69	96%	63	88%	62	86%	56	78%	69	96%
A5	O	North of Justin Hall	34	4	12%	33	97%	34	100%	33	97%	34	100%	32	94%	34	100%
A5	W	North of Justin Hall	165	11	7%	143	87%	148	90%	141	85%	145	88%	110	67%	148	90%
F1		Front of Justin Hall	6	0	0%	5	83%	4	67%	2	33%	3	50%	3	50%	5	83%
A3	W	North of Vattier Street	36	22	61%	44	122%	46	128%	46	128%	43	119%	24	67%	46	128%
A2	T	South of Vattier Street	235	12	5%	214	91%	222	94%	220	94%	213	91%	140	60%	222	94%
A1	T	East of Beach Art Museum	83	9	11%	78	94%	81	98%	80	96%	70	84%	52	63%	81	98%
A1A	Y	South of Beach Art Museum	35	2	6%	14	40%	18	51%	16	46%	17	49%	16	46%	18	51%
A31	Y	South of Thompson Hall	9	3	33%	4	44%	4	44%	4	44%	2	22%	3	33%	4	44%
E13	Y	College Court	40	6	15%	33	83%	29	73%	25	63%	27	68%	7	18%	33	83%
E3	W	Drive to Nichols Hall	5	0	0%	0	0%	2	40%	1	20%	3	60%	0	0%	3	60%
E16	Y	Alumni Center West	40	3	8%	23	58%	22	55%	20	50%	28	70%	26	65%	28	70%
E1	Y	Alumni Center East	19	2	11%	13	68%	11	58%	11	58%	15	79%	10	53%	15	79%
E5		Mid-Campus Drive at Kedzie Hal	4	2	50%	3	75%	4	100%	3	75%	3	75%	1	25%	4	100%
F8		Front of Anderson Hall	13	1	8%	12	92%	11	85%	10	77%	8	62%	6	46%	12	92%
E7		Meters along Vattier Street	8	2	25%	3	38%	6	75%	7	88%	8	100%	4	50%	8	100%
E10		McCain circle drive	21	2	10%	3	14%	9	43%	10	48%	6	29%	13	62%	13	62%
E12		Danforth Chapel	5	0	0%	0	0%	3	60%	1	20%	1	20%	0	0%	3	60%
E6	Y	Behind Anderson Hall	15	0	0%	5	33%	4	27%	2	13%	8	53%	2	13%	8	53%
E9		Front of Eisenhower Hall	12	0	0%	11	92%	10	83%	8	67%	10	83%	12	100%	12	100%
A24	Y	English Counseling Service	13	5	38%	7	54%	8	62%	7	54%	7	54%	7	54%	8	62%
A25	Y	Seaton Hall Courtyard	39	14	36%	12	31%	18	46%	18	46%	18	46%	18	46%	18	46%
A26	W	College Heights Rd	52	20	38%	27	52%	28	54%	26	50%	25	48%	16	31%	28	54%
A20	K	Just north of Waters Hall	31	17	55%	21	68%	25	81%	22	71%	23	74%	19	61%	25	81%
A22	W	Just north of Shellenberger hall	40	15	38%	26	65%	29	73%	29	73%	30	75%	19	48%	30	75%
A17	O	North of Waters Hall	123	3	2%	123	100%	123	100%	113	92%	123	100%	60	49%	123	100%
A17	W	North of Waters Hall	180	8	4%	175	97%	176	98%	172	96%	174	97%	110	61%	176	98%
A17	T	North of Waters Hall	68	1	1%	67	99%	66	97%	67	99%	67	99%	53	78%	67	99%
A18	W	North of Bushnell Hall	119	19	16%	114	96%	116	97%	115	97%	114	96%	79	66%	116	97%
A19	W	North of Bushnell Hall	20	10	50%	12	60%	17	85%	16	80%	17	85%	14	70%	17	85%
A21	Y	Between Waters & Shellenberger	9	2	22%	5	56%	6	67%	4	44%	5	56%	5	56%	6	67%
A4	Y	North of Holton Hall	7	0	0%	5	71%	6	86%	6	86%	5	71%	4	57%	6	86%
D6	Y	Lafene Health Center	105	5	5%	65	62%	77	73%	32	30%	82	78%	48	46%	82	78%
A4	GM	NE of Marlatt Hall	119	104	87%	104	87%	107	90%	108	91%	102	86%	106	89%	108	91%
D5	GM	South of Marlatt Hall	199	162	81%	173	87%	181	91%	183	92%	179	90%	158	79%	183	92%
D3	Y	Front of Goodnow Hall	22	13	59%	13	59%	16	73%	14	64%	18	82%	8	36%	18	82%
A28	W	Durland Hall	213	73	34%	208	98%	206	97%	204	96%	195	92%	108	51%	208	98%
A28	O	Durland Hall	190	55	29%	185	97%	188	99%	185	97%	183	96%	115	61%	188	99%
D1	O	Old stadium lot	255	22	9%	215	84%	249	98%	235	92%	214	84%	150	59%	249	98%
D1	Z	Old stadium lot	311	311	100%	311	100%	311	100%	310	100%	309	99%	303	97%	311	100%
D1	T	Old stadium lot	275	6	2%	96	35%	263	96%	239	87%	195	71%	110	40%	263	96%
D1	W	Old stadium lot	63	6	10%	28	44%	60	95%	59	94%	53	84%	43	68%	60	95%
D1	R	Old stadium lot	60	60	100%	60	100%	60	100%	60	100%	60	100%	67	112%	67	112%
F5	W	On-Street, Petticoat Lane	11	1	9%	10	91%	9	82%	10	91%	10	91%	7	64%	10	91%
	Y	Rowing Center	13	4	31%	5	38%	5	38%	6	46%	2	15%	1	8%	6	46%
H8		17th Street	2	0	0%	1	50%	2	100%	2	100%	0	0%	0	0%	2	100%
H8		17th Street	4	1	25%	2	50%	1	25%	3	75%	2	50%	3	75%	3	75%
	Garage	Union Parking Garage	1367	25	2%	730	53%	864	63%	845	62%	771	56%	505	37%	864	63%
Subtotal			15703	4411	28%	8146	52%	8798	56%	8444	54%	8410	54%	6492	41%	9495	60%
TOTAL (stadium lots not included)			11253	4332	38%	7932	70%	8565	76%	8207	73%	8114	72%	6177	55%	9131	81%

Parking Removed for Implementation of K-State Master Plan					
Lot ID		Location	# Spaces Removed	Peak Demand	%
B1	T	East of Weber Hall	120	114	95%
B2	R	North of Claflin Rd	537	536	100%
B3	R	South of Jardine Dr	256	256	100%
B4	T	North of Call Hall	110	110	100%
B5	T	East of Mosier Hall	379	377	99%
B11	T	Dole Hall Lot	88	80	91%
B12	W	West of Call Hall	40	30	75%
B16	T	North of Weber Hall	271	215	79%
B17	Z	North of Weber Hall	768	675	88%
B18	Z	North of Jardine Dr	206	76	37%
C3	W	Edwards Hall Lot	127	99	78%
D5	GM	South of Marlatt	199	183	92%
A11	D	West Hall Lot	88	79	90%
A28	W	Durland Hall Lot	213	208	98%
	O		190	188	99%
B13	T	North of Umberger Hall	30	30	100%
	W		206	202	98%
A17	T	SW Corner of Claflin Rd and Mid Campus Dr	68	67	99%
	O		123	123	100%
	W		180	176	98%
A18	W	North of Bushnell Hall	119	116	97%
A22	W	North of Waters hall	40	30	75%
A21	K	North of Waters hall	31	25	81%
A5	O	North of Justin Hall	34	34	100%
A5	W	North of Justin Hall	165	148	90%
A6	W	North of Dickens Hall	72	69	96%
A2	T	South of Vattier St	235	222	94%
TOTAL			4895	4468	91%

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