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City of University City Parking Study

Prepared for:

City of University City
Department of Public Works
6801 Delmar Boulevard
University City, MO 63130

Prepared by:

Lochmueller Group
411 N. 10th Street, Suite 200
St. Louis, MO 63101
314.621.3395
Project No: 519-0130-OTE



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Introduction

Lochmueller Group (Lochgroup) was asked to perform a parking study for select study areas to:

- Identify current parking surpluses and deficiencies through physical counts at various time periods throughout the week;
- Make general observations of who is utilizing on-street parking (i.e. students, Loop patrons, construction or service providers, etc.), relative proximity of parking to final destination (i.e. pedestrian observations), parking turnover and parking duration;
- Research improved ways to manage on-street parking through parking restrictions, permitting, wayfinding signage, payment systems, etc.;
- Make recommendations aimed at increasing the availability of on-street parking for City residents;
- Present findings to the Public Works Department; and
- Document all findings into a condensed report.

This document presents the method used for the data collection, summarizes the data collected, and present the findings from our research and recommendations for the studied areas.

Context of University City's Built Environment

University City was founded in 1906. Most of the eastern and southern portions of the City today were platted and built out before 1930. Because most buildings were platted and constructed pre-1930, the urban fabric of these neighborhoods was not built to accommodate personal vehicles. As technology and transportation advanced and more and more people own their own car, the City has struggled to accommodate the need for parking in certain parts of its older, denser neighborhoods. **Figure 1** shows when each parcel's structure was first built.



Figure 1. Study Areas and the Year at which Structures were Built

The map in **Figure 1** shows the prevalence of structures built prior to 1930 within the three study areas used in this parking study.

Description of Study Areas

The City’s Department of Public Works, Council Members and Traffic Commission defined three areas to be evaluated in a parking study:

- **Zone 1** encompassing the area bounded by Vernon Avenue to the north, Eastgate and Melville Avenues to the east, Kingsbury Avenue to the south, and Trinity and Kingsland Avenues to the west
- **Zone 2** encompassing the area bounded by Stratford and Pershing Avenues to the north, Jackson Avenue and Forest Park Parkway to the east, Maryland Avenue and University Drive to the south, and Hanley Road and Jackson Avenue to the west
- **Zone 3** encompassing both sides of Forsyth Boulevard between Big Bend Boulevard and Forest Park Parkway, and both sides of Lindell Boulevard between Forsyth Boulevard and Manhattan Avenue

These zones are depicted in **Figure 2** below.



Figure 2: Study Area Zones

Zone 1

Shown in **Figure 3**, Zone 1 is bounded by Vernon Avenue to the north, Eastgate Avenue and Melville Avenue to the east, Kingsbury Avenue to the south, and Trinity Avenue and Kingsland Avenue to the west.

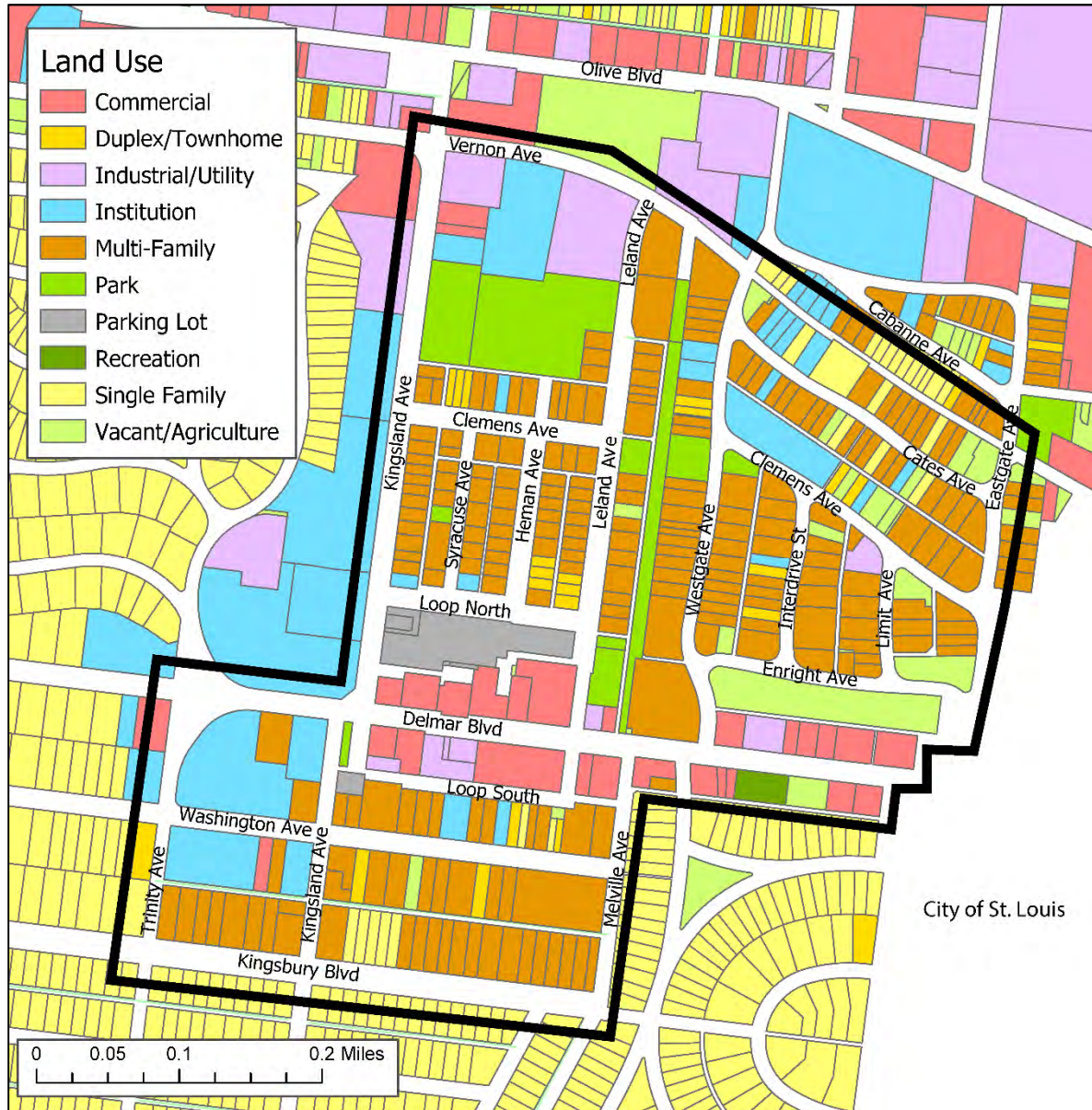


Figure 3: Zone 1 Area Boundary

Zoning and Land Uses

Most notably, Zone 1 encompasses portions of the “The Loop”, a major entertainment, retail, and commercial destination located along Delmar Boulevard to the east and west of Skinker Boulevard. The

portion of Delmar Boulevard within University City runs from Skinker Boulevard to the east and Kingsland Avenue to the west.

The areas to the north and south of The Loop are zoned as high-density residential. The land use is primarily multi-family. Ownership is a mix of owner-occupied and rentals with Washington University as one of the most prominent property owners; a high percentage of residents are affiliated with the university as students (undergraduate and graduate), staff, or faculty.

Parking Locations

Zone 1 has several parking options including on-street, surface lots, garages, and private parking. Parking for the residential areas of Zone 1 to the north and south of Delmar Boulevard is generally provided on-street with limited spaces dedicated to tenants behind the buildings with access via alleyways. Street parking is still necessary to accommodate all residents because in these rear lots the number of spaces is generally less than the number of residents occupying the units.

Along The Loop, metered public parking is provided on both sides of Delmar Boulevard, on the south side of Enright Avenue (one street north of Delmar Boulevard), and the first block of Westgate Avenue on the north side of Delmar Boulevard. In addition, a metered public parking garage has a driveway on Delmar Boulevard to the east of Westgate Avenue.

A free public surface lot, referred to as “Lot 4”, is in the northeast quadrant of Kingsland Avenue and Delmar Boulevard. A free public surface lot behind Salt and Smoke at Delmar Boulevard and Melville Avenue is referred to as Lot A in this report.

There is an additional free lot behind Mission Taco and Blue Print Coffee to the east of Eastgate Avenue outside of University City limits but serves as dedicated parking for Loop businesses on the northeast block closest to the intersection of Skinker and Delmar Boulevards. This lot was not included in this parking study.

There are metered lots near The Loop as well. These include the surface lot to the east of the Tivoli Theatre and the surface lot to the east of the Post Office off Kingsland Avenue. These metered lots were not included in this parking study.

Parking is not allowed on the north side of Enright Avenue; the north end of Loop North Drive and Loop South; both sides of Kingsland and Leland Avenues between Loop North and Loop South; on Vernon Avenue between Westgate and Eastgate Avenues; on Trinity Avenue south of Washington Avenue and in front of the Center of Creative Arts (COCA); on the north side of Delmar between Kingsland and Trinity Avenues; and along the alleyway behind Delmar Boulevard from Eastgate to Melville Avenues.

Washington University Parking and Policies

Washington University and University City’s proximity presents challenges and opportunities for managing on-street parking demand in Zone 1. The following sections present information on the University’s parking policies and discusses their impact on parking conditions in University City.

On-Campus Parking

Washington University provides on-campus parking on and near the Danforth Campus. This parking is divided and permitted by five zones that faculty, staff and students can apply for. Zones 1 thru 4 are immediately on or adjacent to the campus; Zone 5 parking has two locations, on the North and West Campuses, and provides commuter options to the main campus for a lower annual cost. Some zones have some requirements for application, i.e. only graduate students can park in Zone 1.

For the 2019-2020 school year, an annual on-campus parking pass for Zones 1 thru 4 cost \$852, Zone 5 on the West Campus cost \$642, and Zone 5 on the North Campus cost \$450. A red pass, which is available only to faculty and staff and allows access to all zones, cost \$2,124.

Lochmueller was unable to reach the Parking and Transportation Department to ask if and how permitting and pricing has changed in recent years, as well as how many spaces are provided in each zone.

Parking is not included in a student's tuition at this time, and we were not able to ask the Department if this has ever been done or considered in the past. While this may seem like an option to alleviate the issue of students utilizing on-street parking in areas of Zone 1, the acceptance of this policy may be infeasible and/or create new parking issues.

If this policy were changed, all students would be entitled to have a parking space on campus, and it is likely that more students would bring a car with them for their time at Washington University than do today.

In the 2018-2019 school year, a total of 19,924 students and faculty were enrolled and employed on the Danforth campus. While we do not know the number of available parking spots in Zones 1 thru 5 to confirm, it is reasonable to hypothesize that Washington University would not be able to provide a parking space for all students, faculty, staff, and visitors on or near campus.

Also, additional vehicles being brought to school and parked in the area could also increase the utilization of the residential streets that are already highly parked during the daytime and evening hours (i.e. Sub-Areas A and C).

University Owned Student Housing Parking

Washington University owns several multi-family residential properties north and south of Delmar Boulevard that serve primarily or exclusively students. In some instances, properties owned by the University are historic and their non-conformities are grandfathered-in, including parking. In these cases, these properties were not required by city code to add additional parking spaces beyond what was existing on the property.

Washington University has made recent efforts to alleviate parking stresses in Zone 1, as demonstrated with the new mixed-use development located at 6255 Delmar Boulevard. The Lofts, as it is named, is a mixed-use development with 600 student-only residential units. Parking was provided in an adjacent garage structure and initially student-tenants were charged an additional fee for a space when it first opened.

Due to the higher cost for a parking spot, many student-tenants forewent paying for the parking space in the garage and instead parked on the surrounding streets where parking was free, resulting in parking issues along Enright Avenue specifically. To remedy this unintended impact, Washington University now includes the cost of a parking space in a tenant’s rent for The Loft units, and it is our understanding that the parking issue has essentially gone away.

Zone 2

Figure 4 depicts Zone 2 as the area bounded by Stratford Avenue and Pershing Avenue to the north, Jackson Avenue and Forest Park Parkway to the east, Maryland Avenue and University Drive to the south, and Hanley Road and Jackson Avenue to the west.

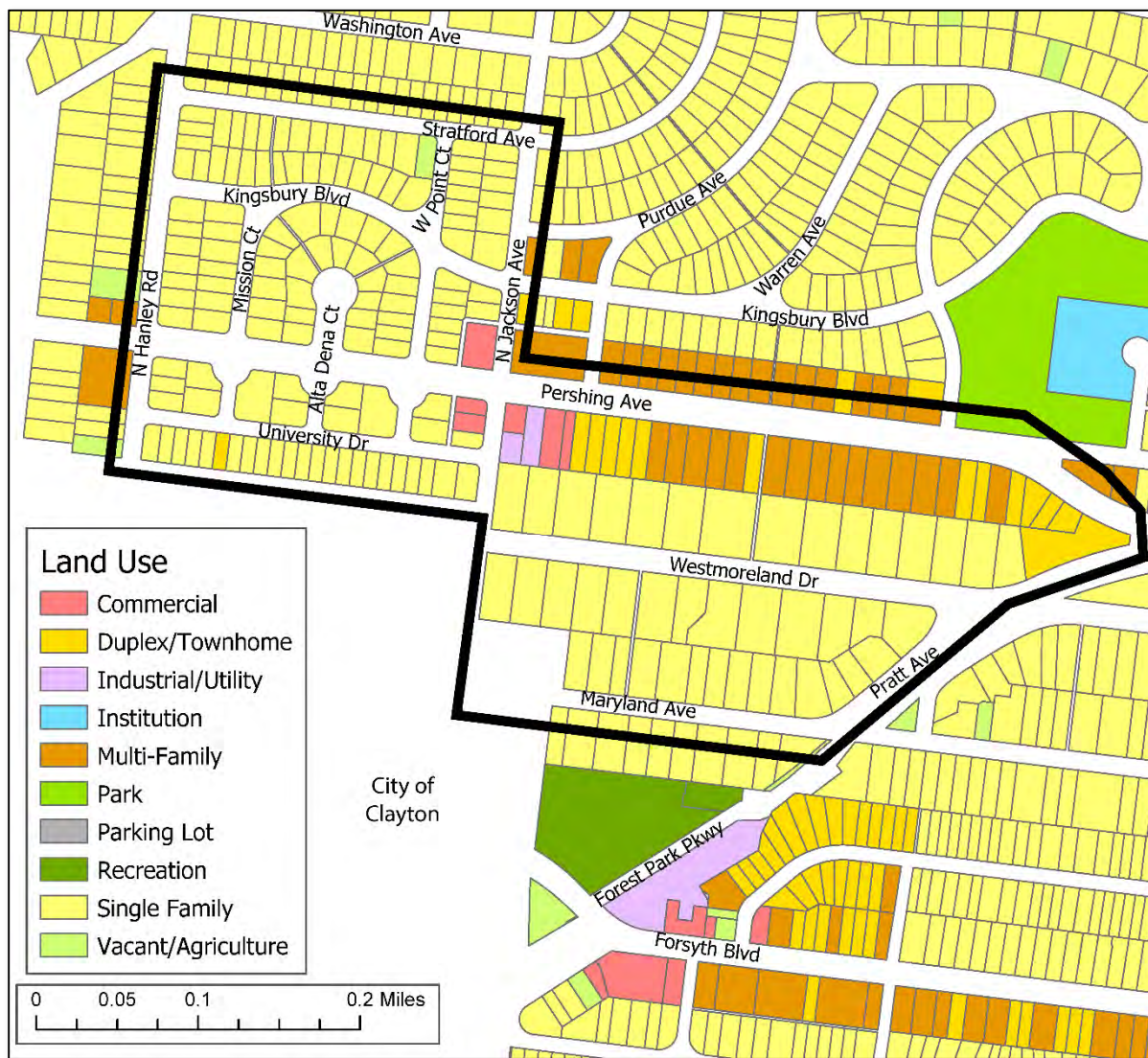


Figure 4: Zone 2 Area Boundary

Zoning and Land Uses

Zone 2 is primarily zoned single-family residential, but existing land uses include single-family, multi-family, and commercial. Light commercial and medium-density residential land uses are present along Pershing Avenue between Jackson Avenue and Forest Park Parkway. Single-family homes are on most other streets.

The City of Clayton is adjacent to this zone’s west and south boundaries. Nearby within Clayton’s city limits are residential and education land uses.

Parking Locations

There are no surface lots in Zone 2, only on-street, private driveway, private garage parking. Single-family home residents primarily use their driveways and garages for parking their vehicles. Multi-family residents use the on-street parking in front of their building to park their personal vehicles as well as whatever is provided behind their buildings.

Parking is not allowed on either side of Hanley Road, the east side of Jackson Avenue between Pershing and Stratford Avenues, the south side of Pershing Avenue from Hanley Road to Jackson Avenue, on the east side of Jackson Avenue from Pershing to Maryland Avenues, or the east side of Pershing Avenue from Forest Park Parkway to Flynn Park.

Zone 3

Figure 5 depicts Zone 3 which includes both sides of Forsyth Boulevard between Big Bend Boulevard and Forest Park Parkway, and both sides of Lindell Boulevard between Forsyth Boulevard and Manhattan Avenue. The City of Clayton is located adjacent to this zone’s west and south boundaries.

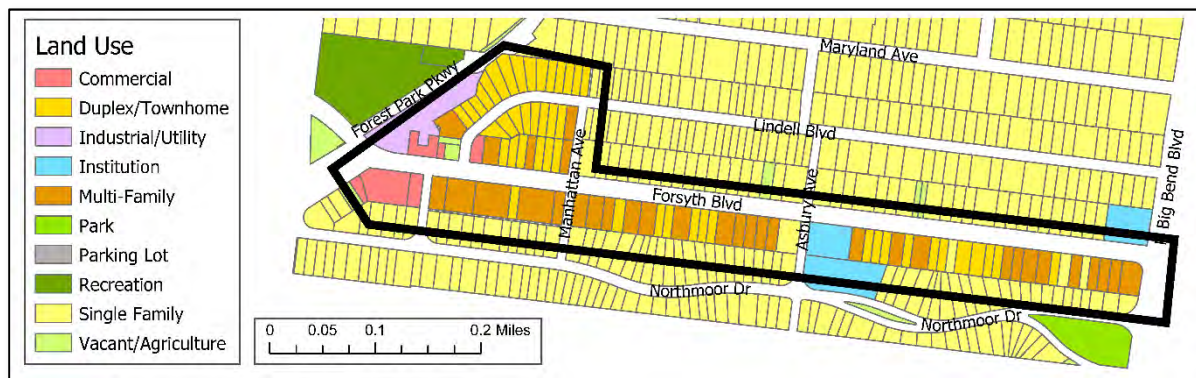


Figure 5: Zone 3 Area Boundary

Zoning and Land Uses

Land uses in Zone 3 range from commercial on the west end near the Forsyth Boulevard and Forest Park Parkway junction to single and multi-family residential heading east along Forsyth and Lindell Boulevards. Washington University caps the east end of Zone 3, while a Metrolink stop with a large surface parking lot caps the west end of Zone 3 on the other side of Forest Park Parkway. The portion of

Lindell Boulevard in the study area is a one-way heading west lined by multi-family residences and next to a commercial strip along the west end of Forsyth Boulevard.

Parking Locations

On-street parking is provided for the businesses and residences in the studied neighborhood. Metered parking is located adjacent to the commercial uses on the east end of Forsyth Boulevard and south end of Lindell Boulevard. East of this section of Forsyth Boulevard, on the north side there is restricted parking from 9AM to 3PM. In front of Our Lady of Lourdes, there is a two-hour on-street parking limit. In addition, a metered private surface lot is in the northwest quadrant of Forsyth and Lindell Boulevards. A Metrolink stop with a large surface parking lot caps the west end of Zone 3 on the west side of Forest Park Parkway.

Data Collection

Method

Parking occupancy counts and observations were conducted on a typical weekday and weekend to identify the existing utilization and peaking characteristics for each parking facility. For all zones, weekday counts and observations were conducted from 1PM to 7PM, and weekend counts and observations on Saturdays from 3PM to 7PM. These hours were selected as they would represent the busiest time periods for each zone to better identify peak occupancy levels. The duration of data collection and observation period was selected to understand how long vehicles were parked and make assumptions if they were parked in the same spot for the entire day. For example, if a vehicle was parked when the count began at 1PM and stayed until 5PM or 6PM, it is reasonable to assume they were parked in the same spot during the morning as well as it resembles a typical “commuter” pattern or schedule.

Counts and observations were conducted along all streets within the three zones on an hourly basis. The observations would denote any parking restrictions as currently posted, quantify the relative occupancy of on-street parking along each block segment in periodic intervals, and attempt to identify (by inspection) non-residential parking that may be occurring.

Relative occupancy for each segment was scored with the following system: if parking along a segment was approximately 0-25% utilized, it was scored “1”; if 25-50% utilized, then “2”; if 50-75%, then 3; if 75-90%, then “4”; and if over 90%, then “5”. These scores helped determine the overall occupancy levels for a zone or sub-area by adding cumulative scores. For the purposes of this study, utilization over 90% is considered a location with a parking “problem”.

Schedule

Zone 1 parking data was collected in the spring and in the fall. In the spring, data was collected on Thursday, April 25th, 2019 and Saturday, May 18th, 2019. In the fall, data was collected Thursday, September 12th, 2019 and Saturday, September 14th, 2019. These two times of year and days during the week were selected to coincide with peak demand from Washington University students who were in regular session (i.e. not finals week) during both spring and fall semesters. Selecting these weekends

also avoided major holidays such as Easter and Labor Day when students and residents may be out of town.

Zones 2 & 3 parking data was collected on Wednesday, May 8th, 2019 and Saturday, June 8th, 2019.

All data collection was performed under favorable weather conditions to capture typical parking conditions.

Observations & Data Summary

The peak hour of parking utilization was identified for each zone and for both the weekday and weekend time periods. The peak hours were determined as the one hour with the highest utilization, or highest cumulative scores, for each zone.

For each of these hours, a map was created to visualize and better understand the relative occupancy along each segment and for the zones as a whole. These maps and the observations noted during data collection are presented below for each zone. Some street segments depicted in the peak hour utilization maps had different peak utilization periods than the hour shown in the maps. For hourly utilization tables for each segment and zone, see the **Appendix**.

Zone 1

Parking Utilization Sub-Areas

Zone 1 was the most complex and varied of the zones because of its diversity of land uses. Based on our data collection findings and to assist in its analysis and discussion of results, three sub-areas were established: Sub-Area A captures the northern residential land uses; Sub-Area B captures The Loop's commercial uses; and Sub-Area C captures the southern residential land uses. See **Figure 6** for sub-area boundaries.

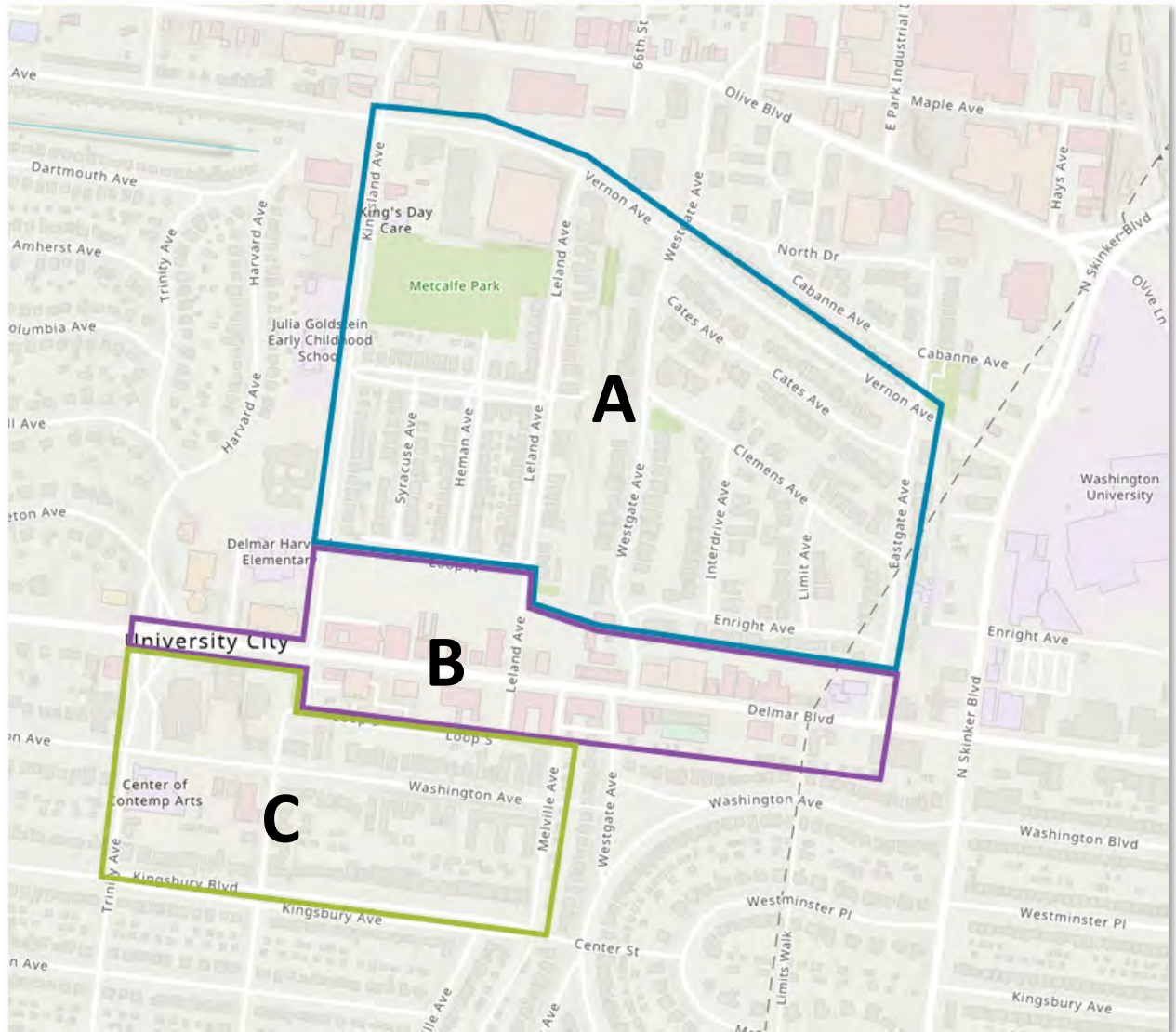


Figure 6: Zone 1 Sub-Areas

Weekday Utilization

During the weekday, 7PM was the highest demand hour for which data was collected in Zone 1. Its utilization map is shown in **Figure 7**.

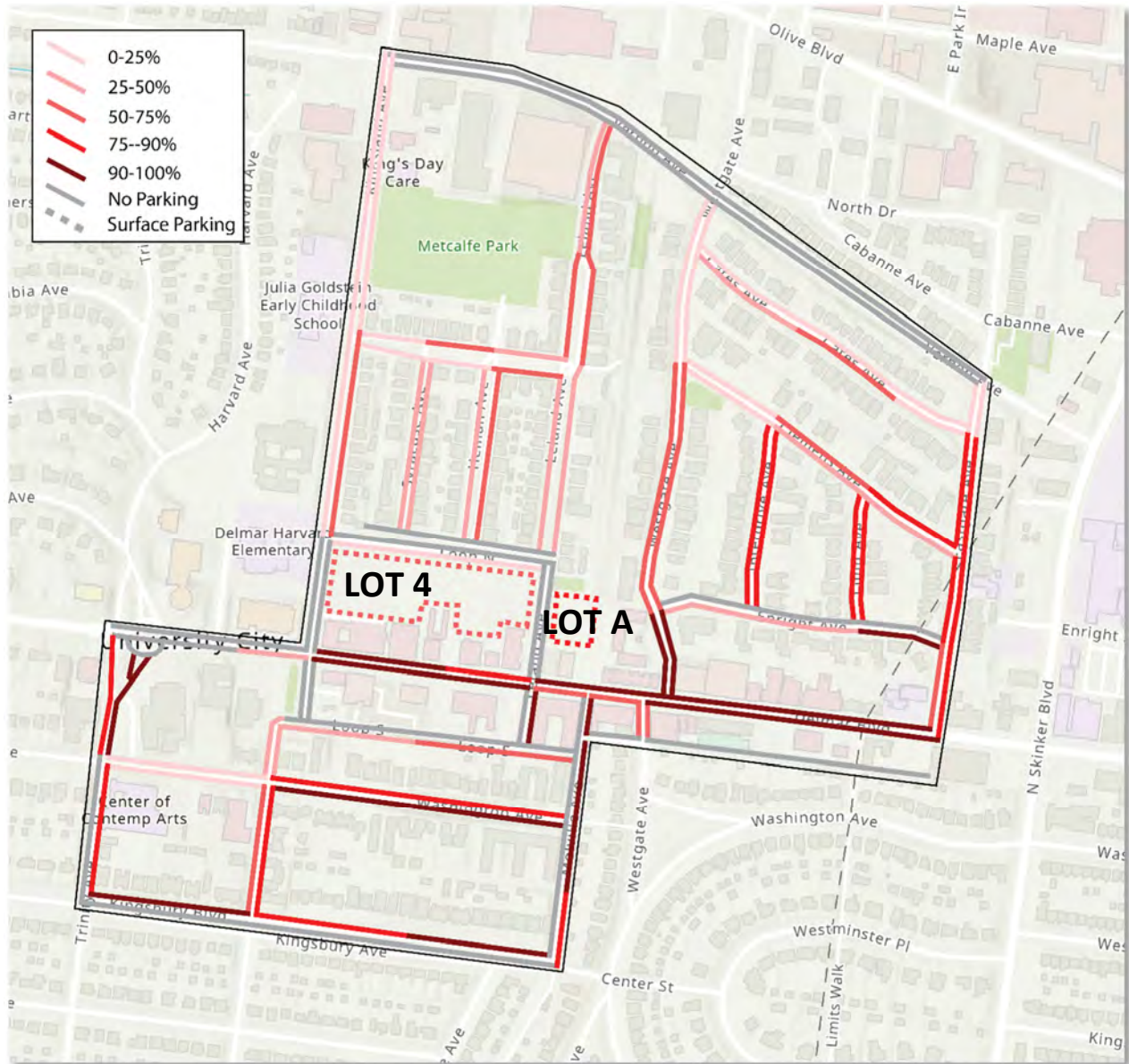


Figure 7: Zone 1 Weekday Peak Hour of Parking Utilization (7PM)

Delmar Boulevard is highly utilized due to the concentration of restaurants and entertainment. The first block of Westgate and Eastgate Avenues, the southeastern block of Leland Avenue and southeastern block of Melville Avenue were also highly utilized by people coming to The Loop to patronize the commercial businesses. Lot A was also almost 90% utilized and Lot 4 was approximately 75% utilized.

The demand in Sub-Areas A and C was from resident parking, not Loop patrons. Washington Avenue, Kingsbury Boulevard, Eastgate Avenue, Limit Avenue, and Interdrive Street were highly utilized in the evening hours when residents were home.

Weekend Utilization

During the weekend, 3PM was the highest demand hour for which data was collected in Zone 1. Its utilization map is shown in **Figure 8**.

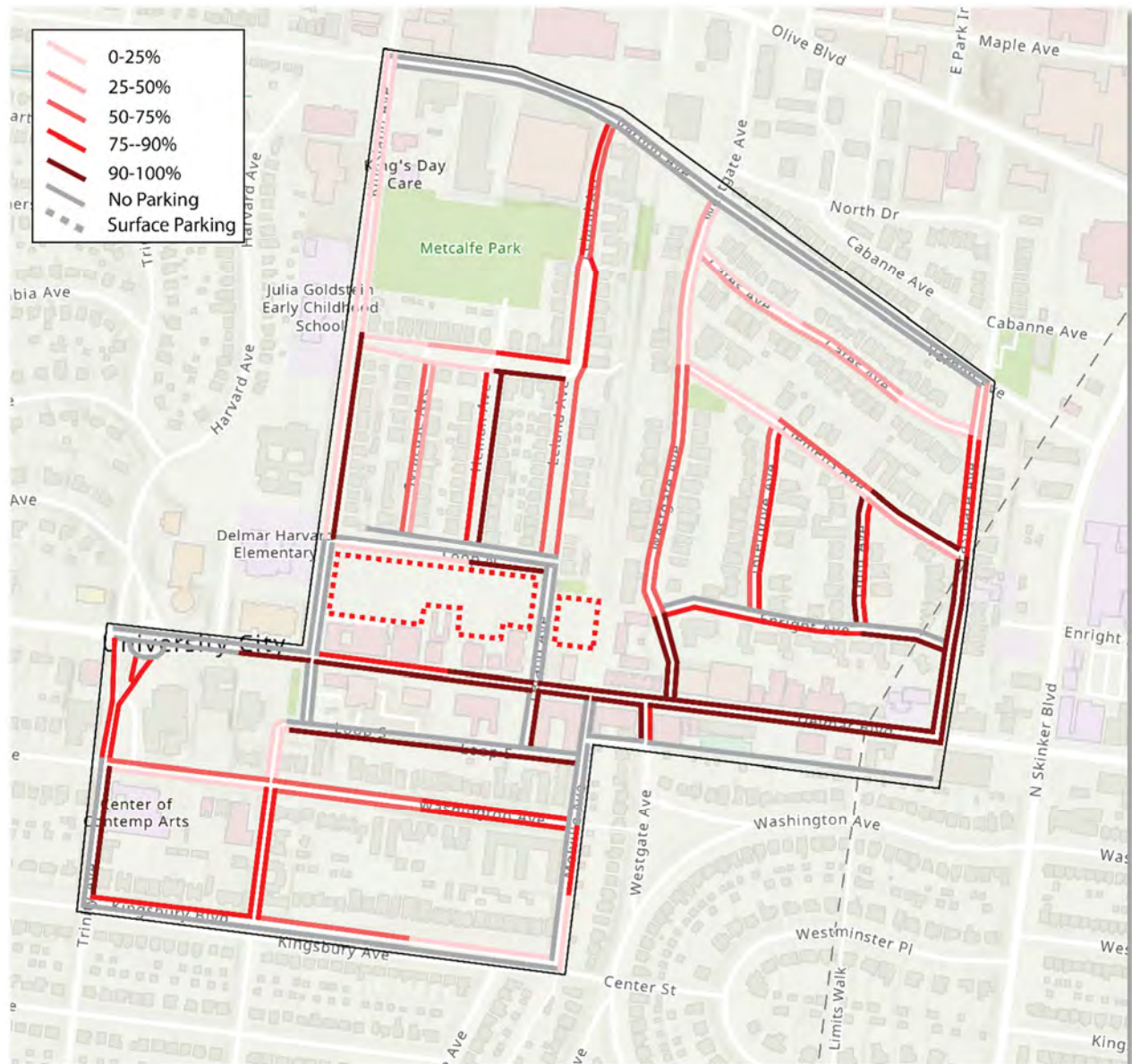


Figure 8: Zone 1 Weekend Peak Hour of Parking Utilization (3PM)

During the weekend observation period, residential streets in Sub-Area C were less utilized than they were during the weekday. The portion of Trinity Avenue next to COCA and the University United Methodist Church was highly utilized, likely from visitors to both uses. Delmar Boulevard was highly utilized over the weekend although significant turnover was observed. The surface lots behind The Loop were 75-90% full and experienced significant turnover. Like Sub-Area C, residential streets in Sub-Area A were more utilized during the weekend than weekday. There was little turnover on these streets. Many residents likely either walk to The Loop for activities and entertainment on the weekend afternoons or are home.

Observations

Sub-Area A

In Sub-Area A, there was little to no change in demand on weekdays from 1PM to 7PM or on the weekend from 2PM to 6PM. Weekend demand was generally higher than the weekday, increasing in the late afternoon and evening hours on Saturday. This is likely because people are returning from Saturday errands before going out or eating dinner.

On the weekdays and weekends, demand increased on the east side of Sub-Area A in the late afternoon and evening hours, primarily on Eastgate Avenue, Interdrive Street, Westgate Avenue, and Limit Avenue. The south end of Eastgate Avenue (Sub-Area A), closest to Delmar, saw almost 100% utilization during the evening hours due to its proximity to Loop hot-spots like Mission Taco, United Provisions, and Peacock Diner.

The west side of Sub-Area A, which includes the Parkview Gardens neighborhood, saw a small increase in demand during the late afternoon and evening hours on both the weekdays and weekend. These parking trends reflect the daily patterns of the residents. Most residents in Sub-Area A work or run errands during the day and return in the evening.

Cates Avenue, the east portion of Clemens Avenue (not in Parkview Gardens) and the west end of Eastgate Avenue were almost always under-utilized. At no point was there no available parking on a street in Parkview Gardens (the west side of Sub-Area A).

Sub-Area B

Trends in parking utilization in Sub-Area B reflect the commercial character of this area. The restaurants, bars, entertainment venues, and shops along Delmar Boulevard are the likely destinations for parking users along Delmar Boulevard regardless of time of day. During the weekday observation period, Delmar Boulevard was less than 75% utilized until the end of a typical workday around 5PM when utilization increased to between 75 and 100%.

While Delmar Boulevard and the first block of streets perpendicular to it are often highly utilized, particularly in the evening, there is significant turnover. The far west side of Delmar Boulevard on the south side of the street across from the library had the opposite trend of segments abutting commercial uses to the east. This on-street parking area mostly serves students living in the adjacent residential multi-family building to the south. The demand was highest, mostly 100% utilized, during the day time and emptied out in the evening.

Students have the opposite peak parking demand hours to working residents. Due to their proximity to Washington University, they usually walk to and from school, leaving their cars on the street or in their designated parking spots. When they return home after the school day, they use their car for errands or evening entertainment. These trends are more noticeable in Sub-Area C. There is no evidence that students who live elsewhere park in this area to walk to school and if they are, this is an insignificant proportion of all on-street parkers.

The parking lots behind The Loop had a similar demand pattern to on-street parking on Delmar Boulevard. Lot 4 was about 50% utilized throughout the weekday hours with a slight increase by 7PM when utilization reached about 75%. Lot A reached around 75% utilization during the weekday evening hours and did so sooner than Lot 4.

On the weekends, these parking lots were about 75% utilized throughout the day, increasing to almost 100% utilization in the evening when activities on The Loop increase. Loop commercial parking demand never bled into the southern neighborhoods of Sub-Area C.

It was also observed that finding public parking in The Loop is an issue. There are few signs along Delmar Boulevard directing visitors to public parking lots. The only sign on Delmar between Skinker Boulevard and Trinity Avenue is the parking sign for the garage, which is metered (see **Figure 9**). Signage directing visitors to the parking lot next to the Tivoli Theatre on the south block of Delmar Boulevard between Limit Avenue and Melville Avenue also does not have a parking sign (see **Figure 10**).



Figure 9: Parking Garage Sign



Figure 10: Eastbound approach to parking lot next to Tivoli

Lot 4 and Lot A have parking signs, but they are on Leland Avenue and mostly obstructed by trees from the intersection of Leland Avenue and Delmar Boulevard where visitors would turn in to access that parking (see **Figures 11-13**).



Figure 11: Leland Avenue and Delmar Avenue intersection westbound



Figure 12: View from northbound on Leland at Leland Avenue and Delmar Boulevard Intersection

Figure 13: Lot A Parking Sign



Lot 4, it is unclear as to where the public and private parking begins and ends within that area (see **Figure 14**). There are no clear barriers between the two types of parking in Lot 4. Adding plantings or more vertical barriers would help a user visually distinguish between public and private parking and be confident that they are parking legally.



Figure 14: Lot 4 public parking sign and private parking sign

The two wayfinding signs along Delmar Boulevard show where businesses and parking are located in the Loop but they are difficult to read with small font and not being placed at key locations; one on the northwest intersection of Eastgate Avenue and Delmar Boulevard (see **Figure 15**); one on the south block of Delmar Boulevard between Melville Avenue and Limit Avenue. Way-finding signs should be near entrances and exits of parking lots or in public spaces so that people can gather to look at them without obstructing the sidewalk to viewshed at intersections.



Figure 15: Wayfinding sign on Eastgate Avenue and Delmar Boulevard

Metered parking along Delmar Boulevard is also not consistent. From Limit Avenue to Eastgate Avenue, on-street parking is free on Delmar Boulevard (see **Figure 16**). East of Eastgate Avenue and west on Limit Avenue along Delmar Boulevard, parking is metered.

There are also some side streets off Delmar Boulevard where the metered parking is missing, making some spaces free and others not within the same block (see **Figure 17**).

For a visitor, the inconsistency in whether they will be charged for parking or not leads them to first look for free parking and then look for metered parking. This increases the time required to find a desirable parking space which increases congestion in the Loop as cars search for a better spot.



Figure 16: No meters on north side of Delmar Boulevard between Limit Avenue and Eastgate Avenue, facing eastbound



Figure 17: Inconsistent parking meters on Limit Avenue south of Delmar Boulevard

While there are signs showing where parking along Delmar, there should be an easy-to-find online map and in-person way-finding maps at strategic locations along the Loop to identify nearby public parking lots. Online, the Delmar Loop website has a PDF map that can be downloaded but it is not described or labeled as a map that identifies where people can park (see **Figure 18**). Instead, it is labeled as a business directory.



Figure 18: Loop map online identification

Additionally, the interactive map that is on the front page of the Delmar Loop website does not note any public parking locations (see **Figure 19**).

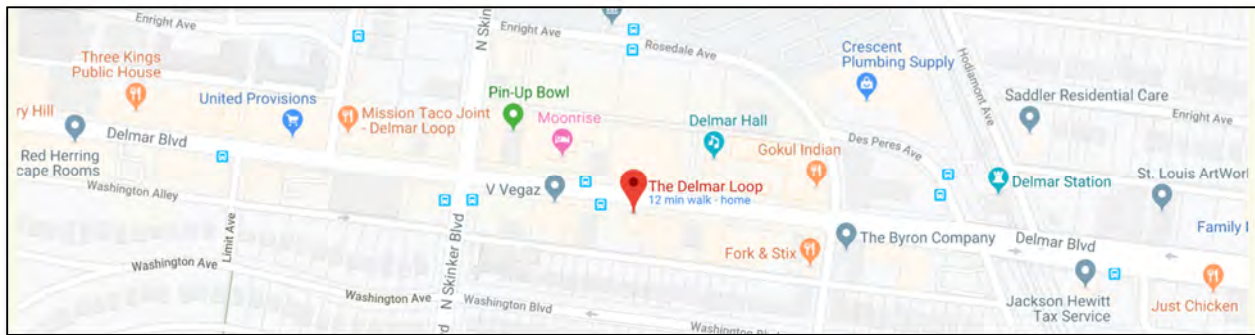


Figure 19: Delmar Loop front page interactive map

Sub-Area C

Trends in parking utilization in Sub-Area C were the reverse of Sub-Area A because of the higher concentration of students and their opposite parking patterns to non-student residents who leave during the day for work and return home at night. Students leave their cars for the day on the street and walk to school, returning in the evening.

Kingsbury Boulevard and Washington Avenue saw their highest utilization during the day, close to 100%, with a slight decrease in the evening when students returned from school and used their cars for errands or evening entertainment. Most students that were observed walking on these streets coming from Washington University were observed entering the multi-family units. It was not clear whether students who do not live in the adjacent multi-family units were parking on these streets to walk to school. While this may be occurring, non-resident students parking along these streets are not significantly impacting utilization.

It is important to note that these results reflect only two days of observations and observations of Kingsbury Boulevard and Washington Avenue occurred only once per hour. No license plate scanning or on-site surveys and interviews of students were conducted.

These residential areas are much denser (more units per acre) than the multi-family units to the north in Sub-Area A, resulting in the on-street parking being more highly utilized. Future development that

would increase the demand on parking should be compliant with City code so as to mitigate negative on-street parking impacts.

Trinity Avenue between Washington Avenue and Delmar Boulevard was highly utilized throughout the weekday observation period. The programs and activities at COCA and the University United Methodist Church are likely causing this high parking demand. During the weekend, the demand on this portion of Trinity Avenue was highest in the early afternoon and declined slightly in the late afternoon and evening hours.

Loop South demand also reflected the fact that students live in the adjacent buildings, particularly on the east end where the densest multi-family buildings are located. Demand declined by the early afternoon and evening from 100% to 50% utilized. The west end of Loop South had consistently lower utilization as compared to the east end regardless of time of day. The buildings on the west end are less dense than those on the east and the commercial uses on Delmar Boulevard are more active towards the east than the west.

There is no parking allowed directly in front of COCA on Trinity Avenue, but the south end of that block was well utilized and experienced high turnover. The construction east of COCA on Washington Avenue reduced the amount of on-street parking than what is usually available.

Zone 2

Weekday Utilization

During the weekday, 7PM was the highest demand hour for which data was collected in Zone 2. Its utilization map is shown in **Figure 20**.

Demand did not vary significantly for most of Zone 2 during the hours observed, remaining around 75% occupied on Pershing Avenue throughout the weekday hours with an increase to 90-100% utilization by 7PM. This increase was seen primarily on the south side of Pershing Avenue. The south side of Pershing Avenue has more multi-family units than the north, resulting in higher demand for on-street parking when residents return home from work in the evening.

All other streets in Zone 2 remained under 50% utilized, the majority of which were under 25% utilized or less, on both the weekday and weekend observed periods.

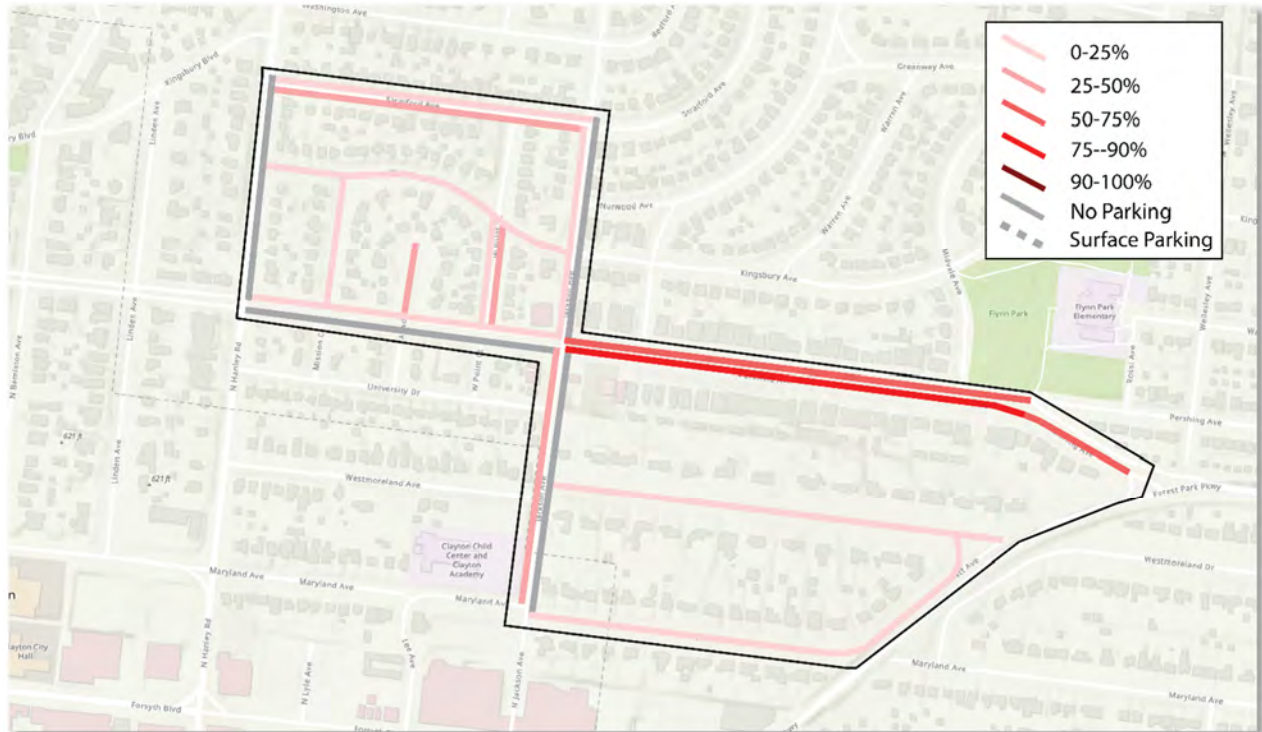


Figure 20: Zone 2 Weekday Peak Hour of Parking Utilization (7PM)

Weekend Utilization

During the weekday, 2PM was the highest demand hour for which data was collected in Zone 2. Its utilization map is shown in **Figure 21**.

Demand in Zone 2 generally declined on the weekend, likely because residents were out running errands or doing other weekend activities. There was a moderate increase in demand along the south side of Pershing Avenue in the late afternoon and evening hours on the weekend. Utilization remained under 90% on the south side of Pershing Avenue over the weekend. On the other residential streets in the zone, demand did not change throughout the hours observed and there was little to no turnover.

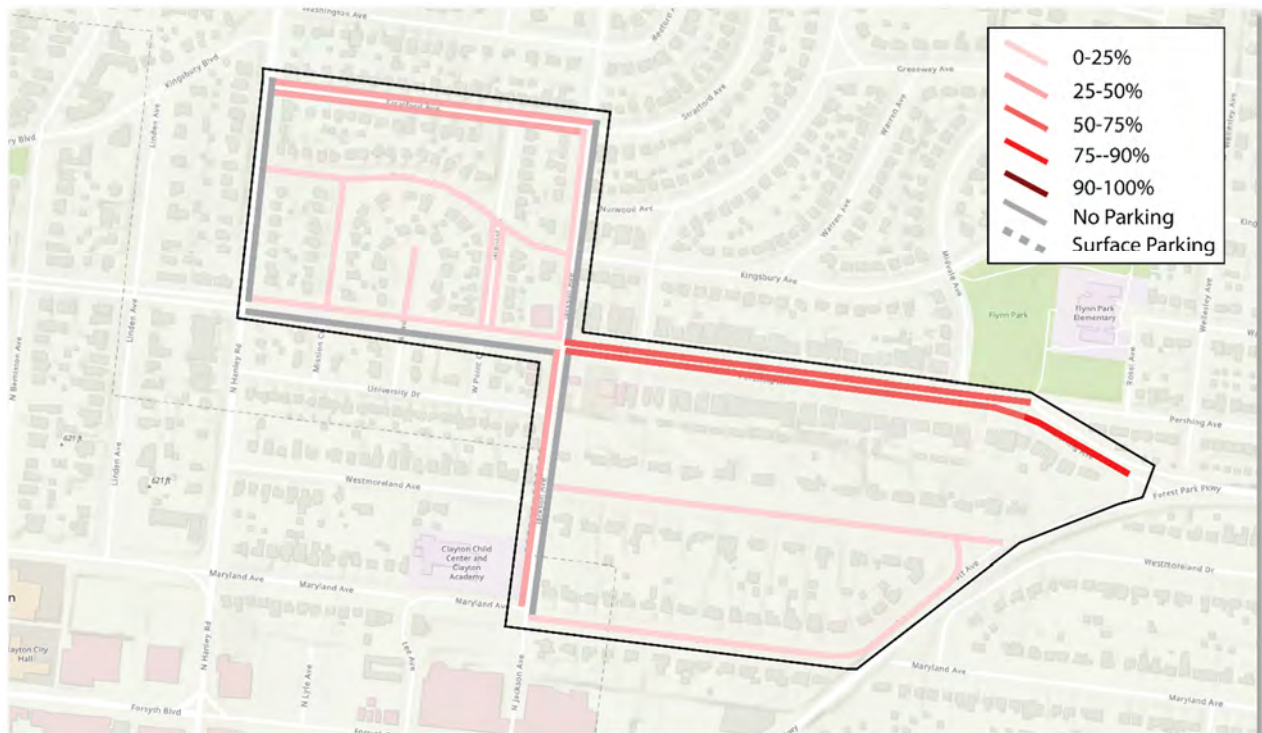


Figure 21: Zone 2 Weekend Peak Hour of Parking Utilization (2PM)

Observations

There was little to no turnover observed for these residential areas on the weekday or weekend. Most of these streets are lined with single-family homes except for Pershing Avenue. Most of these single-family homes have driveways and garages where residents can park their vehicles. The cars that were parked along the street did not move throughout the hours observed, including the evening hours after work.

Maryland Avenue and Westmoreland Drive are the closest streets to Clayton’s employment centers. Only one car was parked on Maryland Avenue from 2PM to 7PM. At most 15 cars were parked on the street at one time (3PM) on Westmoreland Drive. The vehicles observed parking on these streets were typically home service, home improvement, lawn care or other types of service vehicles.

The portion of Jackson Avenue closest to Pershing Avenue was more utilized than the northern end of Jackson Avenue because of the coffee/bike shop and restaurant on the corner of Jackson and Pershing Avenues. In the evening, on-street parking near that corner was highly utilized and saw significant turnover. Overall, Zone 2 has an acceptable parking condition as it exists today due to none of the streets within the study area exceeding 90% utilization.

Zone 3

Weekday Utilization

During the weekday, 1PM was the highest demand hour for which data was collected in Zone 3. Its utilization map is shown in **Figure 22**.

Lindell Boulevard and the stretch of Forsyth Boulevard that borders the commercial land uses was highly utilized during most hours observed, more so in the late afternoon and evening, averaging between 75-90% utilized. While parking is in high demand on these segments of these streets, there was turnover near the commercial land uses. The south side of Forsyth Boulevard, which was more utilized than the north for almost all hours of observation, has a higher density of households than the north. The north side of Forsyth Boulevard has resident permit restricted parking from Manhattan Avenue to Big Bend Boulevard during the weekdays.

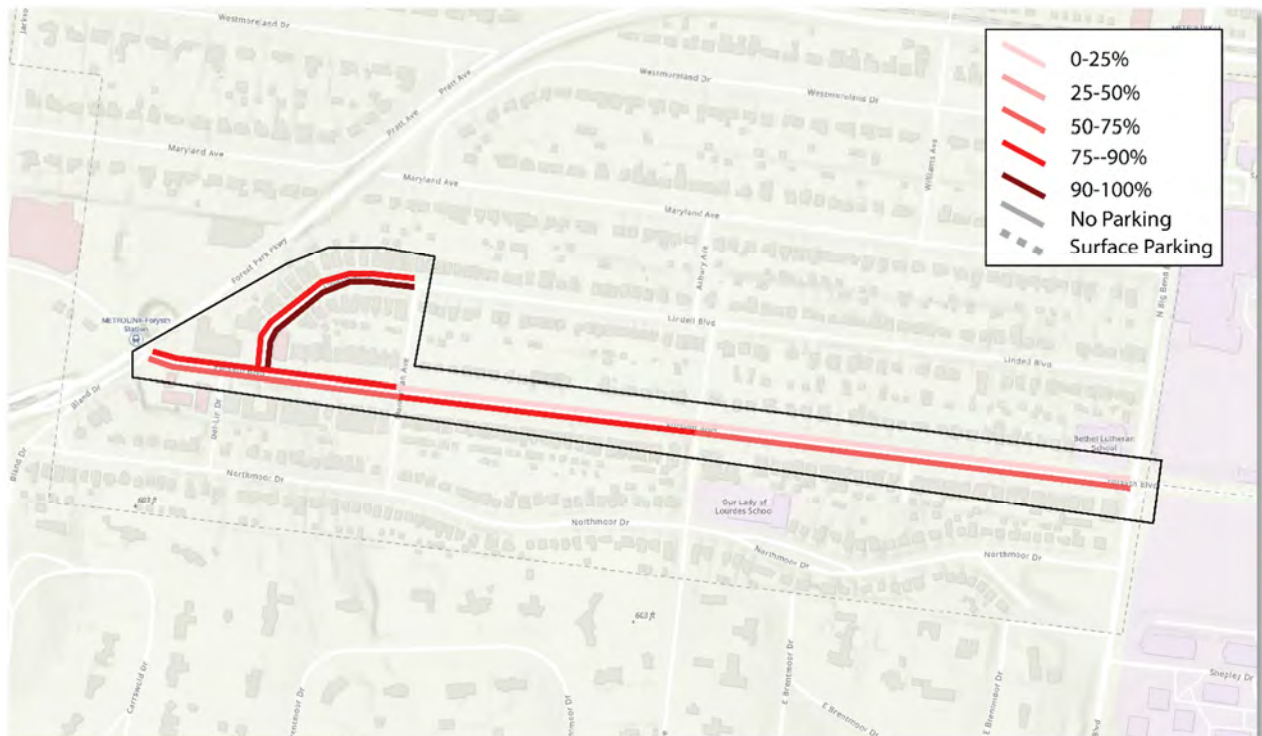


Figure 22: Zone 3 Weekday Peak Hour of Parking Utilization (1PM)

Weekend Utilization

During the weekday, 3PM was the highest demand hour for which data was collected in Zone 3. Its utilization map is shown in **Figure 23**. Parking utilization decreased in the areas near residential land uses starting around 5PM. Near the commercial businesses, parking utilization was consistently in the 50-75% utilization range.

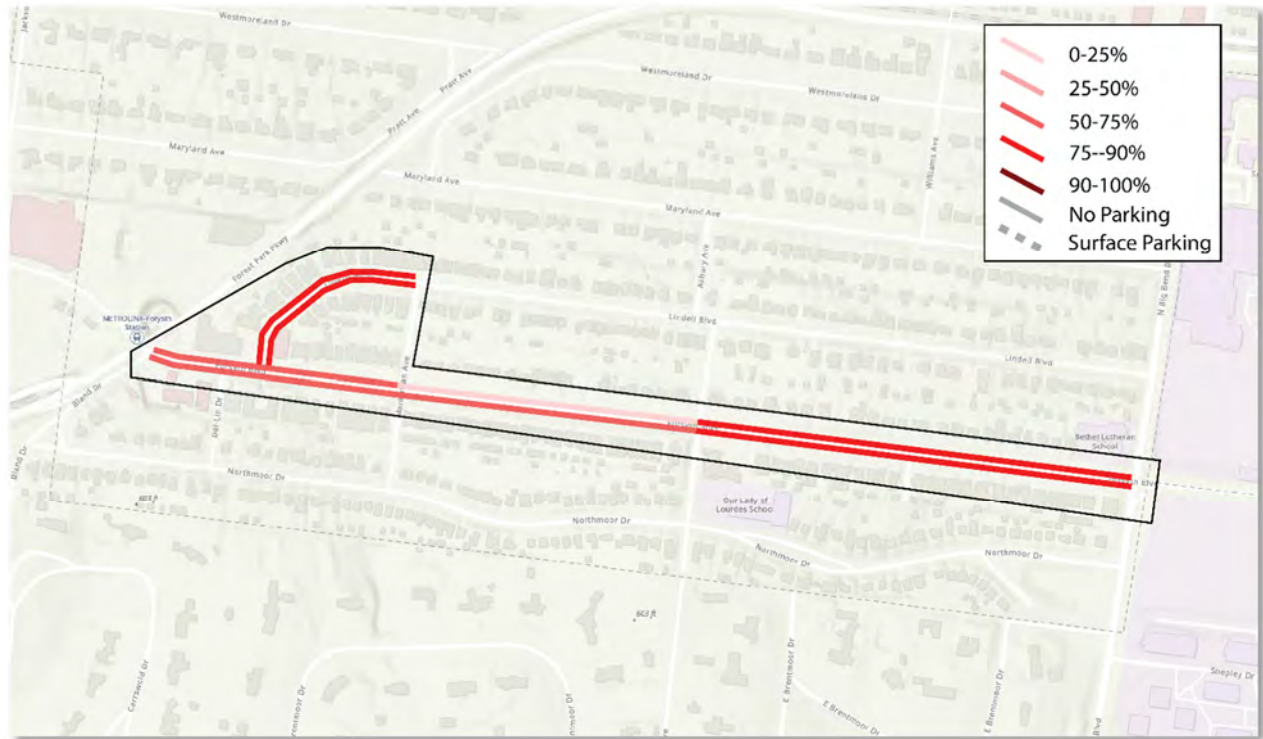


Figure 23: Zone 3 Weekend Peak Hour of Parking Utilization (3PM)

Observations

During the hours when school lets out, the south side of Forsyth Boulevard next to Our Lady of Lourdes saw an increase in utilization. There is a time limit on the parking in front of the school, so cars did not park there unless they had quick business to do with the school or were picking up a child.

The residential permit parking along the north side of Forsyth Boulevard from Manhattan Avenue to Big Bend Boulevard resulted in very low-utilization during the weekday.

The south side of Forsyth Boulevard was well utilized throughout the day with a slight decline in the evening hours. This indicates that some Washington University students or staff may be parking along Forsyth Boulevard to walk to Washington University. However, these would represent the minority of parked cars on the south side as most had not left by 7PM. It is more likely that the cars parked on the south side of Forsyth Boulevard belonged to residents that live along the south side of Forsyth Boulevard in the multi-family buildings.

Forsyth Boulevard over the weekend was highly utilized particularly from Asbury Avenue to Big Bend Boulevard. Since the restricted parking on the north side of Forsyth Boulevard does not apply to the weekends, there was an increase from 0-25% utilized to 75-90% utilized on the north side between Asbury Avenue and Big Bend Boulevard as compared to the weekday. One explanation for this is that Washington University was holding an event on the Saturday for which attendees used Forsyth for parking. Another explanation is that residents from the south side of Forsyth Boulevard may be using the on-street parking over the weekends and moving them to a less convenient location during the week.

Parking along Lindell Boulevard had little to no turnover indicating that residents of the multi-family buildings along that segment of Lindell Boulevard are using the on-street parking for their personal vehicles.

Data Summary

Zone 1 had the highest overall utilization of all zones. Overall, Zones 2 and 3 do not have an on-street parking issue regardless of the day of the week or time of day or week except for a few specific streets:

- In Zone 1, the streets with utilization over 90% included Trinity Avenue, the north side of Kingsbury Boulevard, south side of Washington Avenue, north portion of Melville Avenue, Leland Avenue south of Delmar Boulevard, Delmar Boulevard, south end of Westgate Avenue, southeast portion of Enright Avenue, west side of Limit Avenue, southern portion of Eastgate Avenue, northeast portion of Clemens Avenue East, southern portion of Kingsland Avenue between Loop North and Clemens Avenue West.
- In Zone 2, there were no streets that exceeded 90% parking utilization during the times data was collected.
- In Zone 3, the only street that exceeded 90% utilization was the southern block of Lindell Boulevard during the weekday afternoon.

Consistently underutilized streets include the west end of Loop South, most of Loop North, the north end of Kingsland Avenue near Vernon Avenue, Cates Avenue between Westgate and Eastgate Avenues, Clemens Avenue between Westgate and Eastgate Avenues, Westmoreland Drive, Maryland Avenue, and all the residential streets west of Jackson and North of Pershing Avenues.

General observations reveal that on-street parking demand is directly related to the land use adjacent to the street and the intensity of that use. Residential land uses see a slight increase in parking demand in the evening unless the residences are mostly occupied by students. For student-occupied residences, demand is highest during the day and decreases slightly in the evening. Commercial land uses see higher parking utilization in the late afternoon and evening hours during the weekday and experience consistent moderate to high demand on the weekend afternoon and evening hours.

Recommendations

While this study did not determine there is a parking problem for most of the study areas, the following recommendations should be considered to address the parking issues that do exist in particular portions of the City as described in the prior analysis. To address parking constraints, a city can take steps to reduce demand, increase supply, or better manage the public parking system. These recommendations are organized by first recommending solutions that would apply to all zones studied. This is followed by zone specific recommendations.

All Zones

Require a residential parking permit

Currently, residential parking permits are issued based on which neighborhoods collectively apply for one and qualify based on their proximity to surrounding institutions like Washington University or the Clayton business district. If you live in a neighborhood that has been approved for an on-street parking permit by the Department of Public Works, you can receive a residential parking permit. If the City were to proactively enforce a residential parking permit system on the residential streets with parking problems, this may reduce utilization and at least prevent those who are not residents from parking on these streets (although this was not found to be happening).

Another option is to take the residential permit parking system a step further by adding a nominal cost for a parking permit that must be renewed annually. This would also likely reduce the number of people using on-street parking for residential purposes even if the cost is low.

There are downsides to proactively instituting a parking permit and adding a cost to permits. Applying a residential parking permit to these high-density areas may result in spill-over parking into other streets that did not have a parking problem prior and do not have a required permit. Adding a cost to a permit may be viewed as a “cash grab” by the City, making it politically infeasible. Because residents mostly use on-street parking in residential areas, instituting these policies may not reduce utilization significantly. Residents may think it is worth the hassle and trouble to get a permit if the alternative is no longer owning a car.

Better regulate development that modifies existing buildings with dimensional non-conformities

Much of University City’s road network and infrastructure was built in an era prior to the prevalence of personal vehicles. As a result, many buildings are non-conforming, meaning they do not comply with current parking requirements. In anticipation of more people moving to the area and more development occurring, the City should ensure its zoning code explicitly outlines what kinds of changes to an existing non-conforming building will remove their grandfathered-in status as a legal non-conforming building, thereby requiring them to become conforming in accordance with City code.

The University City Code regulates dimensional non-conformities in Division 3: Dimensional Non-Conformities as follows:

Section 400.3090 – Non-Conforming Structures

[R.O. 2011 §34-153.2; Ord. No. 6139 §1(Exh. A (part)), 1997]

- A. *Non-Conforming Structures Associated with Conforming Uses.* Any non-conforming structure, which is associated with a conforming use, may remain as a non-conforming structure, subject to the following provisions:
1. *Enlargement, repair, alterations.* Any such structure may be enlarged, maintained, repaired or remodeled; provided however, that no such enlargement, maintenance, repair or remodeling shall either create any additional non-conformity or increase the degree of existing non-conformity of all or any part of such structure, except as may be permitted under Section **400.3100** of this Article.

Section 400.3090 of the City code above describes generally what modifications are not allowed if an owner wants to maintain a legal non-conformity. Not having enough off-street parking to comply with current code is considered a dimensional non-conformity per Section 400.3110 below.

Section 400.3110 – Other Dimensional Non-Conformities

[R.O. 2011 §34-153.4; Ord. No. 6139 §1(Exh. A (part)), 1997]

- A. Any other dimensional non-conformities may remain non-conforming, so long as any modification to a building site or the structures thereon, as may be permitted by this Article, does not create any increase in the degree of such other dimensional non-conformity. Without limiting the generality of the foregoing, the following provisions shall apply to other dimensional non-conformities:
1. *Open space.* In situations where common open space is required by this Chapter, and an existing development does not provide the required amount of such open space, any existing open space shall not be reduced in size.

Off-Street parking. In situations where the number of off-street parking spaces is less than required, no reduction in existing off-street parking shall be permitted, except as may be provided for under Article VII, Section 400.2130 of this Chapter.

Increasing the number of bedrooms in a legal non-conforming building that does not have adequate parking per current code is technically increasing its degree of dimensional non-conformity. Therefore, the building is no longer grandfathered in with its non-conformities, requiring the developer to bring it into compliance with all City code.

Property owners and developers interested in investing in and renovating properties in these older areas may interpret the code differently than the City intends. To reduce ambiguity and disagreement between the City and property owners, the code should be more explicit regarding how a building becomes non-conforming. Some questions that city code should address explicitly are as follows:

- What degree of modification to a building would make it no longer legally non-conforming? Include specific examples of what is would maintain the legal non-conforming status and what would remove this status.

- If a property owner increases the intensity of the use, making the structure no longer eligible to be legally non-conforming, what additional changes need to be made for them to come into compliance? For example, if a developer adds 3 beds to a building that does not have enough parking for its existing number of beds, how many additional parking spaces must they provide to become conforming if they want to keep their additional 3 beds? Would the developer have to add parking spaces based on the number of additional bedrooms? Or, would they need to add enough parking spaces to bring the entire building into compliance with the off-street parking regulations as if it were a new build?
- Would the City offer an alternative to building new parking such as an in-lieu fee per parking space lacking that would go towards maintaining, adding, or operating parking and multi-modal facilities in the area?

There are many options the City could pursue to better regulate dimensional non-conformities and mitigate future strains on residential on-street parking. More explicit regulations pertaining to non-conforming situations would not only benefit the City but clarify for developers what they can and cannot do to a property to maintain a legal non-conformity. This would save time and money for both parties, reduce the potential for legal battles, and improve relationships between the City and developers in these high-density, older neighborhoods.

Uniformly and frequently enforce parking regulations

In all zones, any parking restrictions or policies should be enforced consistently and frequently to create a culture of compliance. Consequences for violating parking rules should be costly so as to discourage repeat offenders. Consider using an electronic citation issuance system to improve efficiency and effectiveness of enforcing parking rules.

Zone 1

Zone 1 has the most diversity in land-uses ranging from dense multi-family housing to commercial and restaurant creating a walkable urban environment. Zone 1's parking was busiest in the evening weekend hours. While the parking was effectively at capacity during this time, it did turn over frequently meaning people were coming and going rather than staying for long extended periods. The main issues regarding parking in Zone 1 include encouraging alternative modes of transportation, better utilizing available space during these peak hours, and increasing awareness of where available parking spaces are.

Facilitate and encourage alternate modes of transportation

One means of reducing demand for parking in Zone 1 is to increase the ways in which people can get to the Loop by investing in infrastructure for non-personal vehicle mobilities. Shared use and micro-mobility vehicles like scooters and bicycles are examples of such types of alternative transportation that can reduce the number of personal vehicle trips in the Loop. Current initiatives to bring these services to City are a step in the direction towards encouraging alternate modes of transportation.

In addition to shared-use and micro-mobility transportation, facilitating the use of personal bikes and encouraging walking make using a car unnecessary in The Loop. Residents could also be offered a discount for the Trolley or to use the scooters and other shared use services to encourage non-personal

car use. High-quality bike facilities such as designated bike lanes, smooth road conditions, and bike racks in strategic locations can reduce the use of vehicles to get to the Loop, thereby reducing parking demand. By adding bike racks in logical and prominent locations and improving multimodal route connectivity, the City can better control where bicyclists park and use their bikes.

Promote Shared Parking

Shared parking better utilizes existing parking spaces. In the Loop, there are several businesses with exclusive rights to parking lots including but not limited to the Regions Bank, Craft Alliance, and the Public Library. Many of these entities have opposite peak hours of operation to adjacent land uses and could be encouraged to share their parking. Compatible day-time uses like banks and night-time uses like the restaurants and bars would increase the effective supply of parking in the area during high-demand hours. Shared parking would be particularly effective if it applied to all parking spaces in the Loop including on-street and all parking lots.

Confine employee parking to specific parking areas

Like Loop patrons, Loop employees want to park as close to their destination as possible. This can reduce the perceived supply of parking for patrons if employees are using the most convenient spaces along the Loop. The City should work with businesses to identify employee parking spaces away from prime patron parking locations. For example, the far west and north sides of Lot 4 are the least utilized spaces on the Loop at all times of the day and week. Employees may have to walk further to their destinations in exchange for freeing up convenient spaces for Loop patrons and increasing the perception that there is available parking.

Increase awareness of parking facilities

As described in the data collection section, the way-finding signs and parking identification signs in Sub-Area B (along the commercial areas of The Loop) are not highly visible or easily readable to the general public. Information about parking and navigating to that parking needs to be conveyed in an obvious, clear, and redundant manner. The more attention grabbing and repetitive, the better a message is conveyed.

It is suggested that signs along Delmar be installed to point visitors in the direction of the parking lots behind The Loop businesses like Lot A and Lot 4. The Loop's website should also have a map that clearly identifies public parking along The Loop, ideally one that is interactive and does not require download to view. Many patrons may not be able to download PDFs onto their phones. A downloadable PDF map can be difficult to read as well. The map that exists is long and oriented with the west end of The Loop (near the library) at the top and the east end at the bottom. The legend for this map is also at the bottom so when viewing the map online; the reader won't know that what colors are identifying and where parking areas are unless they scroll further down.

All parking related maps should provide information on the cost and any time restrictions on the parking. To avoid map clutter, a parking map's sole purpose should be to convey information about public parking and avoid displaying information about businesses and landmarks unless they are essential to orienting the reader to the map. A map should include the locations of all public parking

spaces, at what hours they are available for public use, and the cost per hour. This map should be easy to read in-person and online. The online version should be interactive if possible and the in-person versions should be located at entrances and exits for parking lots and garages along The Loop and where appropriate, in areas with high levels of pedestrian traffic. The signs should be revamped using more universally understood icons in conjunction with larger text size.

Develop a downtown access and circulation plan

If the parking issue in the Loop and surrounding residential areas needs further analysis, it is recommended the City perform a comprehensive downtown access and circulation plan. A downtown access and circulation plan would assess the overall circulation in The Loop and surrounding residential areas given the existing traffic volume, modal splits, expected growth, and infrastructure improvements. This plan would use this information to identify mobility issues and priorities as well as more concrete capital improvement projects and policy changes that would address identified and data-backed issues. Many municipalities include a circulation plan as a component of a comprehensive plan or downtown area plan. Examples of cities that have undergone downtown access and circulation plans include the following:

- Independence Englewood Station Arts District, Missouri (2013)
- Lewiston-Clarkston Downtown Circulation Plan, Idaho (2011)
- Great Falls Downtown Access, Circulation, and Streetscape Plan, Montana (2013)
- North Fair Oaks Circulation and Parking Analysis – California (2013)

Zone 2

There were little to no parking issues in Zone 2 for the hours and days observed. The only areas with some congestion in Zone 2 included Pershing east of Jackson. This segment borders high density multi-family residential where very little off-street parking is available. The residential neighborhood north of Pershing between Hanley and Jackson had very few cars parked on the streets throughout the day and there was no evidence that people parked on the street to go to Clayton.

While there is no identifiable parking problem, if the City wishes to pursue reducing utilization further, a residential parking permit along the south block of Pershing may reduce parking utilization slightly. As cautioned previously, this may not reduce utilization because the people parking along Pershing would likely all qualify to receive a permit. The only instance where it would reduce utilization is for those people who do not want to go through the process of getting a permit.

Zone 3

There were several road segments with high parking utilization in Zone 3 for the hours and days observed. Like Zone 2, there are high-density residential land uses on the south side of Forsyth where utilization is highest. These residents have few off-street parking spaces and rely on on-street parking for parking their personal vehicles. There did not appear to be a parking problem near the commercial uses at the west end of Zone 3 except for the south side of Lindell Boulevard. The spaces along the northwest end of Forsyth Boulevard were also well utilized with a moderate amount of turnover indicating a successful commercial district rather than a parking problem.

If there is interest in further reducing parking utilization, particularly on the southern block of Lindell Boulevard and southeastern end of Forsyth Boulevard, the City could pursue instituting a residential parking permit. While the same reservations regarding this recommendation from Zone 2 apply to Zone 3, there are more non-residential uses close to Zone 3 than Zone 2. Therefore, it is slightly more likely that non-residents are parking in Zone 3, in which case a residential parking permit may be more likely to reduce utilization in these specific areas.

Appendix

Zone 1 Hourly Parking Utilization

STREET NAME	Direction	WEEKDAY							WEEKEND			
		1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Washington Ave Melville to Middle	North	5	5	5	5	5	5	4	4	4	4	4
	South	5	5	5	5	5	5	5	3	4	4	4
Washington Ave Middle	North	5	5	5	5	5	4	4	3	3	3	3
	South	5	5	5	5	5	4	5	2	3	3	3
Washington Ave Middle to Trinity	North	2	2	2	2	4	4	1	4	3	4	3
	South	2	2	2	3	3	3	1	4	3	3	1
Trinity Ave Washington to Kingsbury Blvd	East	2	4	3	4	4	4	4	4	4	5	5
	West	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Kingsbury Blvd Trinity to Kingsland	North	5	5	5	5	5	3	3	3	2	3	4
	South	Private	Private	Private	Private	Private	Private	Private	4	2	2	2
Kingsbury Blvd Kingsland to Middle	North	4	4	4	2	4	3	2	3	3	2	3
	South	Private	Private	Private	Private	Private	Private	Private	4	4	3	2
Kingsbury Blvd Middle to Melville	North	5	5	5	5	5	3	3	2	2	1	1
	South	Private	Private	Private	Private	Private	Private	Private	4	3	2	2
Melville Kingsbury to Alley	East	5	5	5	4	4	4	4	1	1	1	1
	West	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Melville Alley to Washington	East	5	5	5	5	5	5	5	3	4	4	4
	West	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Melville Washington to Loop South	East	5	5	5	5	5	5	5	NP	NP	NP	NP
	West	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Loop South Melville to Commerce Bank	North	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
	South	4	5	3	4	2	2	3	3	2	4	5
Loop South Commerce Bank to Kingsland	North	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
	South	2	3	2	2	3	3	2	5	5	3	5

City of University City Parking Study – Appendix

STREET NAME	Direction	WEEKDAY							WEEKEND			
		1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Enright Ave Limit to Interdrive	South	3	3	3	3	3	3	2	5	3	4	4
Enright Ave Interdrive to Westgate	North	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
	South	1	1	1	2	3	2	2	5	3	5	4
Interdrive	East	4	3	3	3	3	4	4	3	3	3	4
	West	4	4	3	3	3	4	4	3	3	3	3
Limit Ave	East	4	5	4	4	5	4	4	4	4	4	4
	West	5	5	4	4	5	4	4	3	4	4	5
Clemens Westgate to Interdrive	North	3	2	1	2	2	2	4	5	4	4	5
	South	3	2	1	2	2	2	2	2	2	2	2
Clemens Interdrive to Limit	North	4	3	1	3	3	2	3	4	4	4	3
	South	3	3	1	1	1	1	2	2	1	2	1
Clemens Limit to Eastgate	North	1	1	1	1	1	1	1	1	1	1	1
	South	1	1	1	1	1	1	1	1	1	1	1
Cates Ave Westgate to Interdrive	North	1	2	2	1	1	1	1	1	1	1	1
	South	1	1	1	1	2	1	2	1	2	2	2
Cates Ave Interdrive to Limit	North	2	2	2	1	2	3	1	1	2	2	2
	South	1	1	1	2	2	3	3	2	2	2	2
Cates Ave Limit to Eastgate	North	1	1	1	1	1	1	1	1	2	1	1
	South	1	1	1	1	1	1	1	1	1	1	1
Vernon Ave Westgate to Eastgate	North	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
	South	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Eastgate Vernon to Cates	East	1	1	1	1	1	1	1	2	1	1	2
	West	1	1	1	1	1	1	1	2	3	3	2
Eastgate Cates to Clemens	East	2	2	1	1	1	4	4	3	2	2	4
	West	2	2	2	1	1	4	4	3	3	3	4
Eastgate Clemens to mid-block	East	3	3	2	2	2	4	4	4	3	3	5
	West	3	2	2	2	3	4	4	4	4	4	5
	East	3	2	2	3	5	3	4	4	5	5	5

City of University City Parking Study – Appendix

STREET NAME	Direction	WEEKDAY							WEEKEND			
		1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Eastgate mid-block to Enright	West	3	2	3	3	5	5	4	4	5	5	5
Eastgate Enright to Delmar	East	3	3	4	2	5	5	4	5	4	4	5
	West	4	4	4	1	3	5	3	5	5	4	5
Delmar Eastgate to City Limits	North	4	4	5	5	5	5	5	5	5	5	5
	South	4	1	1	2	1	3	5	5	5	5	5
Alley Parallel to Delmar	North	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
	South	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Parking Lot by Ciceros		2	2	2	2	2	2	3	4	4	4	4
Parking Lot behind S&S		2	2	2	3	3	4	4	4	4	4	4

Zone 3 Hourly Parking Utilization

Street Name	Direction	WEEKDAY							WEEKEND				
		1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM
Forsyth FP to Manhattan	South	3	3	3	3	3	3	3	3	3	3	3	3
	North	4	3	3	3	3	3	3	3	3	3	3	3
Forsyth Manhattan to Asbury	South	4	3	3	3	3	4	3	3	3	3	3	3
	North	1	1	1	1	1	1	1	1	1	1	1	1
Forsyth Asbury to Big Bend	South	3	3	3	3	3	2	2	4	3	3	3	2
	North	1	1	1	1	1	1	1	4	4	1	1	1
Lindell Manhattan to Forsyth	South	5	5	4	4	4	4	4	4	4	3	4	4
	North	4	5	5	3	3	3	3	4	3	3	3	3