UNI – College Hill Neighborhood Parking Study

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INTRODUCTION

Adequate parking is often a challenging and a controversial issue that plagues most university campuses and the University of Northern Iowa (UNI) is no exception. According to the UNI Public Safety Department records, there are approximately 8,936 parking spaces on campus. However, the number of students, faculty, staff, and visitors on campus exceeds 16,000 daily. Adding to the campus parking controversy is the high density street parking that accompanies neighborhoods located near campus, an undesirable characteristic to perennial residents of Cedar Falls, Iowa. This high density street parking is largely the result of rental housing in the area combined with off campus parking during the school week.

Study Objectives

Figure 1 illustrates the geographic distribution of campus parking at UNI. As shown, parking areas are most heavily skewed to the west side of campus. Available parking to the east is relatively scarce. Through casual observation, it’s also suspected that a number of campus parking areas are significantly underutilized. Underutilized parking areas represent a sustainability inefficiency that likely equates to lost revenue for UNI and elevated parking pressures in other areas.

The intent of this study is twofold:

- Because of the skewed spatial distribution of campus parking, it’s reasonable to expect that city street parking east of campus would experience greater pressure during the school week from UNI commuters. One objective of this study is to assess how street parking densities east and north-northeast of campus are affected during the school week as compared to Sunday afternoon (e.g., baseline) conditions. The intent is to assess UNI commuter influence on street parking densities in this area, effectively separating it out from residential or rental street parking; and
- To quantitatively assess select campus parking areas often perceived as underutilized by the campus community and identify potential means of improving their use.
Figure 1. UNI campus map illustrating the distribution of campus parking areas and identifying select parking areas assessed in this study.
STUDY METHODS

Data Collection, Analysis, and Interpretation

The following briefly describes the information sources and methodologies used to complete this study.

- 2010 digital aerial photographs and 2008 high resolution Light Detection and Ranging (LiDAR) hillshade imagery, and pertinent geographic information system (GIS) coverages of the study area were obtained from the IDNR’s NRGIS library (http://www.igsb.uiowa.edu/nrgislibx/). This information was used for field work, GIS integration, and diagram development.

- During October, street segments within the study area were visited to obtain counts of parked motorized vehicles. One street segment, located south-southwest of campus was also included in the study in an effort to correlate street parking densities with high density rental housing. Motorized vehicle counts were obtained late on a Sunday afternoon (3:30-6:00 pm), during the late morning (10-11:30 am) on a Monday, and during the middle afternoon (1:20-2:30 pm) on a Tuesday. Motorized vehicle counts were entered as a GIS attribute for each street segment included in the study. GIS was also used to calculate and illustrate linear parking densities for each street segment (e.g., number of motorized vehicles per linear length [feet] of road segment). GIS software was also used to calculate and illustrate the net change in parked vehicles observed during the school week.

- Parking capacities of UNI’s multimodal transportation center (MMTC), the Business and Community Services (BCS) Gravel “B” lot, the Asphalt “B” lot, the BCS “A” lot, and the Industrial Technology Center (ITC) “A” lot (see Figure 1) were determined by counting vehicles present in these lots at various times during the course of a school day in October 2010. Vehicle capacity counts were limited to “A”, “B”, “G” and “Park and Pay” (i.e., Paid) spaces within these areas. With the exception of the Asphalt “B” lot, these campus parking areas appeared to be significantly underutilized during the school week. In contrast, the Asphalt “B” lot (located directly north of the BCS Gravel “B” lot) was used as a well utilized reference site since its use often appeared to be near capacity. Consequently, vehicle counts from the Asphalt “B” lot were collected for percent capacity comparison purposes with the other campus parking areas included in the study.
- Historic campus parking data was obtained from UNI’s Public Safety Department. This information was used to compile relevant background information used to put the campus parking portion of this study into perspective.
- MS Excel and ESRI GIS software (ArcView 9.3) were used to compile, analyze, and graphically illustrate data collected for the study.

**Potential Limitations**

The following briefly identifies potential methodology limitations of the study:
- Street vehicle counts did not account for portions of street segments inaccessible for parking. This would include areas such as driveway entrances and signage limiting street parking to specific stretches of the street segment. As a result, calculated street parking densities are likely lower than true parking densities.
- Vehicle counts included the total number of motorized vehicles parked within the designated street segment. Subsequent street density calculations did not treat street segments with parking limited to one side any differently that those that had parking on both sides.
- Using Sunday afternoon street parking as a baseline may not be an ideal representation of baseline conditions, particularly on segments where parking was allowed on both sides of a street on Sunday. Regardless, it should provide a good indicator as to how street parking densities are affected by school day parking.
- Campus parking counts did not differentiate whether vehicles in campus lots had the appropriate permit. It simply focused on the presence of the vehicle. In many instances, it was apparent that vehicles parked in a number of areas were not equipped with a proper permit. Consequently, some percent parking capacities may be overstated.
- Both off-campus street parking and campus parking are highly temporal in nature with vehicles coming and going at various times. Consequently, the times and dates in which data was collected may not accurately depict conditions and are no indication of turnover rates.
STUDY RESULTS

Street Parking Density

Background Information and Previous Studies. The issue of street parking in the area east-northeast of UNI’s campus (referred to as the College Hill Neighborhood [CHN] area) has long been an issue, particularly in regard to competing parking interests of College Hill merchants and UNI students. In 1990, A & S Research completed a survey study on parking issues associated with the area. Nearly half of the survey respondents indicated they used College Hill parking for UNI related reasons, competing for parking availability with College Hill merchant customers. Additionally, survey results determined that both UNI students and College Hill business patrons shared the same desire for two to five hour parking areas as opposed to the 30 minute and five or 10 hour meters common to the area at that time. Students wanted extended times (in reference to the 30 minute parking meters that dominated College Hill street parking at the time) for attending class while merchants wanted extended times for their customers and employees. On the other side of the coin, the five and 10 hour metered parking areas were problematic due to low turnover rates. Approximately 80 percent of the general parking respondents and merchants that participated during the 1990 survey, believed there was an extreme need for additional parking in the area, perhaps by providing more surface parking or construction of a parking ramp.

Similar studies were conducted for the area in 1993 and 1999 (Snyder and Associates, 1999). These studies found that congested street parking continued to plague the CHN area largely because of the extensive rental housing and UNI commuters. Although some parking recommendations such as alternate side parking and stronger on-site parking requirements had been implemented by the City of Cedar Falls, high street parking densities persisted. The problem was attributed to the lack of convenient campus parking. It was concluded that commuters preferred to park on public streets that were closer to their destination than campus parking lots. The 1999 study assessed parking occupancy and turnover rates to identify problem areas. Price Laboratory School and the College Hill commercial areas were identified as the biggest problem areas. The 1999 study also attempted to differentiate how much of the street parking congestion was caused by CHN residents versus UNI commuters. These efforts, however, were inconclusive. Again, respondents to surveys indicated the need for more parking and convenient campus parking. The call for a parking ramp was again re-stated as follows “A parking ramp, for example, would provide an acceptable,
convenient alternative place for UNI commuters to park, thereby reducing some of the parking congestion on city streets.”

Since these studies, a number of free one to two hour parking areas and two hour metered lots have been established within the College Hill area. This includes one hour free parking along College Street; two hour free parking lots along 22nd Street; the closing of 23rd Street east of College Street for a free one hour parking area; and two hour metered lots between College and Olive streets.

Current Findings. Figure 2 illustrates the extent of the study area in which vehicle counts were collected for the street parking portion of this project. Overall, vehicle counts were obtained for 110 street segments. As shown, a majority of the street segments included in the study area are located east-northeast of campus, similar to the CHN area addressed in the 1990, 1993, and 1999 studies. The Starview Drive street segment, located south-southwest of campus, was also included in this study. This street is dominated by rental properties. Consequently, its Sunday afternoon baseline parking density (calculated at just over 0.0164 vehicles per foot [v/ft]) was used as an indicator of high-density rental housing.

Results of Sunday baseline parking density data are shown in Figure 3. As indicated, a number of street segments within the study area exhibited rather high densities. These segments appear to be indicative of nearby rental or campus housing, a correlation supported by observation and parking densities greater than 0.0164 v/ft (i.e., the Starview Drive indicator density).
Figure 2 - Study Area and Road Segments

Legend
- Street Segments
- Study Area

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Figure 3 - Baseline (Sunday pm) Parking Density

Legend

Baseline Parking Density

- 0.000000 - 0.006369
- 0.006370 - 0.016400
- 0.016401 - 0.033094
- 0.033095 - 0.058739

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Figures 4 and 5 highlight the net parking density gain or loss during the school week. As indicated in Figures 4 and 5, vehicle counts were obtained to reflect Tuesday-Thursday (TTh) and Monday-Wednesday-Friday (MWF) class days. Results show that a significant number of street segments experienced negligible change or actual decreased in parking density during the school week. Fifty-six of the TTh and 64 of the MWF street segments decreased in parking density. This is likely due to the presence of high density rental or campus housing in these areas and, as with the case of Merner Avenue, the ability to park on either side of the street on a Sunday (during the school week, parking is limited to one side of the street).

Street segments highlighted in orange and red represent areas found to exhibit a marked increase in parking density during the school week (subjectively set at a net density change greater than 0.008 v/ft). This included 28 of the study’s street segments for both TTh and MWF. Street segments most affected by UNI commuter parking included segments of College Street (south of University Avenue); Walnut Street; 26th Street; Iowa Street; 22nd Street; Floral Court; and northern segments of Merner Avenue.
Figure 4 - Tuesday-Thursday Net Parking Density Change

Legend

Parking Density Change (Vehicles/ft)

-0.023256 - -0.010142
-0.010141 - 0.000000
0.000001 - 0.010830
0.010831 - 0.024242
0.024243 - 0.053191

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Figure 5 - Monday-Wednesday-Friday Net Parking Density Change

Legend

MWF Parking Density Change (Vehicles/ft)
-0.025830 - -0.011111
-0.011110 - 0.000000
0.0000001 - 0.007692
0.007693 - 0.018382
0.018383 - 0.038750

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Campus Parking

**Background Information.** According to records provided by UNI Public Safety, total campus parking prior to the construction MMTC was 8,486 spaces. This number declined to 8,306 spaces during MMTC construction (the 2008-2009 academic year) and then increased to 8,936 spaces after its completion.

UNI’s enrollment versus active parking permits issued from the 2005-2006 and 2009-2010 academic years is illustrated in Figure 6. As shown, enrollment dipped slightly after 2005-2006 and then gradually climbed from 12,260 in 2006-2007 to 13,201 in 2009-2010 (UNI, 2010). The total number of active parking permits issued, however, remained relatively stable during this time frame since dropping slightly after the 2005-2006 year. Figure 6 also reveals which permits were issued most frequently during this time frame. As shown, “B” permits were far more prevalent than any other permit type, almost double the next most popular permit type (“C” permits). This is likely attributable to the fact that “B” permits are available to faculty, staff and students; allow parking in more desirable areas on campus; and are favorably priced. Fewer “A” and “G” permits are issued as these represent the higher and pricier end of the permit hierarchy and are unavailable to the undergraduate student population. Historic pricing for “A”, “B” and “G” permits (i.e., the permit types of focus for this study) is shown in Figure 7.

Figure 6. Historic UNI enrollment versus issued permits from 2005-2006 to 2009-2010 academic years.
Figure 7. Historic campus parking permit fees.

Figure 8 illustrates some historical information on issued permits versus total spaces available by permit type. As shown, the greatest disparity exists for “B” permits where the number of issued permits is roughly 1,300 to 1,500 greater than the number of available “B” spaces. Although the number of issued “A” permits exceeds the number of available “A” slots, the difference is considerably more narrowed than “B” permits. Issued “G” permits (i.e., 25) matched the number of “G” spaces available in 2006 and 2008. However, after completion of the MMTC in 2009, only 33 “G” permits were issued as compared to 55 available spaces.
Study Findings. Table 1 summarizes percent capacity (i.e., 100 x vehicle count / total spaces available) data obtained for each campus parking area included in the study. As indicated, a number of parking areas were grossly underutilized (below 10% capacity) throughout each day of the school week. These included the BCS Gravel “B” lot, the BCS “A” lot, MMTC “G” spaces, and MMTC “Paid” areas. The ITC “A” lot was also underutilized although not to the degree observed for the aforementioned areas.

Percent capacity results for Asphalt “B”, MMTC “A”, and MMTC “B” indicate these campus parking areas are more efficiently utilized. As shown, average percent capacities for these areas ranged from approximately 66% to 81%.
TABLE 1
Campus Parking Capacities

<table>
<thead>
<tr>
<th>Parking Area</th>
<th>Space Type</th>
<th>Total Spaces Available</th>
<th>MWF Capacity Range</th>
<th>TTh Capacity Range</th>
<th>Average School Week Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCS Gravel B</td>
<td>B</td>
<td>297</td>
<td>5.05 – 25.93 %</td>
<td>11.78 – 35.35 %</td>
<td>8.25%</td>
</tr>
<tr>
<td>BCS A</td>
<td>A</td>
<td>35</td>
<td>2.86 - 2.86 %</td>
<td>0.00 – 20.00%</td>
<td>4.29% *</td>
</tr>
<tr>
<td>ITC A</td>
<td>A</td>
<td>132</td>
<td>11.36 – 40.15 %</td>
<td>20.45 – 42.42 %</td>
<td>32.29%</td>
</tr>
<tr>
<td>Asphalt B</td>
<td>B</td>
<td>368</td>
<td>26.36 -94.29 %</td>
<td>44.84 – 88.35 %</td>
<td>65.86%</td>
</tr>
</tbody>
</table>

| MMTC         | A          | 179                    | 61.45 – 84.92 %    | 68.16 – 81.01 %    | 73.53%                       |
|              | B          | 174                    | 26.44 – 100.00 %   | 77.59 – 100.00 %   | 81.32%                       |
|              | G          | 31                     | 3.23 – 12.90 %     | 3.23 - 9.68 %      | 6.86%                        |
|              | Paid       | 176                    | 0.57 – 3.98 %      | 1.70 - 4.55 %      | 2.42%                        |

\* Counts are skewed toward the high end as most vehicles during peak times did not have appropriate permit figures.

Figures 9 through 11 graphically illustrate daily (temporal) variations in percent capacity for each parking area. As shown, parking areas appear to be most heavily used from roughly 9:30 am to 2:30 pm, likely reflecting popular course times. Figure 8 also illustrates a sampling period that reflects south parking area capacities during a day of inclement weather. As shown, inclement weather did not yield any discernable spikes in parking capacities.

Figure 9. Tuesday-Thursday percent parking capacities for UNI’s MMTC.
Figure 10. Monday-Wednesday-Friday percent parking capacities for UNI’s MMTC.

Figure 11. Tuesday-Thursday percent parking capacities for UNI’s south campus parking lots.
CONCLUSIONS AND RECOMMENDATIONS

Study findings reveal that roughly 25% of the street segments included in the study exhibited a marked increase in parking density during the school week. The remaining street segments showed marginal increases or, as in most cases, a decrease in parking density. These results indicate that rental or campus housing, rather than UNI commuter parking, has the greatest impact on street parking densities realized east-northeast of campus. Consequently, in order to relieve congested areas prone to high density street parking, it appears that Cedar Falls would need to further restrict street parking in select areas and/or develop more stringent city ordinances directed at rental housing parking availability requirements.

Although the Asphalt and MMTC “B” lots appear to be well used, campus parking assessment results indicate a number of parking areas are grossly underutilized. These include south campus lot areas identified as BCS Gravel “B” and BCS “A” as well as the “G” and “Paid” spaces of the MMTC. The ITC “A” lot south of campus was also determined to be underutilized but less severely. Weak demand for designated spaces in these areas is likely the result of permit pricing; course scheduling; classroom locations; permit availability; and permit holder-desired destination spatial relationships for faculty, staff, and students. The extremely weak demand for MMTC “Paid” spaces may be attributed to competition with nearby free parking available on surrounding streets and College Hill lots, unfavorable geographic location, and/or poor advertising/promotion of the MMTC.

In any case, under utilized parking areas represent lost revenue for UNI and a transportation sustainability inefficiency that should be addressed. Existing campus parking should be optimized by first identifying other underutilized parking areas. Correlating campus parking use patterns with semester class schedules would likely prove to be a complementary measure as offered course times and locations undoubtedly play a significant role in temporal demands placed on campus parking areas. Ultimately, parking area reclassifications are in order and should be reviewed on a more frequent basis to better ensure optimization of campus parking areas with course schedules. Data collected from this study alone indicates a significant number of spaces in the BCS and ITC “A” lots could strategically be replaced with more popular “B” permits without sacrificing convenience to current “A” permit holders. A sizable portion of the “Paid” and “G” spaces within the MMTC could also be converted to more popular permit types, again without detrimental consequences to “Park and Pay” users or “G” permit holders. Finally, a large portion of the BCS Gravel area could
be strategically reclassified for less expensive permit types in an effort to make more efficient use of this existing parking space.
REFERENCES


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