Downtown Platteville Parking and Traffic Flow Analysis

Downtown Engineering

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Prepared for the city of Platteville

Vol. 1 of 2

University of Wisconsin Platteville

ACKNOWLEDGEMENTS

We would like to thank the City of Platteville and Delta 3 Engineering for allowing us to work with them throughout this analysis. We would like to give a special thanks to Howard Crofoot, the Director of Public Works for the City of Platteville, and Dan Dreessens from Delta 3 Engineering, the city engineer, for their direction on this analysis. Also, we would like to thank Dr Sam Owusu-Ababio and Dr Thomas Nelson for their expertise and guidance; as well as, Dr Andrew Jacque and Diane Hardyman for their assistance.

EXECUTIVE SUMMARY

The Downtown Engineering team was asked to analyze the downtown Platteville parking and traffic situation. The Public Works Director and city engineer, Delta 3, requested the analysis to determine if existing conditions are adequate for current and future demand.

Members of the community feel that parking in the downtown area is inadequate. However, the parking studies that were conducted show that the parking situation is adequate for all facility types except 24 hour parking. This type of parking is primarily used by residents that live downtown. 24 hour parking facilities were at or near capacity throughout the all study periods. Parking was also analyzed by availability within a 150' and 250' of central Main Street. A minimum of 18% of all parking was found to be available within 150' of central downtown. Within 250', this value increased to 29%. These minimums were found to occur during the weekday study. McGregor Plaza was analyzed separately from the downtown area and found to have a large surplus of parking.

The existing street network provides high levels of service for the existing traffic volumes and proves to be adequate for growth and future developments the city has proposed within the next five to ten years. These future developments will not have a negative effect on parking in the area if demand remains constant.

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1. INTRODUCTION

1.1. Background

The Director of Public Works and the city engineer, Delta 3, have expressed concern regarding the adequacy of parking and the effects new developments in downtown Platteville would have on both parking and traffic flow. Additional concerns exist as to how the existing street network will be impacted by potential growth in the next five to ten years and whether current bike rack demand is being met. The area of concern is outlined in **Figure 1.1**.

Figure 1.1: Downtown Platteville Boundaries

Downtown Platteville consists primarily of the area bordered by Elm Street (west) and County Road B (east), and Furnace Street (north) and Pine Street (south); this can be considered the central business district in Platteville due to the high volume of business in this area.

1.2. Problem Statement

Downtown Platteville will be going through significant changes in the next five to ten years due to the anticipated population growth and increase in enrollment at the University of Wisconsin-Platteville. These changes affecting the downtown area include: the addition of a traffic signal at Main Street and Water Street, the reconstruction of Water Street, a possible new residential development east of the Post Office, a potential new multi-use development along Elm Street, possible development of the Pioneer Ford site, and University of Wisconsin-Platteville expansion. A map of these developments can be seen in **Figure 1.2**.

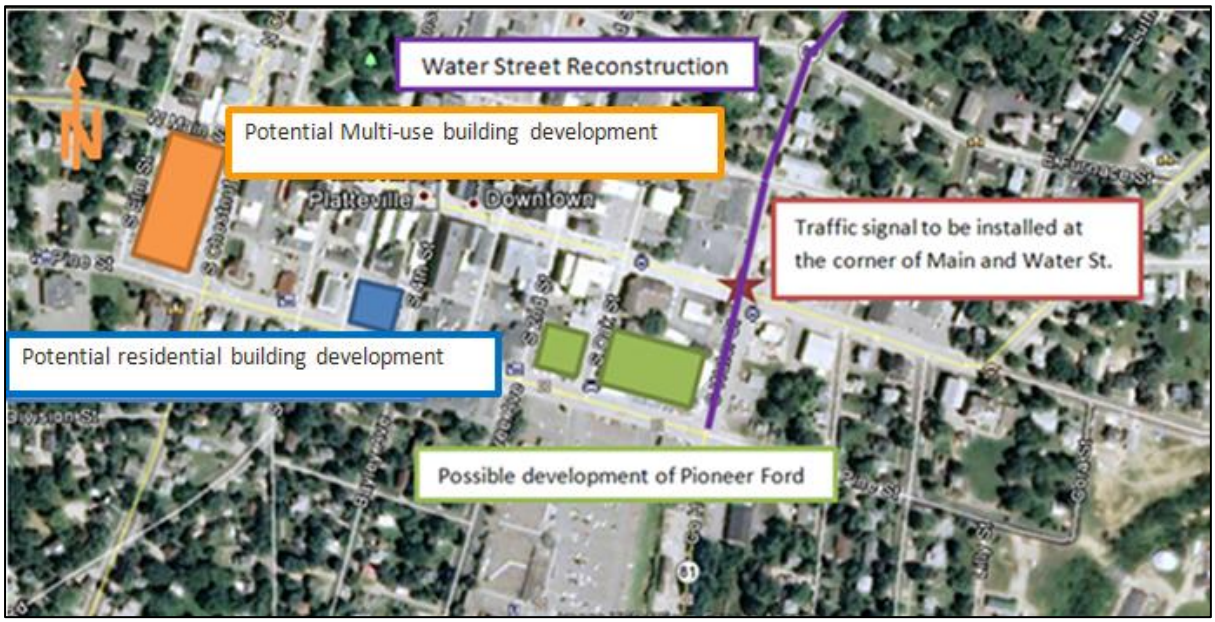

Figure 1.2: Locations of Future Developments in Downtown Platteville

Stop signs are currently the traffic control devices at all four approaches of the intersection of Main Street and Water Street. They will be replaced with 24 hour traffic actuated signals to create the best level of service and lowest volume to capacity ratio. The traffic signals will be coordinated with other signals in the network. Reconstruction of Water Street (STH 80), from Pine Street heading north out of the city, will begin in the spring of 2012. The area that may be developed for a residential building is currently a parking lot with two hour and 24 hour parking. This residential development would also provide parking spaces for the downtown area. Currently, Pioneer Ford is a car dealership with two separate lots. The first lot is located at the corner of Pine St and Water St; it consists of an outdoor car lot and two buildings that contain a showroom, offices and a repair shop.

The second lot, located on Pine St between 2nd St and Oak St, is an outdoor car lot. City officials anticipate these changes will impact parking needs, traffic flow patterns, and driver behavior within the downtown area, but the extent of the impacts are not yet known.

1.3. Objectives

The primary objectives of the downtown Platteville traffic flow and parking analysis were as follows:

- To examine the existing parking inventory and usage characteristics
- To assess the existing bike rack inventory and usage characteristics
- To evaluate the existing and future traffic flow patterns

The objectives stated above were accomplished through the following series of tasks:

a) Conduct parking inventory and license plate checks for the downtown area
b) Conduct bike rack inventory and usage study for the downtown area
c) Survey business owners and customers that shop in the downtown area to determine the public's perception of parking
d) Perform turning movement and segment counts at selected locations within the street network
e) Determine a future traffic growth rate and apply it to the turning movement count data
f) Find trip generation and parking rates for the future developments

2. DOWNTOWN PARKING

2.1. License Plate Count

2.1.1. Procedure

In order to conduct an accurate parking study, the parking inventory of downtown Platteville needed to be gathered. It was determined that the parking study would include public and private parking. Therefore both needed to be included in the inventory. A map was developed that divided the downtown area into blocks. It can be seen in **Figure 2.1** that most blocks are outlined by four curb faces and contain all lots inside the block.

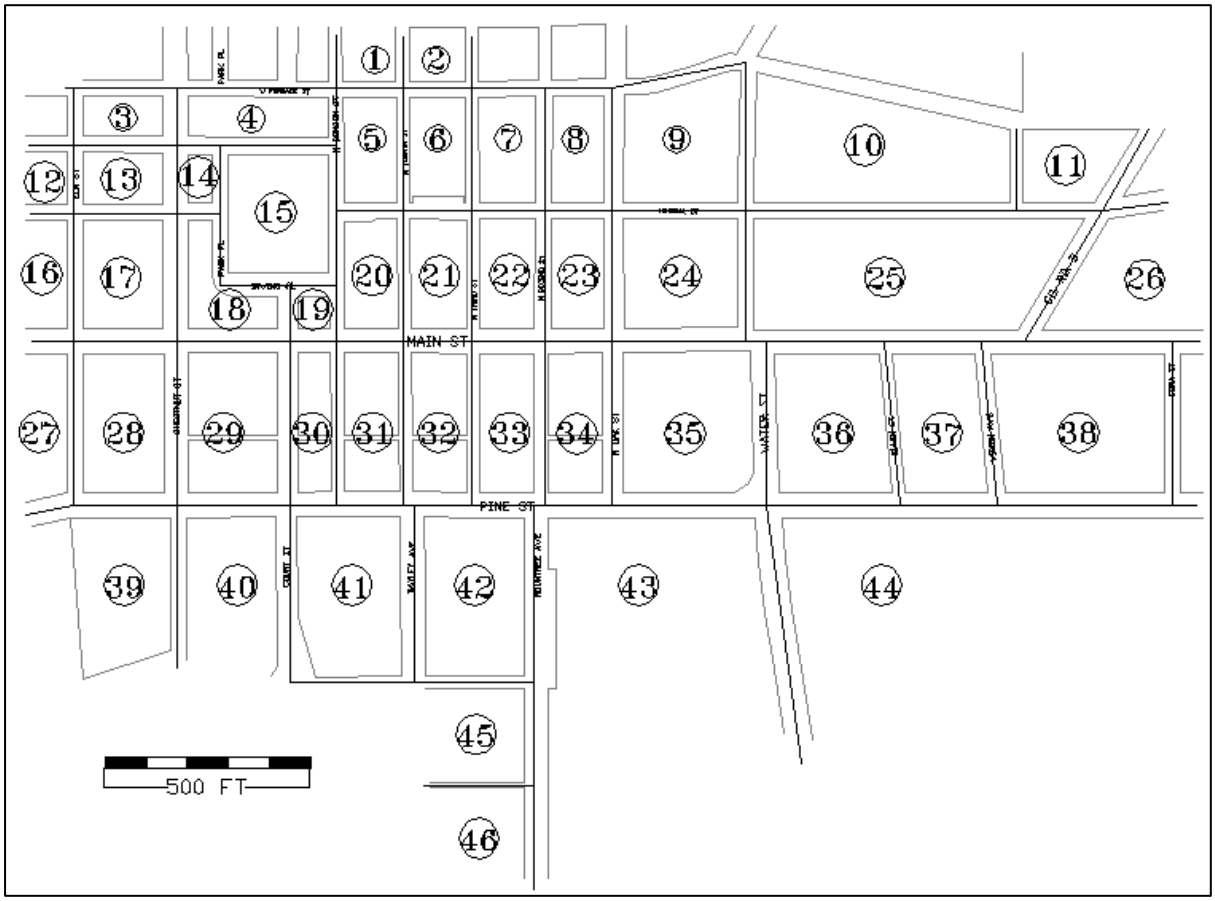

Figure 2.1: Downtown Block Map

An inventory by block can be seen in **Table 2.1** and **Table 2.2.** A more detailed table that includes parking by block segment can be seen in the Appendix in **Table A.1.**

Table 2.1: Parking Inventory by Block North of Main Street

		Street & Alley Stalls										Off-Street					
		Public										Public					
Block	Facility Type	5 Min.	15 Min.	30 Min.	2 Hr.	4 Hr.	No 3-6 am	24 Hr.	48 Hr.	Motorcycle	Private	2 Hr.	No 3-6 am	24 Hr.	48 Hr.	Private	Total Stalls
1	Lot															18	18
2	Lot														7		7
3	Curb						2										2
4	Lot															15	15
5	Curb	5					14										19
5	Lot															35	35
6	Curb			2			8										10
6	Lot															19	19
7	Curb				4		5										9
7	Lot															19	19
8	Curb				4		12										16
8	Lot															29	29
9	Curb						17										17
10	Curb								20								20
10	Lot															5	5
11	Curb								4								4
13	Curb						5										5
14	Curb						5		2		4						11
15	Curb				16		34				5						55
16	Curb						11										11
17	Curb						11		3								14
17	Lot															23	23
18	Curb				8	9	5										22
18	Lot															11	11
19	Curb								1								1
19	Lot															6	6
20	Curb	4			18						4						26
20	Lot															7	7
21	Curb				4	4											8
21	Lot												29	9		10	48
22	Curb				9												9
22	Lot											10				12	22
23	Curb				22												22
23	Lot											10		11		8	29
24	Curb				15		6										21
24	Lot															69	69
25	Curb						12		7								19
25	Lot															44	44
26	Curb								8								8
Totals		**9**	**0**	**2**	**100**	**13**	**147**	**0**	**45**	**0**	**13**	**20**	**29**	**20**	**7**	**330**	**735**

Table 2.2: Parking Inventory by Block South of Main Street

		Street & Alley Stalls										Off-Street					
		Public									Private	Public				Private	Total Stalls
Block	Facility Type	5 Min.	15 Min.	30 Min.	2 Hr.	4 Hr.	No 3-6 am	24 Hr.	48 Hr.	Motorcycle		2 Hr.	No 3-6 am	24 Hr.	48 Hr.		
27	Curb						10										10
28	Curb				19		3										22
28	Lot															54	54
29	Curb				16												16
29	Lot															61	61
30	Curb	3	1		19					1	2						26
30	Lot															9	9
31	Curb		1		10												11
31	Lot											25		26		19	70
32	Curb				4												4
32	Lot															51	51
33	Curb				21					1							22
33	Lot															23	23
34	Curb				21					3							24
34	Lot															13	13
35	Curb				10		5										15
35	Lot															56	56
36	Lot															45	45
37	Curb						5										5
37	Lot															20	20
38	Curb						15		6								21
38	Lot															6	6
39	Curb						5										5
40	Curb								8								8
41	Curb								12								12
41	Lot															7	7
42	Curb								26								26
42	Lot															24	24
43	Curb								45								45
43	Lot															387	387
44	Lot															56	56
45	Curb								10								10
46	Curb								8								8
Totals		**3**	**2**	**0**	**120**	**0**	**43**	**0**	**115**	**5**	**2**	**25**	**0**	**26**	**0**	**831**	**1172**

These tables provide an accurate depiction of the various types of parking that are available and their approximate locations downtown. Once an accurate inventory was finalized, a parking usage study could be completed.

Data was collected in three possible intervals: 30 minutes, 1 hour, and 2 hours. These intervals followed an accepted practice and were based on the legal parking duration. For convenience and practicality reasons, the 5 minute, 15 minute, and 30 minute stalls were checked every 30 minutes.

A total of four parking studies were conducted, one during a weekday and one during the weekend in both downtown Platteville and the McGregor Plaza lot. The McGregor Plaza lot was analyzed separately from the downtown area to ensure results were not skewed by the surplus of

parking in McGregor Plaza. The parking studies in the downtown area took place on March 8th & March 31st, 2012. McGregor Plaza studies were conducted on March 10th & March 14th, 2012.

2.1.2. Parking Usage Characteristics

2.1.2.1. Downtown

Data was divided into four groups:

- Short term parking (5 minute, 15 minute, and 30 minute)
  - Collected at 30 minute intervals
- 2 hour parking
  - Collected at 1 hour intervals
- Long term parking (4 hour, no parking from 3am to 6am, 24 hours, 48 hour)
  - Collected at 2 hour intervals
- Private parking
  - Collected at 2 hour intervals

The data that was collected was placed into duration distribution graphs to visually represent the length of time each car spent in a given parking space. **Figure 2.2**, **Figure 2.4**, **Figure 2.6**, and **Figure 2.8** represent data collected in the downtown area on a weekday. The duration graphs show that for all parking facilities the majority of vehicles are parked for a short period of time.

The data that was collected was also placed into accumulation pattern graphs to visually represent the parking volume trends of a given parking type throughout the day. These graphs also represent how much of the available parking was being used. **Figure 2.3**, **Figure 2.5**, **Figure 2.7**, and **Figure 2.9** on the following pages represent data that was collected in the downtown area on a weekday. After examining the accumulation graphs that are also shown, it becomes apparent that every type of parking is underutilized with the exception of 24 hour parking, which is typically at or near capacity.

The block specific data that was used to develop the figures, and relevant tables, can be found in the Appendix in **Table A.2** through **Table A.46**.

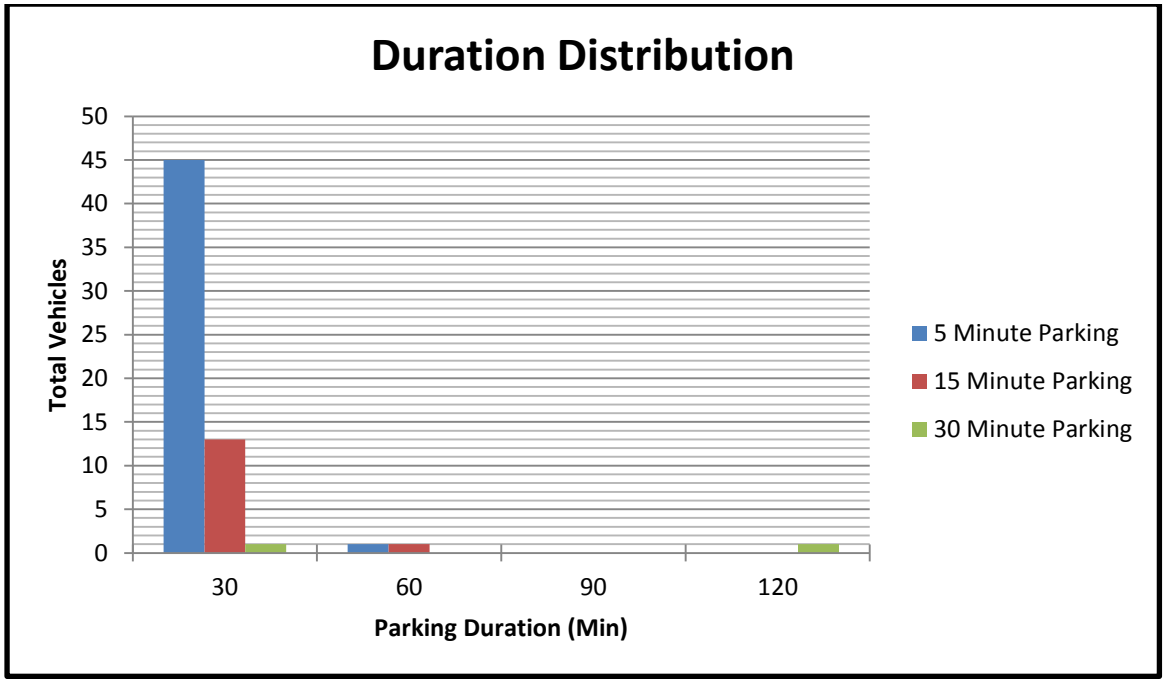

Figure 2.2: Weekday Duration Distribution, Short Term Parking

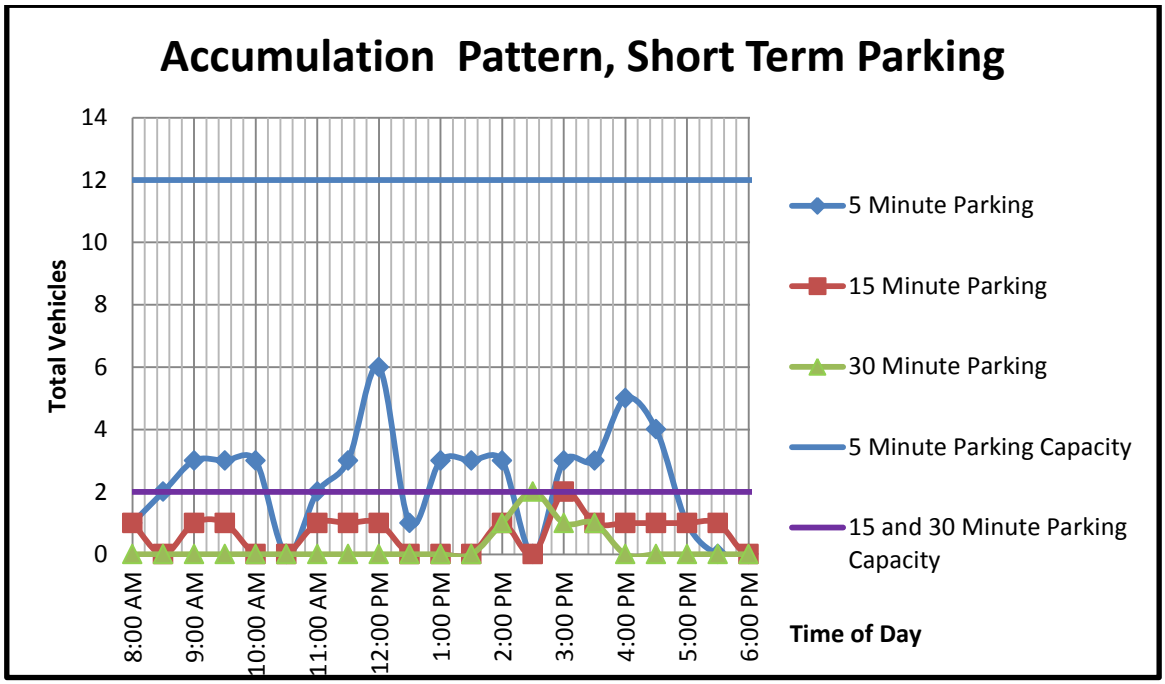

Figure 2.3: Weekday Accumulation Pattern, Short Term Parking

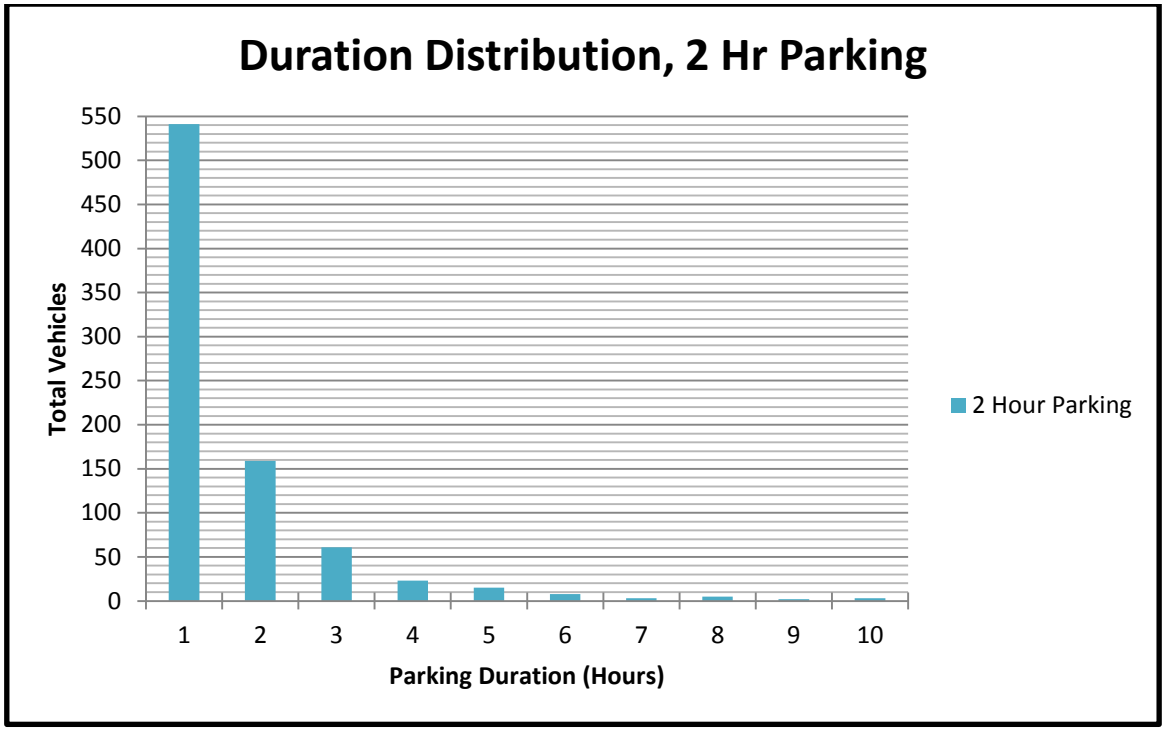

Figure 2.4: Weekday Duration Distribution, 2 Hour Parking

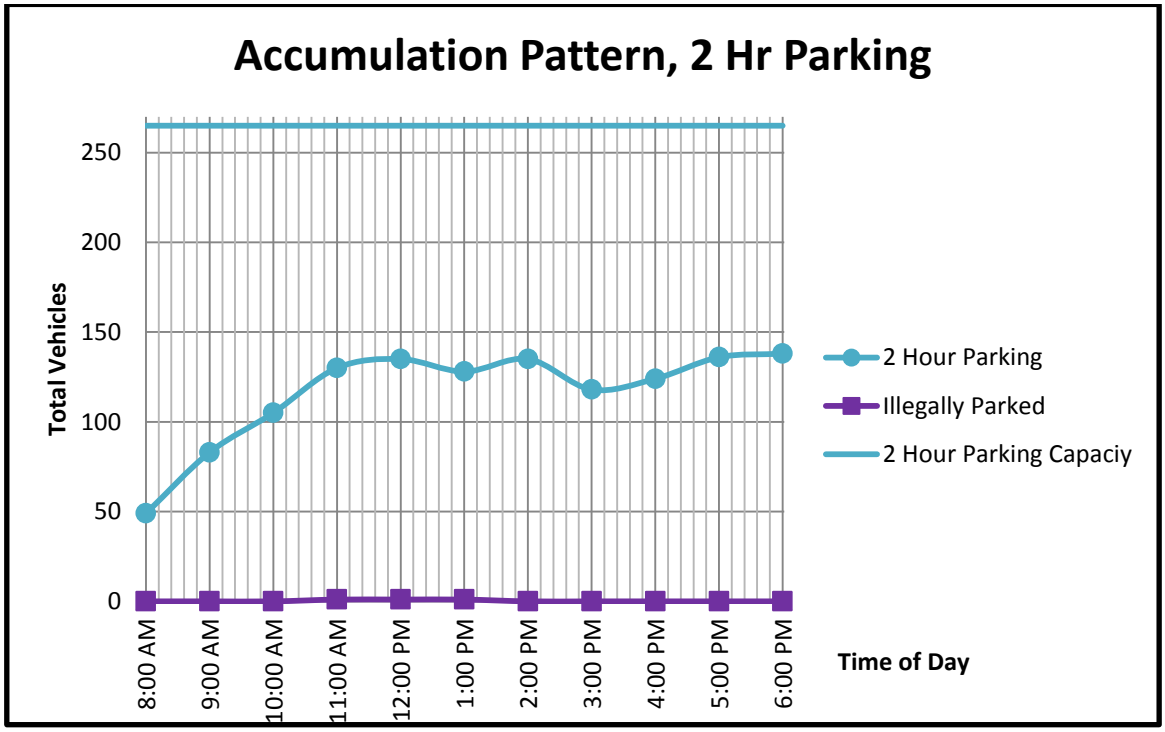

Figure 2.5: Weekday Accumulation Pattern, 2 Hour Parking

**(One illegally parked vehicle was observed at 11:00 AM, 12:00 PM, and 1:00 PM)*

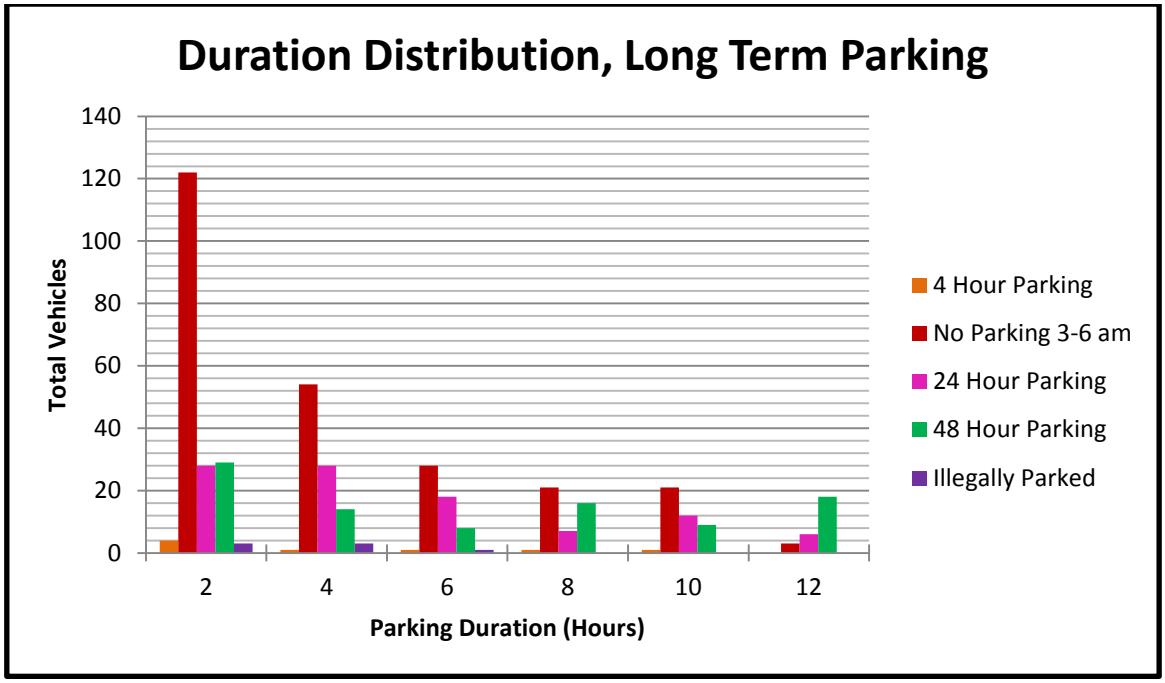

Figure 2.6: Weekday Duration Distribution, Long Term Parking

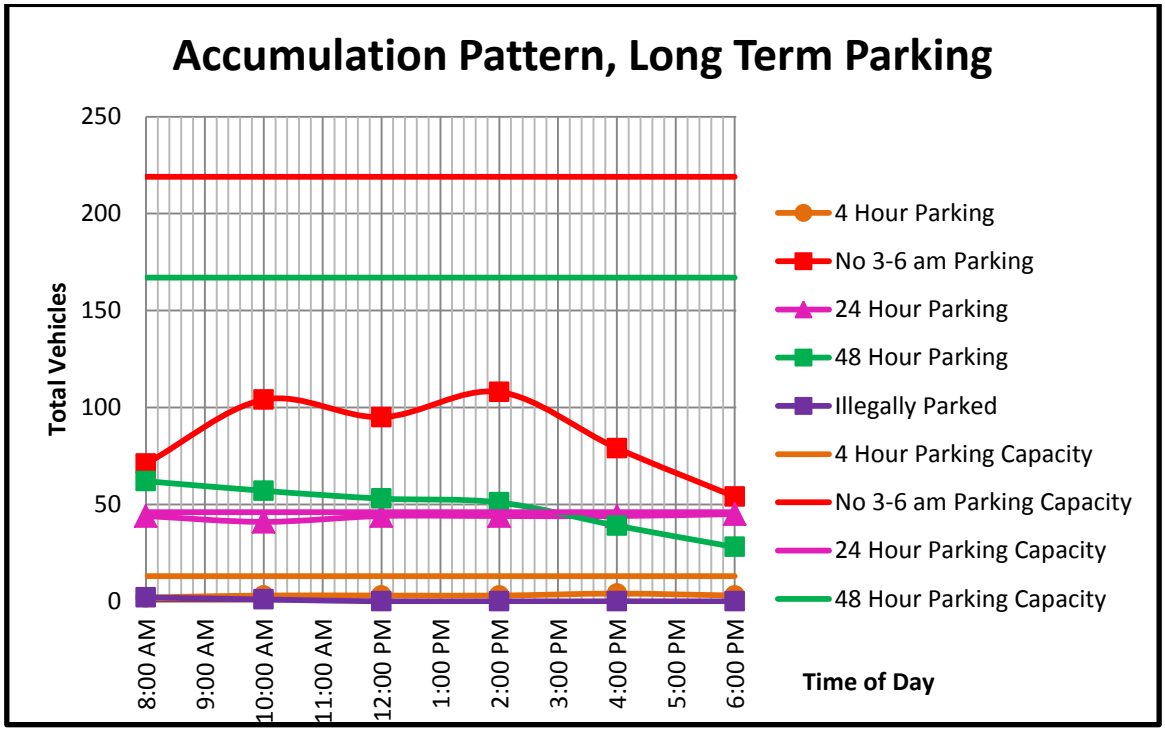

Figure 2.7: Weekday Accumulation Pattern, Long Term Parking

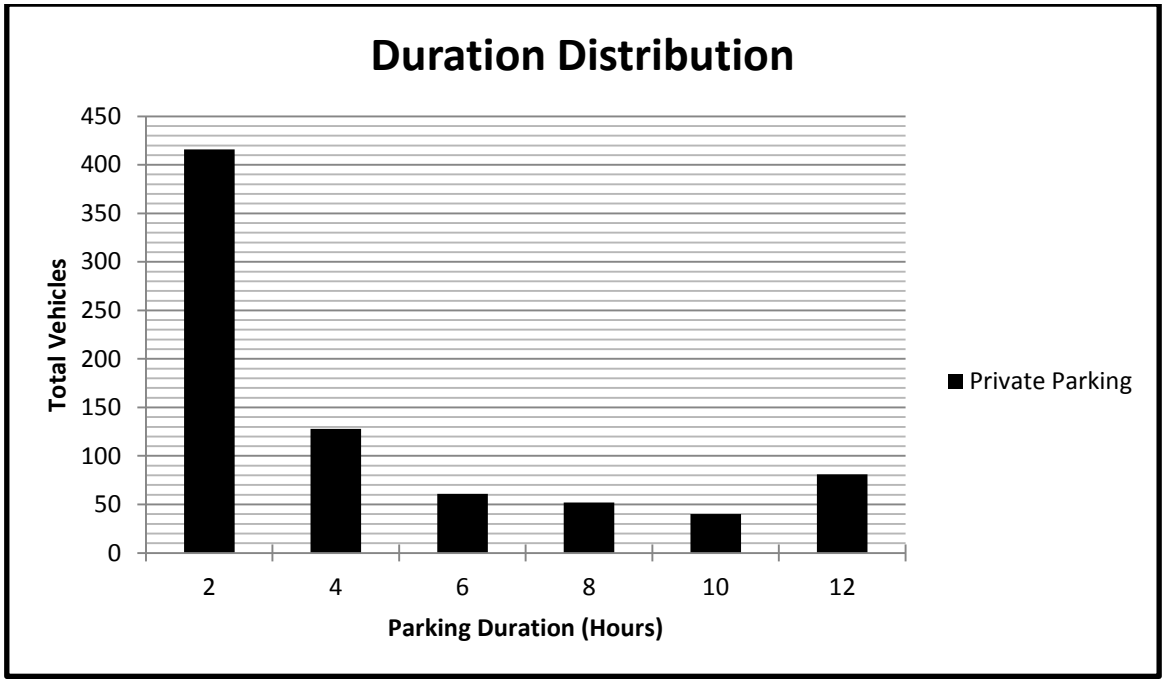

Figure 2.8: Weekday Duration Distribution, Private Parking

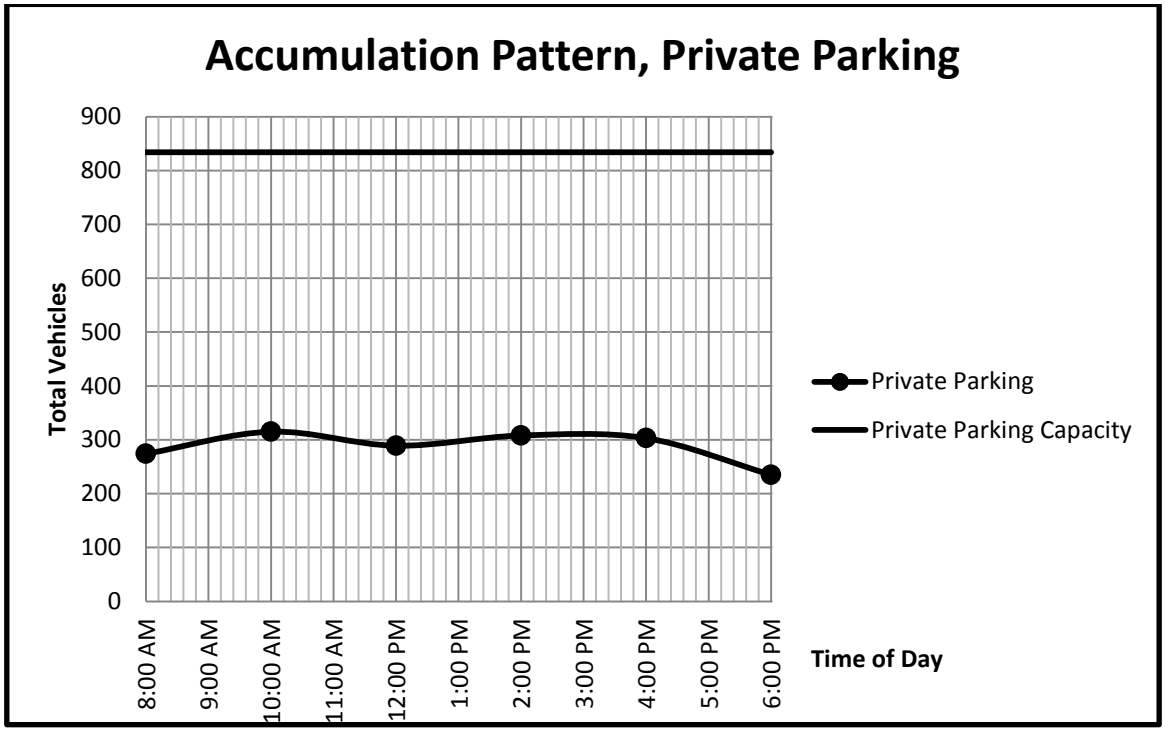

Figure 2.9: Weekday Accumulation Pattern, Private Parking

Figure 2.10, **Figure 2.12**, **Figure 2.14**, and **Figure 2.16** represent duration distribution from data collected on a weekend in downtown Platteville.

Figure 2.11, **Figure 2.13**, **Figure 2.15**, and **Figure 2.17** represent accumulation patterns from data collected on a weekend in downtown Platteville.

The block specific data that was used to develop the figures, as well as relevant tables, can be found in the Appendix in **Table A.47** through **Table A.91.**

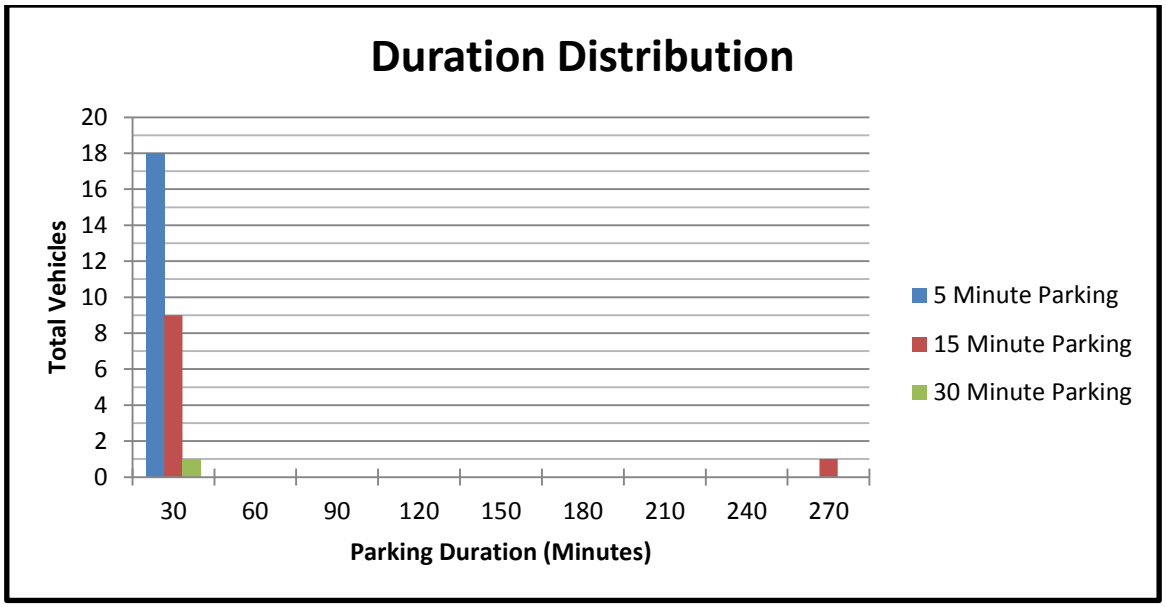

Figure 2.10: Weekend Duration Distribution, Short Term Parking

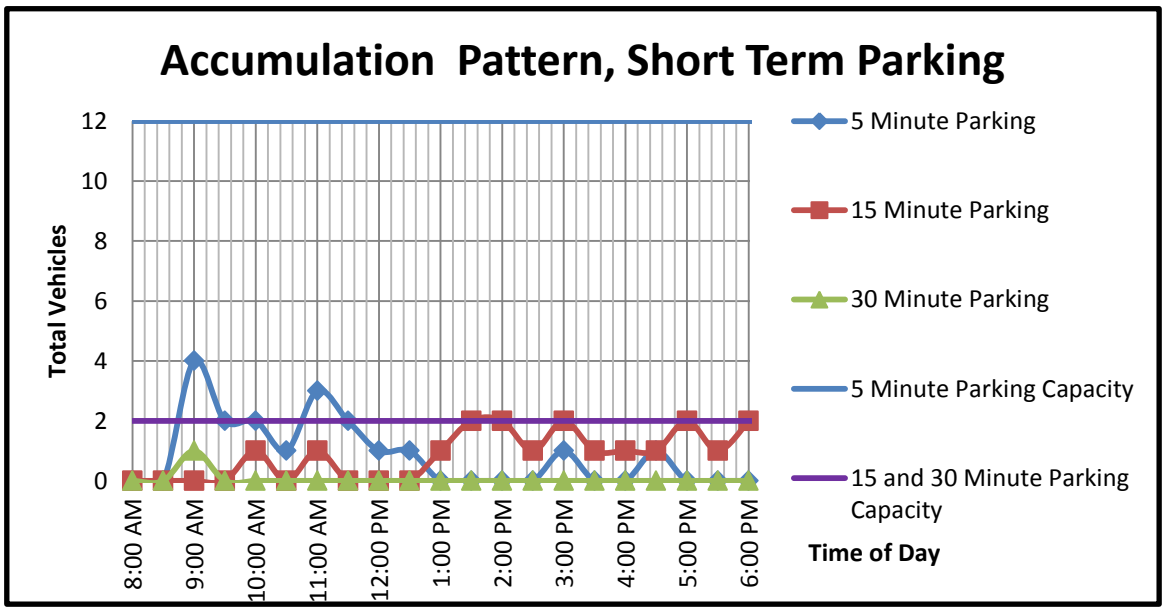

Figure 2.11: Weekend Accumulation Pattern, Short Term Parking

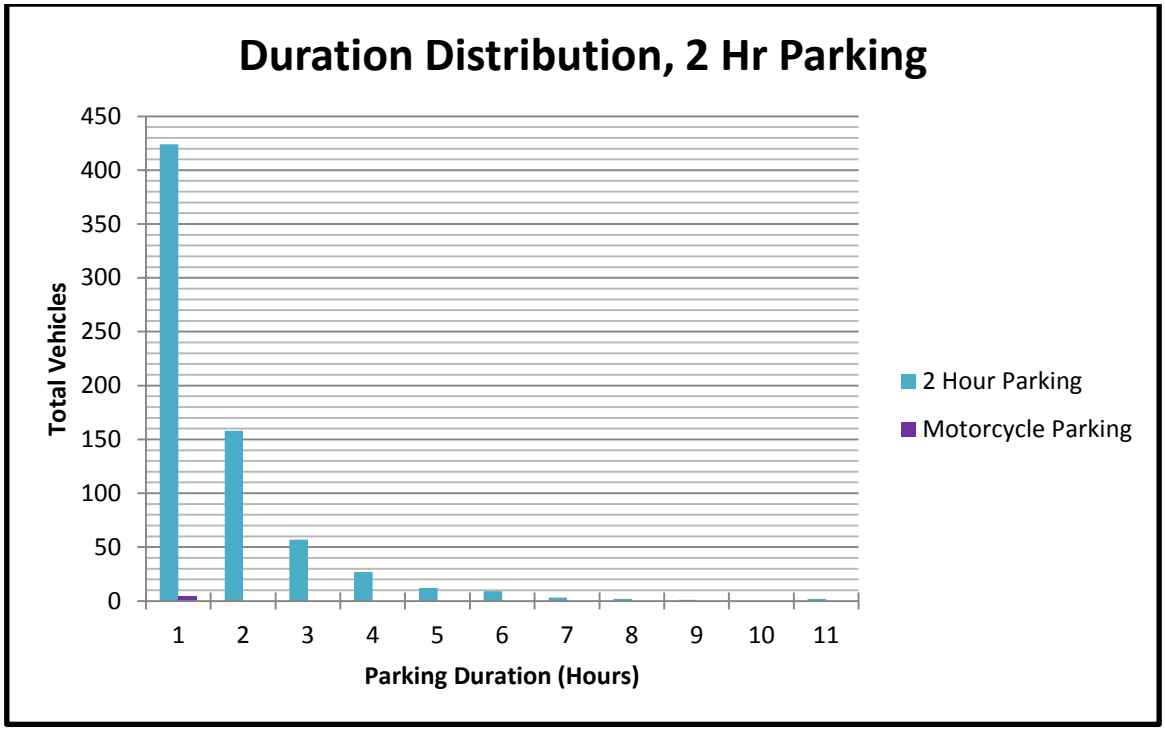

Figure 2.12: Weekend Duration Distribution, 2 Hour Parking

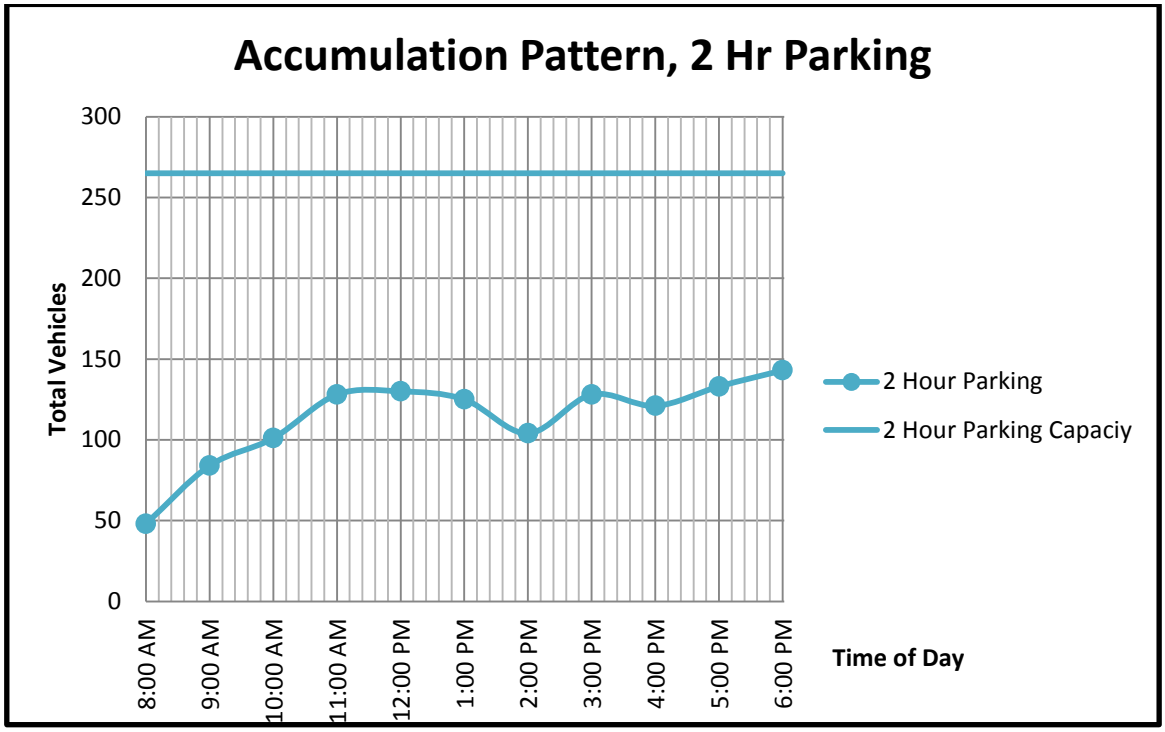

Figure 2.13: Weekend Accumulation Pattern, 2 Hour Parking

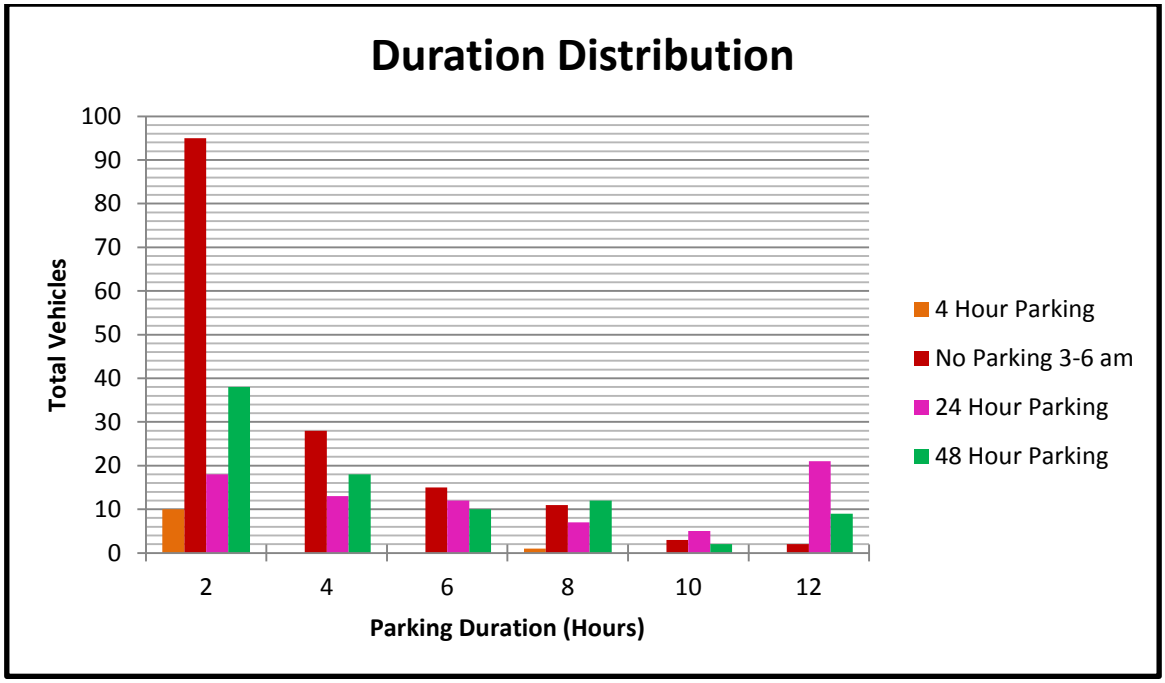

Figure 2.14: Weekend Duration Distribution, Long Term Parking

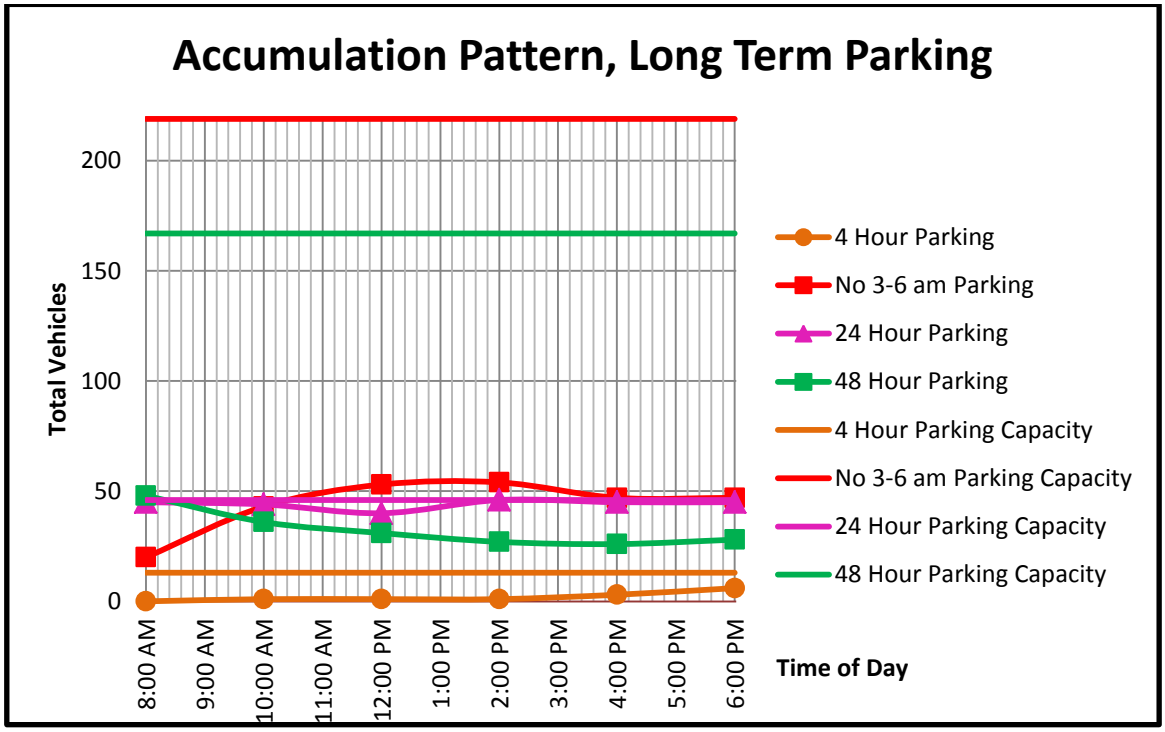

Figure 2.15: Weekend Accumulation Pattern, Long Term Parking

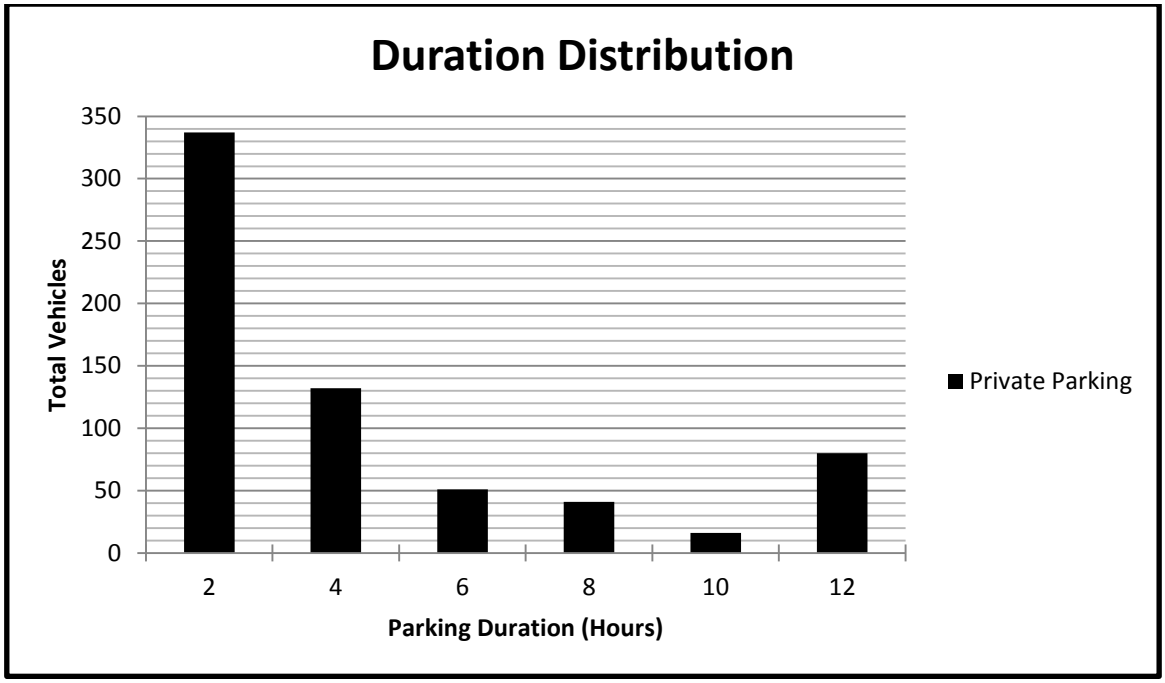

Figure 2.16: Weekend Duration Distribution, Private Parking

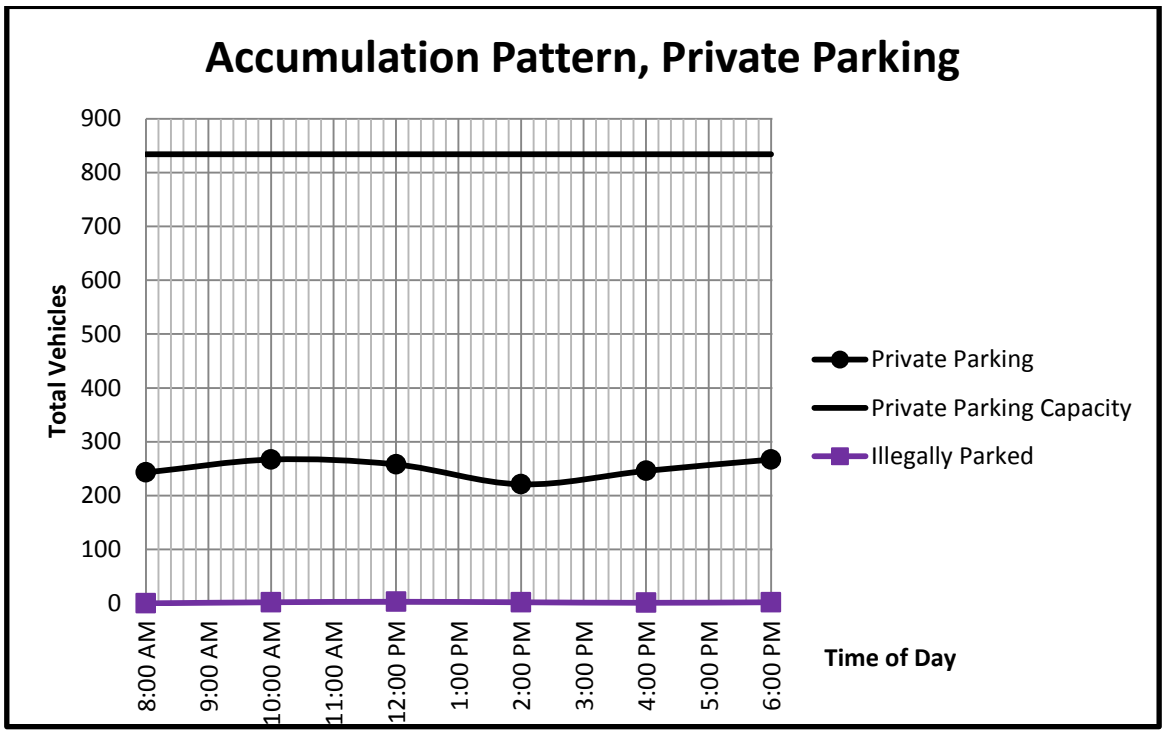

Figure 2.17: Weekend Accumulation Pattern, Private Parking

**(Two illegally parked vehicles were observed at 10:00 AM, 2:00 PM, and 6:00 PM; three illegally parked at 12:00 PM; one illegally parked at 4:00 PM)*

2.1.2.2. McGregor Plaza

Figure 2.18 and **Figure 2.20** represent duration distribution data collected from McGregor Plaza on a weekday. **Figure 2.19** and **Figure 2.21** represent accumulation pattern data collected from McGregor Plaza on the weekend. The data that generated these graphs, and all other relevant tables, is shown the Appendix in **Table A.92** through **Table A.95**.

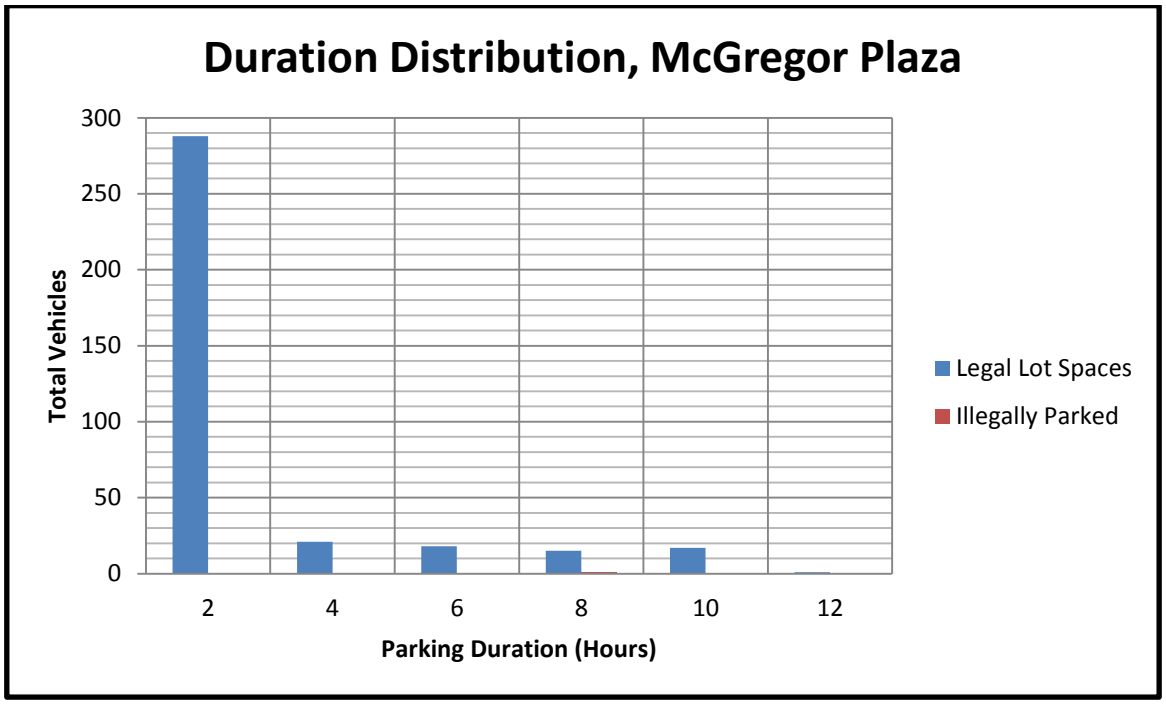

Figure 2.18: Weekday Duration Distribution, McGregor Plaza

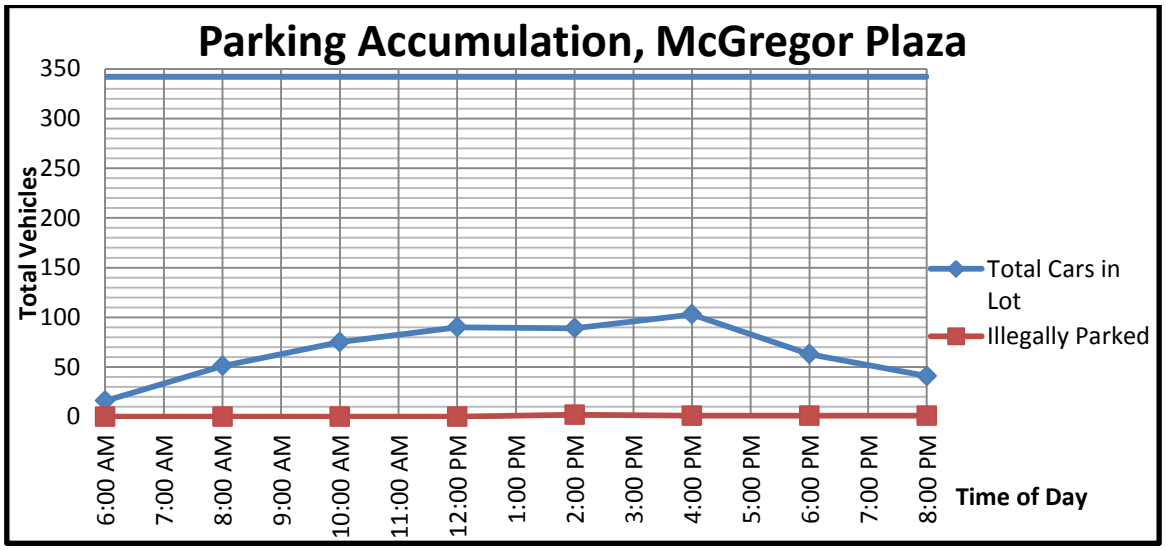

Figure 2.19: Weekday Accumulation Pattern, McGregor Plaza

**(One illegally parked vehicle was observed at 2:00 PM)*

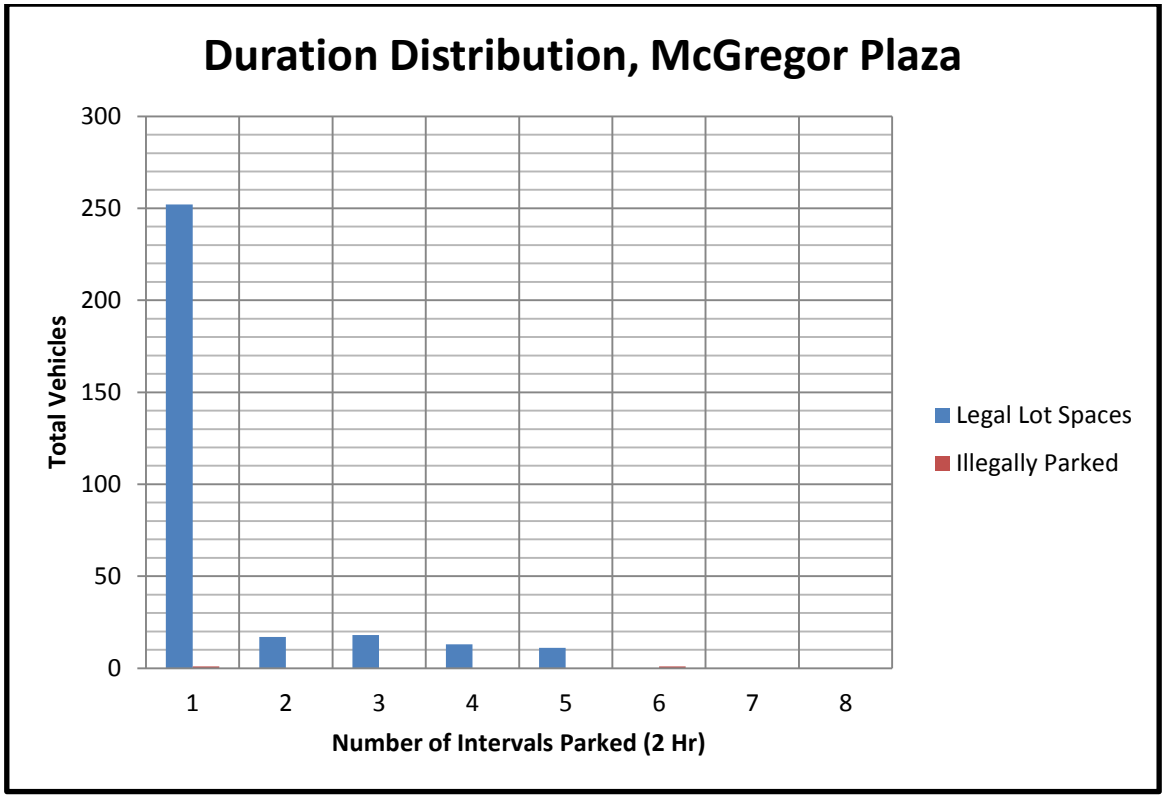

Figure 2.20: Weekend Duration Distribution, McGregor Plaza

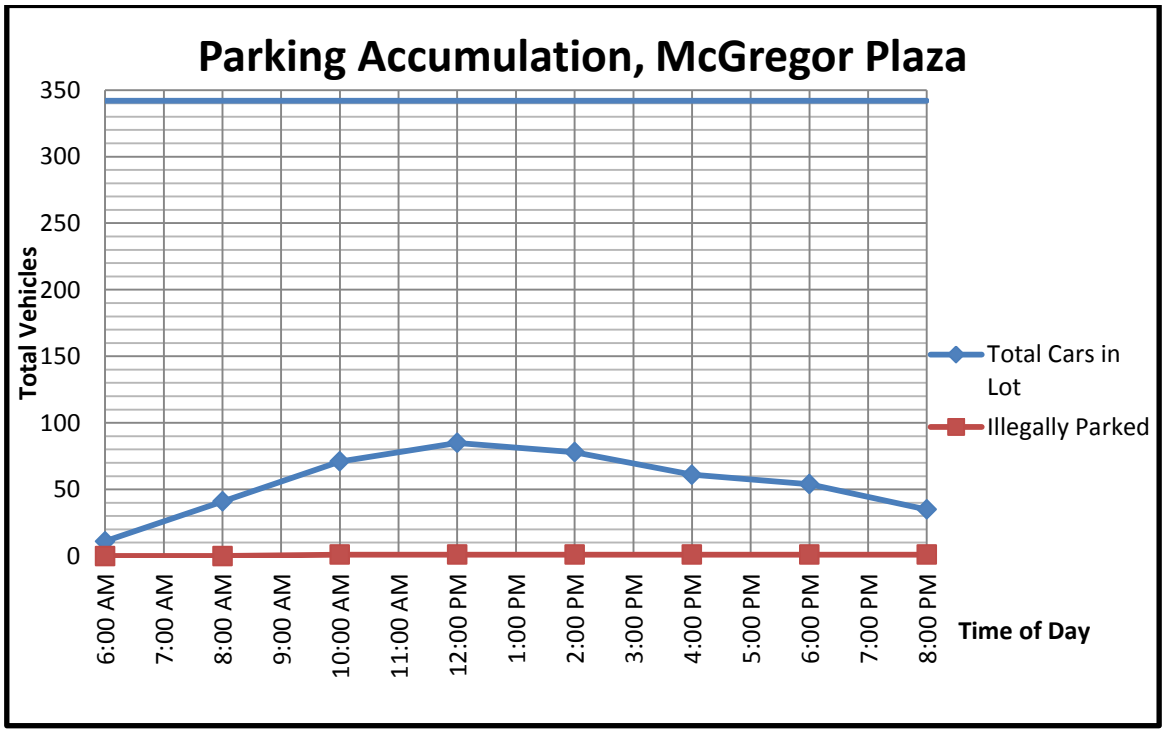

Figure 2.21: Weekend Accumulation Pattern, McGregor Plaza

**(One illegally parked vehicle was observed between 10:00 AM - 8:00 PM)*

2.1.3. Parking Demand and Supply Analysis

2.1.3.1. Downtown

After data collection was completed, an analysis of supply and demand could be finalized. One way this was analyzed was by determining if each block had a surplus or deficiency of parking, this can be seen in **Table 2.3** and **Table 2.4**. From the tables it can be seen that by block, no deficiencies in parking were found. Space hours of supply and demand were calculated using **Equation 2.1** and **Equation 2.2**, respectively.

$$Space\ Hours\ of\ Supply = f * \sum_{j=1}^{N} t_j \quad \text{.....2.1}$$

Where: f = efficiency factor of 0.9 for curb parking and 0.85 for surface lot parking

t_j = total length of time the j^{th} space can be legally parked on

N = number of parking spaces available

$$Space\ Hours\ of\ Demand = \sum_{i=1}^{N} n_i * t_i \quad \text{.....2.2}$$

Where: n_i = number of vehicles parked for the i^{th} interval or duration

t_j = mid-parking duration for the i^{th} class

N = number of classes of parking duration ranges

Table 2.3: Surplus or Deficiency of Weekday Parking by Block

Block	Space Hours of Demand	Space Hours of Supply	Percentage of Capacity Used	Surplus or Deficiency
1	134	184	73%	Surplus
2	56	71	78%	Surplus
3	0	20	0%	Surplus
4	38	153	25%	Surplus
5	190	545	35%	Surplus
6	15	99	15%	Surplus
7	170	287	59%	Surplus
8	263	454	58%	Surplus
9	62	194	32%	Surplus
10	70	397	18%	Surplus
11	6	216	3%	Surplus
12	0	0	0%	Surplus
13	0	54	0%	Surplus
14	20	119	17%	Surplus
15	189	575	33%	Surplus
16	80	119	67%	Surplus
17	180	386	47%	Surplus
18	69	341	20%	Surplus
19	78	83	94%	Surplus
20	184	332	55%	Surplus
21	483	569	85%	Surplus
22	164	295	56%	Surplus
23	344	505	68%	Surplus
24	444	912	49%	Surplus
25	154	654	24%	Surplus
26	0	86	0%	Surplus
27	48	99	48%	Surplus
28	396	738	54%	Surplus
29	302	781	39%	Surplus
30	159	349	46%	Surplus
31	478	802	60%	Surplus
32	437	560	78%	Surplus
33	153	493	31%	Surplus
34	111	370	30%	Surplus
35	175	500	35%	Surplus
36	86	459	19%	Surplus
37	152	254	60%	Surplus
38	36	288	13%	Surplus
39	30	50	61%	Surplus
40	52	86	60%	Surplus
41	162	201	81%	Surplus
42	184	526	35%	Surplus
43	318	918	35%	Surplus
44	300	571	53%	Surplus
45	0	102	0%	Surplus
46	0	82	0%	Surplus

Table 2.4: Surplus or Deficiency of Weekend Parking by Block

Block	Space Hours of Demand	Space Hours of Supply	Percentage of Capacity Used	Surplus or Deficiency
1	136	184	74%	Surplus
2	64	71	90%	Surplus
3	0	20	0%	Surplus
4	30	153	20%	Surplus
5	88	545	16%	Surplus
6	7	99	7%	Surplus
7	243	287	85%	Surplus
8	271	454	60%	Surplus
9	24	194	12%	Surplus
10	64	267	24%	Surplus
11	2	43	5%	Surplus
12	0	0	0%	Surplus
13	0	54	0%	Surplus
14	0	119	0%	Surplus
15	48	575	8%	Surplus
16	4	119	3%	Surplus
17	106	386	27%	Surplus
18	76	341	22%	Surplus
19	48	83	58%	Surplus
20	165	332	50%	Surplus
21	385	569	68%	Surplus
22	164	295	56%	Surplus
23	351	505	69%	Surplus
24	419	912	46%	Surplus
25	128	654	20%	Surplus
26	2	86	2%	Surplus
27	24	99	24%	Surplus
28	384	738	52%	Surplus
29	358	781	46%	Surplus
30	167	349	48%	Surplus
31	395	802	49%	Surplus
32	125	560	22%	Surplus
33	117	493	24%	Surplus
34	102	370	28%	Surplus
35	153	500	31%	Surplus
36	126	459	27%	Surplus
37	118	254	47%	Surplus
38	38	288	13%	Surplus
39	10	50	20%	Surplus
40	48	86	56%	Surplus
41	52	201	26%	Surplus
42	78	526	15%	Surplus
43	230	918	25%	Surplus
44	174	571	30%	Surplus
45	0	102	0%	Surplus
46	0	82	0%	Surplus

Table 2.5 and **Table 2.9** show the available supply, demand, and whether there is a surplus or deficiency of short term parking. **Table 2.6**, **Table 2.7**, **Table 2.8**, **Table 2.10**, **Table 2.11**, and **Table 2.12** show the available supply, demand, surplus or deficiency, the turnover rate and average parking duration. The turnover rate shows how many vehicles are in one stall per hour. Therefore, a lower turnover rate signifies that vehicles are remaining in one spot for a longer period of time. The turnover rate and the average parking duration of the short term parking are inaccurate because for convenience during the study, the short term stalls were only checked every 30 minutes. The average parking duration is approximately how many hours a car is in one parking space. The supply and demand values show how much parking is available and how much of that parking is actually being used; when demand exceeds supply it represents a deficiency.

Table 2.5: Short Term Weekday Parking Characteristics

	5 Minute	15 Minute	30 Minute
Demand (hrs)	24	8	3
Supply (hrs)	118.8	19.8	19.8
Is there a surplus or deficiency?	***Surplus***	***Surplus***	***Surplus***

Table 2.6: 2 Hour Weekday Parking Characteristics

	2 Hour
Average Parking Duration (hrs/veh)	1.67
Turnover Rate (veh/stall/hr)	0.28
Demand (hrs)	1366
Supply (hrs)	2551
Is there a surplus or deficiency?	***Surplus***

Motorcycles would be included in the above table, however during the weekday study no motorcycles were observed parking in the downtown area.

Table 2.7: Long Term Weekday Parking Characteristics

	4 Hour	No Parking 3-6 am	24 Hour	48 Hour
Average Parking Duration (hrs/veh)	4.50	4.18	5.29	6.34
Turnover Rate (veh/stall/hr)	0.05	0.09	0.18	0.05
Demand (hrs)	36	1042	524	596
Supply (hrs)	140	2300	469	1804
Is there a surplus or deficiency?	***Surplus***	***Surplus***	***Deficiency***	***Surplus***

Table 2.8: Private Weekday Parking Characteristics

	Private
Average Parking Duration (hrs/veh)	4.50
Turnover Rate (veh/stall/hr)	0.08
Demand (hrs)	3498
Supply (hrs)	8507
Is there a surplus or deficiency?	***Surplus***

Table 2.9: Short Term Weekend Parking Characteristics

	5 Minute	15 Minute	30 Minute
Demand (hrs)	9	9	1
Supply (hrs)	113.4	18.9	18.9
Is there a surplus or deficiency?	***Surplus***	***Surplus***	***Surplus***

Table 2.10: 2 Hour Weekend Parking Characteristics

	2 Hour	Motorcycle
Average Parking Duration (hrs/veh)	1.73	1.00
Turnover Rate (veh/stall/hr)	0.24	0.07
Demand (hrs)	1201	4
Supply (hrs)	2551	50
Is there a surplus or deficiency?	***Surplus***	***Surplus***

Table 2.11: Long Term Weekend Parking Characteristics

	4 Hour	No Parking 3-6 am	24 Hour	48 Hour
Average Parking Duration (hrs/veh)	2.55	3.47	6.82	4.85
Turnover Rate (veh/stall/hr)	0.07	0.06	0.14	0.04
Demand (hrs)	28	534	518	432
Supply (hrs)	140	2300	469	1804
Is there a surplus or deficiency?	***Surplus***	***Surplus***	***Deficiency***	***Surplus***

Table 2.12: Private Weekend Parking Characteristics

	Private
Average Parking Duration (hrs/veh)	4.50
Turnover Rate (veh/stall/hr)	0.07
Demand (hrs)	2956
Supply (hrs)	8507
Is there a surplus or deficiency?	***Surplus***

It can be seen that the only deficiency of parking is found in 24 hour parking with approximately a 50 hour deficiency.

The following page contains **Figure 2.22**. This diagram visually represents the occupancy percentage of each street or parking lot at 2 PM on a weekday. This diagram was chosen because it represents the highest occupancy experienced. Additional diagrams were created to display the occupancy percentages at all intervals of the day. These additional diagrams can be found in the Appendix in **Figure A.1** through **Figure A.12**.

From the diagrams it can be seen that parking is available along and near Main Street for the duration of the study. These diagrams also show that there was heavy occupancy in the 24 hour lots, which for most of the day were 81-100% full. It should also be noted that occupancy was high for parking along Elm Street; this could be due to students parking there and walking to the UW-Platteville campus, which is only two blocks away.

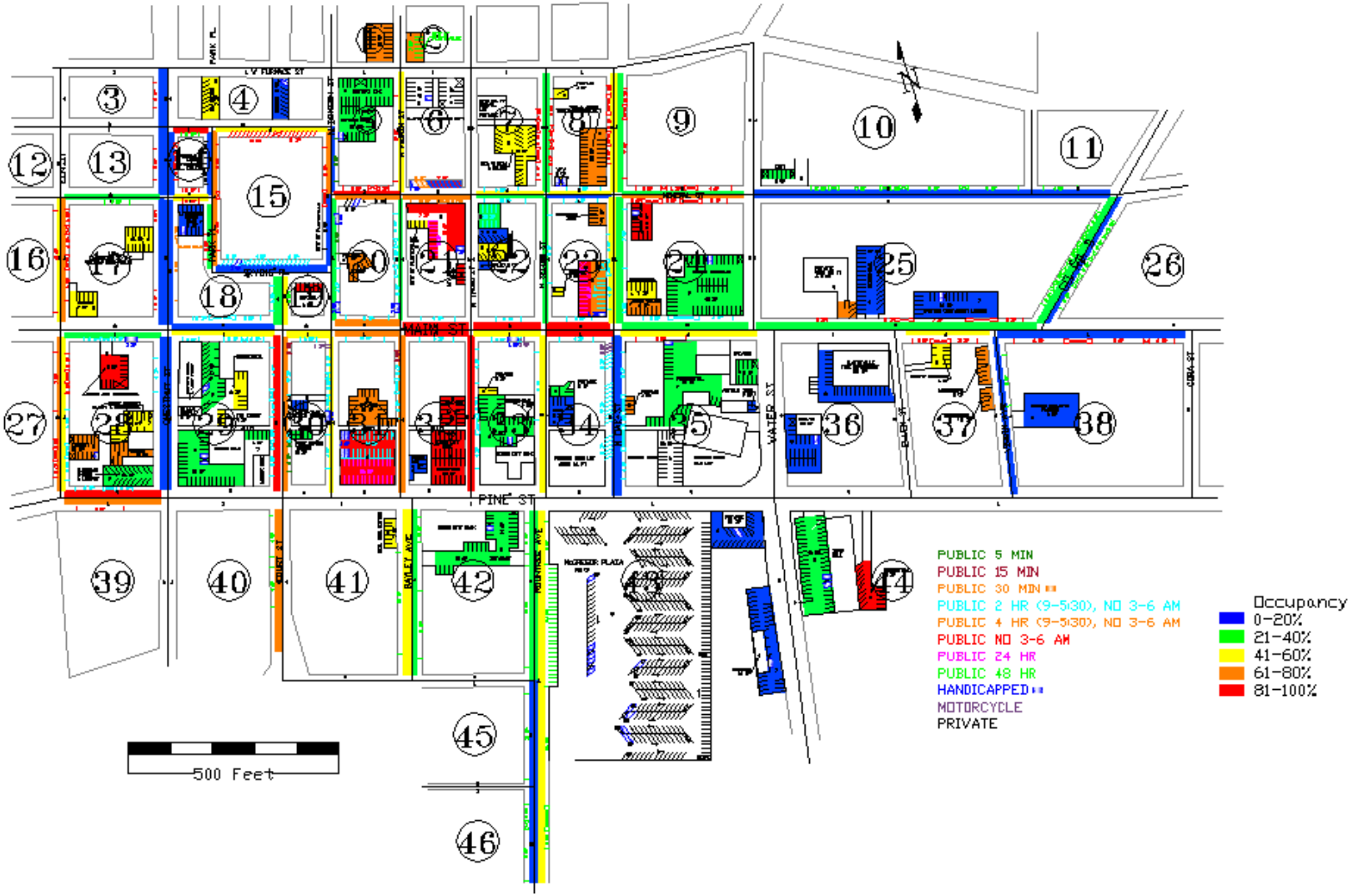

Figure 2.22: 2 PM Weekday

Parking availability was also analyzed by walking distance from the most central portions of Main Street. The radii chosen were centered on the intersection of Main Street and Third Street; this area of Main Street consistently experienced the highest occupancy percentages. **Figure 2.23** shows the parking facilities within the radii of 150 and 250 feet.

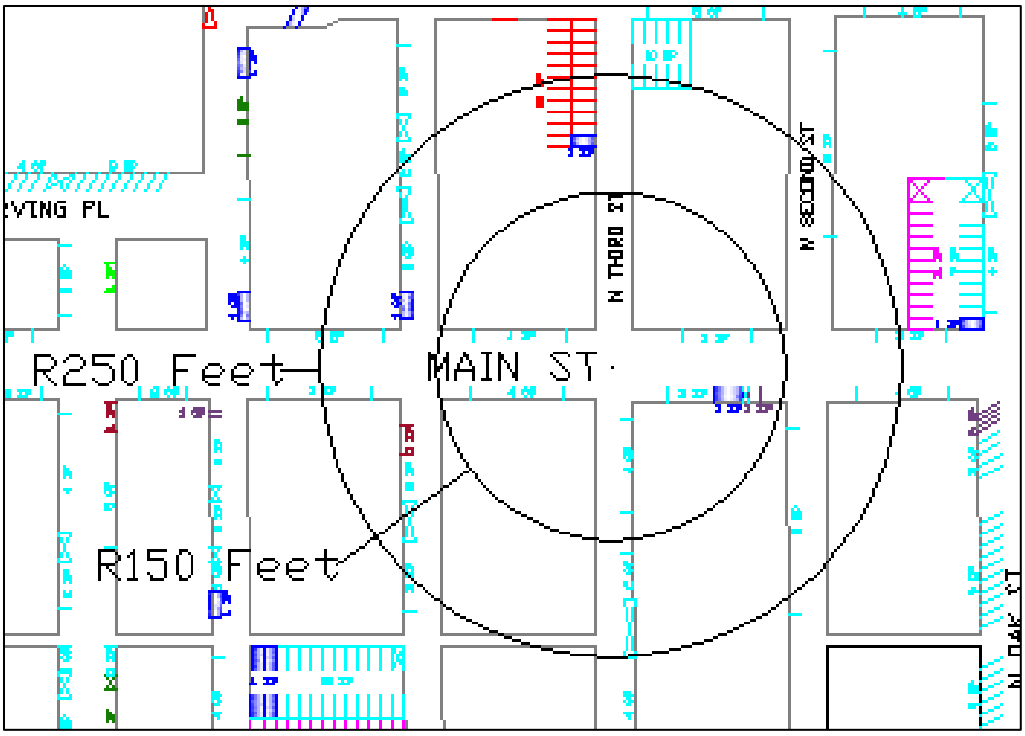

Figure 2.23: Parking Facilities within 150' and 250' Radii of the Intersection of Main St and Third St

The values in **Table 2.13** through **Table 2.16** represent the number of facilities that fall within a given occupancy percentage in the provided radius. Highlighted in yellow are the percentages of spaces that are available at various times of the day within these radii.

Table 2.13: Parking Availability within 150' of Central Downtown on a Weekday

Occupancy	8am	10am	12pm	2pm	4pm	6pm
0-20%	2	0	0	0	0	2
21-40%	0	1	1	0	0	0
41-60%	1	0	2	1	1	2
61-80%	2	3	2	0	2	1
81-100%	0	1	0	4	2	0
% Usage	42%	66%	54%	82%	74%	38%
% Available	58%	34%	46%	18%	26%	62%

Table 2.14: Parking Availability within 150' of Central Downtown Platteville on a Weekend

Occupancy	8am	10am	12pm	2pm	4pm	6pm
0-20	4	1	0	0	3	1
21-40	1	0	1	2	1	1
41-60	0	1	1	0	0	1
61-80	0	0	1	1	1	2
81-100	0	3	2	2	0	0
% Usage	14%	66%	66%	62%	26%	46%
% Available	86%	34%	34%	38%	74%	54%

Table 2.15: Parking Availability within 250' of Central Downtown Platteville on a Weekday

Occupancy	8am	10am	12pm	2pm	4pm	6pm
0-20	7	1	0	0	1	2
21-40	0	2	3	2	1	3
41-60	3	2	2	2	2	4
61-80	4	6	5	3	5	4
81-100	0	3	4	7	5	1
% Usage	36%	61%	64%	71%	67%	49%
% Available	64%	39%	36%	29%	33%	51%

Table 2.16: Parking Availability within 250' of Central Downtown Platteville on a Weekend

Occupancy	8am	10am	12pm	2pm	4pm	6pm
0-20	9	2	1	3	4	2
21-40	3	2	2	4	3	2
41-60	1	3	2	1	3	3
61-80	0	3	6	2	2	5
81-100	1	4	2	3	2	2
% Usage	23%	57%	59%	47%	43%	54%
% Available	77%	43%	41%	53%	57%	46%

It can be seen that the lowest availability of parking is 18% on a weekday and 34% on a weekend. This high availability shows that there is enough parking within a reasonable walking distance of central downtown.

2.1.3.2. McGregor Plaza

McGregor Plaza is a shopping center that consists of 342 parking spaces. Piggly Wiggly is the main business in the shopping center and draws a majority of the customers. **Table 2.17** and **Table 2.18** show the average parking duration, turnover rate, supply and demand, and whether there is a surplus or deficiency.

Table 2.17: McGregor Plaza Weekday Parking Characteristics

Average Parking Duration (hrs/veh)	2.94
Turnover Rate (veh/stall/hr)	0.06
Demand (hrs)	535
Supply (hrs)	3488
Is there a surplus or deficiency?	***Surplus***

Table 2.18: McGregor Plaza Weekend Parking Characteristics

Average Parking Duration (hrs/veh)	1.44
Turnover Rate (veh/stall/hr)	0.05
Demand (hrs)	447
Supply (hrs)	3488
Is there a surplus or deficiency?	***Surplus***

The tables show that there is clearly a heavy surplus because the parking lot is only utilizing 15% of its capacity.

2.2. Bike Study

2.2.1. Procedure

In order to ensure results were not skewed by a lack of bikers due to the cold weather it was delayed until the warmer weather. Therefore, the bike study was conducted at the same time as the weekend downtown parking study on March 31st, 2012. Similar to the license plate check, which analyzed parking, the bike rack study also needed an accurate inventory. **Table 2.19** shows the amount of the various types of bike racks.

Table 2.19: Bike Rack Inventory

Type of Bike Rack	Total Quantity Downtown
City Racks on Streets	14
7 ft Standard Bike Racks	1
Racks Behind Momentum	1
Large Curved Pipe Rack	2
Small Curved Pipe Rack	1
5 ft Standard Bike Racks	3

Figure 2.24 shows the locations of each of the bike racks in the downtown area.

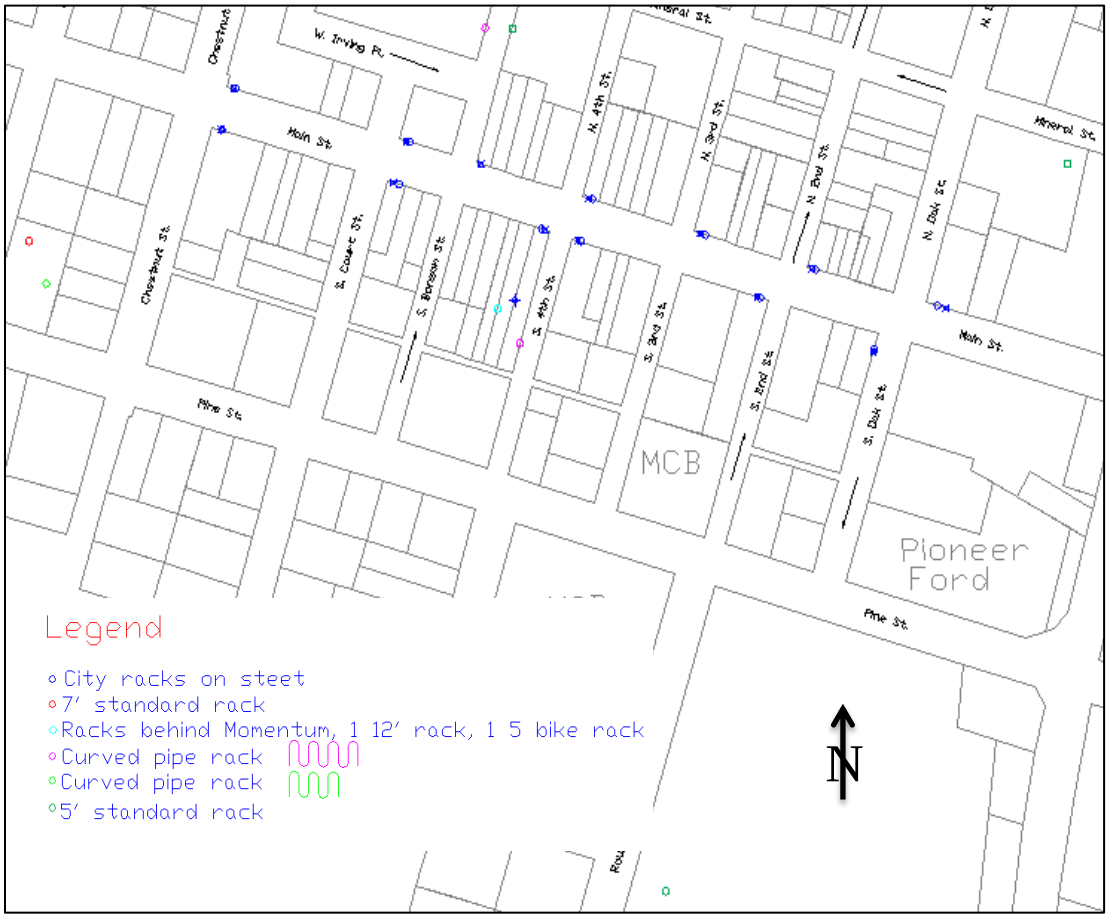

Figure 2.24: Bike Rack Inventory Map

2.2.2. Bike Rack Usage Characteristics

Similar to the parking study data, the bike rack data was plotted on distribution and accumulation pattern graphs to visually represent the data. **Figure 2.25** and **Figure 2.26** show the duration distribution and accumulation pattern data that was collected. In the Appendix are shown **Table A.96** and **Table A.97**, which present the raw data that helped generate these figures and relevant tables.

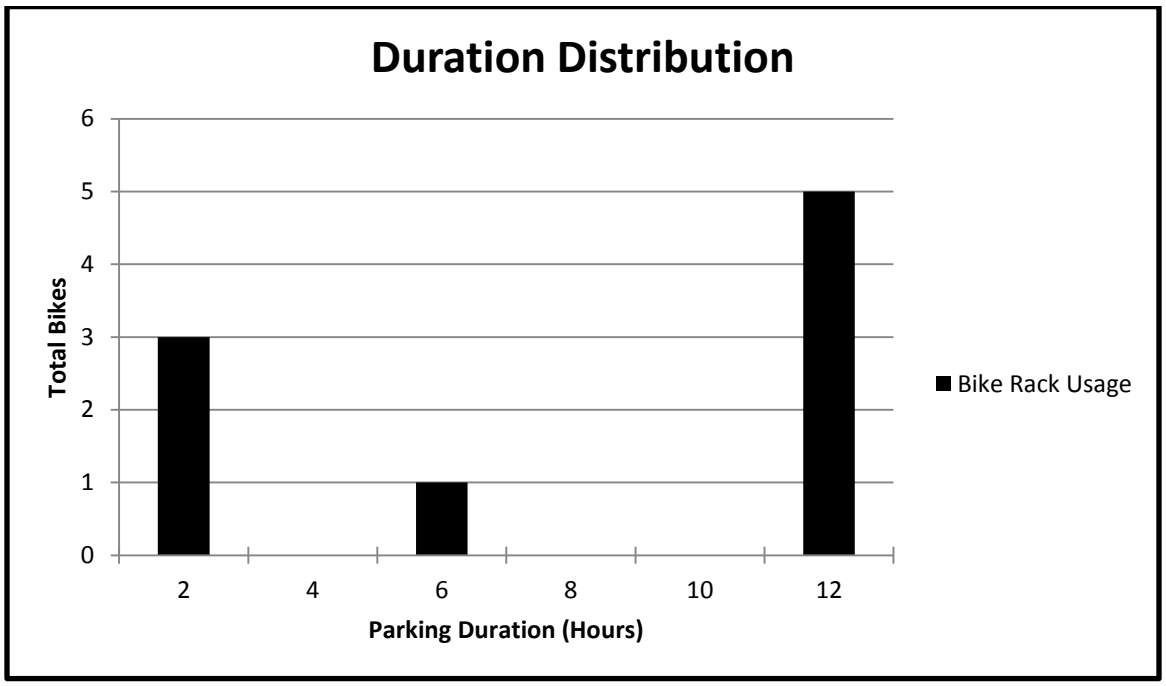

Figure 2.25: Weekend Duration Distribution, Bike Racks

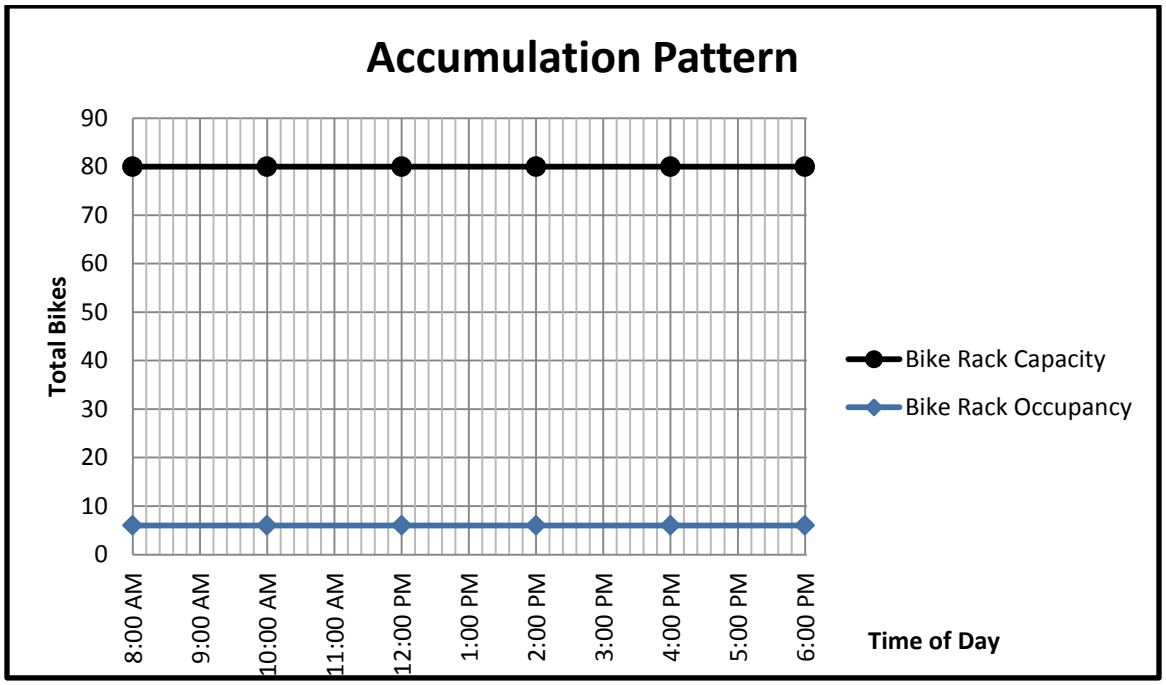

Figure 2.26: Weekend Accumulation Pattern, Bike Racks

2.2.3. Bike Rack Usage Analysis

From the collected data it can be seen that there are approximately 80 places for bikes to park in the downtown area. During the study six bikes were observed during each interval. Most of the bikes recorded downtown remained there for the duration of the study. **Table 2.20** shows numerically how under-utilized the bike racks are in downtown Platteville.

Table 2.20: Weekend Bike Rack Usage Characteristics

Average Parking Duration (hrs/bike)	8.00
Turnover Rate (bike/space/hr)	0.01
Demand (hrs)	72
Supply (hrs)	816
Is there a surplus or deficiency?	***Surplus***

After analyzing the data it is evident that there are more than enough bike racks to meet the needs of the people biking to and storing their bikes downtown.

2.3. Business Owner and Customer Interviews

2.3.1. Procedure

Interviewing business owners and customers in the downtown area was of importance to determine the public's perception of the parking situation downtown. It was also important to analyze whether perception of parking was consistent with data collected during the parking studies. The participants in these surveys were business owners, employees, and customers of businesses on and near Main Street. Interviews were conducted on three separate occasions: February 29th, March 28th, and March 31st, 2012. Interviewees were asked several questions regarding their views on the parking situation in downtown Platteville. Business owners and employees were asked the following questions:

- Do people complain about parking? If so, what do they complain about?
- What do you think the perception is about the parking situation for your business?
- How many employees do you have working on a given day?
- Where do the employees have to park? How far away is that from the business?

- If the city would lease parking for employees, how much would the business/employees be willing to pay?
- What suggestions do you have about parking near your business?
- Would you be in favor of metered parking?

Questions that were asked to customers were as follows:

- How far did you have to walk from where you parked your car to get to the business?
- How long do you typically leave your car parked in one spot downtown?
- Do you come by yourself or other people?
- Do you combine errands?
- How often do you go downtown?
- What is your perception of the parking situation downtown?
- Do you have any suggestions to improve the downtown parking?
- Are you in favor of metered parking on Main Street?

Using the responses, a general perception of the parking supply and demand as well as citizens' recommendations to optimize parking downtown could be found.

2.3.2. Business Owner Interview Results

50 business owners were interviewed for this study. Survey results from interviewing business owners can be seen in **Figure 2.27** through **Figure 2.32**. The data used to produce these figures can be seen in **Table A.98** in the Appendix.

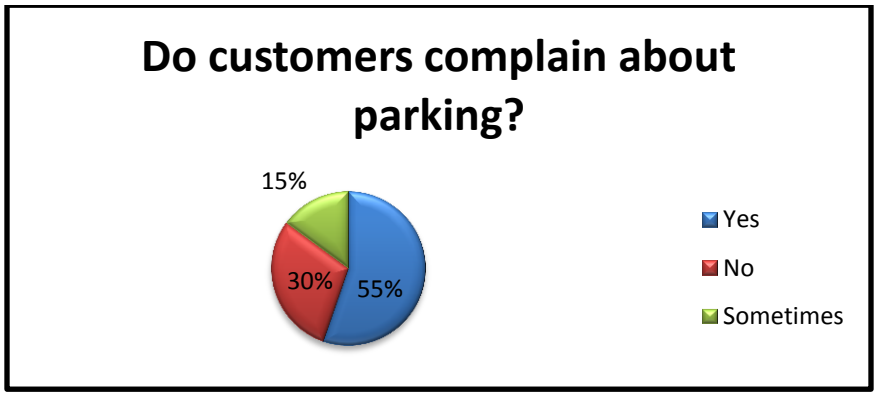

Figure 2.27: Customer Complaints

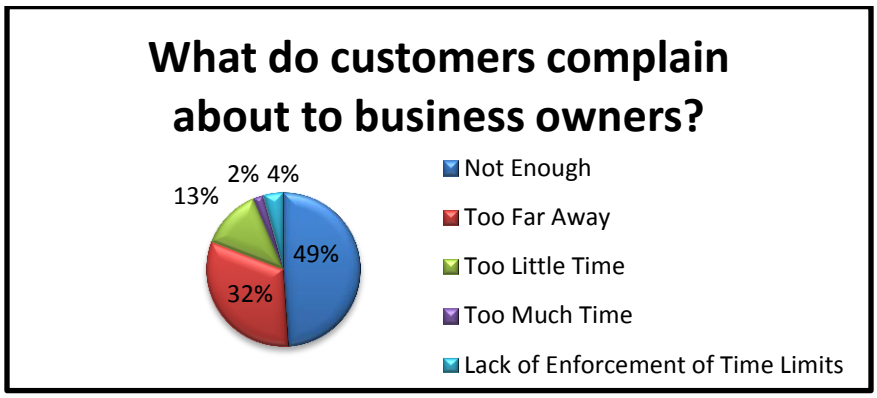

Figure 2.28: What are Customers' Complaints?

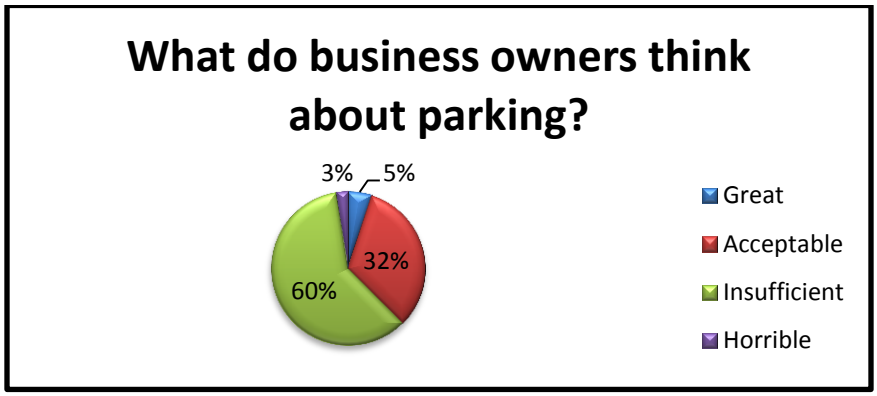

Figure 2.29: Business Owner Parking Perception

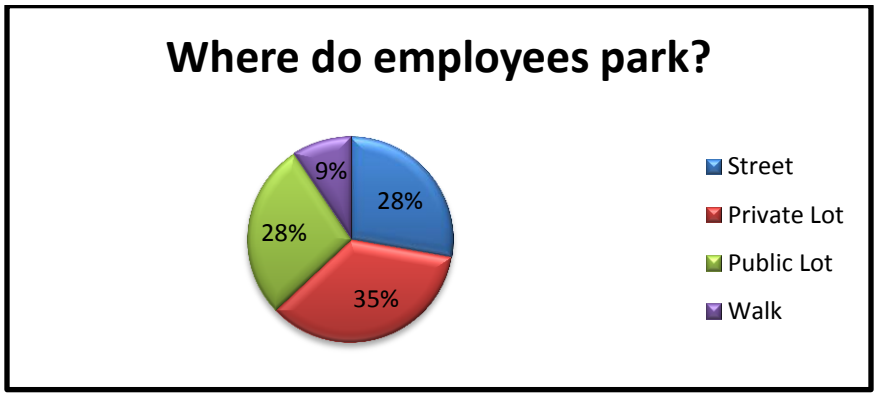

Figure 2.30: Employee Parking

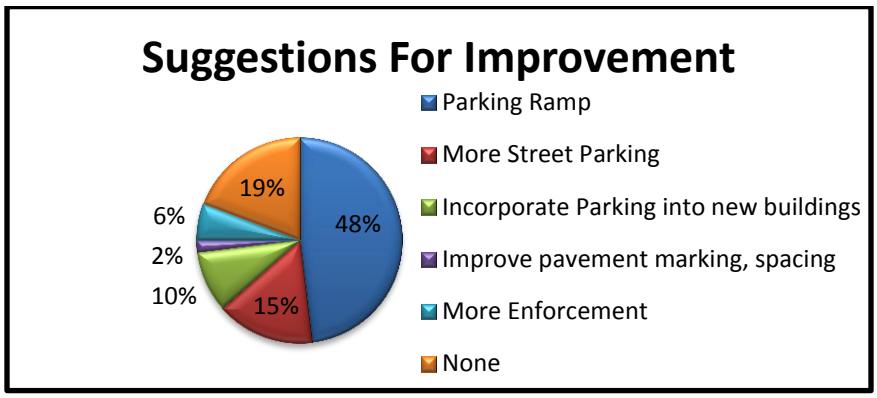

Figure 2.31: Business Owner Recommendations

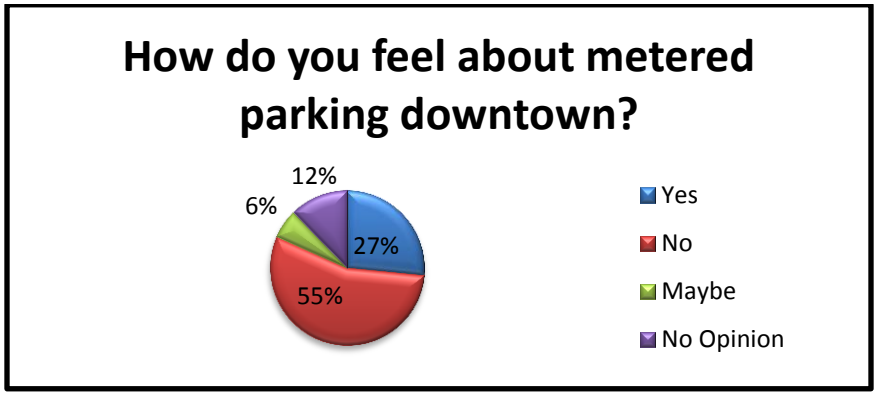

Figure 2.32: Business Owners Input Regarding Metered Parking

When talking with business owners it was very obvious that customers complain about parking, specifically that there is not enough. Also, most business owners have the perception that parking downtown is insufficient. However, nearly 60% of business owners responded that their employees park in a public lot or on the street. These employees might be taking up spaces that could be used by customers. A common complaint that was received was that the employees or residents of downtown will park in front of businesses, reducing the parking along Main Street and the storefronts. Business owners would like to see more parking in downtown by building a parking ramp. They feel that adding a parking ramp would provide spaces for the residents of downtown, employees, and customers that will shop downtown longer than two hours and ultimately open up more spaces on Main Street.

2.3.3. Customer Interview Results

50 customers were interviewed for this study. Survey results can be seen in **Figure 2.33** and **Figure 2.38**. **Table A.99** in the Appendix provides data that produced these figures.

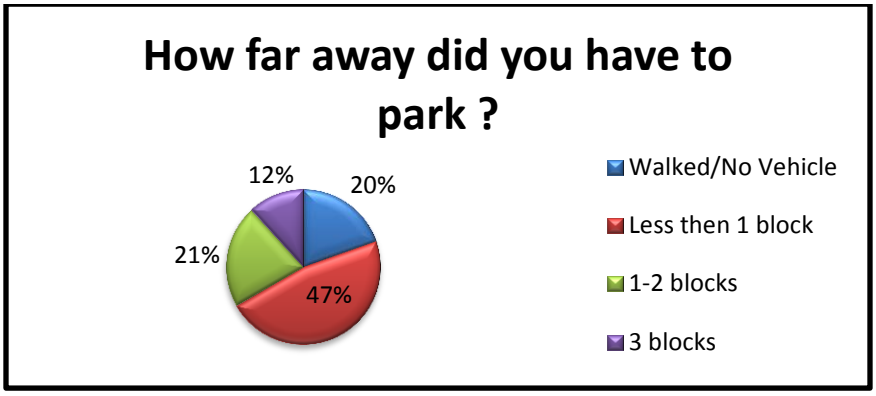

Figure 2.33: Distance from Destination

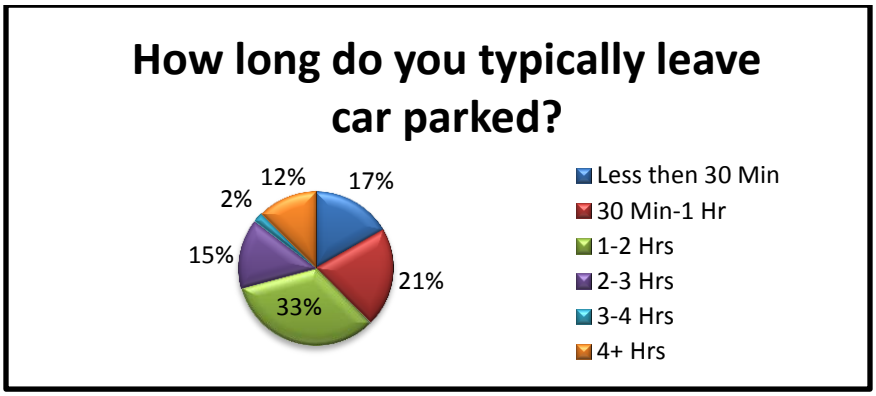

Figure 2.34: Average Customer Parking Duration

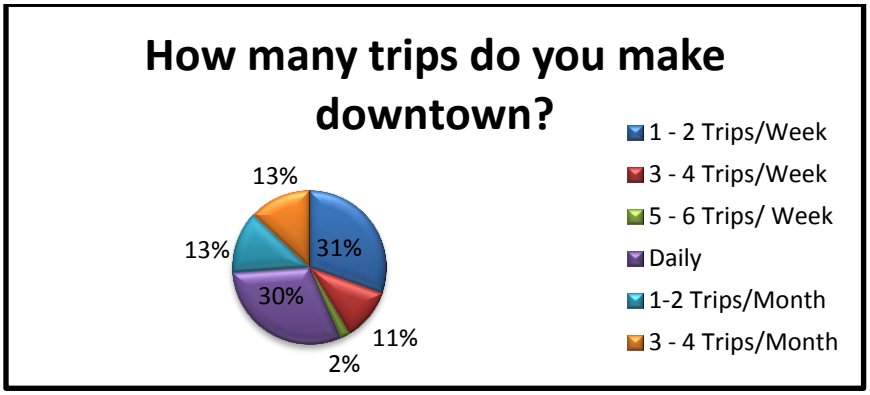

Figure 2.35: Frequency Visiting Downtown

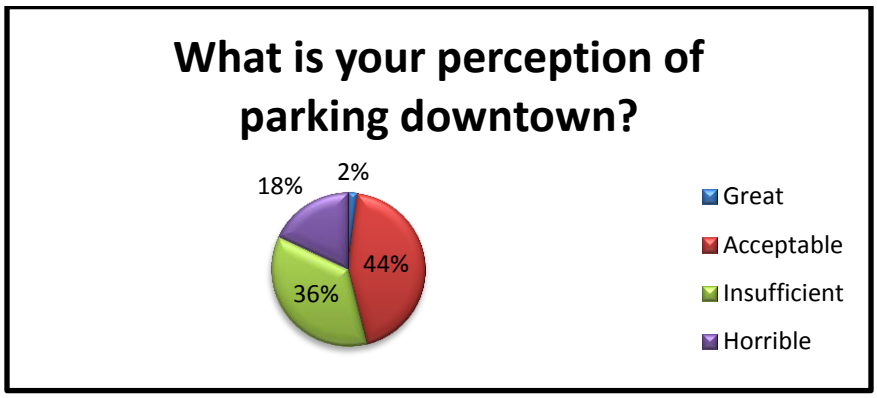

Figure 2.36: Customer Downtown Parking Perception

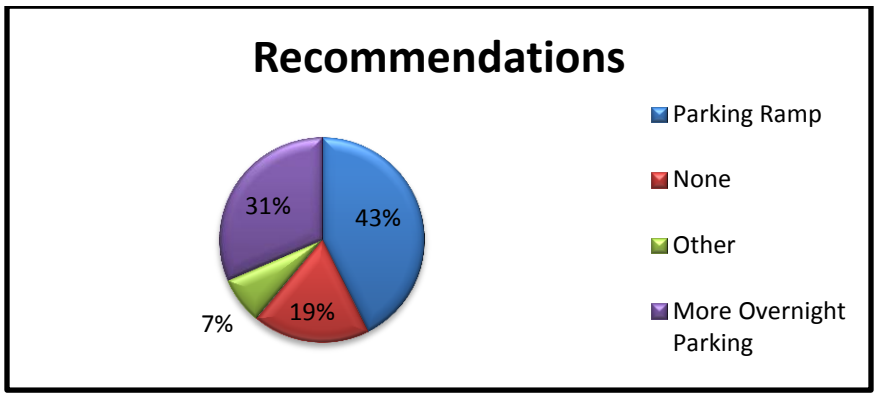

Figure 2.37: Customer Parking Recommendations

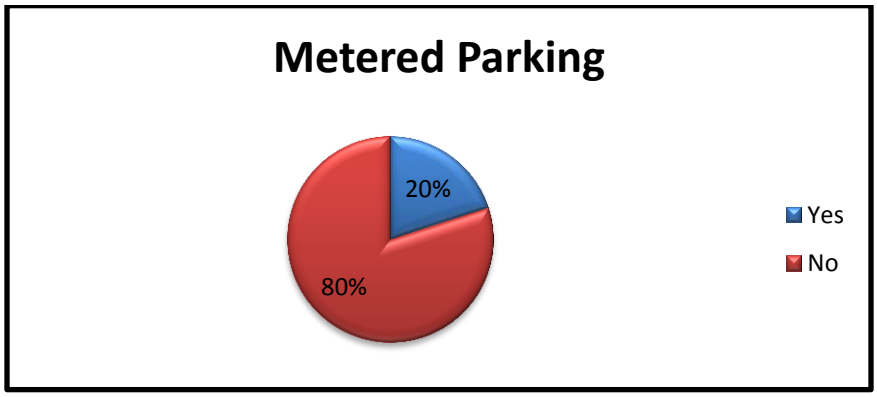

Figure 2.38: Customer Feelings about Metered Parking

Overall, customers were nearly split on the perception of the parking situation downtown. However, most of the customers had to walk less than a block to get to their destination, visited more

than one business during one trip downtown, and came alone. Most customers felt that a parking ramp would be beneficial and make parking downtown easier. Similar to the business owners, they thought that a ramp would help ease the congestion of parking downtown. It would provide a place for residents, employees, and shoppers to park for an extended period of time. However, 80% of customers were against metered parking as a source of revenue to pay for such facilities.

3. DOWNTOWN TRAFFIC FLOW

3.1. Procedure

Turning movement studies proved to be critical for predicting traffic flow. It was determined that the intersections to be analyzed were: Pine Street, Main Street, and Furnace Street, with the cross-streets of Chestnut Street and Water Street. Intersection volume data was collected using JAMAR TDC-8 handheld traffic-data collectors. It was collected at all six intersections of interest by Downtown Engineering team members during the morning and afternoon peak hours of a Tuesday, Wednesday, and Thursday. In order to ensure that data was collected during the peak hour, counts were conducted for two hours during the morning and afternoon peak traffic flow periods. **Table 3.1** shows the data collection dates and peak hour information for each intersection.

Table 3.1: Turning Movement Data Collection Details

Intersection	Dates Studied	AM Peak Hour	PM Peak Hour
Pine St. & Water St.	Feb. 21, 2012 - Feb. 23, 2012	7:30 - 8:30	4:15 - 5:15
Furnace St. & Water St.	Feb. 21, 2012; Feb. 29, 2012; Mar. 1, 2012; Mar. 6, 2012	7:30 - 8:30	4:30 - 5:30
Main St. & Chestnut St.	Feb. 14, 2012 - Feb. 16, 2012; Feb. 23, 2012	7:30 - 8:30	4:30 - 5:30
Pine St. & Chestnut St.	Feb. 21, 2012 - Feb. 23, 2012	7:30 - 8:30	4:15 - 5:15
Main St. & Water St.	Feb. 14, 2012 - Feb. 16, 2012; Feb. 22, 2012	7:15 - 8:15	3:45 - 4:45
Furnace St. & Chestnut St.	Feb. 27, 2012 - Feb. 29, 2012	7:45 - 8:45	4:15 - 5:15

Every intersection aside from Furnace Street and Water Street was counted during the three week period from February 14, 2012 to February 29, 2012. As shown in the table the typical morning peak hour occurred between 7:30 and 8:30. Although the typical afternoon peak hour varied more, it was consistently sometime between 4:15 and 5:30.

3.2. Data

The peak hour is defined as the four consecutive 15 minute intervals with the highest total volume. Turning movement volumes for a given intersection were used to determine the average intersection peak hour volumes. This data can be seen in the Appendix in **Table A.100** through **Table A.105** and is summarized in **Table 3.2**.

Table 3.2: Three Day Average Peak Hour Turning Movements

		From North			From East			From South			From West		
		Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**
Pine and Water	**AM**	67	244	1	2	15	3	4	161	156	198	15	28
	PM	76	248	7	4	18	4	8	279	244	278	43	85
Main and Water	**AM**	55	220	12	17	84	63	23	129	51	37	77	33
	PM	46	215	11	23	91	68	36	217	87	116	108	57
Furnace and Water	**AM**	48	266	7	3	27	4	4	153	27	51	55	13
	PM	29	241	7	10	37	7	5	309	66	52	34	32
Pine and Chestnut	**AM**	12	86	183	101	89	15	10	88	5	10	37	3
	PM	14	80	218	209	108	27	21	110	10	15	129	14
Main and Chestnut	**AM**	31	240	33	26	150	9	19	147	31	39	107	11
	PM	27	240	44	44	152	18	40	285	64	52	187	19
Furnace and Chestnut	**AM**	1	266	81	37	11	51	23	167	1	0	7	0
	PM	2	277	39	90	11	32	34	326	3	2	12	1

The average peak hour turning movement data was entered into Trafficware's Synchro 8 program. A street network representing downtown Platteville was utilized for analysis. This presented a visual depiction of turning movements throughout downtown Platteville, an example of this can be seen in **Figure 3.1** for the morning peak hour.

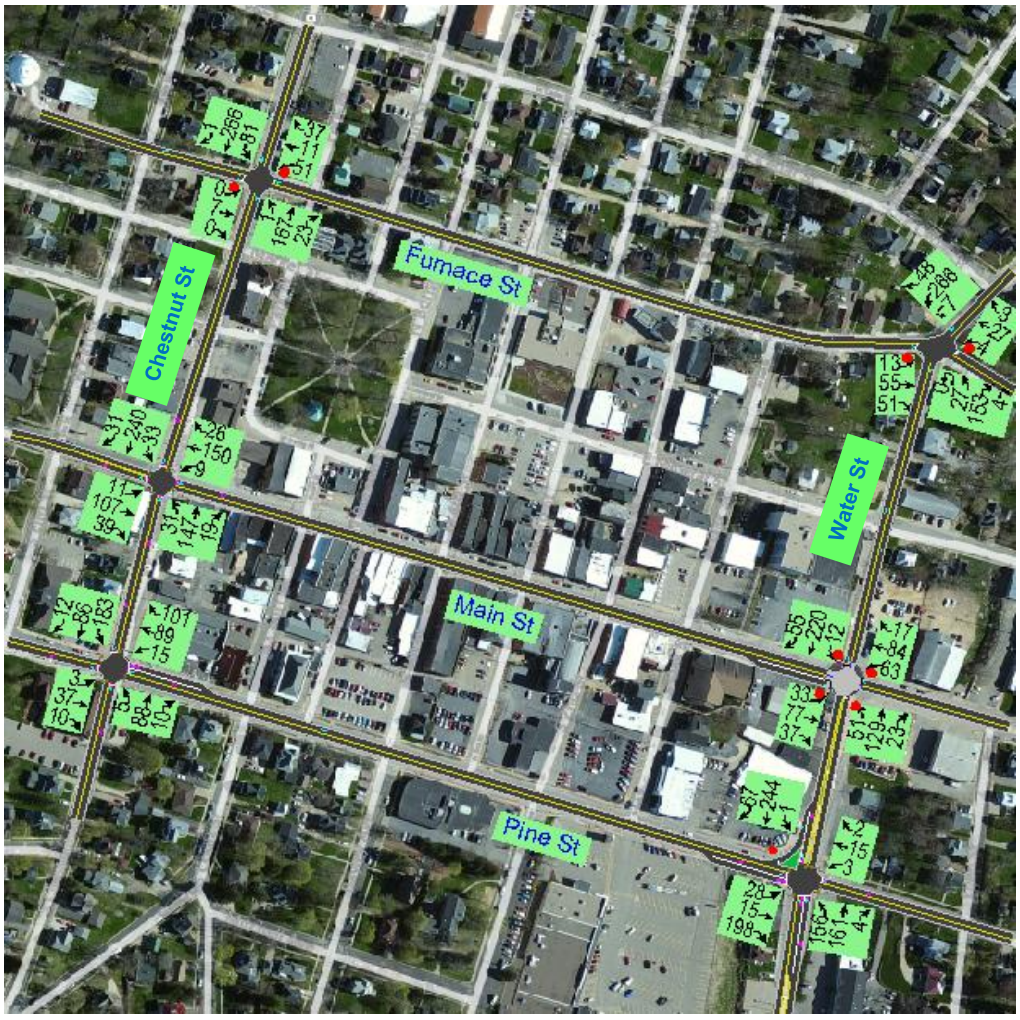

Figure 3.1: Current Morning Peak Hour Turning Movements on the Downtown Platteville Street Network

With the reconstruction of Water Street beginning in the spring of 2012, the intersection of Main Street and Water Street will be changed to a signalized intersection; currently the intersection is a 4-way stop. The peak hour turning movements were entered into a Synchro network that accounted for these reconstruction changes. A signal timing plan was created using a phase diagram provided by Delta 3 Engineering and Synchro's optimize feature with an actuated cycle of 45 seconds and other features as shown in **Table 3.3**. The diagram that was utilized for the morning peak hour is shown in **Figure 3.2** while the afternoon peak hour can be seen in the Appendix in **Figure A.1**. The diagram was used to examine the effects of the new signals on traffic flow patterns in the downtown area.

Table 3.3: Signal Timing Used in Analyzing the New Signal at the Intersection of Main Street and Water Street

	East/Westbound	**North/Southbound**
Minimum Initial (sec)	4.0	4.0
Minimum Split (sec)	21.0	21.0
Total Split (sec)	21.0	24.0
Yellow Time/10 (sec)	30	30
All-Red Time/10 (sec)	20	20

Figure 3.2: Downtown Platteville Street Network with the Addition of Traffic Signals at Main Street and Water Street With Morning Peak Hour Turning Movements

3.3. Network Performance Analysis

3.3.1. Current

As seen in both the table and the figures in the previous section, most of the traffic through downtown Platteville follows the routes of State Trunk Highways (STH) 80 and 81. Through Platteville, STH 80 follows Water Street while STH 81 turns west onto Pine Street from Water Street

and continues north onto Chestnut Street. **Figure 3.3** shows the turning movement data from the afternoon peak hour, which had the highest daily volume.

Figure 3.3: Current Afternoon Peak Hour Turning Movements

Although STH 80 and 81 carry the majority of traffic through Platteville, concern was expressed that motorists are using Furnace Street to bypass traffic signals on these streets in an attempt to cut travel time. After analysis, it was estimated that approximately 25% of vehicles traveling northbound on STH 81 may turn left from Water Street onto Furnace Street, using Furnace Street as a short cut, and then continue onto STH 81. However, fewer motorists seem to use this route when traveling southbound on STH 81. Roughly 17% of the vehicles that travel south on STH 81 turn left

onto the west end of Furnace Street. The other vehicles using Furnace Street appear to predominately be using it to connect southbound or northbound STH 81 with the opposite direction on STH 80. **Table 3.4** provides clues as to why less motorists use Furnace Street when traveling southbound on STH 81 by showing estimated travel times from where the routes diverge to when they reconnect.

Table 3.4: Travel Times Using Either STH 81 or Furnace Street

	Total Trip Time (sec)	
	Northbound	**Southbound**
Existing Conditions		
Following 81	90.5	87.6
Utilizing Furnace Street	110.7	119.7
After Signal Installation		
Following 81	90.5	87.6
Utilizing Furnace Street	98.1	110.5

It typically takes northbound motorists using Furnace Street (from Water Street) 20 seconds longer than following STH 81. When traveling southbound on STH 81, motorists will experience a 30 second increase in travel time by using Furnace Street to travel to Water Street. The percentage of vehicles using Furnace Street as a short cut may increase following the signal installation due to approximately a 10 second decrease in the travel time. The concern that drivers are using Furnace Street instead of following STH 81 should be revisited following the completion of reconstruction work to confirm these assumptions and future projections.

The data entered into Synchro also included the following:

- Heavy vehicle percentages found during the study
- Link lengths between intersections taken from a scaled map of downtown Platteville
- Signal timings from the traffic signal boxes that were provided by the City of Platteville

Using this information, Synchro was able to calculate a level of service (LOS), volume to capacity ratio (v/c), and delay for each approach. The larger of the morning or afternoon peak hour values for the current network are shown for each intersection in **Table 3.5**.

Table 3.5: Current Performance Measures of the Intersections in Downtown Platteville

	Main and Water	Pine and Water	Pine and Chestnut	Main and Chestnut	Furnace and Chestnut	Furnace and Water
Larger Peak Hour	PM	PM	PM	PM	AM	PM
Max v/c	0.63	0.49	0.49	0.61	0.24	0.25
Total Delay (sec/veh)	15.4	10.5	12.7	13	3.8	3.8
LOS	C	B	B	B	A	A

All of the current signals downtown are operating with a level of service of "B" and a total intersection delay between 10 and 13 seconds. Aside from the four-way stop at Main Street and Water Street, the un-signalized intersections that were studied are operating with a level of service of "A" and a total delay of 3.8 seconds. The intersection of Main Street and Water Street has the lowest level of service in downtown with a "C" and the highest total delay with 15.4 seconds. Following the installation of a traffic signal at the intersection, the performance will improve tremendously as shown in **Table 3.6**.

Table 3.6: Performance Measures of the Intersection of Main Street and Water Street After New Signals are Installed

Larger Peak Hour	PM
Max v/c	0.52
Total Delay (sec)	9.4
LOS	A
95^{th} Percentile Queue Length (feet)	118

The 95^{th} percentile queue length is 118 feet on Water Street between Main Street and Pine Street. The distance between Main Street and Pine Street is 407 feet therefore traffic should not back up into either of these two intersections. It will have a new level of service of "A" and almost a 40% reduction in total delay. Using the algorithm in Synchro, none of the other intersections in the network will be seeing any change in their overall performance measures following the installation of the signal.

The analysis, broken down by lane of every intersection, is available in the Appendix in **Table A.106** through **Table A.111**.

3.3.2. Future Growth Impacts

Projections were also examined to determine the effects of Platteville's continued growth on downtown traffic flow over the next five and ten years. In order to obtain a growth rate to apply to current traffic volumes, city growth and university growth were plotted in **Figure 3.4**.

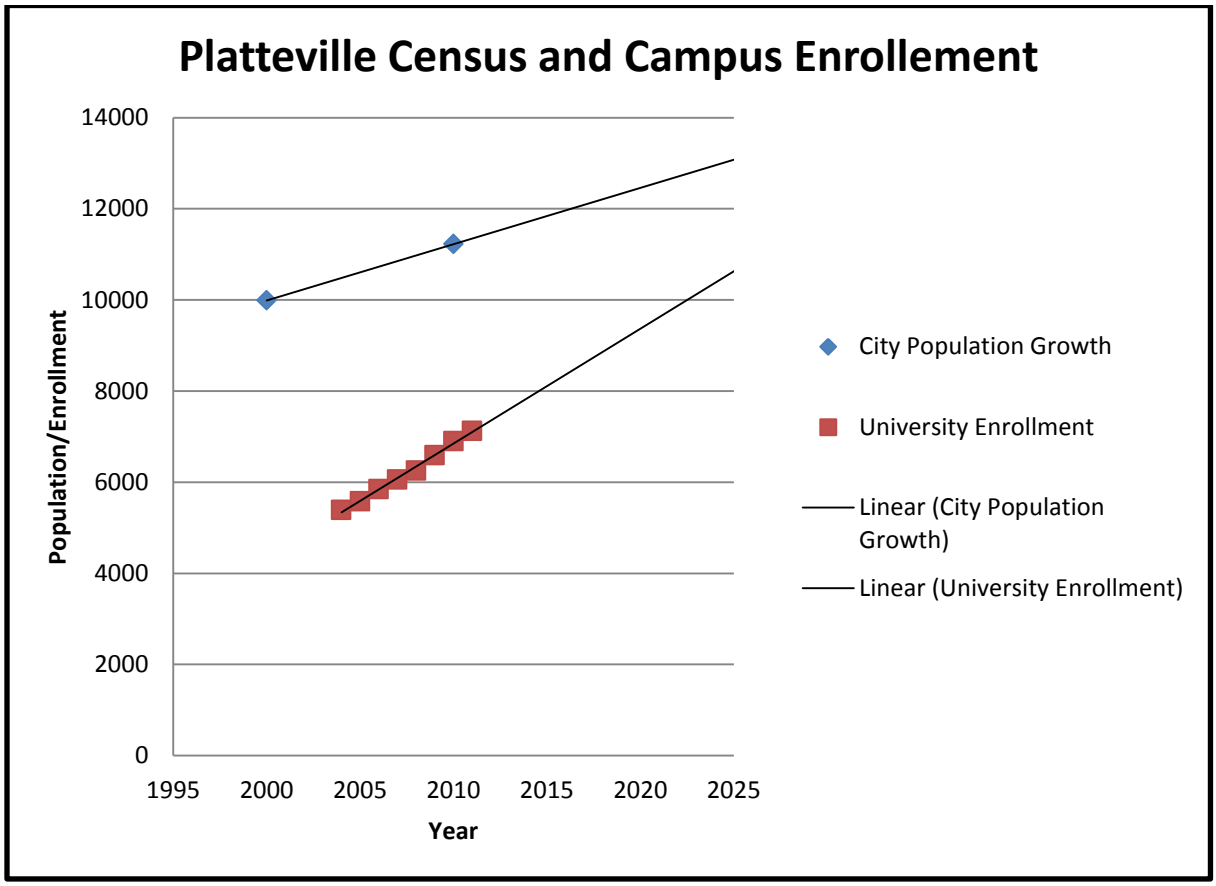

Figure 3.4: Anticipated Growth Rate

University expansion was included in the consideration because it is experiencing rapid growth and is one of the primary employers in the city. The city and UW-Platteville saw growth rates of 1.2% and 4.1%, respectively. The two growth rates were averaged and a yearly growth rate of 2.7% was used in

the future analysis. This growth rate was then applied to the current turning movements, and the projections for 2017 and 2022 were entered into Synchro. These diagrams are **Figure A.2** through **Figure A.5** in the Appendix. Heavy vehicle traffic percentages and existing signal timings were assumed to remain the same when making future projections.

The resulting performance measures for all of the intersections at five and ten years are shown in **Table 3.7**.

Table 3.7: Future Performance Measures of Downtown Intersections

	Main and Water		**Pine and Water**		**Pine and Chestnut**		**Main and Chestnut**		**Furnace and Chestnut**		**Furnace and Water**	
	5 years	10 years	5 years	10 years	5 years	10 years	5 years	10 years	5 years	10 years	5 years	10 years
Peak Hr	PM	PM	PM	PM	PM	PM	PM	PM	AM	AM	PM	PM
Max v/c	0.55	0.58	0.53	0.63	0.53	0.60	0.65	0.70	0.31	0.42	0.44	0.63
Total Delay (sec)	9.9	10.5	10.9	12.3	13	14.4	14.1	17.2	4.3	5.2	5.9	8.5
LOS	A	B	B	B	B	B	B	B	A	A	A	A

Within ten years the highest volume to capacity ratio in the downtown network will be 70%. This will lead to the changes in performance for each intersection that are shown in **Table 3.8**.

Table 3.8: Change in Performance from Present (Following Installation of Signals at Main Street and Water Street) to 2022

	Main and Water	**Pine and Water**	**Pine and Chestnut**	**Main and Chestnut**	**Furnace and Chestnut**	**Furnace and Water**
ΔMax v/c	0.06	0.14	0.11	0.09	0.18	0.38
ΔTotal Delay (sec)	1.1	1.8	1.7	4.2	1.4	4.7
LOS Change	A→B	None	None	None	None	None

Without any modification to the existing network, and if traffic follows the growth rate that was assumed, the increase in delay over 10 years will be minimal for most intersections. The level of service

will stay the same at all intersections aside from the intersection of Main Street and Water Street, which will drop from a level of service “A” to a “B”.

4. ANTICIPATED DEVELOPMENT

4.1. Multi-Use Development East of the Post Office – At the Corner of Pine Street and Bonson Street

4.1.1. Proposal

A proposal by Stevens Construction would create a new residential building on the current public parking lot east of the Post Office, located in Block 31 on **Figure 2.1**. If this development takes place, it is assumed that it will be completed by 2017. The original proposal was to have a development consisting of residential apartments, retail establishments, and parking spaces. Following concerns from the Platteville Common Council, the proposal was last modified to remove the retail establishments in order to provide more parking. The current proposal has not yet been approved, but as it currently stands (as of 4/10/2012), the development will have 41 dwelling units, with approximately 100-110 beds, and 89 parking spaces in two lower levels of the structure. Of these spaces, the 43 in the upper level will be reserved for tenants and the 46 in the lower level will be available to be leased by the public. In addition to the spaces in the structure there will also be 6 spaces created in the alley behind the building that will be designated 2 hour parking.

4.1.2. Development Impacts

4.1.2.1. Traffic Flow

The trips generated by the development could be calculated using *Trip Generation: An ITE Informational Report* from the Institute of Transportation Engineers (ITE) and the current development plans provided by the city. As shown in **Table 4.1**, the highest total trips will be generated in the afternoon, when the anticipated number of beds was used as the variable. The afternoon provided the highest entering and exiting volumes aside from the exiting trips generated in the morning when the

anticipated number of beds was the variable. This generated five more exiting trips than the afternoon, and the entering trips were substantially lower. Therefore, the time when the development will have the most impact will be during the afternoon.

Table 4.1: AM and PM Trips Generated by the Development East of the Post Office

2-3 Floor Low Rise Apartment			
AM	Trips Generated	Entering	Exiting
# of beds 100	38.86	7	32
# of dwelling units 41	26.45	6	21
PM			
# of beds 100	72.79	46	27
# of dwelling units 41	30.81	20	11

The trips generated by the development needed to be assigned to a path to take through downtown in order to examine the impacts on downtown traffic flow. The breakdown by percentage for both entering and exiting trips that was used for analysis is shown in **Figure 4.1**.

Figure 4.1: Trip Assignment Percentages for Trips Generated by the Development East of the Post Office

These percentages were established by examining the current traffic patterns in town, the density of traffic attractions along the routes possible, and the anticipated demographic characteristics of the residents of the building. Using those factors, half of the vehicles are anticipated to follow STH 81 south of town to or from US 151 or Business 151. In addition, 30% will likely travel towards the north side of town using STH 81 and 20% may commute to campus using their vehicles. Vehicles

traveling towards the north using STH 81 will also impact the intersections of Chestnut Street with Main Street and Furnace Street, which was taken into account when finding the impacts. The network diagrams that were used from Synchro can be seen in the Appendix in **Figure A.6** and **Figure A.7**. The performance of the downtown intersections anticipated for 2017 after incorporating the trips generated by this development, and without modifying the existing timings and geometry, are shown in **Table 4.2**.

Table 4.2: Intersection Performance Anticipated for 2017 Taking into Account the Trips Generated by the Development East of the Post Office

	Main and Water	Pine and Water	Pine and Chestnut	Main and Chestnut	Furnace and Chestnut	Furnace and Water
Larger Peak Hour	PM	PM	PM	PM	AM	PM
Max v/c	0.55	0.55	0.55	0.65	0.32	0.44
Total Delay (sec)	9.9	11.1	13.3	14.2	4.3	5.9
LOS	A	B	B	B	A	A

When the values from **Table 4.2** are compared with the five year values from **Table 3.7** there does not appear to be a significant difference following the development, with the total intersection delay increasing by at most 0.4 seconds.

4.1.2.2. Parking

Using the *ITE Parking Generation Manual* the expected peak parking demand was found for the development. While not all of the spaces will always be occupied, ITE has found that the peak demand occurs between 12am and 4am with over 90% of the spaces occupied in a suburban development between 10pm and 6am. The formulas for the peak parking demand only used the number of dwelling units, unlike the trip generation models, therefore the 41 units expected were used. Using the formulas generated by ITE from the studies they conducted, the weekday peak demand is expected to be 42.67 spaces and the weekend peak demand is expected to be 43.41 spaces. These are both close to the 43 tenant spaces that the developer is expecting to provide. There are currently 47 spaces

available in the parking lot, which will be replaced with additional 46 long term spaces to be leased out. With the addition of the six spaces located in the alley, the total amount of parking available to the public will increase. This will increase the number of long term parking available by 20. However there will be 15 less 2 hour parking spaces than what currently exists. **Table 4.3** shows if the demand remains constant, a surplus of two hour parking will remain present even with the decrease in available spaces.

Table 4.3: 2 Hour Parking Supply and Demand due to Development East of the Post Office

	2 Hour
Total # Legal Spaces (S_P)	240
Demand	1366
Supply	2310
Is there a supply or demand?	***Surplus***

4.2. Multi-Use Development of the Library Block – Pine Street and Elm Street

4.2.1. Proposal

A developer has proposed purchasing the buildings on the "library block", which is referred to as Block 28 on **Figure 2.1**. Due to the preliminary nature of the plans, this development is not expected to be impacting traffic and parking needs until 2022. While no specific plans have been released yet for this development, the most likely composition of the development would be as follows:

- 100-200 beds of residential space, no specific number of dwelling spaces was provided
- Replacement space for the current public library, which would be demolished to make room for the development
    - The library director would like to double the current size, bringing it to 22,000 square feet.
- Coffee shop or other retail space

4.2.2. Development Impacts

4.2.2.1. Traffic Flow

Trips that will be generated by this development were once again found using *Trip Generation: An ITE Informational Report*, which breaks down the trips generated by each land use. These trip generations, along with a breakdown of entering and exiting percentages, are shown in **Table 4.4** through **Table 4.6**. In order to simulate the worst case scenario, the trips to be generated were found using the 200 bed estimate. The current library has almost 11,000 square feet of gross floor area, but the library director expressed an interest in doubling that size in any redevelopment. Due to not having any details of specific floor plans, the gross floor area of the coffee shop was assumed to be 2,000 square feet for analysis purposes, which was the average value found by ITE when gathering their data.

Table 4.4: Trips Generated by the Residential Component of the Proposed Development for the Library Block

2-3 Floor Low Rise Apartment (200 Beds)			
	Trips Generated	Entering Trips	Exiting Trips
AM	64	11	53
PM	92	58	34

Table 4.5: Trips Generated by the Replacement Library Component of the Proposed Development

Library (GFA, 22,000 sf)			
	Trip Generation	Entering Trips	Exiting Trips
AM	23	16	7
PM	5	2	3

Table 4.6: Trips Generated by the Coffee Shop Retail Component of the Proposed Development

Coffee Shop (GFA, 2000 sf)			
	Trips Generated	Entering Trips	Exiting Trips
AM	117	60	57
PM	41	20	20

The same process that was used to assign the trips to a path for the development east of the Post Office was used for this development as well. An estimate of the trip distribution is shown in **Figure 4.2**. Due to the development's close proximity to the University campus, the assumption was made that none of the trips would go to the University. This is based on the likelihood that students living in the development would walk to campus instead of driving.

Figure 4.2: Distribution of Trips Generated by the Proposed Development through the Downtown Intersections of Interest

Of the vehicles leaving, approximately 60% will go through the intersection of Pine Street and Chestnut Street traveling on Pine Street. 25% of the vehicles leaving the development will likely turn left at the intersection of Pine Street and Chestnut Street in order to travel along STH 81 towards Lancaster, WI. Since all vehicles will not only be leaving on Pine Street, 15% are expected to turn left at the intersection of Main Street and Chestnut Street in order to also travel along STH 81. This leads to 40% of the total vehicles following that route towards Lancaster. The network diagrams created in Synchro using these volumes can be seen in the Appendix in **Figure A.8** and **Figure A.9** for the morning and afternoon peak hour respectively. These estimated percentages were established by examining the current traffic patterns in town, the density of traffic attractions along the routes possible, and the anticipated demographic characteristics of the residents of the building.

The performance of the downtown intersections including the traffic from the future developments can be seen in **Table 4.7**.

Table 4.7: Future Performance Measures of Downtown Intersections if Both Developments are occupied by 2022

	Main and Water	Pine and Water	Pine and Chestnut	Main and Chestnut	Furnace and Chestnut	Furnace and Water
Larger Peak Hour	PM	PM	PM	PM	PM	PM
Max v/c	0.6	.74	0.74	0.72	0.58	0.63
Total Delay (sec)	10.9	13.7	17	18	5.6	8.5
LOS	B	B	B	B	A	A

While the intersections' level of service did not change with the addition of the developments to the expected volume in 2022, the maximum volume to capacity ratio and the total delay increased by up to 0.16 and 2.6 seconds respectively as shown in **Table 4.8**.

Table 4.8:Change in Intersection Performance in 2022 if Both Developments are Occupied

	Main and Water	Pine and Water	Pine and Chestnut	Main and Chestnut	Furnace and Chestnut	Furnace and Water
ΔMax v/c	0.02	0.11	0.14	0.02	0.16	0
ΔTotal Delay (sec)	0.4	1.4	2.6	0.8	0.4	0
LOS Change	None	None	None	None	None	None

4.2.2.2. Parking

Expected parking requirements for this development were found using the *ITE Parking Generation Manual*. An estimate of 90 dwelling spaces was determined using similar ratios that were utilized in the development east of the Post Office. Using the formulas shown in **Equation 4.1** and **Equation 4.2** from ITE, the weekday peak demand is expected to be 85.3 spaces, and the weekend peak demand is expected to be 92.9 spaces.

$$Required\ Spaces = 0.87(\#\ of\ dwelling\ units) + 7 \quad \text{.....4.1}$$

$$Required\ Spaces = 1.01(\#\ of\ dwelling\ units) + 2 \quad \text{.....4.2}$$

After speaking with the current library director the desired size of any replacement library would be 22,000 square feet of gross floor area, which is more than double the existing size. This leads to an expected peak demand of 59.6 spaces for a typical weekday using **Equation 4.3**. There were no formulas available to estimate future weekend demand. There were also no formulas in the manual for a coffee shop land use, although the weekday demand for a non-hamburger fast food restaurant is 8.2 spaces per 1,000 square feet gross floor area. This was used to approximate the demand for a coffee shop. The average size of a coffee shop was assumed to be 2000 square feet which was the value provided by *Trip Generation: An ITE Informational Report*. Therefore, it was determined that the peak demand was approximately 16.4 spaces. The total parking demand for this development is anticipated to be approximately 162 spaces, which should be planned for by the developer.

$$Required\ Spaces = 1.48\left(\frac{GFA}{1000}\right) + 27 \quad \text{.....4.3}$$

5. CONCLUSION

5.1. Downtown Parking

The purpose of this analysis was to examine parking inventory and usage characteristics in downtown Platteville, and to examine how future developments will impact traffic flow.

On the basis of the analysis, the following conclusions are reached:

- There is currently sufficient parking in downtown Platteville, with exception of 24 hour parking facilities, as parking supply exceeds demand for these facilities
- The occupancy maps of parking facilities show that there was typically vacant parking within one or two blocks of Main Street, during both weekday and weekend
- Parking for the McGregor Plaza parking lot is highly underutilized. The majority of vehicles do not remain in the lot for more than a one to two hour interval, showing a high turnover rate due to the types of businesses located in the plaza
- Bike rack usage study showed that these were largely underutilized

5.2. Interviews

Business owners/employees and customer interviews were conducted in order to determine the common perception of downtown parking. It was found that the majority of people, business owners/employees and customers, believe there is not enough parking. A popular suggestion from interviewees was to build a parking ramp, which should include overnight parking. The request for additional overnight parking coincides with the analysis of the parking data that was collected. A comparison of parking analysis and interviews revealed that customers do not want to walk more than one block (approximately 100 to 150 feet) to reach their destination; this leads them to believe that parking is inadequate.

5.3. Traffic Flow

When analyzing the traffic flow in downtown it can be seen that all six intersections were at a LOS “A” or “B” with the exception of Main Street and Water Street which had a LOS of “C”. Once a signal light is installed at this intersection the LOS will improve from a “C” to an “A”. As Platteville’s population grows the traffic flow should not be greatly affected for the next five and ten years. All intersections will continue to have an acceptable level of service.

If the proposed developments are constructed they would have little to no effect on the existing traffic flow downtown. All intersections would remain at an acceptable level of service following the construction of these developments. The development of the library block Parking will not affect parking in the area. However, the development east of the Post Office will create a surplus of all parking types if demand remains constant.

The existing traffic system, which includes parking and traffic flow, is expected to remain adequate through Platteville’s growth and development plans.

6. RECOMMENDATIONS

Based on the conclusions reached from analysis of the data collection, there are few recommendations to be made. There is only one aspect of the parking in the downtown area that is deficient. The availability of 24 hour parking in the downtown area is extremely low. Occupancy was high throughout the day, regardless of whether it was a weekday or weekend. No other type of parking saw a comparable amount of demand.

- It is recommended that 24 hour parking facilities be added in the downtown area

This would be accommodated with the current design of the development east of the Post Office. However, if that development does not occur, the optimal location for this parking facility would be the most western of the existing Pioneer Ford lots between Oak Street and 2nd Street. The location of the lot can be seen in **Figure 6.1**. The location of the lot is central enough that it would be utilized by a variety of people living in the downtown area. This lot is also ideal, because it does not conflict with the historic appeal of Main Street.

- Permit parking should be used in this lot in order to prevent non-residents from restricting the parking of downtown residents who have limited options

Permits should be purchased by residents in the area, who would utilize the lot the most. The City of Platteville already provides a vast amount of free public parking, so this should not cause undue hardships to people visiting the downtown.

Figure 6.1: Pioneer Ford Lot for Possible 24 Hour Parking (highlighted in red)

- New businesses should be required to provide parking for their customers on site

A vast majority of businesses currently rely on public parking for their customers. Projected growth figures of traffic and population suggest that public parking will become more limited; therefore, new businesses should be required to provide the parking spaces recommended by ITE to meet the increased demand from their customers.

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