3.0 DATA COLLECTION AND ANALYSIS

This section describes the data collection effort, summarizes occupancy rates for different time periods, analyzes parking turnover and duration, and compares demand estimated using local data to demand estimated using average rates published by the Institute of Transportation Engineers. Results are presented for the entire study area and for three sub-zones.

3.1 DATA COLLECTION

RSG and the Town counted the number of cars parked in each lot and on-street space on the dates and at the intervals described Table 6. According to representatives from the Town, Friday and Saturday evenings are the critical time periods. Therefore, counts were conducted over several hours on those two days. The Town conducted supplemental spot counts during other weekdays to help quantify parking demand during mid-morning, the lunch hour, and early evening. Raw data from the parking counts are contained in Appendix A.

Table 6: Parking Survey Dates and Time Intervals

Date	Time Intervals	By
Friday, Dec 8, 2006	4:00-8:00 PM every ½ hour	RSG
Saturday, Dec 9, 2006	4:00-7:00 PM every ½ hour	RSG
Monday, Dec 18, 2006	4:00-4:30	Town Planner
Tuesday, Dec 19, 2006	9:15-10:00 a.m.; 12:00-12:40 a.m.; 4:00-4:40 p.m.	Town Planner
Wednesday, Jan 3, 2007	9:00-9:45 a.m.; 12:00-12:45 p.m.;	Town Planner
Thursday, Jan 4, 2007	9:00-9:30 a.m.; 12:15-12:50 p.m.; 5:00-5:30 p.m.	Town Planner

In addition to counting the number of parked cars, RSG also noted the license plate number of each parked vehicle during each time interval at the locations listed below. This information is used to estimate the parking duration and turnover at each parking facility and was collected during the Friday and Saturday evening counts.

Parking duration data were collected at the following core parking facilities selected because they are arguably the most desirable parking locations during weekend evenings.

- Town Corner lot (#101);
- Richmond Corner Market lot (#102);
- Banknorth lot (#107);
- US 2 westbound on-street parking in front of Richmond Corner Market (#202);
- Bridge Street on-street parking in front of Richmond Commercial Block (#200);
- Depot Street on-street parking (#201); and
- Bridge Street on-street parking between Depot Street and the railroad tracks (#207)

The core facilities are identified in Figure 7 on page 16.

3.2 PARKING UTILIZATION FOR ENTIRE STUDY AREA

Figure 3 shows the total number of cars parked during each time interval for all days on which data were collected for the entire study area. The time periods have been sorted from highest to lowest based on number of parked cars. Figure 3 also compares the number of parked cars to the overall supply, or capacity, of parking spaces. A target utilization of 85% is also indicated on the graph. The 85% threshold is a common target used in parking analysis. At an occupancy rate of 85%, there are still enough spare spaces to allow drivers to search for, enter, and exit parking spots.

The peak parking period for the entire study area occurred more frequently during the lunch hour. Saturday evening had the lowest parking demand. Figure 3 also shows that the total number of parking spaces in the study area far exceeds demand.

Figure 4, Figure 5, and Figure 6 present the parking occupancy for each facility during the three lunch hour data collection periods. The small lot in front of the Goodwin Baker Building (#111) and the Waitsfield Telecom lot (#115) were fully occupied during all three time periods. On-street parking along Bridge Street (#200), Depot Street (#201) and in front of the Richmond Corner Market (#202, #203) had occupancy ratios between 85 and 100% during at least one of the three lunch periods as did the Town Corner (#101), Banknorth (#107), and town office (#121) off-street lots.

Although the lunch hour has the largest overall parking demand of all of the time periods analyzed, the demand is distributed over the entire study area. As a result, demand for parking does not exceed the number of official parking spaces in most facilities. During the three lunch hours during which data were collected, drivers arriving in the core area of the village would have had multiple options for parking their cars.

Figure 3: Utilization Ranking for Entire Study Area

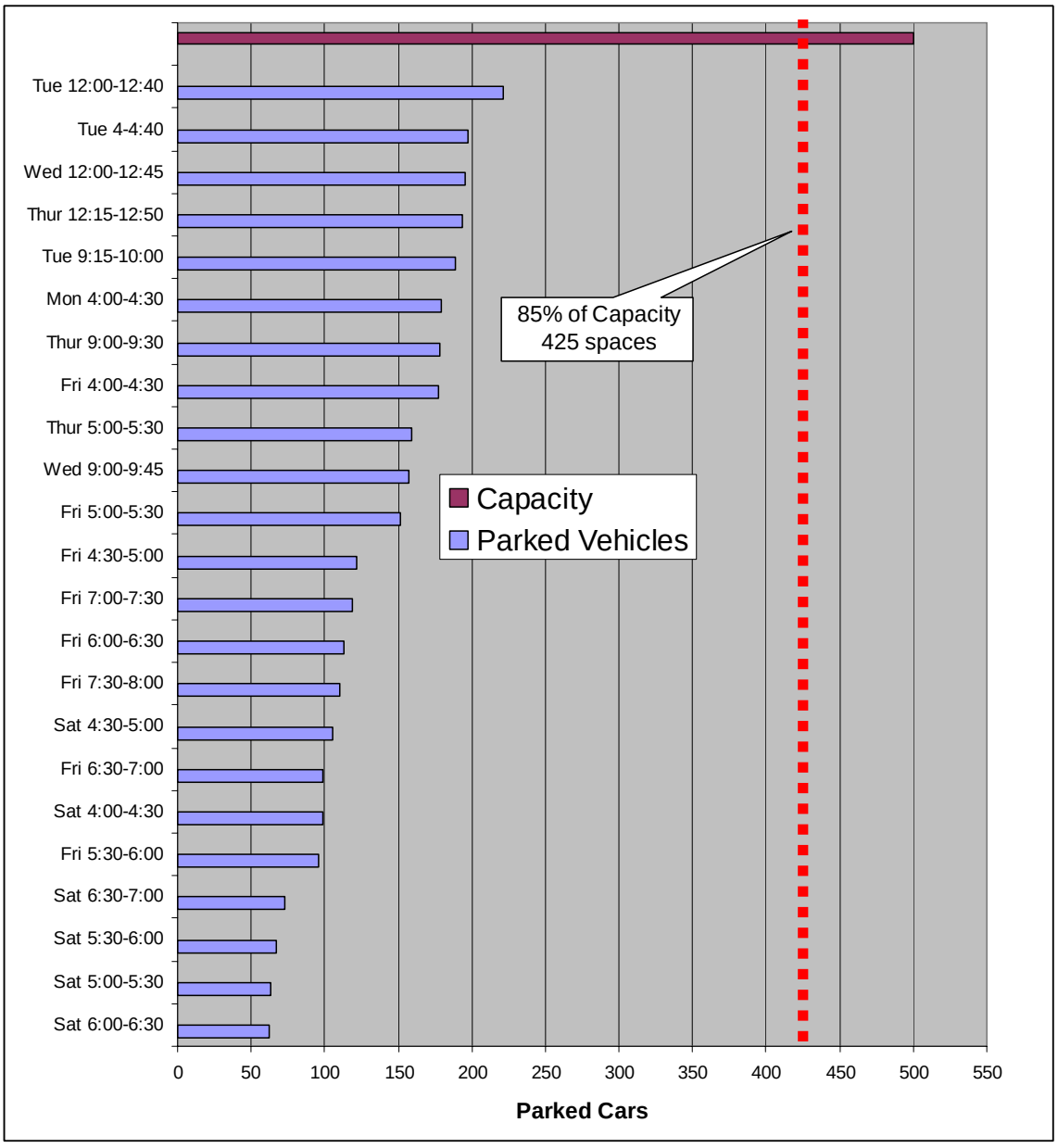


Figure 4: Parking Occupancy 12:00-12:40 p.m. on Tuesday, December 19, 2006

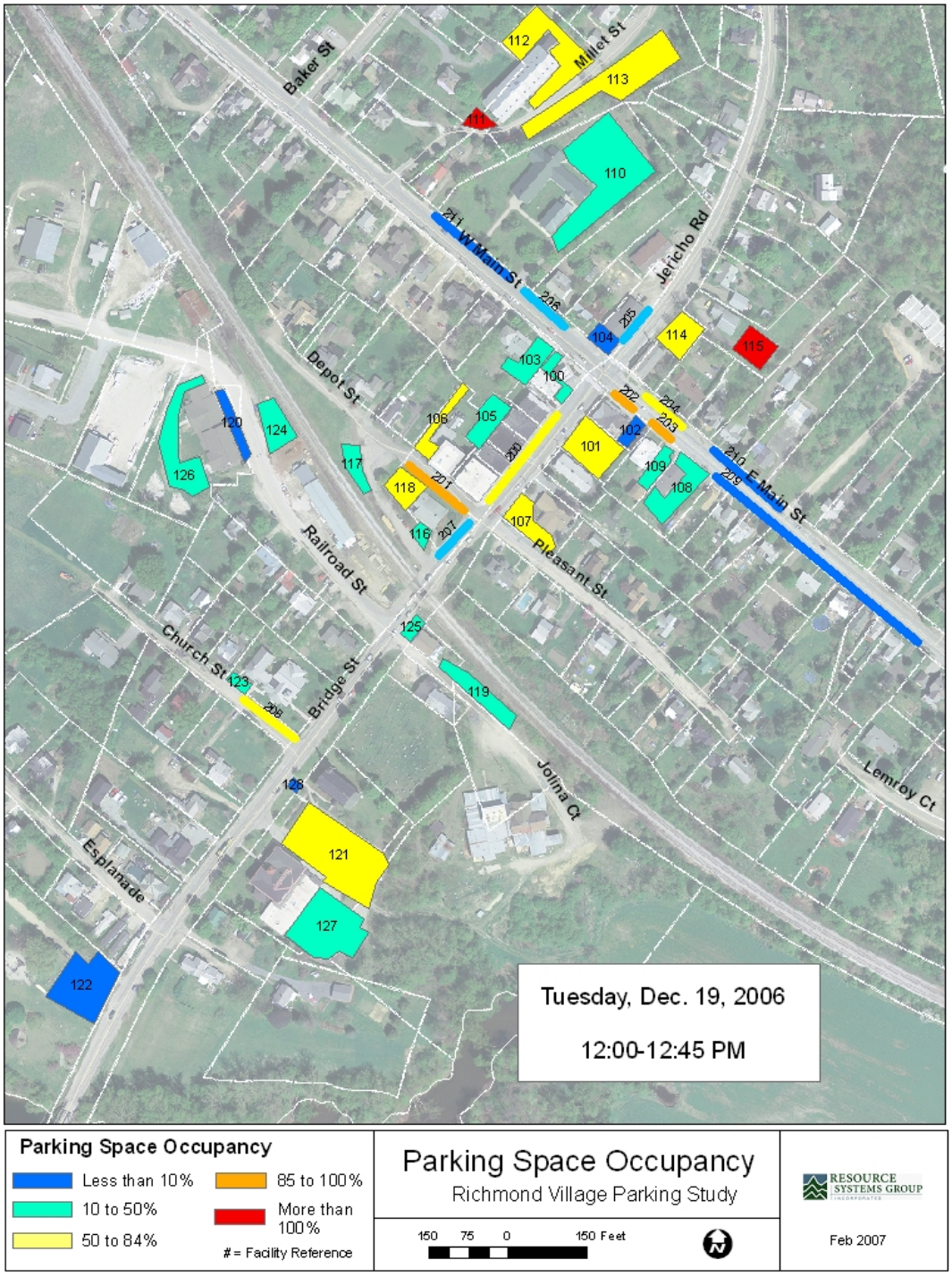


Figure 5: Parking Occupancy 12:00-12:40 p.m. on Wednesday, January 3, 2007

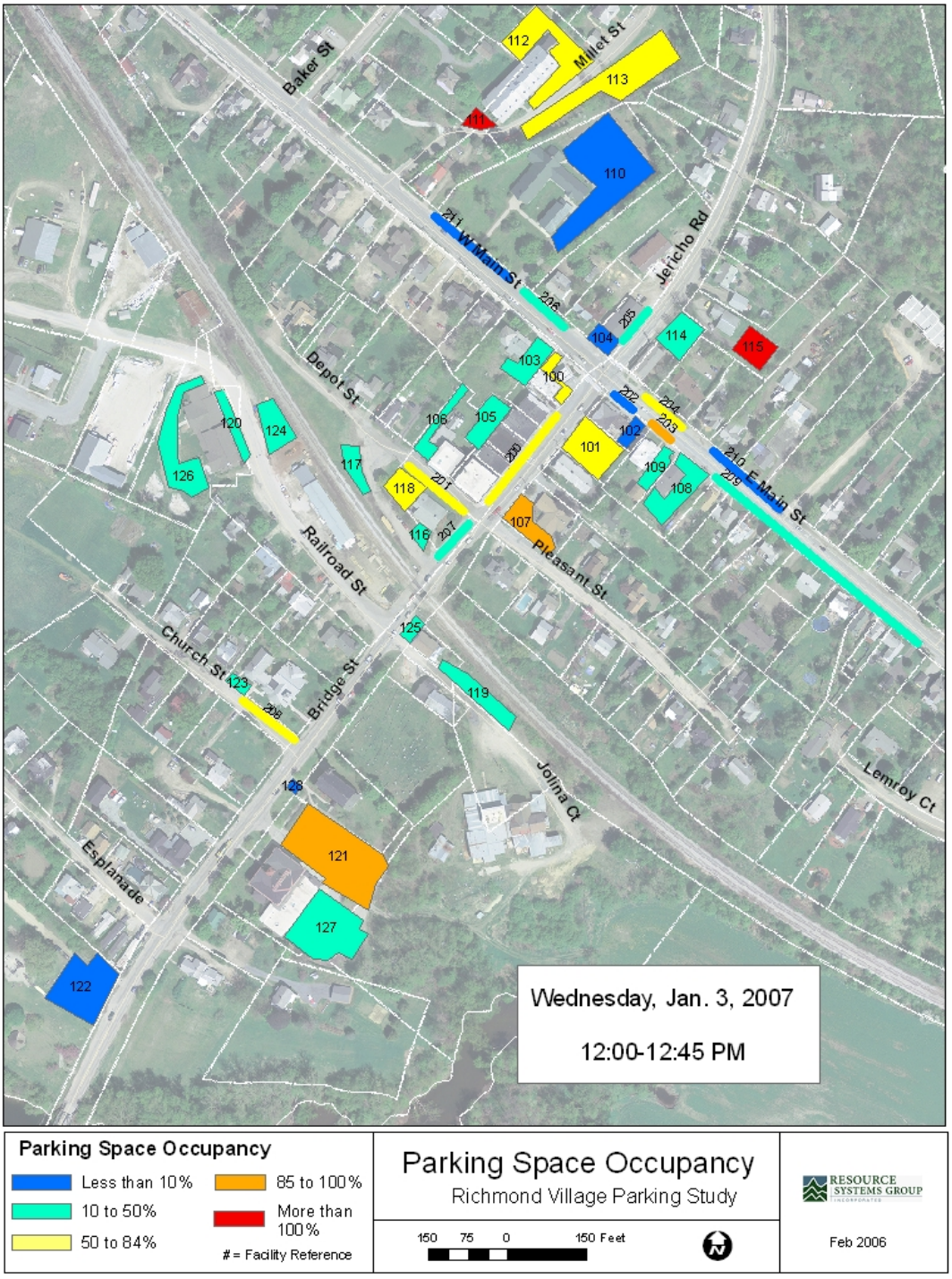
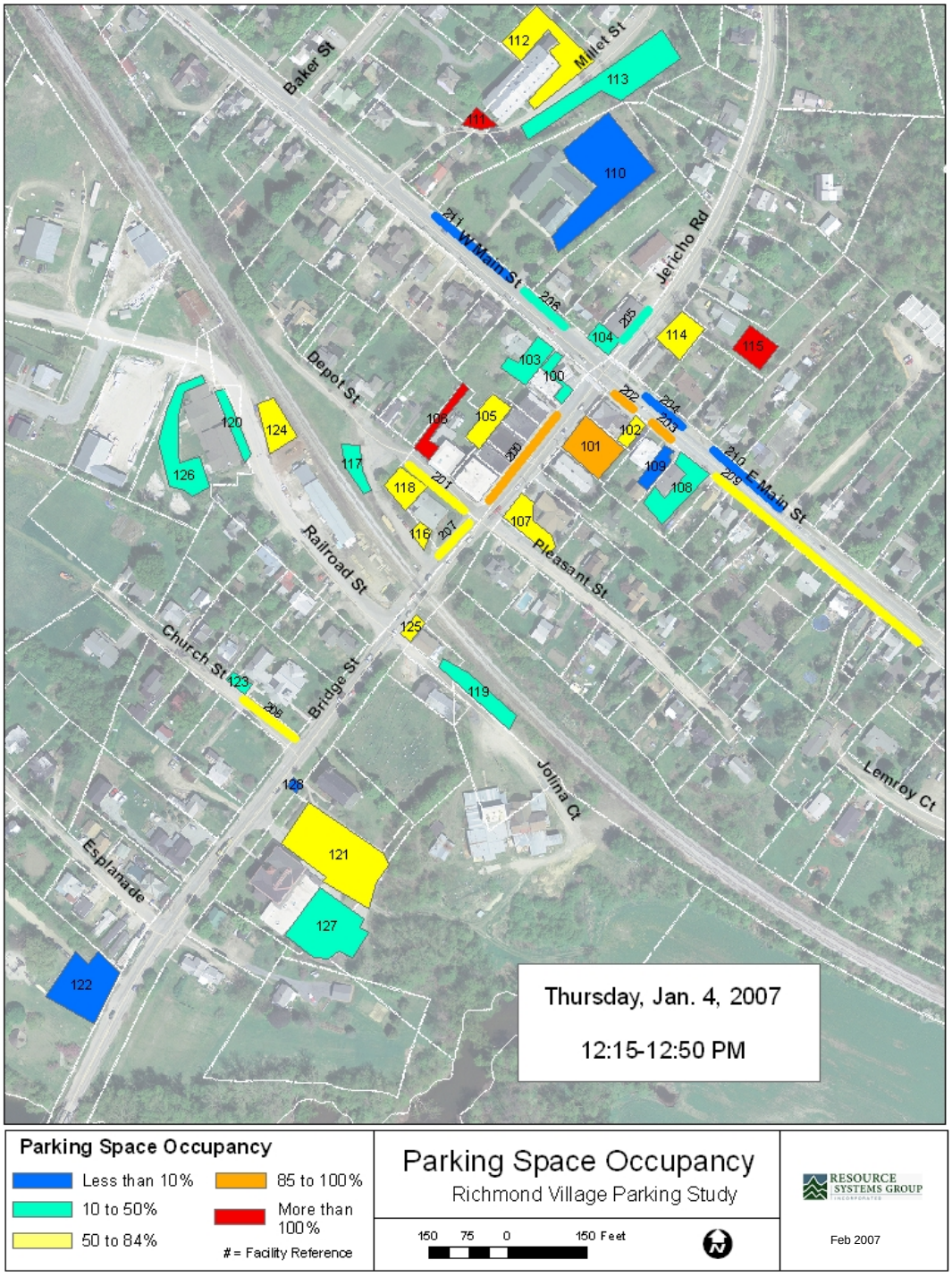


Figure 6: Parking Occupancy 12:15-12:50 p.m. on Thursday, January 4, 2007



3.3 PARKING UTILIZATION BY ZONE

To develop a better understanding of potential deficiencies, the parking facilities have been organized into the following three zones, also shown in Figure 7:

- **Core:** This zone includes the parking facilities that serve the businesses concentrated along Bridge Street generally between US 2 and Pleasant Street. Most of the parking spaces are available for general public use. Employees, customers, and other visitors will generally seek a parking spot in one of these locations first before searching any of the other facilities located in the rest of the village.
- **Non-core north:** This zone includes parking facilities located north of US 2. The largest parking lots in the village are located in this zone and serve the Goodwin Baker office building (lots #111, 112, and 113) and Our Lady of the Rosary church (#110). All of the off-street lots in this zone are privately owned and presumably available for private use only. There are a few sections of on-street parking along US 2 and Jericho Road available for general public use. People with final destinations in the core area of the village do not typically park in the north zone, even though parking is often readily available and is not officially restricted.
- **Non-core south:** This zone includes all parking facilities south of US 2 outside of the core. This zone is large and contains parking facilities throughout. If one considered only the location of the parking facilities, it would be logical to create a fourth study zone south of the railroad tracks. However, since the parking counts do not indicate any issues with the parking facilities within the non-core south zone, further refinement of the study zones would not provide any information useful in this analysis.

Although the peak hour for the entire study area occurred during the lunch hour, the peak period for the core study zone occurred on Friday evening (Figure 8 on page 17). Similar to the entire study area, Saturday evening had the lowest demand of all periods within the core. Between 4:00 and 8:00 p.m. on Friday, parking spaces in the core were almost 100% occupied for an hour and the 85% threshold was exceeded for two of the four hours data were collected.

For the non-core north and south zones, Friday and Saturday evenings have the least parking demand. The lunch hour and mid-morning time frames were the peak periods for the non-core south zone. The highest parking demand for the non-core north zone occurred during the lunch hour, in the mid-morning, and in the evening on different days (Figure 9 page 18; Figure 10 page 19).

Both non-core north and south zones contain land uses that will cause spikes in parking demand not captured during the data collection efforts for this study. In the north zone, Our Lady of the Rosary church will generate parking demand during services such as funerals that could occur at anytime during a typical weekday. A regularly scheduled weekly Mass was in session during the Saturday evening count. The on-street parking in front of the church (#211) and its off-street lot (#110) were 100% occupied at that time.

The south zone contains the Town offices, library, and Congregational church which all generate parking demand during board meetings, voting, and other special events. The south zone also contains the parking lot for the Village Green and recreational fields that generates significant parking demand during warmer months of the year. This zone also contains the Gifford Funeral home on Depot Street which can generate spikes in demand at a variety of times at any time of the year.

With these caveats in mind, Figure 9 and Figure 10 indicate that parking capacity within the north and south zones far exceeded demand during all of the data collection periods. These data suggest that there is excess capacity available within these zones to spikes in demand and spill-over form the core.

Appendix B contains a map for each half hour interval between 4:00 and 8:00 p.m. on Friday evening that show the occupancy for each parking facility within the village. By thumbing through these maps it becomes apparent that the core parking facilities remain near or fully occupied during the four hour period. At the same time, the parking facilities in the non-core areas remain under utilized and almost empty.

Figure 7: Study Zones

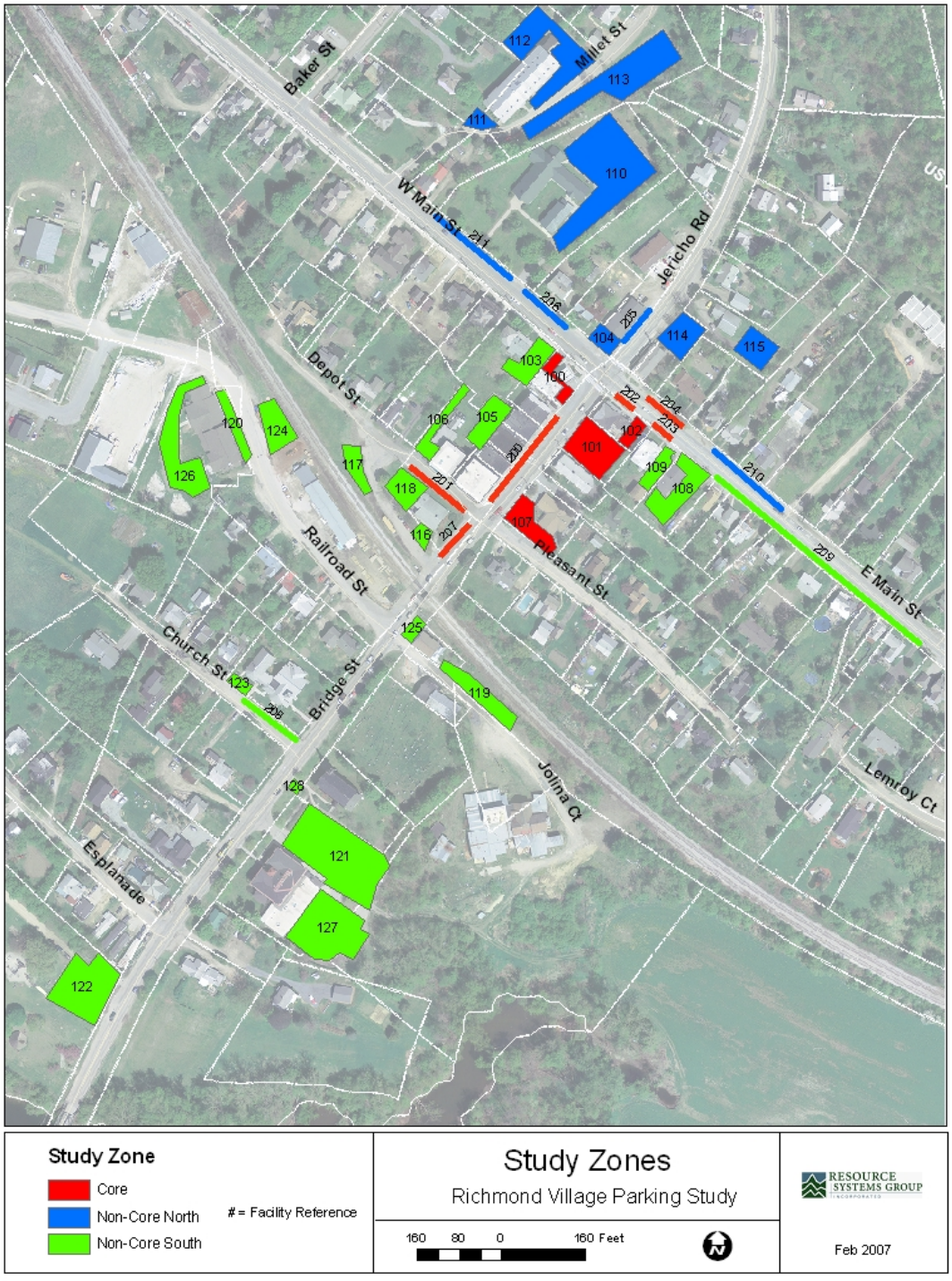


Figure 8: Utilization Ranking of Core Parking Facilities

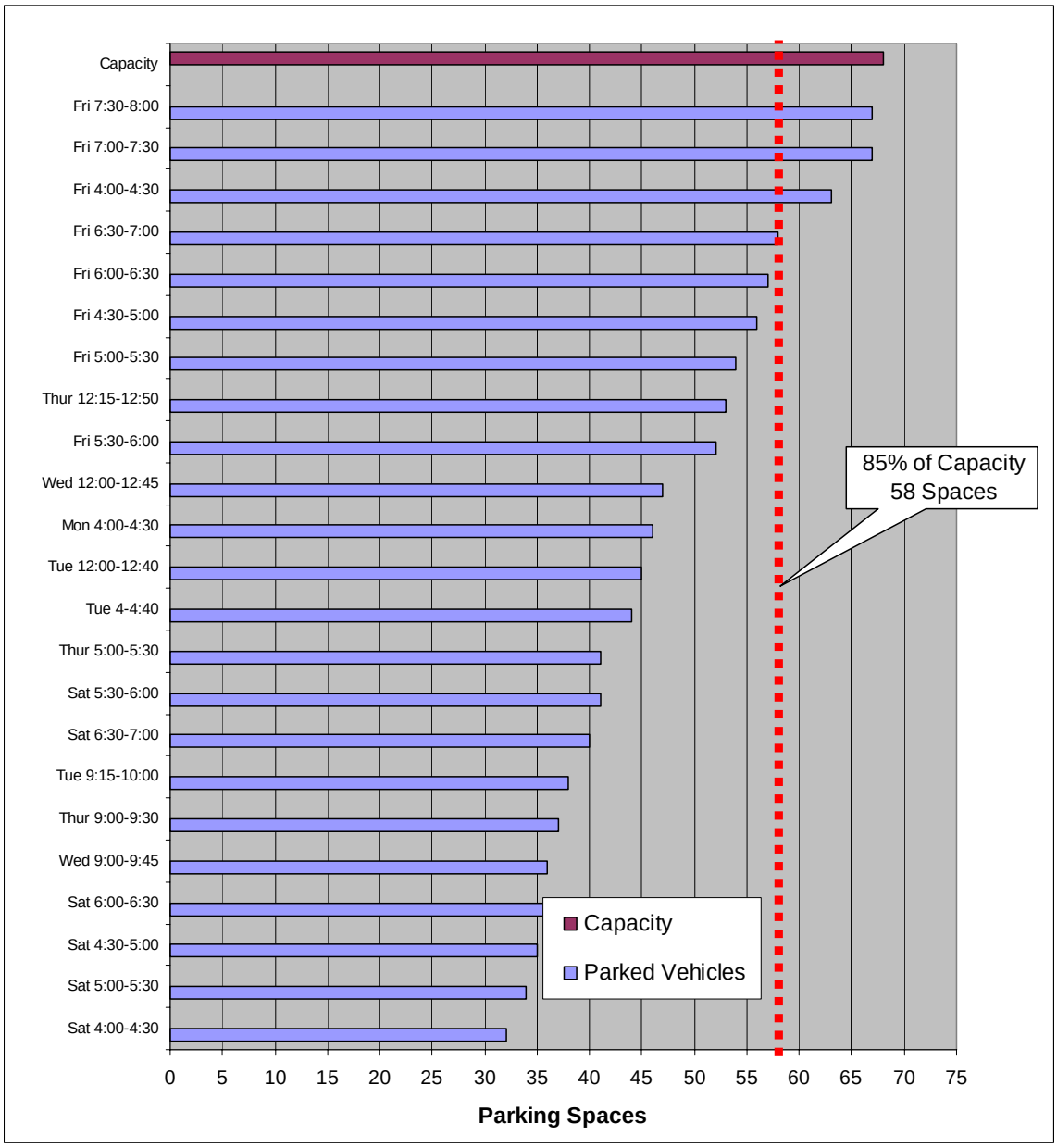


Figure 9: Utilization Ranking of Non-Core Parking Facilities North of US 2

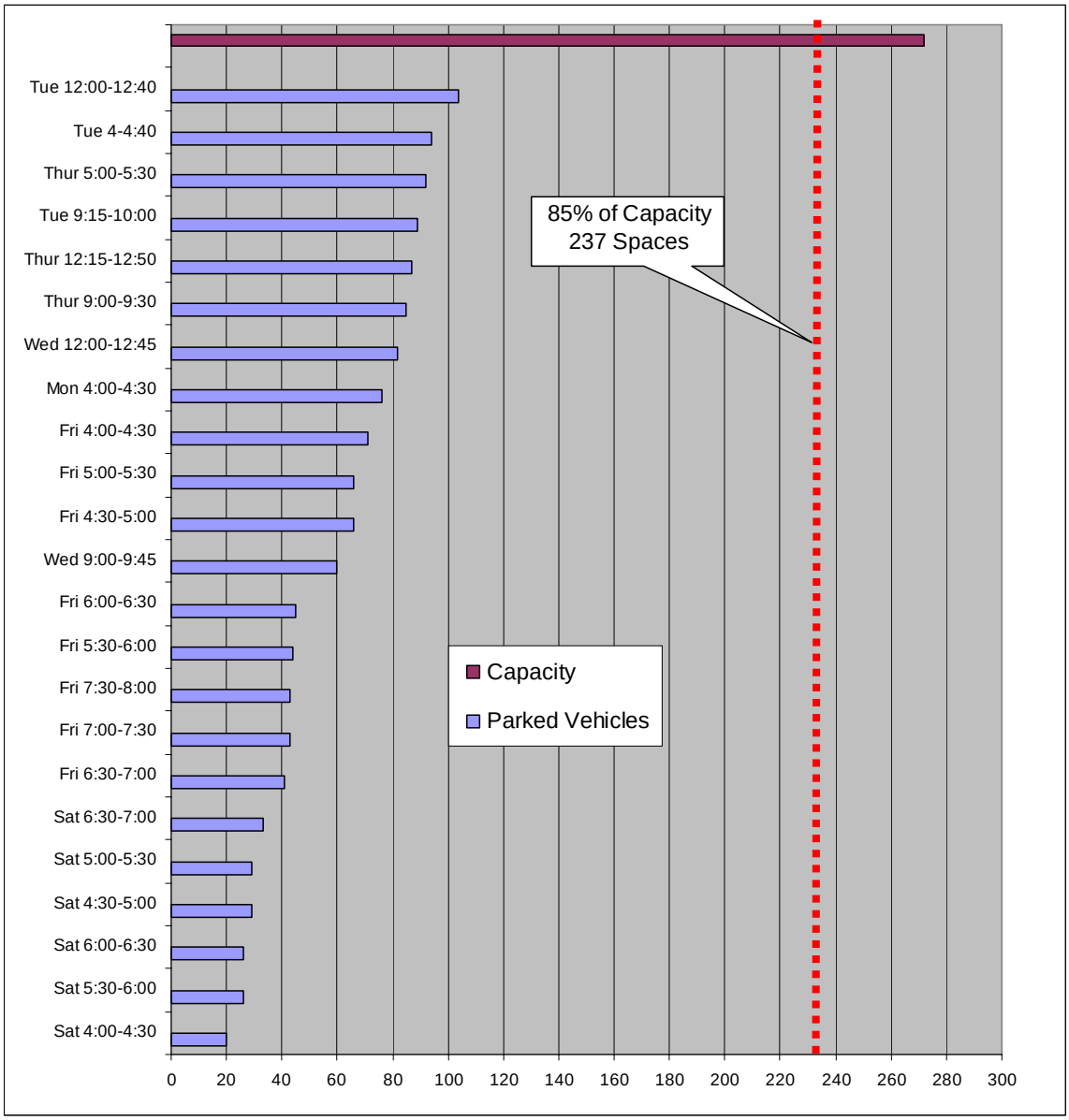
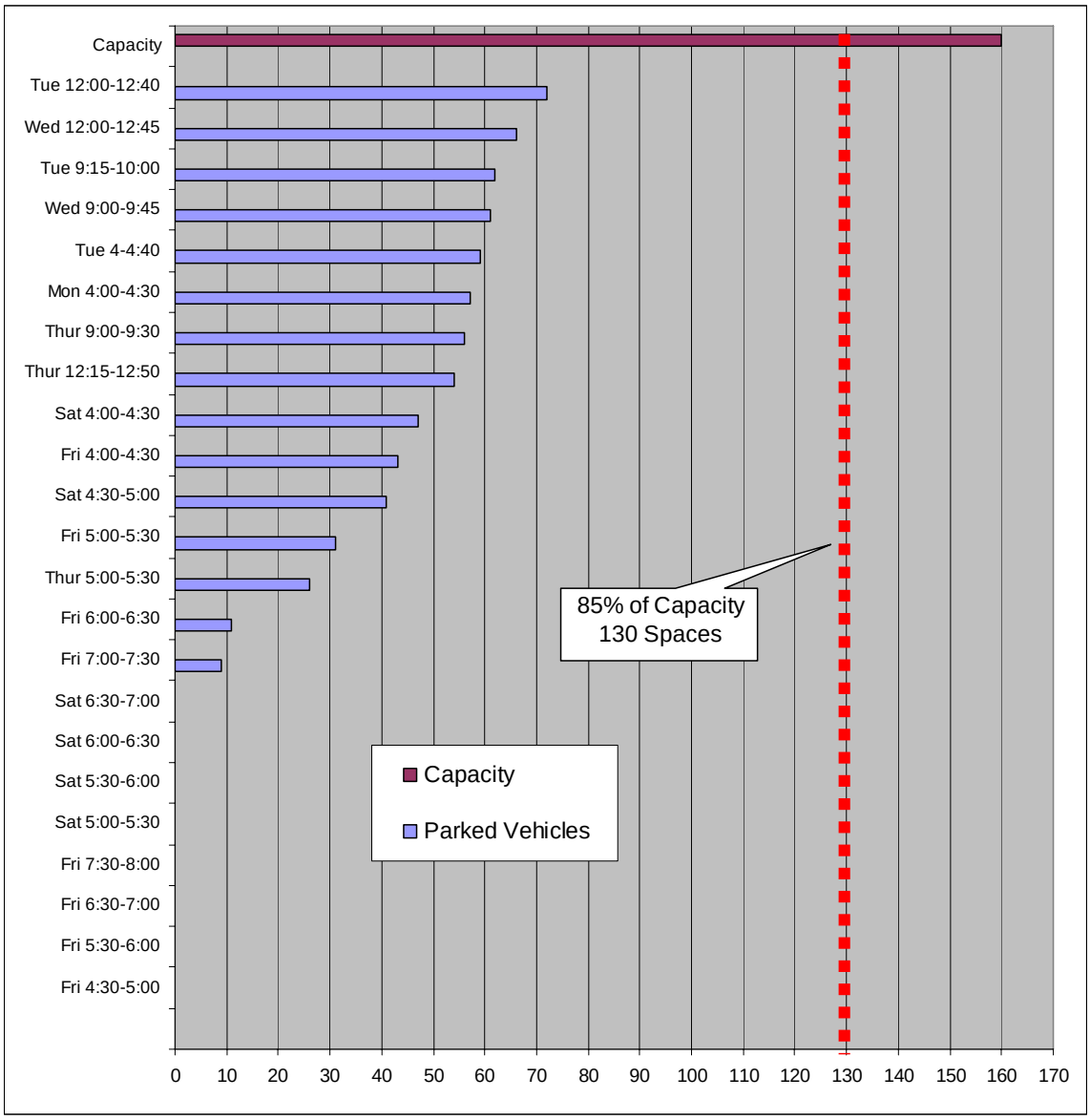


Figure 10: Utilization Ranking of Non-Core Parking Facilities South of US 2



3.4 TURNOVER AND DURATION

The following turnover and duration analyses focus on the parking facilities within the core study zone. The analysis relies on recording the license plates of parked cars which were collected during the Friday and Saturday periods. Because the number of parked cars was low during the Saturday

period, it is not possible to draw any meaningful conclusions from those data. Therefore, the following analysis is limited to the Friday evening time period.

Table 7 shows the percentage of parking spaces in each facility that turned over during each half hour period. It indicates the percentage of spaces that became available from one ½ hour to the next. The percentage is equal to the number of empty spaces plus the number of new cars parked in the facility since the previous ½ hour, all divided by the total number of spaces.

About half of the parking spaces in the core turned over every half hour on Friday evening. Parking spaces that serve the Cumberland Farms convenience store and the Richmond Corner Market have high turnover rates that reflect the quick visits generated by those uses. These high turnover rates ensure that parking spaces are usually available for a steady stream of customers.

The on-street parking along Bridge Street between Depot Street and the railroad tracks (#207) also had a high turn over rate. This result is skewed by the small number of spaces provided. Regardless, it is reasonable to suggest that drivers seeking short-term parking (less than ½ hour), can't find a space in front of the Richmond Commercial Block and therefore park along this section.

The rest of the core parking facilities have turnover rates ranging from the mid-forties to mid-fifties for every half hour. This is a healthy turn over rate and it means that a driver has a good chance of finding a parking space in a prime location.

Table 7: Turn Over Rates for Core Parking Facilities – Friday, December 8, 2006

Ref #	Facility Name	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	Average
100	Cumberland Farms	50%	75%	75%	75%	75%	75%	75%	71%
101	Town Corner Lot	26%	63%	58%	47%	26%	47%	32%	43%
102	Richmond Corner Market lot	60%	80%	80%	80%	80%	60%	60%	71%
107	Banknorth lot	55%	45%	82%	45%	45%	45%	0%	45%
200	Bridge St. Commercial Block on-street	50%	81%	44%	50%	44%	63%	38%	53%
201	Depot Street on-street	0%	50%	50%	83%	50%	50%	17%	43%
202	US 2 on-street in front of Richmond Corner Market	100%	100%	100%	100%	100%	100%	100%	100%
207	Bridge St. on-street in front of Denitist Office	100%	100%	75%	100%	100%	50%	25%	79%
								Weighted average based on number of parking spaces	52%

Parking duration is presented in Table 8 for three parking facilities within the core. Estimating parking duration was constrained by the relatively short data collection period. The duration of vehicles parked at the start of the count could not be verified because it was unknown how long they had been parked. After accounting for the number of non-verifiable vehicles, the three parking facilities listed in Table 8 were the only study locations that generated reasonable numbers of cars within the various duration categories.

About one-half of the parked cars had durations of a half hour or less and about eighty percent of the cars were parked for less than 1 ½ hours. Although this observation is based on only a few locations, it is supported by the turnover analysis presented above. Taken together, these two analyses indicate that durations are relatively short and the turn over rate is relatively high.

Vehicles that were parked for more than two hours are most likely owned by owners and employees from the surrounding businesses. This observation is based on conversations with the owners of the Richmond Corner Market and Toscano's. The owners of Toscano's park adjacent to the building in the Town Corner lot (#101) and occupy a couple of spaces throughout the evening. They ask their employees to park in the informal lot next to Depot Street (#117). An important issue raised by the owner of Toscano's is that their employees do not feel safe walking to cars parked in that location when they leave latter in the evening.

Table 8: Parking Duration - Friday, December 8, 2006 4:00-8:00 p.m.

	Town Corner Lot (#101)		Bridge St. Commercial Block On-Street (#200)		Banknorth Lot (#107)	
Duration	Parked Vehicles	Percent	Parked Vehicles	Percent	Parked Vehicles	Percent
1/2 Hour	18	55%	26	63%	8	50%
1 Hour	5	15%	10	24%	3	19%
1 1/2 Hours	3	9%	2	5%	2	13%
2 Hours	0	0%	0	0%	0	0%
More Than 2 Hours	7	21%	3	7%	3	19%
Duration Verified	33	61%	41	63%	16	41%
Duration not Verified	21	39%	24	37%	23	59%
Total Cars Parked during Count Period	54		65		39	

3.5 COMPARISON TO NATIONAL PARKING DATA

To provide a comparison to the locally collected data, parking demand has been estimated for the core study zone based on rates published by the Institute of Transportation Engineers (ITE) in "Parking Generation 3rd Edition". The published rates have been applied to the size (square feet) of the businesses that depend on the parking facilities in the core. The businesses served by the core parking facilities include Cumberland Farms, Toscano's Restaurant, Richmond Corner Market, Banknorth, and all of the retail establishments, restaurants, and offices located in the Richmond

Commercial Block along Bridge Street. Appendix C lists the specific businesses, their sizes, and the various rates used in the analysis.

Two different approaches were used to estimate the peak demand and the hourly distribution of parking for the core businesses. One method estimated the demand by applying rates specific to each business. "Parking Generation" includes data for most of the uses. However, the ITE rates are often based on much larger establishments making their application in Richmond village less reliable. In addition, the parking generation rates are based on stand alone businesses located on individual parcels.

In the other method, all of the businesses in the core are assumed to be one shopping center. When all of the uses are combined together, there is approximately 26,000 square feet of retail, service, and office space in the core.

As shown in Table 9, the core's peak hours corresponds with those of a shopping center. Figure 10 shows a second peak occurring in the core during the lunch hour based on the ITE shopping center rates. The second peak during the lunch hour was also observed in the core based on local data. The shopping center rate also accounts for shared parking, an important efficiency benefit inherent within a mixed use center such as Richmond village. Different land uses have different periods of peak parking demand. Since uses such as offices and restaurants peak at different times of the day, they can share some of the same spaces. In addition, the mix of different land uses in close proximity connected by a safe and pleasant sidewalk system allows patrons to access multiple destinations from one parking space.

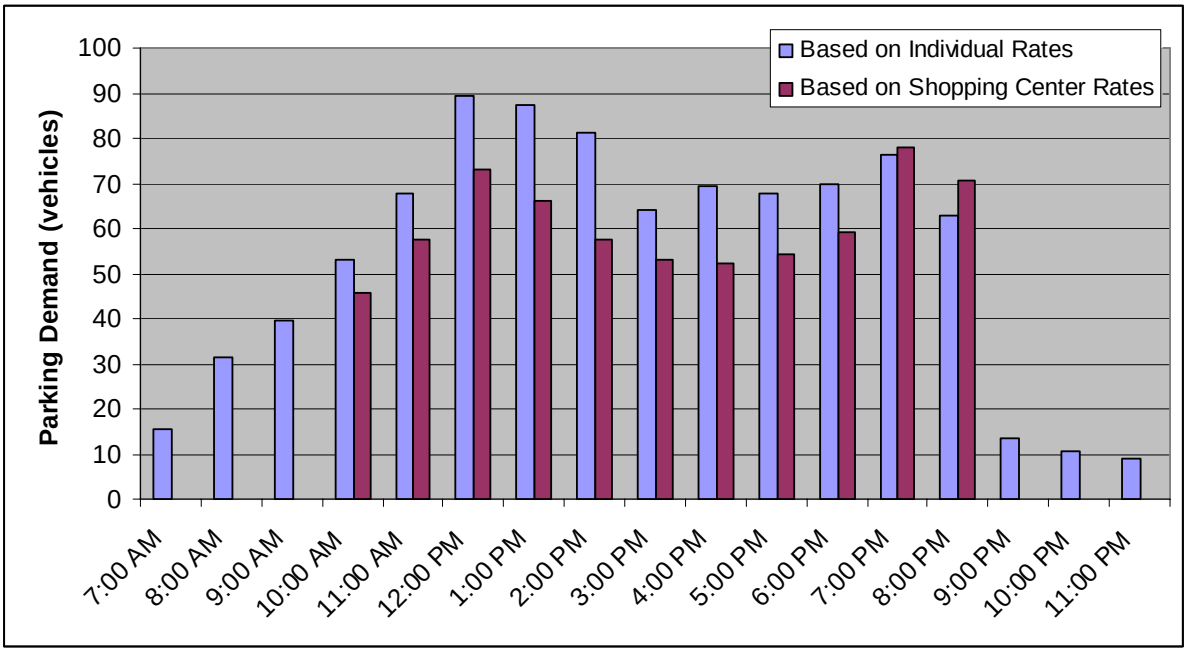
Given that the peaks align with those observed locally, and that the businesses share many of the same parking facilities, it is reasonable to compare the parking demand in the village core to a shopping center.

The peak demand observed in the field of 67 parked cars is less than, but reasonably close to, the peak demand of 78 based on the ITE shopping center rate. There are a total of 68 parking spaces in the core. As noted above, it is good practice to maintain an occupancy of 85%, which translates into a demand of 58 parked cars. The 85% target is exceeded based on local data and the ITE rate.

Table 9: Comparison of ITE and Local Data for Core

Method	Peak Hour		Peak Demand (Parked Vehicles)	
	ITE	Local Data	ITE	Local Data
Based on Individual Rates	12:00-1:00 p.m.	7:00-8:00 p.m.	90	67
Based on Shopping Center Rates	7:00-8:00 p.m.		78	

Figure 11: Hourly Variation of Parking Demand in Core Based on ITE Rates



3.6 ANALYSIS SUMMARY

The study area contains almost 500 parking spaces. About 88% of the parking spaces are located in off-street surface lots with the balance located on-street. Forty percent of the parking spaces are available for general public use. All of the on-street parking spaces are available for general public use. The majority of off-street parking spaces are available only to the patrons, visitors, employees, or residents of the buildings served by the lots.

Based on the data collection, the peak parking period for the entire study area occurred more frequently during the lunch hour. Saturday evening had the lowest parking demand.

Parking demand during the lunch hour is distributed over the entire study area. As a result, there is less demand placed on any one specific off-street lot or block of on-street spaces. During the weekday lunch hour, drivers arriving in the core area of the village have multiple options for parking their cars.

To develop a better understanding of potential deficiencies, the parking facilities have been organized into the core zone, centered along Bridge Street between Pleasant Street and US 2, the non-core zone north of US 2, and the non-core zone south of US 2.

The non-core north zone contains 160 spaces and the non-core south zone contains 272 spaces. The number of parking spaces in both non-core zones far exceeded demand during all of the data

collection periods. During the data collection peak hours, the parking occupancy was 45% and 38% for the non-core north and south core zones respectively. However, both zones are subjected to spikes in demand due to the special land uses they contain (churches, municipal offices, recreation field, etc) which were not captured during data collection. Although there is excess capacity during a typical weekday, the additional spaces provide an important reserve to accommodate demand generated by the special land uses.

The core zone contains 68 parking spaces and most of these are owned by the Town or State of Vermont (along US 2) and are available for general public use. One important exception is the Banknorth lot. Although parking is officially restricted to customers and employees, the Banknorth lot is used by the general public, particularly in the evening.

Peak parking demand in the core occurs during Friday evenings. Between 4:00 and 8:00 p.m. on Friday, parking spaces in the core were almost 100% occupied for an hour and the 85% threshold was exceeded for two of the four hours data were collected.

Peak parking demand for businesses that rely on the parking spaces in the core was verified using rates published by the Institute of Transportation Engineers. Based on the ITE rates, the peak parking demand is 78 vehicles, which is comparable to the peak demand of 67 spaces observed in the field. Both exceed the 85% threshold of 58 spaces available in the core.

The high percentage of occupancy is mitigated to some degree by a high turn over rate within the core parking facilities. Overall, about 50% of the parking spaces in the core turned over every ½ hour during the Friday evening count. About one-half of the parked cars had durations of a half hour or less and about eighty percent of the cars were parked for less than 1 ½ hours.

Vehicles that were parked for more than two hours are most likely owned by owners and employees from the surrounding businesses. Although parking spaces are available in the informal lot on Depot Street, employees do not feel safe walking to cars parked in that location when they leave latter in the evening.