

TECHNICAL REPORT

**UNIVERSITY DISTRICT
ON-STREET PARKING STUDY**

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For the
Seattle Department of Transportation

FEBRUARY 16, 2011

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1. Introduction

This report presents the findings of a parking study conducted in October 2010 in the University District. The purpose was to evaluate parking characteristics in areas where signed parking restrictions or unrestricted parking exists. The resulting data and analysis will help the Seattle Department of Transportation (SDOT) to understand current parking conditions and determine if changes in parking management are needed.

2. Study Methodology

Data Collection

The study was divided into two distinct areas as shown in Figure 1 and Figure 2. The parking inventory is also shown on these figures. These are referred to as the "North Study Area" and the "South Study Area" due to the distance separating blockfaces in the north and south, as well as the different nature and use of each area. The south study area includes the Boat Street Triangle, which includes spaces along the south blockface of NE Boat West Roadway (WR) Street and public parking in the triangular area on the north side of NE Boat WR Street.

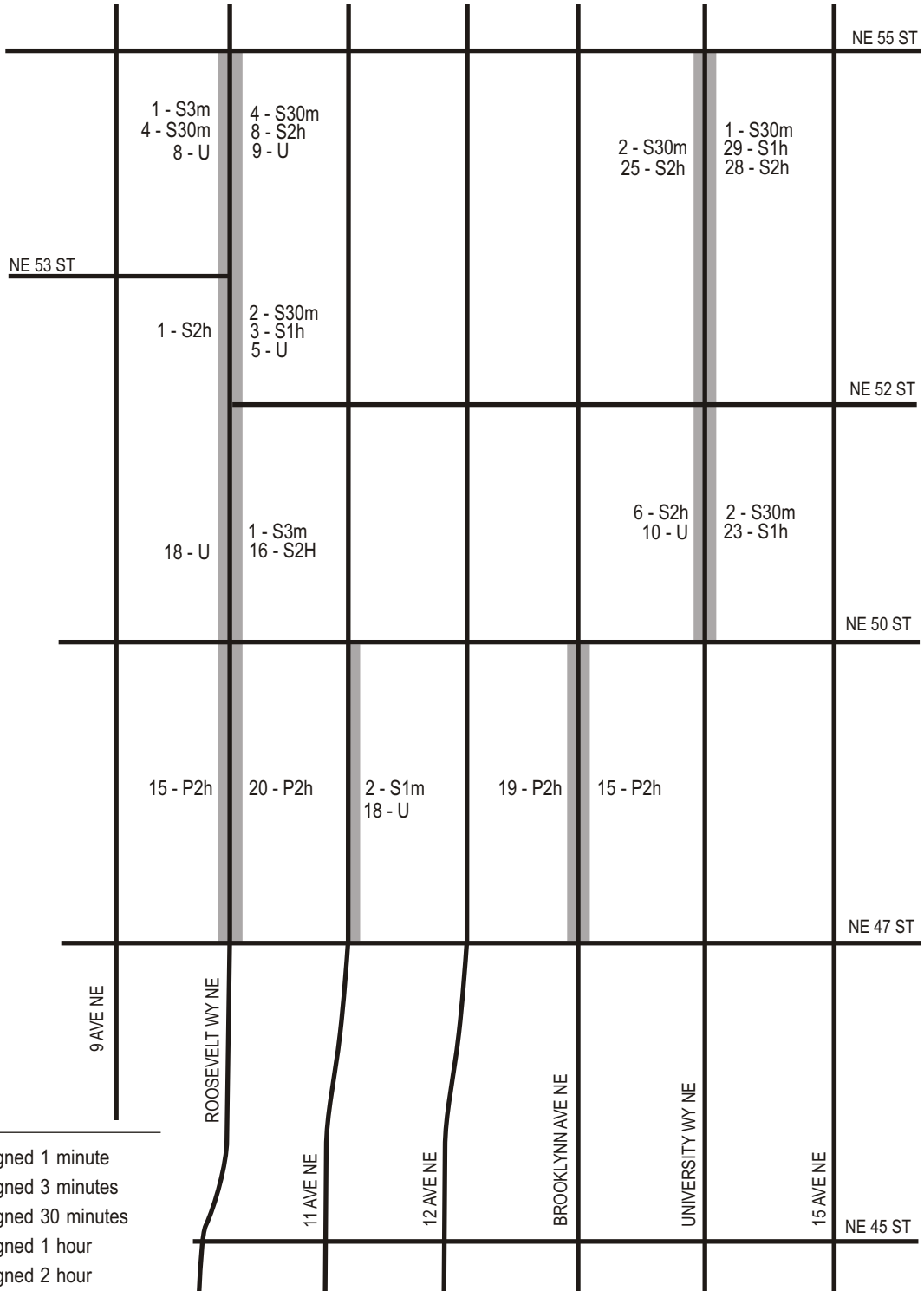
Parking data were collected from 10:00 AM to 8:00 PM on Tuesday, October 26, 2010. Parking activity was recorded in one-hour intervals by Operations Management Group (OMG), Ltd. using hand-held electronic data collection tools. A sequence number was assigned to every parking space within each street segment to ensure consistent data collection. The inventory and sequence numbers included all parking spaces by type, and other curb spaces such as bus zones, hydrants, and driveways where parking is not allowed. In addition to recording vehicles parked in legally-designated spaces, surveyors recorded "squeeze-in" vehicles on each street segment, which represent motorists who created their own space between other vehicles, at the end of the block, or in no-parking zones. These vehicles are included in the survey to reflect the total demand for parking. SDOT staff collected additional parking occupancy data at 5:00 AM on Wednesday, October 27 in the south study area on blockfaces with unrestricted parking.

This study analyzes three parking indicators:

Utilization – Percentage of legal parking spaces occupied by a vehicle. Utilization rates above 100% can occur when vehicles park in illegal spaces or squeeze into marginal areas such as those near intersections, fire hydrants or driveways. Utilization for spaces with time limits of 30-minutes or less could reflect a lower than actual rate because parking occupancy was surveyed at one-hour intervals, and some cars may have parked and left between each survey.

Duration – Length of time that a vehicle occupied a space.

Compliance – Percentage of vehicles that parked within the established time limits. For example, cars that parked for two hours or less in a signed two-hour zone. Parking restrictions are not in effect after 6:00 PM on weekdays and Saturdays or all day on Sunday. Therefore, compliance with a two-hour time limit was only determined for cars that parked until 4:00 PM. Cars that parked after 4:00 PM would be compliant with the posted time limit even if they parked for longer than two hours.



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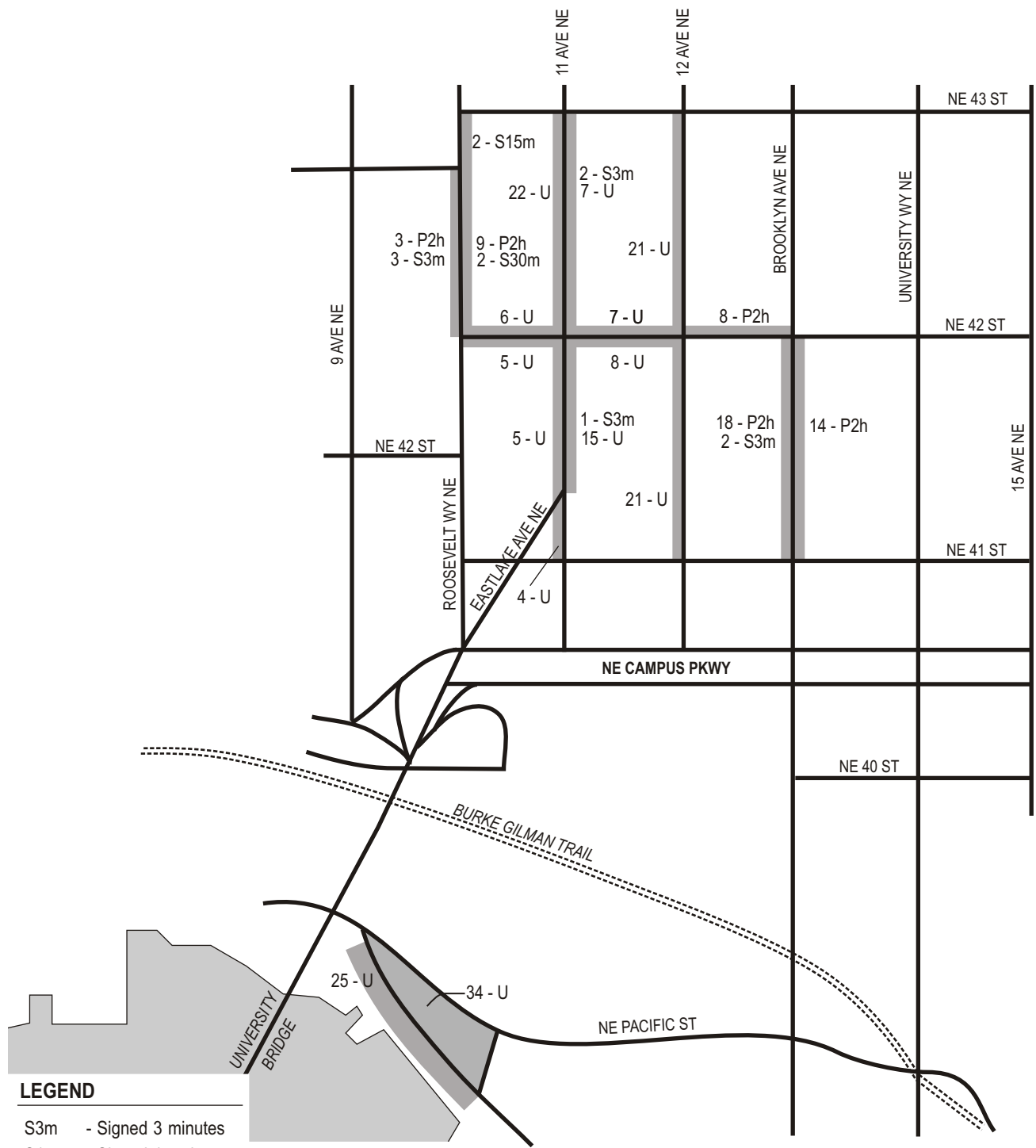
- S1m - Signed 1 minute
- S3m - Signed 3 minutes
- S30m - Signed 30 minutes
- S1h - Signed 1 hour
- S2h - Signed 2 hour
- P2h - Pay Station 2 hour
- U - Unrestricted

Study Block Face

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Figure 1
Parking Inventory
North Study Area





LEGEND

- S3m - Signed 3 minutes
- S15m - Signed 15 minutes
- S30m - Signed 30 minutes
- P2h - Pay Station 2 hour
- U - Unrestricted

Study Block Face

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Figure 2
Parking Inventory
South Study Area



Parking Capacity

Practical capacity of on-street parking is typically defined at 85% utilization. At utilization rates lower than 85%, the next arriving visitor is usually able to find a convenient parking space. When occupancy exceeds practical capacity, drivers experience delays and frustration while searching for a parking space. Circling the block in search of a parking space also contributes to area traffic congestion and vehicle emissions. Practical capacity is used to determine the adequacy of a parking system. SDOT generally considers utilization rates of 75% to be the threshold where additional parking management techniques should be explored. That way measures can be put in place before parking reaches capacity. In business districts like the University District, SDOT uses parking management measures to prioritize transit, short-term customer parking, and loading needs, over long-term commuter parking. In mixed-use neighborhoods, SDOT also considers residential parking needs.

3. Overall Inventory, Utilization, and Compliance

Table 1 summarizes the weekday average utilization before and after 6:00 PM on a weekday, peak utilization before 6:00 PM, and compliance for one-hour, two-hour, and unrestricted spaces. In addition to the inventory shown in Table 1, there were two one-minute signed spaces, two three-minute signed spaces, and fifteen 30-minute spaces in the north study area. In the south study area there were eight three-minute spaces, two 15-minute spaces, and two 30-minute spaces. The average utilization of these spaces was from 14% to 38% before 6:00 P.M. based on the number of times a car was seen in a space with a one-hour survey interval. These spaces typically show lower utilization because they are used only for drop off and pick up. Compliance ranged from 75% to 100%.

Table 1. Weekday Parking Utilization and Compliance

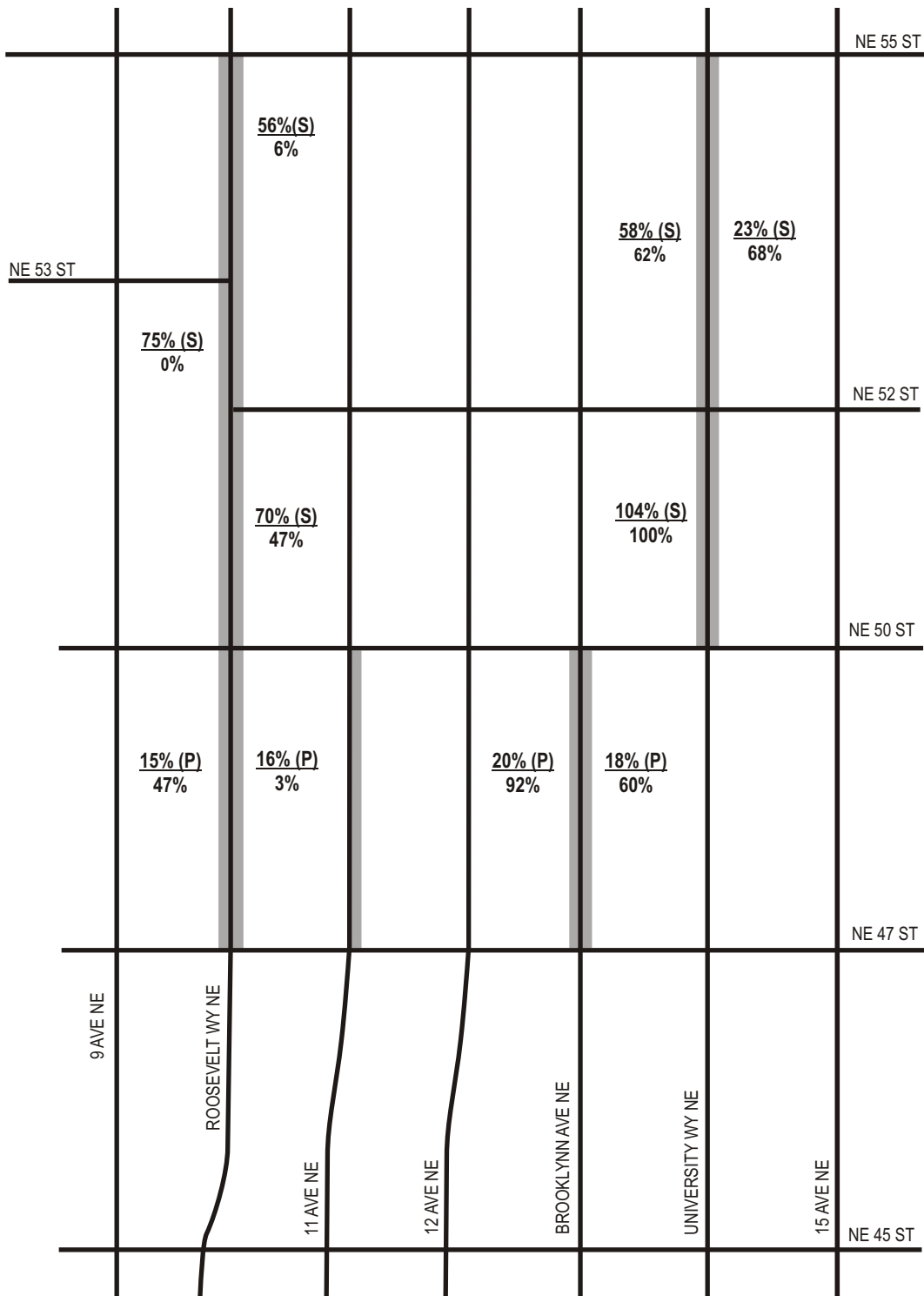
AREA	Inventory		Average Utilization (10/26/2010)		Peak Utilization (before 6:00 P.M.)		Compliance		
	Time Limit	Type	Number Spaces	Before 6:00 PM	After 6:00 PM	Peak Hour	% Utilized	# of Parked Cars	% in Compliance
NORTH									
One-hour	Signed	55	50%	74%	5:00 P.M.	75%	203	76%	
Two-hour	Signed	84	52%	58%	3:00 P.M.	60%	260	97%	
	Pay Station	69	17%	49%	4:00 P.M.	28%	125	91%	
none	Unrestricted	68	86%	67%	2:00 P.M.	94%		n/a	
SOUTH									
One-hour	Signed	0	--	--	--	--	--	--	
Two-hour	Signed	0	--	--	--	--	--	--	
	Pay Station	52	58%	101%	5:00 P.M.	83%	208	84%	
none	Unrestricted	121	111%	105%	2:00 P.M. ^a	112%		n/a	
BOAT STREET TRIANGLE									
Two-hour	Signed	59	90%	(b)	11:00 A.M.	108%	148	62%	
TOTAL ALL AREAS		539	68%	68%			949	76%	

(a) Peak utilization of 112% occurred from 10:00 A.M. to 2:00 P.M.

(b) Parking data were not collected after 6:00 PM. Observations were that the Boat Street Triangle was nearly vacant after 6:00 PM.


n/a There is no parking restriction; therefore, all vehicles would be in compliance.

Figure 3 and Figure 4 show utilization by blockface for two-hour signed and pay station parking spaces in the north and south study areas, respectively. The utilization is shown before 6:00 PM and after 6:00 PM when restrictions are no longer in effect. Figure 5 and Figure 6 show the parking utilization by blockface for unrestricted parking spaces in the north and south study areas, respectively. Figure 6 also shows 5:00 AM, which typically represents residential parking demand.



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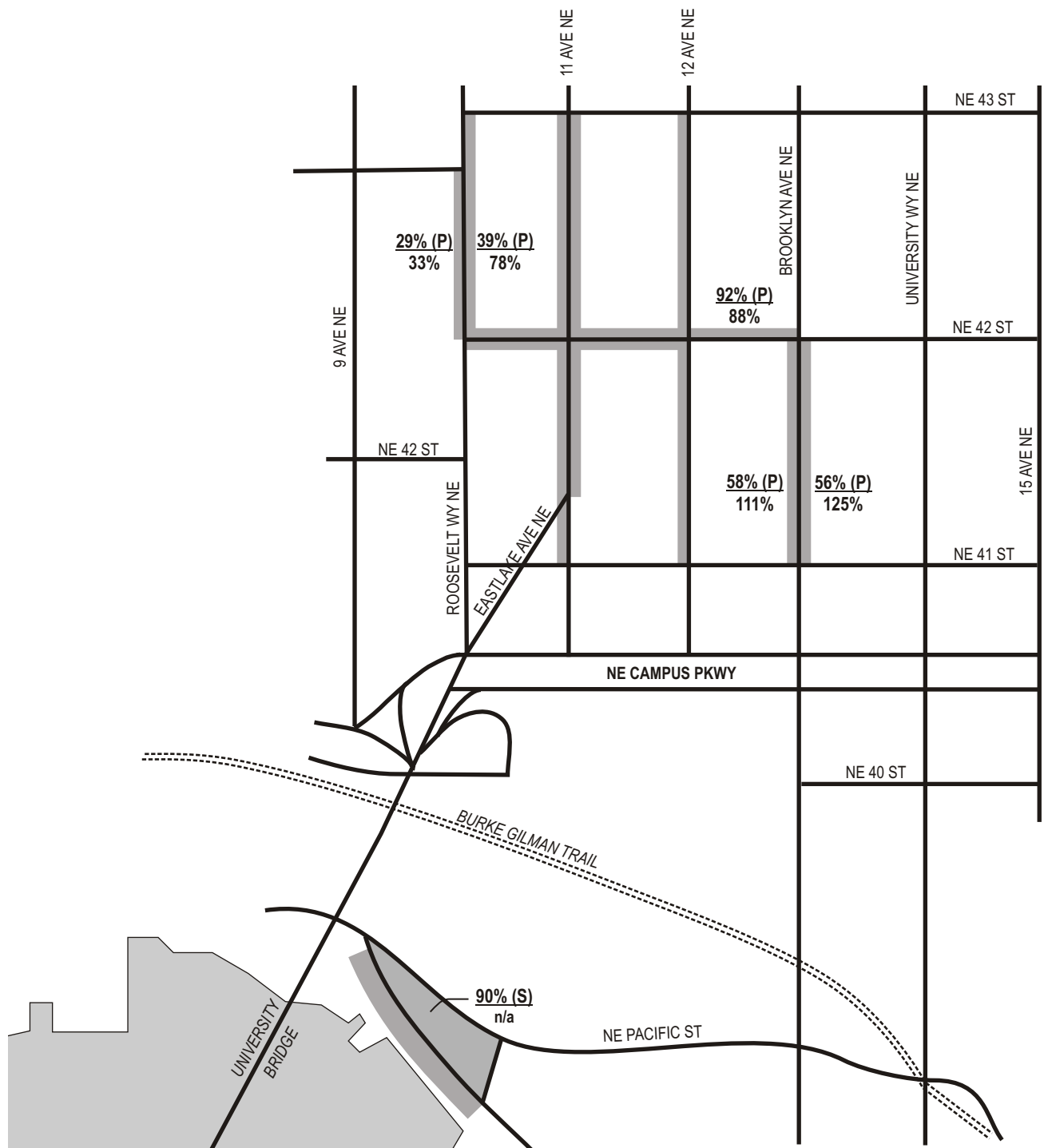
Before 6:00 PM - XX% (S)= Signed (P) = Pay Station
After 6:00 PM - XX%

 Study Block Face

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Figure 3
Average Parking Utilization
Two-Hour Spaces
North Study Area





LEGEND

Before 6:00 PM - XX% (S)= Signed (P) = Pay Station

After 6:00 PM - XX%

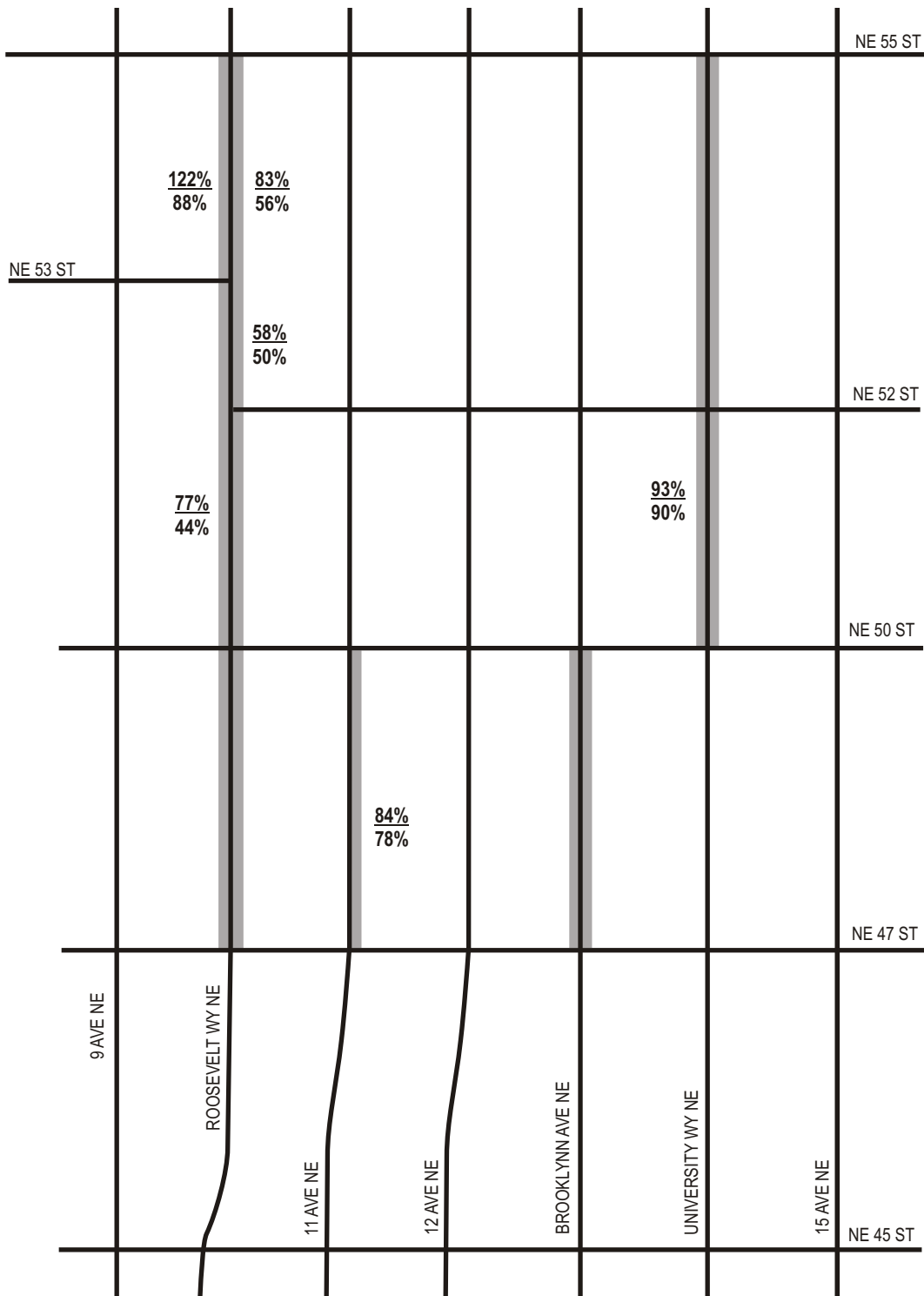
n/a = Not Available

Study Block Face

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Figure 4
Average Parking Utilization
Two-Hour Spaces
South Study Area





LEGEND

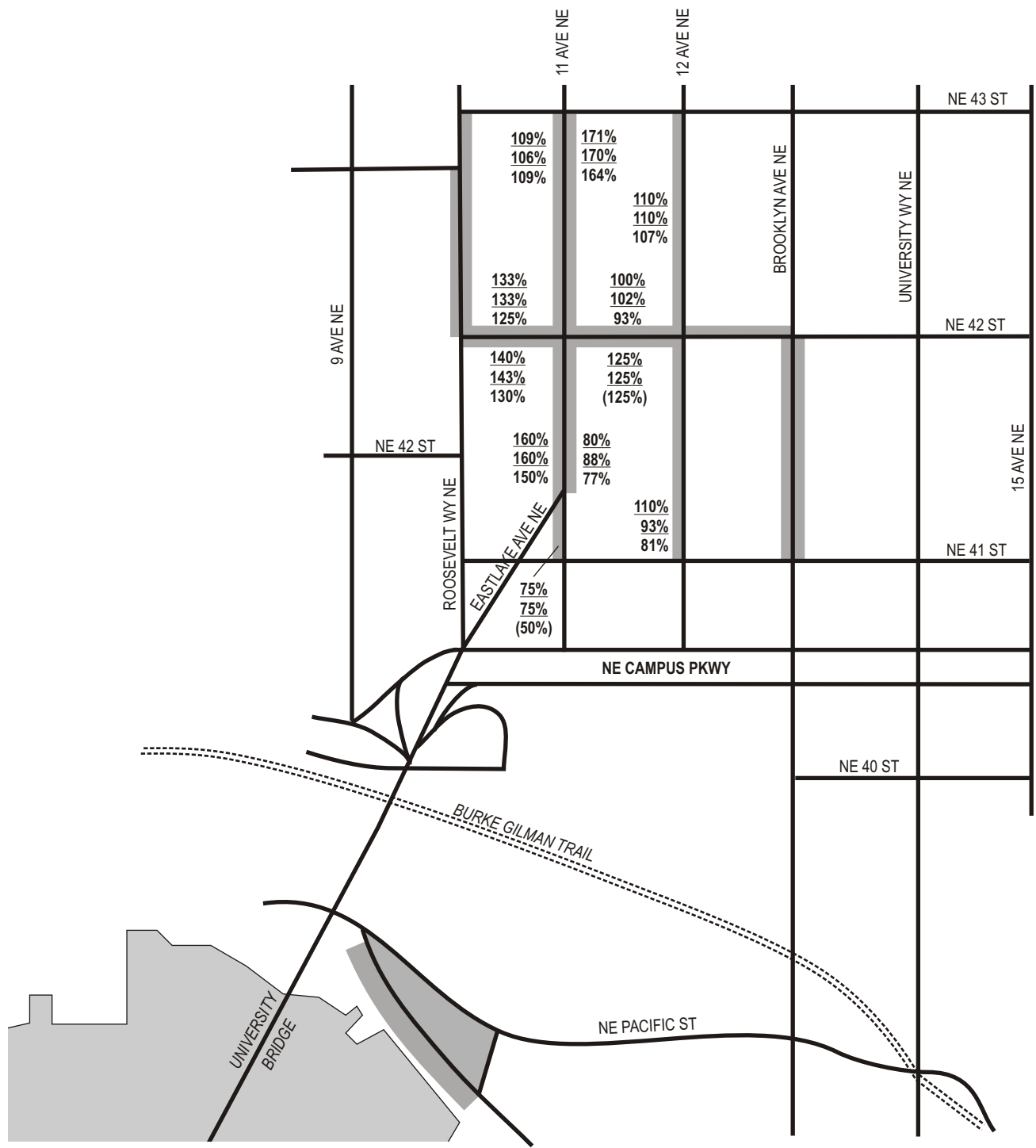
Before 6:00 PM - XX%
After 6:00 PM - XX%

 Study Block Face

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Figure 5
Average Parking Utilization
Unrestricted Spaces
North Study Area





LEGEND

- 5:00 AM - XX%
- Before 6:00 PM - XX%
- After 6:00 PM - XX%
- Study Block Face

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Figure 6
Average Parking Utilization
Unrestricted Spaces
South Study Area



4. North Study Area Findings

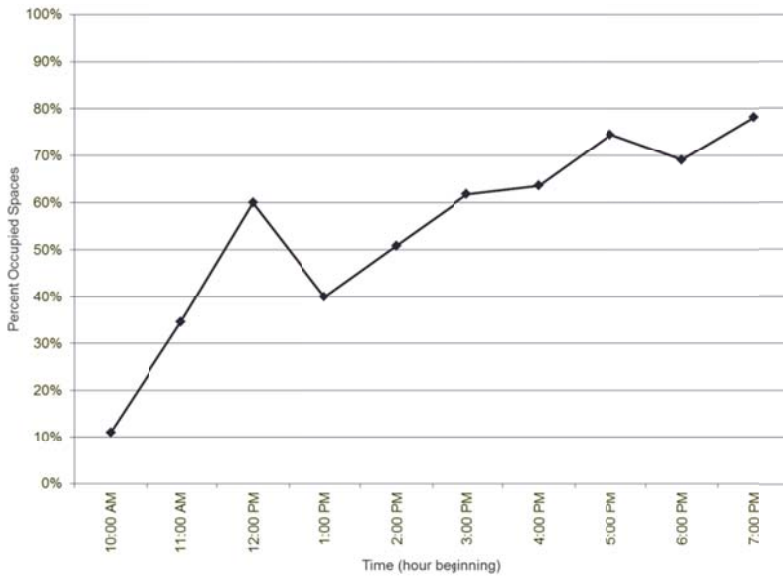


One-Hour Signed Parking

Figure 7 shows utilization of signed one-hour spaces from 10:00 AM to 8:00 PM. There are 55 signed one-hour parking spaces in the north study area, located primarily on University Way north of NE 50th Street. The signed parking restriction is in effect until 6:00 PM, after which point utilization generally increases.

Figure 8 shows duration for vehicles parked in one-hour time-limited spaces; 76% parked for one hour or less when the time limit was in effect.

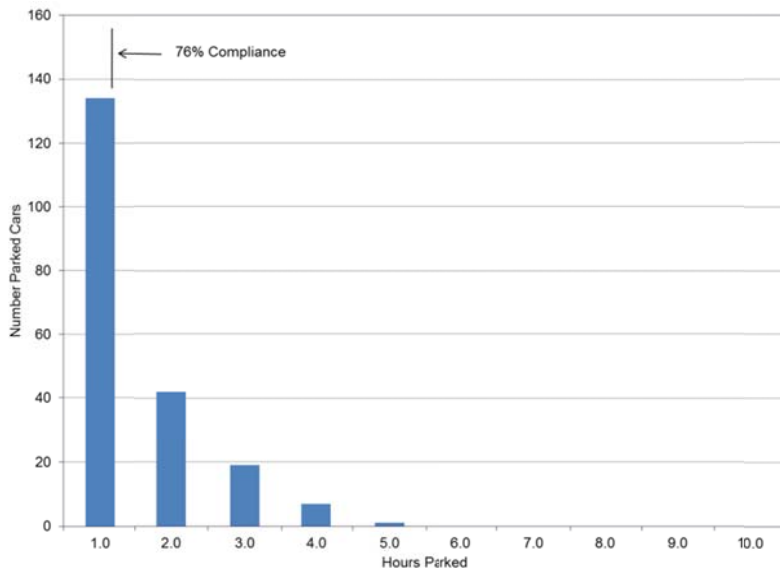
Figure 7. Utilization of One-Hour Signed Parking Spaces – North Study Area



Key Findings

- Average utilization was 50% on a weekday before 6:00 PM, 74% after 6:00 PM
- Peak utilization was 60% at noon, while the time limit was in effect; evening utilization peaked at nearly 80%
- Compliance rate was 76% on a weekday when time limit was in effect
- Average duration was 1.52 hours

Figure 8. Parking Duration of One-Hour Parking – North Study Area





Two-Hour Signed and Paid Parking

Figure 9 shows parking utilization for both two-hour parking at time limited (signed) and two-hour pay station parking spaces. The signed spaces (no payment required) show a higher utilization than the paid spaces. The utilization of two-hour parking spaces after 6:00 PM was 58% for signed spaces and 49% for pay stations.

Table 1 shows the compliance rates for cars parked at two-hour pay stations and two-hour signed spaces in the north study area. Parking restrictions are **not** in effect after 6:00 PM on weekdays. Cars parked at 4:00 P.M. that stayed past 6:00 P.M. were counted as compliant. Figure 10 shows the parking duration. There were 36 parked cars at 10:00 AM. These vehicles were not included in this calculation because the duration of a parked car is unknown before 10:00 AM.

Figure 9. Utilization of Two-Hour Spaces – North Study Area

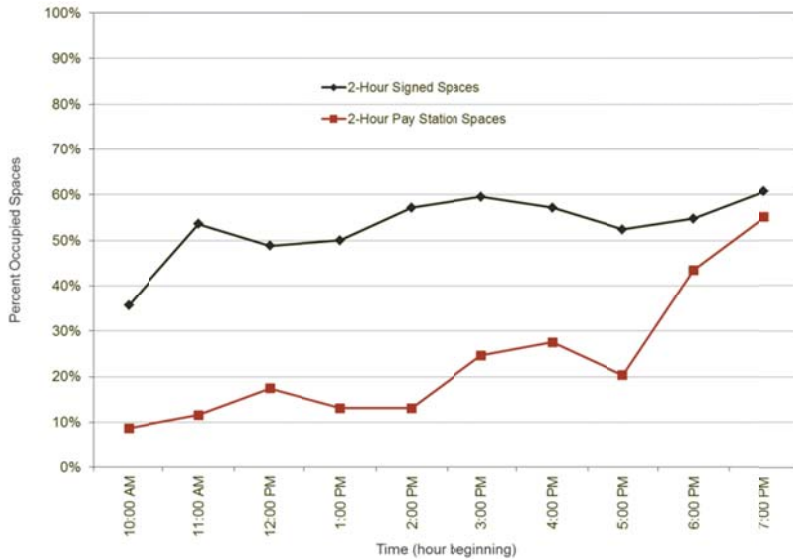
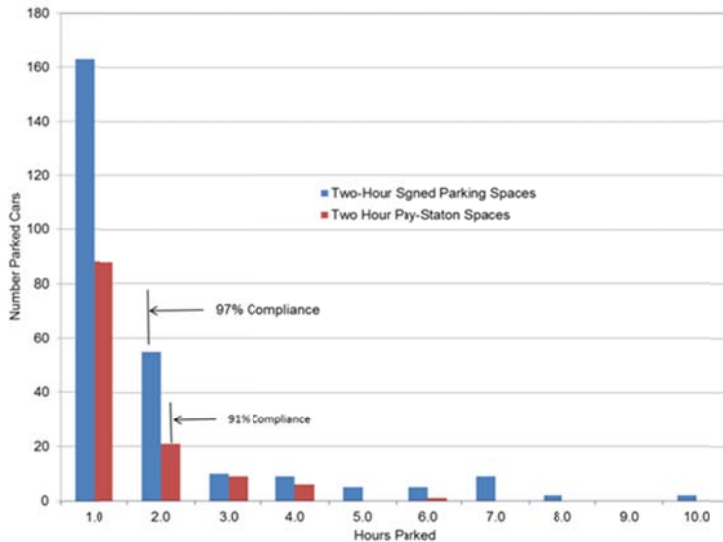


Figure 10. Parking Duration of Two-Hour Parking – North Study Area



Key Findings

2-hr time limit

- Average utilization was 52% on a weekday before 6:00 PM, 58% after 6:00 PM
- Peak utilization was 60% at 2:00 PM, while the time limit was in effect, and 61% in the evening
- Compliance rate was 97% for signed spaces when time limit was in effect
- Average duration was 2.02 hours.

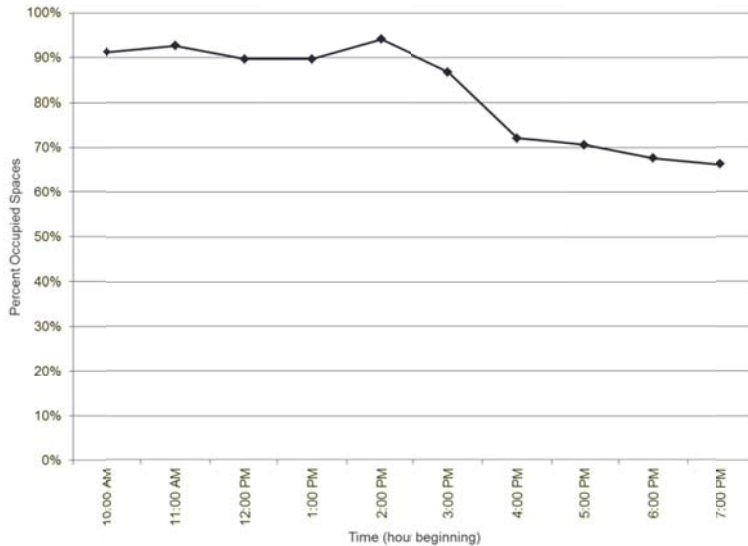
2-hr paid

- Average utilization was 17% on a weekday before 6:00 PM, 49% after 6:00 PM
- Peak utilization was 28% at 4:00 PM, while the time limit was in effect, and 61% in the evening
- Compliance rate was 91% for pay-station spaces when the restriction was in effect
- Average duration was 1.52 hours

Unrestricted Parking

Figure 11 shows parking utilization for unrestricted parking spaces in the north study area. Parking utilization falls after 6:00 PM. Unrestricted parking has no time limit, and so all vehicles would be compliant. However, duration was evaluated to show how the existing parking is used. Figure 12 shows parking duration for unrestricted parking in the north study area.

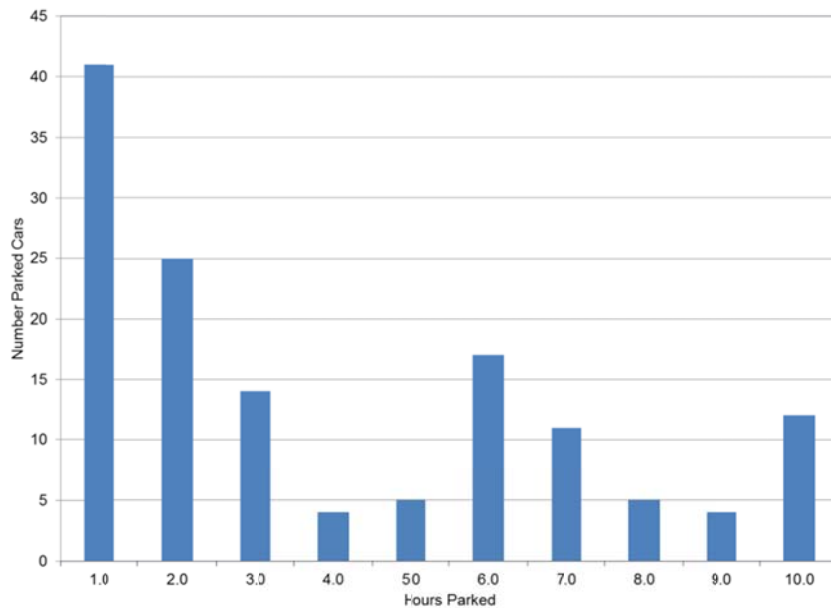
Figure 11. Utilization of Unrestricted Spaces – North Study Area



Key Findings

- Average utilization was 86% on a weekday before 6:00 PM, 67% after 6:00 PM
- Peak utilization was 94% at 2:00 PM
- Average duration was over 5 hours
- 48% parked for two hours or less
- About 42% of all vehicles parked for four or more hours

Figure 12. Parking Duration of Unrestricted Parking – North Study Area



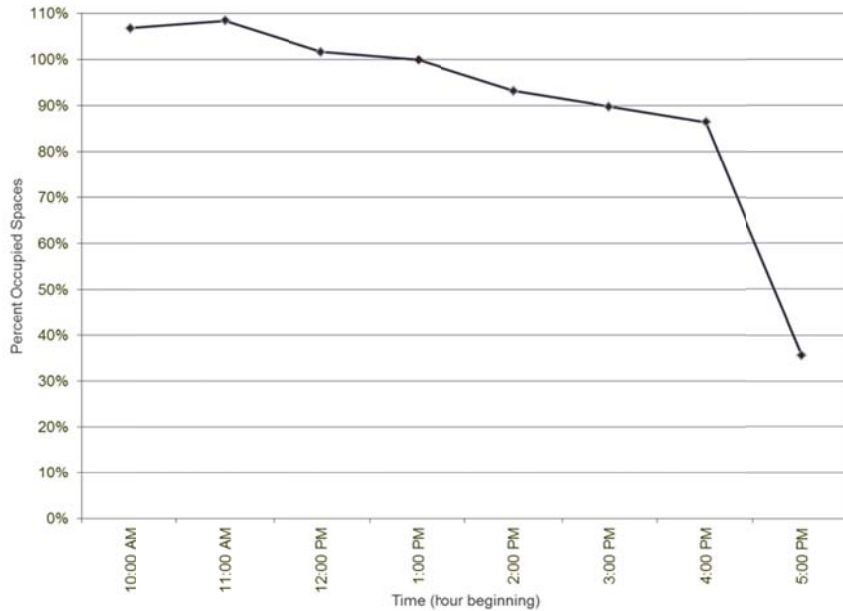
5. South Study Area Findings



Two-Hour Signed Parking – Boat Street Triangle

Figure 13 shows parking utilization for two-hour signed parking spaces in the Boat Street Triangle. The Boat Street Triangle has approximately 59 parking spaces within the triangle and on the blockface along the Boat Street West Roadway. Public parking in the Boat Street Triangle is un-striped and lacks curb definition. Parking data were not collected after 6:00 PM because observations indicated that the parking utilization dropped significantly after 4:00 PM. Figure 14 shows the parking duration in this area.

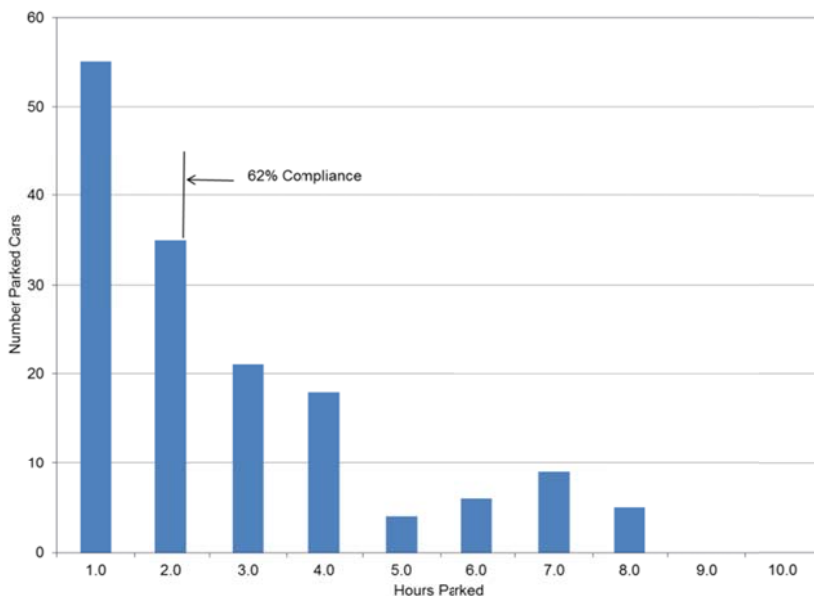
Figure 13. Utilization of Two-Hour Signed Parking Spaces – Boat Street Triangle



Key Findings

- Average utilization was 90% on a weekday before 6:00 PM
- Peak utilization was 108% at 11:00 AM
- The Boat Street Triangle was nearly empty at 6:00 PM
- Compliance rate was 62% when the time limit was in effect
- Average duration was 3.92 hours

Figure 14. Parking Duration of Two-Hour Signed Parking – Boat Street Triangle



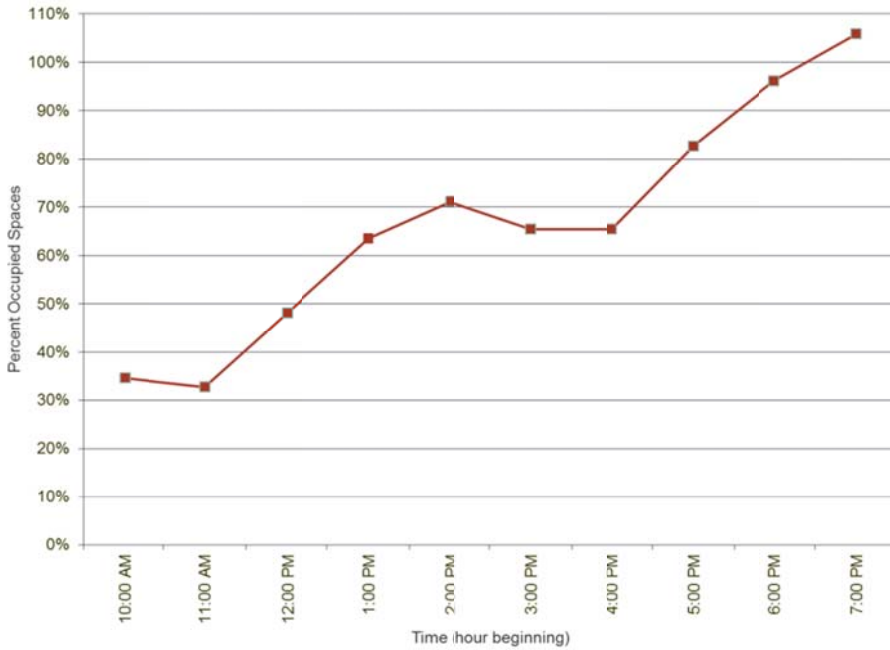


Two-Hour Pay-Station Parking

Figure 15 shows parking utilization for two-hour pay-station spaces in the south study area. All of the signed two-hour spaces in the south study area are located in the Boat Street Triangle, and the results for that area are presented separately below.

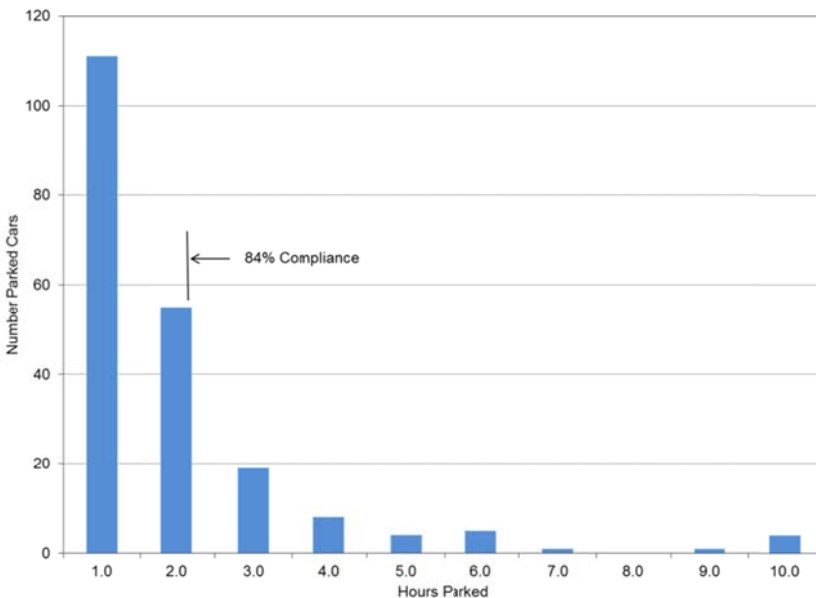
Figure 16 shows parking duration for two-hour pay station parking in the south study area. Twenty-five cars were parked at 10:00 A.M. These cars were not included in the calculation because if the car arrived before 10:00 A.M. the duration is unknown.

Figure 15. Utilization of Two-Hour Pay Station Spaces – South Study Area



- Key Findings**
- Average utilization was 58% on a weekday before 6:00 PM, 101% after 6:00 PM
 - Peak utilization was 71% at 2:00 PM, while the time limit was in effect, and reached 106% in the evening
 - Compliance rate was 84% on a weekday when the restrictions were in effect
 - Average duration was 2.14 hours

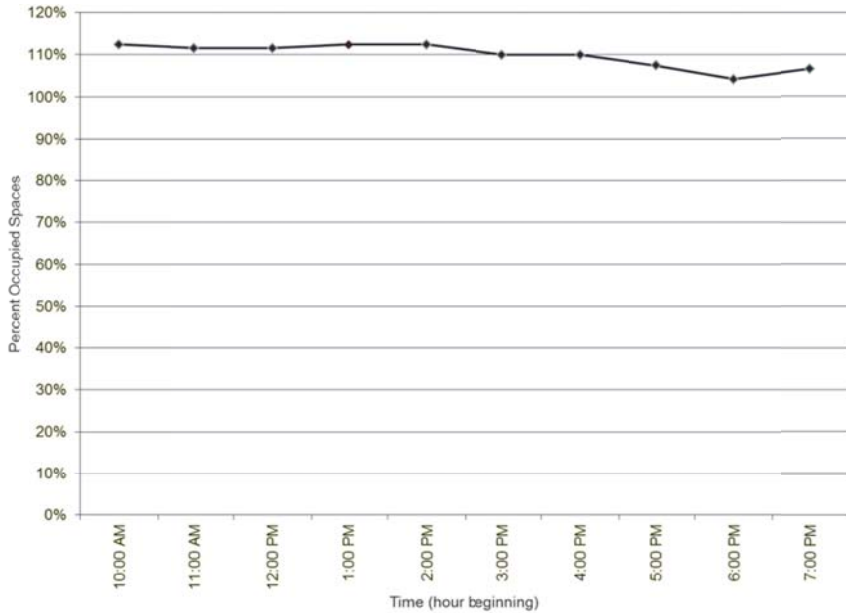
Figure 16. Parking Duration of Two-Hour Pay Station Parking – South Study Area



Unrestricted Parking

Figure 17 shows parking utilization for unrestricted parking spaces in the south study area. Parking utilization exceeded the supply for the entire survey period. Unrestricted parking has no time limit; therefore, all vehicles would be compliant. However, the parking duration for the unrestricted spaces was determined to show how the existing parking is used. Figure 18 shows parking duration for unrestricted parking in the south study area. There were 136 cars parked for all ten hours of the survey. These cars were likely parked for more than 10 hours.

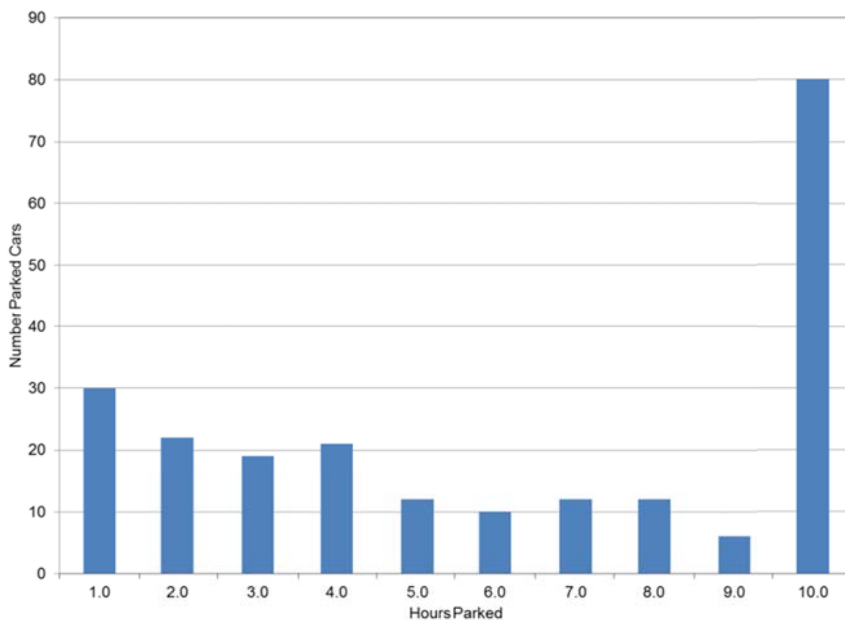
Figure 17. Utilization of Unrestricted Spaces - South Study Area



Key Findings

- Average utilization was 111% on a weekday before 6:00 PM, 105% after 6:00 PM
- Peak utilization was 112% from 10:00 AM to 2:00 PM
- Average duration was over six hours
- 35% of cars parked for 10 hours or more

Figure 18. Parking Duration for Unrestricted Parking – South Study Area



6. Summary of Findings

Overall Utilization

- Average utilization before 6:00 PM was below 75% in all time-limited spaces, except in the Boat Street Triangle area (90%).
- Average utilization before 6:00 PM for unrestricted parking spaces was 86% in the north study area and 111% in the south study area.
- Utilization of two-hour signed parking was consistently much higher than the utilization of two-hour pay station parking up until 6:00 PM. The utilization of two-hour pay station parking increased rapidly after 6:00 PM when restrictions are no longer in effect.

Overall Compliance

- Compliance with time-limited spaces was generally good – 75% or greater for one-hour and two-hour time limits, except in the Boat Street Triangle area.
- Compliance with the two-hour signed spaces in the Boat Street Triangle area was 62%.

Long-term Parking

Unrestricted parking in the south study area showed utilizations over 100% for most blockfaces. The 5:00 AM parking occupancy count was equal to the last occupancy count at 8:00 PM for almost all blockfaces, which may relate to residential parking activity. 35% of vehicles parked for 10 or more hours.

Unique Findings for Specific Blocks

University Way, west blockface, between NE 50th Street and NE 52nd Street

In the north study area, there was one blockface with two-hour signed parking that exceeded 100% utilization. This blockface was fully occupied relative to the measured supply of parking and additional parked cars were squeezed in to exceed the parking capacity.

NE 42nd Street, north blockface, between 12th Avenue NE and Brooklyn Avenue NE

In the south study area there was one blockface with two-hour pay station parking for which the average utilization was 92%. The peak utilization was 100% at 12:00 P.M., 1:00 P.M., and 3:00 P.M. The average utilization for all of the pay stations in this area was 58%.