MEMORANDUM

Date:

January 19, 2015

Project #: 17786.0

To:

Bill Ray

Pacific University 2043 College Way

Forest Grove, OR 97716

From:

Matthew Bell, Ribeka Toda, and Anthony Yi, P.E.

Project:

Pacific University Forest Grove Campus Transportation Analysis

Subject:

Parking Assessment

This memorandum summarizes the results of a parking assessment prepared for Pacific University in support of the Pacific University Forest Grove Campus Transportation Analysis. This memorandum includes an evaluation of existing and future parking conditions within the University's Forest Grove campus boundary and along the adjacent street system. The information presented in this memorandum is based on data collected at the University in September and October 2014, as well as data provided in the January 2007 *Pacific University Master Plan* (Reference 1).

As described below, the University's overall existing parking supply is sufficient to accommodate existing and future parking demand. However, there are several areas within the campus core and along the adjacent street system where parking demand currently exceeds the *effective capacity* of the parking supply (i.e. parking demand is greater than 85 percent of the parking supply). Parking in these areas can be a challenge today and will continue to be a challenge in the future given the anticipated growth in student and faculty/staff population. Future parking demand within the campus core will continue to exceed the *effective capacity* of the parking supply and potentially spill into other parking areas, including the adjacent street system. Therefore, this memorandum evaluates the potential for several new off-street parking facilities within the campus boundary, as well as changes in existing parking designations, to address parking demand within these areas. Subsequent memoranda will evaluate the potential for alternative parking strategies to address parking demand without adding new parking facilities.

STUDY AREA

The study area consists of the surface parking lots and streets located within and adjacent to Pacific University's Forest Grove campus boundary. Figure 1 illustrates the study area. The streets included in the study area were selected based on a review of the local transportation system and discussions with City of Forest Grove and University staff. While the parking configurations and designations along many of the adjacent streets have changed since 2007, the streets included in the study area are consistent with the streets evaluated in the 2007 Master Pan.



DATA COLLECTION

Parking supply and demand data was collected at Pacific University's Forest Grove campus on Tuesday, September 30th and Wednesday, October 22nd, 2014. The data includes:

- A detailed inventory of the off- and on-street parking supply, including the total number of parking spaces located within each of the University's surface parking lots and along each of the adjacent streets by designation (student, faculty/staff, visitor, etc.);
- A 7-hour off-street parking count (9:00 a.m. to 4:00 p.m.), including the total number of parked vehicles within each of the University's surface parking lots, and
- A 7-hour on-street parking count (9:00 a.m. and 4:00 p.m.), including the total number of parked vehicles along each of the adjacent streets between on the same day as the offstreet parking counts.

A comparison between the parking supply and demand data collected as part of this study and the data collected as part of the 2007 Master Plan is provided throughout the following sections.

EXISTING PARKING CONDITIONS

This section documents existing parking conditions within Pacific University's Forest Grove campus boundary and along the adjacent street system. This section includes a summary of existing parking supply and demand data and is based on information collected at the University in September and October 2014 as well as data provided in the 2007 Master Plan.

Off-Street Parking Conditions

Off-Street Parking Supply

Pacific University currently has 16 surface parking lots located within the Forest Grove campus boundary. Appendix "A" contains the University's current campus map, which illustrates the location of the lots with respect to adjacent campus facilities. Table 1 summarizes the total number of spaces within each lot by designation. As shown in Table 1, the total existing off-street parking supply consists of 988 parking spaces, including:

- 341 spaces available to all students and faculty/staff permit holders (open no overnight),
- 369 spaces available to students who live on campus (resident overnight),
- 112 spaces available to faculty/staff who commute to campus (reserved open),
- 53 spaces available to specific faculty/staff (reserved specific), and
- 113 spaces available to disabled, patients, visitors, loading/delivery, etc.

Table 1: Existing Off-Street Parking Supply

/ anihen I						,		7		Teballan
, during	Open - No	Residential	Reserved	Reserved	Reserved Specific ²	Permit	Commuter	Reserved Life Staff	reserved Fleet	lot
Delivery		11181118111	i do							
			18							18
			31		2					34
00	75		10							103
2	32				12					52
		39								40
	19			2	1					23
										12
1			5		13					20
		99			7		10			06
		46								46
		218	2 1		2	2		2		231
	65									29
	110									116
	13									14
	27				11					39
			47		2				2	54
									19	19
										1
			1							1
					2					2
					1					П
1										2
1										1
1							14			1
										1
17	341	369	112	2	53	2	10	2	21	886

¹ Parking stalls for any staff or faculty

² Parking stalls for a specific staff or faculty 3 Parking stalls for University owned vehicles and equipment

⁴ This does not include 3 motorcycle spots (southeast corner of lot, vehicles cannot park there) 5 This does not include 1 motorcycle spot (next to the west most exit of lot, vehicles cannot park there)

⁶ These spaces are generally inaccessib e

This represents an increase of 231 off-street parking spaces since 2007 (988-757=231). This increase is primarily due to the addition of three new surface parking lots (Lots N, O, and P) and the expansion of three others (Lots K, L, and M). Other changes that have occurred since 2007 include the relocation of Lot J from the northeast corner of the Main Street/University Avenue intersection to the southeast corner of the Cedar Street/23rd Place intersection and the redevelopment of Lot X for other campus related uses.

Off-Street Parking Demand

Parking demand is typically measured by counting the total number of parked vehicles within a given area over a period of time. A parking system is generally considered to be full, or at its *effective capacity*, when parking utilization (i.e. parked vehicles to parking spaces) reaches 85 to 90 percent. Beyond that, drivers can have a difficult time locating the few available spaces. Exhibit 1 shows the hourly parking utilization profile for the existing off-street parking supply on Tuesday, September 30th and Wednesday, October 22nd, 2014.

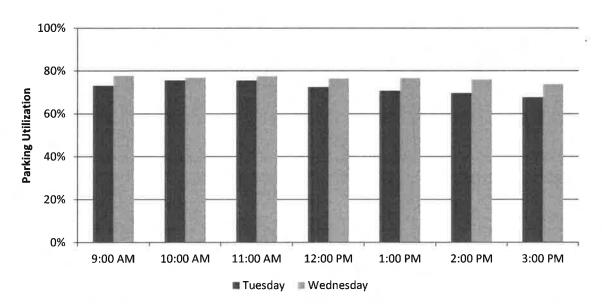
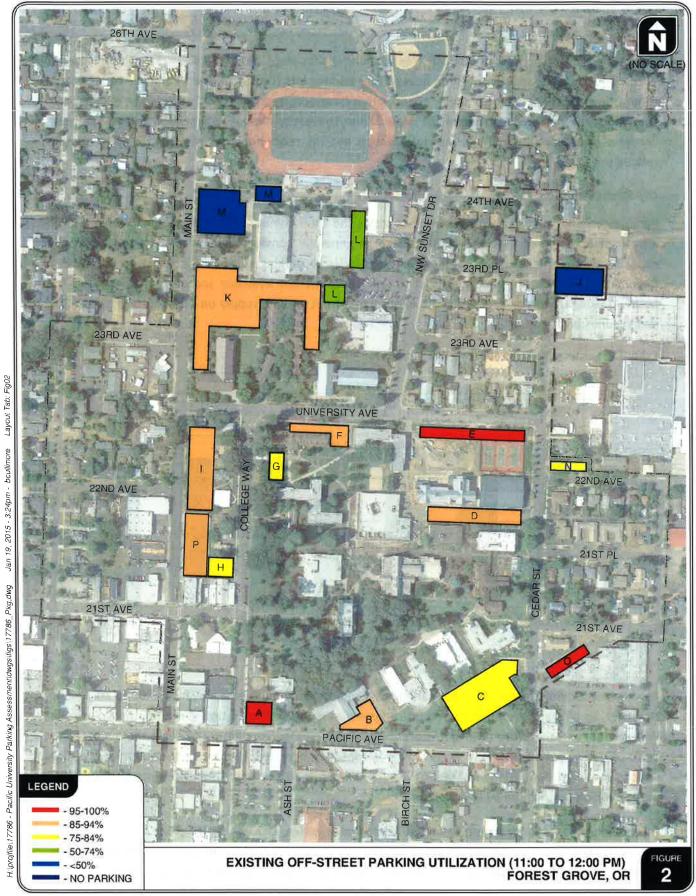


Exhibit 1: Existing Off-Street Parking Utilization

As shown in Exhibit 1, peak off-street parking demand occurred on Wednesday from 9:00 to 10:00 a.m. However, an all staff meeting occurred on-campus during this 9:00 a.m. time period on that particular Wednesday, and therefore does not represent average parking conditions. As such, the average-day peak off-street parking demand occurred on Wednesday between 11:00 a.m. to 12:00 p.m., during which time off-street parking utilization was approximately 78 percent. This represents a total of 766 parked vehicles during the peak time period.

Figure 2 illustrates the off-street parking utilization rates within each of the University's surface parking lots during the peak time period (11:00 to 12:00 p.m.). As shown, parking utilization varies significantly from less than 50 percent within Lots J and M to more than 95 percent within Lots A, O, and E.



While Exhibit 1 suggests that the existing off-street parking supply is sufficient to accommodate existing off-street parking demand, Figure 2 shows that the available spaces may not be located in areas where demand is the highest or may not be designated to accommodate the demand. The following provides a summary of the 222 off-street spaces available (988-766=222) during the peak time period:

- 100 spaces are available to all students and faculty/staff (open no overnight),
- 59 spaces are available to students who live on campus (resident overnight),
- 7 spaces are available to all faculty/staff (reserved open),
- 10 spaces are available for specific faculty/staff (reserved specific), and
- 46 spaces are available to disabled, patients, visitors, loading/deliveries, etc.

Appendix B contains a detailed summary of the off-street parking supply and an hourly breakdown of off-street parking demand by lot and designation.

On-Street Parking Conditions

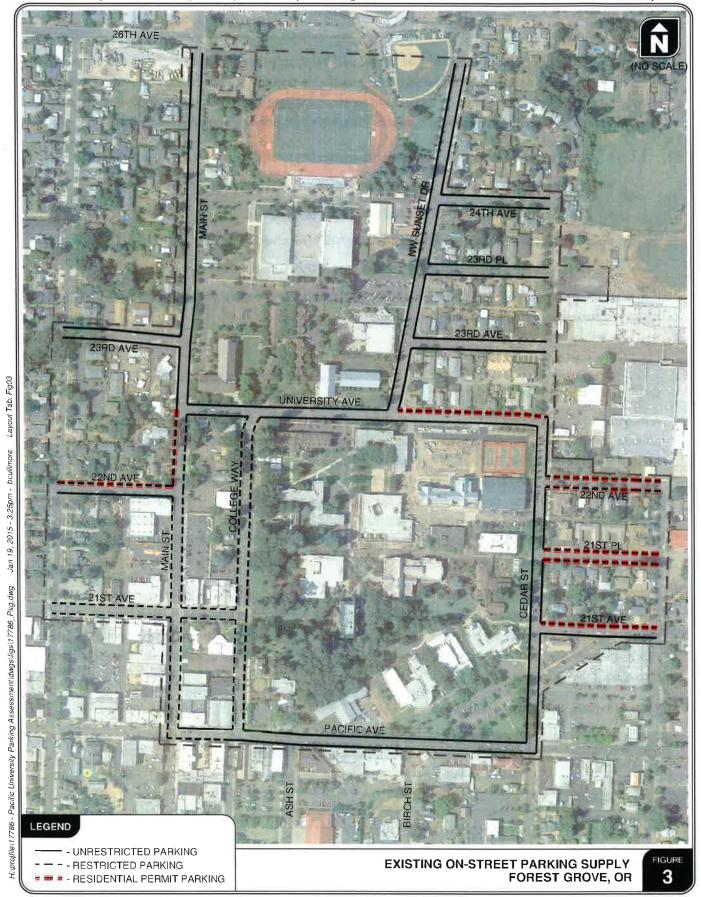
On-Street Parking Supply

A majority of the on-street parking spaces located within the study area are unrestricted, meaning that anyone can use them for any amount of time. However, there are several spaces along Main Street, College Way, 21st Avenue, and Pacific Avenue with 2-hour time restrictions between 8:00 a.m. and 5:00 p.m. There are also several spaces along Main Street, University Avenue, 22nd Avenue, 21st Place, and 21st Avenue with 4-hour time restrictions during all hours of all days. The City of Forest Grove implemented a residential parking permit program along these streets to prevent non-residents from parking in excess of 4 hours throughout the day and to ensure that all residents have access to onstreet parking.

Figure 3 illustrates the on-street parking spaces located with the study area by designation. Table 2 summarizes the total number of on-street spaces available within the study area by designation. Given that the spaces located along University Avenue and Cedar Street are not striped, the total number of spaces along these streets is an estimate based on the maximum number of parked vehicles observed throughout the study period.

Table 2: Existing On-Street Parking Supply

Designation	Parking Spaces
Unrestricted	333
2-hour (8:00 a.m. to 5:00 p.m.)	231
4-hour Residential Permit	103
No Parking 2:00 a.m. to 6:00 a.m.	60
Other (Electric Vehicle)	2
Total	729



As shown in Table 2, the total existing on-street parking supply consists of 729 parking spaces, including 333 unrestricted and 396 restricted parking spaces. This represents an increase of 54 on-street parking spaces since 2007 (729-675=54). This increase is primarily due to the conversion of College Way to one-way southbound and the addition of angle parking along the east side of the roadway.

On-Street Parking Demand

As with off-street parking, on-street parking is considered to be full, or at its *effective capacity*, when parking utilization (i.e. parked vehicles to parking spaces) reaches 85 to 90 percent. However, unlike off-street parking demand, on-street parking demand is not limited to the University. Based on the close proximity of Pacific University to downtown Forest Grove and the surrounding residential neighborhoods, the existing on-street parking supply is used by Pacific University students, faculty/staff, and visitors, customers and employees of downtown businesses, residents, and others. Because more detailed information is not readily available, the on-street parking demand data includes all user groups. Exhibit 2 shows the hourly parking utilization profile for the existing on-street parking supply on Tuesday, September 30th and Wednesday, October 22nd, 2014.

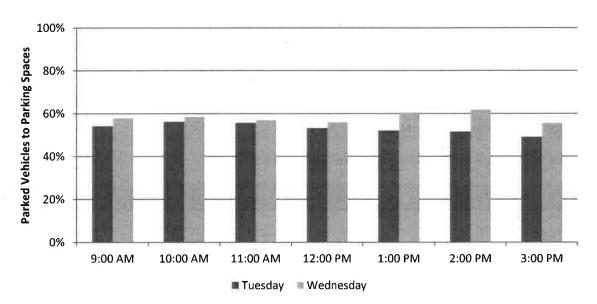


Exhibit 2: Existing On-Street Parking Utilization

As shown in Exhibit 2, peak on-street parking demand occurred on Wednesday from 2:00 to 3:00 p.m.; other similar peaks can be seen at 9:00 a.m. and 1:00 p.m. However, similar to off-street parking these peaks can be attributed to an all staff meeting that occurred on campus from 9:00 to 10:30 a.m. and from two afternoon events that occurred on campus from 1:00 to 3:00 p.m. (one event with 90 prospective students and the other event with 20 others individuals). Therefore, data from the 11:00 a.m. to 12:00 p.m. time period was used to reflect the average-day peak time period in this analysis, during which time on-street parking utilization was approximately 57 percent. This represents a total of 415 parked vehicles during the peak time period.

Figure 4 illustrates on-street parking utilization along the streets located within the study area during the peak time period (11:00 to 12:00 p.m.). As shown, parking utilization varies significantly from less than 50 percent along segments of Main Street to more than 95 percent along segments of College Way.

Similar to off-street parking, while Exhibit 2 suggests that the existing on-street parking supply is sufficient to accommodate existing on-street parking demand, Figure 4 shows that the available spaces may not be located in areas where demand is the highest or may not be designated to accommodate the demand. The following provides a summary of the 314 off-street spaces available (729-415=314) during the peak time period:

- 179 are available along street with no restrictions,
- 61 are available along streets with 2-hour time restrictions,
- 54 are available along streets with 4-hour time restrictions, and
- 20 are available along streets with other parking restrictions or designations.

Appendix C contains a detailed summary of the on-street parking supply and an hourly breakdown of on-street parking demand by block face and designation.

Overall Parking Conditions

As described above, peak parking demand within Pacific University's Forest Grove campus boundary and on the adjacent street system occurs from 11:00 to 12:00 p.m. Table 3 summarizes the overall parking supply and demand data for the University.

Table 3: Overall Parking Supply and Demand (11:00 a.m. to 12:00 p.m.)

Description	Parking Supply	Parking Demand	Percent of Parked Vehicles
Off-Street Parking	988	766	78%
On-Street Parking	729	415	57%
Total	1,717	1,181	69%

As shown in Table 3, the overall parking supply includes 1,717 parking spaces while overall parking demand is for 1,181 parking spaces, or approximately 69 percent of the overall parking supply. Accordingly, the existing parking supply is sufficient to accommodate existing parking demand. However, as described above, there are several areas within the campus boundary and along the adjacent street system where parking demand currently exceeds the *effective capacity* of the parking supply. Therefore, the following section evaluates the potential for several new off-street parking facilities within the campus boundary, as well as changes in existing parking designations to address parking demand within these areas.



Existing Parking Demand Rate

A parking demand rate was calculated based on the supply and demand data presented above, as well as student and faculty/staff population information provided by the University. The demand rate is a ratio of total University population to existing parking demand. As indicated previously, the on-street parking demand includes Pacific University students, faculty/staff and visitors as well as customers and employees of downtown businesses, residents, and others. Because the on-street parking demand generated from each of these user groups cannot be separated, the on-street parking demand used to calculate the parking demand rate is the total demand observed within the study area, which represents a conservative approach. Table 4 summarizes the existing parking demand rate for Pacific University's Forest Grove campus.

Table 4: Existing Parking Demand Rate

Undergraduate	Graduate	Faculty	Staff	Total	Parking Demand	Parking Rate
1,600	600	285	435	2,920	1,181	0.40

As shown in Table 4, the existing parking demand rate for Pacific University's Forest Grove campus is approximately 0.40, or 0.40 parked vehicles per student, faculty/staff, and visitor to the campus. This represents an increase in the rate since 2007 of approximately 0.08 (0.40-0.32=0.08).

Standard Reference Manual

The Institute of Transportation Engineers (ITE) Parking Generation Manual, 4th Edition (Reference 2), is a standard reference manual that cites parking generation rates for a wide variety of land uses including urban and suburban universities. According to the manual, the parking generation rate for a suburban university such as Pacific University in Forest Grove has an average parking generation rate of approximately 0.40 vehicles per student, faculty/staff, and visitor. Therefore, the parking demand rate for Pacific University's Forest Grove campus is consistent with ITE standards for suburban universities.

FUTURE PARKING CONDITIONS

This section documents future parking conditions within Pacific University's Forest Grove campus boundary and along the adjacent street system. This section includes a summary of future parking supply and demand and is based on discussions with University staff in September and October 2014.

Future Parking Supply

Based on discussions with University staff, there are no anticipated changes to the future parking supply.

Future Parking Demand

Based on discussions with University staff, increases in the student and faculty/staff populations as well as the relocation of at least one program to the Hillsboro campus will be the primary factors influencing future parking demand within the study area. Other factors include new residential, retail, and commercial developments surrounding the University, which are more difficult to estimate.

The student population is expected to increase by approximately 1-2 percent per year over the next several years. Based on the current student population (2,200 students), the University expects an increase of approximately 440 students by 2024. However, the school of optometry (approximately 300 students) is expected to relocate to the Hillsboro campus sometime over the next several years. Therefore, the net increase in student population will be approximately 140 students (440-300=140) by 2024.

The faculty/staff population is also expected to increase by approximately 1-2 percent per year over the next several years. Based on the current faculty/staff population (720 faculty/staff), the University expects an increase of approximately 144 faculty/staff by 2024.

In order to estimate future parking demand, the existing parking demand rate (0.40 parking spaces per person) was applied to the future population estimate described above. Table 5 summarizes the year 2024 parking demand estimate.

Table 5: Estimated Year 2024 Parking Supply and Demand

Fu	ıture Parking Supp	ly	Ful	ture Parking Dem	and		Parking Supply Below Effective Capacity?
Off-Street	On-Street	Total	2024 Population	Existing Demand Rate	Demand	Percent of Parked Vehicles	
988	729	1,717	3,204	0.40	1,282	75%	Yes

As shown in Table 5, the future parking supply includes 1,717 parking spaces while the future parking demand is for 1,282 parking spaces, or approximately 75 percent of the overall parking supply. Accordingly, the future parking supply is sufficient to accommodate future parking demand. However, as described above, there are several areas within the campus boundary and along the adjacent street system where parking demand is expected to continue to exceed the *effective capacity* of the parking supply during peak time periods. Parking in these areas is a challenge today and will continue to be a challenge in the future. It is likely that some students and faculty/staff will not be able to park where they want to park. Therefore, the following evaluates the potential for several new off-street parking facilities within the campus boundary, as well as changes in existing parking designations, to address parking demand within these areas. Subsequent memoranda will evaluate the potential for alternative parking strategies for addressing parking demand that do not involve new parking facilities.

POTENTIAL PARKING FACILITIES

Based on discussions with University staff, the University is considering opportunities for additional offstreet parking facilities within the Forest Grove campus boundary, including the addition of one new surface parking lot along the west side of Cedar Street, the expansion of three existing surface parking lots (lots C, F, and G), and the implementation of on-street parking along University Avenue west of Sunset Drive. Figure 5 illustrates the location of the potential new parking facilities. The University is also considering opportunities to change the designation of several parking spaces within existing surface parking lots to better meet parking demand. The following provides an assessment of each potential parking facility.

New Surface Parking Lot

Per discussions with University staff, a new surface parking lot could be developed along the west side of Cedar Street in the vacant property located south of the greenhouse and north of Berglund Hall. Access to the approximately 0.25 acre site could be provided via the existing driveway located across from 21st Avenue. Given that one acre can accommodate approximately 100 to 115 parking spaces depending on landscaping, drive isles, and other local requirements; the new surface parking lot could include approximately 25 to 28 parking spaces. The additional spaces could be designated as reserved-open to accommodate demand for more faculty/staff parking spaces within the campus boundary.

Lot C Expansion

Lot C is located in the southeast corner of the campus boundary. Per discussions with University staff, Lot C could expand west into the vacant property located south of Jefferson Hall. Access to the approximately 0.40 acre site could be provided via the existing driveway to Lot C located along Cedar Street. Given the size of the site, the Lot C expansion could include approximately 40 to 46 additional parking spaces. The additional spaces could be designated as open-no overnight, consistent with the existing designation of Lot C or as reserved-open to accommodate demand for more faculty/staff parking spaces within the campus boundary.

Lot F Expansion

Lot F is located at the center of the campus boundary along the south side of University Avenue. Per discussions with University staff, Lot F could expand west into the vacant property located northwest of McCormick Hall. Access to the approximately 0.10 acre site could be provided via the existing driveways to Lot F located along University Avenue. Given the size of the site, the Lot F expansion could include approximately 10 to 12 parking spaces. While the additional spaces could accommodate the relatively high demand for parking within this area, University staff has indicated that the area is highly utilized by pedestrians and therefore may not be the best location for a new parking facility.



Lot G Expansion

Lot G is located at the center of campus boundary along the east side of College Way. Per discussions with University staff, Lot G could expand west into the vacant property located between Lot G and College Way. Access to the approximately 0.10 acre site could be provided via the existing driveway to Lot G located along College Way. Given the size of the site, the Lot G expansion could include approximately 10 to 12 parking spaces. While the additional spaces could accommodate the relatively high demand for parking within this area, University staff has indicated that the area is highly utilized by pedestrians and therefore may not be the best location for a new parking facility.

University Avenue

On-street parking could be provided along the segment of University Avenue located between College Way and NW Sunset Drive, which is approximately 450-feet long. Given that on-street parking spaces are 22 to 25 feet long on average, this segment of University Avenue could include approximately 30 to 35 on-street parking spaces. The additional spaces could be unrestricted, consistent the segments of University Avenue located west of College Way and east of NW Sunset Drive. The spaces could also help reduce on-street parking utilization rates along University Avenue and College Way below their effective capacity.

University Avenue provides the only east-west connection between Main Street and NW Sunset Drive between NW Willamina Avenue to the north and Pacific Avenue (OR 8) to the south. Traffic volumes and travel speeds along University Avenue can be relatively high during peak time periods. Therefore, in addition to on-street parking, the University should consider curb extensions at the pedestrian crossings to provide a more pedestrian friendly environment.

Other Facilities

Another opportunity discussed with the University includes the addition of five to ten parking spaces along the north side of Scott Hall in the landscaped area between Scott Hall and the fire lane. While the addition of five to ten parking spaces within this location could accommodate the relocation of five to ten reserved-specific spaces to this location, University staff has indicated that this area is highly utilized by pedestrians and therefore may not be the best location for a new parking facility.

New Designations

The University has also considered changing the designation or relocating many of the reserved-specific spaces. Based on the supply data, the University currently has 53 parking spaces reserved for specific faculty/staff (reserved-specific). A majority of the spaces are located within eight of the University's surface parking lots; three are located in individual spaces adjacent to Drake and Frye. While the spaces generally represent a small portion of the total parking stalls available within each surface parking lot, the parking demand data shows that a majority of the spaces (81 percent) are occupied during the peak time period (11:00 to 12:00 p.m.). Given that changing the designation of these spaces to reserved-

open or open-no overnight will not reduce the demand for these spaces by the specific individuals, it is not expected to increase the capacity of the surface parking lots.

Finally, the University has also considered changing the designation of entire surface parking lots to better accommodate demand. Based on discussions with University staff, these include changing the designations of Lots C and D from open-no overnight to reserved-open. Changing the designation of Lot C would have a significant impact on the open-no overnight spaces, which area available to all student commuters as well as faculty and staff, and therefore Lot C should remain as is. However, the University could consider changing the designation of Lot D to reserved-open to accommodate demand by faculty and staff for additional spaces in the area. This potential change would have less of an impact on the availability of open-no overnight spaces.

CONCLUSIONS

Existing Parking Conditions

Off-Street Parking Conditions

- The Pacific University Forest Grove campus currently has 16 surface parking lots with a total of 988 parking spaces.
- Peak off-street parking demand occurs from 11:00 to 12:00 p.m. with demand for 766 parking spaces, or approximately 78 percent of the available parking supply.

On-Street Parking Conditions

- There are a total of 729 on-street parking spaces located within and adjacent to the Pacific University Forest Grove campus boundary.
- Peak on-street parking demand occurs from 11:00 to 12:00 p.m. with demand for 415 parking spaces, or approximately 57 percent of the available parking supply.

Overall Parking Conditions

- The Pacific University Forest Grove campus has a combined on- and off-street parking supply of 1,717 parking spaces.
- Peak on- and off-street parking demand occurs from 11:00 to 12:00 p.m. with demand for 1,181 parking spaces, or approximately 69 percent of the available parking supply.
- While the existing parking supply is sufficient to accommodate existing parking demand, there are several areas within the campus boundary and along the adjacent street system where parking demand exceeds the effective capacity of the parking supply (i.e. parking demand is greater than 85 percent of the parking supply).
 - The potential for several new parking facilities, as well as changes to existing parking designations, are evaluated in this report.

Future Parking Conditions

Overall Parking Conditions

- An increase in the student and faculty/staff population and the relocation of the school of optometry to the Pacific University Hillsboro campus will result in an increase the overall population from 2,920 to 3,204. Given an existing parking demand rate of 0.40 parked vehicles per person, future parking demand will be for 1,282 parking spaces, or 75 percent of the available parking supply.
- While the future parking supply will be sufficient to accommodate future parking demand, there are several areas within the campus boundary and along the adjacent street system where parking demand is expected to continue to exceed the *effective capacity* of the parking supply.
 - The potential for several new parking facilities, as well as changes to the existing parking designations are evaluated in this report.

Potential Parking Facilities

- The development of a new surface parking lot along the west side of Cedar Drive could increase the off-street parking supply by 25 to 28 spaces. These spaces could be designated as reserved-open.
- The expansion of Lot C could increase the off-street parking supply by approximately 40 to 46 spaces. These spaces could be designated as open-no overnight.
- The expansion of Lot F could increase the off-street parking supply by approximately 10 to 12 spaces; however, this area currently experiences a high level of pedestrian activity.
- The expansion of Lot G could increase the off-street parking supply by approximately 10 to 12 spaces; however, this area currently experiences a high level of pedestrian activity
- The addition of on-street parking along University Avenue between College Way and NW Sunset Drive could increase the on-street parking supply by approximately 30 to 35 spaces.
- With an existing parking utilization of approximately 81 percent, changing the designation or relocating the reserved-specific spaces would not necessarily provide an increase in offstreet parking supply within the high-demand areas.
- Changing the designation of Lot C from open-no overnight to reserved-open would have a significant impact on the availability of open-no overnight spaces.
- Changing the designation of Lot D from open no-overnight to reserved-open would have less of an impact on the availability of open-no overnight spaces.