

Summary of Findings:

**Parking and Mode Split Study
for Transit Oriented Development**

Pearl District – Portland, OR

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1.0 Introduction

The objective of the study is to collect and add to the existing parking and trip generation data available on transit oriented developments. Students from Portland State University's ITE Student Chapter collected data to determine residential parking demand and trip generation by mode split at three downtown residential housing developments in a transit oriented development. The housing developments selected for the study included three privately owned condominiums with a minimum of 100 dwelling units and a private residential parking garage.

2.0 Description of Study Sites

The Pearl District Neighborhood is a former contaminated warehouse and light industrial area located just north of the central business district in Portland, Oregon. Its boundaries are West Burnside Street to the south, NW Broadway to the east, Burlington Northern Railroad tracks to the north, and the Interstate 405 Freeway to the west. The area has undergone significant development since the late 1990s. Today it is an area of high-rise condominiums, warehouse-to-loft conversions, a grocery store, restaurants, galleries, upscale shops, and banks. It is also known for the quality of transit within the district. The transit system there has contributed to the construction of mixed use projects with parking ratios lower than found elsewhere in the central city.

Three residential housing complexes from the Pearl District Neighborhood were studied. None of the three buildings have a Transportation Management Plan.

Tanner Place

726 NW 11th Avenue

Built in 2000, Tanner Place contains 120 condominiums and 7,188 square feet of ground floor retail space. The residential units are mostly 1 and 2 bedrooms, with a few 3 bedrooms and townhouses. To date, all residential and commercial space is occupied.

The parking garage is located below the building and provides 148 secure, resident-only parking spaces. Metered parking is also available around the building. Tanner Place sits between both the north and south running Portland Streetcar lines, is located within a quarter mile of 3 bus lines, and is half a mile from Interstate 405. It is also located on the edge of the Fareless Square, the zone in the central city where transit rides are free.



The Streetcar Lofts

1030 NW 12th Avenue

The Streetcar Lofts were built over a former rail yard in 2002. The building contains 139 condominiums and 9,000 square feet of ground retail space. Residences include mostly 1 and 2 bedroom units, but there are also several lofts and studios, and a few townhouses. To date, all residential and commercial space is occupied.

The building contains 146 secure, resident-only parking spaces and is surrounded by metered street parking. The Streetcar Lofts building is located within 2 blocks of the Portland Streetcar and a quarter mile of a bus line and is half a mile from Interstate 405.



The Avenue Lofts

1400 NW Irving Street

The Avenue Lofts was originally built in 1923 and was the site of the Meier and Frank Warehouse. It was renovated in 2004 to create 170 loft condominiums and townhouse homes. To date, all residential and commercial space is occupied.

The building contains 186 secure, resident-only, parking spaces, and is surrounded by metered street parking. The Avenue Lofts building is located 4 blocks from the Portland Streetcar and within a quarter mile of two bus lines and Interstate 405. It also falls within Fareless Square.



3.0 Methodology

Residential complexes in the Pearl District are managed and maintained by several property management companies. Selection of the three study sites was determined based on first securing a property management company who would allow students to conduct the study and finally selecting among the available buildings managed by the property management company. In this study, students worked with staff at Multi-Services, Inc. to conduct surveys at Tanner Place, Streetcar Lofts, and the Avenue Lofts.

Parking demand and trip generation data was collected continuously from 7 AM – 6 PM on three weekdays and recorded in 15 minute increments. To facilitate data collection at the three sites, a new data collection form was developed. A copy of the data collection form is attached. Students

observed vehicles entering and exiting the parking garage and surveyed pedestrians entering and exiting the condominium at Tanner Place on Thursday, January 18th, 2007, at the Streetcar Lofts on Tuesday, January 30th, 2007, and at the Avenue Lofts on Wednesday, January 31st, 2007.

Data was collected at the entrance / exit of the parking garage and at all building doors facing the sidewalk and street. Diagrams of the building sites are attached. Garage data, collected through observations, consisted of the number of vehicles, number of people in the vehicle, and the bicyclists and pedestrians entering and exiting the parking garage. In addition, a base count of vehicles in the garage was collected at the beginning and end of every shift. This data was used to crosscheck the accuracy of observed and surveyed data.

Building door data consisted of the number of pedestrians entering or exiting the building by mode split (auto driver, auto passenger, walk, transit, and bike / other). This data was collected via a one question survey of all pedestrians entering and exiting the building doors. Students asked pedestrians what mode of transportation they were going to use if leaving the building or coming from a previous destination. Students also asked respondents to state their trip purpose. This question was asked because the survey was focused just on people who lived in the building or were visiting residents. As such, maintenance personnel, business employees, and visitors of businesses were excluded from the study.

Other data collected in the report included a base count of all vehicles in the parking garage and building information. The base count of vehicles in the parking garages was collected between 10:00 PM and 11:00 PM for Tanner Place and Streetcar Lofts on Thursday, February 15th, 2007 and for The Avenue Lofts on Tuesday, February 22nd, 2007. Building information was requested and provided by the building's property management company. All raw data and building information is included in the data collection sheets attached.

Detailed effort was undertaken to assess the parking demand for the residential element of each project separately (additional data not included in this study were obtained for the parking demand of the commercial elements). Following data collection, rates were calculated such as the trips per dwelling unit and vehicles per dwelling unit. Other performance indicators were calculated from parking garage data to determine the parking demand by hour and peak vehicle observations.

4.0 Summary of Findings

Parking Demand

Discussions with the property management company revealed that all parking units or spaces, in all three buildings, were sold to residents, with the number of parking spaces per dwelling unit at just slightly above 1. The total number of garage parking spaces available is displayed with other building information in Table 1. An actual count of vehicles in the parking garage, shown in Table 2, reveals that parking garage spaces are not fully utilized. Actual vehicles counts in the garage indicate that approximately 50%-60% of all available parking spaces were occupied at 7 AM when data collection efforts started. The base count of all vehicles counted at night reveals

90% garage occupancy. This indicates a large percentage of about 30%-40% of all vehicles actually in the parking garage left the building premises before 7 AM.

Table 2 displays the garage and off-site parking demand at the three study sites and the number of vehicles per dwelling unit. The parking demand remains fairly constant and reveals even when the garage is at lowest occupancy, which occurs around 1 PM, the total number of vehicles that left the garage is half of the number of vehicles at 7 AM. Another observation made from Table 2 is that although a large number of vehicles left in the morning, the total number of vehicles in the garage at 6:00 PM was less than it was at 7 AM, indicating not all residents returned home.

The highest rate of vehicles per dwelling unit occurs in the morning and late afternoons. This result is not surprising since this is the time residents are leaving home to go to work and returning home from work. The 3rd Edition of the ITE Parking Generation handbook states the number of parked vehicles per dwelling unit for the studied land use type is 1.3. The peak number of vehicles per dwelling unit in this study was 0.73.

Table 1: Building Information

	Tanner Place	Streetcar Lofts	The Avenue Lofts
Site Size (square feet)	7,188	9,000	-
Dwelling Units	120	139	170
Dwelling Units Occupancy	100%	100%	100%
Parking Spaces Available	148	146	186
Parking Units Occupancy	100%	100%	100%

Table 2: Parking Demand

	Garage Parking Demand			Off-Site Parking Demand			Total Vehicles per Dwelling Unit		
	Tanner Place	Streetcar Lofts	The Avenue Lofts	Tanner Place	Streetcar Lofts	The Avenue Lofts	Tanner Place	Streetcar Lofts	The Avenue Lofts
7:00 AM - 7:59 AM	83	76	104	4	4	3	0.73	0.58	0.63
8:00 AM - 8:59 AM	74	65	92	3	2	2	0.64	0.48	0.55
9:00 AM - 9:59 AM	65	64	90	2	4	4	0.56	0.49	0.55
10:00 AM - 10:59 AM	59	70	90	3	3	5	0.52	0.53	0.56
11:00 AM - 11:59 AM	56	66	84	4	4	4	0.50	0.50	0.52
12:00 PM - 12:59 PM	57	68	83	4	6	2	0.51	0.53	0.50
1:00 PM - 1:59 PM	57	68	78	4	6	3	0.51	0.53	0.48
2:00 PM - 2:59 PM	58	61	78	4	6	2	0.52	0.48	0.47
3:00 PM - 3:59 PM	61	58	82	5	8	4	0.55	0.47	0.51
4:00 PM - 4:59 PM	65	61	90	6	8	4	0.59	0.50	0.55
5:00 PM - 5:59 PM	74	70	100	10	5	9	0.70	0.54	0.64
	PEAK PARKING						0.73	0.58	0.64

Trip Generation

Trip generation data during peak hours and for the 11 hour study period for vehicle trips and person trips are displayed in Table 3 and 4, respectively. Vehicle trips include all vehicles entering and exiting the garage as well as vehicles used by drivers entering and exiting building doors. Person trips include all persons observed in the study entering or exiting the building either by vehicle or on foot.

The AM peak, PM peak, and 11 hour peak vehicle trip counts are displayed in Table 3. Of importance in Table 3 are the rates of vehicle trips per dwelling unit. The 7th Edition of the ITE Trip Generation Handbook states the number of vehicle trips per dwelling unit for the studied land use type is 0.34 in the AM period and 0.38 in the PM period. The rates in this study were found to be lower, with 0.15 to 0.29 vehicle trips per dwelling unit in the AM period and 0.16 to 0.24 vehicle trips per dwelling unit in the PM period.

Figure 4 displays person trips counts and their percentages by mode split. Not surprisingly, the most frequently used mode of transportation is the private vehicle. The mode split shows that from 43% to 68% of persons observed in the study left and returned to the study site by vehicle. Pedestrian / bicycle trips make up the second most frequently used mode of transportation, with 20% to 52% of all persons observed in the study walking or riding a bicycle. Although not indicated in Table 4, it should be noted that the majority of persons in the ped / bike category walked. Finally, despite the study sites' location near transit, transit use was the least frequently used mode of transportation with 3% to 14% of all observed persons in the study taking transit.

Table 3: Trip Generation – Vehicle Trips

		Dwelling Units	Vehicles	Vehicle Trips per Dwelling Unit
AM Peak Hour between 7-9 AM				
8:00-9:00 AM	Tanner	120	20	0.17
7:45-8:45 AM	Streetcar Lofts	130	20	0.15
7:45-8:45 AM	The Avenue Lofts	170	34	0.20
PM Peak Hour between 4-6 PM				
5:00-6:00 PM	Tanner	120	20	0.17
4:00-5:00 PM	Streetcar Lofts	130	21	0.16
5:00-6:00 PM	The Avenue Lofts	170	40	0.24
11 Hour Summary				
7 AM - 6 PM	Tanner	120	183	1.53
	Streetcar Lofts	130	151	1.16
	The Avenue Lofts	170	237	1.39

Table 4: Person Trips by Mode Split

		Counts				Percentages		
		Vehicle	Transit	Ped/Bike	TOTAL PERSONS	Vehicle	Transit	Ped/Bike
AM Peak Hour between 7-9 AM								
8:00-9:00 AM	Tanner	21	4	19	44	48%	9%	43%
7:45-8:45 AM	Streetcar Lofts	25	1	11	37	68%	3%	30%
7:45-8:45 AM	The Avenue Lofts	36	2	13	51	71%	4%	25%
PM Peak Hour between 4-6 PM								
5:00-6:00 PM	Tanner	23	5	7	35	66%	14%	20%
4:00-5:00 PM	Streetcar Lofts	23	2	9	34	68%	6%	26%
5:00-6:00 PM	The Avenue Lofts	50	2	33	85	59%	2%	39%
11 Hour Summary								
7 AM - 6 PM	Tanner	220	25	141	386	57%	6%	37%
	Streetcar Lofts	176	18	212	406	43%	4%	52%
	The Avenue Lofts	274	20	202	496	55%	4%	41%

5.0 Conclusion

Surveys at three study sites were conducted in the second half of January. It should be noted that the average daily temperatures were slightly below normal for that time of year. Overnight lows on the night prior to all three survey days were below freezing. There was no indication from residents that low temperatures were affecting mode choice; however, surveying at an alternative time of year may yield different results.

Overwhelmingly the auto was the primary mode used by the residents of all three buildings, followed closely by walking. Most walking trips observed were short errands, with the resident usually returning within an hour. A number of residents using the auto indicated they were using transit or other non-auto modes on the weekend or after work, for nearby errands. These same residents also indicated their jobs were far enough away that they considered the auto more advantageous.

While the property management company indicated all parking spaces were sold, observations indicated all spaces might not be occupied, though this cannot be confirmed. Some residents also indicated using another garage or location to store vehicles, and in certain cases double parking was allowed in the garage. Their statements implied they felt not enough parking was available.