WESTLAKE AVENUE NORTH CYCLE TRACK
Traffic Circulation Study

Seattle Department of Transportation

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Bicyclists using the 1800 block of parking area, Westlake Avenue North

Bicyclists heading north during the morning commute

View looking north, parked cars and pedestrians

What We Set Out to Observe: Westlake Design, Circulation Patterns and Counts

The intent of this study was to document existing conditions, collect and analyze data regarding circulation patterns of people on bicycles, people on foot and people in cars as they use the Westlake Avenue North corridor. The team observed and documented the physical conditions experienced by users of the Westlake Avenue North and the Westlake East Roadway Avenue North -- the roadway through the parking lot -- especially those conditions that indicated opportunities for safety improvements.

How the Study was Conducted

An inventory of physical features was conducted and included:

- Number of driveway/street ends and intersections on both the west and east sides of Westlake Avenue North
- Traffic control at each driveway/street end
- A compilation of existing SDOT data on roadway volumes, speeds, and collision history

Multimodal traffic data counts were done using Automatic Traffic Recording counts (also called tube counts) and camera/video analysis. Video was also used to document behaviors and interactions between parking lot users. The study included:

- Turning movement counts (driveway ins and outs) at driveway intersections with Westlake Avenue North and the parking area
- Parking aisle and service drive counts
- Counts along the existing sidewalk on the east side of the parking lot (the Cheshiahud Lake Union Loop)

In addition to circulation patterns, the team identified potential opportunities for safety improvements, both general and location-specific, along the Westlake Avenue North corridor.

Collection times

Traffic data was collected in September 2013. A range of days and times were selected to capture both peak and off-peak hours (See Table 1). Figure 1 shows the locations of the data collection by type. Driveways were numbered sequentially from south to north for reference.

TABLE 1: DATA COLLECTION DATES/TIMES

DATA TYPE	No. of LOCATIONS	DATES	TIMES OF DAY		
Turning Movement Counts (Driveway Ins and Outs) Parking Drive/Service Drive	14*	**WEEKDAYS** Thu 9/12/2013 Thu 9/19/2013 Thu 10/3/2013	AM	Noon	PM
Bicycle and Pedestrian Counts	3	**WEEKDAYS** Thu 9/12/2013 Thu 9/19/2013 Thu 10/3/2013	AM	Noon	PM
Video Analysis	4	**WEEKDAYS** Thu 9/12/2013 Thu 9/19/2013 Thu 10/3/2013	AM	--	PM
ATR/Tube Counts	2	**CONTINUOUS** Thu 9/12/2013 - Sat 9/14/2013	24 Hours		
Speed Observations	2	**CONTINUOUS** Thu 7/25/2013- Thu 8/1/2013	Hourly		

*Driveway #1 was under construction during the data collection so data collection at this location and access was limited.



Bicyclists using the parking lot, sidewalk and negotiating a driveway

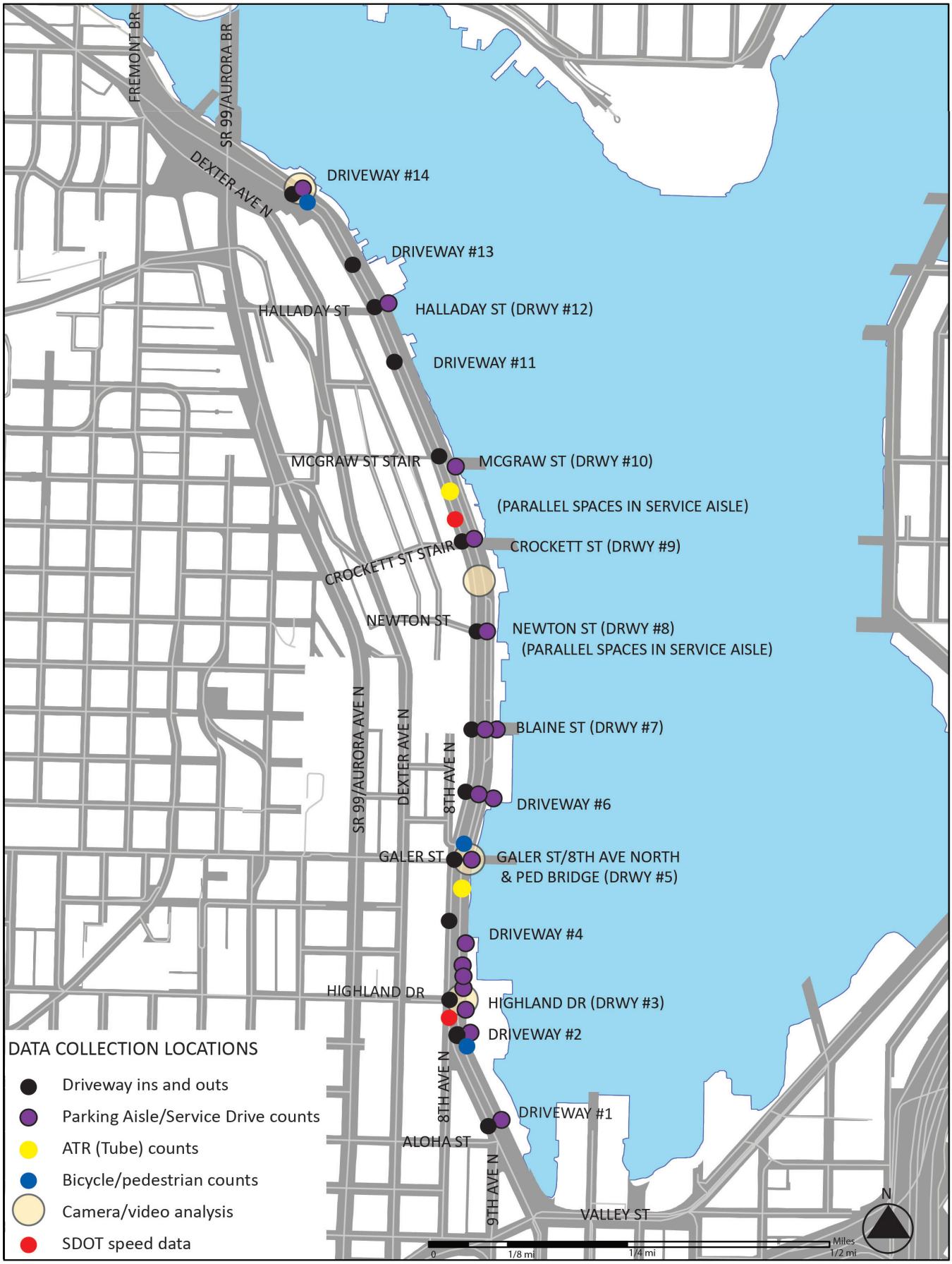


FIGURE 1: DATA COLLECTION LOCATIONS AND TYPES

What We Learned: Highlights

Pedestrian and Bicycle Volumes and Circulation

- Overall, pedestrian volumes are typically higher than bicycle volumes - many pedestrians live in and use this corridor for business, to access transit, and for recreation.
- People on bicycles tend to travel northbound using either the sidewalk or service drive and travel southbound using the parking lot.

Visibility Issues

- It is difficult for motorists backing out of parking spaces to see bicyclists, especially children and people on bicycles moving quickly.
- The planting along Westlake Avenue North and landscaping adjacent to driveways limit sight distance for motorists turning into/out of the parking area.
- Parked cars and dumpsters also limit sight distance for all parking lot users.

Turning Movements from Westlake Avenue North

- People driving cars tend to turn quickly from Westlake Avenue North into the parking area, likely due to the speed and volume of traffic on Westlake, combined with sight distance limitations, and lack of turning pockets.

High pedestrian volumes near the AGC Building

Pedestrian and dumpster near Driveway #14

Bicyclist and dumpster near Driveway #2

Motor vehicle turning in parking area at Newton Street

Queuing motor vehicles at the Highland Drive traffic signal

Motor vehicle activity at the AGC Building entrance/ Highland Drive traffic signal

Northbound bicyclist at Driveway #14

Queued Motor Vehicles Block Driveways

- Motor vehicles waiting for a green light to exit onto Westlake Avenue North from the parking lot can block north-south movement by motor vehicles and bicycles using the parking drive aisles. This issue was observed at the signalized driveways more frequently than at the stop-controlled driveways.

Intersection-Specific Issues

At two intersections, encounters between modes were observed where the path of one mode consistently conflicted with the path of another, as described below.

Highland Drive (Driveway #3)

- This is a complex, 7-legged intersection with the highest volume of turning traffic. It is heavily used by all modes and motor vehicles queue to enter/leave the garage, the Starbuck's drive-through and the parking area on Westlake Avenue North. Conflicts were observed between crossing bicyclists and motorists entering and exiting Highland Drive onto Westlake Avenue North.

Driveway #14

- At Driveway #14, where the parking drive terminates into a driveway and the Cheshiahud Lake Union Loop connects to the west sidewalk on Westlake Avenue North, conflicts were observed between people on bicycles negotiating two close 90 degree turns from the sidewalk to the parking lot, and motorists entering/exiting the parking lot or the driveway to the north.

What We Learned: The Numbers

Westlake Avenue North

- Used by approximately 24,000 motor vehicles a day
- No turn pockets, limited sight distance due to landscaping and dumpsters
- Motorists turn quickly to/from Westlake Avenue North and parking lot

Turning Movement Counts

- 4:30 to 5:30 PM is the busiest time for most driveways
- Southern driveways (from Crockett Street south to Driveway #2) have the highest use volumes
- Highland Drive/Driveway #3 has the highest turning volumes
- See Figure 3 for a sample of turning volumes categorized by driveway and street end

Parking Drive Aisle

- Approximately 1,100 to 1,200 motor vehicles travel on the parking drive per day
- Traffic counts from the north end of the parking lot between McGraw and Crockett Streets show that motor vehicle volumes peak in the late afternoon and early evening

Pedestrian and Bicycle Volumes

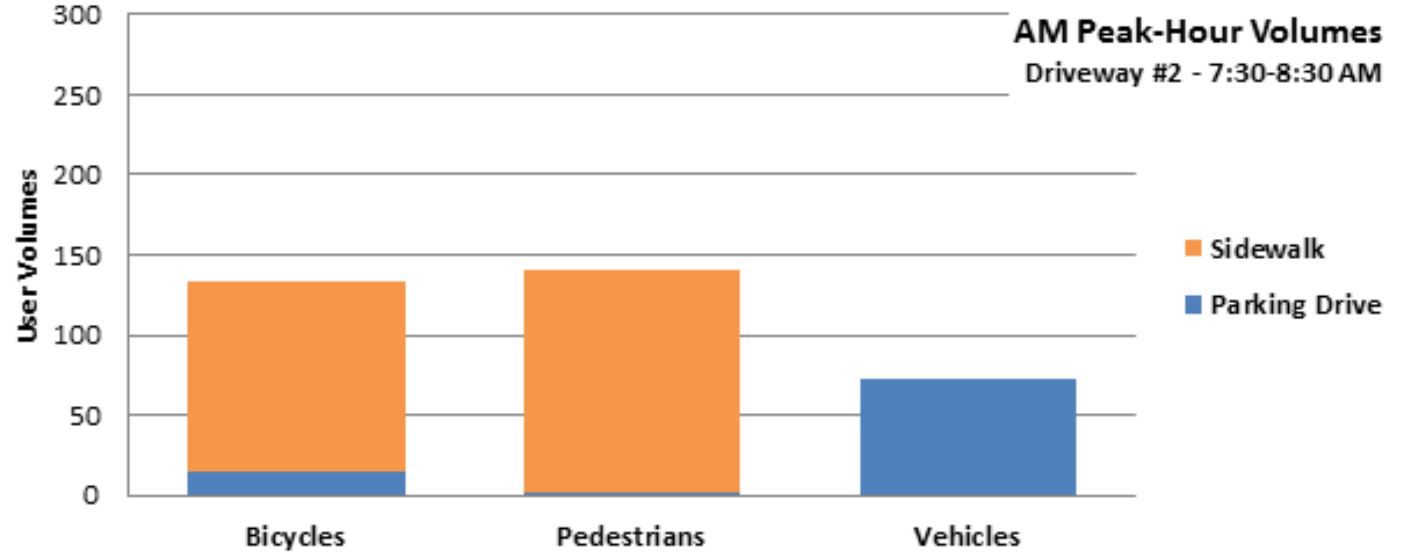
- Over 600 pedestrians were counted near Driveway #2 during the three peak times
- Pedestrian volumes are highest during the midday
- Over 400 bicyclists were counted near Driveway #2 during the three peak timest
- Figure 2 shows multi-modal volumes for the AM, midday and PM

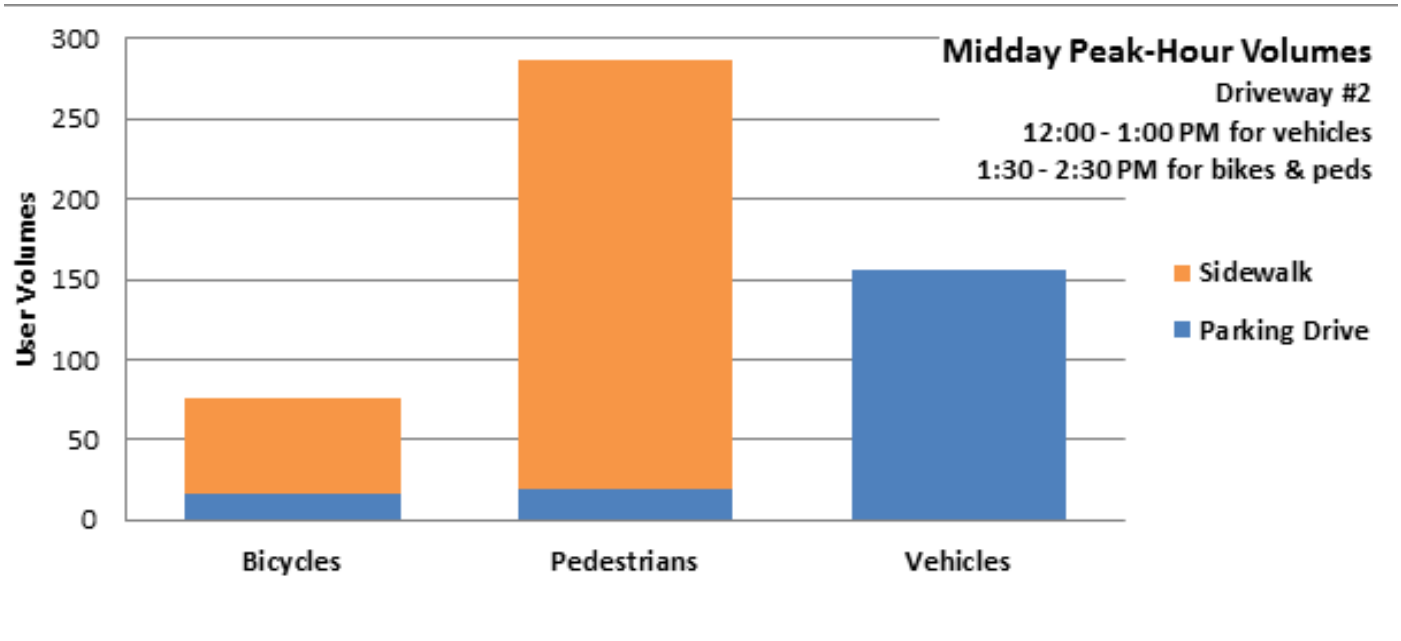
Collision Data

Vehicular collision data from August 2010- July 2013 provided by SDOT shows:

- 60 collisions reported on Westlake,
- 35% of collisions occur at intersections

There have been seven reported bicycle related crashes along Westlake Avenue N and 18 reported crashes in the parking area between January 1, 2007 and January 1, 2011.





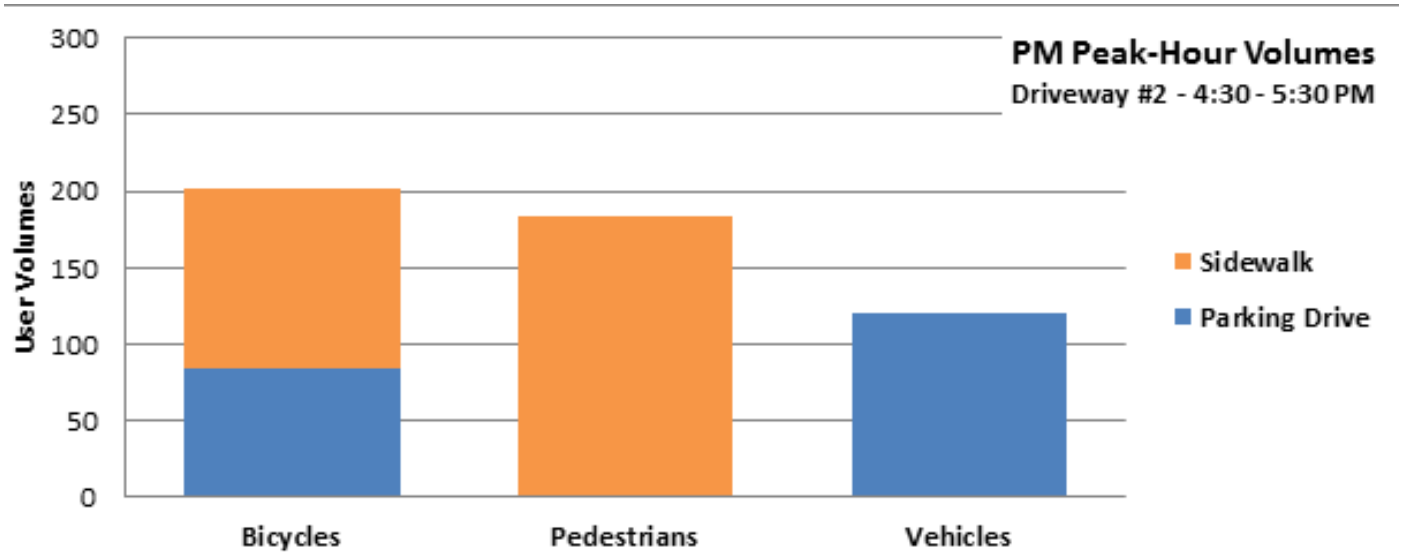


FIGURE 2: PEAK HOUR MULTI-MODAL VOLUMES NEAR DRIVEWAY #2 AND THE PARKING DRIVE

FIGURE 3: PEAK HOUR TURNING VOLUMES INTO AND OUT OF THE PARKING LOT FROM WESTLAKE AVENUE NORTH