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Urban Evacuation Data





Data Overview



LOCATION-BASED SERVICES DATA

DATA CHARACTERISTICS

- Mobile Devices
- Location data collection by Apps
- GPS quality
- User permission

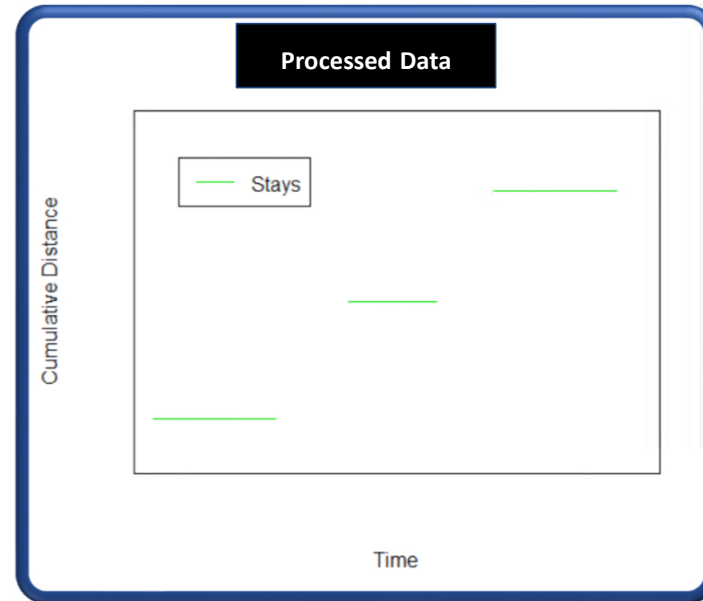
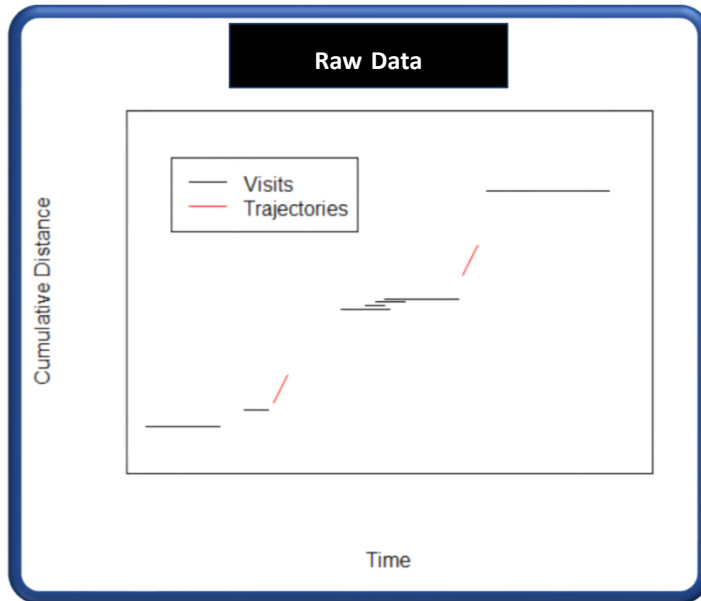
- Large sample size
- Frequent pings
- Spatial precision
- Persistent ID
- Anonymized





Trip Ends

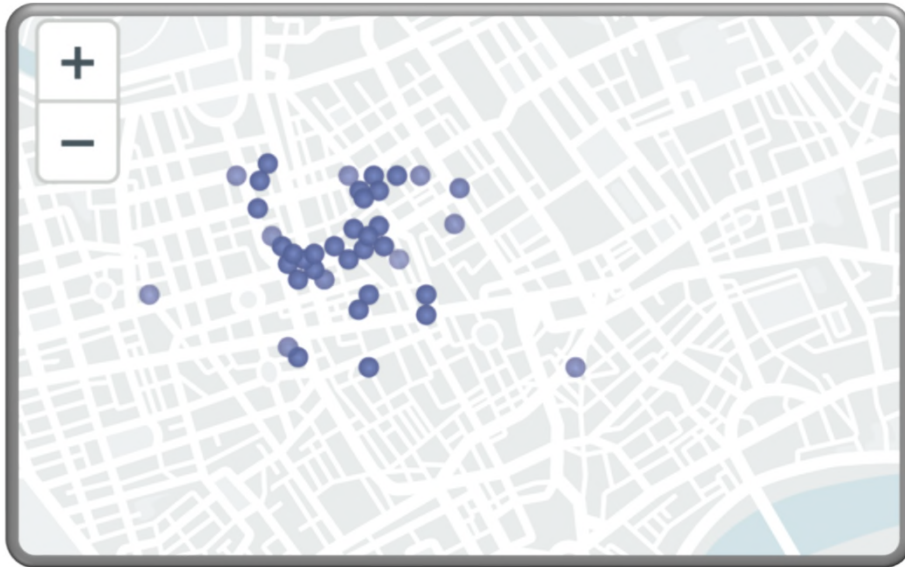
PROCESS ACTIVITY STAYS





Identify Home & Work Locations

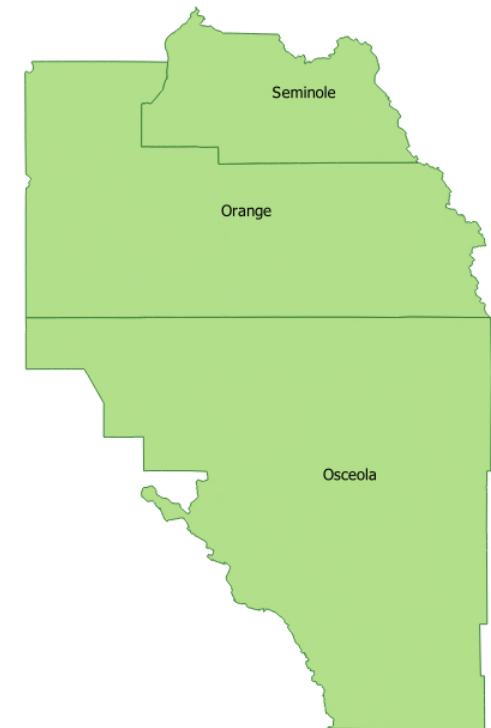
DETERMINE HOME AND WORK LOCATIONS





Key Analysis Elements

- Data
 - LBS: Q2 and Q3 Trips
 - NHTS 2017: Nation-wide Data
- Study Area :
 - Orange County, Osceola County, Seminole County
- Activity Locations
 - Home, Work/School and Others
- Device Employment Status
 - Worker and Non-worker
- Device Residency Status
 - Residents and Visitors
- Day of Week
 - Average Weekday, Average Saturday and Average Sunday





Resident Device Summaries

County	Population	Total Tracts	Valid Devices		Tract with Valid Devices		Penetration Rate	
			Q2	Q3	Q2	Q3	Q2	Q3
Orange	1,112,932	207	57,605	62,844	207	206	5.2	5.6
Osceola	277,689	41	15,811	17,602	41	41	5.7	6.3
Seminole	389,271	86	19,801	21,900	86	86	5.1	5.6
Total	1,779,892	334	93,217	102,346	334	333	5.3	5.9

County	Devices w/Valid Work Location		Valid Work Location Percent		Median Home-to-Work Distance (mi)		Average Usable Days	
	Q2	Q3	Q2	Q3	Q2	Q3	Q2	Q3
Orange	34,004	37,213	59.0	59.2	9.4	9.6	30.0	32.2
Osceola	9,143	10,297	57.8	58.5	12.5	12.4	28.3	31.2
Seminole	12,373	13,602	62.5	62.1	8.8	8.8	34.4	36.5
Total	55,520	61,112	59.8	59.9	10.2	10.3	30.9	33.3

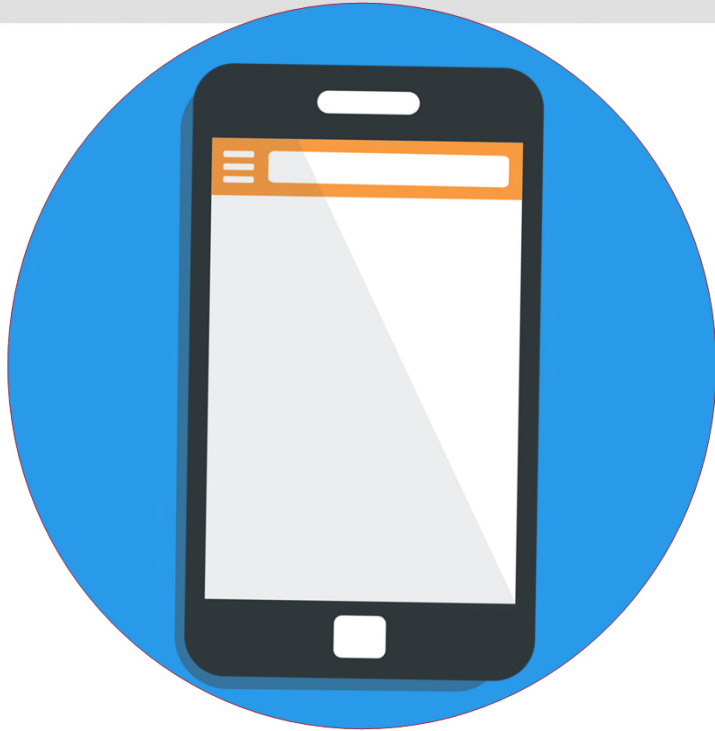




Data Expansion



Weight the Data



***WEIGHT
THE DEVICES***



***WEIGHT
THE TRIPS***





Weight Devices

Devices with NO regular workplace



Devices WITH regular workplace





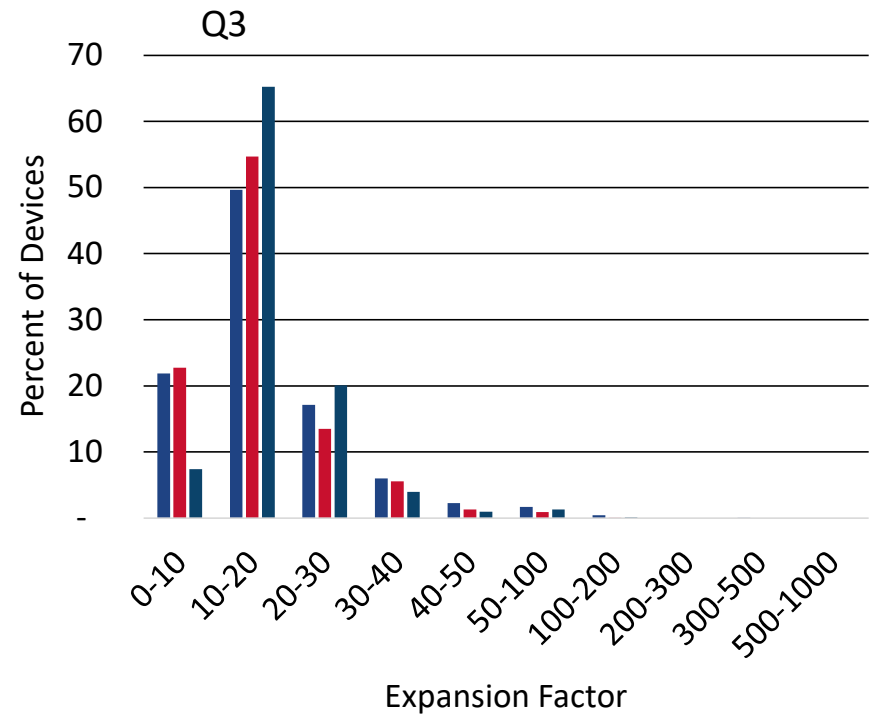
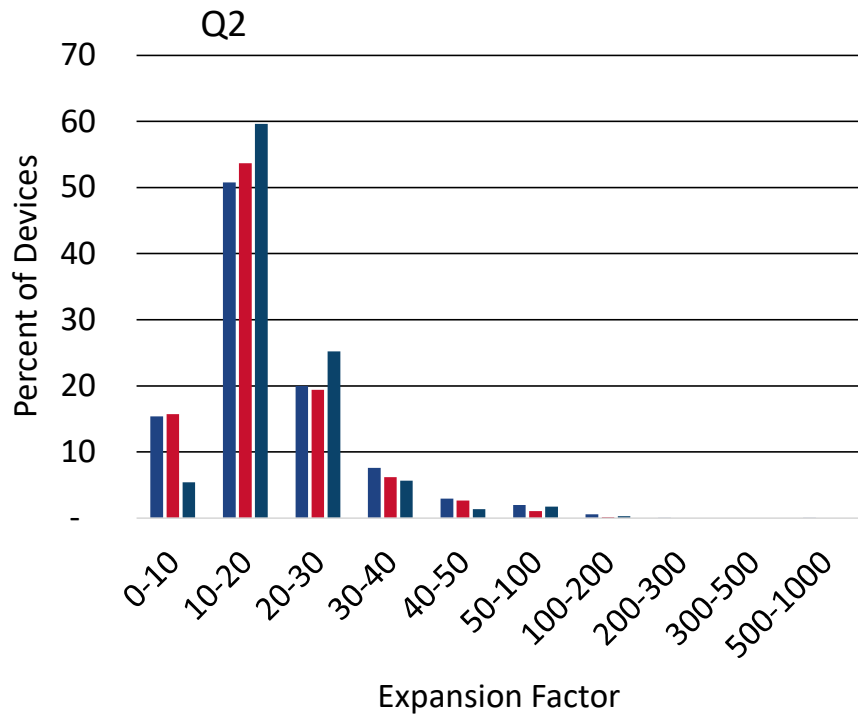
Resident Expansion Summaries

County	Actual Population	Q2		Q3	
		Weight Totals for Home County	Weight Totals for Work County	Weight Totals for Home County	Weight Totals for Work County
Orange	1,112,932	1,112,932	772,727	1,112,932	771,024
Osceola	277,689	277,689	158,223	277,689	157,326
Seminole	389,271	389,271	225,871	389,271	224,492
Total	1,779,892	1,779,892	1,156,821	1,779,892	1,152,841





Resident Expansion Weights



■ Orange ■ Osceola ■ Seminole

■ Orange ■ Osceola ■ Seminole



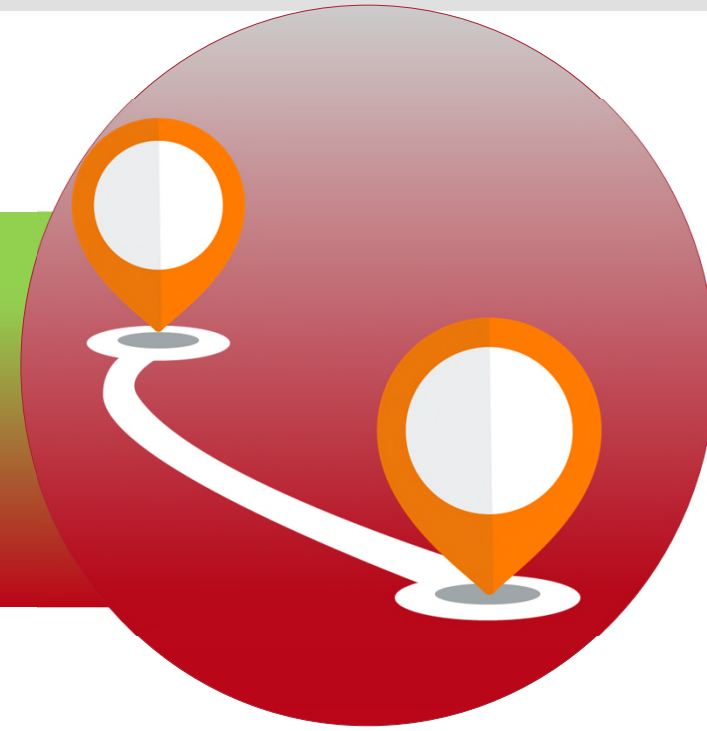


Weight the Trips

Apply
Device
Weights



Normalize
by Number of
Valid Days





Trip Summaries – Residents



Trip Rates

Total Trips

County	Q2			Q3		
	Weekday	Sat	Sun	Weekday	Sat	Sun
Orange	3,357,028	2,499,472	2,325,197	3,349,252	2,545,834	2,324,921
Osceola	733,588	555,996	505,483	735,032	557,803	521,381
Seminole	1,125,622	869,419	783,034	1,103,657	874,189	783,290
Total	5,216,238	3,924,887	3,613,714	5,187,941	3,977,826	3,629,591

Total Rates

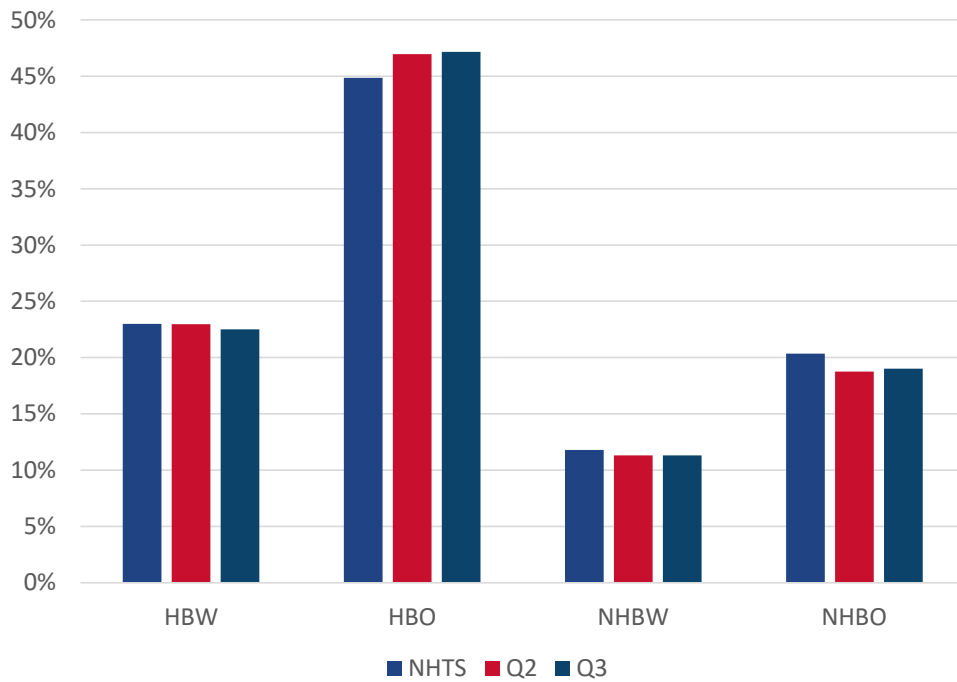
County	Q2			Q3		
	Weekday	Sat	Sun	Weekday	Sat	Sun
Orange	3.07	2.28	2.13	3.06	2.33	2.13
Osceola	2.69	2.04	1.86	2.70	2.05	1.91
Seminole	2.94	2.27	2.04	2.88	2.28	2.04
Total	2.98	2.24	2.07	2.96	2.27	2.07



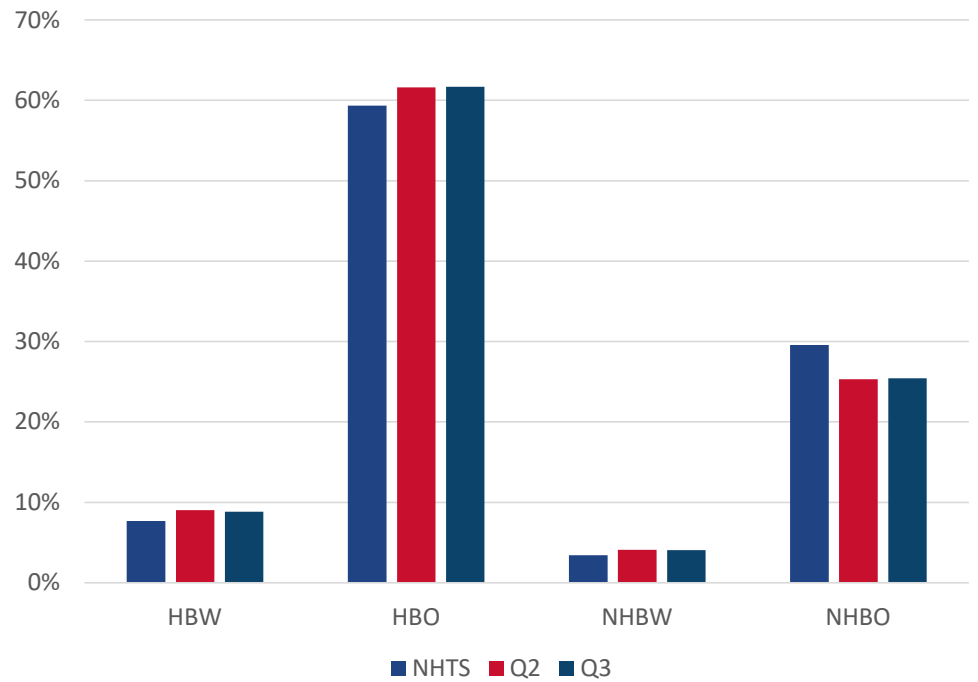


Trip Purpose

Weekdays



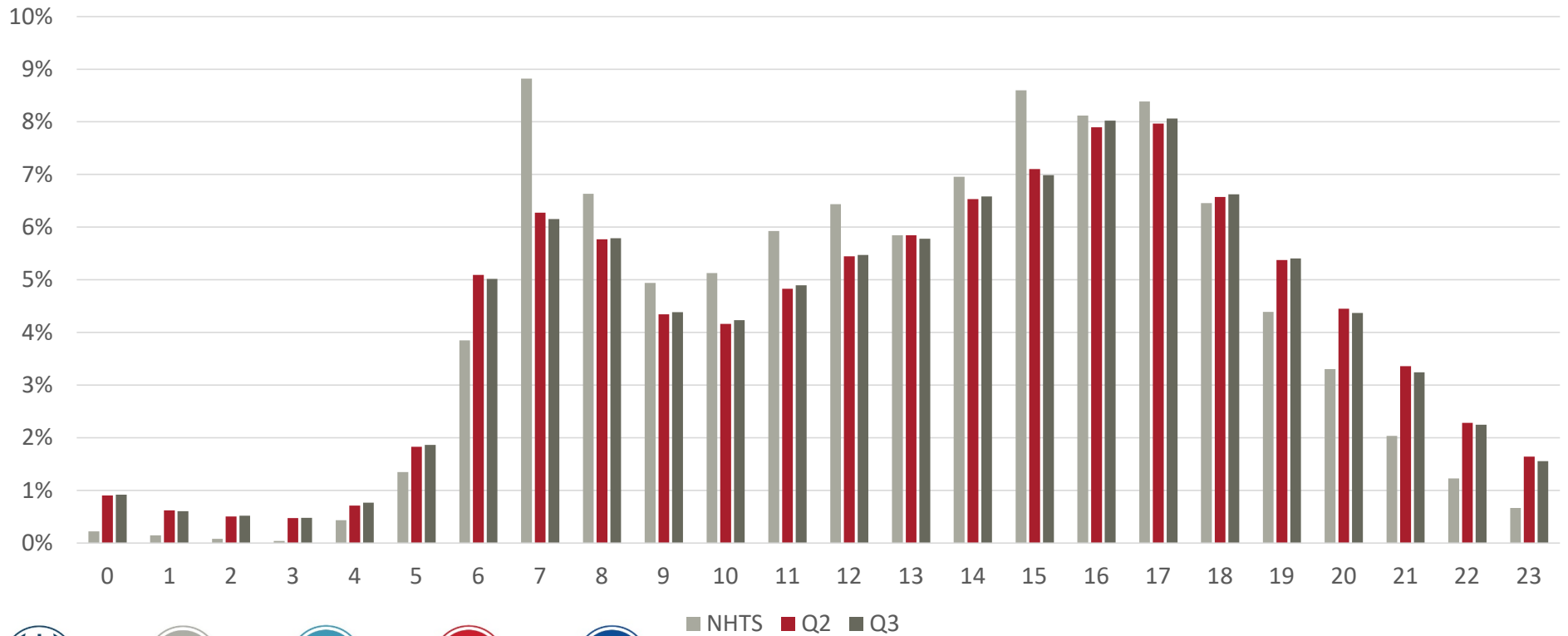
Saturdays





Trip Start Hour

TOD Distribution - Weekday



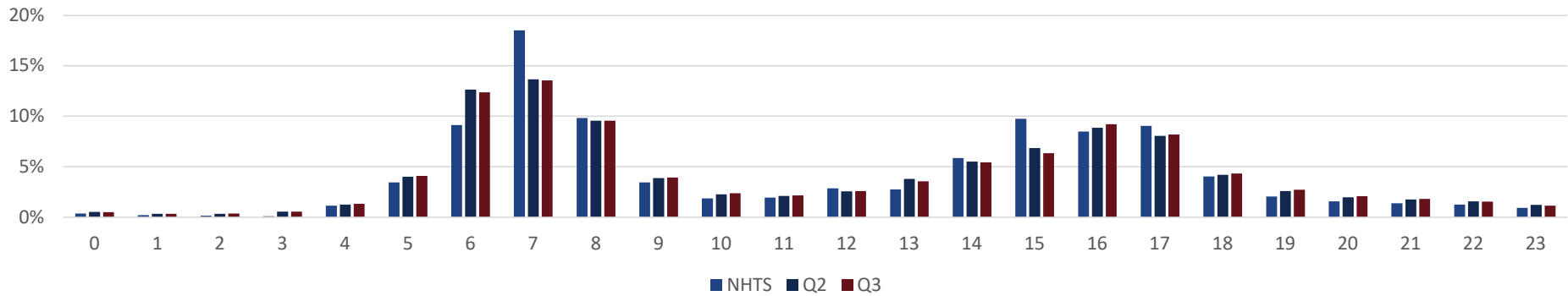
■ NHTS ■ Q2 ■ Q3



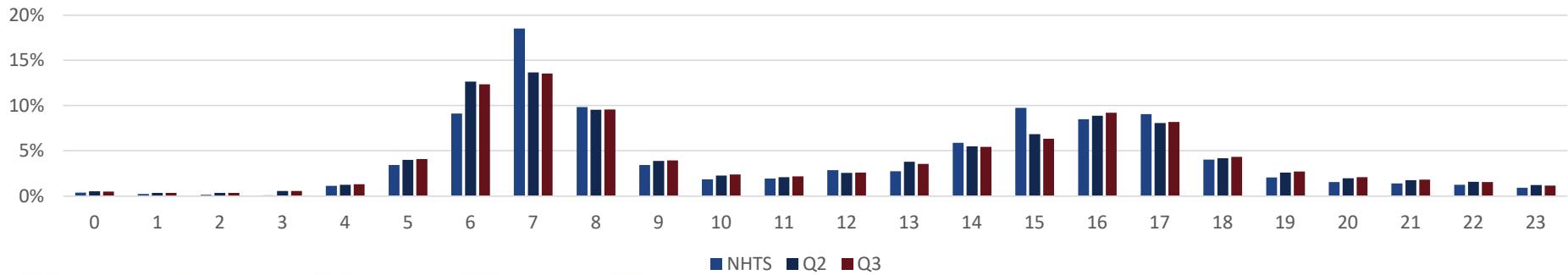


Trip Start Hour by Purpose

TOD Distribution – HBW Trips



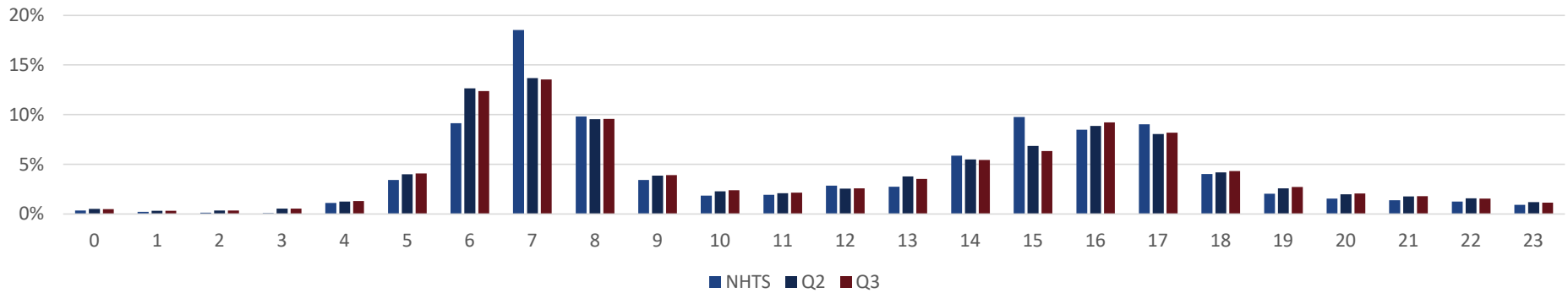
TOD Distribution – HBO Trips



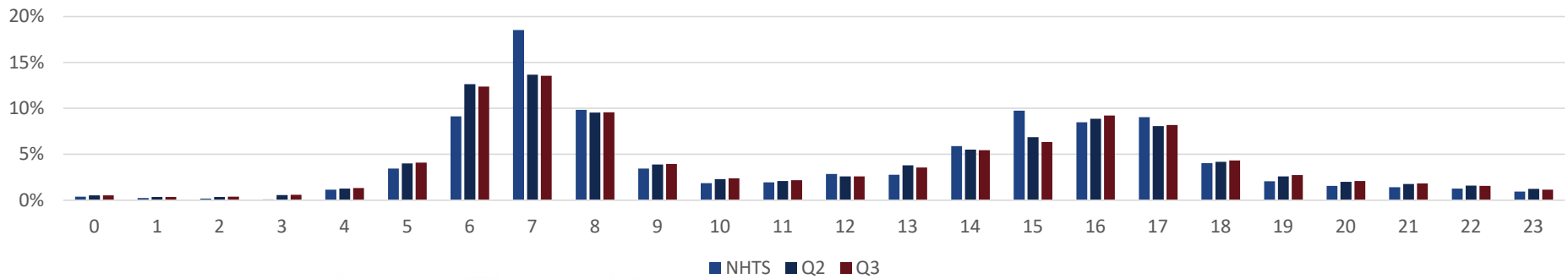


Trip Start Hour by Purpose

TOD Distribution – NHBW Trips



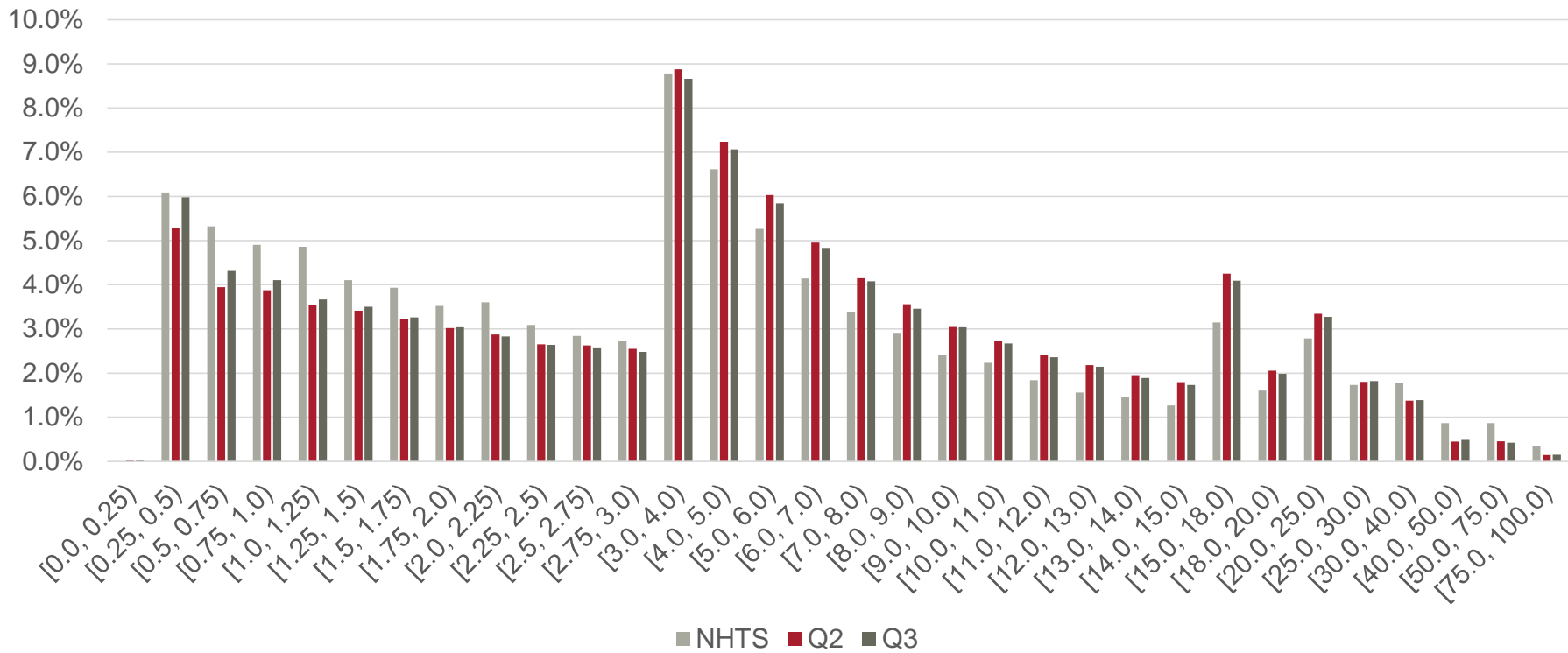
TOD Distribution – NHBO Trips





Trip Length Frequencies

Trip Length Distribution - Weekday



■ NHTS ■ Q2 ■ Q3





Average Trip Lengths

Trip Purpose	NHTS			Q2			Q3		
	Weekday	Sat	Sun	Weekday	Sat	Sun	Weekday	Sat	Sun
1 HBW	9.7	9.9	10.1	10.7	10.4	10.7	10.7	11.9	10.4
2 HBO	5.8	7.9	7.1	7.8	9.2	9.5	7.6	9.1	9.3
3 NHBW	7.7	8.5	7.4	6.9	7.7	8.0	6.8	7.5	7.6
4 NHBO	5.7	7.3	8.0	6.6	7.6	7.9	6.6	7.2	7.5
Overall	6.9	7.9	7.5	8.2	8.9	9.2	8.0	8.8	8.9

Trip Purpose	NHTS			Q2			Q3		
	Weekday	Sat	Sun	Weekday	Sat	Sun	Weekday	Sat	Sun
1 Night	9.6	9.2	8.0	8.3	9.0	9.5	7.0	8.3	9.0
2 Sunrise	14.4	15.4	12.7	12.7	11.9	11.7	11.8	11.2	9.9
3 Early AM	10.7	11.2	10.4	11.3	13.3	12.2	11.0	12.7	12.7
4 AM peak	6.7	9.0	7.7	9.1	10.9	10.8	9.1	10.4	10.4
5 Midday 1	6.1	7.2	7.0	6.9	8.3	8.8	6.8	8.3	8.6
6 Midday 2	6.4	7.5	7.4	7.5	8.4	8.7	7.2	8.2	8.4
7 PM peak	7.4	8.0	8.0	8.1	8.3	8.7	8.0	8.3	8.5
8 Evening	6.0	8.1	8.2	7.2	8.3	8.9	7.2	8.2	8.4
9 Late Eve	8.4	9.5	8.2	11.7	11.6	12.3	11.2	12.6	13.4
Overall	6.9	7.9	7.5	8.2	8.9	9.2	8.0	8.8	8.9





Visitor Travel



Total Visitation

Visitors include all people living outside the 3-county region

Total Daily Visitors

Q2		
Weekday	Sat	Sun
417,604	432,808	363,631

Q3		
Weekday	Sat	Sun
402,725	406,442	346,533

Top Home States of Visitors

State	Q2			Q3		
	Weekday	Sat	Sun	Weekday	Sat	Sun
Florida	55%	62%	60%	56%	65%	64%
Georgia	3%	4%	3%	3%	3%	2%
Illinois	3%	2%	2%	2%	2%	2%
New Jersey	2%	2%	2%	3%	2%	3%
New York	3%	3%	3%	6%	4%	5%
Pennsylvania	3%	2%	2%	3%	2%	2%
Texas	3%	3%	3%	3%	2%	2%

*Baseline from Other Sources:	daily				
Total Orlando dom	75,000,000	205,479			
https://attractionsmagazine.com/visit-orlando-75-million-visitors-2018/					
Total Florida out o	126,100,000	345,479			
https://www.orlandosentinel.com/business/tourism/os-bz-visit-florida-tourism-record-20190220-story.html					

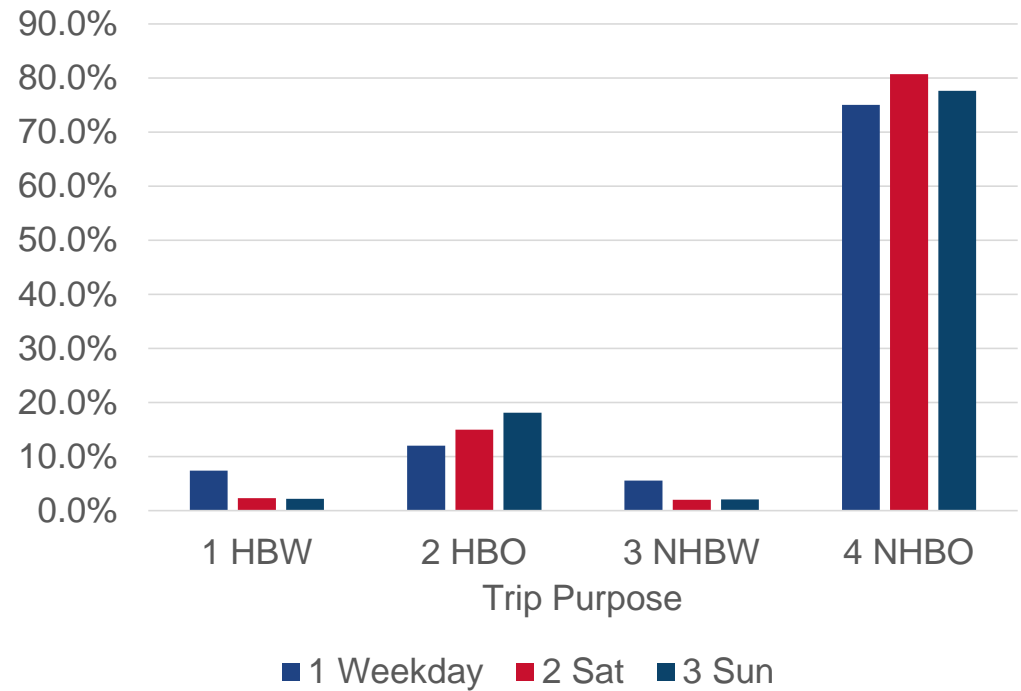




Trip Rates and Trip Purpose

Q2		
Weekday	Sat	Sun
3.67	3.38	3.26

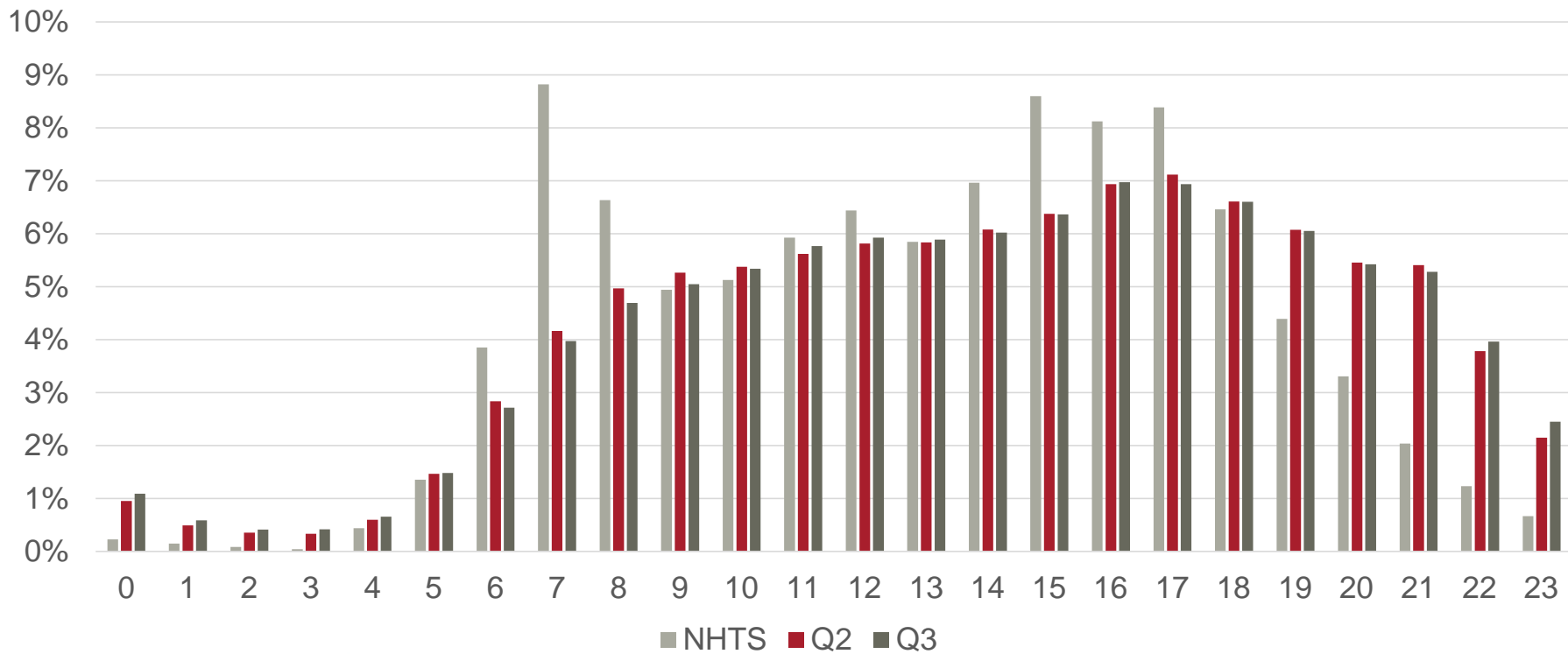
Q3		
Weekday	Sat	Sun
3.71	3.36	3.22





Trip Start Hour

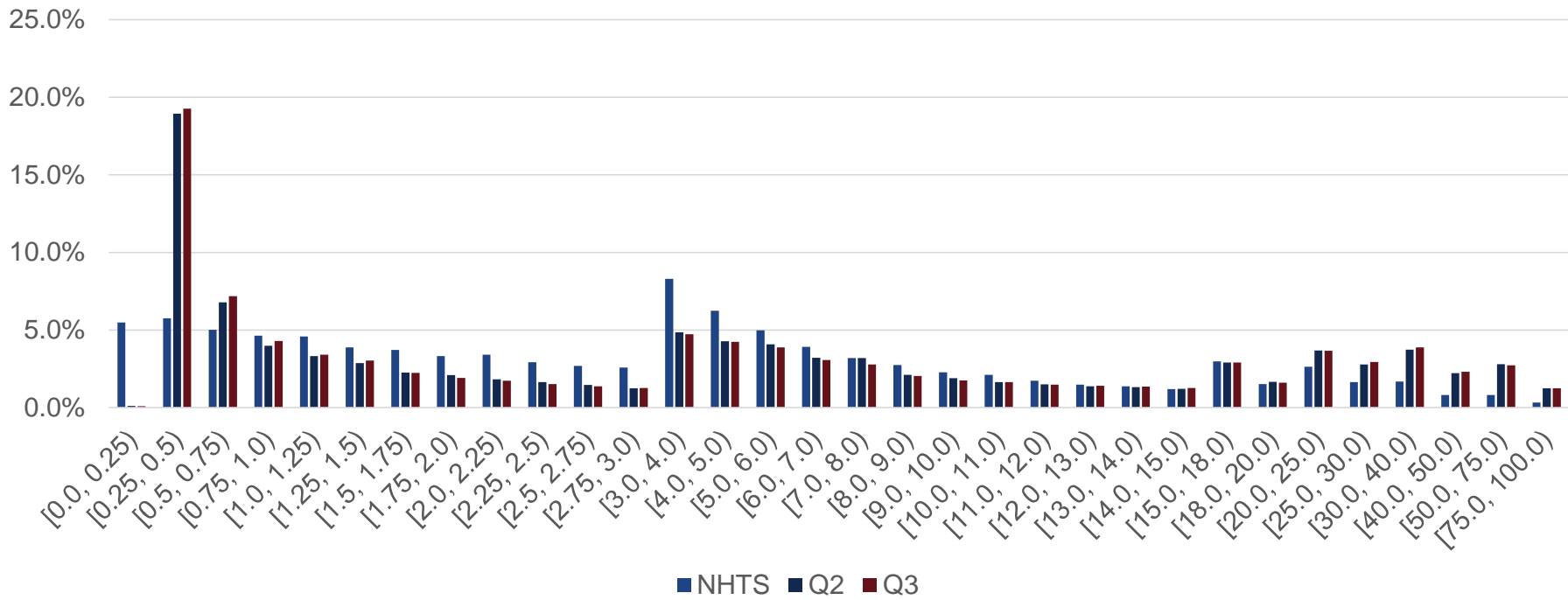
TOD Distribution - Weekday





Trip Length Frequencies

Trip Length Distribution - Weekday





Average Trip Lengths

Trip Purpose	Q2			Q3		
	Weekday	Sat	Sun	Weekday	Sat	Sun
HBW	30.9	29.9	27.5	30.1	28.8	29.3
HBO	55.3	52.9	60.1	54.2	48.7	60.2
NHBW	17.3	19.7	21.6	16.3	24.0	23.6
NHBO	10.8	11.3	13.4	10.9	11.7	14.7
Overall	18.0	18.1	22.3	17.9	18.4	24.1





External Trips

Residents

External Trip Type	Q2			Q3		
	Weekday	Sat	Sun	Weekday	Sat	Sun
I-I	97%	96%	96%	97%	96%	96%
IEEI	3%	4%	4%	3%	4%	4%

Visitors

External Trip Type	Q2			Q3		
	Weekday	Sat	Sun	Weekday	Sat	Sun
I-I	74%	75%	72%	74%	74%	70%
IEEI	26%	25%	28%	26%	26%	30%





Activity Summaries



General Summaries

Percentage of Activities by County, Day of Week, Location Type, Employment and Residency

Activity County	Q2 (%)	Q3 (%)
Orange County	64	64
Osceola County	15	15
Seminole County	21	21

Activity Day	Q2 (%)	Q3 (%)
Weekday	73	72
Saturday	14	14
Sunday	13	14

Activity Location	Q2 (%)	Q3 (%)
Home	42	42
Work/School	11	11
Others	47	47

Employment Status	Q2 (%)	Q3 (%)
Worker	69	68
Non-worker	31	32

Residency Status	Q2 (%)	Q3 (%)
Resident	84	85
Visitor	16	15

Devices by Employment and Residency, Q2

Employment	Residency	
	Resident	Visitor
Worker	20%	43%
Non-worker	13%	24%

Devices by Employment and Residency, Q3

Employment	Residency	
	Resident	Visitor
Worker	20%	41%
Non-worker	14%	25%





Summary List

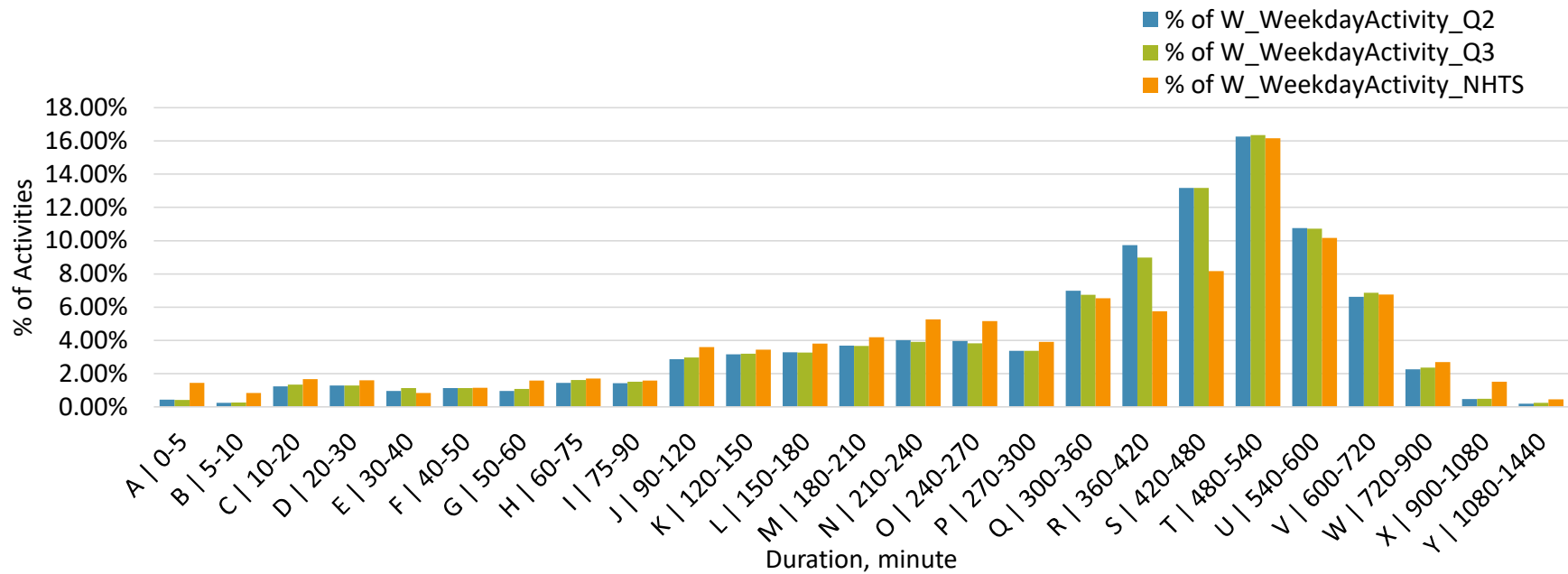
- Distribution of activities by duration, start hour and end hour
 - Data : LBS and NHTS (for comparison)
 - Measures: Percentage of average weekday and average weekend activities
 - Filters: Location and Employment
- Hourly distribution of activities
 - Data: LBS
 - Measures: Number/Percentage of active devices and activities in average weekday, average Saturday and average Sunday
 - Filters: County, Residency, Employment, Location, Tract





Activity Duration – LBS vs NHTS

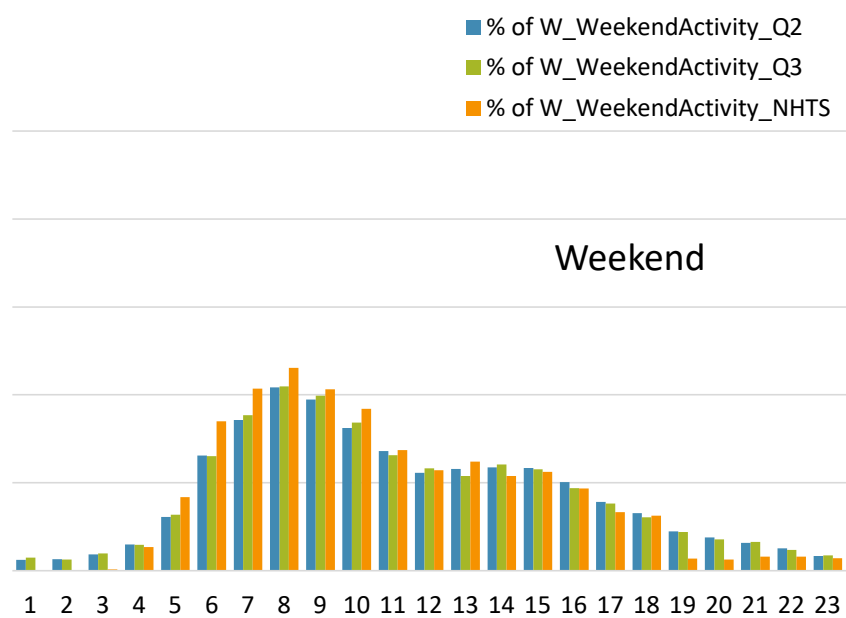
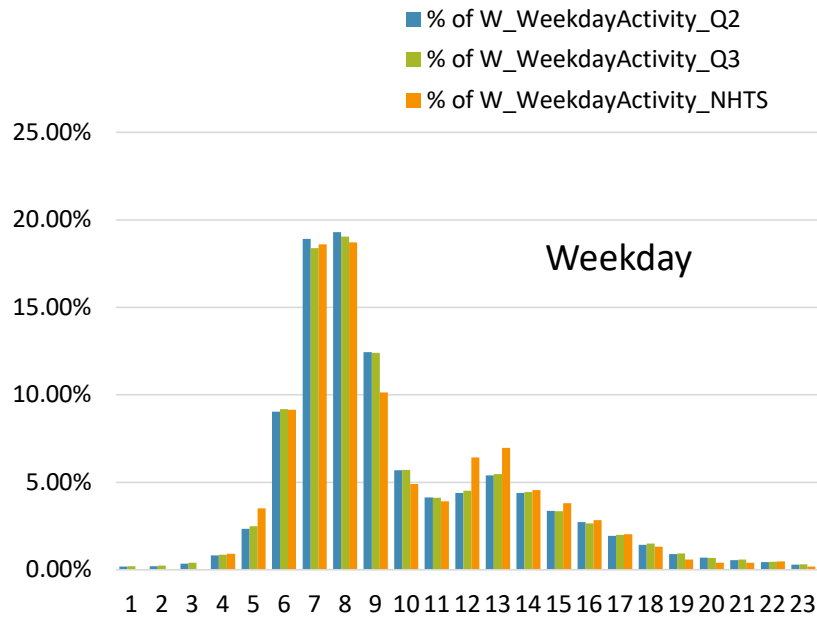
Distribution of Work Activity Duration for Resident Workers in Average Weekday





Activity Start Hour – LBS vs NHTS

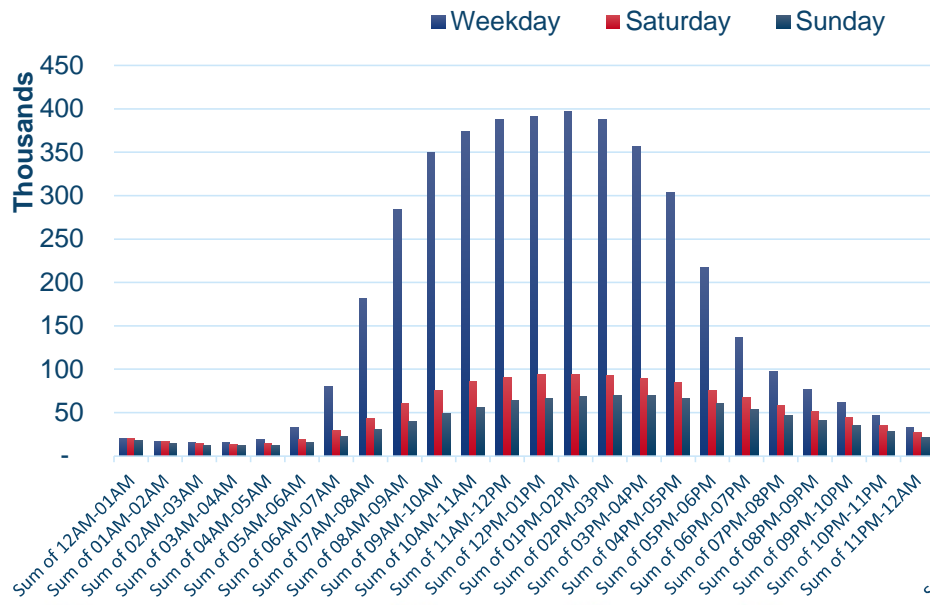
Start Hour of Work Activities by Residents in Average Weekday and Average Weekend



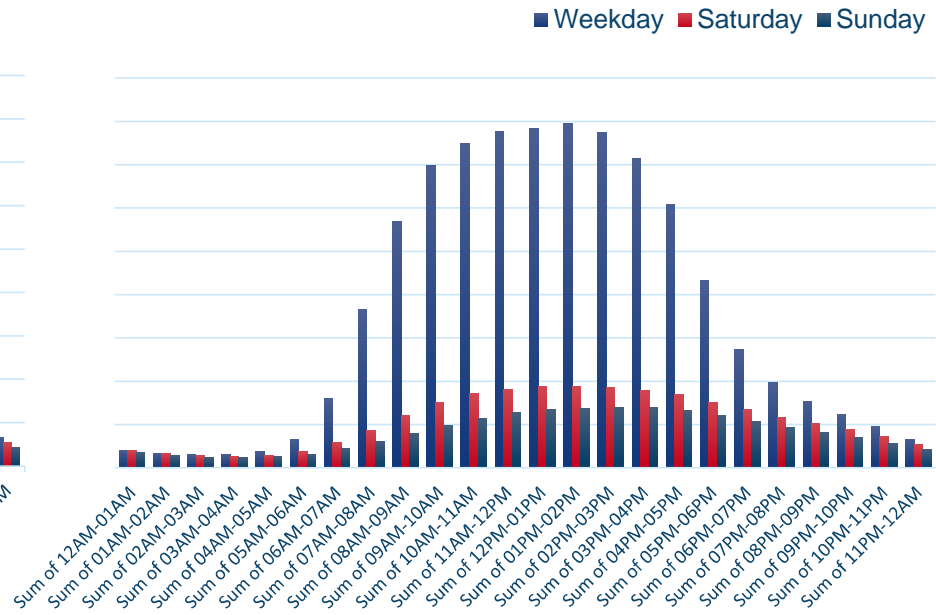


Active People & Activities by Hour of Day

Number of People by Hour of Day in Orange County
(For Resident Worker Engaged in Work Activities)



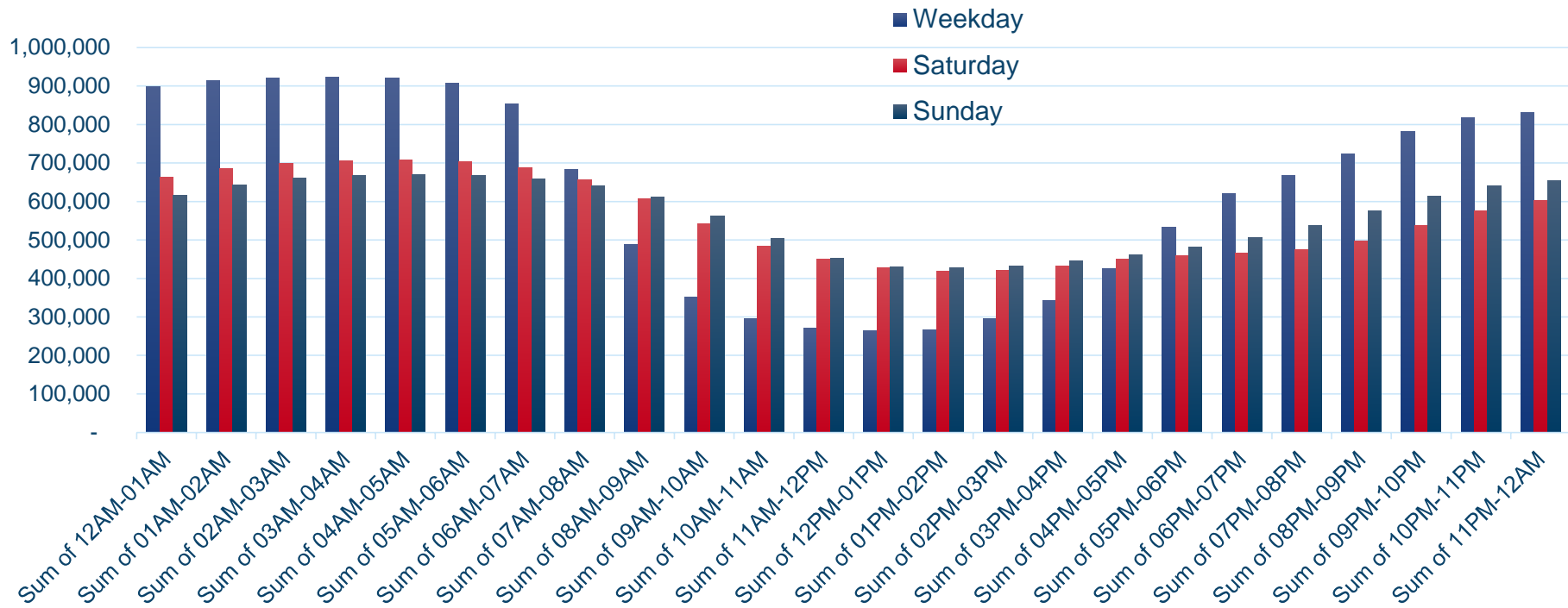
Number of Ongoing Activities by Hour of Day in Orange County
(For Resident Worker Engaged in Work Activities)





People & Activities by Hour of Day

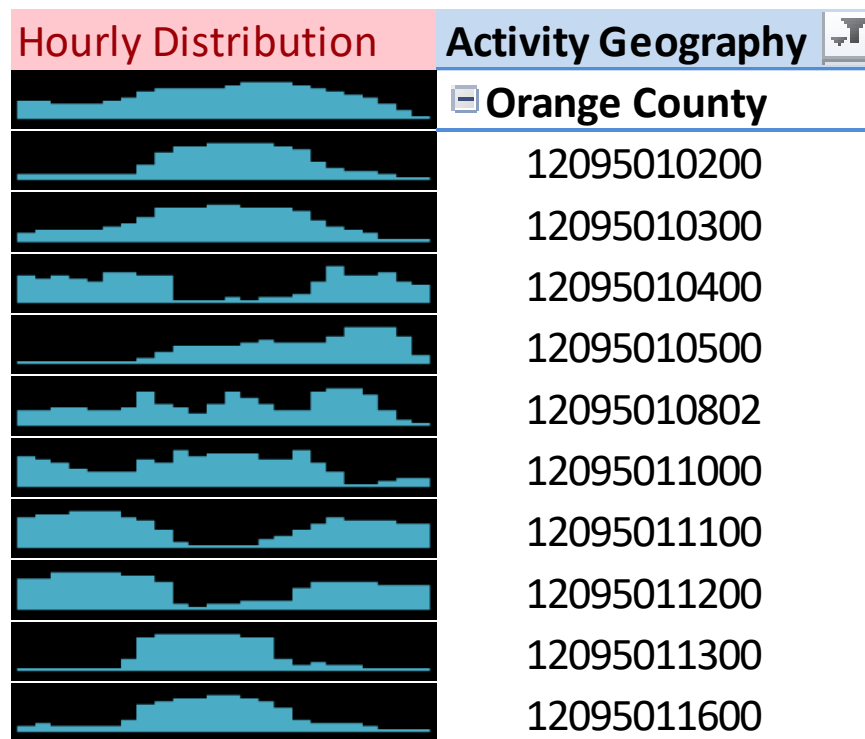
Number of Active People (For Resident Worker Engaged in Home Activities)





Disaggregate Counts of Active Devices

Example of hourly counts of people in selected tracts in Orange County in an average weekday





Disaggregate Counts of Active Devices

Example of hourly counts of people in selected tracts in Orange County in an average weekday

