Last Mile Freight Study
Overview, Methods and Approach, & Analysis Results

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Goods Movement & Transportation Finance Dept.
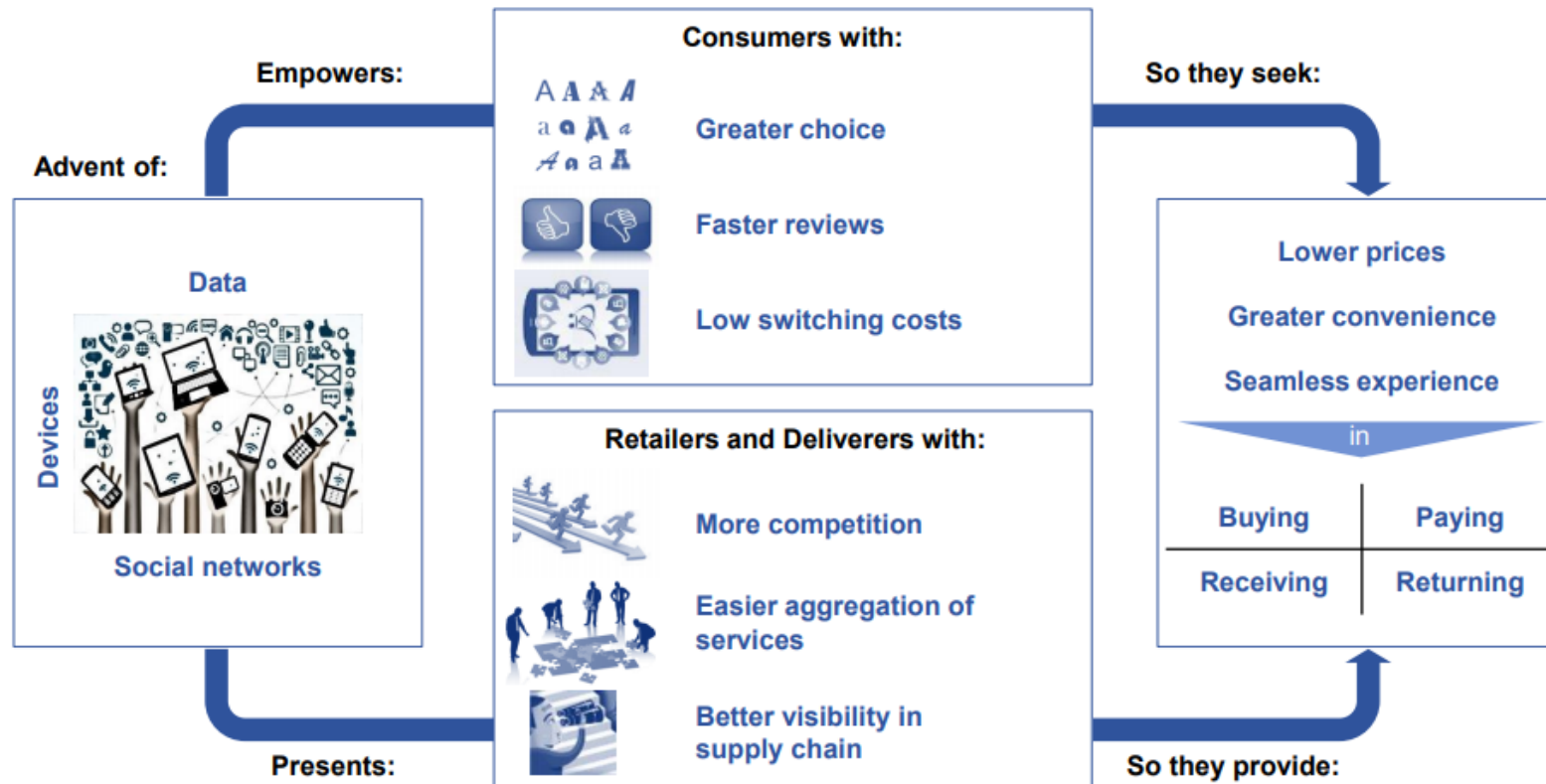International Urban Freight Conference
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Digitally enabled consumers driving most of the eCommerce demand see bargaining power shifting toward them

Rise of the digital consumer

Empowers:

Consumers with:

Greater choice

Faster reviews

Low switching costs

So they seek:

Lower prices

Greater convenience

Seamless experience

in

| Buying | Paying |
| Receiving | Returning |

Advent of:

Data

Devices

Social networks

Retailers and Deliverers with:

More competition

Easier aggregation of services

Better visibility in supply chain

Presents:

So they provide:

We have crossed barriers in choice, transparency, and service expectations

Source: Accenture analysis

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accenture
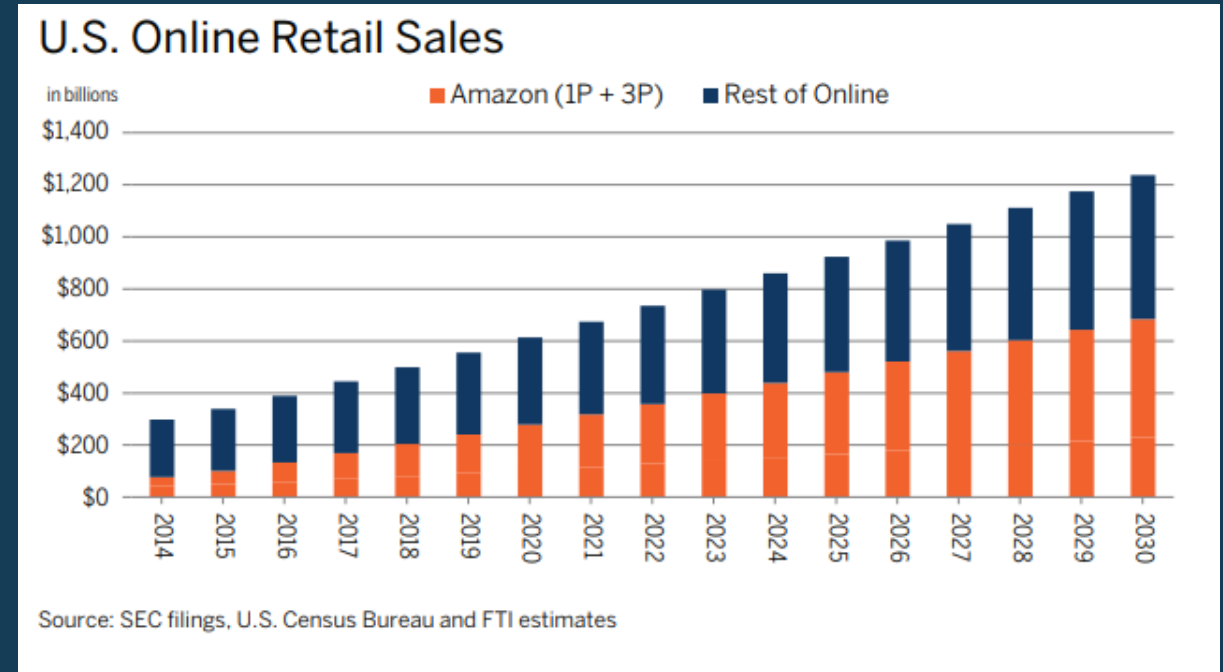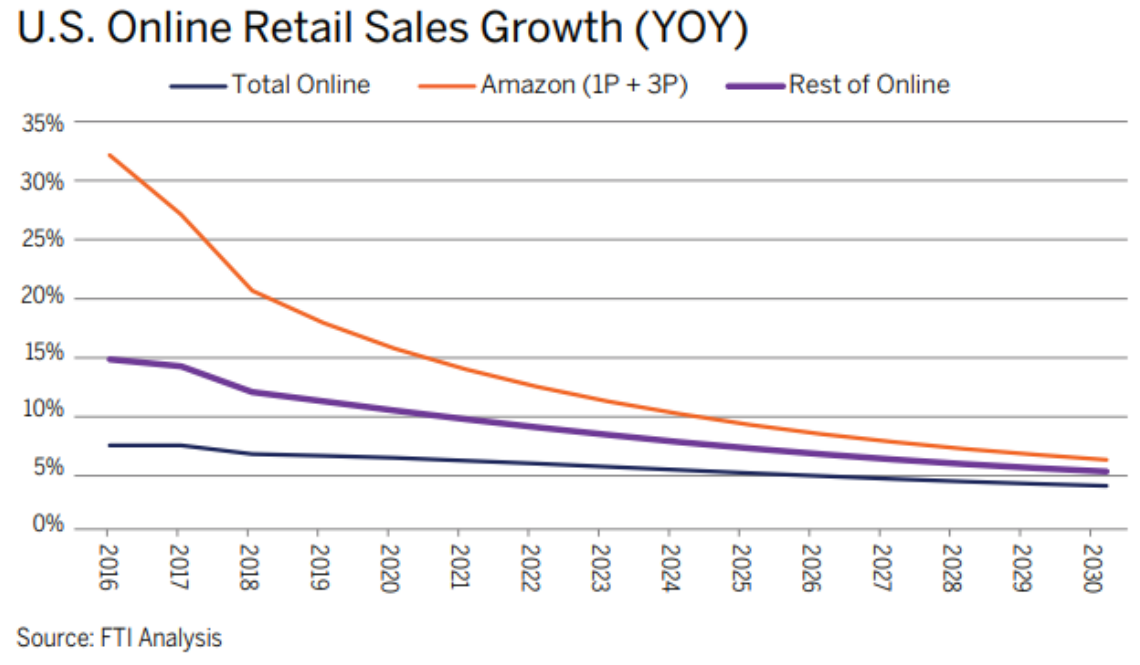
E-Commerce v. In-Store Retail Sales
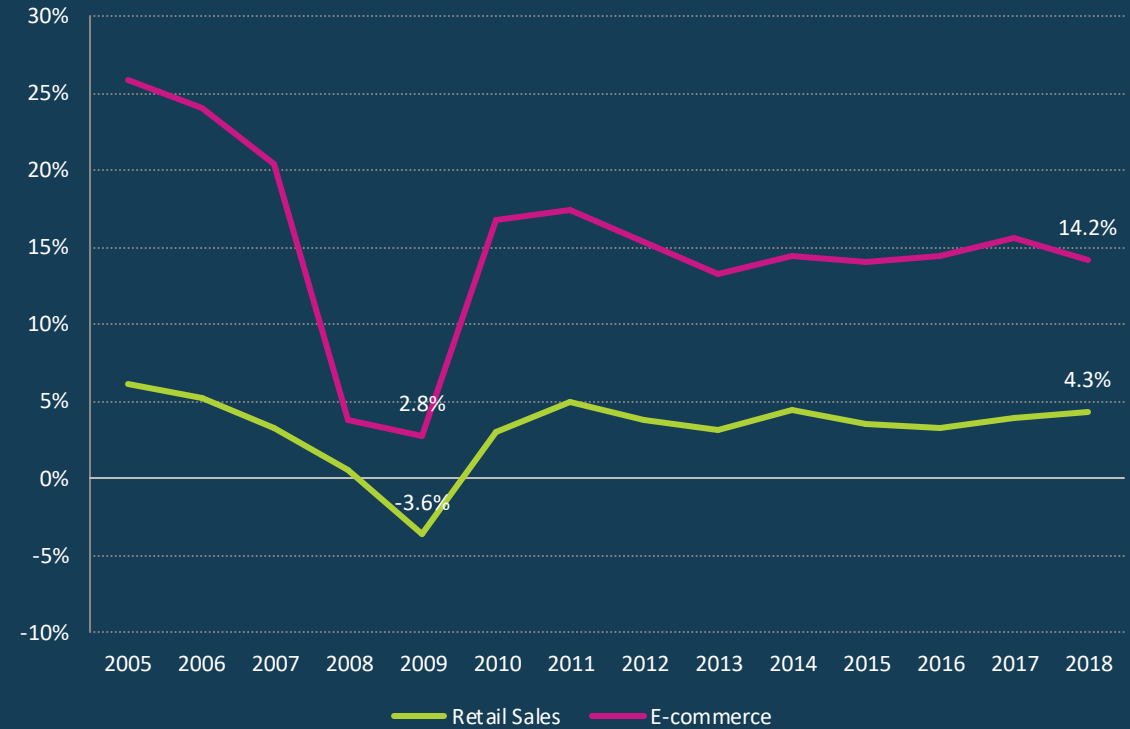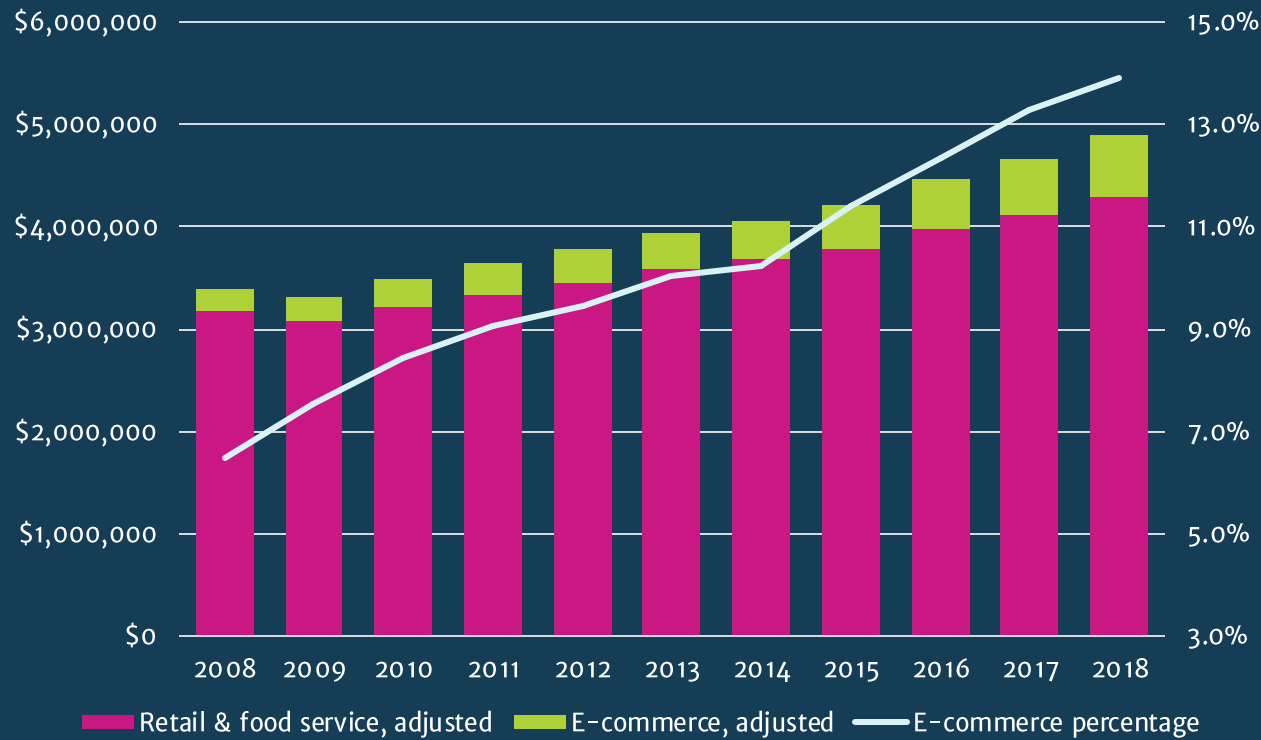
Source: U.S. Census Bureau: Monthly Retail Trade & Quarterly E-Commerce Reports

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E-Commerce Forecast

2018 E-Commerce Sales Market Share ($515 billion)
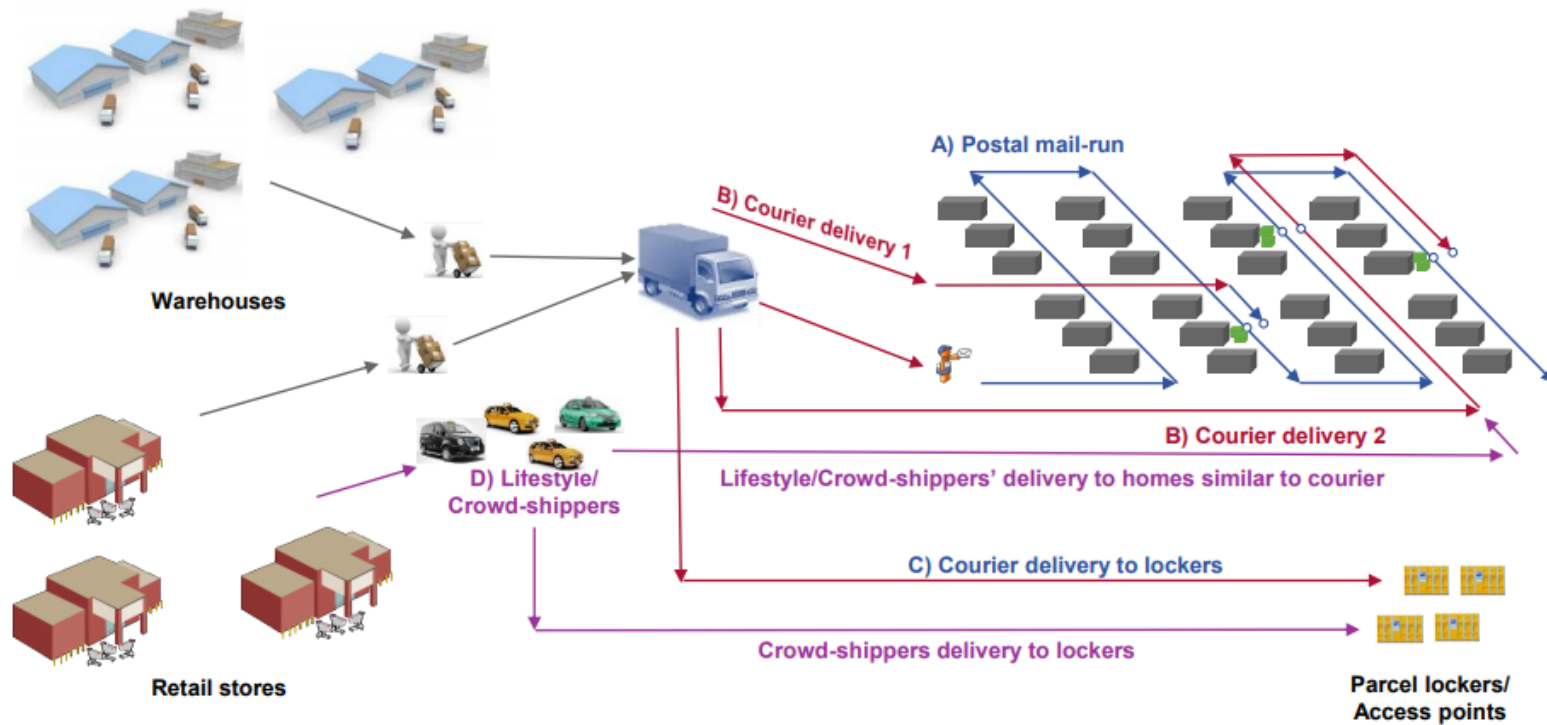
- Amazon – 41%
- eBay, Walmart & Apple – 15%
- Remaining top 15 – 11%
- Remaining top 500 – 23%
- Remaining top 1,000 – 5%

U.S. Online Retail Sales Growth (YOY)

Source: FTI Analysis

U.S. Online Retail Sales

Source: SEC filings, U.S. Census Bureau and FTI estimates

**Source: FTI Consulting, U.S. Census Bureau Quarterly E-Commerce Report, SEC Filings, eMarketer, Digital Commerce 360**

The last mile, which holds key to the consumer experience, has witnessed an emergence of multiple delivery models

Last mile delivery models

Warehouses

A) Postal mail-run

B) Courier delivery 1

D) Lifestyle/ Crowd-shippers

B) Courier delivery 2

Lifestyle/Crowd-shippers' delivery to homes similar to courier

C) Courier delivery to lockers

Crowd-shippers delivery to lockers

Retail stores

Parcel lockers/ Access points

Consumer convenience and cost reduction have been primary objectives guiding the change

Ride Sharing

U.S. Ride Sharing Customers & Global Demographic Makeup of Customers

Source: Statista
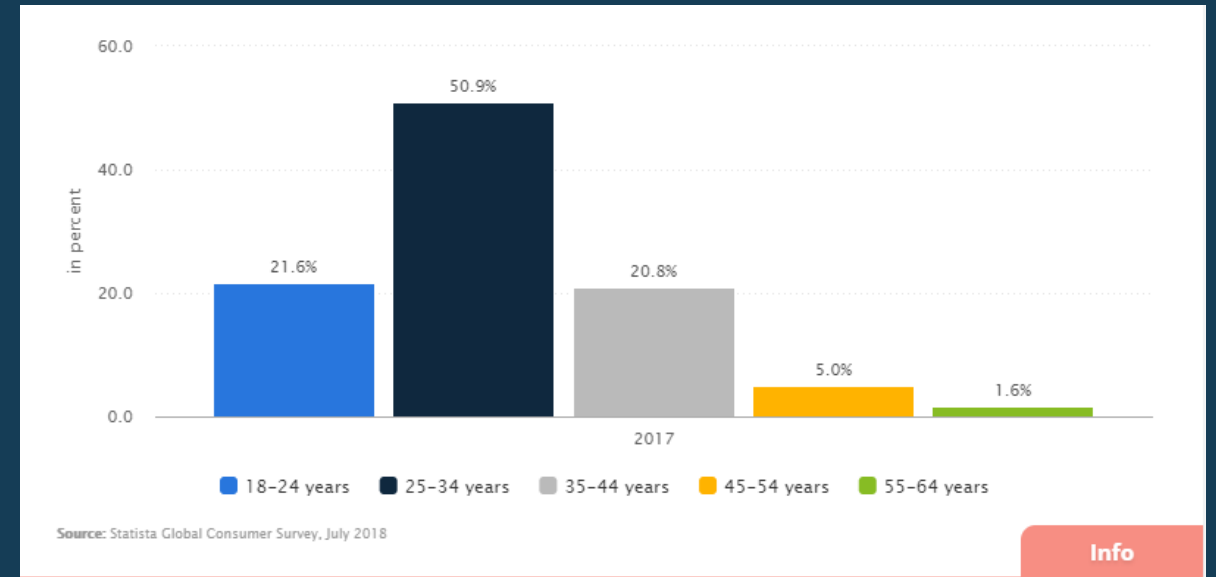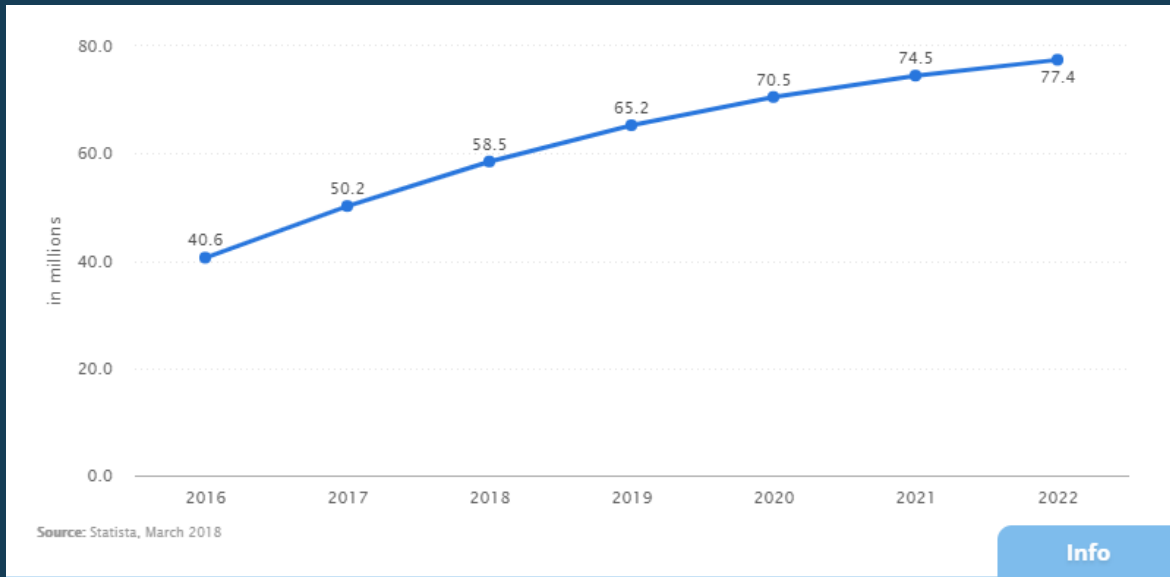
Study Goals

- Improve the regional understanding of last-mile delivery conditions, challenges, and solutions
- Understand the challenges and needs from a variety of users
- Quantify delivery issues and conditions
- Balance conflicting demands for street space
- Develop strategies appropriate for different areas
- Identify pilot projects for delivery improvements
- Have a stakeholder-driven process

- Stakeholder input
- Citywide data analysis
- Data collection
- Case study recommendations, pilot project concepts and toolbox of strategies
- Final products and resources

Stakeholder Input

- Project Advisory Committee (PAC)
- Delivery/receiver interviews
- Input used at several points to interpret data and approach
- Pilot project concept collaboration

Citywide Data Analysis

- Defined existing conditions
  - Screening parameters
  - Street typologies
- Identified case study locations

GIS Screening by Attributes	Mapping Screen Locations and Visually Identify Clusters	Visual Review of Block Clusters	Added to Draft Case Study List
90,000 Blocks	605 Screened Blocks	(35 blocks)	17 Case Studies

PAC Input

Street Typologies in Los Angeles:
20% Commercial*
10% Industrial
60% Residential
10% Alley, Service Roads

*2% CBDs

Roadway Typologies

— General Commercial Major
— General Commerical Minor
— Industrial Major
— Industrial Minor
— Regional Commercial Major
— Regional Commercial Minor

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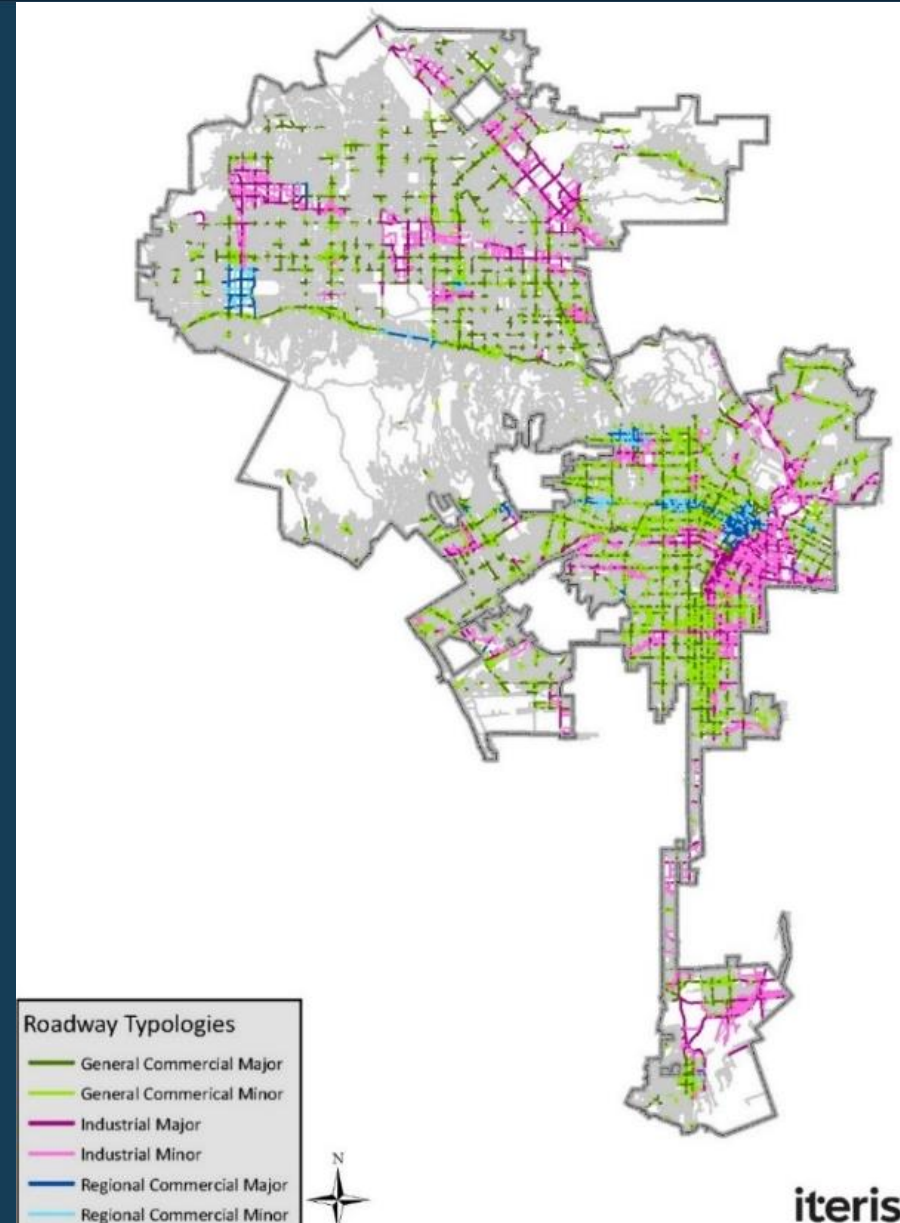
Findings – Citywide Analysis

| Typologies	Blocks	Truck Volume	Collisions	Parking Tickets	Deliveries	Bus Stops	Parking Meters
		Daily	5-Year	1-Year	Daily	Total	Total
Regional Commercial Major	1%	191	0.25	11.82	89.5	1.3	4.2
Regional Commercial Minor	1%	150	0.03	2.98	50.4	0.2	4.6
General Commercial Major	8%	126	0.24	0.65	15.8	0.7	2.0
General Commercial Minor	10%	115	0.02	0.31	7.6	0.1	0.8
Industrial Major	4%	234	0.39	1.25	21.2	0.6	0.8
Industrial Minor	6%	169	0.02	1.27	19.8	0.1	0.7
Residential Major	5%	81	0.10	0.45	2.3	0.3	0.1
Residential Minor	55%	20	0.01	0.04	1.2	0.0	0.0
All Commercial/Industrial Typologies	**30%**	**147**	**0.13**	**1.15**	**17.8**	**0.3**	**1.3**
All Blocks in the City		60	0.05	0.38	6.7	0.1	0.4

Citywide Data gaps
- Curb designation and regulation
- Off-street loading docks

Last Mile Freight Case Study Locations

- Case study areas
- Data collection plan
- Sample collection & analysis
- Full data collection (35 blocks), processing & review
- Analysis tool
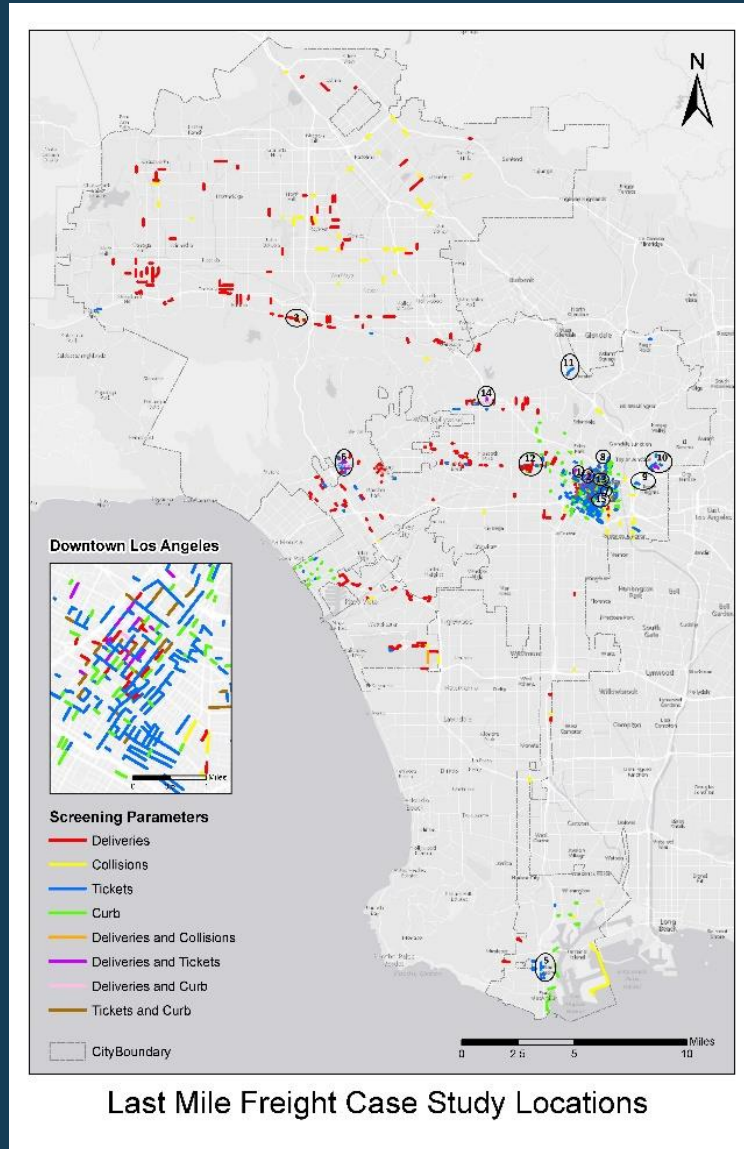
Case Study Area	Neighborhood	Total
Wilshire Boulevard, Bixel Street, Lucas Avenue	Westlake	5 blocks
Hill Street - Downtown	Jewelry District	2 blocks
Whitley Street	Hollywood	1 block
Santee Street	Garment District	2 blocks
Main Street and Broadway	Venice	3 blocks
6th - 8th, Grand, Hope and Olive	Downtown	6 blocks
Ventura Boulevard	Encino	2 blocks
Grand Avenue, 6th, 11th, 14th Streets	San Pedro	2 blocks
Westwood, Galey, Kinross	Westwood	4 blocks
Traction Avenue/2nd St.	Arts District	2 blocks
North Spring/North Broadway	Chinatown	4 blocks
Cesar Chavez Avenue	Boyle Heights	2 blocks

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Field Data Collection

Case Study block (Location Key)
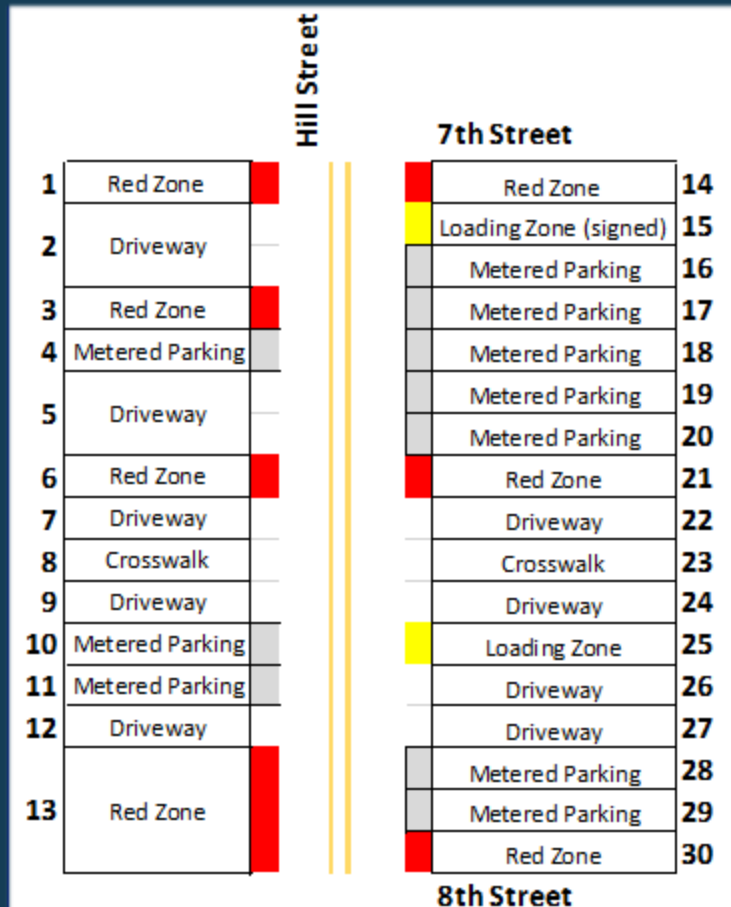
Curb Utilization

| Curb Location	Time In/Out	Addl Location	Vehicle Type	Activity
Identifier	Fill in	Blank if at Curb	Car/Personal Vehicle	Parked
		In Driveway	TNC (Uber/Lyft)	Waiting
		Used Driveway to Park	Taxi	Loading Passengers
		On Curb	Delivery Truck	Parcel Deliveries
		In Travel Lane	Postal Truck	Collecting Mail
		In Bus Lane	Service Truck/Van	Other pick-up
		In Bike Lane	Food Truck	Other Deliveries (e.g. linen)
		Alley	Large Truck (18-wheeler)	Bulk Food Delivery
		Other	Other Truck/Van	Food Delivery Service
			Motorcycle	Utility Service
			Bus	Other
			Bicycle	
			Pedestrian	

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Field Data Collection

- How should the data be collected: Video vs. Technician
  - Video − fixed point, limited in view, visual record
  - Technician − move around obstacles, may be overloaded, no visual record

Video Technique Observations:

- 150 feet of resolution due to "Renaissance perspective"
  - One point perspective – vanishing point
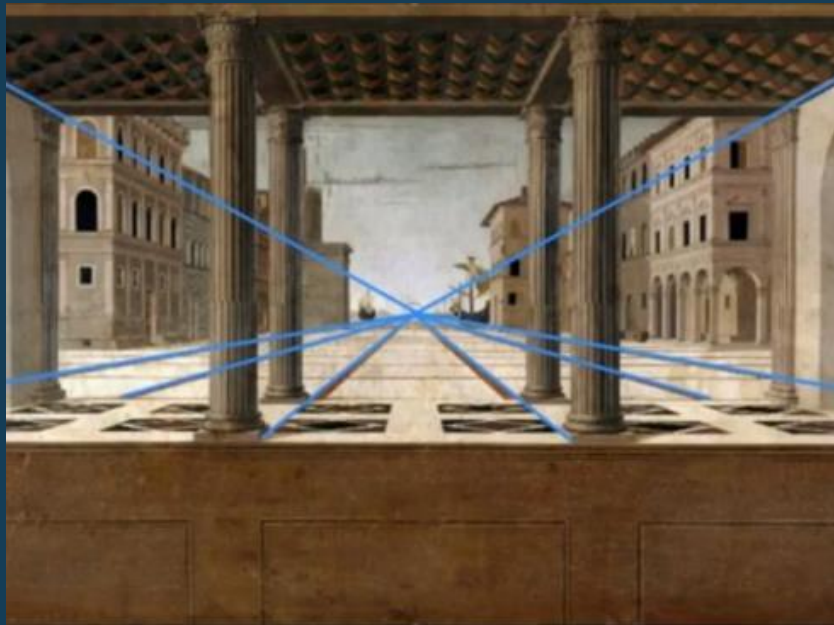
Technician Technique Observations:

- Technicians did not report being 'overwhelmed'
- Could record all activity – verified with video
- No additional time to tabulate data
- Adjusting/cleaning records was required

Location: Hill St bet 7th and 8th (Southside)
City: Los Angeles, CA

| CURB LOCATION	ADDITIONAL LOCATION		VEHICLE TYPE:	DELIVERY? (Yes/No)	TIME IN	TIME OUT	ACTIVITY				
	At Curb	At Drwy					Parked	Waiting	Dropping off Passenger	Parcel Delivery	Other Delivery
25	X		VAN	N	-	10:17 AM	X				
27		X	CAR	N	10:20 AM	10:21 AM			X		
27		X	CAR	N	10:29 AM	10:30 AM		X			
28	X		CAR	N	-	10:35 AM		X			
9		X	CAR	N	10:34 AM	10:35 AM			X		
9		X	UBER	N	10:36 AM	10:37 AM			X		
27		X	CAR	N	10:42 AM	10:42 AM			X		
23	X		CAR	N	10:44 AM	10:53 AM		X			
28	X		CAR	N	10:46 AM	10:46 AM		X			
26		X	CAR	N	10:51 AM	10:52 AM		X			
26		X	CAR	N	10:55 AM	10:55 AM		X			
27		X	CAR	N	10:57 AM	10:59 AM		X			
25	X		CAR	N	11:06 AM	11:11 AM			X		
28	X		VAN	N	11:06 AM	-	X				
25	X		VAN	N	-	11:14 AM	X				
25	X		VAN	Y	11:16 AM	12:00 PM				X	
27		X	CAR	N	11:24 AM	11:27 AM	X				
25	X		CAR	Y	11:26 AM	11:33 AM					X
27		X	CAR	N	11:28 AM	11:30 AM		X			
29	X		CAR	N	11:29 AM	11:30 AM	X				
25	X		CAR	N	11:34 AM	-	X				
13	X		CAR	N	11:38 AM	-			X		
25	X		CAR	N	-	11:41 AM	X				
25	X		VAN	N	11:49 AM	-	X				
29	X		CAR	N	11:50 AM	11:52 AM	X				
25	X		CAR	N	11:51 AM	11:52 AM	X				
27		X	CAR	N	11:55 AM	11:58 AM		X			

Video Pilot on Hill Street s/o 6th Street (Downtown)
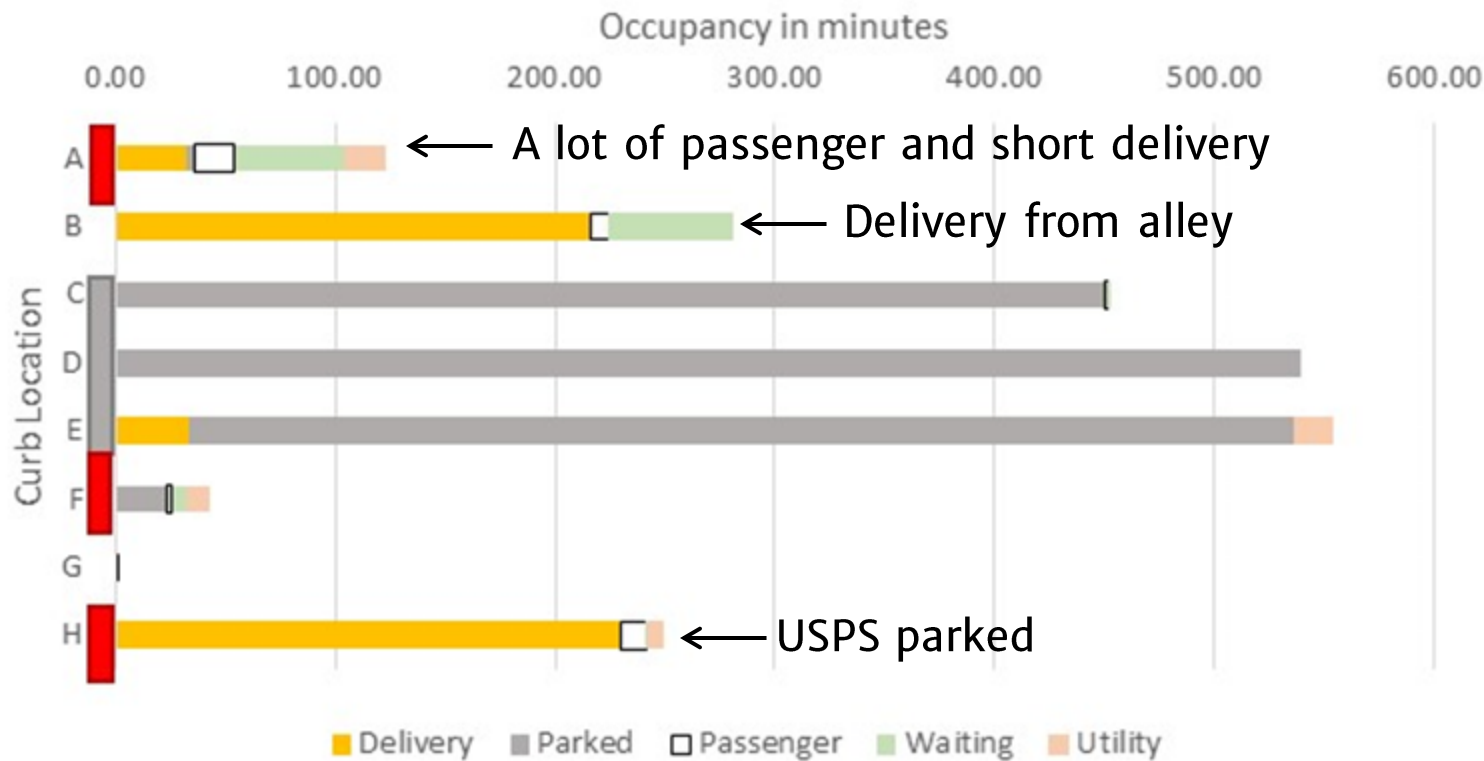
- Five cameras deployed
- 24-hour period
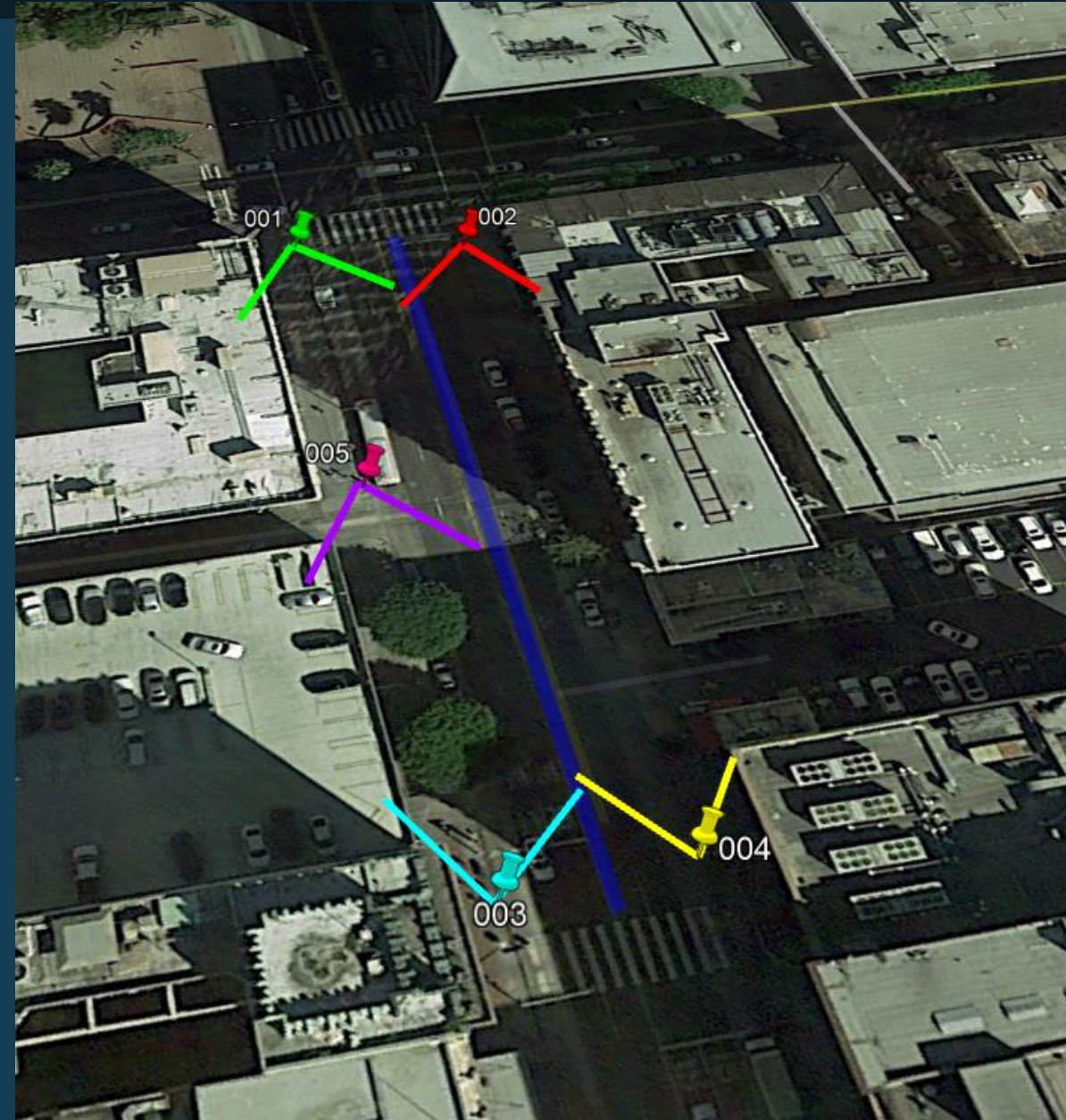
Video Camera Field Deployment
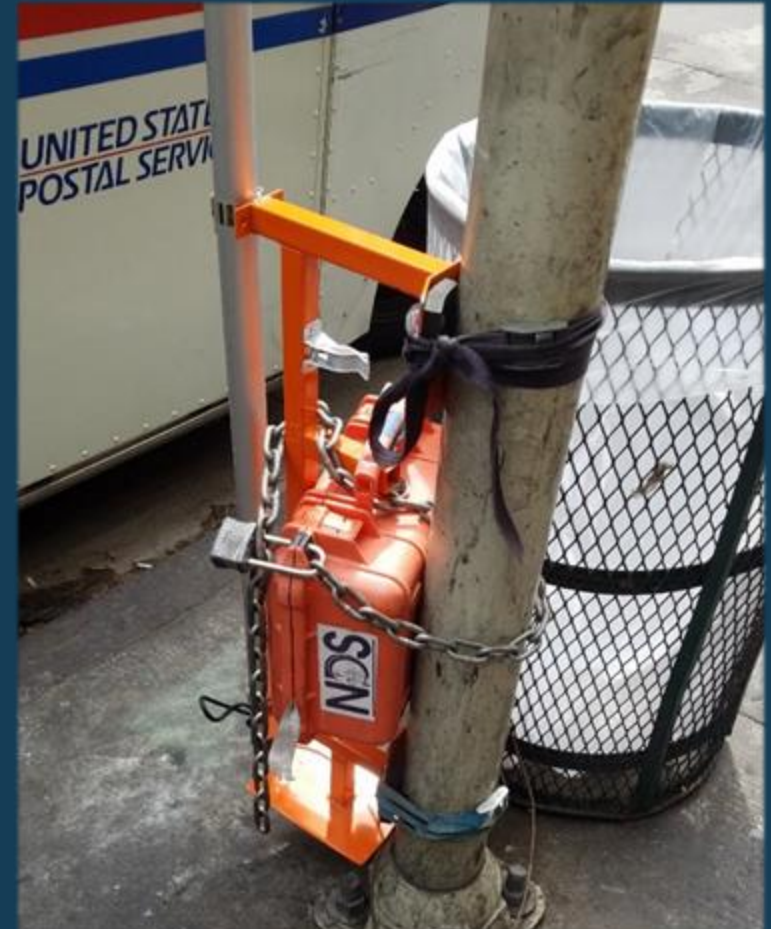
Video Pilot on Hill Street (Downtown) − West Side Duration

West Curb Occupancy by Activity - 9 am - 6 pm

← A lot of passenger and short delivery

← Delivery from alley

← USPS parked

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- ## Issues per Case Study Location from Data Collection Plan

	Wilshire Boulevard, Bixel Street, Lucas Avenue – Westlake	6th – 8th, Grand, Hope and Olive – Downtown	Ventura Boulevard – Encino	Van Nuys Boulevard – Van Nuys	Grand Avenue, 6th, 11th, 14th Streets – San Pedro	Boulevard, Galey, La Conte, Midvale – Westwood	Avenue/2nd St. – Downtown – Arts District (add)	North Spring/North Broadway – Chinatown	Cesar Chavez Avenue – Boyle Heights	USC Medical Center – Boyle Heights	Wilshire Boulevard and side streets – Koreatown	Los Feliz Boulevard – Atwater Village	Hill Street – Downtown Jewelry District	Whitley Street – Hollywood	Santee Street – Downtown Garment District	Crocker Street – Downtown – Skid Row	Main Street and Broadway – Venice	Average Frequency and Total Issues
Delivery Frequency (from GIS Screening)																		
Daily Deliveries/Block	84	306	1,045	63	18	265	59	49	78	206	15	652	340	194	72	59	14	228
Citations/Block (yearly)	82	87	9	6	90	13	66	48	93	48	22	3	240	5	160	189	21	73
Issues																		
"Cruising" by commercial delivery vehicles	X	X	X	X	X	X				X	X		X	X	X	X	X	13
Designated commercial zones occupied by non-commercial vehicles	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	13
Lack of adequate alley loading	X	X			X	X	X			X		X	X	X	X	X	X	12
Lack of adequate off-street loading bays	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	15
Multiple deliveries/pick-ups from the same block throughout a day	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
TNC (e.g., Uber/Lyft) use impedes curbside access		X			X		X		X		X		X	X			X	7
Use of red curb zones for commercial deliveries		X	X	X		X		X		X	X	X	X	X		X	X	12
Vehicles with handicap placards occupy majority of on-street parking spaces, reducing curbside space for commercial delivery		X		X		X		X		X	X			X		X	X	9
Parking in travel lanes (aka "double parking") by commercial delivery vehicles		X			X	X	X			X		X	X	X	X	X		9
Available curb space occupied by other elements (e.g., bike share stations, parklets)		X			X	X	X		X		X						X	7
Commercial deliveries occurring in bike lanes		X		X		X											X	4
Private vehicles acting as commercial delivery vehicles utilizing on-street parking		X				X	X	X			X			X		X	X	7
Deliveries blocking transit	X	X	X	X		X		X	X	X	X	X	X				X	12
Count	6	13	6	8	4	11	6	11	6	6	11	6	11	9	6	8	10	

In case study blocks:

- White Zone: 12.2 actions per day

- Yellow Zone: 8.2 actions per day

- Red Zones 5.3 actions per day

- Parking: 4.3 actions per day

- Alleys: 3.5 actions per day

Curb	Action			Total
	Parked	Passenger	Delivery	
Red	1.9	2.7	0.7	5.3
Parking	3.9	0.2	0.2	4.3
Yellow	5.2	0.4	2.6	8.2
Driveway	1.0	0.9	0.5	2.4
Crosswalk	0.9	0.3	0.1	1.3
White	5.6	5.0	1.6	12.2
Alley	2.4	0.7	0.4	3.5

- Parking and loading had the longest durations
- Parking was about 1:30 hour
  - Parking outside of parking spots was 25 minutes on average
- Passenger loadings was 2 minutes on average but large range
- Loading was about 30 minutes on average

Curb	Parked	Action Passenger	Delivery
Red	0:25:05	0:01:07	0:24:22
Parking	1:30:45	0:07:15	0:36:29
Yellow	0:27:08	0:05:20	0:33:22
Driveway	0:35:52	0:03:22	0:22:31
Crosswalk	0:02:16	0:02:20	0:14:17
White	0:35:29	0:03:44	0:36:34
Alley	0:09:29	0:03:01	0:45:59
Bike Share	0:06:00	0:02:00	-
Total	1:04:08	0:02:02	0:29:53
Outside Parking	0:27:09	0:01:43	0:28:53

Findings - Delivery Vehicle Analysis

- Delivery vehicles were 61% of all deliveries − 70% package/parcel (FedEx/UPS/USPS)
- All types split evenly between zones with trucks being the exception for yellow, red and parking zones

Type	All Deliveries		Type of Curb Area Used for Deliveries				
			Yellow	White	Red	Parking	Other (Driveway)
Delivery Vehicle	61%		38%	9%	34%	11%	7%
Personal Vehicle	25%		31%	3%	43%	11%	11%
Truck	7%		50%	8%	15%	19%	8%
Other (e.g. Utility Truck)	7%		35%	9%	43%	9%	4%
Total	100%		37%	7%	36%	12%	6%

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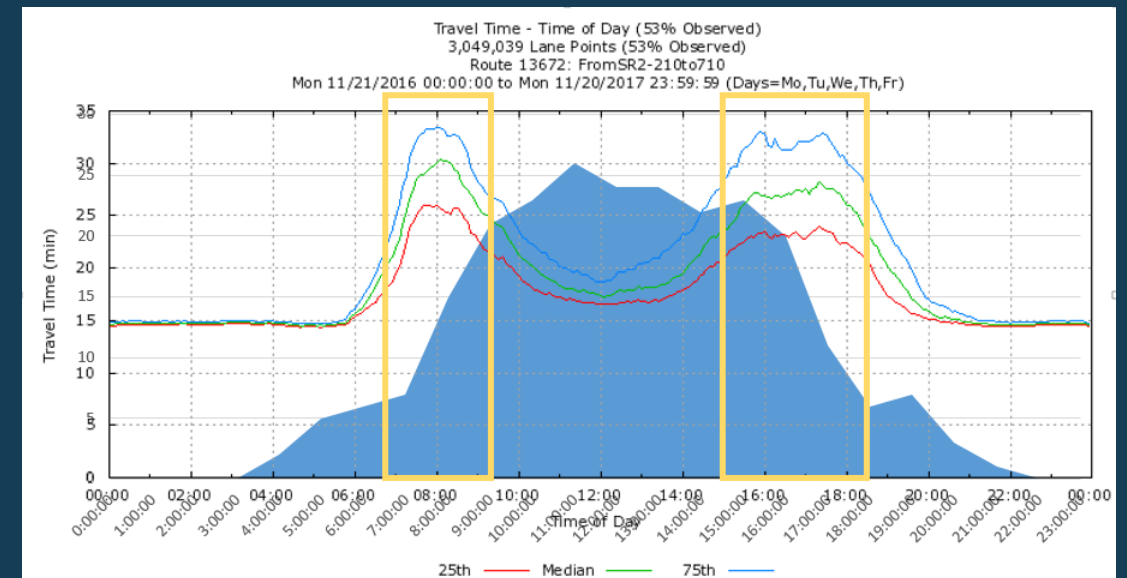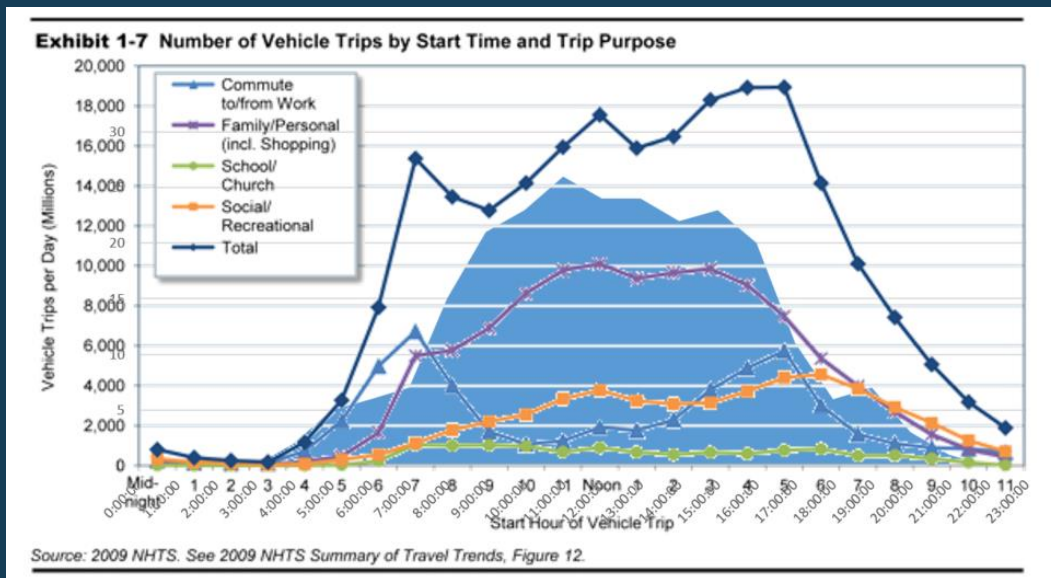# Findings - Transportation Network Company Analysis

- TNCs were 10% of all passenger loading
- They utilized red zones nearly twice as much as personal vehicles and taxis—and less likely to use white zones

Type	All Passenger Loading	Type of Curb Area Used For Passenger Loading				
		Red	Parking	Yellow	White	Other (Driveway)
TNC /(e.g. Uber Lyft)	10%	73%	9%	3%	5%	10%
Taxi / Shuttle	3%	44%	15%	11%	19%	11%
Bus	46%	99%	0%	0%	0%	1%
Personal Vehicle	41%	47%	12%	5%	27%	9%
Total	100%	73%	6%	3%	12%	7%

- Deliveries peak during business hours in the middle of the day
- Follows general travel trends but more concentrated before and after commuting hours (delivery in-transit hours)
- Deliveries traveling during peak congestion periods

Exhibit 1-7 Number of Vehicle Trips by Start Time and Trip Purpose

Source: 2009 NHTS. See 2009 NHTS Summary of Travel Trends, Figure 12.

41 recommendations in case study blocks

Loading Zone Strategies
- Creation, extension or shifting the location of yellow zones within blocks

Alley Strategies
- Develop commercial-only alleys
- Implement commercial parking spots in one-way alleys

Lane Strategies
- Consider Floating/Offset transit lane
- Install concrete pads at loading zones
- Provide for signed median loading in two-way left turn lanes (TWLTL) where feasible and safe.

Shared Space Recommendations
- Consider options for making the curb and roadway area a flex area
- Consider the expanded use of removable bollards

LMF Delivery Strategy Categories

Curb Area
1. Curb Loading Areas
2. Manage Curb Demand
3. Shared Space
4. Operating Hours
5. Restricted Locations

Delivery Cos. and Receivers
1. Delivery Consolidation
2. Building/ Parking Improvements
3. Vehicle Options

Application / Implementation
1. Enforcement
2. Technology
3. Education

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Recommendations - Pilot Project Concepts

1. **Cargo eBike Delivery Pilot**
2. Off Peak Delivery Program
3. **Data Sharing/Collection**
4. Common Carrier Lockers
5. **Zero Emission Infrastructure/Vehicle**
6. LA Express Park Commercial Module/Permitted Parking
7. **Code the Curb**
8. Integration of Postal Service Guidelines into Building Code

# Curb Space Management Study

8-12 cities will be selected for detailed study from the 6 counties in SCAG region.

Site recommendations and pilot project areas will be determined through public participation, stakeholder engagement, and technical analysis.

- Build from LMFS
- Expand analysis coverage
- Consider all modes/uses
- Enhance data collection framework
- Further support pilot projects & implementation strategies
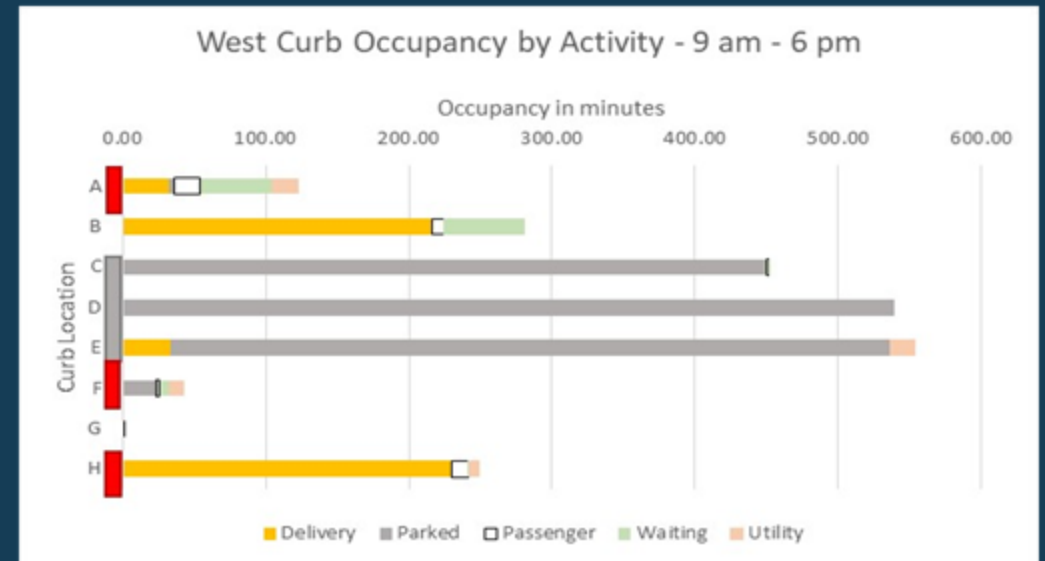
Thank you for your involvement!

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