San Diego County Air Pollution Control District

Warehouse Working Group (WWG) Meeting
June 3

2024

San Diego County
Air Pollution
Control District

Meeting Announcements

- Participants muted
- Save questions and comments until end of each section

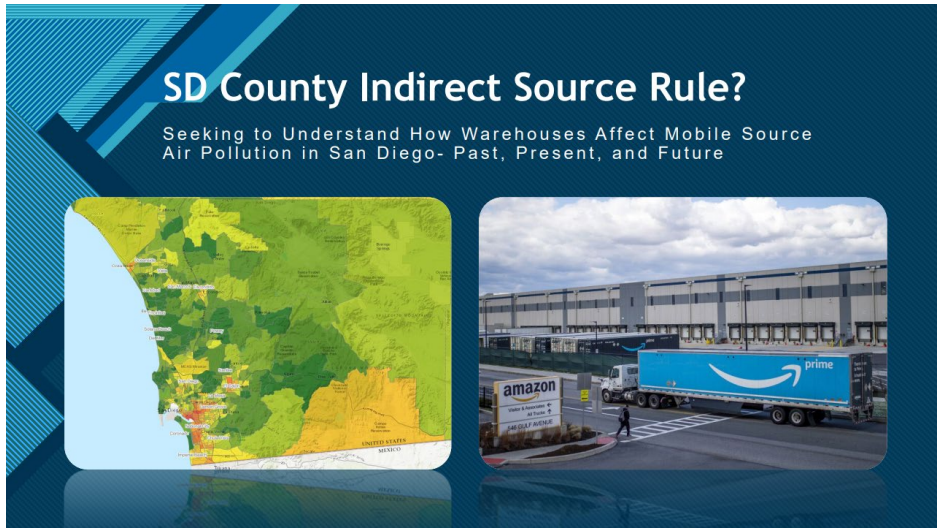
Overview

- Attendance & Introductions (5 min)
- May Meeting Summary (5 min)
- APCD truck trip rate analysis (60-90 min)
- Next Steps (10 min)
- Non-agenda / Participant Comments (5 min)
- Action Items / Next Meeting (5 min)

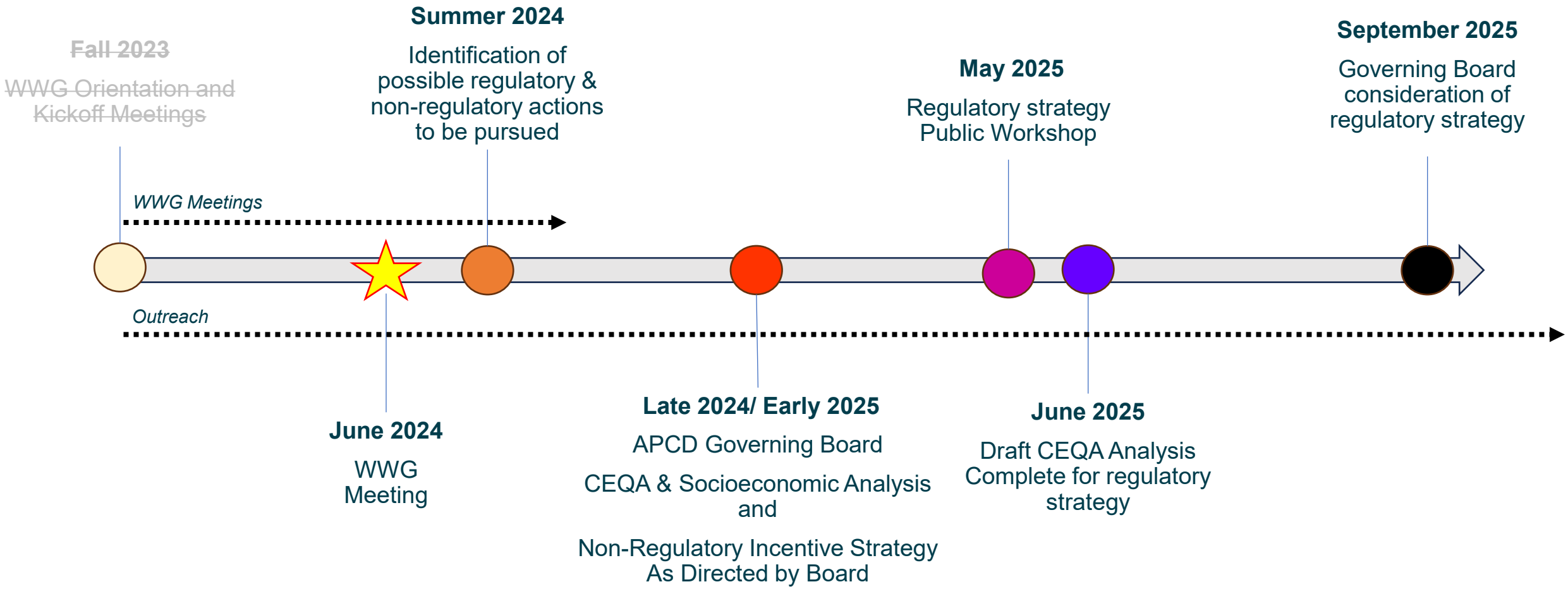
Attendance and Introductions

WWG Timeline Recap

- 5/6/24
  - ➢IEA Warehouse Analysis/Presentation
  - ➢APCD truck trip rate analysis
  - ➢Working definition of warehouse
  - ➢Planning and Policy Committee comments
  - ➢Comments:
    - IEA's analysis does not study local impacts
    - Will District prepare similar analysis?
    - Warehouse definition is critical
    - Will District survey warehouse owners/operators?



ISR Timeline Recap (tentative)



Board Direction and Goals

- Board direction (June 2023)
  - Prioritize under-resourced communities
  - Consider smaller warehouses (<100k sq ft)
- Goals of truck trip rate analysis
  - Address Board's direction
  - Obtain *San Diego specific* truck trip data
  - Estimate truck trip rates
  - Rates critical for estimating baseline emissions
  - Emission reductions
  - Cost-effectiveness
  - Public health benefits

Key Findings of Truck Trip Analysis

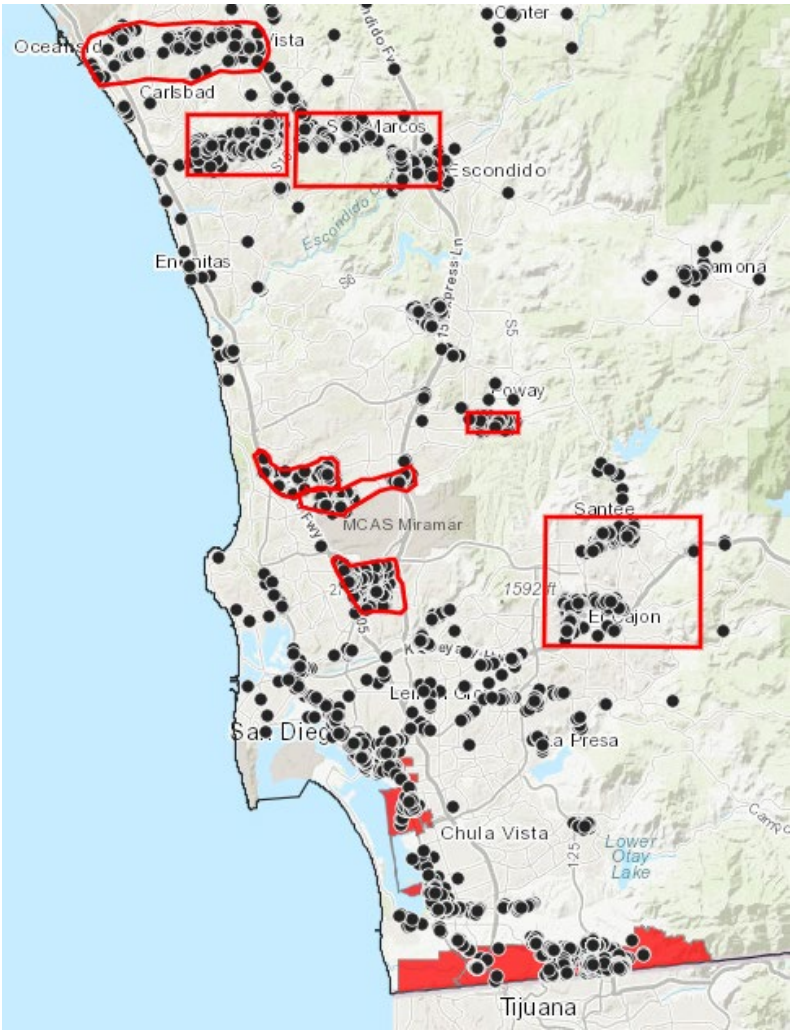
- Strong positive linear relationship between warehouse square footage and truck volume using San Diego County data
- Necessary to adjust for unknowns
- ≥50k sq ft - in range of other rates (<1.0 trip/1k sq ft)
- <50k sq ft - less confidence (>1.0 trip/1k sq ft)
- More data needed for smaller warehouses

Data and Methodology

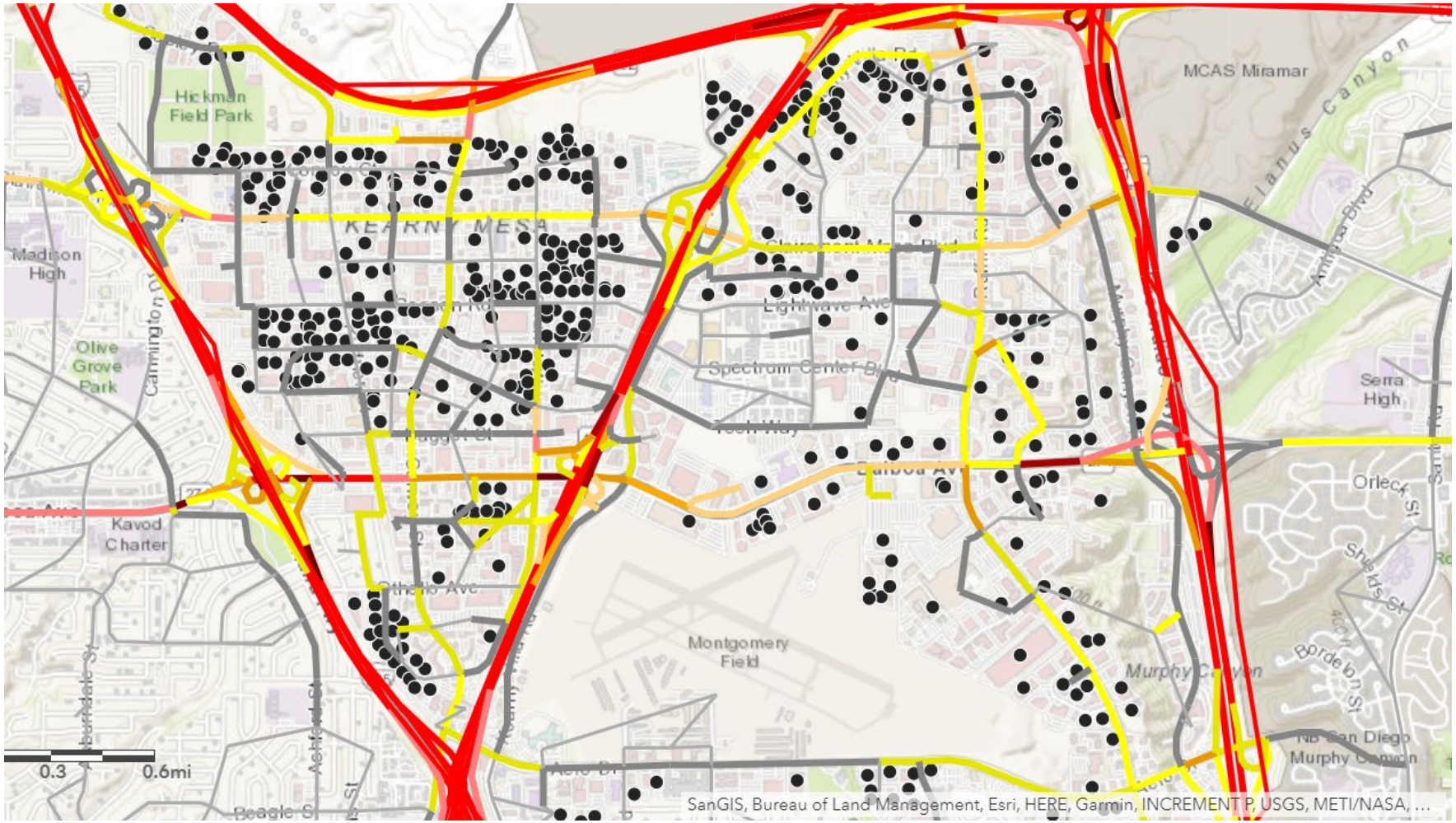
- Warehouse inventory (CoStar)
- SANDAG Transportation Modeling Data
  - 2016 base year
  - 2019 Federal Regional Transportation Plan
  - Heavy-duty truck volumes along freeways and street segments
- GIS Map
  - Include CoStar and SANDAG data
  - Warehouse clusters throughout region
  - Identify street segments near warehouses
  - Estimate truck trip rates

Warehouse Clusters

- Portside Community
- International Border Community
- Poway
- Kearny Mesa
- Santee and El Cajon
- Miramar
- Sorrento Valley
- Carlsbad and Vista
- San Marcos and Escondido
- Oceanside and Vista



Truck Volumes Map



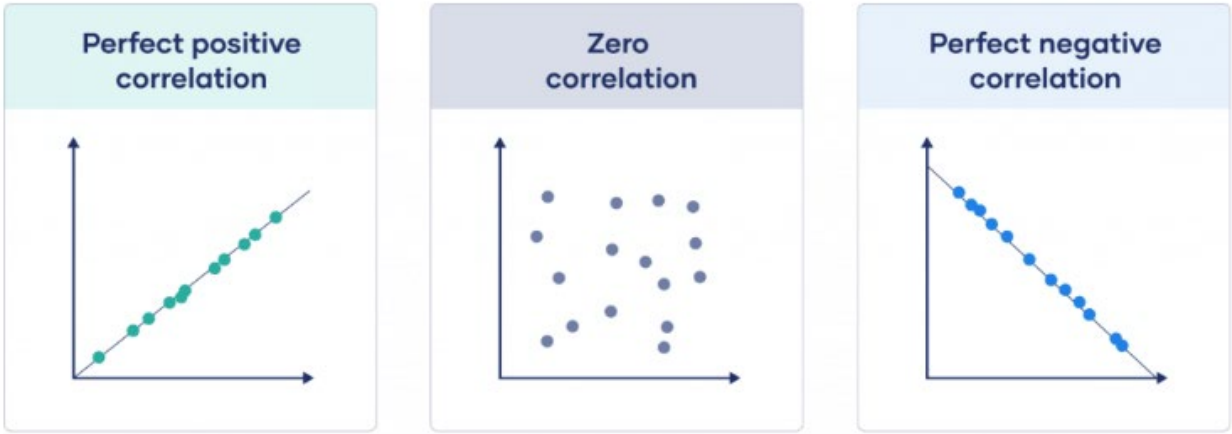
SANDAG 2016 Base Year Truck Volume (A to B Truck Flow)

A to B Truck Flow

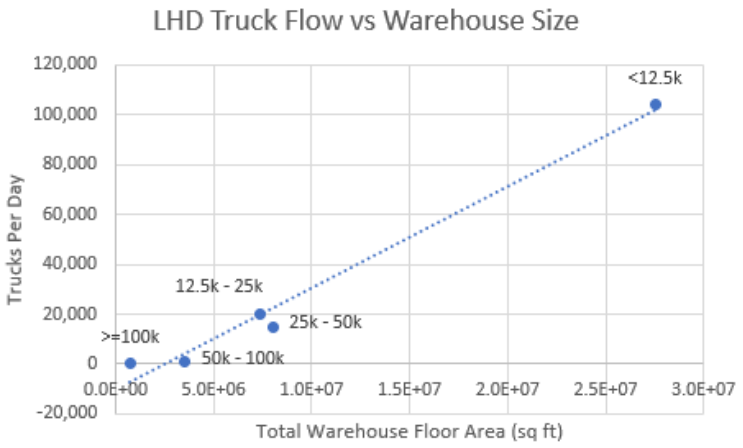
- Greater Than or Equal to 1000
- 900 - 1000 Truck Volume
- 800 - 900 Truck Volume
- 700 - 800 Truck Volume
- 600 - 700 Truck Volume
- 500 - 600 Truck Volume
- 400 - 500 Truck Volume
- 300 - 400 Truck Volume
- 200 - 300 Truck Volume
- 100 - 200 Truck Volume

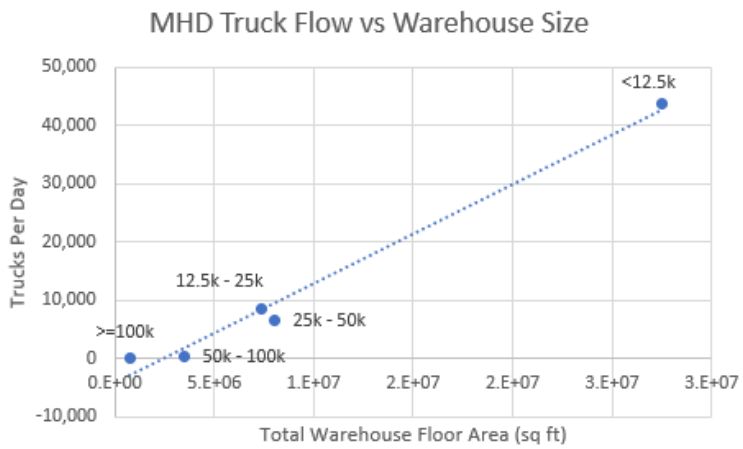
Correlation Coefficient

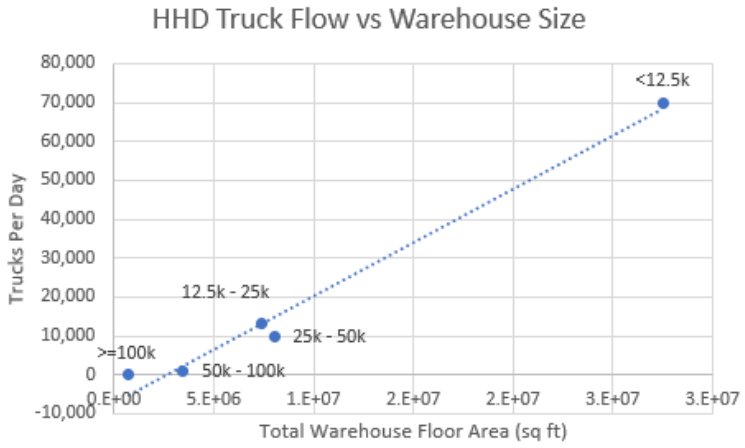
- Correlation coefficient between -1 and 1
- Relationship between variables
- 1 = perfect positive correlation
- 0 = zero correlation
- -1 = perfect negative correlation



Correlation Coefficients SD County







Correlation Coefficients Table

Area	Light-Heavy Duty (Class 2B to 5)	Medium-Heavy Duty (Class 6 to 7)	Heavy-Heavy Duty (Class 8)
County	0.992	0.992	0.992
Portside	0.998	0.998	0.995
International Border	0.884	0.905	0.992
Poway	0.29	0.27	0.22
Kearny Mesa	0.57	0.52	0.86
Santee and El Cajon	1.00	1.00	1.00
Miramar	0.9998	0.9998	0.9999
Sorrento Valley	0.88	0.88	0.88
Carlsbad and Vista	0.62	0.64	0.48
San Marcos and Escondido	0.996	0.995	0.998
Oceanside and Vista	0.991	0.992	0.986

Truck Trip Rate Example

Truck Flow
50 truck trips
per day

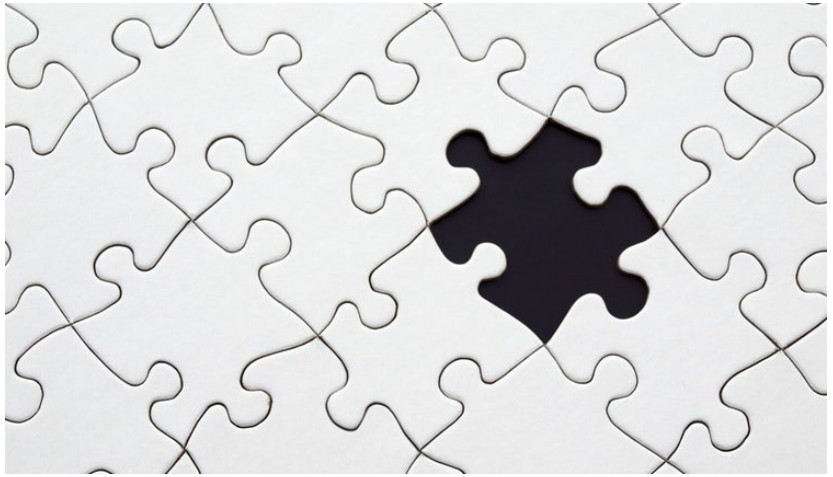
Floor Area
100,000 sq ft

Truck Trip Rate

0.50 daily
trips per
1,000 sq ft

Data Gaps

- Unknown - buildings that conduct warehousing activities
  - Building classification and tenancy (30% of total floor area)
- Unknown - truck flow that goes in/out of warehouses
  - SANDAG Commercial Vehicle Survey data (13% of truck flow)
- Modeled data and not actual truck counts
  - Calibrate models with observed data



SCAQMD Business Survey*

Statistical Measure	Overall Trip Rate (daily trips per 1,000k sq ft)	Truck Trip Rate (daily trips per 1,000k sq ft)
Minimum	0.33	0.05
Maximum	3.41	1.76
Average	1.22	0.53

**SCAQMD High Cube Warehouse Truck Trip Study, White Paper Summary of Business Survey Results, June 2014*

ITE Warehouse Study*

Category	Trucks Daily Trips Per 1,000k sq ft	5+ Axle Trucks Daily Trips Per 1,000k sq ft
Transload & Short-Term Storage	0.454	0.233
Cold Storage	0.836	0.749
Fulfillment Center	0.717	0.242

**Institute of Transportation Engineers, High-Cube Warehouse Vehicle Trip Generation Analysis, Oct. 2016*

SCAQMD R2305 Trip Rates*

Category or Building Size	Class 4 - 7 (daily truck trips per 1,000k sq ft)	Class 8 (daily truck trips per 1,000k sq ft)
≥200k sq ft	0.12	0.33
≥100k to <200k sq ft	0.14	0.21
Cold storage (≥100k sq ft)	0.29	0.75

**SCAQMD, Rule 2305, Staff Report, May 2021*

ITE Trip Rates*

Category	Daily Truck Trips Per 1,000k sq ft
Warehousing	0.19
Mini-Warehouse	0.17
High-Cube Transload & Short-Term Storage Warehouse	0.10
High-Cube Fulfillment Center Warehouse	1.37
High-Cube Parcel Hub Warehouse	0.64
High-Cube Cold Storage Warehouse	0.12

**Institute of Transportation Engineers, Trip Generation Manual, 10th Edition*

Truck Trip Rates (Portside)

Floor Area (sq ft)	Average Warehouse Size (sq ft)	LHD (daily truck trips per 1,000k sq ft)	MHD (daily truck trips per 1,000k sq ft)	HHD (daily truck trips per 1,000k sq ft)	LHD (daily truck trips)	MHD (daily truck trips)	HHD (daily truck trips)
≥100k	250,783	0.30	0.14	0.15	76	35	38
50 to 100k	63,200	1.13	0.43	0.75	71	27	47
25 to 50k	36,396	0.23	0.07	0.08	8	3	3
12.5 to 25k	20,750	1.60	0.65	2.98	33	13	62
<12.5k	4,756	3.09	1.24	1.99	15	6	9

Truck Trip Rates (IBC)

Floor Area (sq ft)	Average Warehouse Size (sq ft)	LHD (daily truck trips per 1,000k sq ft)	MHD (daily truck trips per 1,000k sq ft)	HHD (daily truck trips per 1,000k sq ft)	LHD (daily truck trips)	MHD (daily truck trips)	HHD (daily truck trips)
≥100k	225,775	0.55	0.27	0.67	124	61	152
50 to 100k	67,953	1.59	0.72	0.94	108	49	64
25 to 50k	38,683	0.68	0.31	0.46	26	12	18
12.5 to 25k	19,138	1.74	0.76	1.25	33	15	24
<12.5k	7,470	3.62	1.57	2.92	27	12	22

Truck Trip Rates (Clusters*)

Floor Area (sq ft)	Average Warehouse Size (sq ft)	LHD (daily truck trips per 1,000k sq ft)	MHD (daily truck trips per 1,000k sq ft)	HHD (daily truck trips per 1,000k sq ft)	LHD (daily truck trips)	MHD (daily truck trips)	HHD (daily truck trips)
≥100k	181,957	0.54	0.22	0.42	98	40	77
50 to 100k	66,692	0.17	0.05	0.29	11	3	20
25 to 50k	34,153	1.83	0.79	1.43	62	27	49
12.5 to 25k	18,227	3.36	1.43	1.99	61	26	36
<12.5k	5,604	2.69	1.13	1.85	15	6	10

**Excludes Poway, Kearny Mesa, Carlsbad and Vista*

Truck Trip Rates (County)

Floor Area (sq ft)	Average Warehouse Size (sq ft)	LHD (daily truck trips per 1,000k sq ft)	MHD (daily truck trips per 1,000k sq ft)	HHD (daily truck trips per 1,000k sq ft)	LHD (daily truck trips)	MHD (daily truck trips)	HHD (daily truck trips)
≥100k	185,027	0.04	0.02	0.04	8	4	7
50 to 100k	69,497	0.25	0.10	0.23	17	7	16
25 to 50k	36,789	1.57	0.69	1.06	58	25	39
12.5 to 25k	18,210	2.35	0.98	1.54	43	18	28
<12.5k	5,573	3.23	1.35	2.17	18	8	12

Use of Truck Trip Rates

- Indirect Source Rule
  - Calculate truck trips
  - Applicable requirements
- Emissions Baseline
  - Nitrogen oxide (NOx)
  - Particulate matter (PM2.5)

Key Findings of Truck Trip Analysis

- Strong positive linear relationship
- Necessary to adjust for unknowns
- ≥50k sq ft – rates within range (<1.0 trip/1k sq ft)
- <50k sq ft – rates out of range (>1.0 trip/1k sq ft)
- More data needed for smaller warehouses

Question or Comments

- ‘Raise hand’ feature or dial *9
- ‘Chat’ feature
- Question:
  - What aspects of the study do you agree with, and find interesting?
  - Are there any aspects you feel require more analysis or disagree with?

Next Steps

- Finalize truck trip rates
- Baseline emissions
- Emission reductions
- Cost-effectiveness
- Public health benefits
- Governing Board update

Question or Comments

- ‘Raise hand’ feature or dial *9
- ‘Chat’ feature

Non-Agenda & Participant Comments

- ‘Raise hand’ feature or dial *9
- ‘Chat’ feature

Next Meeting

- Monday, July 1, 2024, 3:00 p.m. to 5:00 p.m.
  - Topics to be determined

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