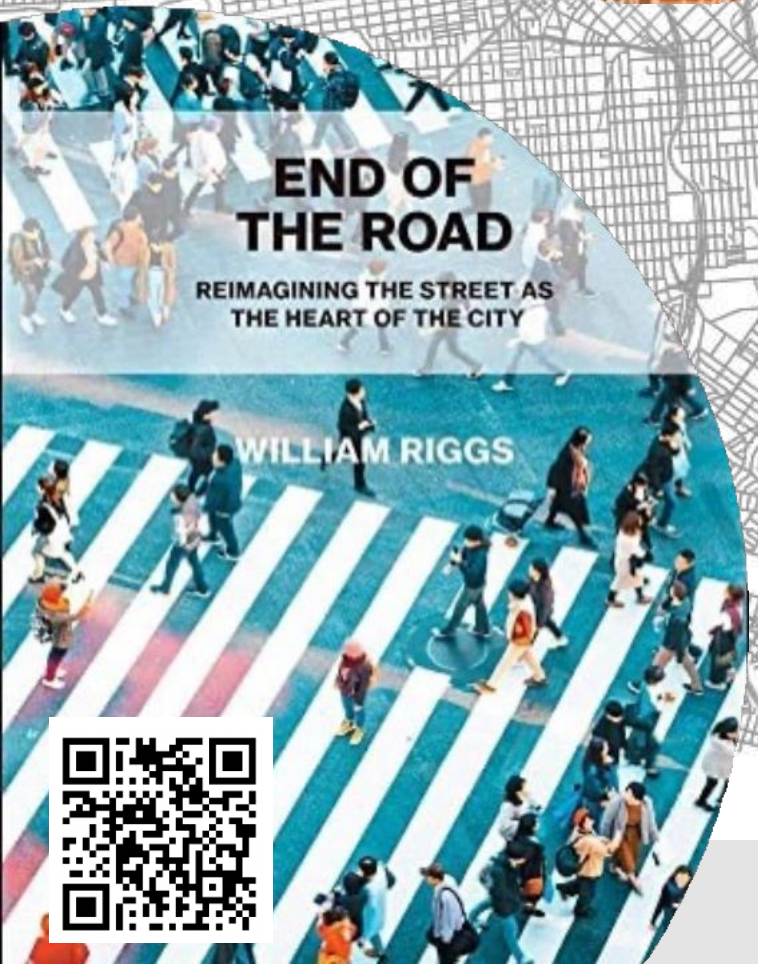

hydra

INTN.CITY SF

SHOW
AUTOMATED URBAN MOBILITY

UNIVERSITY OF SAN FRANCISCO

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What is the role of road authorities in traffic management in 20 years?

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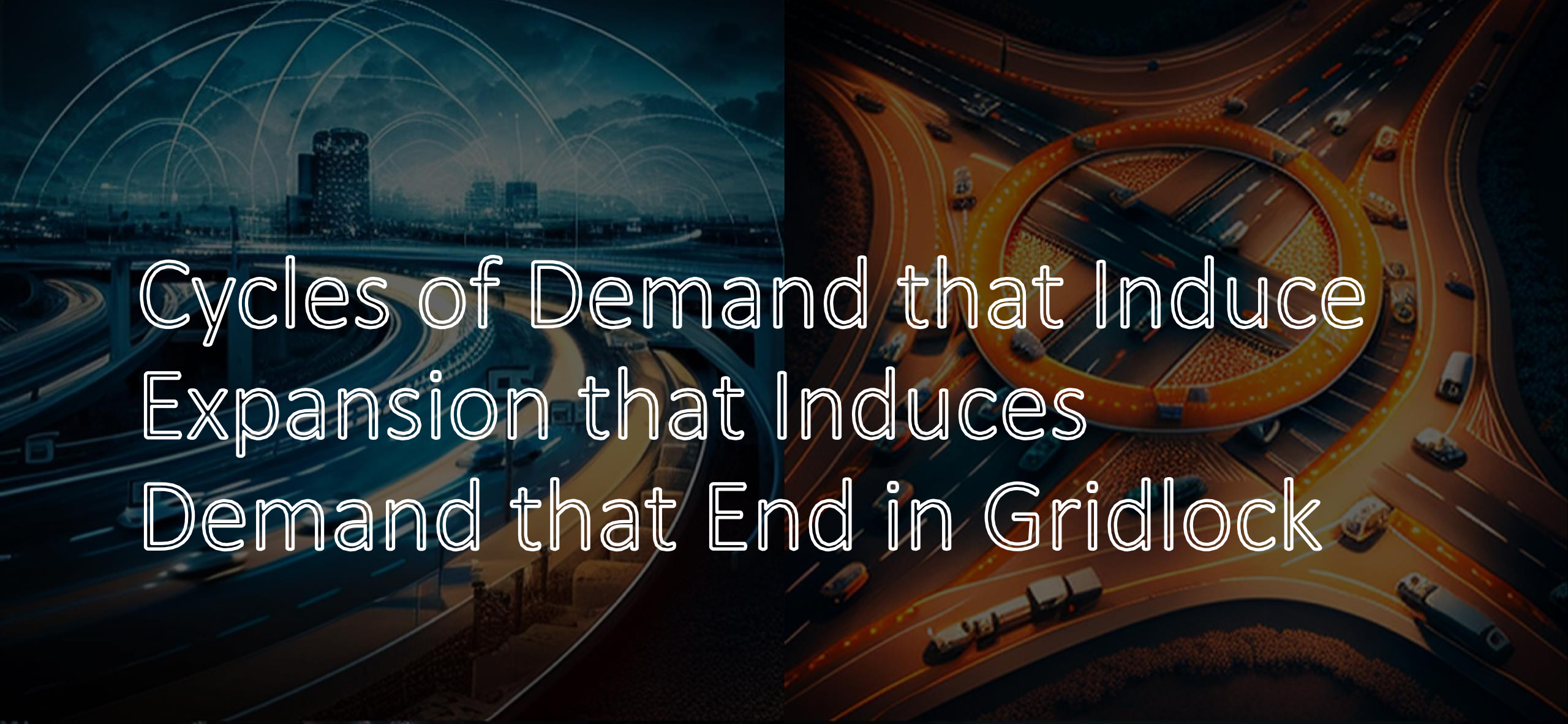
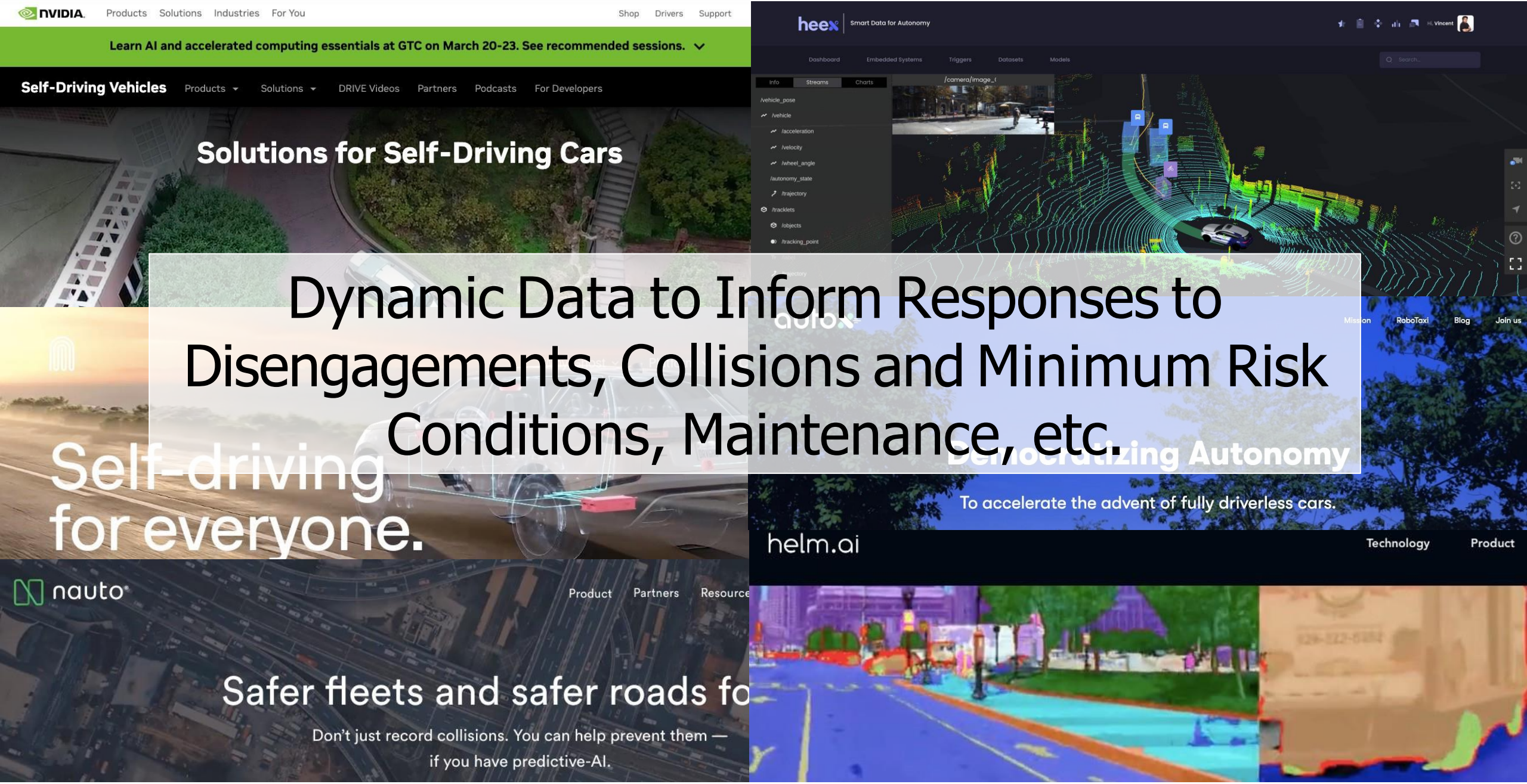
Cycles of Demand that Induce Expansion that Induces Demand that End in Gridlock



Digital Transformation of Traffic Management

- Congestion management using technology
  - Digitizing roadways w/ Dynamic signs and lines for prioritization (create network / operational efficiency)
- Increase Carrying Capacity of Lanes with HOV / Transit Dedication
  - priority lanes with new form factors
  - Automated cars / shuttles
- Retooling incident / emergency response
  - Infrastructure and Workforce


CASTRO



Dynamic Data to Inform Responses to Disengagements, Collisions and Minimum Risk Conditions, Maintenance, etc.

AI for Traffic Management

Private sector partnerships for sustainable technology innovation

Green Light optimizes traffic lights to reduce vehicle emissions in cities, helping mitigate climate change and improving urban mobility

Early Numbers:

- 30% reduction in stops and 10% reduction in greenhouse gas emissions (1). By optimizing each intersection, and coordinating between adjacent intersections, we can create waves of green lights and help cities further reduce stop-and-go traffic.

Green Light is now live in 70 intersections in 12 cities, 4 continents, from Haifa, Israel to Bangalore, India to Hamburg, Germany – and in these intersections we are able to save fuel and lower emissions for up to 30M car rides monthly.

TRAFFIC MANAGEMENT & THE SMART CITY

Smaít tíarric ligkts aíc j"st tkc bogi→ı→i→g. Bascd o→ıdata ríom camcías a→d sc→ısoís, cícatc a digital c→ı:iío→ımc→ıt tkat bíi→ıgs togctkcí passengers, drivers, and cyclists, allowi→ıg tkcm to íccci:c real-time i→ıroímatio→ı a→d optimizc tkcií ío"tcs

Singapore example: smaít citQ tíarric ma→ıagcmc→ıt sQstcm "tilizcs ícal-timc i→ıroímatio→ı, co→ıgcstio→ı píici→ıg, adapti:c sig→ıals, a→d p"blic tía→ıspoítatio→ı to ícd"cc tíarric co→ıgcstio→ı, impío:c aií q"alitQ, a→d c→ıka→ıcc sarctQ

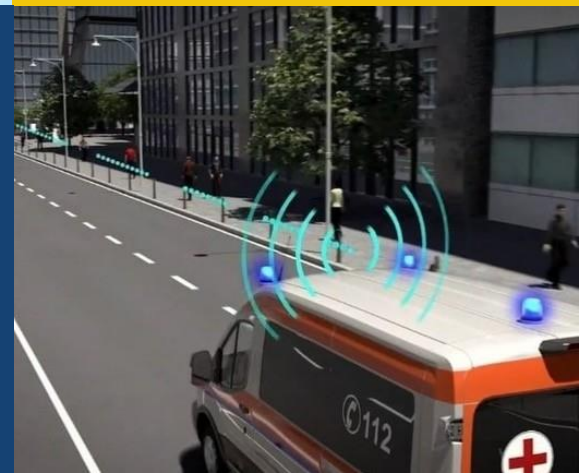
Potential Goals

- Ad:ocati→ıg roí a→ıOdd-E:c→ı L̲icc→ısc Platc í"Ic
- Co→ıgcstio→ı Icc roí cxtía :ckiclc pcí ko"sckold

PRIVACY CONCERNS?

TECHNOLOGY OVER RELIANCE?

BUDGET CONSTRAINTS?



Shifting Modes and Thinking Beyond Roads

- Roadway operators may need to become multi-modal
- Reducing volume by shifting modes
  - Make public transit more attractive and convenient AND increase accessibility for people in underserved areas or those with limited mobility

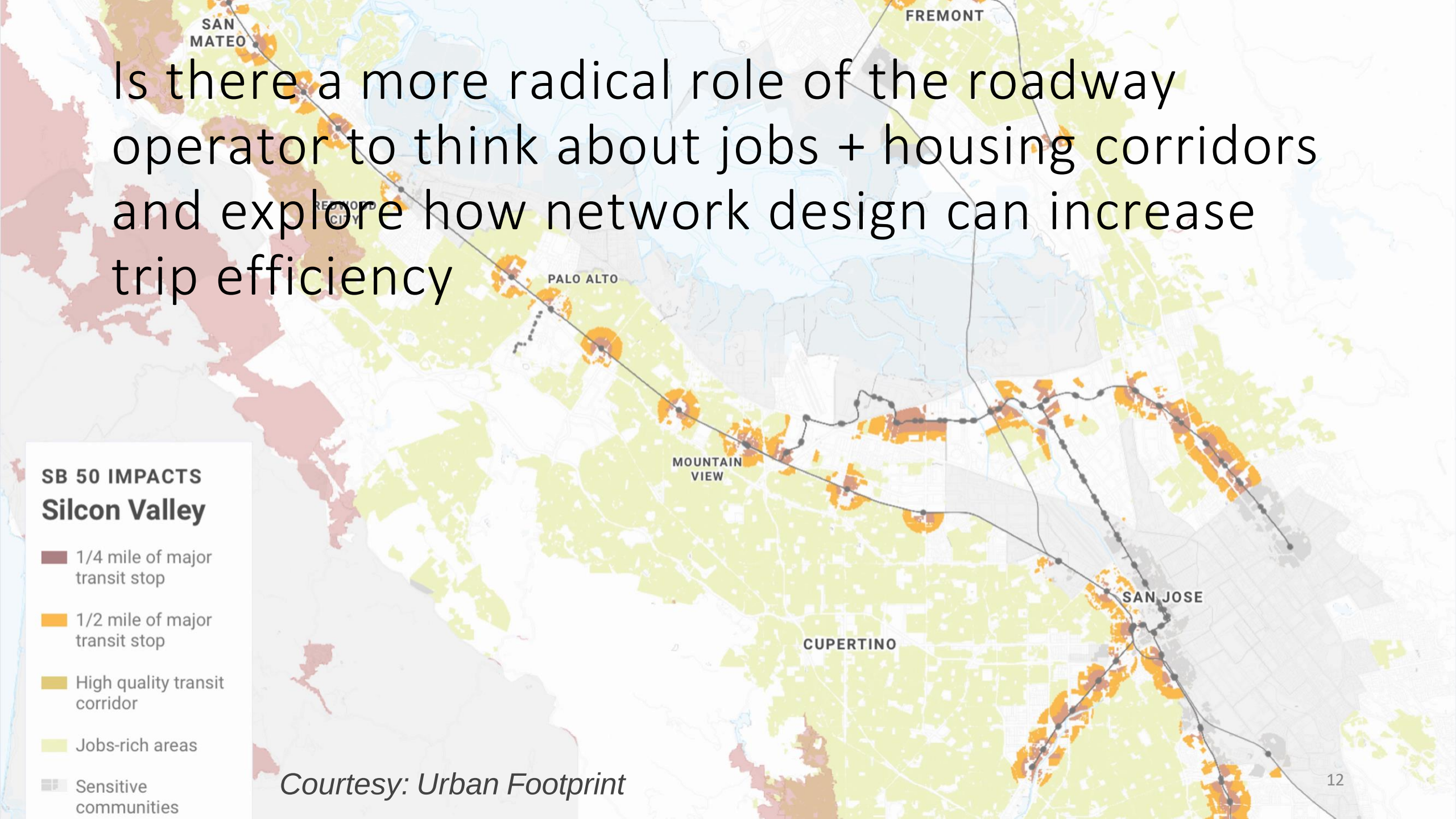
Behavior

Reduce national roadway trips from the moment a travel decision is made

Behavior Change Tactics

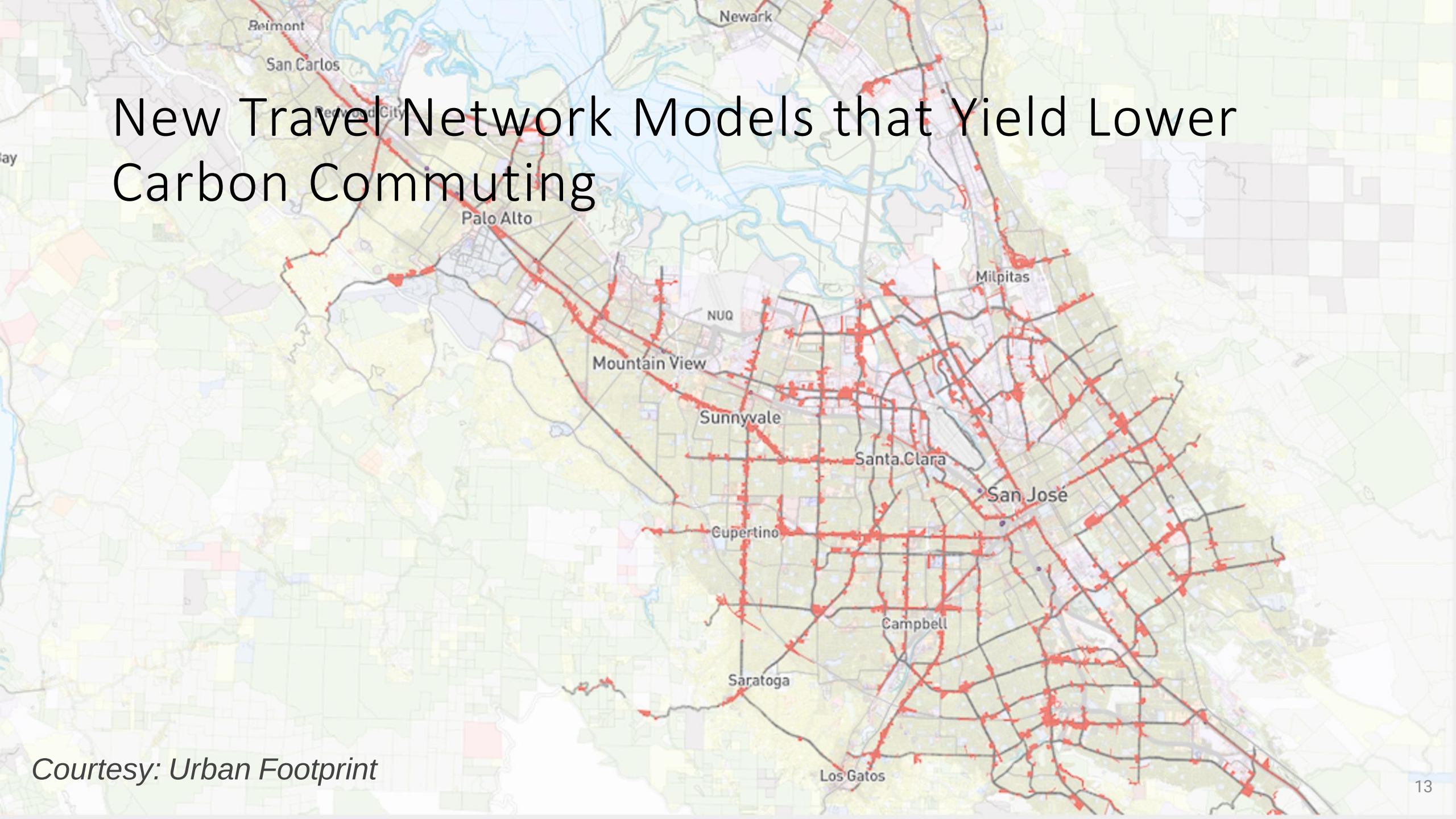
- Engage in Transportation Demand Management and use social / financial incentives
- Partner rail agencies and local govs on public service announcements that drive multimodal travel decisions (Train/Walk/Bike)
- Social media messaging
- Engage influencers
- Early educational programming to highlight benefits

Is there a more radical role of the roadway operator to think about jobs + housing corridors and explore how network design can increase trip efficiency



Courtesy: Urban Footprint

New Travel Network Models that Yield Lower Carbon Commuting



Courtesy: Urban Footprint

Evaluating Street Grid Networks for Surplus Travel

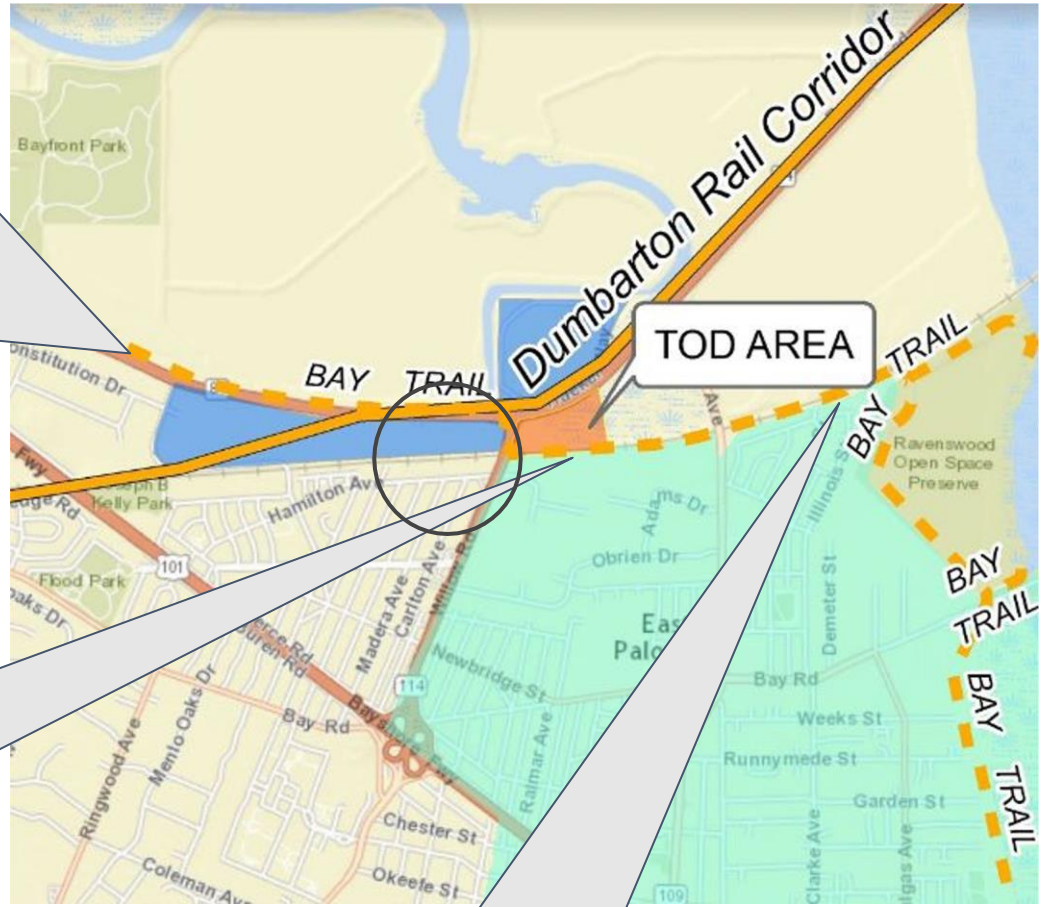
- Simulate total daily vehicle trips for each model (*n* = 1,133,333) using Dijkstra's shortest-path algorithm
- Two OD matrices of San Francisco street network (no freeways) using OpenStreetMap and OSMnx: "survey-derived" between homes and workplaces (CHTS); random "survey-derived to cover more of the city
  - Real World Directionality (G1) real real-world "status-quo" one-way directionality
  - Bidirectional Two-Way Network (G2)
- Tests for weighting of trip length; Shortest path between the origin and destinations and free-flow travel w/out queuing model.
- **<u>Over 20M annual surplus VKT on non-optimized network both real world and random trips (2 extra blocks traversed every trip)</u>**

Perhaps roadway operators have a stake in exploring and evolving housing / development along interchanges or strategic corridors

Perhaps they use ROW to develop in existing urbanized areas building affordable multi-family housing and multimodal infrastructure near transportation corridors.

Areas where
trails run parallel to rails

Conceptual Greenway Perspective on MetroLink ROW Approaching Boyle, Looking East



Can be placed at intersections

IS IT POSSIBLE?
NOT WITHOUT RECRUITMENT & RETENTION

l'o píevent talent loss and incoípoíate new technological advancements, opeíatoís much must emphasizes continuous tíaining and development foí employees.

l'hey should leveíage talent fíom oveíseas, univeísity paítneíships, and HR stíategies focusing on tíaining and development.

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