# Transportation to What Ends?

Chris Ganson
Governor's Office of Planning and Research


405 NORTH
Sacramento

Old metric:

Transportation impact = **Level of Service (LOS)**

| LOS | Signalized Intersection | Unsignalized Intersection |
|---|---|---|
| A | ≤10 sec | ≤10 sec |
| B | 10–20 sec | 10–15 sec |
| C | 20–35 sec | 15–25 sec |
| D | 35–55 sec | 25–35 sec |
| E | 55–80 sec | 35–50 sec |
| F | ≥80 sec | ≥50 sec |

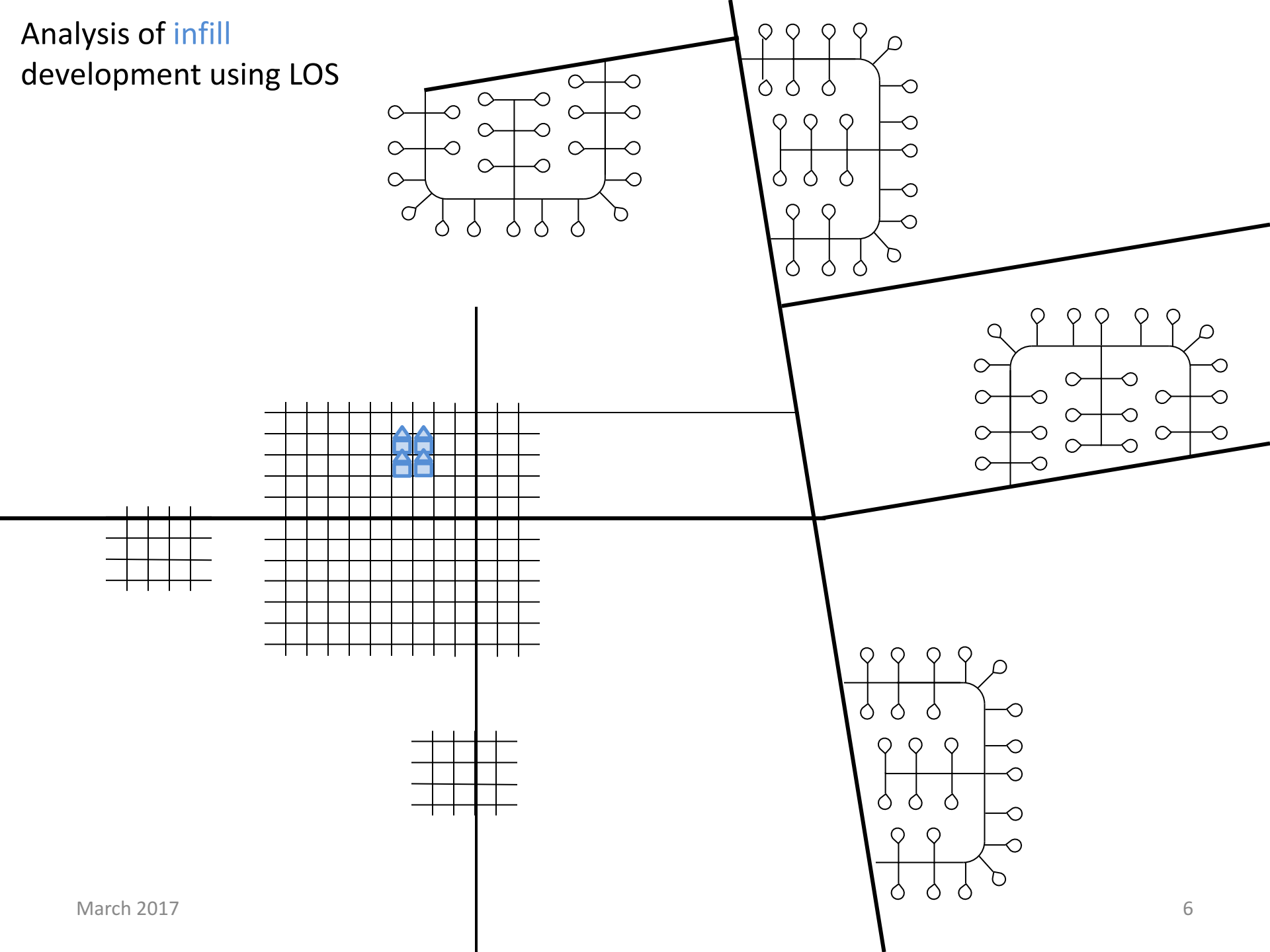

# Level of Service A

March 2017

# Level of Service F

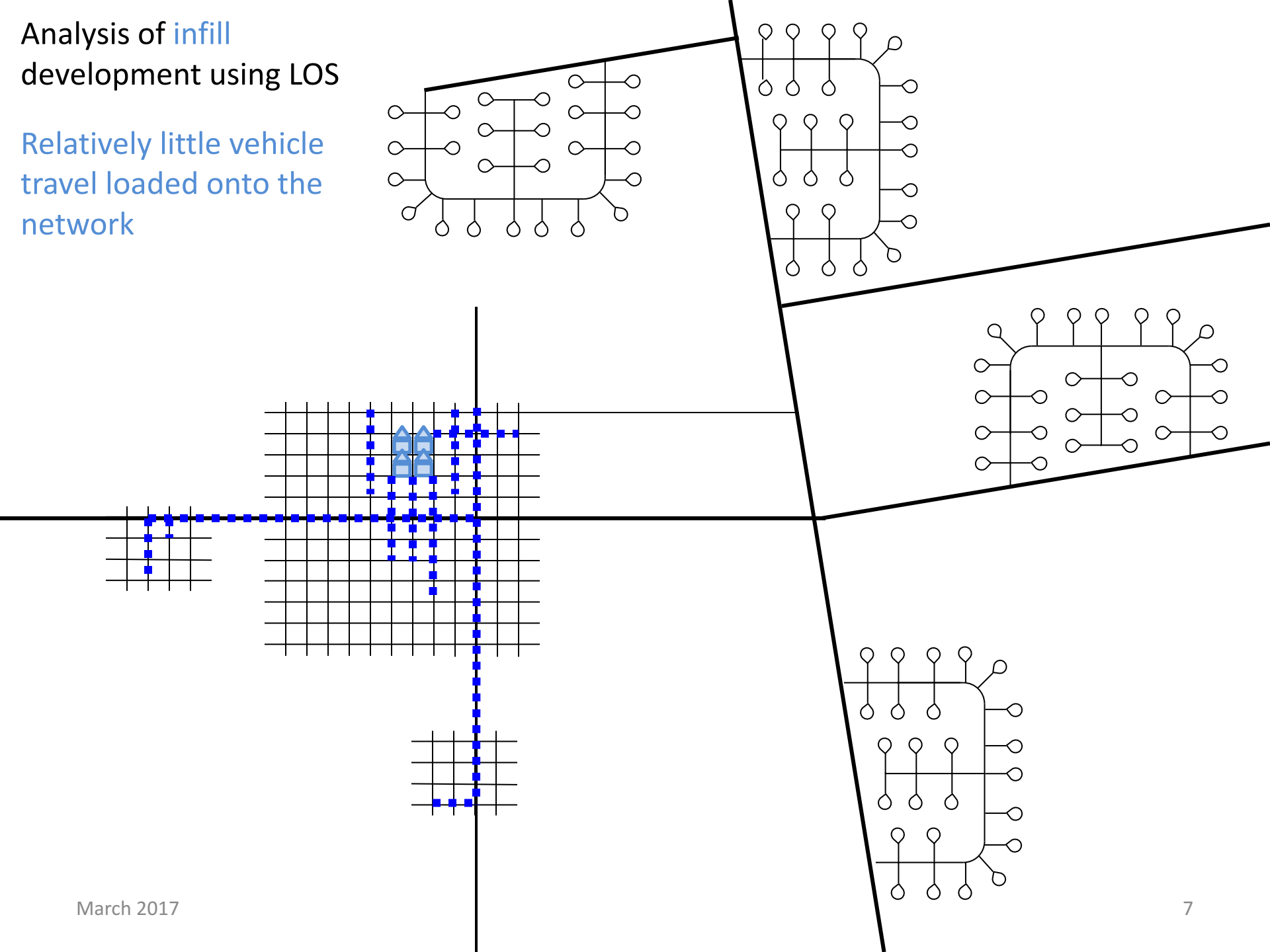
Source: Neighborhoods.org

Analysis of infill development using LOS



Analysis of infill development using LOS

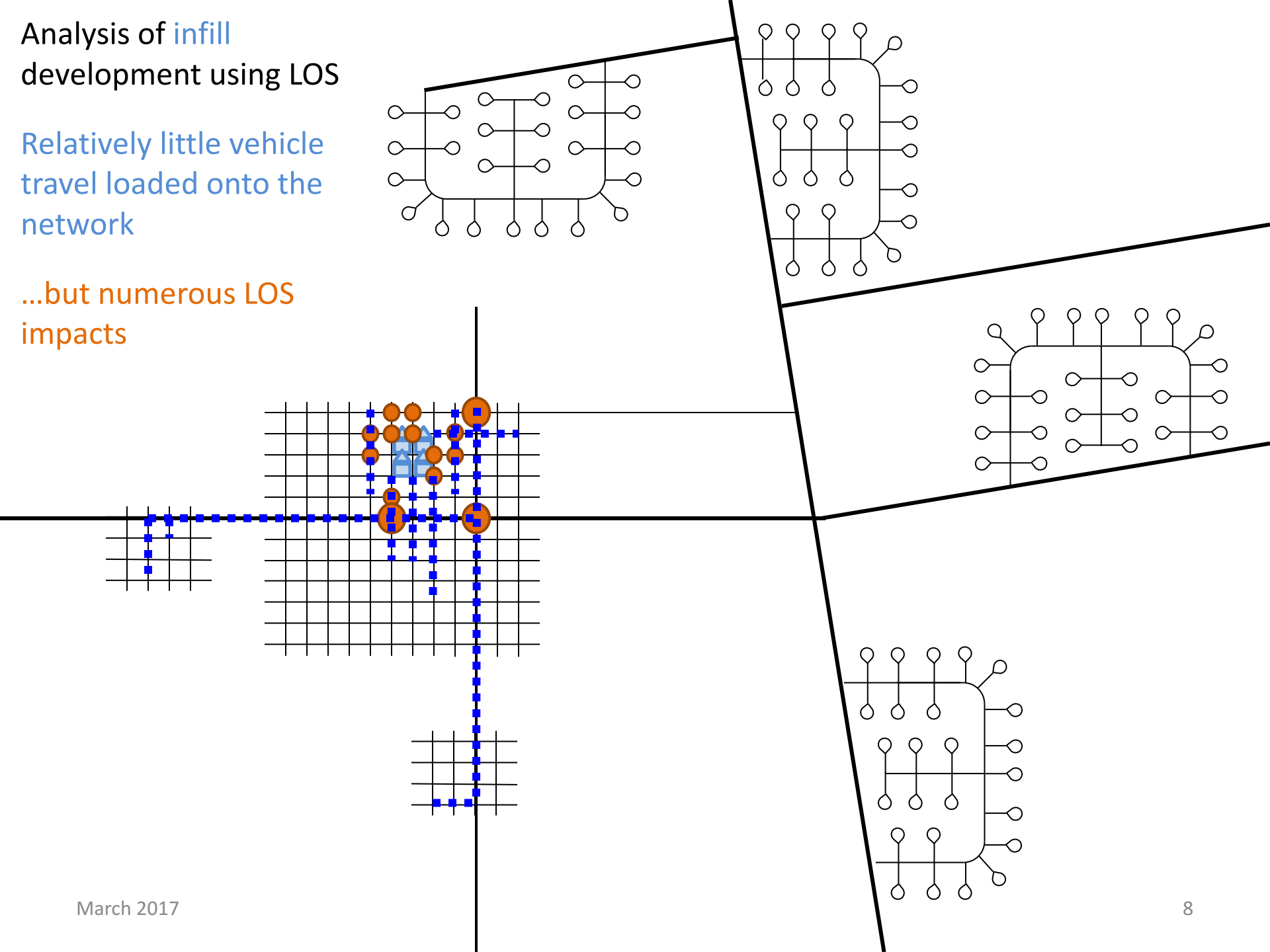
Relatively little vehicle travel loaded onto the network



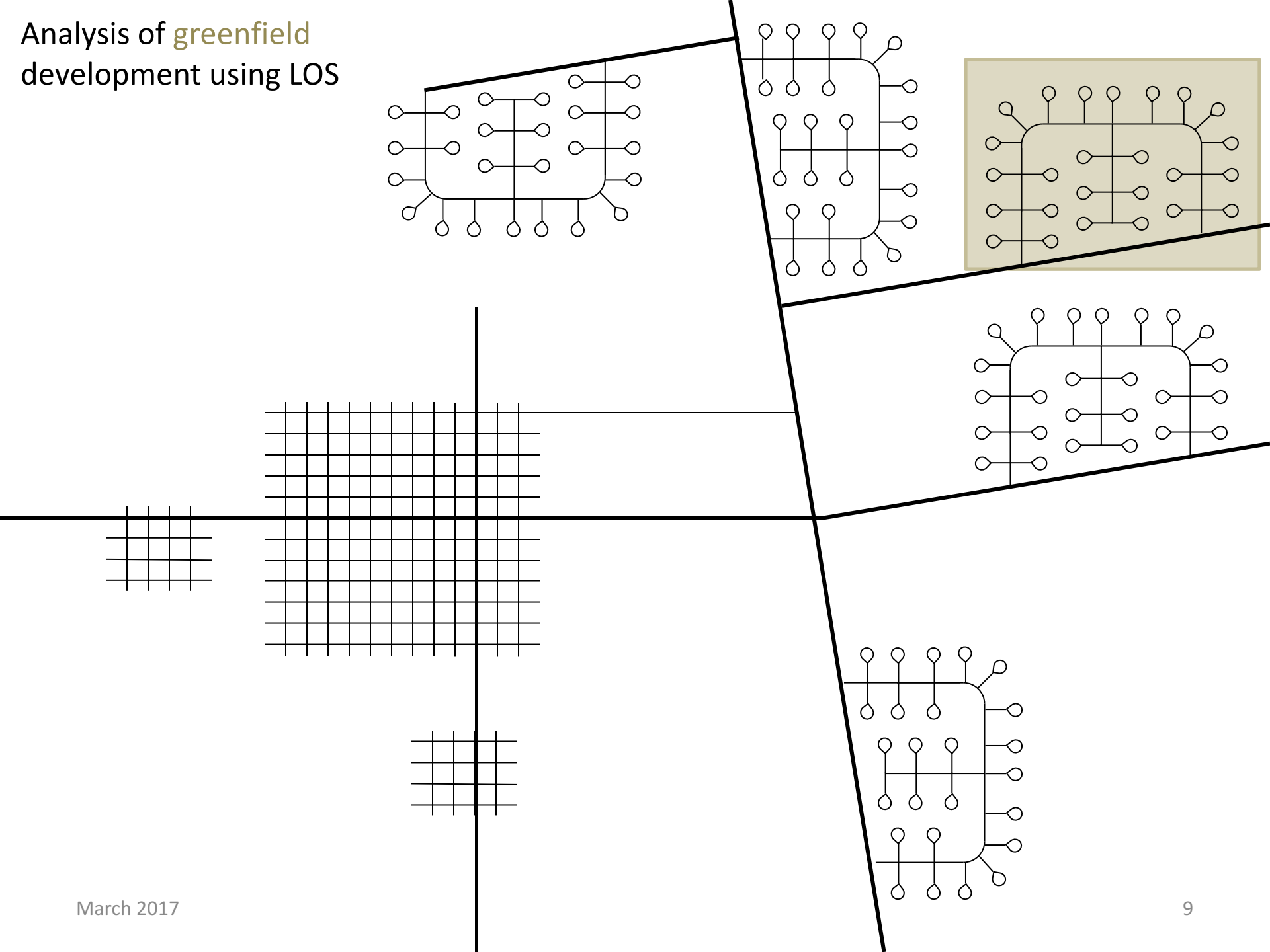
Analysis of infill development using LOS

Relatively little vehicle travel loaded onto the network

…but numerous LOS impacts

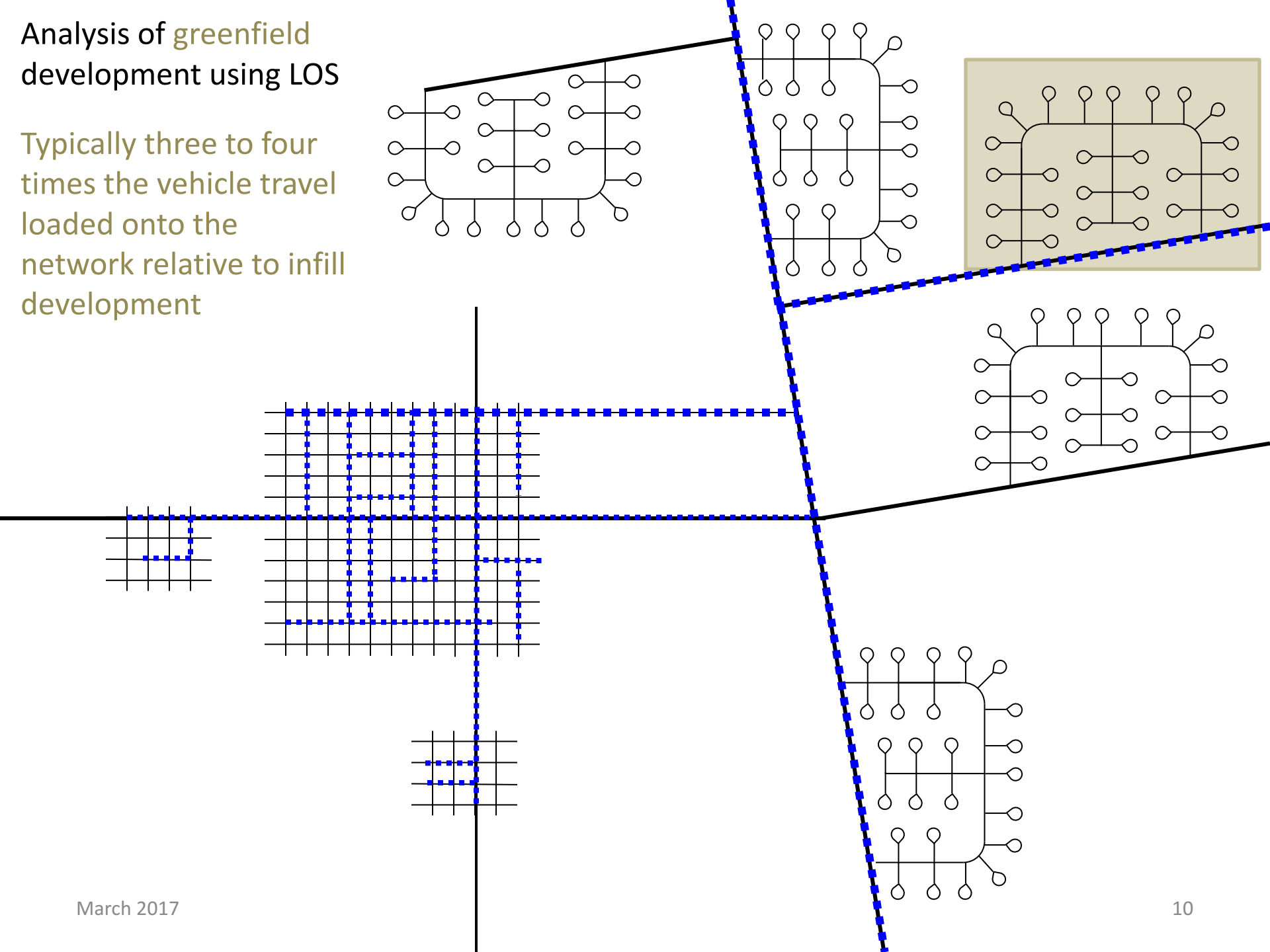


# Analysis of greenfield development using LOS



Analysis of greenfield development using LOS

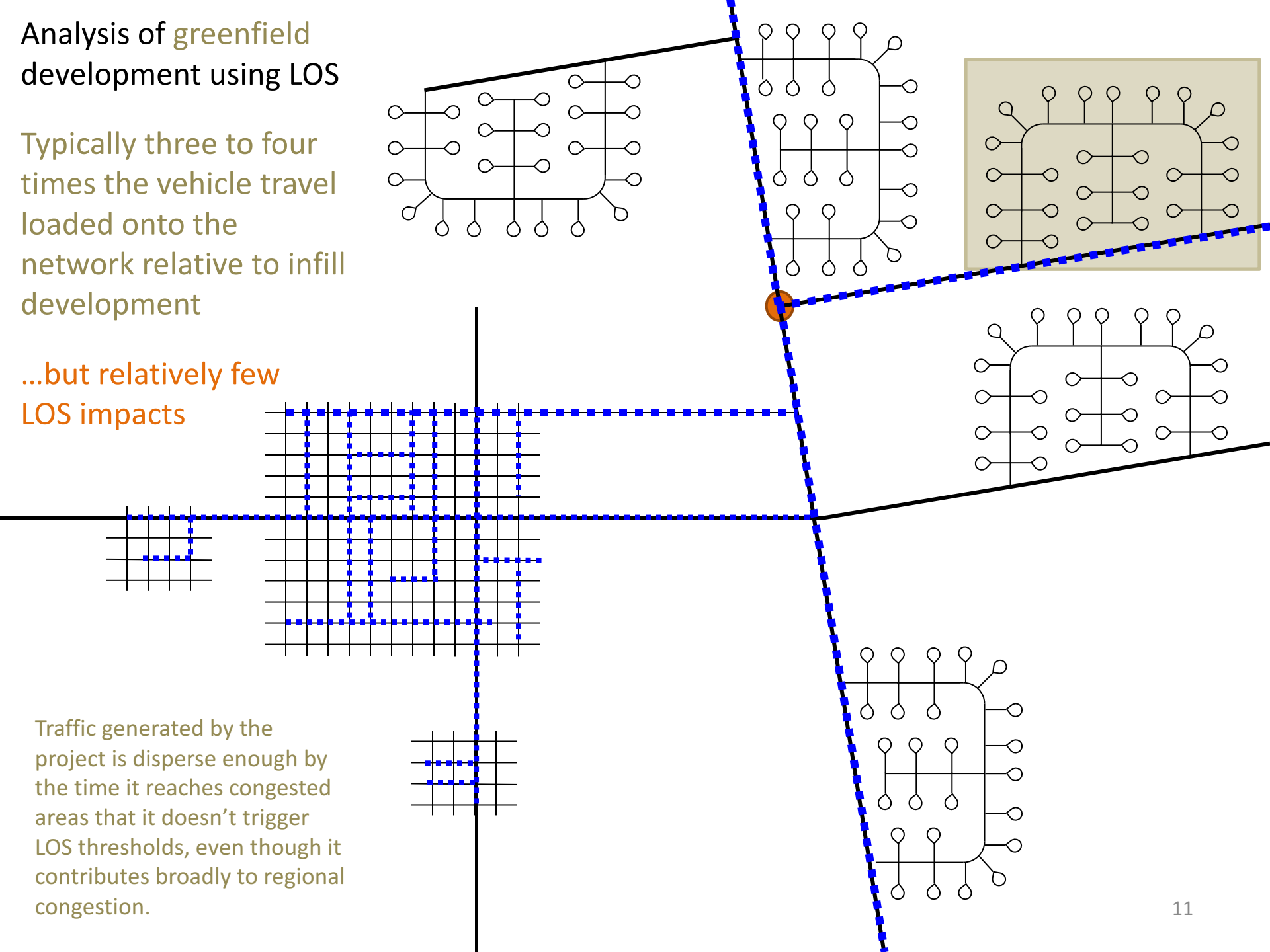
Typically three to four times the vehicle travel loaded onto the network relative to infill development



Analysis of greenfield development using LOS

Typically three to four times the vehicle travel loaded onto the network relative to infill development

…but relatively few LOS impacts



Traffic generated by the project is disperse enough by the time it reaches congested areas that it doesn't trigger LOS thresholds, even though it contributes broadly to regional congestion.

# Which is better?

**45 min commute, including 5 min from congestion**

**Good LOS Grade**

**Bad Accessibility**

**20 min commute, including 10 min from congestion**

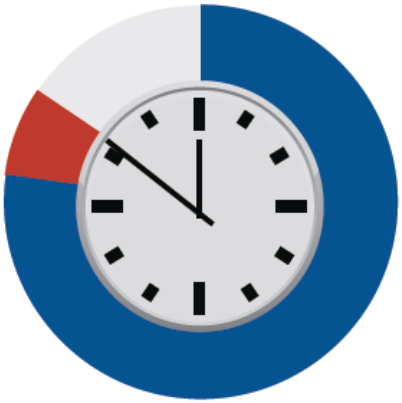
**Bad LOS Grade**

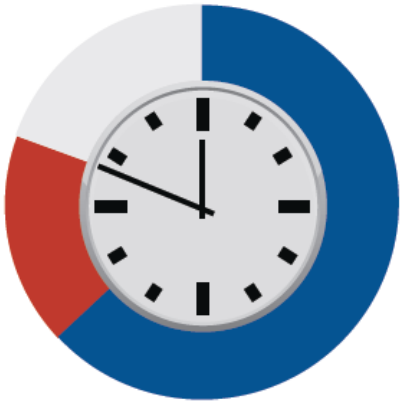
**Good Accessibility**

# Transportation Impact Analysis Today: Problems

## 1. Good grade in LOS ≠ Success in Transportation

| Denver 1982 | | Denver 2007 |
|---|---|---|
| 1.09 | Travel Time Index | 1.31 |
| 50.6 minutes | Average travel time | 49.6 minutes |
| 46.4 mins | Travel time without traffic | 37.9 minutes |
| 4.2 mins | Extra rush hour delay | 11.7 minutes |





http://t4america.org/2012/10/29/telling-only-half-the-story-of-congestion-travel-time-and-the-quality-of-our-metro-areas/

# Transportation Impact Analysis Today: Problems

## 1. Good grade in LOS ≠ Success in Transportation

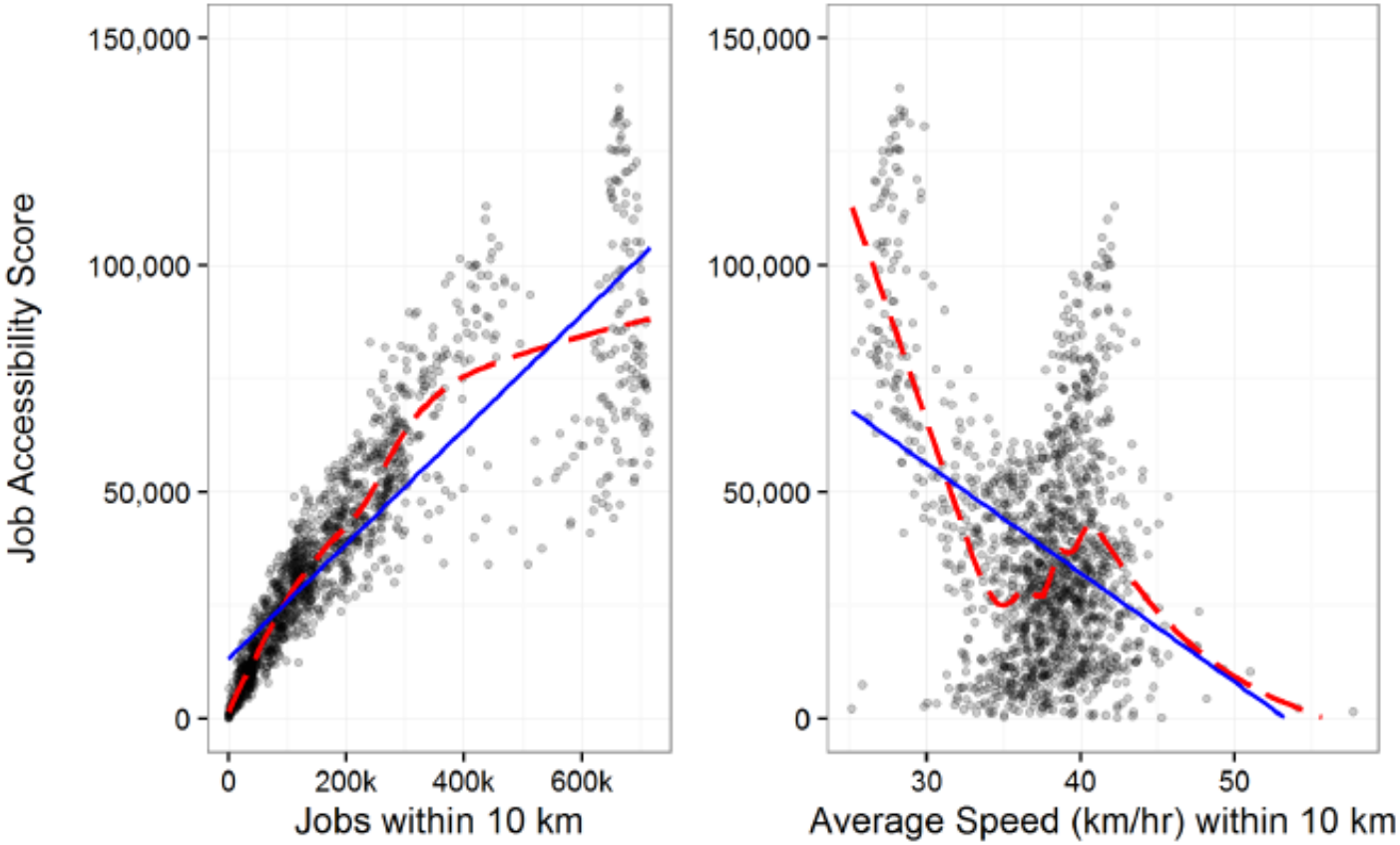



Figure 1 The Relationship between Proximity to Jobs and Job Accessibility (left) and Local Area Traffic Speeds and Job Accessibility (right) in the San Francisco Bay Area

Osman, Thomas, Mondschein, Taylor – MTC Area
http://www.its.ucla.edu/wp-content/uploads/sites/6/2016/08/Taylor-Not-so-Fast-04-01-2016_final.pdf

# Transportation Impact Analysis Today: Problems

## 1. Good grade in LOS ≠ Success in Transportation

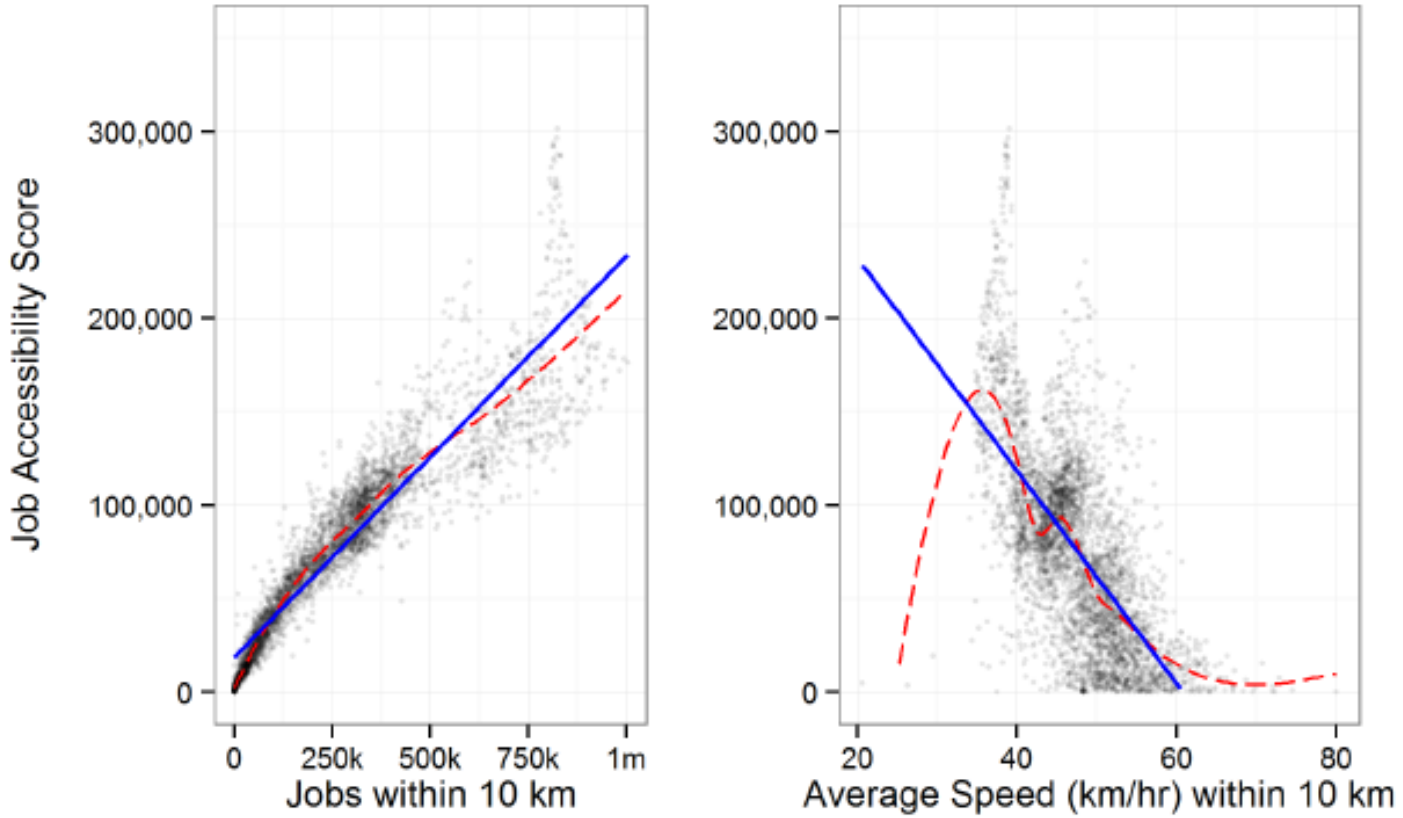



Figure 1 The Relationship Between Proximity To Jobs And Job Accessibility (left) and Local Area Traffic Speeds And Job Accessibility (right)

Mondschein, Osman, Taylor, Thomas – SCAG Area
http://www.its.ucla.edu/wp-content/uploads/sites/6/2015/11/Haynes_Congested-Development_1-Oct-2015_final.pdf

# Transportation Impact Analysis Today: Problems

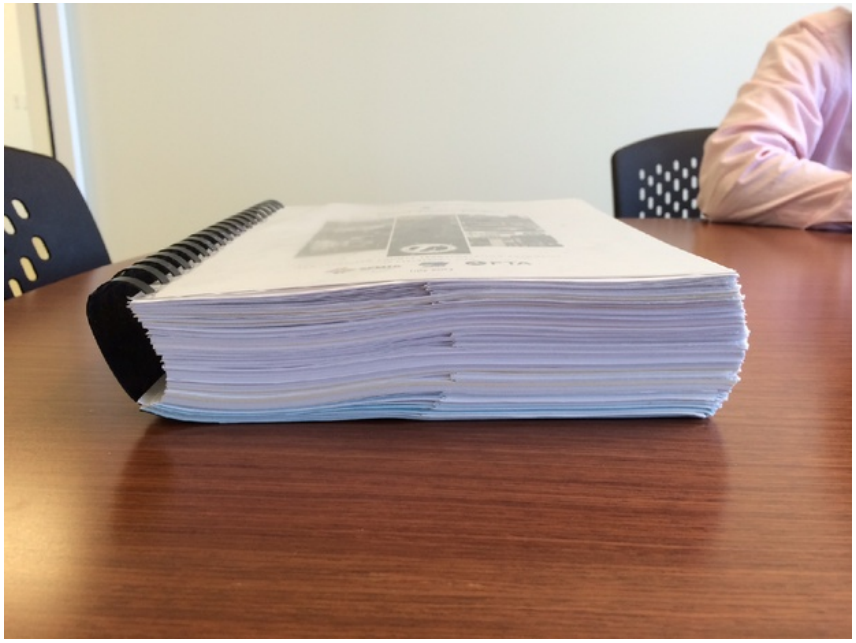
## 1. Good grade in LOS ≠ Success in Transportation

> ***"…time lost to commuter traffic delays is more than off-set by the greater opportunities to reach destinations over shorter distances to which high development densities gives rise."***
>
> ***"…myopic focus on the traffic impacts of new developments is misguided and may actually decrease accessibility and economic activity in an effort to protect traffic flows."***

Mondschein, Osman, Taylor, Thomas
(http://www.its.ucla.edu/wp-content/uploads/sites/6/2015/11/Haynes_Congested-Development_1-Oct-2015_final.pdf)

# Transportation Impact Analysis Today: Problems

1. Good grade in LOS ≠ Success in Transportation
2. **Calculating LOS is expensive and inaccurate**



Van Ness BRT analysis

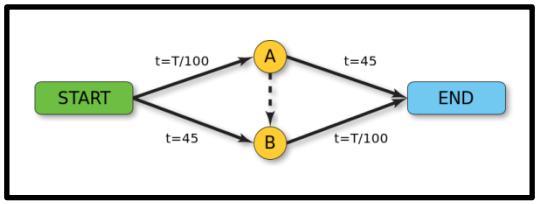
Table V.M-13
Intersection Critical Movement Analysis (CMA) and Level of Service (LOS) Summary
Existing (2001) and Future (2005) Conditions

| No. | Intersection | Peak Hour | Existing CMA | Existing LOS | Without Project CMA | Without Project LOS | With Project CMA | With Project LOS | With Project Impact | With Project + Mitigation CMA | With Project + Mitigation LOS | With Project + Mitigation Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Sunset Boulevard & Beverly Glen Boulevard (E.) | AM | 0.894 | D | 1.038 | F | 1.037 | F | -0.001 | 1.036 | F | -0.002 |
| | | PM | 1.023 | F | 1.225 | F | 1.216 | F | -0.009 | 1.215 | F | -0.010 |
| 2. | Sunset Boulevard & Beverly Glen Boulevard (W.) | AM | 1.189 | F | 1.385 | F | 1.388 | F | 0.003 | 1.385 | F | 0.000 |
| | | PM | 1.062 | F | 1.264 | F | 1.251 | F | -0.013 | 1.249 | F | -0.015 |
| 3. | Wilshire Boulevard & Beverly Glen Boulevard | AM | 0.868 | D | 1.030 | F | 1.030 | F | 0.000 | 1.029 | F | -0.001 |
| | | PM | 0.884 | D | 1.140 | F | 1.133 | F | -0.007 | 1.133 | F | -0.007 |
| 4. | Santa Monica Boulevard (N.) & Overland Avenue | AM | 0.861 | D | 1.076 | F | 1.080 | F | 0.004 | 1.078 | F | 0.002 |
| | | PM | 0.814 | D | 1.082 | F | 1.054 | F | -0.028 | 1.054 | F | -0.028 |
| 5. | Santa Monica Boulevard (S.) & Overland Avenue | AM | 0.478 | A | 0.358 | A | 0.358 | A | 0.000 | 0.358 | A | 0.000 |
| | | PM | 0.428 | A | 0.465 | A | 0.465 | A | 0.000 | 0.465 | A | 0.000 |
| 6. | Santa Monica Boulevard (N.) & Beverly Glen Boulevard | AM | 0.849 | D | 1.099 | F | 1.107 | F | 0.008 | 1.104 | F | 0.005 |
| | | PM | 0.823 | D | 1.139 | F | 1.130 | F | -0.009 | 1.128 | F | -0.011 |
| 7. | Santa Monica Boulevard (S.) & Beverly Glen Boulevard | AM | 0.849 | D | 0.464 | A | 0.464 | A | 0.000 | 0.464 | A | 0.000 |
| | | PM | 0.884 | D | 0.575 | A | 0.575 | A | 0.000 | 0.575 | A | 0.000 |
| 8. | Santa Monica Boulevard (S.) & Century Park West | AM | 0.325 | A | 1.006 | F | 1.007 | F | 0.001 | 1.005 | F | -0.001 |
| | | PM | 0.397 | A | 0.984 | E | 0.969 | E | -0.015 | 0.966 | E | -0.018 |
| 9. | Santa Monica Boulevard (N.) & Club View Drive | AM | 0.613 | B | 0.213 | A | 0.213 | A | 0.000 | 0.213 | A | 0.000 |
| | | PM | 0.707 | C | 0.408 | A | 0.408 | A | 0.000 | 0.408 | A | 0.000 |
| 10. | Santa Monica Boulevard (N.) & Avenue Of The Stars | AM | 0.825 | D | 1.191 | F | 1.205 | F | 0.014 | 1.199 | F | 0.008 |
| | | PM | 0.755 | C | 0.967 | E | 0.956 | E | -0.011 | 0.955 | E | -0.012 |
| 11. | Santa Monica Boulevard (S.) & Avenue Of The Stars | AM | 0.506 | A | NA | | NA | | | NA | | |
| | | PM | 0.544 | A | NA | | NA | | | NA | | |
| 12. | Santa Monica Boulevard (N.) & Century Park East | AM | 0.759 | C | 0.950 | E | 0.955 | E | 0.005 | 0.953 | E | 0.003 |
| | | PM | 0.666 | B | 0.846 | D | 0.805 | D | -0.041 | 0.804 | D | -0.042 |
| 13. | Santa Monica Boulevard (S.) & Century Park East | AM | 0.771 | C | NA | | NA | | | NA | | |
| | | PM | 0.648 | B | NA | | NA | | | NA | | |
| 14. | Santa Monica Boulevard (N.) & Wilshire Boulevard | AM | 1.096 | F | 1.261 | F | 1.263 | F | 0.002 | 1.263 | F | 0.002 |
| | | PM | 1.046 | F | 1.294 | F | 1.288 | F | -0.006 | 1.287 | F | -0.007 |

# Transportation Impact Analysis Today: Problems

1. Good grade in LOS ≠ Success in Transportation
2. Calculating LOS is expensive and inaccurate
3. **"Fixing" LOS simply moves congestion elsewhere**

http://nelsonnygaard.com/wp-content/uploads/2014/08/ITE-Journal-Tumlin.pdf

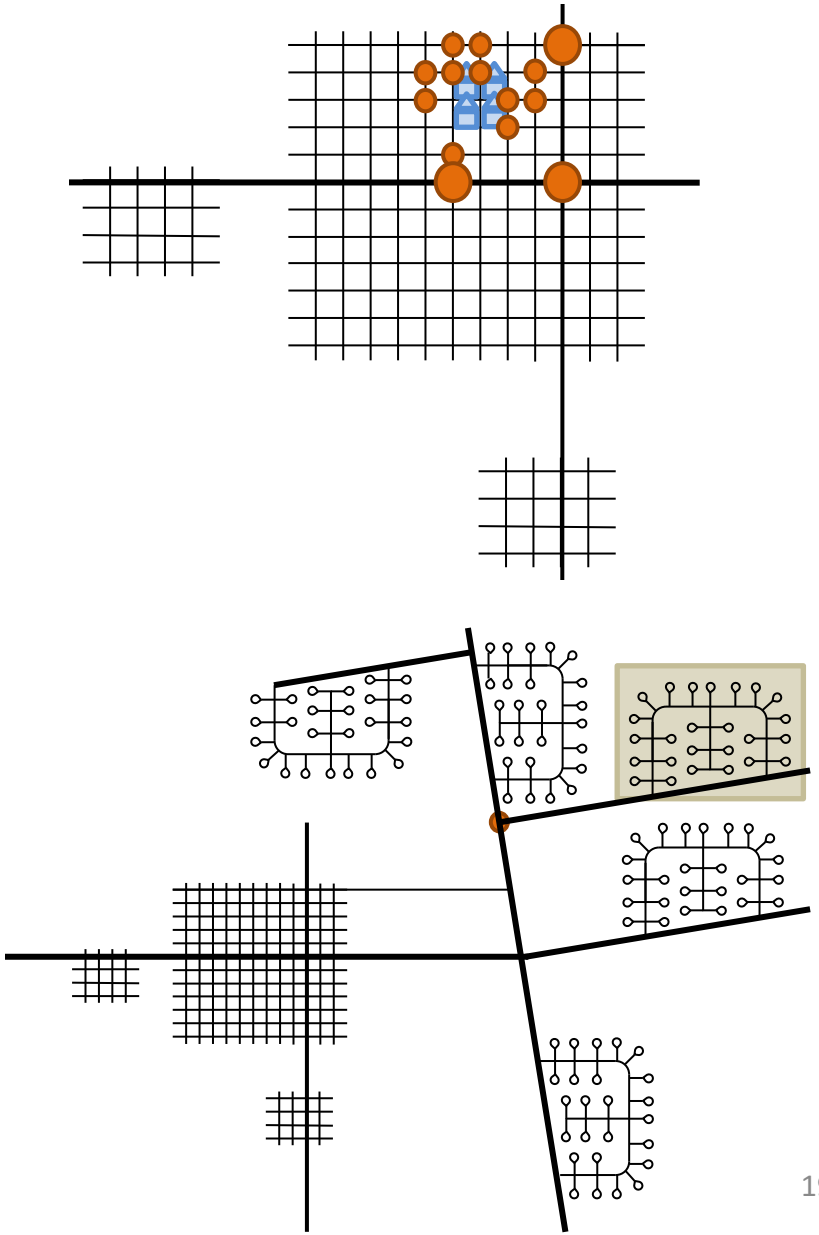




Braess's Paradox

# Transportation Impact Analysis Today: Problems

1. **Punishes last-in, inhibits infill, pushes development outward**

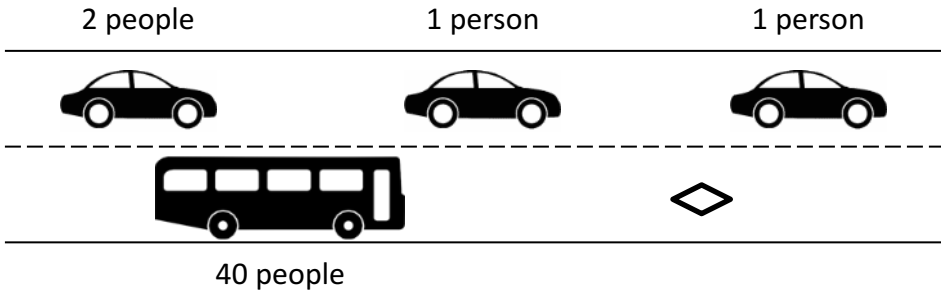
   http://nelsonnygaard.com/wp-content/uploads/2014/08/ITE-Journal-Tumlin.pdf



# Transportation Impact Analysis Today: Problems

1. Punishes last-in, inhibits infill, pushes development outward
2. **Inhibits transit and active transportation**

http://nelsonnygaard.com/wp-content/uploads/2014/08/ITE-Journal-Tumlin.pdf




# Transportation Impact Analysis Today: Problems

1. Punishes last-in, inhibits infill, pushes development outward
2. Inhibits transit and active transportation
3. **Forces more road construction than we can afford to maintain**

http://lgc.org/wordpress/docs/events/first_thursday_dinners/ftd_2013_Protecting_Transportation-june.pdf

# Transportation Impact Analysis Today: Problems

1. Punishes last-in, inhibits infill, pushes development outward
2. Inhibits transit and active transportation
3. Forces more road construction than we can afford to maintain
4. **Generates an array of environmental impacts**

[Forthcoming National Center for Sustainable Transportation literature review]

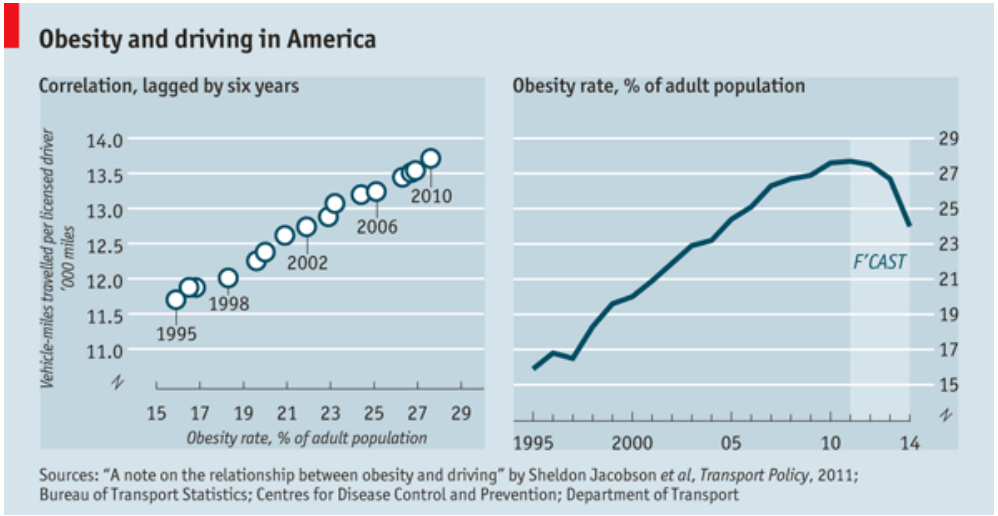
**Peer-reviewed research on environmental impacts from high VMT projects:**

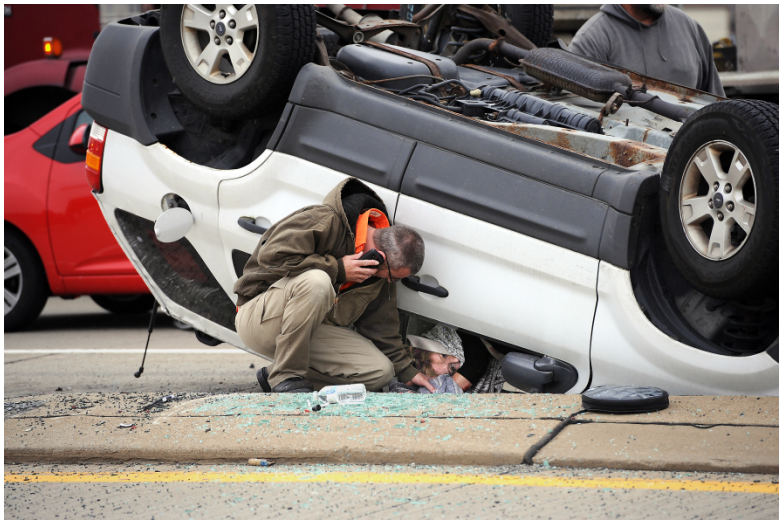
- Emissions
  - GHG
  - Regional pollutants
- Energy use
  - Transportation energy
  - Building energy
- Water
  - Water use
  - Runoff – flooding
  - Runoff – pollution
- Consumption of open space
  - Sensitive habitat
  - Agricultural land

# Transportation Impact Analysis Today: Problems

1. Punishes last-in, inhibits infill, pushes development outward
2. Inhibits transit and active transportation
3. Forces more road construction than we can afford to maintain
4. Generates an array of environmental impacts
5. **Worsens public health and safety**

[Forthcoming National Center for Sustainable Transportation literature review]



# Transportation Impact Analysis Today: Problems

**Auto-mobility remains of fundamental importance to transportation in California for the foreseeable future.**

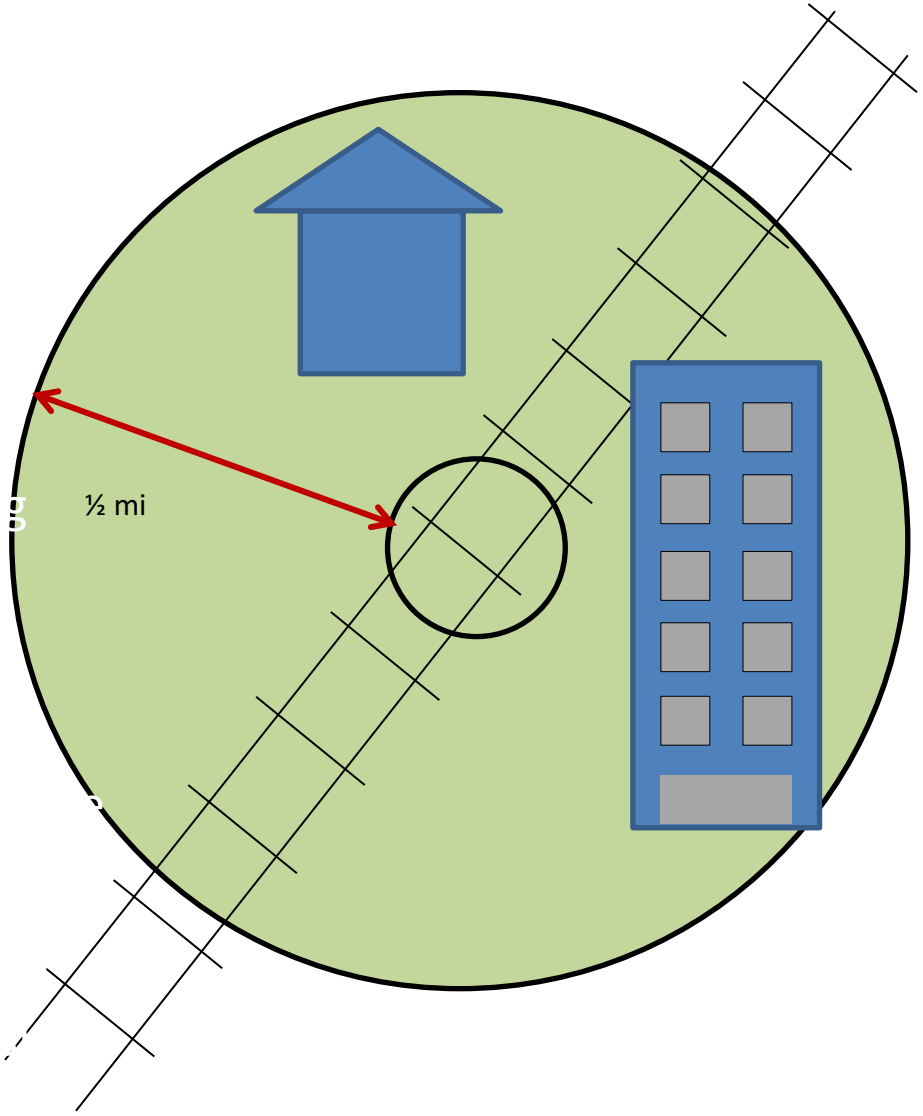
**Our current approach slows development, harms the economy, renders other modes unviable, harms health, harms the environment, is unaffordable…and fails to deliver auto mobility.**

New Metric:

Transportation impact = **Vehicle Miles Traveled (VMT)**

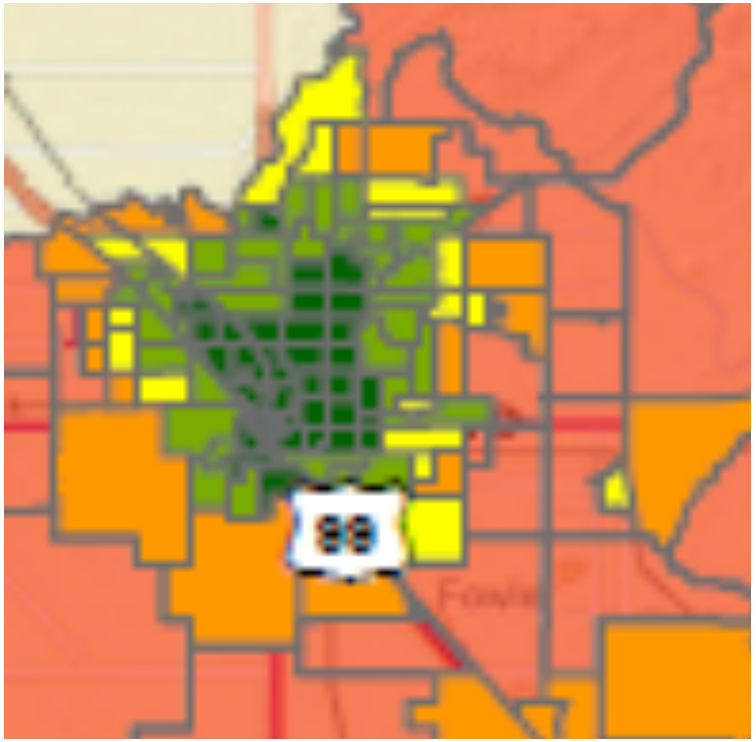
# Benefits of VMT as a Measures of Transportation Impact

1. **Streamline TOD**



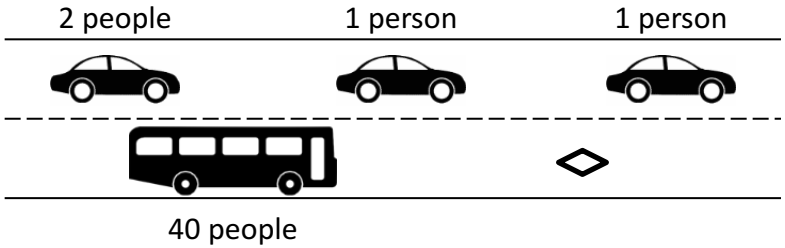
# Benefits of VMT as a Measures of Transportation Impact

1. Streamline TOD
2. **Streamline infill**



# Benefits of VMT as a Measures of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. **Streamline transit projects**




# Benefits of VMT as a Measures of Transportation Impact

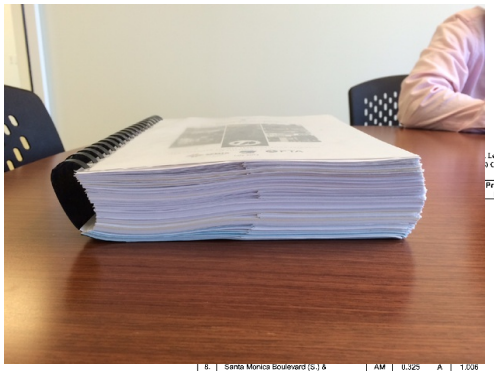
1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. **Streamline active transportation projects**

# Benefits of VMT as a Measures of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. Streamline active transportation projects
5. **Streamline locally-serving retail**

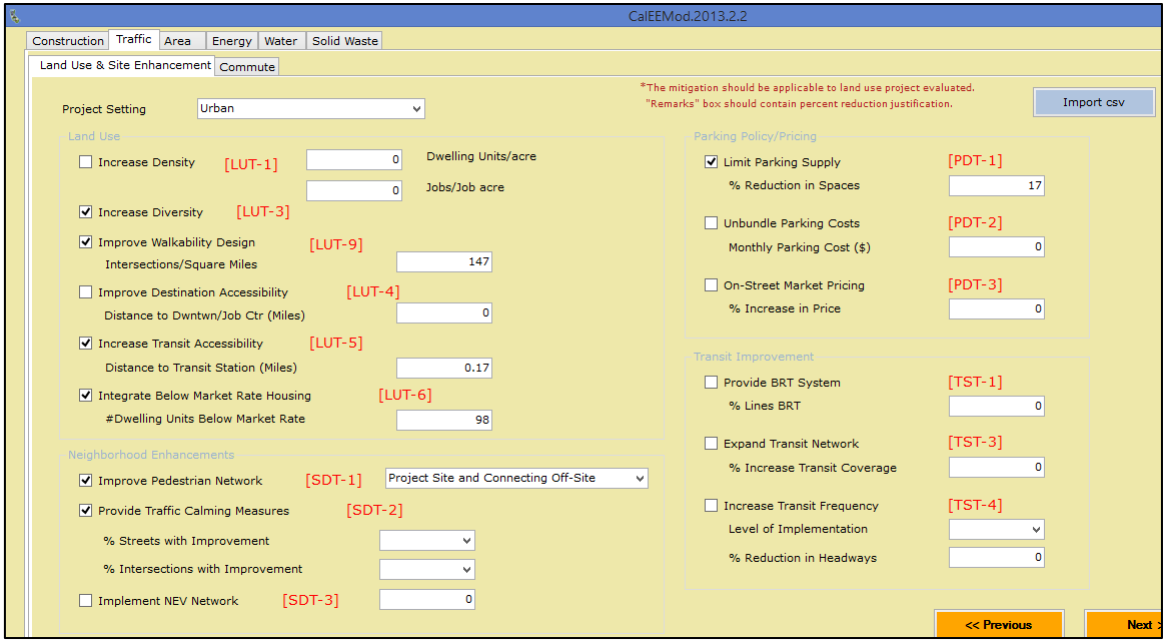

# Benefits of VMT as a Measures of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. Streamline active transportation projects
5. Streamline locally-serving retail
6. **Streamline modeling for remaining projects**



Level of Service (LOS) Summary
Conditions

| | | | Project LOS | With Project CMA | With Project LOS | With Project Impact | With Project + Mitigation CMA | With Project + Mitigation LOS | With Project + Mitigation Impact |
|---|---|---|---|---|---|---|---|---|---|
| | | | F | 1.037 | F | -0.001 | 1.036 | F | -0.002 |
| | | | F | 1.216 | F | -0.009 | 1.215 | F | -0.010 |
| | | | F | 1.388 | F | 0.003 | 1.385 | F | 0.000 |
| | | | F | 1.251 | F | -0.013 | 1.249 | F | -0.015 |
| | | | F | 1.030 | F | 0.000 | 1.029 | F | -0.001 |
| | | | F | 1.133 | F | -0.007 | 1.133 | F | -0.007 |
| | | | F | 1.080 | F | 0.004 | 1.078 | F | 0.002 |
| | | | F | 1.054 | F | -0.028 | 1.054 | F | -0.028 |
| | | | A | 0.358 | A | 0.000 | 0.358 | A | 0.000 |
| | | | A | 0.465 | A | 0.000 | 0.465 | A | 0.000 |
| | | | F | 1.107 | F | 0.008 | 1.104 | F | 0.005 |
| | | | F | 1.130 | F | -0.009 | 1.128 | F | -0.011 |
| | | | A | 0.464 | A | 0.000 | 0.464 | A | 0.000 |
| | | | A | 0.575 | A | 0.000 | 0.575 | A | 0.000 |
| 8. | Santa Monica Boulevard (S.) & Century Park West | AM | 0.325 | A | 1.008 | F | 1.007 | F | 0.001 | 1.005 | F | -0.001 |
| | | PM | 0.397 | A | 0.984 | E | 0.969 | E | -0.015 | 0.966 | E | -0.018 |
| 9. | Santa Monica Boulevard (N.) & Club View Drive | AM | 0.613 | B | 0.213 | A | 0.213 | A | 0.000 | 0.213 | A | 0.000 |
| | | PM | 0.707 | C | 0.408 | A | 0.408 | A | 0.000 | 0.408 | A | 0.000 |
| 10. | Santa Monica Boulevard (N.) & Avenue Of The Stars | AM | 0.825 | D | 1.191 | F | 1.205 | F | 0.014 * | 1.199 | F | 0.008 |
| | | PM | 0.755 | C | 0.967 | E | 0.956 | E | -0.011 | 0.955 | E | -0.012 |
| 11. | Santa Monica Boulevard (S.) & Avenue Of The Stars | AM | 0.508 | A | NA | | NA | | | NA | | |
| | | PM | 0.544 | A | NA | | NA | | | NA | | |
| 12. | Santa Monica Boulevard (N.) & Century Park East | AM | 0.759 | C | 0.950 | E | 0.955 | E | 0.005 | 0.953 | E | 0.003 |
| | | PM | 0.666 | B | 0.846 | D | 0.805 | D | -0.041 | 0.804 | D | -0.042 |
| 13. | Santa Monica Boulevard (S.) & Century Park East | AM | 0.771 | C | NA | | NA | | | NA | | |
| | | PM | 0.648 | B | NA | | NA | | | NA | | |
| 14. | Santa Monica Boulevard (N.) & Wilshire Boulevard | AM | 1.096 | F | 1.261 | F | 1.263 | F | 0.002 | 1.263 | F | 0.002 |
| | | PM | 1.046 | F | 1.294 | F | 1.288 | F | -0.006 | 1.287 | F | -0.007 |

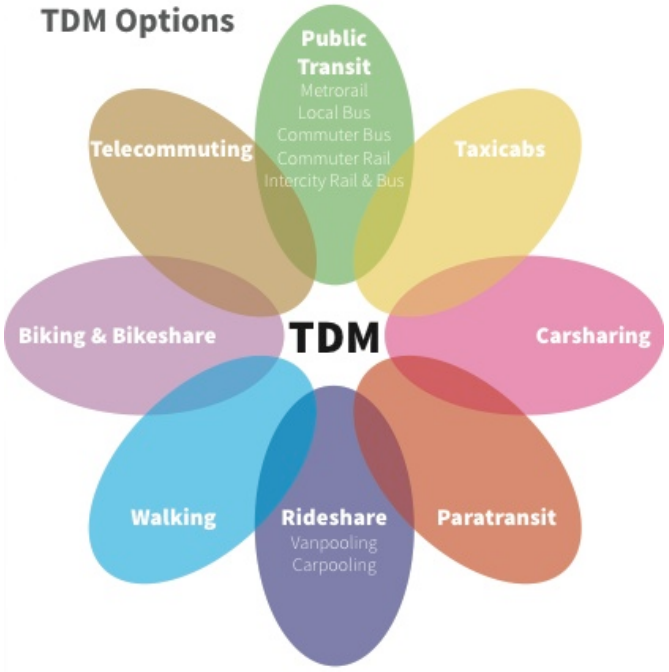



http://www.caleemod.com/

# Benefits of VMT as a Measures of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. Streamline active transportation projects
5. Streamline locally-serving retail
6. Streamline modeling for remaining projects
7. **Attack regional congestion more effectively**

http://nelsonnygaard.com/wp-content/uploads/2014/08/ITE-Journal-Tumlin.pdf

# Benefits of VMT as a Measures of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. Streamline active transportation projects
5. Streamline locally-serving retail
6. Streamline modeling for remaining projects
7. Attack regional congestion more effectively
8. **Reduce future pavement maintenance deficits**

http://lgc.org/wordpress/docs/events/first_thursday_dinners/ftd_2013_Protecting_Transportation-june.pdf

# Benefits of VMT as a Measures of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. Streamline active transportation projects
5. Streamline locally-serving retail
6. Streamline modeling for remaining projects
7. Attack regional congestion more effectively
8. Reduce future pavement maintenance deficits
9. **Massive public health improvements**

**> 23,000 deaths/y attributable to physical inactivity in California**

**Achieving CA's mode share targets:**

- **2,095 fewer deaths annually**
- **$1 billion-$15 billion/y prevented premature deaths and disability**

**Maizlish N.** ***Increasing Walking,*** *Cycling, and Transit: Improving Californians' Health, Saving Costs, and Reducing Greenhouse Gases. Final Technical Report to the California Department of Public Health (CDPH)*. Berkeley, CA; 2016. https://www.cdph.ca.gov/programs/Documents/IncreasingWalkingCyclingTransitFinalReport2016rev2017-01-28.pdf

# Benefits of VMT as a Measures of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. Streamline active transportation projects
5. Streamline locally-serving retail
6. Streamline modeling for remaining projects
7. Attack regional congestion more effectively
8. Reduce future pavement maintenance deficits
9. Massive public health improvements
10. **Reduction in GHG and other emissions**

# Benefits of VMT as a Measures of Transportation Impact

## Picturing a low-VMT future

Image Credits- Urban Advantage, Roma Design Group, City of Dana Point

# Benefits of VMT as a Measures of Transportation Impact

## Picturing a low-VMT future


Image Credits- Urban Advantage, Roma Design Group, City of Dana Point

# Plan Transportation for the Wellbeing of Your City (Not Vice Versa)

Stop using LOS for Transportation Impact Studies

Thinking/Visioning : what kind of city (region, etc.) do we want?

What transportation infrastructure forwards that vision?

Replace Ad-hoc, LOS-based charges with impact fee program based on VMT

# Plan Transportation for the Wellbeing of Your City (Not Vice Versa)

What transportation infrastructure forwards that vision?

Direct measures of access, e.g.

- Sugar Access (Citilabs) tool
- Rails to Trails Low-Stress Bikeways tool

Use LOS as a stopgap metric to inform planning, *not* to assess impacts

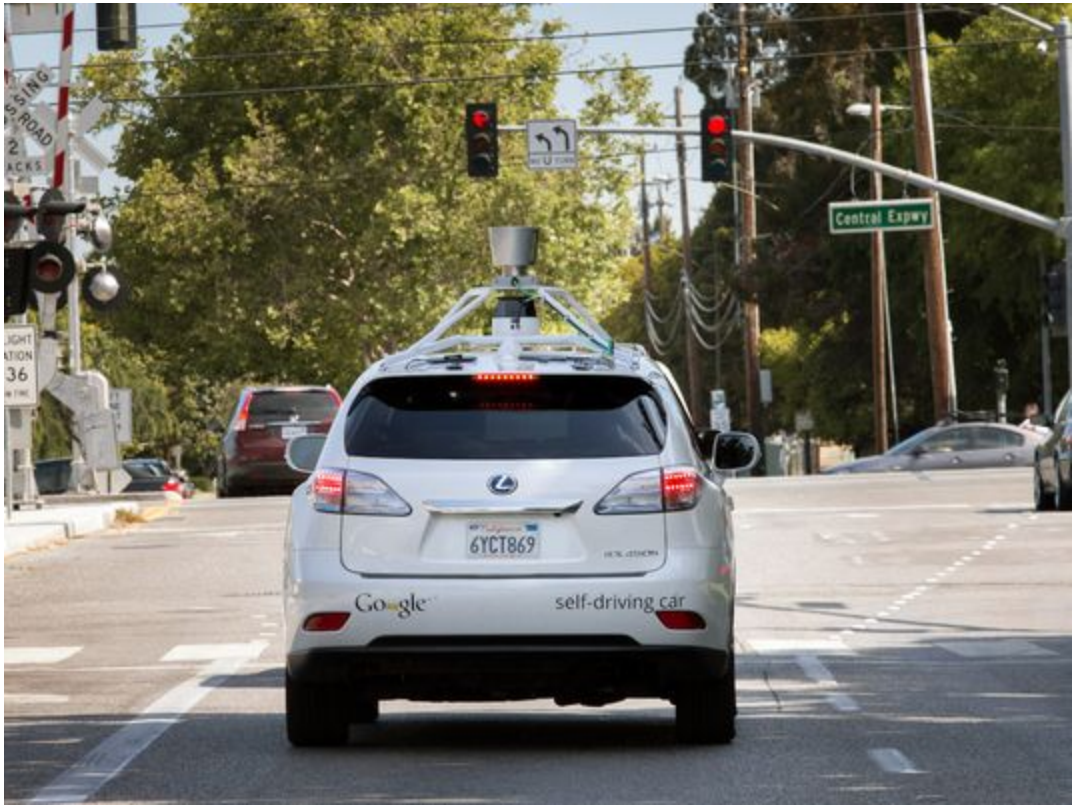
Weigh your jurisdiction's transportation interests alongside livability, safety for bikes and pedestrians, fiscal viability, land consumption, energy/water use, GHG emissions, etc.

# Thanks!

Chris Ganson: chris.ganson@opr.ca.gov

| VMT | GHG | Possible Effect of Driverless Vehicles |
|---|---|---|
| ↑ | ↑ | Easy to go by car |

| VMT | GHG | Possible Effect of Driverless Vehicles |
|---|---|---|
| ↑ | ↑ | Easy to go by car |
| ↑ | ↑ | Vehicles park themselves remotely, do errands, collect family members |



| VMT | GHG | Possible Effect of Driverless Vehicles |
|---|---|---|
| ↑ | ↑ | Easy to go by car |
| ↑ | ↑ | Vehicles park themselves remotely, do errands, collect family members |
| ↑ | ↑ | Replacement of line-haul transit |

→

| VMT | GHG | Possible Effect of Driverless Vehicles |
|---|---|---|
| ↑ | ↑ | Easy to go by car |
| ↑ | ↑ | Vehicles park themselves remotely, do errands, collect family members |
| ↑ | ↑ | Replacement of line-haul transit |
| ↑ | ↑ | Replacement of bike and walk trips |

| VMT | GHG | Possible Effect of Driverless Vehicles |
|---|---|---|
| ↑ | ↑ | Easy to go by car |
| ↑ | ↑ | Vehicles park themselves remotely, do errands, collect family members |
| ↑ | ↑ | Replacement of line-haul transit |
| ↑ | ↑ | Replacement of bike and walk trips |
| ~ | ↑ or ↓ | Right-sizing of vehicles |

**or**

**?**

# What do we need?  Synthesis of current thinking

- **Shared use**
- Shared ride
- Zero emissions
- Right-priced
- Transit-supportive
- Equitable
- Well-behaved

# What do we need?  Synthesis of current thinking

- Shared use
- **Shared ride**
- Zero emissions
- Right-priced
- Transit-supportive
- Equitable
- Well-behaved

# What do we need? Synthesis of current thinking

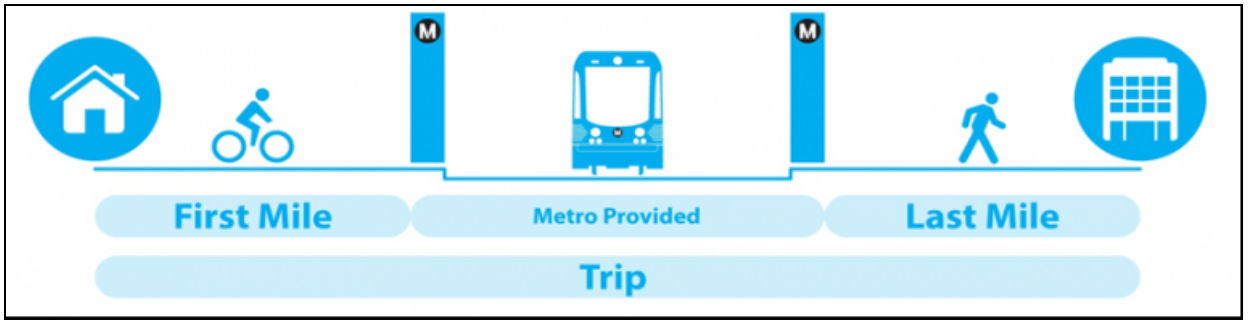
- Shared use
- Shared ride
- **Zero emissions**
- Right-priced
- Transit-supportive
- Equitable
- Well-behaved

# What do we need?  Synthesis of current thinking

- Shared use
- Shared ride
- Zero emissions
- **Right-priced**
- Transit-supportive
- Equitable
- Well-behaved

# What do we need? Synthesis of current thinking

- Shared use
- Shared ride
- Zero emissions
- Right-priced
- **Transit-supportive**
- Equitable
- Well-behaved



# What do we need?  Synthesis of current thinking

- Shared use
- Shared ride
- Zero emissions
- Right-priced
- Transit-supportive
- **Equitable**
- Well-behaved

# What do we need?  Synthesis of current thinking

- Shared use
- Shared ride
- Zero emissions
- Right-priced
- Transit-supportive
- Equitable
- **Well-behaved**

# Thanks!!

Chris Ganson: chris.ganson@opr.ca.gov