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# Get Connected: How to Measure Connectivity in your Community

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# Outline

- What is connectivity?
  - Benefits
  - How to measure
  - Real-world hurdles to implementation
  - Interactive
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# What is Connectivity?

- Compact street network
  - Multiple ways to get to one place
  - Few dead ends
  - Direct routing
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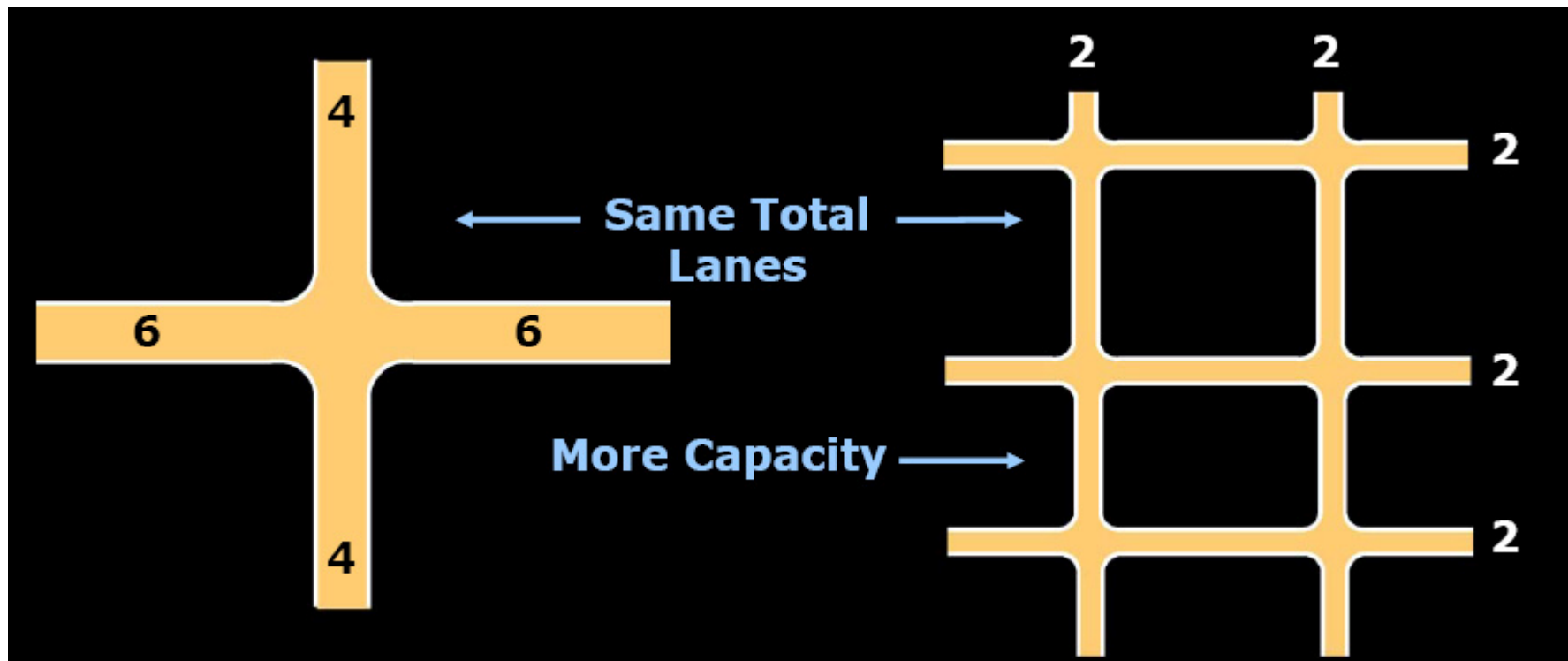
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# Benefits

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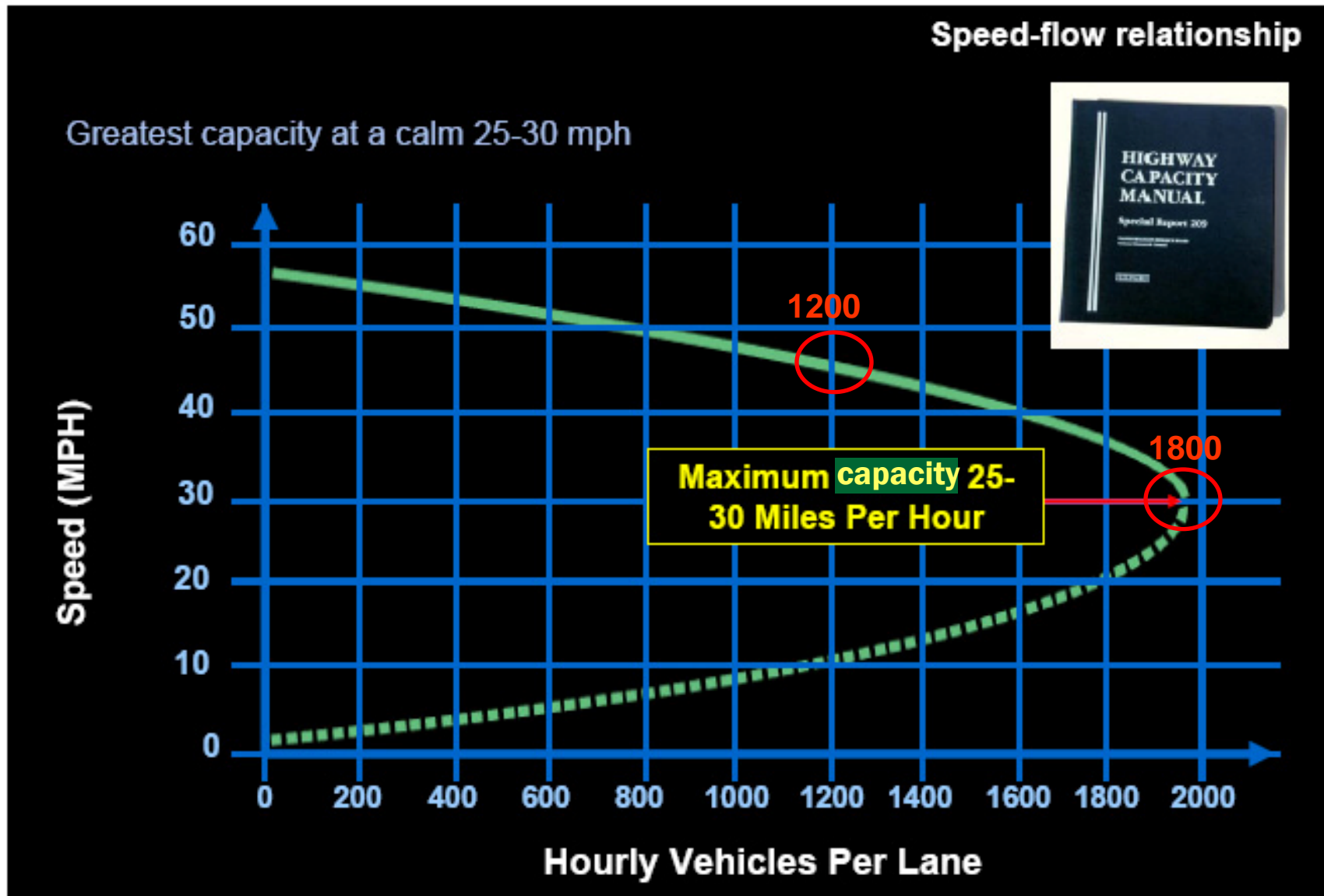
# Street Capacity

A network of small streets has greater capacity than a disconnected hierarchy of large streets



Credit: Tim Jackson

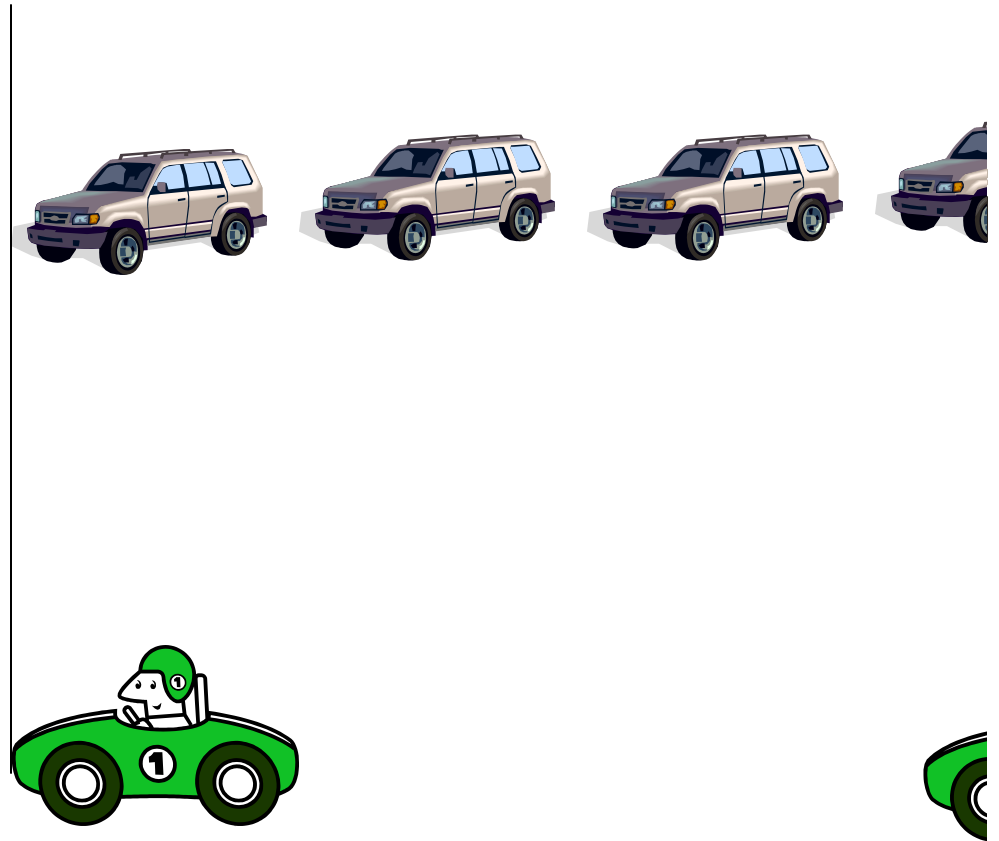
# Capacity 101



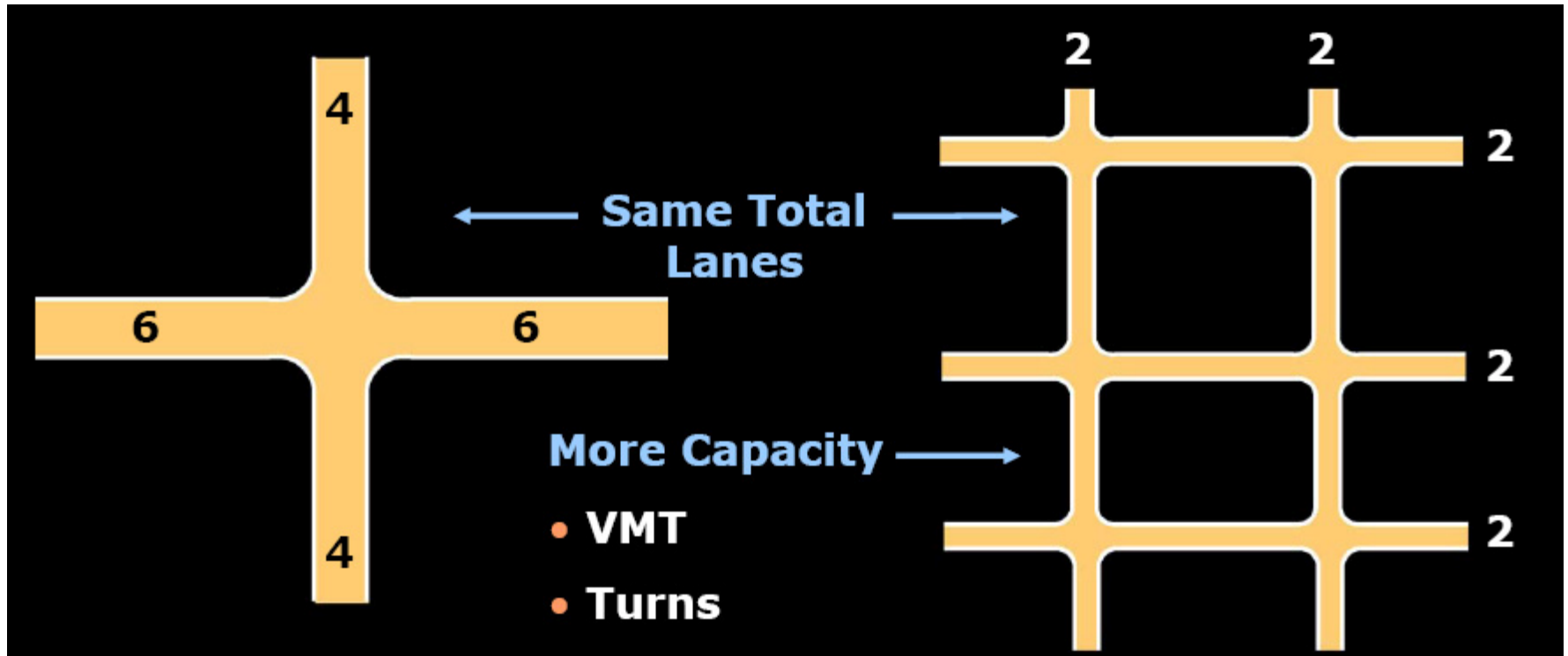
Credit: Tim Jackson



# Capacity 101



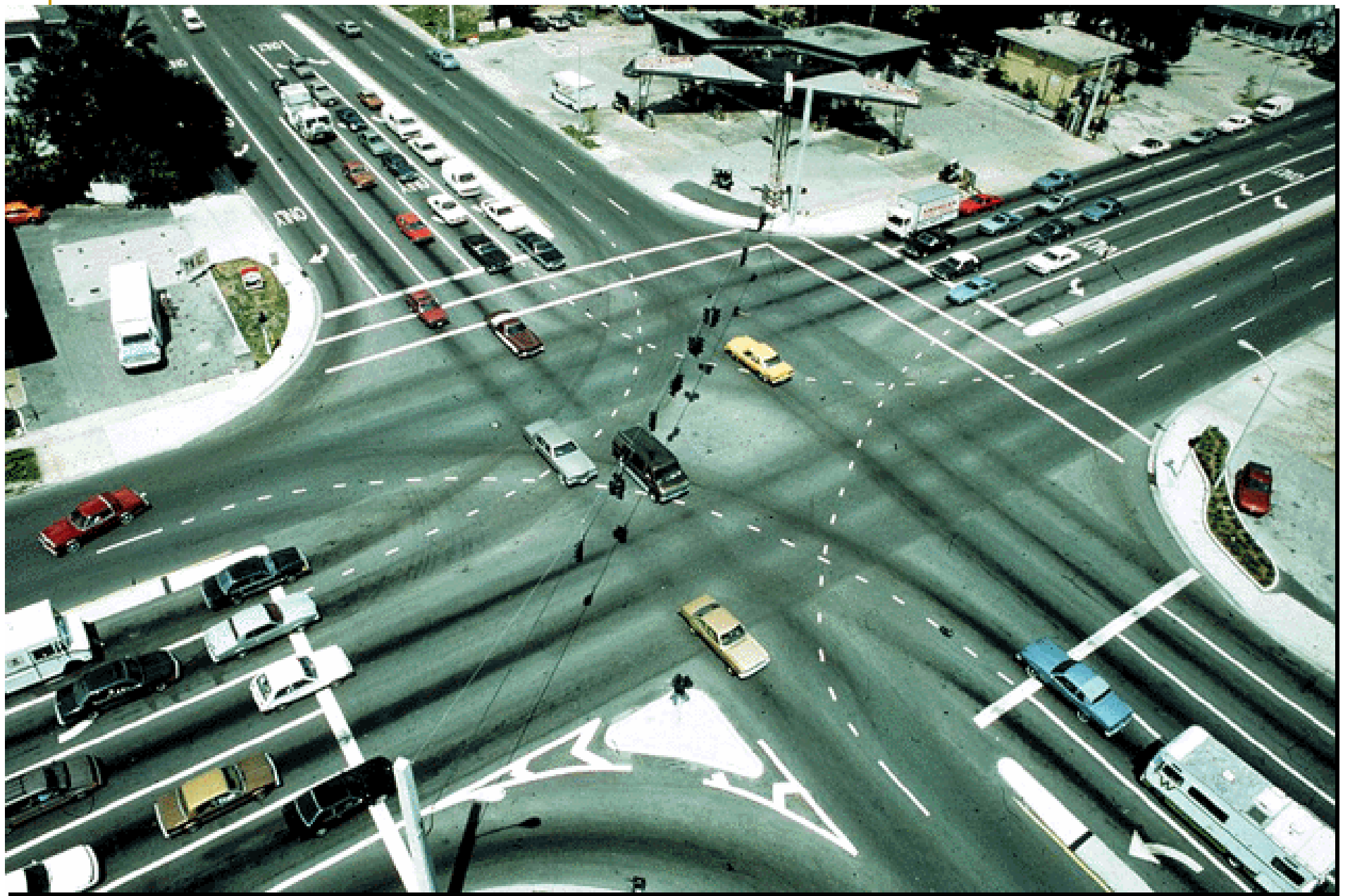
# Street Capacity



Credit: Tim Jackson

4-lane arterial @ 45mph = 2400 vph

Two 2-lane streets @ 30mph = 3600 vph



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## “Street Sewers”

- All trips include travel on the arterials
  - Through traffic is mixed with local traffic
    - Traffic congestion is exacerbated in peak periods
  - No alternatives when
    1. Accidents
    2. Construction
    3. Other closures (weather related, community events, etc)
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# Modal Bias

- System dependent on arterials is auto-centric
  - Arterials have **less** capacity, but they have **greater** speeds
  - Speed differential between motor vehicles and bikes greater
    1. Less pleasant
    2. Higher chance of collision
    3. Higher level of injury
  - Allows for land uses to be more spread out
    1. Discourages transit and bike/ pedestrians
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# Design Improvements

- Allows for skinny streets
- Traffic Calming
- Allows for alleys

## Benefits of alleys

1. No garage faces
  2. Continuous pedestrian front (no curb cuts)
  3. Utilities (trash collection, water mains, etc)
  4. EMS access
  5. Informal social space
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# Emergency Access/Evacuation

Single- or limited-point access creates problems



- Response time
- Evacuation time
- Route impediments
- Safety

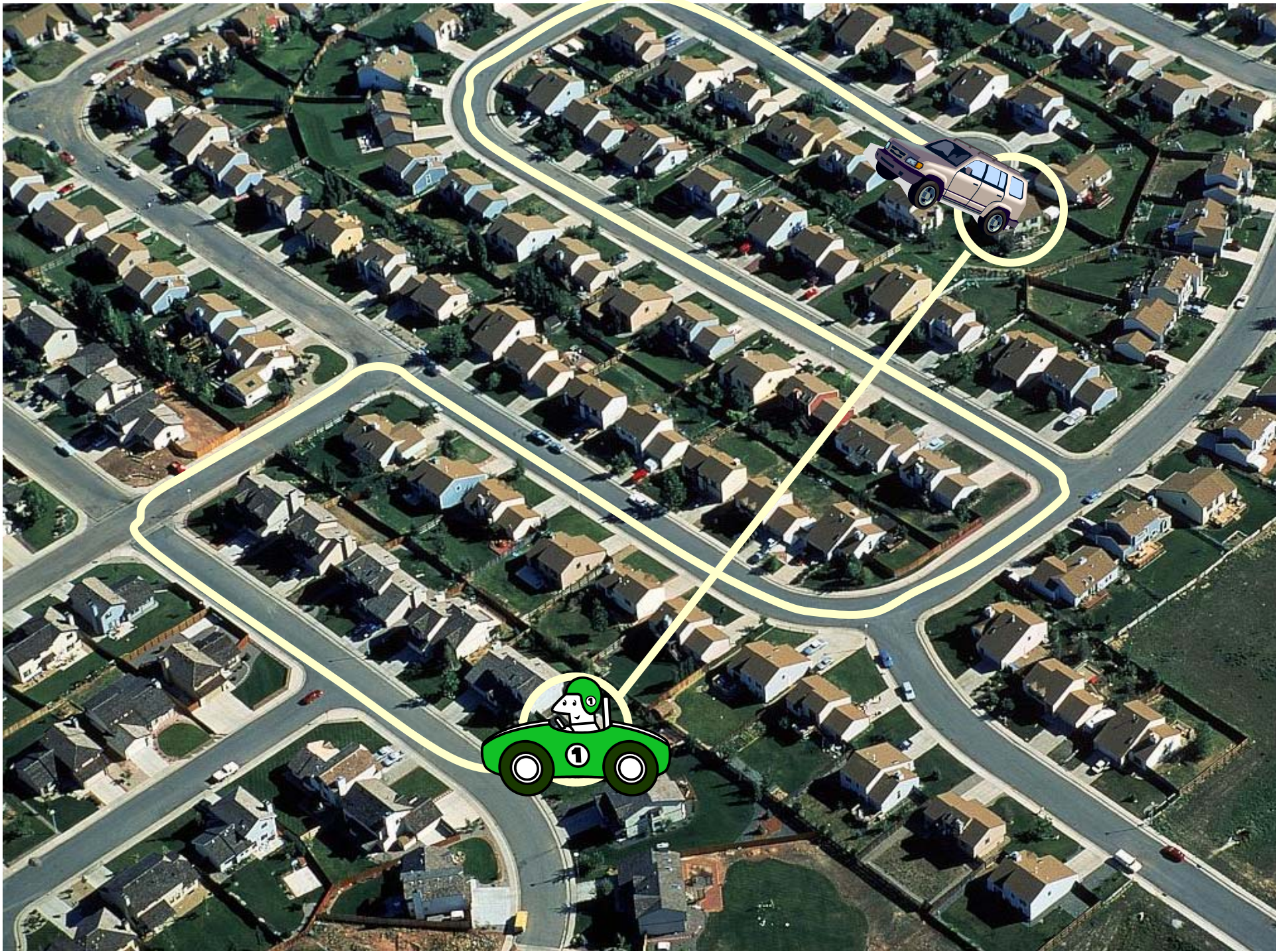


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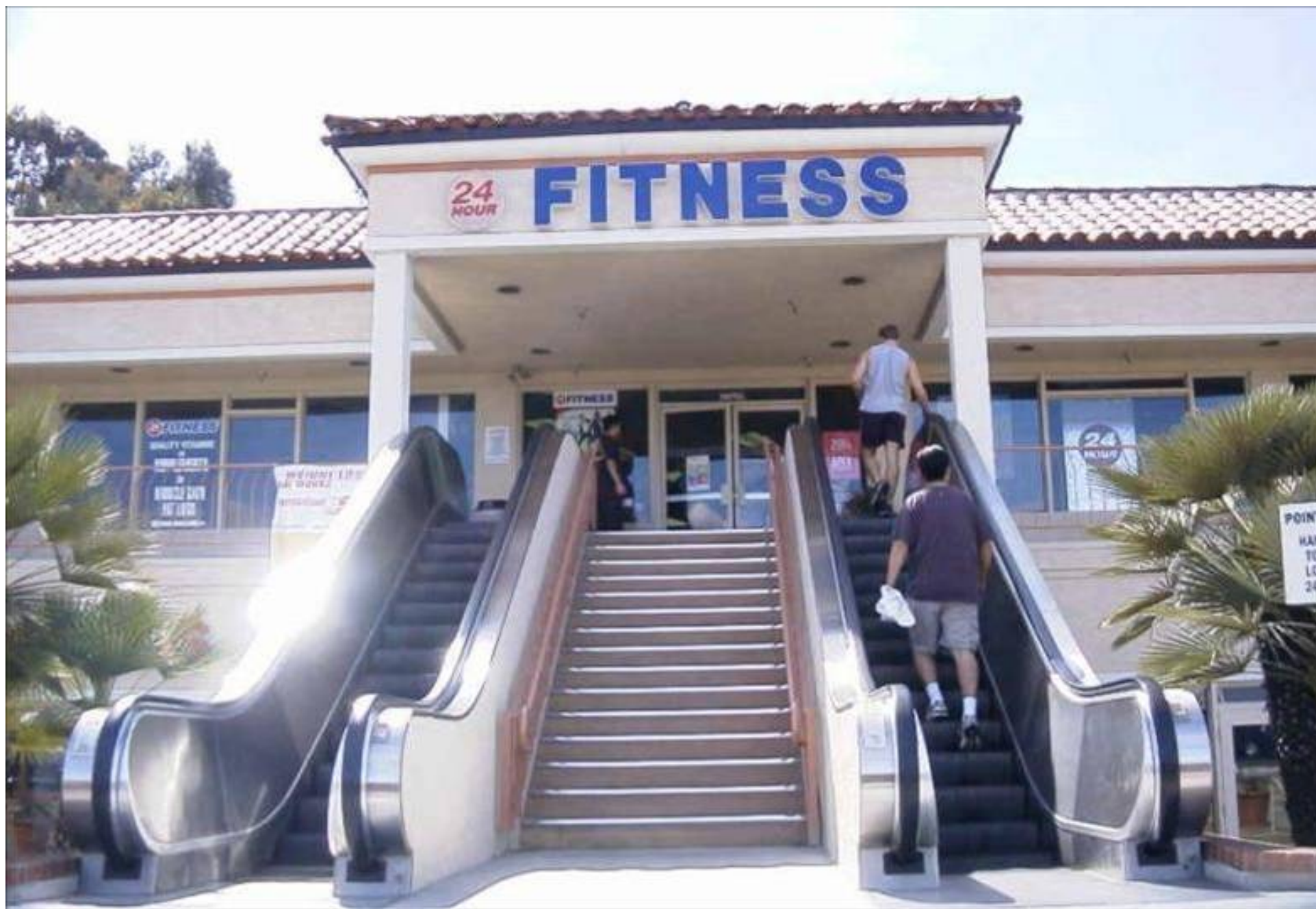
# Shorter Trips

- Increased connectivity creates shorter trips
  - Encourages non-motorized modes
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# Measuring Connectivity

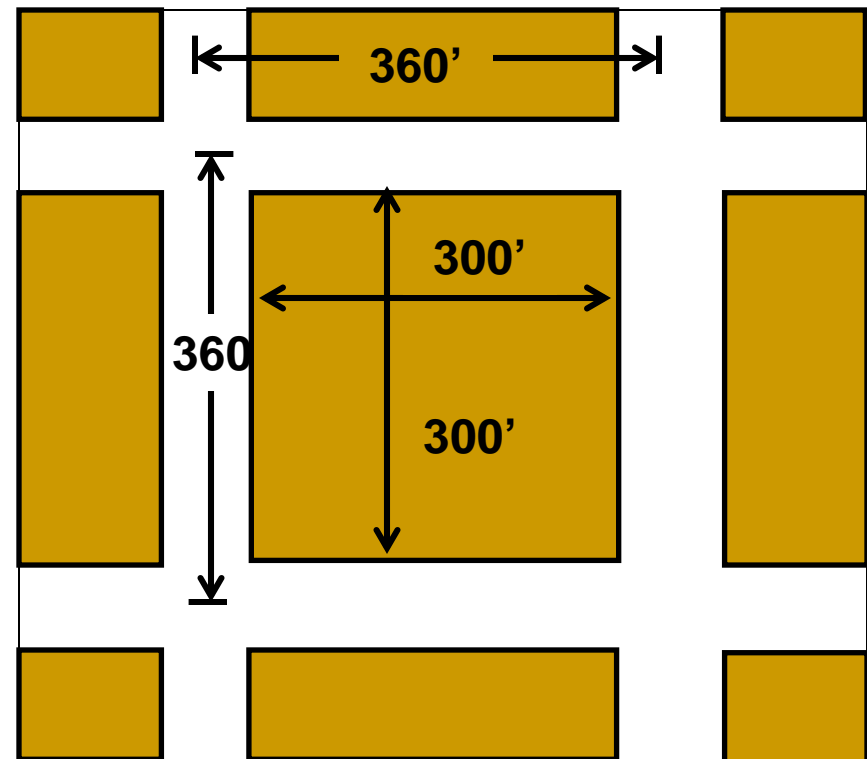
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# Block length and perimeter

- Set maximum block lengths
- Set maximum block perimeters

Block length: 360'

Block perimeter: 1200'



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## Maximum intersection length & maximum cul-de-sac length

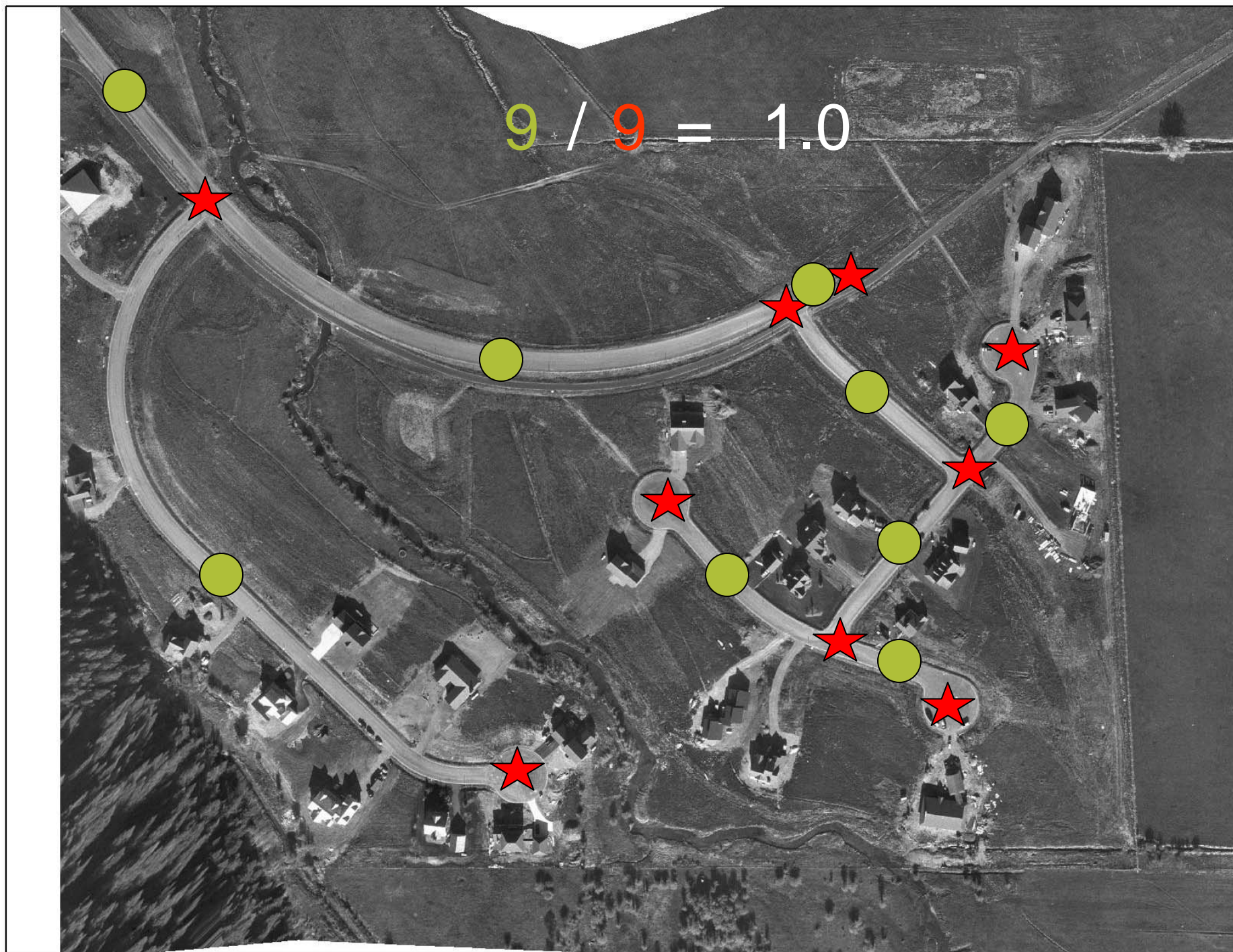
- Max intersection spacing:  
530 feet (Portland) – 1,500 feet (Cary, NC)  
(Fort Collins 660 feet to 1,320 feet)
  - Max cul-de-sac length:  
200 feet – 600 feet  
(Fort Collins and Boulder 660 feet)
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# Links/ Nodes

- Nodes are intersections and dead ends/ cul-de-sacs
- Links are the segments between nodes
- Divide links by nodes



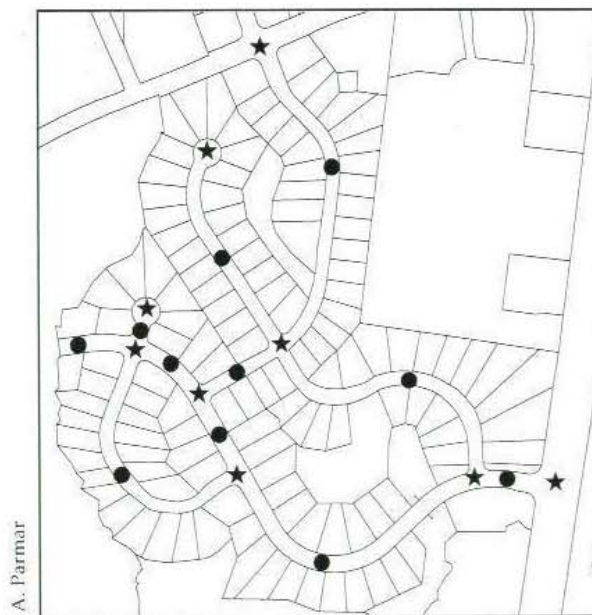




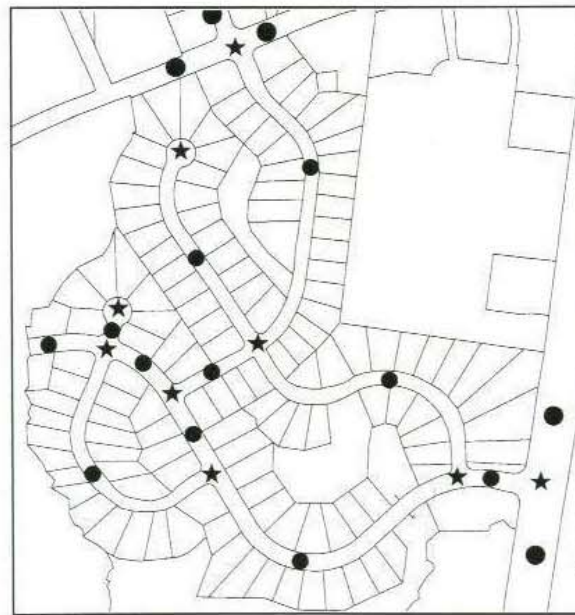


# Links/ Nodes

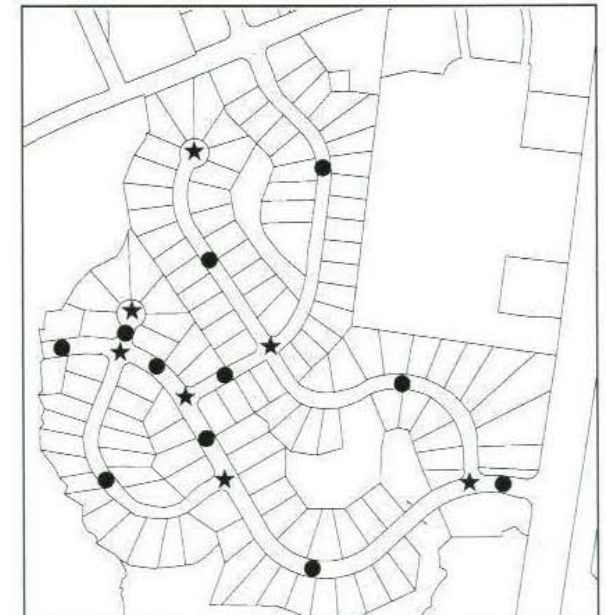
- Need clarity on method of calculation



● Links – 11  
★ Nodes – 9  
Connectivity Index =  $11/9 = 1.22$



● Links – 16  
★ Nodes – 9  
Connectivity Index =  $16/9 = 1.78$

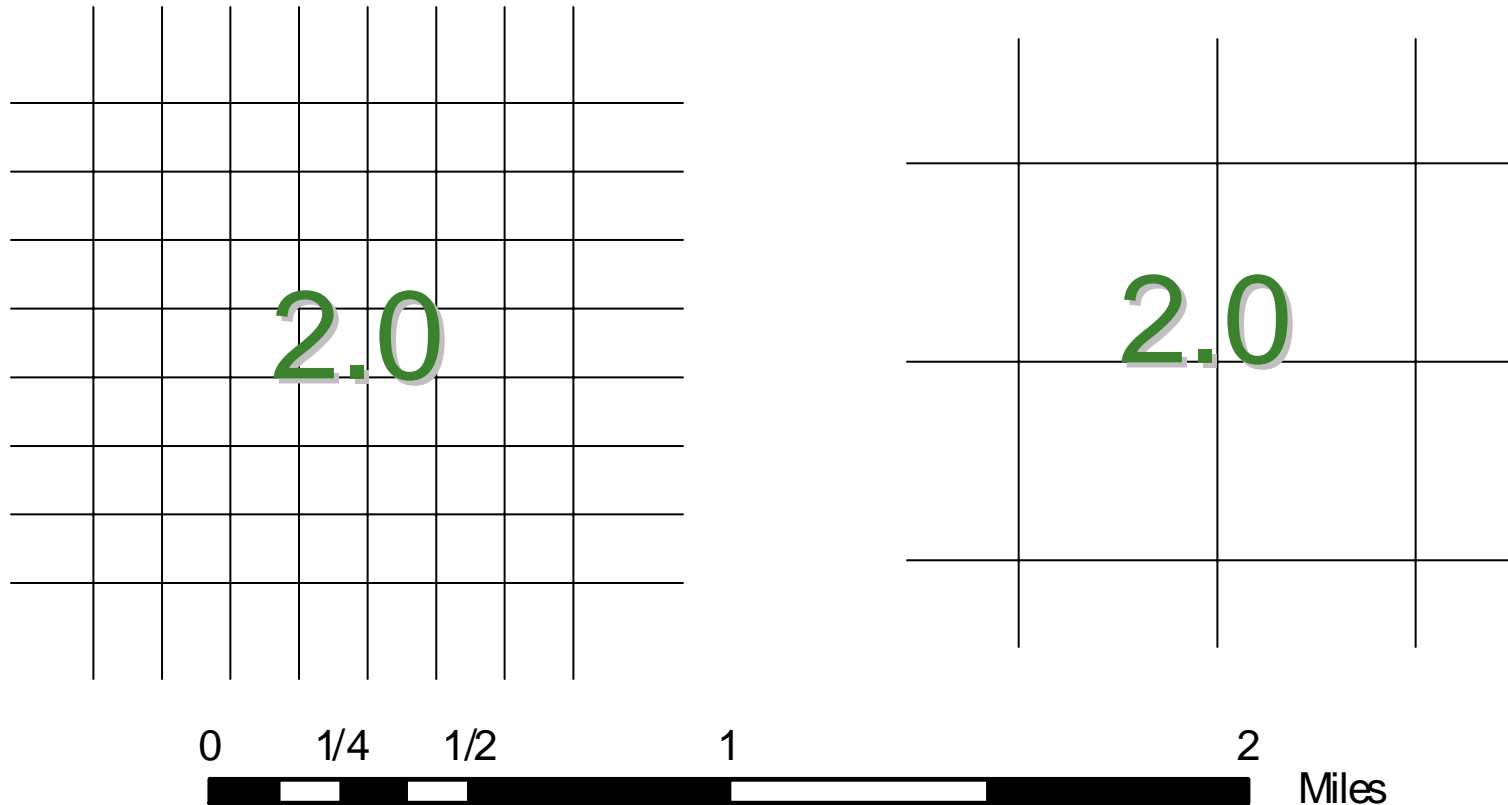


● Links – 11  
★ Nodes – 7  
Connectivity Index =  $11/7 = 1.57$

Source: Handy, et al. *Planning for Connectivity*. PAS Report Number 515

# Intersections/ Square Mile

- Links/ nodes does not measure scale



- Minimum 200 intersections/ square mile

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# Route Directness Index

Straight line distance (as the crow flies)

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Street network

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# Real-world hurdles

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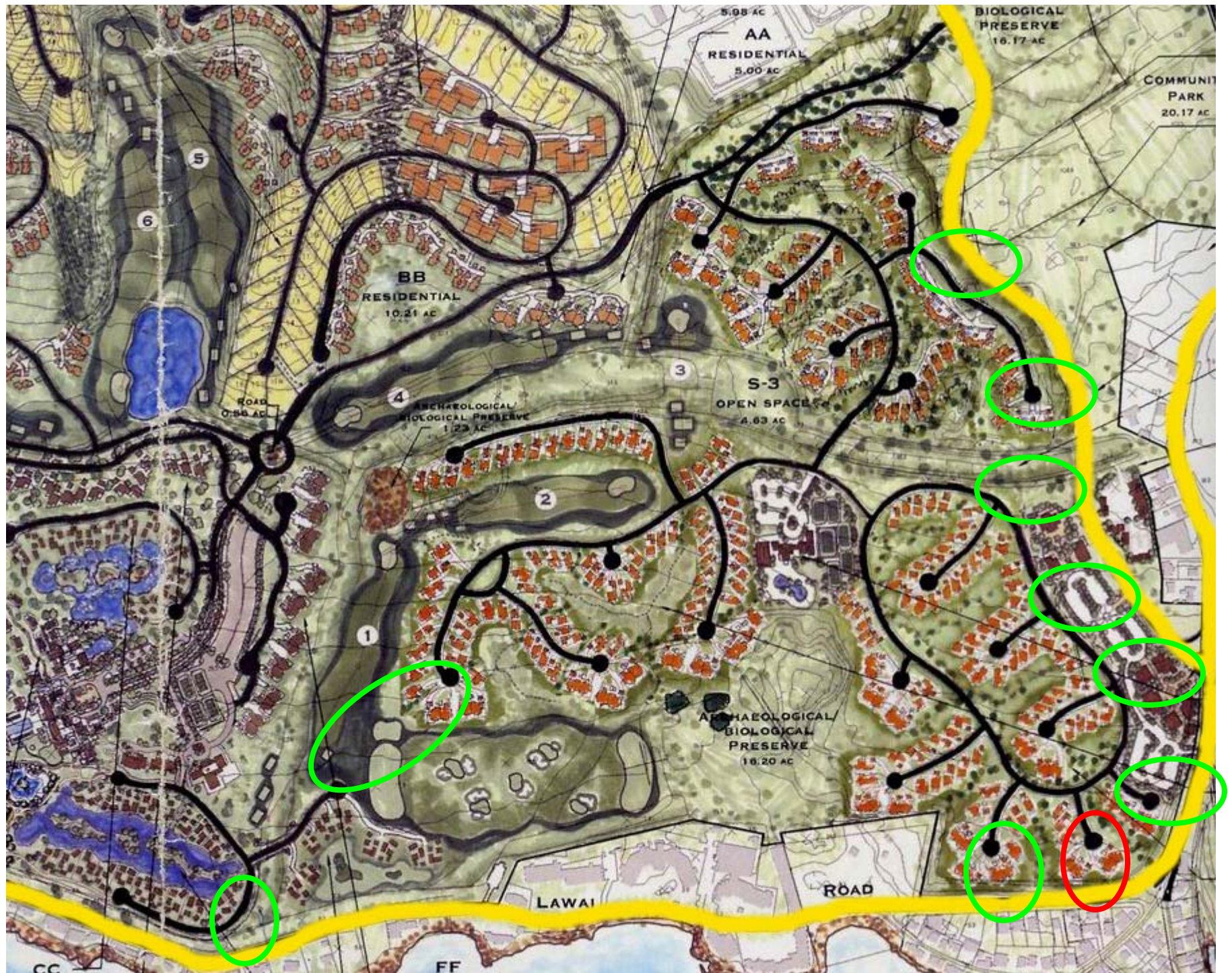
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## Problems with incremental improvements in connectivity

- Unfair burden on connectivity pioneer
  - Traffic will increase on this street









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## Problems with incremental improvements in connectivity

- Unfair burden on connectivity pioneer
    - Traffic will increase on this street
  - Politically difficult
    - Meeting attendees
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# Connection Access

- Local governments (developers) often have to receive permission to connect to state roads
  - Adjacent developments not interested in connecting
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# Legend

- Rail Boulevard
- Parkway
- Avenue
- Connector
- Drive
- Street
- Bicycle Path
-  Interstate
- - - Existing streets
- - - Planned Roads
-  Rail Transit
-  Rail Stations
- Stream/Gulch
-  N-S ROW
- East Kapolei
- UHWO
- DHHL
- City parks

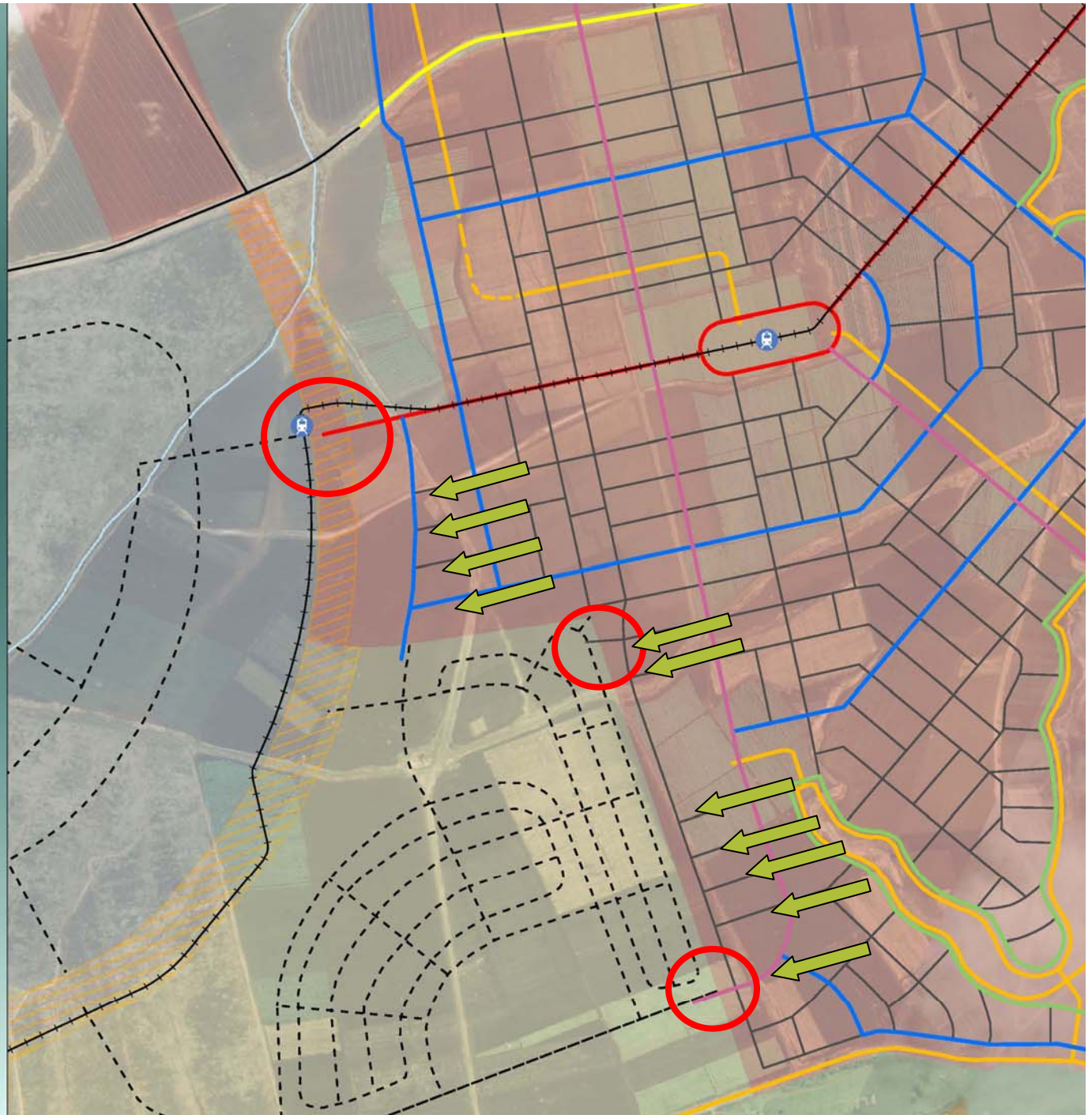


0 1/8 1/4 1/2 Miles

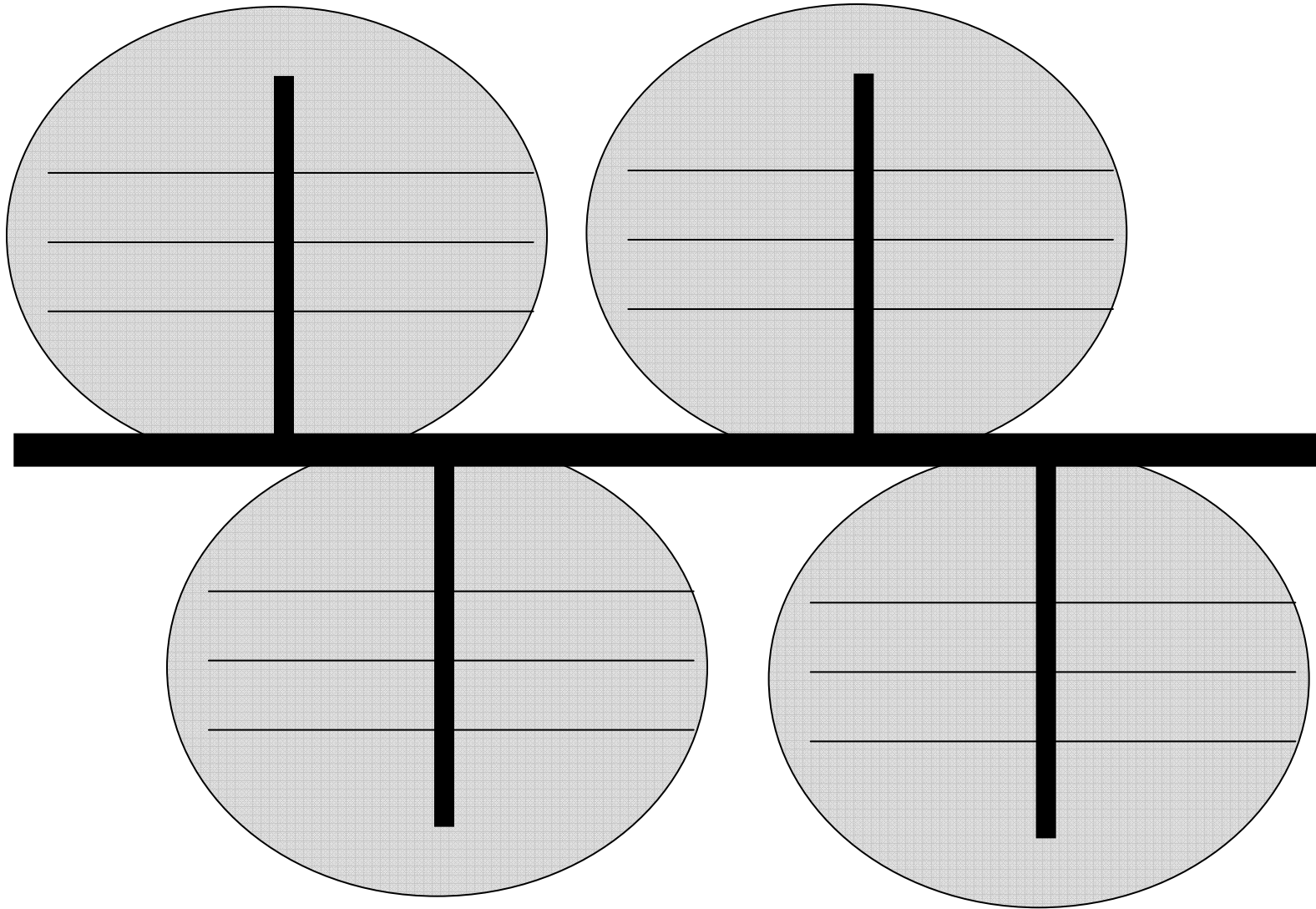
Bike facility data taken from  
Bike Plan Hawaii 2003



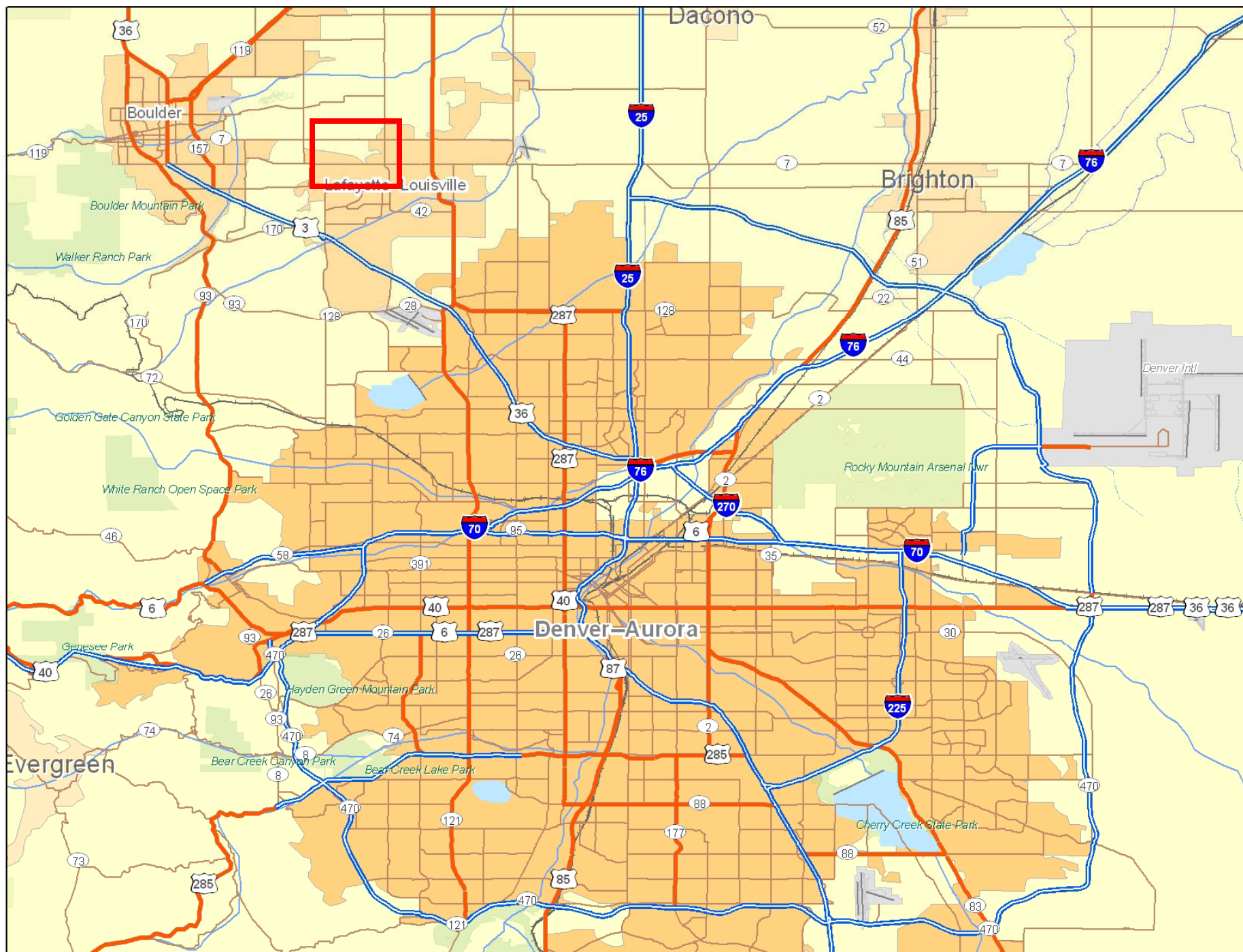
November 2005

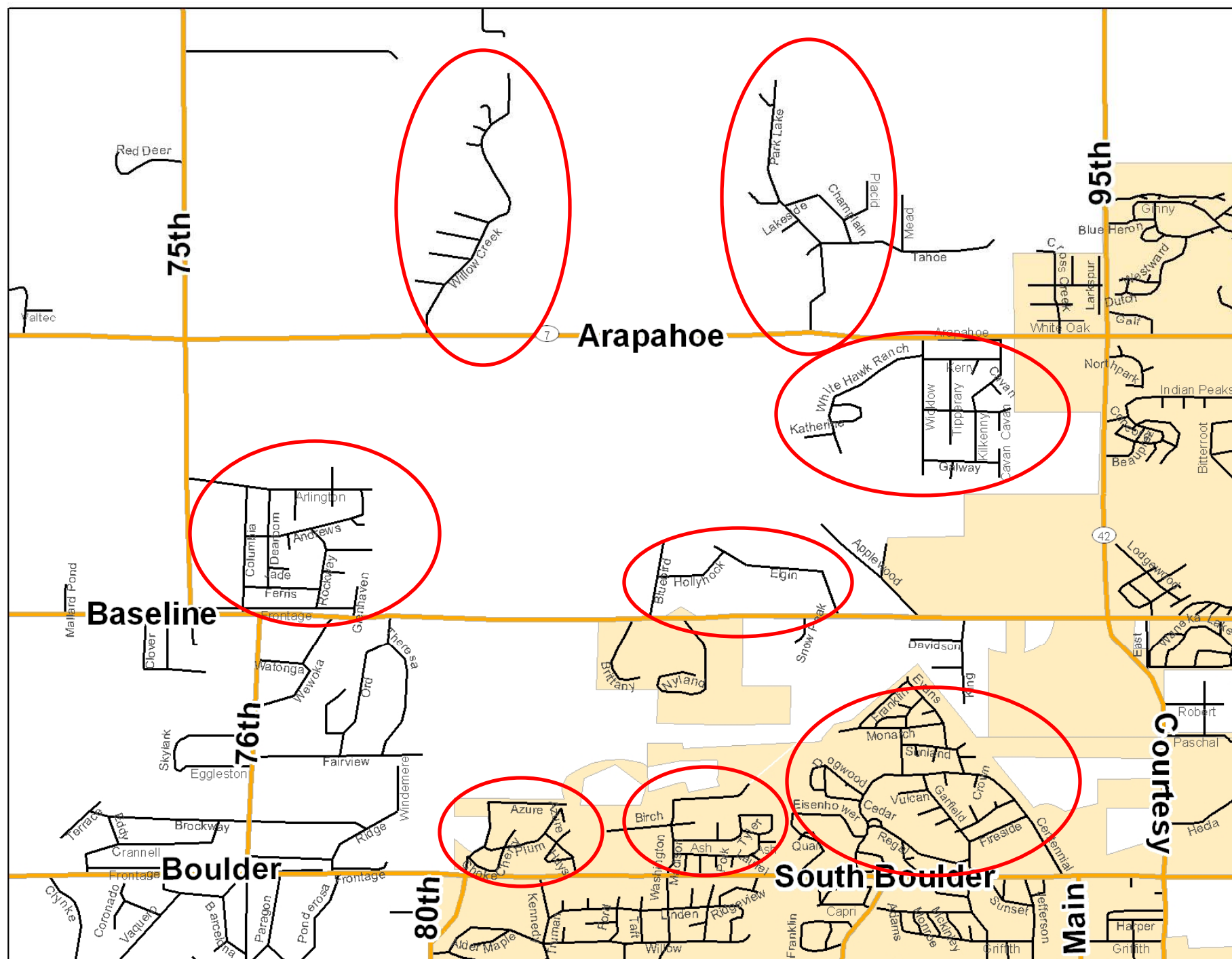


# Pod Development









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# Private Sector Perspective (Developer)

- Too costly
    - Often means loss of most expensive cul-de-sac lots
    - Is increased connectivity site-specific or of regional benefit? Who pays?
  - Fears of cut-through traffic from other developments
  - Destroys “exclusivity” of project – marketing, lot values
  - Unfair, unnecessary delays in project review/approval process
    - “Plans can’t be changed”
    - “I’ll never get my building permits”
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# Resident Perspective

- Fears of cut-through traffic from other developments
    - ❑ Safety, noise, quality of life
    - ❑ Neighborhood character and preservation
    - ❑ Property values
  - Increased mobility may be “unwanted benefit”
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## Public Sector Perspective (Planner)

- Difficult role of balancing community/ individual benefits
  - How to fairly compare costs/benefits with other strategies?
  - Difficult to apply to existing neighborhoods (retrofit)
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# Interactive Exercise

- Does your community have connectivity standards?
  - If not, do you think this would a good idea?
  - Personal experiences with implementation?
  - 20 minute exercise, 10 minute discussion
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